Public Comment No. 1650-NFPA 70-2024 [Global Input]

This Global Public Comment is for CMP-10 to review the use of the terms "overcurrent", "overcurrent protective devices" and "overcurrent protection".

Additional Proposed Changes

File Name	Description	Approved
CMP-10_OCPD_TG-4_CMP-10.pdf	CMP-10_OCPD_TG-4 CMP-10	
All_CMP_Comments_Files_from_CMP-10_TG-4.pdf	All CMP Comments Files from CMP-10 TG-4	

Statement of Problem and Substantiation for Public Comment

This Public Comment is submitted on behalf of a Task Group formed under the purview of Code Making Panel 10 consisting of Randy Dollar, Thomas Domitrovich, Jason Doty, Diane Lynch, Alan Manche, Nathan Philips, David Williams, and Danish Zia. This Public Comment, along with other Public Comments, was developed with the goal of improving usability and accuracy on requirements associated with overcurrent protective devices.

The Task Group reviewed all instances of the term "overcurrent", "overcurrent protective devices" and "overcurrent protection" and provided recommended changes to align proposed and current defined terms.

For consistency, the task group chose to use the full defined term "overcurrent protective device" in the title of all sections or subdivisions and the acronym "OCPD" or "OCPDs" when used in the body of each code section.

The term overcurrent protection applies to the application of an overcurrent protective device OCPD, to protect conductors and equipment.

Two documents are attached: One for your specific code panel and the other is a comprehensive document illustrating all of the code-wide comments made by this task group.

The current term "Overcurrent Protective Device, Branch-Circuit" is being deleted and the new defined term "Overcurrent Protective Device (OCPD)" will be used instead.

The following are the proposed terms being submitted to CMP-10.

PC 1639 Overcurrent Protection.
Automatic interruption of an overcurrent

PC 1636 Overcurrent Protective Device (OCPD).
A device capable of providing protection over the full range of overcurrent between its rated current and its interrupting rating. (CMP-10)

Informational Note 1: Prior editions of NFPA 70 included the defined term "branch circuit overcurrent protective device" for overcurrent protective devices suitable for providing protection for service, feeder and branch circuits. This term has been revised to a generalized term of "overcurrent protective device" (OCPD). The specific requirements using this term may include modifiers (such as branch OCPD, feeder OCPD, service OCPD) to specify location or application of the OCPD, or to specify variations (such as supplementary OCPD).

Informational Note 2: See 240.7 for a list of overcurrent protective devices suitable for providing protection for service, feeder, branch circuits and equipment.

Related Item

- Global PI 4050
- PC 1636
- PC 1639

Submitter Information Verification

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Submittal Date: Sun Aug 25 21:48:57 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8365-NFPA 70-2024
Statement: This global second revision provides clarity and accuracy of the term overcurrent protective devices and overcurrent protection in the articles under the purview of CMP-10.

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-10			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
10	Article 100		
	Circuit Breaker	Overcurrent	Fine as is
	Coordination, Selective. (Selective Coordination)	Overcurrent condition	Fine as is
	Coordination, Selective. (Selective Coordination)	overcurrent protective devices	overcurrent protective devices (OCPDs)
	Coordination, Selective. (Selective Coordination)	overcurrents	Fine as is
	Coordination, Selective. (Selective Coordination)	overcurrent protective device	overcurrent protective device (OCPD)
	Current Limiting (as applied to overcurrent protection devices)	overcurrent protection devices	overcurrent protective devices (OCPDs)
	Feeder	final branch-circuit overcurrent protective device	overcurrent protective device (OCPD)
	Fuse	overcurrent protective device	overcurrent protective device (OCPD)
	Fuse	overcurrent	Fine as is
	Fuse, Electronically Actuated	overcurrent protective device	overcurrent protective device (OCPD)
	Fuse, Electronically Actuated	overcurrent	Fine as is
	Overcurrent	Overcurrent protection	Fine as is
	Overcurrent Protective Device, Branch-Circuit	Revise with the term Overcurrent Protective Device. (OCPD)	
	Overcurrent **Protective** Device, Supplementary (need to Revise term with acronym)	overcurrent protective device	overcurrent protective device (OCPD)
	Panelboard	overcurrent devices	overcurrent protective devices (OCPDs)
	Surge-Protective Device (SPD). (X2)	overcurrent device. (X2)	overcurrent protective device (OCPD)
	Switchboard	overcurrent	overcurrent protective devices (OCPDs)
	Tap Conductor	Overcurrent protection	Fine as is
10	Article 215		
	215.1	Overcurrent protection	Fine as is
	215.4(A)(1)Ex.1	overcurrent devices protecting the feeders	feeder OCPD
	215.4(A)(1)Ex.3	overcurrent device	OCPD
	215.5 Title	Overcurrent protection	Fine as is
	215.5	Feeders shall be protected against overcurrent	Feeders shall be provided with overcurrent protection in accordance with Article 240, Parts I
	215.5	overcurrent device	OCPD
	215.5Ex	overcurrent device protecting the feeders	feeder OCPDs
	215.5Ex	overcurrent device	OCPD

	215.18(B)	branch circuit overcurrent devices	OCPDs
10	**Article 225**		
	225.40. Title	Overcurrent protective devices	Fine as is
	225.40.	feeder overcurrent device (x2)	feeder OCPD
	225.40.	branch circuit overcurrent devices	Branch circuit OCPDs
	225.42(B)	branch circuit overcurrent devices	OCPDs
10	**Article 230**		
	230.7 Ex.2	Overcurrent protection	Fine as is
	230.42(A)(1)	overcurrent device (X3)	OCPD
	230.82(6)	Overcurrent protection	Fine as is
	230.82(7)	Overcurrent protection	Fine as is
	230.82(8)	Overcurrent protection	Fine as is
	230.82(9)	Overcurrent protection	Fine as is
	230.82(10)	Overcurrent protection	Fine as is
	230 Part VII	Overcurrent protection	Fine as is
	230.90(A)	overcurrent device	OCPD
	230.90(A)Ex.3	overcurrent device	OCPD
	230.90(B)	overcurrent device	OCPD
	230.91	overcurrent device (X2)	OCPD
	230.92	overcurrent device (X4)	OCPDs and OCPD
	230.93	overcurrent device	OCPD
	230.94	overcurrent device (X3)	OCPD
	230.94	Overcurrent protection (X2)	Fine as is
	230.95(A)	overcurrent device	OCPD
	230.95(B)	overcurrent device	OCPD
10	**Article 240**		
	240	Overcurrent Protection	Fine as is
	240.1 (X3)	Overcurrent protection	Fine as is
	240.2	branch-circuit Overcurrent protective devices	~~branch circuit~~ Overcurrent protective devices
	240.4. Title	Protection of Conductors	Overcurrent Protection of Conductors
	240.4	Protected against overcurrent	shall be provided with overcurrent protection in accordance with
	240.4(B). Title	Overcurrent devices	Overcurrent protective Devices
	240.4(B)	Overcurrent device	OCPD
	240.4(B)	Overcurrent protective device	OCPD

	240.4(C). Title	Overcurrent devices	Overcurrent protective Devices
	240.4(C). (X2)	Overcurrent device.	OCPD
	240.4(D)	Overcurrent Protection	Fine as is
	240.4(D)(1)	Overcurrent protection	Fine as is
	240.4(D)(1)(2)		(a) OCPDs in accordance with 240.7 shall be marked for use with 18 AWG copper conductor (b) Delete (c) change to (b)
	240.4(D)(2)	Overcurrent protection	Fine as is
	240.4(D)(2)(2)		(a) OCPDs in accordance with 240.7 shall be marked for use with 16 AWG copper conductor (b) Delete (c) change to (b)
	240.4(D)(3)	Overcurrent protection	Fine as is
	240.4(D)(3)(2)		~~(a) Fuses and circuit breakers in accordance with 240.7 marked for use with 14 AWG copper-clad aluminum conductor~~ ~~(b) Delete~~
	240.4(D)(3)(2)		OCPDs in accordance with 240.7 shall be marked for use with 14 AWG copper-clad aluminum conductor
	240.4(E)	Protected against overcurrent	shall be permitted to have overcurrent protection in accordance with the following
	240.4(F)	Overcurrent protection	Fine as is
	240.4(F)	Overcurrent protective device	OCPD
	240.4(G). (X2)	Overcurrent protection	Fine as is
	240.4(H)	Protected against overcurrent	shall be provided with overcurrent protection in accordance with
	240.5	Protected against overcurrent	shall be provided with overcurrent protection in accordance with
	240.5(A)	Overcurrent device	OCPD
	240.5(A)	Protected against overcurrent	Fixture wires shall be provided with overcurrent protection in accordance with
	240.5(A)	Supplementary overcurrent protection	Fine as is
	240.5(B) Title	Branch-circuit overcurrent device.	Branch-Circuit Overcurrent protective Devices

	240.9	Protection of conductors against overcurrent	Fine as is
	240.10. Title	Supplementary Overcurrent protection	Fine as is
	240.10.	Supplementary overcurrent protection	Fine as is
	240.10.	Branch-Circuit overcurrent devices	OCPDs
	240.10.	Supplementary overcurrent devices	Supplementary OCPDs
	240.11. (X2)	Feeder overcurrent protective devices.	Feeder OCPDs
	240.11. (X2)	Service overcurrent protective device.	Service OCPD
	240.15(A). Title	Overcurrent device	Overcurrent protective device required
	240.15(A)	Overcurrent device	OCPD
	240.15(A)	Overcurrent trip. Overcurrent relay	Fine as is
	240.15(B) Title	Overcurrent device	Circuit breaker as Overcurrent protective device
	240.16	Branch circuit overcurrent protective devices	OCPDs
	240.21	Overcurrent Protection	Fine as is
	240.21	overcurrent protective device	OCPD
	240.21 (A)	Overcurrent Protection	Fine as is
	240.21 (B)	Overcurrent Protection	Fine as is
	240.21 (B) (1) (1) (b)	Overcurrent device(s)	OCPDs
	240.21 (B) (1) (1) (b)	overcurrent protective device	OCPD
	240.21 (B)(1) (1) (4)	Overcurrent device	OCPD
	240.21 (B) (1)(1) (4) In	Overcurrent Protection	Fine as is
	240.21 (B) (2) (1)	Overcurrent device	OCPD
	240.21 (B) (2) (2)	Overcurrent devices	OCPDs
	240.21 (B) (3) (1)	Overcurrent device	OCPD
	240.21 (B) (3) (2)	Overcurrent device	OCPD
	240.21 (B) (4) (3)	Overcurrent device	OCPD
	240.21 (B) (4) (4)	Overcurrent device	OCPD
	240.21 (B) (4) (4)	Overcurrent devices	OCPDs
	240.21 (B) (5) (2)	Overcurrent device	OCPD
	240.21 (B) (5) (2)	Overcurrent devices	OCPDs
	240.21 (B) (5) (3)	Overcurrent device	OCPD
	240.21 (C). (X2)	Overcurrent Protection	Fine As Is
	240.21 (C) (1). Title	Title change	Overcurrent Protective Device
	240.21 (C) (1)	"...protected by overcurrent protection..."	Fine As Is
	240.21 (C) (1)	Overcurrent protective device	OCPD
	240.21 (C) (2) (1) (b)	Overcurrent device(s)	OCPDs

	240.21 (C) (2) (1) (b)	Overcurrent device	OCPD
	240.21 (C) (2) (4)	Overcurrent device	OCPD
	240.21 (C) (2) (4)	Overcurrent device	OCPD
	240.21 (C) (2) (4)	Overcurrent protection	Fine as is
	240.21 (C) (3) (2)	Overcurrent devices	OCPDs
	240.21 (C) (3) (3)	Overcurrent devices	OCPDs
	240.21 (C) (4) (2)	Overcurrent device	OCPD
	240.21 (C) (4) (2)	Overcurrent devices	OCPDs
	240.21 (C) (4) (3)	Overcurrent device	OCPD
	240.21 (C) (5)	Overcurrent Protection	Fine As Is
	240.21 (C) (6) (1)	Overcurrent device	OCPD
	240.21 (D)	Overcurrent devices	OCPDs
	240.21 (E)	.shall be permitted to be protected against overcurrent.	"..shall be permitted to have overcurrent protection.."
	240.21 (F)	.shall be permitted to be protected against overcurrent.	"..shall be permitted to have overcurrent protection.."
	240.21 (H). (X2)	Overcurrent Protection	Fine As Is
	240.22. (X2)	Overcurrent device	OCPD
	240.24(A)	Supplementary overcurrent protection	Fine as is
	240.24(A). (X4)	Overcurrent protective devices	OCPDs
	240.24(B)	Overcurrent devices	OCPDs
	240.24(B)(1). Title	Feeder overcurrent protective devices	Feeder OCPDs
	240.24(B)(1)	Service overcurrent protective devices	Service OCPDs
	240.24(B)(2). TITLE	Branch-circuit overcurrent protective device	Fine as is
	240.24(B)(2).	Branch-circuit overcurrent protective device	Branch-Circuit OCPD
	240.24(C)	Overcurrent protective devices	OCPDs
	240.24(D)	Overcurrent protective devices	OCPDs
	240.24(E)	Overcurrent protective devices	OCPDs
	240.24(E)	Supplementary overcurrent protection	Fine as is
	240.24(E) (X2)	Overcurrent protective devices	OCPDs
	240.24(F)	Overcurrent protective devices	OCPDs
	240.30(A)	Overcurrent devices	OCPDs
	240.32	Overcurrent devices	OCPDs
	240.33	Overcurrent devices	OCPDs
	240.86	Overcurrent device	OCPD
	240.86(B)	Overcurrent device	OCPD
	240.86(C)	Overcurrent device	OCPD

	240.87	Overcurrent device	OCPD
	240.90.	Overcurrent protection	Fine as is
	240.91(B). (X2)	Overcurrent device	OCPD
	240.92	Overcurrent device	OCPD
	240.92(A)	~~be protected~~	shall be provided with overcurrent protection
	240.92(C)	Overcurrent protection	Fine as is
	240.92(C)(1)(1)	Overcurrent device	OCPD
	240.92(C)(1)(2)	protective devices	Fine as is
	240.92(C)(1)(3)	Overcurrent devices	OCPDs
	240.92(C)(2)(1)	Overcurrent device	OCPD
	240.92(C)(2)(2) (X3)	Overcurrent devices	OCPDs
	240.92(C)(2)(3)	Overcurrent relaying	Fine as is
	240.92(C)(2)(4)	Overcurrent device	OCPD
	240.92(D)	Overcurrent protection	Fine as is
	240.92(D)(2). (X3)	Overcurrent devices	OCPDs
	240.92(D)(4)	Overcurrent device	OCPD
	240.92(E)	Overcurrent device	OCPD
	240.92(E)	Overcurrent protection	Fine as is
10	**Article 242**		
	242.14(ABC)	Overcurrent device	OCPD
	242.16	Overcurrent protection	Branch-circuit OCPD
10	**Article 404**		
	404.5	Overcurrent Devices	OCPDs
10	**Article 408**		
	408.4(A)	Overcurrent device	OCPD
	408.6 (X2)	Overcurrent protection devices	OCPDs
	408.36. Title	Overcurrent protection	Fine as is
	408.36. (X2)	Overcurrent protective device	OCPD
	408.36. (X3)	Overcurrent devices	OCPDs
	408.36(A)	Overcurrent protection	Fine as is
	408.36(B)	Overcurrent protection	Fine as is
	408.36(C)	Overcurrent device	OCPD
	408.36(D)	Overcurrent protection devices	OCPDs
	408.52	Overcurrent devices	OCPDs
	408.54	Overcurrent devices	OCPDs

	408.55	Overcurrent devices	OCPDs

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-1			
CMP	**NEC Section (using First Draft of 2026 NEC)**	**Current Language**	**"New" Language**
1	**Article 110**		
	110.10.	overcurrent protective devices	OCPDs
	110.10.	circuit protective devices	Fine as is
	110.26(C)(2)	overcurrent devices	OCPD
	110.26(C)(3)	overcurrent devices	OCPD
	110.52	Overcurrent protection	Fine as is
	110.52	Overcurrent	Motor-operated Equipment shall be provided with overcurrent protection
	110.52	Overcurrent	Transformers shall be provided with overcurrent protection

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-2			
CMP	**NEC Section (using First Draft of 2026 NEC)**	**Current Language**	**"New" Language**
2	**Article 100**		
	Branch Circuit (Branch-Circuit)	overcurrent device	overcurrent protective device (OCPD)
2	**Article 120**		
	120.5(E)	overcurrent device	OCPD
	120.7(B)	overcurrent protective device	OCPD
	120.87(3)	Overcurrent protection	Fine as is
2	**Article 210**		
	210.4(A)	branch-circuit overcurrent protective device, OCPD	Fine as is
	210.4(C)	branch-circuit OCPD	Fine as is
	210.11(B)	branch-circuit OCPD	Fine as is
	210.12(A)	branch-circuit OCPD (X-8)	Fine as is
	210.18	~~overcurrent device~~ OCPD (X-2)	Fine as is
	210.19(A)(1)EX	branch-circuit OCPD	Fine as is
	210.20.	Overcurrent protection	Fine as is
	210.20.	branch-circuit OCPD	Fine as is
	210.20(A)	branch-circuit OCPD	Fine as is
	210.20(C)	branch-circuit OCPD	Fine as is
	T-210.24	Overcurrent protection	Fine as is
2	**Annex D**		
	D3. (X2)	Overcurrent Protection	CMP-2 To review references to OCPD and the revised terms.
	D3a. (X8)	Branch-Circuit OCPD	CMP-2 to Review
	D3a.	Overcurrent Protection	CMP-2 to Review
	D3a. (X2)	Branch-Circuit OCPD	CMP-2 to Review

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-3			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
3	Article 100		
	Fault Managed Power.	Overcurrent protection	Fine as is
	Fire Alarm Circuit	Overcurrent device	overcurrent protective device (OCPD)
3	Article 300		
	300.5-T	Overcurrent Protection	Fine as is
	300.17(I)	Overcurrent Device	OCPD
	300.28(C)(3). (X5)	Overcurrent Protection	Fine as is
3	Article 590		
	590.6(A)	Overcurrent Protection	Fine as is
	590.6(B)	be protected from Overcurrent	shall be provided with overcurrent protection
	590.9. Title	Overcurrent protective device	Fine as is
	590.9(A)	Overcurrent protective devices	OCPDs
	590.9(B) Title	Service Overcurrent protective devices	Fine as is
	590.9(B)	Overcurrent protective devices	OCPDs
3	Article 721		
	721.50(A)	Overcurrent	Fine as is
3	Article 722		
	722.1	Overcurrent Protection	Fine as is
3	Article 724	Class 1	
	724.40(B). (X3)	Overcurrent Devices	OCPDs
	724.40(B). (X2)	Overcurrent Device	OCPD
	724.40(B). (X2)	Overcurrent Protection	Fine as is
	724.43. (X4)	Overcurrent Protection	Fine as is
	724.45	Overcurrent Device	OCPD
	724.45. (X3)	Overcurrent Devices	OCPDs
	724.45(A)	Overcurrent Devices	OCPDs
	724.45(B)	Overcurrent Protection	Fine as is
	724.45(B)	Overcurrent Device	OCPD
	724.45(C). (X2)	Overcurrent protective devices	OCPDs
	724.45(D)	Overcurrent Protection	Fine as is
	724.45(E)	Overcurrent Protection	Fine as is
3	Article 725		
	725.1 In	Overcurrent Protection	Fine as is

	725.127	Overcurrent Device	OCPD
3	**Article 760**		
	760.41(B)	Overcurrent protective device	OCPD
	760.41(B)	Overcurrent protection devices	OCPDs
	760.43. (X3)	Overcurrent Protection	Fine as is
	760.45. Title	Overcurrent device	Overcurrent protective device
	760.45	Overcurrent protection devices	OCPDs
	760.45 Ex 1 & 2	Overcurrent Protection	Fine as is
	760.121(B)	Branch-Circuit Overcurrent protective device	OCPD
	760.121(B)	Overcurrent protection devices	OCPDs
	760.127	Overcurrent Protection	Fine as is
	760.127	Overcurrent Device	OCPD
3	**Article 794**		
	794.1	Overcurrent Protection	Fine as is

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-4			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
4	Article 690		
	690.2	PV dc Overcurrent protective devices	PV dc OCPDs
	690.8	Overcurrent Device	OCPD and OCPDs
	690.9. Title	Overcurrent Protection	Fine as is
	690.9(A). (X2)	be protected from Overcurrent	shall be provided with overcurrent protection
	690.9(A)(1). Title	Overcurrent Protection	Fine as is
	690.9(A)(1).	Overcurrent protective devices	OCPDs
	690.9(A)(2). Title	Overcurrent Protection	Fine as is
	690.9(A) (2)	be protected from Overcurrent	shall be provided with overcurrent protection
	690.9(A) (2) In	Overcurrent protection	Fine as is
	690.9(A) (2) In	Overcurrent device	OCPD
	690.9(A)(3)	Overcurrent	Fine as is
	690.9(B)	shall be permitted to prevent overcurrent of conductors	Fine as is
	690.9(B)	Overcurrent device	OCPD and OCPDs
	690.9(C)	Overcurrent protective device and Devices	OCPD and OCPDs
	690.31(E)	Overcurrent protective devices	OCPDs
	690.45	Overcurrent protective device	OCPD
	690.45	Overcurrent Device	OCPD
4	Article 692		
	692.8. Title	Overcurrent Device	Overcurrent Protective Devices
	692.8	Overcurrent protective device	OCPDs
	692.9	Overcurrent Protection	Fine as is
	692.9	Overcurrent Devices	OCPDs
4	Article 694		
	694.7(D)	Overcurrent Device	OCPD
	694.12(B). Title	Overcurrent Device	Overcurrent Protective Device
	694.12(B)(2). Title	Overcurrent Devices	Overcurrent Protective Devices
	694.12(B)(2)	Overcurrent Devices	OCPDs
	694.15	Overcurrent Protection	Fine as is
	694.15	Overcurrent Devices	OCPDs
	694.15 In	Overcurrent Protection	Fine as is
	694.15(B)(1)	Overcurrent Protection	Fine as is
	694.15(C)	Overcurrent Devices	OCPDs

4	**Article 705**		
	705.11(C). Title	Overcurrent Protection	Fine as is
	705.11(C)	be protected from overcurrent	have overcurrent protection
	705.11(C)(1). (1) (2) (3)	Overcurrent protective device	OCPD
	705.11(C)(2)	Overcurrent protection devices	OCPDs
	705.12(A)(2). (X4)	Overcurrent Device	OCPD
	705.12(A)(3)	Overcurrent Devices	OCPDs
	705.12(B)	(Multiple) Overcurrent Device and (s)	OCPD. And OCPDs
	705.12(B)	(Warning labels) Overcurrent Device and (s)	Overcurrent Protective Device and Devices
	705.28(B)Ex.1	Overcurrent Devices	OCPDs
	705.28(B)Ex.3	Overcurrent Device	OCPD
	705.30. Title	Overcurrent Protection	Fine as is
	705.30(A). (X2)	Overcurrent Protection	Fine as is
	705.30(A)	Overcurrent Devices	OCPDs
	705.30.(C)	Overcurrent Devices	OCPDs
	705.30.(F)	Overcurrent Protection	Fine as is
	705.70.	Overcurrent Devices	OCPDs
	705.70.	Overcurrent Protection	Fine as is

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-5			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
5	Article 100		
	Ground-Fault Current Path, Effective	overcurrent protective device	overcurrent protective device (OCPD)
	Ground-Fault Protection of Equipment	overcurrent device	overcurrent protective device (OCPD)
5	Article 200		
	200.10(E)	overcurrent device	OCPD
5	Article 250		
	250.4(A)(5). Title	Overcurrent protective Device	Fine as is
	250.4(A)(5)	Overcurrent Device	OCPD
	250.4(B)(4)	Overcurrent Devices	OCPDs
	250.30(A)(1)	Overcurrent Device	OCPD
	250.30(A)(1)	Overcurrent Devices	OCPDs
	250.32(B)(2). (X4)	Overcurrent Protection	Fine as is
	250.32(C)(2). (X4)	Overcurrent Protection	Fine as is
	250.35(B)	Overcurrent Protection	Fine as is
	250.36(D)	Overcurrent Device	Fine as is
	250.36(E)(1)	Overcurrent Device	OCPD
	250.102(B)(2)	Overcurrent Protection	Fine as is
	250.102(D). (X3)	Overcurrent Devices	OCPDs
	250.118(A)(5)	Overcurrent Devices	OCPDs
	250.118(A)(6)	Overcurrent Devices	OCPDs
	250.118(A)(7)	Overcurrent Devices	OCPDs
	250.122(C)	Overcurrent Device	OCPD
	250.122(F)(1). (X3)	Overcurrent protective device	OCPD
	250.122(G)	Overcurrent Device	OCPD
	250.142. (X2)	Overcurrent Device	OCPD
	250.148	Overcurrent Device	OCPD
	250.164	Overcurrent Device	OCPD
	250.166	Overcurrent Protection	Fine as is
	250.169	Overcurrent Devices	OCPD
5	Article 270		
	270.4(A)(5)	Overcurrent Device	OCPD
	270.4(B)(4)	Overcurrent Devices	OCPDs
	270.30(A)(1)	Overcurrent Devices	OCPDs

	270.32(B)(2). (X4)	Overcurrent Protection	Fine as is
	270.32(C)(2). (X4)	Overcurrent Protection	Fine as is
	270.35(B)	Overcurrent Protection	Fine as is
	270.35(B)	Overcurrent protective device	OCPD
	270.36(D)	Overcurrent Device	OCPD
	270.36(E)	Overcurrent Devices	OCPDs
	270.102(C)(2)	Overcurrent Protection	Fine as is
	270.102(D)	Overcurrent Device	OCPDs
	270.114(C)(3)	Overcurrent setting	CMP to review Language based on new terms
	270.118	Overcurrent Devices	OCPDs
	270.142	Overcurrent Devices	OCPDs
	270.148(B)	Overcurrent Device	OCPD
	270.164(B)	Overcurrent Device	OCPD
	270.166(A)	Overcurrent Protection	Fine as is
	270.169	Overcurrent Devices	OCPDs

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-6			
CMP	**NEC Section (using First Draft of 2026 NEC)**	**Current Language**	**"New" Language**
6	**Article 310**		
	310.10(G).	Overcurrent Protection	Fine as is
	310.15(A)	Overcurrent Protection	Fine as is
	310.16-T	Overcurrent Protection	Fine as is
	310.17-T	Overcurrent Protection	Fine as is
6	**Article 335**		
	335.90.	Overcurrent Protection	Fine as is
6	**Article 382**		
	382.4	Supplementary Overcurrent Protection	Supplementary Overcurrent Protective Device
6	**Article 400**		
	400.16	Overcurrent Protection	Fine as is
	400.16	protected against Overcurrent	shall be provided with overcurrent protection
6	**Article 402**		
	402.14 (X2)	Overcurrent Protection	Fine as is

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-7			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
7	Article 100		
	Service Equipment, Mobile Home	overcurrent protective devices	overcurrent protective devices (OCPDs)
7	Article 545		
	545.24	Branch-circuit overcurrent protective device	Branch-circuit OCPD
	545.24(B) Title	Branch Circuit Overcurrent Protection Device	Overcurrent protective devices
	545.24(B)	a Branch Circuit Overcurrent Protective Device	an OCPD
7	Article 547		
	547.41(A)(6). (X2)	Overcurrent Protection	Fine as is
	547.41(B)	Overcurrent Protection	Fine as is
	547.42	Overcurrent Protection	Fine as is
7	Article 550		
	550.11(B). Title	Branch-Circuit protective equipment	Branch-Circuit Overcurrent Protection
	550.11(B)	Overcurrent Protection	Fine as is
	550.11(B)	Branch-Circuit Overcurrent Devices	OCPDs
	550.11(B)	Overcurrent protection size	OCPD rating
	550.15(E)	Branch-circuit overcurrent protective device	OCPD
	550.32	Overcurrent Protection	Fine as is
7	Article 551		
	551.31(A)	Overcurrent protective device	OCPD
	551.31(C)	Overcurrent protective device	OCPD
	551.31(D)	Overcurrent Protection	Fine as is
	551.42	Overcurrent Protection	Fine as is
	551.43. Title	Branch-Circuit protection	Branch-Circuit Overcurrent Protection
	551.43(A)	Branch Circuit Overcurrent Devices	Branch-Circuit OCPDs
	551.43(A)(3)	Overcurrent Protection	Fine as is
	551.45(C)	Overcurrent protective device	OCPD
	551.47(Q)	Overcurrent protective device	OCPD
	551.47(R)	Overcurrent Protection	Fine as is
	551.47(S)	Overcurrent Protection	Fine as is
	551.74	Overcurrent Protection	Fine as is
7	Article 552		
	552.10.(E) Title	Overcurrent Protection	Fine as is
	552.10(E)(1)	Overcurrent protective devices	OCPDs

	T-552.10(E)(1)	Overcurrent Protection	Fine as is
	552.10(E)(4). (X2)	Overcurrent protective device	OCPD
	552.42(A)	Branch Circuit Overcurrent Devices	OCPDs
	552.42(A)	Overcurrent Protection	Fine as is
	552.45(C)	Overcurrent protective device	OCPD
	552.46(A) IN	Overcurrent Protection	Fine as is
	552.47(P)	Overcurrent protective device	OCPD
	552.47(Q)	Overcurrent Protection	Fine as is
7	**Article 555**		
	555.53	Overcurrent protective device	OCPD
7	**Article 675**		
	675.6	Branch Circuit Overcurrent Protective Device	OCPD
	675.7	Branch Circuit Overcurrent Protective Devices	OCPDs
	675.8	Overcurrent Protection	Fine as is
7	**Article 682**		
	682.15(B)	Feeder Overcurrent protective device	Feeder OCPD

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-8			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
8	Article 312		
	312.11. Title	Overcurrent Devices	Overcurrent Protective Device
	312.11	Overcurrent Devices	OCPDs
	312.11(A). (X3)	Overcurrent Device	OCPDs
	312.11(B)	Overcurrent Devices	OCPDs
	312.11(B)(1)	Overcurrent Device	OCPD
8	Article 366		
	366.12	Overcurrent Devices	OCPDs
	366.56(D)	Overcurrent Protection	Fine as is
8	Article 368		
	368.17(A). Title	Overcurrent Protection	Fine as is
	368.17	Overcurrent Protection	Fine as is
	368.17(A)	Protected against Overcurrent	shall be provided with overcurrent protection
	368.17(B). (X2)	Overcurrent Protection	Fine as is
	368.17(B)	Overcurrent Device	OCPD
	368.17(C)	Overcurrent Devices	OCPDs
	368.17(C)Ex.2	Branch-Circuit Overcurrent Device	Branch-Circuit OCPD
	368.17(C)Ex.3	Overcurrent Device	OCPD
	368.17(C)Ex.4	Branch-Circuit overcurrent plug-in device	CMP to review Language based on new terms
	368.17(D). Title	Overcurrent Protection	Fine as is
	368.17(D)	Protected against Overcurrent	shall be provided with overcurrent protection
8	Article 370		
	370.23. Title	Overcurrent Protection	Fine as is
	370.23	Protected against Overcurrent	shall be provided with overcurrent protection
8	Article 371		
	371.17. Title	Overcurrent Protection	Fine as is
	371.17	Overcurrent Protection	Fine as is
	371.17 (A)-(C). Titles	Overcurrent Protection	Fine as is
	371.17(A)-(C)	Protected against Overcurrent	shall be provided with overcurrent protection
	371.17(D)	Protected against Overcurrent	shall be provided with overcurrent protection
	371.17(F)	Overcurrent	shall be provided with overcurrent protection
	371.17(G)	Overcurrent Protection	
	371.17(G)Ex	Overcurrent Protection	Fine as is
	371.17(G)Ex	Overcurrent Device	OCPD

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-9			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
9	Article 265		
	265.18	Overcurrent Device	OCPD
	265.20.	Overcurrent Protection	Fine as is
	265.20.	Overcurrent protective devices	OCPDs
	265.20.	Overcurrent Devices	OCPDs
9	Article 266		
	266.1	Overcurrent Protection	Fine as is
	266.5	Overcurrent Protection	Fine as is
	266.5	Protected against overcurrent	shall be provided with overcurrent protection
	266.5	Overcurrent Device	OCPD
9	Article 268		
	268.2. (X2)	Overcurrent Protection	Fine as is
	268.70(F)	Overcurrent Devices	OCPDs
	268.82. (X4)	Overcurrent Protection	Fine as is
	Art. 268 Part VII	Overcurrent Protection	Fine as is
	268.90.	Overcurrent Device	OCPD
	268.90.	Overcurrent Devices	OCPDs
	268.91	Overcurrent Device	OCPD
	268.92	Overcurrent Devices	OCPDs
	268.93	Overcurrent Device	OCPD
9	Article 450		
	450.5 (previously 450.3). (X3)	overcurrent protection	Fine As Is
	450.5(A) and Table. (X3)	overcurrent protection	Fine As Is
	Table 450.5(A) Footnote 2. (X4)	overcurrent device	OCPD
	450.5(B)	overcurrent protection	Fine As Is
	Table 450.5(B) and Table (X2)	overcurrent protection	OCPD
	Table 450.5(B) Footnote 2. (X3)	overcurrent device	OCPD
	Table 450.5(B) Footnote 3	overcurrent protection	OCPD
	450.6(A) Title	overcurrent protection	Fine As Is
	450.6(A) (X3)	overcurrent device	OCPD
	450.6(A) Exception	overcurrent device	OCPD
	450.7(A)(1). (X2)	overcurrent protection	OCPD
	450.7(A)(2). Title	overcurrent protection	Fine As Is

	450.7(A)(2)	overcurrent sensing device	Fine As Is
		overcurrent protection	OCPD
		overcurrent device	OCPD
		branch or feeder protective devices	branch or feeder OCPDs
	450.7(A)(3)	overcurrent device	OCPD
	450.7(B)(2)	overcurrent protection	Fine As Is
	450.7(B)(2)(a)	overcurrent protective device	OCPD
	450.7(B)(2)(b)	overcurrent protection	OCPD
	450.7(B)(2)(b)	overcurrents	Fine As Is
	450.7(B)(2)(b) Exception	overcurrent device	OCPD
	450.8(A). (X2)	overcurrent protection	Fine As Is
	450.8(A)(1)	overcurrent protection	Fine As Is
	450.8(A)(2)	overcurrent protection	Fine As Is
	450.8(A)(3)	protective device	OCPD
	450.8(A)(4)(a)	protective device	OCPD
	450.8(B). Title	Overcurrent Protection	Fine As Is
	450.8(B)	overcurrent device	OCPD
	450.9	overcurrent protection	Fine As Is
	450.9	protective devices (2x)	OCPDs
	450.23(A)(1)(d) Informational Note	overcurrent protection	OCPD
	450.23(B)(1) Informational Note 2	overcurrent protection	OCPD
9	**Article 495**		
	495.62. Title	Overcurrent Protection	Fine As Is
	495.72	Overcurrent Relay	Fine As Is

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-10			
CMP	**NEC Section (using First Draft of 2026 NEC)**	**Current Language**	**"New" Language**
10	**Article 100**		
	Circuit Breaker	Overcurrent	Fine as is
	Coordination, Selective. (Selective Coordination)	Overcurrent condition	Fine as is
	Coordination, Selective. (Selective Coordination)	overcurrent protective devices	overcurrent protective devices (OCPDs)
	Coordination, Selective. (Selective Coordination)	overcurrents	Fine as is
	Coordination, Selective. (Selective Coordination)	overcurrent protective device	overcurrent protective device (OCPD)
	Current Limiting (as applied to overcurrent protection devices)	overcurrent protection devices	overcurrent protective devices (OCPDs)
	Feeder	final branch-circuit overcurrent protective device	overcurrent protective device (OCPD)
	Fuse	overcurrent protective device	overcurrent protective device (OCPD)
	Fuse	overcurrent	Fine as is
	Fuse, Electronically Actuated	overcurrent protective device	overcurrent protective device (OCPD)
	Fuse, Electronically Actuated	overcurrent	Fine as is
	Overcurrent	Overcurrent protection	Fine as is
	Overcurrent Protective Device, Branch-Circuit	Revise with the term Overcurrent Protective Device. (OCPD)	
	Overcurrent **Protective** Device, Supplementary (need to Revise term with acronym)	overcurrent protective device	overcurrent protective device (OCPD)
	Panelboard	overcurrent devices	overcurrent protective devices (OCPDs)
	Surge-Protective Device (SPD). (X2)	overcurrent device. (X2)	overcurrent protective device (OCPD)
	Switchboard	overcurrent	overcurrent protective devices (OCPDs)
	Tap Conductor	Overcurrent protection	Fine as is
10	**Article 215**		
	215.1	Overcurrent protection	Fine as is
	215.4(A)(1)Ex.1	overcurrent devices protecting the feeders	feeder OCPD
	215.4(A)(1)Ex.3	overcurrent device	OCPD
	215.5 Title	Overcurrent protection	Fine as is
	215.5	Feeders shall be protected against overcurrent	Feeders shall be provided with overcurrent protection in accordance with Article 240, Parts I
	215.5	overcurrent device	OCPD
	215.5Ex	overcurrent device protecting the feeders	feeder OCPDs
	215.5Ex	overcurrent device	OCPD

	215.18(B)	branch circuit overcurrent devices	OCPDs
10	**Article 225**		
	225.40. Title	Overcurrent protective devices	Fine as is
	225.40.	feeder overcurrent device (x2)	feeder OCPD
	225.40.	branch circuit overcurrent devices	Branch circuit OCPDs
	225.42(B)	branch circuit overcurrent devices	OCPDs
10	**Article 230**		
	230.7 Ex.2	Overcurrent protection	Fine as is
	230.42(A)(1)	overcurrent device (X3)	OCPD
	230.82(6)	Overcurrent protection	Fine as is
	230.82(7)	Overcurrent protection	Fine as is
	230.82(8)	Overcurrent protection	Fine as is
	230.82(9)	Overcurrent protection	Fine as is
	230.82(10)	Overcurrent protection	Fine as is
	230 Part VII	Overcurrent protection	Fine as is
	230.90(A)	overcurrent device	OCPD
	230.90(A)Ex.3	overcurrent device	OCPD
	230.90(B)	overcurrent device	OCPD
	230.91	overcurrent device (X2)	OCPD
	230.92	overcurrent device (X4)	OCPDs and OCPD
	230.93	overcurrent device	OCPD
	230.94	overcurrent device (X3)	OCPD
	230.94	Overcurrent protection (X2)	Fine as is
	230.95(A)	overcurrent device	OCPD
	230.95(B)	overcurrent device	OCPD
10	**Article 240**		
	240	Overcurrent Protection	Fine as is
	240.1 (X3)	Overcurrent protection	Fine as is
	240.2	branch-circuit Overcurrent protective devices	~~branch-circuit~~ Overcurrent protective devices
	240.4. Title	Protection of Conductors	Overcurrent Protection of Conductors
	240.4	Protected against overcurrent	shall be provided with overcurrent protection in accordance with
	240.4(B). Title	Overcurrent devices	Overcurrent protective Devices
	240.4(B)	Overcurrent device	OCPD
	240.4(B)	Overcurrent protective device	OCPD

	240.4(C). Title	Overcurrent devices	Overcurrent protective Devices
	240.4(C). (X2)	Overcurrent device.	OCPD
	240.4(D)	Overcurrent Protection	Fine as is
	240.4(D)(1)	Overcurrent protection	Fine as is
	240.4(D)(1)(2)		(a) OCPDs in accordance with 240.7 shall be marked for use with 18 AWG copper conductor (b) Delete (c) change to (b)
	240.4(D)(2)	Overcurrent protection	Fine as is
	240.4(D)(2)(2)		(a) OCPDs in accordance with 240.7 shall be marked for use with 16 AWG copper conductor (b) Delete (c) change to (b)
	240.4(D)(3)	Overcurrent protection	Fine as is
	240.4(D)(3)(2)		~~(a) Fuses and circuit breakers in accordance with 240.7 marked for use with 14 AWG copper-clad aluminum conductor~~ ~~(b) Delete~~
	240.4(D)(3)(2)		OCPDs in accordance with 240.7 shall be marked for use with 14 AWG copper-clad aluminum conductor
	240.4(E)	Protected against overcurrent	shall be permitted to have overcurrent protection in accordance with the following
	240.4(F)	Overcurrent protection	Fine as is
	240.4(F)	Overcurrent protective device	OCPD
	240.4(G). (X2)	Overcurrent protection	Fine as is
	240.4(H)	Protected against overcurrent	shall be provided with overcurrent protection in accordance with
	240.5	Protected against overcurrent	shall be provided with overcurrent protection in accordance with
	240.5(A)	Overcurrent device	OCPD
	240.5(A)	Protected against overcurrent	Fixture wires shall be provided with overcurrent protection in accordance with
	240.5(A)	Supplementary overcurrent protection	Fine as is
	240.5(B) Title	Branch-circuit overcurrent device.	Branch-Circuit Overcurrent protective Devices

	240.9	Protection of conductors against overcurrent	Fine as is
	240.10. Title	Supplementary Overcurrent protection	Fine as is
	240.10.	Supplementary overcurrent protection	Fine as is
	240.10.	Branch-Circuit overcurrent devices	OCPDs
	240.10.	Supplementary overcurrent devices	Supplementary OCPDs
	240.11. (X2)	Feeder overcurrent protective devices.	Feeder OCPDs
	240.11. (X2)	Service overcurrent protective device.	Service OCPD
	240.15(A). Title	Overcurrent device	Overcurrent protective device required
	240.15(A)	Overcurrent device	OCPD
	240.15(A)	Overcurrent trip. Overcurrent relay	Fine as is
	240.15(B) Title	Overcurrent device	Circuit breaker as Overcurrent protective device
	240.16	Branch circuit overcurrent protective devices	OCPDs
	240.21	Overcurrent Protection	Fine as is
	240.21	overcurrent protective device	OCPD
	240.21 (A)	Overcurrent Protection	Fine as is
	240.21 (B)	Overcurrent Protection	Fine as is
	240.21 (B) (1) (1) (b)	Overcurrent device(s)	OCPDs
	240.21 (B) (1) (1) (b)	overcurrent protective device	OCPD
	240.21 (B)(1) (1) (4)	Overcurrent device	OCPD
	240.21 (B) (1)(1) (4) In	Overcurrent Protection	Fine as is
	240.21 (B) (2) (1)	Overcurrent device	OCPD
	240.21 (B) (2) (2)	Overcurrent devices	OCPDs
	240.21 (B) (3) (1)	Overcurrent device	OCPD
	240.21 (B) (3) (2)	Overcurrent device	OCPD
	240.21 (B) (4) (3)	Overcurrent device	OCPD
	240.21 (B) (4) (4)	Overcurrent device	OCPD
	240.21 (B) (4) (4)	Overcurrent devices	OCPDs
	240.21 (B) (5) (2)	Overcurrent device	OCPD
	240.21 (B) (5) (2)	Overcurrent devices	OCPDs
	240.21 (B) (5) (3)	Overcurrent device	OCPD
	240.21 (C). (X2)	Overcurrent Protection	Fine As Is
	240.21 (C) (1). Title	Title change	Overcurrent Protective Device
	240.21 (C) (1)	"…protected by overcurrent protection…"	Fine As Is
	240.21 (C) (1)	Overcurrent protective device	OCPD
	240.21 (C) (2) (1) (b)	Overcurrent device(s)	OCPDs

	240.21 (C) (2) (1) (b)	Overcurrent device	OCPD
	240.21 (C) (2) (4)	Overcurrent device	OCPD
	240.21 (C) (2) (4)	Overcurrent device	OCPD
	240.21 (C) (2) (4)	Overcurrent protection	Fine as is
	240.21 (C) (3) (2)	Overcurrent devices	OCPDs
	240.21 (C) (3) (3)	Overcurrent devices	OCPDs
	240.21 (C) (4) (2)	Overcurrent device	OCPD
	240.21 (C) (4) (2)	Overcurrent devices	OCPDs
	240.21 (C) (4) (3)	Overcurrent device	OCPD
	240.21 (C) (5)	Overcurrent Protection	Fine As Is
	240.21 (C) (6) (1)	Overcurrent device	OCPD
	240.21 (D)	Overcurrent devices	OCPDs
	240.21 (E)	.shall be permitted to be protected against overcurrent.	"..shall be permitted to have overcurrent protection.."
	240.21 (F)	.shall be permitted to be protected against overcurrent.	"..shall be permitted to have overcurrent protection.."
	240.21 (H). (X2)	Overcurrent Protection	Fine As Is
	240.22. (X2)	Overcurrent device	OCPD
	240.24(A)	Supplementary overcurrent protection	Fine as is
	240.24(A). (X4)	Overcurrent protective devices	OCPDs
	240.24(B)	Overcurrent devices	OCPDs
	240.24(B)(1). Title	Feeder overcurrent protective devices	Feeder OCPDs
	240.24(B)(1)	Service overcurrent protective devices	Service OCPDs
	240.24(B)(2). TITLE	Branch-circuit overcurrent protective device	Fine as is
	240.24(B)(2).	Branch-circuit overcurrent protective device	Branch-Circuit OCPD
	240.24(C)	Overcurrent protective devices	OCPDs
	240.24(D)	Overcurrent protective devices	OCPDs
	240.24(E)	Overcurrent protective devices	OCPDs
	240.24(E)	Supplementary overcurrent protection	Fine as is
	240.24(E) (X2)	Overcurrent protective devices	OCPDs
	240.24(F)	Overcurrent protective devices	OCPDs
	240.30(A)	Overcurrent devices	OCPDs
	240.32	Overcurrent devices	OCPDs
	240.33	Overcurrent devices	OCPDs
	240.86	Overcurrent device	OCPD
	240.86(B)	Overcurrent device	OCPD
	240.86(C)	Overcurrent device	OCPD

	240.87	Overcurrent device	OCPD
	240.90.	Overcurrent protection	Fine as is
	240.91(B). (X2)	Overcurrent device	OCPD
	240.92	Overcurrent device	OCPD
	240.92(A)	~~be protected~~	shall be provided with overcurrent protection
	240.92(C)	Overcurrent protection	Fine as is
	240.92(C)(1)(1)	Overcurrent device	OCPD
	240.92(C)(1)(2)	protective devices	Fine as is
	240.92(C)(1)(3)	Overcurrent devices	OCPDs
	240.92(C)(2)(1)	Overcurrent device	OCPD
	240.92(C)(2)(2) (X3)	Overcurrent devices	OCPDs
	240.92(C)(2)(3)	Overcurrent relaying	Fine as is
	240.92(C)(2)(4)	Overcurrent device	OCPD
	240.92(D)	Overcurrent protection	Fine as is
	240.92(D)(2). (X3)	Overcurrent devices	OCPDs
	240.92(D)(4)	Overcurrent device	OCPD
	240.92(E)	Overcurrent device	OCPD
	240.92(E)	Overcurrent protection	Fine as is
10	**Article 242**		
	242.14(ABC)	Overcurrent device	OCPD
	242.16	Overcurrent protection	Branch-circuit OCPD
10	**Article 404**		
	404.5	Overcurrent Devices	OCPDs
10	**Article 408**		
	408.4(A)	Overcurrent device	OCPD
	408.6 (X2)	Overcurrent protection devices	OCPDs
	408.36. Title	Overcurrent protection	Fine as is
	408.36. (X2)	Overcurrent protective device	OCPD
	408.36. (X3)	Overcurrent devices	OCPDs
	408.36(A)	Overcurrent protection	Fine as is
	408.36(B)	Overcurrent protection	Fine as is
	408.36(C)	Overcurrent device	OCPD
	408.36(D)	Overcurrent protection devices	OCPDs
	408.52	Overcurrent devices	OCPDs
	408.54	Overcurrent devices	OCPDs

	408.55	Overcurrent devices	OCPDs

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-11			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
11	Article 409		
	409.21. TITLE	Overcurrent Protection	Fine as is
	409.21(A)	Overcurrent Protection	Fine as is
	409.21(B)	Protection	Overcurrent protection
	409.21(B)	overcurrent protective device	OCPD
	409.21(B)	Overcurrent Protection	Fine as is
	409.21(C). (X2)	overcurrent protective device	OCPD
	409.104	Overcurrent Devices	OCPDs
11	Article 430		
	430.10(A) In.	Overcurrent Device	OCPD
	430.22(G)(1)(1)	Overcurrent Protection	Fine as is
	430.22(G)(1)(2)	Overcurrent Protection	Fine as is
	430.22(G)(2)(1)	Overcurrent Protection	Fine as is
	430.22(G)(2)(2)	Overcurrent Protection	Fine as is
	430.28	Branc-Circuit protective device	OCPD
	430.28	Overcurrent Device	OCPD
	430.51	Overcurrent	Fine as is
	430.53(C)(5)	Overcurrent Protection	Fine as is
	430.55	Overcurrent Protection	Fine as is
	430.61	Overcurrents	Fine as is
	430.62(A)Ex.2	Feeder Overcurrent protective device	Feeder OCDP
	430.62(A)Ex.2	Overcurrent Protection	Fine as is
	430.62(B)	Feeder Overcurrent protective device	Feeder OCDP
	430.63Ex.	Feeder Overcurrent device	Feeder OCDP
	430.63Ex.	Overcurrent Protection	Fine as is
	430.72. Title	Overcurrent Protection	Fine as is
	430.72(A)	protected against overcurrent	shall be provided with overcurrent protection in accordance with
	430.72(A)	Branch-circuit overcurrent protective devices	OCPDs
	430.72(A)	protected against overcurrent	shall be provided with overcurrent protection in accordance with
	430.72(B). (X2)	Overcurrent Protection	Fine as is
	430.72(B)	Overcurrent Device	OCPD

	430.72(B)	Overcurrent Protection	Fine as is
	430.72(B)(1) (X3)	Overcurrent Protection	Fine as is
	430.72(B)(2) Title	Branch-circuit overcurrent protective device	Fine as is
	430.72(B)(2) (X2)	protective devices	OCPDs
	430.72(C)Ex.	Overcurrent Protection	Fine as is
	430.72(C)(3)	Overcurrent Devices	OCPDs
	430.72(C)(4)	Overcurrent Device	OCPD
	430.72(C)(5)	Protection	Overcurrent protection
	430.87	Overcurrent Device	OCPD
	430.94. (X2)	Overcurrent Protection	Fine as is
	430.94. (X3)	Overcurrent protective device	OCPD
	430.109(A)(7)	Overcurrent protection	Fine as is
	430.109(B)	Branch-circuit overcurrent device	branch-circuit OCPD
	430.111(A). (X2)	Overcurrent Device	Fine as is
	430.112 Ex.	Branch circuit protective device	Suggest CMP to Review
	430.206. Title	Overcurrent protection	Fine as is
	430.206(B)(2)	considered to have Overcurrent	Overload
	430.206(C)	Fault-Current protection	Suggest CMP to Review
	430.207	Overcurrent (overload)Relays	Fine as is
	430.207	Overcurrent Relays	Fine as is
11	**Article 440**		
	440.21	Overcurrent	Fine as is
	440.21	Overcurrent Protection	Fine as is
	440.22(B)(2)Ex.	Overcurrent device	OCPD
	440.52(B)	Overcurrent	shall be provided with overcurrent protection
11	**Article 460**		
	460.9. Title	Overcurrent Protection	Fine As Is
	460.9. (X3)	Overcurrent Device	OCPD
	460.25	Overcurrent Protection	Fine As Is
	460.28(B)	Overcurrent Device	OCPD

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-12			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
12	Article 610		
	610. Part V	Overcurrent Protection	Fine as is
	610.41(A)	Overcurrent Devices	OCPDs
	610.43(A)(1)	Branch Circuit Overcurrent Device	OCPD
	610.53 Title	Overcurrent Protection	Fine as is
	610.53	be protected from Overcurrent	shall be provided with overcurrent protection
	610.53	Overcurrent Devices	OCPDs
	610.53(B)	Branch Circuit Overcurrent Devices	OCPDs
12	Article 620		
	620.12(A)(4)	Overcurrent Protection	Fine as is
	620.22(A)(2) Title	Overcurrent protective device	Fine as is
	620.22(A)(2)	Overcurrent Device protecting	branch-circuit OCPD
	620.22(A)(2)	Overcurrent Device	OCPD
	620.22(B)	Overcurrent Device protecting	branch-circuit OCPD
	620.22(B)	Overcurrent Device	OCPD
	620.25 Title	Overcurrent Devices	Overcurrent Protective Devices
	620.25. (X2)	Overcurrent Devices	OCPDs
	620.53	Overcurrent protective device	OCPD
	620.54	Overcurrent protective device	OCPD
	620.55	Overcurrent protective device	OCPD
	Art 620 Part VII	Overcurrent Protection	Fine as is
	620.61	Overcurrent Protection	Fine as is
	620.61(A). (X2)	be protected against Overcurrent	shall be provided with overcurrent protection
	620.62(A)	Overcurrent protective devices, (OCPD)	OCPDs
	620.62(B)	OCPDs	Fine as is
	620.62(C)	OCPDs. And. Overcurrent Devices	Fine as is. And. OCPDs
	620.62	Overcurrent protective devices	OCPDs
	620.65. (X3)	Overcurrent Devices	OCPDs
12	Article 625		
	625.60(C). (X4)	Overcurrent Protection	Fine as is
12	Article 627		
	627.41	Overcurrent Protection	Fine as is
	627.41(A)	Overcurrent Protection	Fine as is

	627.41(B)	Overcurrent Devices	OCPDs
12	**Article 630**		
	630.12	Overcurrent Protection	Fine as is
	630.12	Overcurrent Device	OCPD
	630.12(A). (X2)	Overcurrent Protection	Fine as is
	630.12(A). (X5)	Overcurrent Device	OCPD
	630.13	Overcurrent Protection	Fine as is
	630.32	Overcurrent Protection	Fine as is
	630.32	Overcurrent Device	OCPD
12	**Article 640**		
	640.9(C)	Overcurrent Protection	Fine as is
	640.22	Overcurrent protection devices	OCPDs
	640.22	Overcurrent Devices	OCPDs
	640.43	Overcurrent protection devices	OCPDs
12	**Article 645**		
	645.27	Overcurrent protective devices, (OCPD)	OCPDs
	645.27	Overcurrent protective devices	OCPDs
12	**Article 646**		
	646.7. (X11)	Overcurrent Protection	Fine as is
12	**Article 647**		
	647.5	Overcurrent Protection	Fine as is
12	**Article 650**		
	650.9	Overcurrent Protection	Fine as is
	650.9	Overcurrent Device	OCPD
12	**Article 660**		
	660.7	Overcurrent Protection	Fine as is
	660.7(A)	Overcurrent protective devices	OCPDs
	660.7(B)	Overcurrent Devices	OCPDs
	660.7(B)	Overcurrent Protection	Fine as is
	660.9	Overcurrent Devices	OCPDs
12	**Article 665**		
	665.24	Overcurrent Protection	Fine as is
12	**Article 668**		
	668.4(C)(2)	Overcurrent Protection	Fine as is
	668.21	Overcurrent Protection	Fine as is

	668.21	Overcurrent Device	OCPD
12	**Article 669**		
	669.9	Overcurrent Protection	Fine as is
	669.9	be protected from Overcurrent	shall be provided with overcurrent protection
12	**Article 670**		
	670.1	Overcurrent Protection	Fine as is
	670.4(B). (X3)	Overcurrent Protection	Fine as is
	670.5. (X4)	Overcurrent Protection	Fine as is
	670.5(C). (X2)	Overcurrent protective device	OCPD
12	**Article 685**		
	685.10.	Overcurrent Devices	OCPDs

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-13			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
13	Article 100		
	Emerg.Power Supply Systems (EPSS)	overcurrent protection devices	overcurrent protective devices (OCPDs)
	Transfer-Switch B-C Emerg. Ltg.	branch-circuit overcurrent device	branch-circuit overcurrent protective device (OCPD)
13	Article 130		
	130.80(C)	overcurrent devices	OCPDs
	130.80(C)	branch-circuit overcurrent device	OCPD
13	Article 445		
	445.11	Overcurrent protective Relay	Fine as is
	445.12. Title	Overcurrent Protection	Fine as is
	445.12(A)	Overcurrent protective means	Overcurrent protection means
	445.12(B)	Overcurrent Protection	Fine as is
	445.12(B) (X2)	Overcurrent Device	OCPD
	445.12(C)	Overcurrent Device	OCPD
	445.12(D)	Overcurrent Devices	OCPDs
	445.12(E). (X3)	Overcurrent Devices	OCPDs
	445.13(A). (X2)	Overcurrent Protection	Fine as is
	445.13(B). Title	Overcurrent protection	Fine as is
	445.13(B).	Overcurrent protective device	OCPD
	445.13(B)	Overcurrent Relay	Fine as is
13	Article 455		
	455.7	Overcurrent Protection	Fine As Is
	455.7	protected from Overcurrent	shall be provided with overcurrent protection in accordance with
	455.7(A)	Overcurrent Protection	Fine As Is
	455.7(B)	Overcurrent Protection	Fine As Is
13	Article 480		
	480.4(B) IN.2	Overcurrent Protection	Fine As Is
	480.6. (X2)	Overcurrent Protection	Fine As Is
	480.7	Overcurrent Device	OCPD
13	Article 695		
	695.4(C)	Overcurrent protective devices	OCPDs
	695.4(H). Title	Overcurrent Device Selection	Overcurrent Protective Device Selection
	695.4(H)	Overcurrent Devices	OCPDs

	695.5	Overcurrent Device	OCPD
	695.5	Overcurrent protective devices	OCPDs
	695.5	Overcurrent Protection	Fine as is
	695.6	Overcurrent protective devices	OCPDs
	695.6	Overcurrent Devices	OCPD
	695.6	Overcurrent Protection	Fine as is
	695.7(A)(2)	Overcurrent Devices	OCPDs
	695.7	Overcurrent Protection	Fine as is
13	**Article 700**		
	700.4(F)(8)	Overcurrent protective devices, (OCPD)	OCPDs
	700.6(E)	Overcurrent protective device	OCPD
	700.10(B). (X6)	Overcurrent Protection	Fine as is
	700.10(B)(6)(b)(ii)	Overcurrent protective device	OCPD
	700.10(B)(6)(e)	Overcurrent protective devices	OCPDs
	Art. 700 Part VI	Overcurrent Protection	Fine as is
	700.30.	Branch-circuit overcurrent devices	OCPDs
	700.32(A)	Overcurrent protective devices, (OCPDs)	OCPDs
	700.32(A) In	Overcurrent Protection	Fine as is
	700.32(C)	Overcurrent Devices	OCPDs
13	**Article 701**		
	701.6(C)	Overcurrent protective device	OCPD
	701.10(B)(1). (X5)	Overcurrent Protection	Fine as is
	701.10(B)(1)	Overcurrent protective device	OCPD
	Art. 701. Part IV	Overcurrent Protection	OCPDs
	701.30.	Branch-Circuit Overcurrent devices	Branch-Circuit OCPDs
	701.32(A). (X2)	Overcurrent protective devices, OCPDs	OCPDs
	701.32(B). (X3)	OCPDs	Fine as is
	701.32(C). (X2)	OCPDs	Fine as is
	701.32(C)Ex	Overcurrent Devices	OCPDs
	701.32(C) In 2	OCPD and OCPDs	Fine as is
13	**Article 702**		
	702.5(C)	Overcurrent protective device	OCPD
13	**Article 706**		
	706.15(E)(1)	Overcurrent Device	OCPD
	706.30(B)	Overcurrent Devices	OCPDs

	706.31 Title	Overcurrent Protection	Fine as is
	706.31(A)	shall be protected at the source from overcurrent.	shall be provided with overcurrent protection at the source
	706.31(A)	shall be protected from overcurrent.	shall be provided with overcurrent protection
	706.31(A) In	Overcurrent Device	OCPD
	706.31(B). Title	Overcurrent Device	Overcurrent Protective Device
	706.31(B)	Overcurrent protective devices	OCPDs
	706.31(B)	Overcurrent devices	OCPDs
	706.31(C)	Overcurrent protective devices	OCPDs
	706.31(E)	Overcurrent Protection	Fine as is
	706.33(B)(2)	Overcurrent Device	OCPD
13	**Article 708**		
	708.10(B)	Overcurrent Protection	Fine as is
	708.24(E)	Overcurrent protective device	OCPD
	Art. 708. Part IV	Overcurrent Protection	Fine as is
	708.50.	Feeder- and Branch-circuit overcurrent devices	Feeder- and Branch-circuit OCPDs
	708.52(B)	Overcurrent Devices	OCPDs
	708.54(A)	Overcurrent protective devices, (OCPD)	OCPDs
	708.54(A). (B). (C)	OCPDs	Fine as is
	708.54	Overcurrent Devices	OCPDs

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-14			
CMP	**NEC Section (using First Draft of 2026 NEC)**	**Current Language**	**"New" Language**
14	**Article 500**		
	500.30(A)(2)	Branch Circuit Overcurrent Protection	OCPD
	500.30.	Overcurrent Protection	Fine as is
14	**Article 501**		
	501.105(B)(5)	Overcurrent Protection	Fine as is
	501.125(B)(2)	Motor Overcurrent	Fine as is
14	**Article 502**		
	502.120(A)	Overcurrent Devices	OCPDs
	502.120(B)(1)	Overcurrent Devices	OCPDs
	502.125	Motor Overcurrent	Fine as is
14	**Article 505**		
	505.30(A)(2)	Branch Circuit Overcurrent Protection	OCPD
	505.30.	Overcurrent Protection	Fine as is
14	**Article 506**		
	506.30.	Branch Circuit Overcurrent Protection	OCPD
	506.30.	Overcurrent Protection	Fine as is

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-15			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
15	Article 100		
	Bull Switch	Overcurrent protection	Fine as is
15	Article 517		
	517.17(B)	Overcurrent protective devices	OCPDs
	517.31(G). (X5)	Overcurrent protective devices	OCPDs
	517.31(G)	Overcurrent	Fine as is
	517.33((C). (X5)	Overcurrent protective devices	OCPDs
	517.42(F)	Overcurrent protective devices	OCPDs
	517.42(F)	Overcurrent	Fine as is
	517.73	Overcurrent Protection	Fine as is
	517.73(A)	Overcurrent protective devices	OCPDs
	517.73(B)	Overcurrent protective devices	OCPDs
	517.73(B)	Overcurrent Protection	Fine as is
	517.74(B)	Overcurrent protective devices	OCPDs
	517.160(A)(2)	Overcurrent Protection	Fine as is
	517.160(A)(2)	Overcurrent protective device	OCPD
	517.160(A)(2)	be protected against Overcurrent	be provided with overcurrent protection
	517.160(A)(3)	Overcurrent protective devices	OCPDs
	517.160(B)(1)	Overcurrent protective devices	OCPDs
15	Article 518		
	518.7(A)(1)	Overcurrent Protection	Fine as is
	518.17(A)(1) and (2)	Overcurrent Devices	OCPDs
15	Article 520		
	520.9	Branch Circuit Overcurrent Device	OCPD
	520.21	Overcurrent protective devices	OCPDs
	520.25. (X3)	Overcurrent Protection	Fine as is
	520.26	Overcurrent protective devices	OCPD
	520.26. (X3)	Overcurrent Protection	Fine as is
	520.27. (X2)	Overcurrent Device	OCPD
	520.44-T	Overcurrent Devices	OCPD
	520.50(C)	Overcurrent Protection	Fine as is
	520.50.	Branch-circuit overcurrent protective device	OCPDs
	520.52	Overcurrent Protection	Fine as is

	520.53(A)	Overcurrent protective devices	OCPDs
	520.53(D)	Overcurrent Protection	Fine as is
	520.54	Overcurrent Devices	OCPDs
	520.54(D)	Overcurrent Device	OCPD
	520.54(D)(1) and (2)	Overcurrent protective devices	OCPD
	520.54(E)	Overcurrent protective device	OCPD
	520.54(E). (X4)	Overcurrent protection device	OCPD
	520.54(E)	Overcurrent Devices	OCPDs
	520.54(K)	Overcurrent Device	OCPD
	520.68	Overcurrent protective device	OCPD
	520.68(3)	Overcurrent Device	OCPD
	520.68(4)	Overcurrent protective device	OCPD
	520.68(6)	Overcurrent Devices	OCPDs
	520.68(C)	Overcurrent Protection	Fine as is
15	**Article 522**		
	522.10(A)(2). (X3)	Overcurrent Devices	OCPDs
	522.10(A)(2	Overcurrent protective device	OCPD
	522.10(B). (X4)	Overcurrent Devices	OCPDs
	522.23. (X3)	Overcurrent Protection	Fine as is
15	**Article 525**		
	525.12	Overcurrent Device	OCPD
	525.23(B)	Overcurrent Device	OCPD
	525.23(C). (X2)	Overcurrent Protection	Fine as is
15	**Article 530**		
	530.9(A)	Branch-circuit overcurrent device	Branch-circuit OCPD
	530.10(C)	Overcurrent Protection	Fine as is
	530.23 and (A)	Overcurrent Protection	Fine as is
	530.23(B)	Overcurrent protective devices	OCPDs
	530.23(D)	Overcurrent Protection	Fine as is
	530.42	Overcurrent Protection	Fine as is
15	**Article 540**		
	540.11(B)	Overcurrent Devices	OCPDs

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-16			
CMP	**NEC Section (using First Draft of 2026 NEC)**	**Current Language**	**"New" Language**
16	**Article 830**		
	830.15. (X4)	Overcurrent Protection	Fine as is

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-17			
CMP	**NEC Section (using First Draft of 2026 NEC)**	**Current Language**	**"New" Language**
17	**Article 422**		
	422.5(C)	Branch-circuit overcurrent protective device	Branch-Circuit OCPD
	422.11. Title	Overcurrent Protection	Fine as is
	422.11	protected against overcurrent	shall be provided with overcurrent protection
	422.11(A)	Overcurrent Protection	Fine as is
	422.11(A)	Branch-circuit overcurrent protective device	Branch-Circuit OCPD
	422.11(B)	Overcurrent Protection	OCPDs
	422.11(C)	Overcurrent Protection	OCPDs
	422.11(D)	Overcurrent protective devices	OCPDs
	422.11(E)	Overcurrent Protection	Fine as is
	422.11(E)(1)	Overcurrent Protection	Fine as is
	422.11(E)(2)	Overcurrent Protection	Fine as is
	422.11(E)(3)	Overcurrent Protection	OCPD
	422.11(E)(3)	Overcurrent Device	OCPD
	422.11(F)(1)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	422.11(F)(1)	Overcurrent Protective Devices	OCPDs
	422.11(G)	Overcurrent Protective Devices	OCPDs
	422.13	Overcurrent Protection	Fine as is
	422.31(A)	Branch-circuit overcurrent protective device	Branch-Circuit OCPD
	422.60(A)	Overcurrent Protection	Fine as is
	422.62(B)(1). (X2)	Overcurrent protective device	OCPD
17	**Article 424**		
	424.19	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	424.19(A)	Supplementary Overcurrent Protection	Fine as is
	424.19(A)	Supplementary Overcurrent Protection	Fine as is
	424.19(A)	Supplementary Overcurrent Protective Device(s)	Supplementary OCPDs
	424.19(B)	Supplementary Overcurrent Protection	Fine as is
	424.22	Overcurrent Protection	Fine as is
	424.22(A)	Overcurrent Protection	Fine as is
	424.22(A)	protected against overcurrent	"..shall be permitted to have overcurrent protection.."
	424.22(B)	Supplementary Overcurrent Protective Device	Supplementary OCPD
	424.22(C). Title	Overcurrent Protective Devices	Fine as is
	424.22(C)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs

	424.22(C)	Overcurrent Protection	Fine as is
	424.22(C)	Supplementary Overcurrent Protection	Fine as is
	424.22(D) (X2)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	424.22(E). (X3)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	424.72	Overcurrent Protection	Fine as is
	424.72(A)	Overcurrent protective device	OCPD
	424.72(B)	Overcurrent protective device	OCPD
	424.72(C). Title	Supplementary Overcurrent Protective Devices	Fine as is
	424.72(C)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	424.72(C)	Overcurrent Protection	Fine as is
	424.72(D). Title	Supplementary Overcurrent Protective Devices	Fine as is
	424.72(D).	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	424.72(D)	Overcurrent protective device	OCPD
	424.72(E)	Supplementary Overcurrent Protective Devices. (X3)	Supplementary OCPDs
	424.82	Overcurrent protective devices	OCPDs
17	**Article 425**		
	425.19	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	425.19(A). (X2)	Supplementary Overcurrent Protection	Fine as is
	425.19(A)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	425.19(B)	Supplementary Overcurrent Protection	Fine as is
	425.22. Title	Overcurrent Protection	Fine as is
	425.22(A)	Overcurrent Protection	Fine as is
	425.22(A)	protected against overcurrent	"..shall be permitted to have overcurrent protection.."
	425.22(B)	Supplementary Overcurrent Protective Device	Supplementary OCPD
	425.22(C). Title	Overcurrent Protective Devices	Fine as is
	425.22(C)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	425.22(C). (X2)	Supplementary Overcurrent Protection	Fine as is
	425.22(D). Title	Supplementary Overcurrent Protective Devices	Fine as is
	425.22(D). (X2)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	425.22(E) (X3)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	425.72	Overcurrent Protection	Fine as is
	425.72(A)	Overcurrent protective device	OCPD
	425.72(B)	Overcurrent protective device	OCPD
	425.72(C). Title	Supplementary Overcurrent Protective Devices	Fine as is
	425.72(C)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs

	425.72(C)	Overcurrent Protection	Fine as is
	425.72(D)	Overcurrent protection	Fine as is
	425.72(E). Title	Supplementary Overcurrent Protective Devices	Fine as is
	425.72(E)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	425.72(E)	Overcurrent Protective Devices	OCPD
	425.72(F). (X3)	Supplementary Overcurrent Protective Devices	Supplementary OCPDs
	425.82	Overcurrent protective devices	OCPDs
17	**Article 427**		
	427.57	Overcurrent Protection	Fine as is
	427.57	considered protected against Overcurrent	considered to have overcurrent protection
17	**Article 680**		
	680.10.(A)& (B)(2)	Overcurrent protective devices	OCPDs
	680.23(F)(2)	Overcurrent Protection	Fine as is

CMP-10 TG-4 Review of Overcurrent Language for the Articles undeer the purview of CMP-18			
CMP	**NEC Section (using First Draft of 2026 NEC)**	**Current Language**	**"New" Language**
18	**Article 393**		
	393.45. Title	Overcurrent ..... Protection	Overcurrent Protection ....
	393.45(A)	Overcurrent Protection	Fine as is
18	**Article 406**		
	406.46(F)	Overcurrent Device	OCPD
18	**Article 410**		
	410.59(A)	Branch-circuit overcurrent devices	Branch-Circuit OCPD
	410.153	Overcurrent Protection	Fine as is
18	**Article 600**		
	600.41	Overcurrent	CMP to Review

Public Comment No. 493-NFPA 70-2024 [Global Input]

The Correlating Committee directs CMPs 1, 10, and 15 to consider use of two defined terms in the NEC, “panelboard” and “enclosure” arranged as “panelboard enclosure” which provides a suitable replacement for the current term “enclosed panelboard”. CMP 10 has deleted the term “enclosed panelboard”

Additional Proposed Changes

File Name	Description	Approved
CN_140.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 140 appeared in the First Draft Report on First Revision No. 8903.

The Correlating Committee directs CMPs 1, 10, and 15 to consider use of two defined terms in the NEC, “panelboard” and “enclosure” arranged as “panelboard enclosure” which provides a suitable replacement for the current term “enclosed panelboard”. CMP 10 has deleted the term “enclosed panelboard”

Related Item

- First Revision No. 8903

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 20:00:23 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected
Resolution: It was verified that none of the NEC provisions of Articles (under CMP-10’s purview) contain the words “enclosed panelboard.” Therefore, no action is necessary.

Correlating Committee Note No. 140-NFPA 70-2024 [Global Input]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Wed May 08 16:47:26 EDT 2024

Committee Statement and Meeting Notes

Committee Statement: The Correlating Committee directs CMPs 1, 10, and 15 to consider use of two defined terms in the NEC, “panelboard” and “enclosure” arranged as “panelboard enclosure” which provides a suitable replacement for the current term “enclosed panelboard”. CMP 10 has deleted the term “enclosed panelboard”

Committee Notes:

Date	Submitted By	
May 8, 2024	Sarah Caldwell	CMP 1, 10 and 15

First Revision No. 8903-NFPA 70-2024 [Definition: Panelboard, Enclosed. (Enclosed Panelboard)]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
10 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.

Bowmer, Trevor N.

Holub, Richard A.

Jackson, Peter D.

Kendall, David H.

Manche, Alan

Osborne, Robert D.

Porter, Christine T.

Schultheis, Timothy James

Williams, David A.

Negative with Comment

Hickman, Palmer L.

For correlation, "enclosed panelboard" continues to be the correct definition and term as added and used in the 2023 NEC.

Public Comment No. 861-NFPA 70-2024 [Article 100]

Article 100 Definitions

Scope. This article contains only those definitions essential to the application of this code. It is not intended to include commonly defined general terms or commonly defined technical terms from related codes and standards. An article number in parentheses following the definition indicates that the definition only applies to that article.

Informational Note: A definition that is followed by a reference in brackets has been extracted from one of the following standards. Only editorial changes were made to the extracted text to make it consistent with this code.

(1) NFPA 30A-2024, *Code for Motor Fuel Dispensing Facilities and Repair Garages*

(2) NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials*

(3) NFPA 75-2024, *Standard for the Fire Protection of Information Technology Equipment*

(4) NFPA 79-2024, *Electrical Standard for Industrial Machinery*

(5) NFPA 99-2024, *Health Care Facilities Code*

(6) NFPA 101®-2024, *Life Safety Code®*

(7) NFPA 110-2025, *Standard for Emergency and Standby Power Systems*

(8) NFPA 303-2026, *Fire Protection Standard for Marinas and Boatyards*

(9) NFPA 307-2026, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*

(10) NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*

(11) NFPA 501-2024, *Standard on Manufactured Housing*

(12) NFPA 790-2024, *Standard for Competency of Third-Party Field Evaluation Bodies*

(13) NFPA 1192-2026, *Standard on Recreational Vehicles*

Accessible (as applied to equipment).

Capable of being reached for operation, renewal, and inspection. (CMP-1)

Accessible (as applied to wiring methods).

Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in or blocked by the structure, other electrical equipment, other building systems, or finish of the building. (CMP-1)

Accessible, Readily. (Readily Accessible)

Capable of being reached quickly for operation, renewal, or inspection without requiring those to whom ready access is requisite to take actions, such as to use tools (other than keys), to climb over or under, to remove obstacles, or to resort to portable ladders, and so forth. (CMP-1)

Informational Note: Use of keys is a common practice under controlled or supervised conditions and a common alternative to the ready access requirements under such supervised conditions as provided elsewhere in the *NEC* .

Adapter.

A device used to adapt a circuit from one configuration of an attachment plug or receptacle to another configuration with the same current rating. (520) (CMP-15)

Adjustable Speed Drive.

Power conversion equipment that provides a means of adjusting the speed of an electric motor. (CMP-11)

Informational Note: A variable frequency drive is one type of electronic adjustable speed drive that controls the rotational speed of an ac electric motor by controlling the frequency and voltage of the electrical power supplied to the motor.

Adjustable Speed Drive System.

A combination of an adjustable speed drive, its associated motor(s), and auxiliary equipment. (CMP-11)

Aircraft Painting Hangar.

An aircraft hangar constructed for the express purpose of spraying, coating, and/or dipping applications and provided with dedicated ventilation supply and exhaust. (CMP-14)

Ambulatory Health Care Occupancy.

An occupancy used to provide services or treatment simultaneously to four or more patients that provides, on an outpatient basis, one or more of the following:

(1) Treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others.

(2) Anesthesia that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others.

(3) Treatment for patients who, due to the nature of their injury or illness, are incapable of taking action for self-preservation under emergency conditions without the assistance of others.

[***101*** **:** 3.3.198.1] (517) (CMP-15)

Ampacity.

The maximum current, in amperes, that a conductor can carry continuously under the conditions of use without exceeding its temperature rating. (CMP-6)

Amplifier (Audio Amplifier) (Pre-Amplifier).

Electronic equipment that increases the current or voltage, or both, of an audio signal intended for use by another piece of audio equipment. Amplifier is the term used to denote an audio amplifier. (640) (CMP-12)

Appliance.

Utilization equipment, generally other than industrial, that is normally built in a standardized size or type and is installed or connected as a unit to perform one or more functions such as clothes washing, air-conditioning, food mixing, and deep frying. (CMP-17)

Applicator.

The device used to transfer energy between the output circuit and the object or mass to be heated. (665) (CMP-12)

Approved.

Acceptable to the authority having jurisdiction. (CMP-1)

Arc-Fault Circuit Interrupter (AFCI).

A device intended to provide protection from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to de-energize the circuit when an arc fault is detected. (CMP-2)

Array (PV Array) (Solar PV Array).

A mechanically and electrically integrated grouping of solar PV modules with mounting system, including any attached system components such as inverters or dc-to-dc converters and attached associated wiring. (690) (CMP-4)

Artificially Ventilated Room "v".

A room volume protected by artificial ventilation and of sufficient size to permit the entry of a person who might occupy the room. (CMP-14)

Informational Note: see ANSI/UL 60079-13, *Explosive Atmospheres — Part 13: Equipment Protection by Pressurized Room "p" and Artificially Ventilated Room "v"* , for information on the requirements for rooms intended for human entry where artificial ventilation is used as a means of reducing the risk of explosion.

Askarel.

A generic term for a group of nonflammable synthetic chlorinated hydrocarbons used as electrical insulating media. (CMP-9)

Informational Note: Askarels of various compositional types are used. Under arcing conditions, the gases produced, while consisting predominantly of noncombustible hydrogen chloride, can include varying amounts of combustible gases, depending on the askarel type.

Associated Apparatus.

Apparatus in which the circuits are not necessarily intrinsically safe themselves but that affects the energy in the intrinsically safe circuits and is relied on to maintain intrinsic safety. Such apparatus is one of the following:

(1) Electrical apparatus that has an alternative type of protection for use in the appropriate hazardous (classified) location

(2) Electrical apparatus not so protected that shall not be used within a hazardous (classified) location

(CMP-14)

Informational Note No. 1: Associated apparatus has identified intrinsically safe connections for intrinsically safe apparatus and also might have connections for nonintrinsically safe apparatus.

Informational Note No. 2: An example of associated apparatus is an intrinsic safety barrier, which is a network designed to limit the energy (voltage and current) available to the protected circuit in the hazardous (classified) location under specified fault conditions.

Informational Note No. 3: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* ; and ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for additional information.

Associated Nonincendive Field Wiring Apparatus.

Apparatus in which the circuits are not necessarily nonincendive themselves but that affects the energy in nonincendive field wiring circuits and is relied on to maintain nonincendive energy levels. Such apparatus is one of the following:

(1) Electrical apparatus that has an alternative type of protection for use in the appropriate hazardous (classified) location

(2) Electrical apparatus not so protected that shall not be used within a hazardous (classified) location

(CMP-14)

Informational Note No. 1: Associated nonincendive field wiring apparatus has designated associated nonincendive field wiring apparatus connections for nonincendive field wiring apparatus and also might have connections for other electrical apparatus.

Informational Note No. 2: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Attachment Fitting, Weight-Supporting (WSAF) (Weight-Supporting Attachment Fitting).

A device that, by insertion into a weight-supporting ceiling receptacle, establishes a connection between the conductors of the attached utilization equipment and the branch-circuit conductors connected to the weight-supporting ceiling receptacle. (CMP-18)

Informational Note No. 1: A weight-supporting attachment fitting is different from an attachment plug because no cord is associated with the fitting. A weight-supporting attachment fitting in combination with a weight-supporting ceiling receptacle secures the associated utilization equipment in place and supports its weight.

Informational Note No. 2: See ANSI/NEMA WD 6, *American National Standard for Wiring Devices — Dimensional Specifications* , for the standard configuration of weight-supporting attachment fittings and related weight-supporting ceiling receptacles.

Attachment Plug (Plug Cap) (Plug).

A device that, by insertion in a receptacle, establishes a connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle. (CMP-18)

Audio Autotransformer.

A transformer with a single winding and multiple taps intended for use with an amplifier loudspeaker signal output. (640) (CMP-12)

Audio Signal Processing Equipment (Audio Equipment).

Electrically operated equipment that produces, processes, or both, electronic signals that, when appropriately amplified and reproduced by a loudspeaker, produce an acoustic signal within the range of normal human hearing (typically 20–20 kHz). Within Article 640, the terms equipment and audio equipment are assumed to be equivalent to audio signal processing equipment. (640) (CMP-12)

Informational Note: This equipment includes, but is not limited to, loudspeakers; headphones; pre-amplifiers; microphones and their power supplies; mixers; MIDI (musical instrument digital interface) equipment or other digital control systems; equalizers, compressors, and other audio signal processing equipment; and audio media recording and playback equipment, including turntables, tape decks and disk players (audio and multimedia), synthesizers, tone generators, and electronic organs. Electronic organs and synthesizers may have integral or separate amplification and loudspeakers. With the exception of amplifier outputs, virtually all such equipment is used to process signals (using analog or digital techniques) that have nonhazardous levels of voltage or current.

Audio System.

The totality of all equipment and interconnecting wiring used to fabricate a fully functional audio signal processing, amplification, and reproduction system. (640) (CMP-12)

Audio Transformer.

A transformer with two or more electrically isolated windings and multiple taps intended for use with an amplifier loudspeaker signal output. (640) (CMP-12)

Authority Having Jurisdiction (AHJ).

An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. (CMP-1)

Informational Note: The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

Automatic.

Performing a function without the necessity of human intervention. (CMP-1)

Bathroom.

An area including a sink with one or more of the following: a toilet, a urinal, a tub, a shower, a bidet, or similar plumbing fixtures. (CMP-2)

Battery.

A single cell or a group of cells connected together electrically in series, in parallel, or a combination of both. (CMP-13)

Battery, Flow. (Flow Battery)

An energy storage component that stores its active materials in the form of one or two electrolytes external to the reactor interface. When in use, the electrolytes are transferred between reactor and storage tanks. (706) (CMP-13)

Informational Note: Three commercially available flow battery technologies are zinc air, zinc bromine, and vanadium redox, sometimes referred to as *pumped electrolyte ESS* .

Battery, Sealed. (Sealed Battery)

A battery that has no provision for the routine addition of water or electrolyte or for external measurement of electrolyte specific gravity and might contain pressure relief venting. (CMP-13)

Battery, Stationary Standby. (Stationary Standby Battery)

A battery that spends the majority of the time on continuous float charge or in a high state of charge, in readiness for a discharge event. (CMP-13)

Informational Note: Uninterruptible Power Supply (UPS) batteries are an example that falls under this definition.

Battery-Powered Lighting Units.

Individual unit equipment for backup illumination consisting of a rechargeable battery; a battery-charging means; provisions for one or more lamps mounted on the equipment, or with terminals for remote lamps, or both; and a relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment. (517) (CMP-15)

Berth.

The water space to be occupied by a boat or other vessel alongside or between bulkheads, piers, piles, fixed and floating docks, or any similar access structure. [**303:** 3.3.2] (555) (CMP-7)

Informational Note: See the definition of *Slip* for additional information.

Bipolar Circuit.

A dc circuit that is comprised of two monopole circuits, each having an opposite polarity connected to a common reference point. (CMP-4)

Block.

A square or portion of a city, town, or village enclosed by streets and including the alleys so enclosed, but not any street. (800) (CMP-16)

Boatyard.

A facility used for constructing, repairing, servicing, hauling from the water, storing (on land and in water), and launching of boats. [**303:** 3.3.3] (555) (CMP-7)

Bodies of Water, Artificially Made. (Artificially Made Bodies of Water)

Bodies of water that have been constructed or modified to fit some decorative or commercial purpose such as, but not limited to, aeration ponds, fish farm ponds, storm retention basins, treatment ponds, and irrigation (channel) facilities. Water depths may vary seasonally or be controlled. (682) (CMP-7)

Bodies of Water, Natural. (Natural Bodies of Water)

Bodies of water such as lakes, streams, ponds, rivers, and other naturally occurring bodies of water, which may vary in depth throughout the year. (682) (CMP-7)

Bonded (Bonding).

Connected to establish electrical continuity and conductivity. (CMP-5)

Bonding Conductor (Bonding Jumper).

A conductor that ensures the required electrical conductivity between metal parts that are required to be electrically connected. (CMP-5)

Bonding Conductor, Equipment. (Equipment Bonding Conductor)

The connection between two or more portions of the equipment grounding conductor. (CMP-5)

Bonding Conductor, Grounding Electrode (Grounding Electrode Bonding Jumper). (Grounding Electrode Bonding Conductor)

A conductor, other than the grounding electrode conductor, used to interconnect two or more grounding electrodes to form the grounding electrode system. (CMP-5)

Bonding Conductor, Main (Main Bonding Jumper). (Main Bonding Conductor)

The connection between the grounded circuit conductor and the equipment grounding conductor, or the supply-side bonding conductor, or both, at the service equipment. (CMP-5)

Bonding Conductor, Supply-Side (Supply-Side Bonding Jumper). (Supply-Side Bonding Conductor)

A conductor installed on the supply side of a service or within a service equipment enclosure(s), or for a separately derived system, that ensures the required electrical conductivity between metal parts required to be electrically connected. (CMP-5)

Bonding Conductor, System (System Bonding Jumper). (System Bonding Conductor)

The connection between the grounded circuit conductor and the supply-side bonding conductor, or the equipment grounding conductor, or both, at a separately derived system. (CMP-5)

Bonding Jumper, Impedance. (Impedance Bonding Jumper).

The connection in an impedance grounded system between the equipment grounding conductor(s) and the grounding electrode side of the impedance grounding device. (CMP-5)

Border Light.

A permanently installed overhead strip light. (520) (CMP-15)

Bottom Shield.

A protective layer that is installed between the floor and flat conductor cable (Type FCC) to protect the cable from physical damage and may or may not be incorporated as an integral part of the cable. (324) (CMP-6)

Branch Circuit (Branch-Circuit).

The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s). (CMP-2)

Branch Circuit, Appliance. (Appliance Branch Circuit)

A branch circuit that supplies energy to one or more outlets to which appliances are to be connected and that has no permanently connected luminaires that are not a part of an appliance. (CMP-2)

Branch Circuit, General-Purpose. (General-Purpose Branch Circuit)

A branch circuit that supplies two or more receptacles or outlets for lighting and appliances. (CMP-2)

Branch Circuit, Individual. (Individual Branch Circuit)

A branch circuit that supplies only one utilization equipment. (CMP-2)

Branch Circuit, Motor. (Motor Branch Circuit)

The circuit conductors, including equipment, between the motor branch-circuit short-circuit and ground-fault protective device and an individual motor. (CMP-11)

Branch Circuit, Multiwire. (Multiwire Branch Circuit)

A branch circuit that consists of two or more ungrounded conductors that have a voltage between them, and a neutral conductor that has equal voltage between it and each ungrounded conductor of the circuit and that is connected to the neutral conductor of the system. (CMP-2)

Branch-Circuit Selection Current (BCSC).

The value in amperes to be used instead of the rated-load current in determining the ratings of motor branch-circuit conductors, disconnecting means, controllers, and branch-circuit short-circuit and ground-fault protective devices wherever the running overload protective device permits a sustained current greater than the specified percentage of the rated-load current. The value of branch-circuit selection current will always be equal to or greater than the marked rated-load current. (440) (CMP-11)

Breakout Assembly.

An adapter used to connect a multipole connector containing two or more branch circuits to multiple individual branch-circuit connectors. (520) (CMP-15)

Broadband.

Wide bandwidth data transmission that transports multiple signals, protocols, and traffic types over various media types. (CMP-16)

Building.

A structure that stands alone or that is separated from adjoining structures by fire walls. (CMP-1)

Building, Floating. (Floating Building)

A building that floats on water, is moored in a permanent location, and has a premises wiring system served through connection by permanent wiring to an electrical supply system not located on the premises. (CMP-7)

Building, Manufactured. (Manufactured Building)

Any building that is of closed construction and is made or assembled in manufacturing facilities on or off the building site for installation, or for assembly and installation on the building site, other than manufactured homes, mobile homes, park trailers, or recreational vehicles. (545) (CMP-7)

Building Component.

Any subsystem, subassembly, or other system designed for use in or integral with or as part of a structure, which can include structural, electrical, mechanical, plumbing, and fire protection systems, and other systems affecting health and safety. (545) (CMP-7)

Building System.

Plans, specifications, and documentation for a system of manufactured building or for a type or a system of building components, which can include structural, electrical, mechanical, plumbing, and fire protection systems, and other systems affecting health and safety, and including such variations thereof as are specifically permitted by regulation, and which variations are submitted as part of the building system or amendment thereto. (545) (CMP-7)

Bulkhead.

A vertical structural wall, usually of stone, timber, metal, concrete, or synthetic material, constructed along, and generally parallel to, the shoreline to retain earth as an extension of the upland, and often to provide suitable water depth at the waterside face. [**303:** 3.3.5] (555) (CMP-7)

Bull Switch.

An externally operated wall-mounted safety switch that can contain overcurrent protection and is designed for the connection of portable cables and cords. (530) (CMP-15)

Bundled.

Cables or conductors that are tied, wrapped, taped, or otherwise periodically bound together. (520) (CMP-15)

Busbar (as applied to low-voltage suspended ceiling power distribution systems).

A noninsulated conductor electrically connected to the source of supply and physically supported on an insulator providing a power rail for connection to utilization equipment, such as sensors, actuators, A/V devices, low-voltage luminaire assemblies, and similar electrical equipment. (393) (CMP-18)

Busbar Support (as applied to low-voltage suspended ceiling power distribution systems).

An insulator that runs the length of a section of suspended ceiling bus rail that serves to support and isolate the busbars from the suspended grid rail. (393) (CMP-18)

Busway.

A raceway consisting of a metal enclosure containing factory-mounted, bare or insulated conductors, which are usually copper or aluminum bars, rods, or tubes. (CMP-8)

Cabinet.

An enclosure that is designed for either surface mounting or flush mounting and is provided with a frame, mat, or trim in which a swinging door or doors are or can be hung. (CMP-8)

Cable, Abandoned. (Abandoned Cable)

Installed cable that is not terminated at equipment other than a termination fitting or a connector and is not identified for future use with a tag. (CMP-3)

Informational Note: See 640.6(B) , 645.6(G) , 760.25, 770.25, 790.25, and 800.25 for requirements covering the removal of abandoned cables.

Cable, Armored (Type AC). (Armored Cable)

A fabricated assembly of insulated conductors in a flexible interlocked metallic armor. (CMP-6)

Cable, Circuit Integrity (CI). (Circuit Integrity Cable)

Cable(s) marked with the suffix "-CI" used for remote-control, signaling, power-limited, fire alarm, optical fiber, or communications systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions. (CMP-3)

Informational Note: See 772.4 for power circuits installed for survivability.

Cable, Coaxial. (Coaxial Cable)

A cylindrical assembly composed of a conductor centered inside a metallic tube or shield, separated by a dielectric material, and usually covered by an insulating jacket. (CMP-3)

Cable, Festoon. (Festoon Cable)

Single- and multiple-conductor cable intended for use and installation where flexibility is required. (610) (CMP-12)

Cable, Flat Conductor (Type FCC). (Flat Conductor Cable)

Three or more separate flat copper conductors placed horizontally edge-to-edge and enclosed within an insulating assembly. (324) (CMP-6)

Cable, Instrumentation Tray (Type ITC). (Instrumentation Tray Cable)

A factory assembly of two or more insulated conductors, with or without an equipment grounding conductor(s), enclosed in a nonmetallic sheath. (CMP-3)

Cable, Integrated Gas Spacer (Type IGS). (Integrated Gas Spacer Cable)

A factory assembly of one or more conductors, each individually insulated and enclosed in a loose fit, nonmetallic flexible conduit as an integrated gas spacer cable rated 0 volts through 600 volts. (CMP-6)

Cable, Limited Use. (Limited-Use Cable)

Cables that are intended to be used with protection such as a raceway or for specific restricted applications. (CMP-3)

Informational Note: Limited use cables are denoted by an "X" suffix, for example Types CL2X or CMX.

Cable, Medium Voltage(Type MV). (Medium Voltage Cable)

A single or multiconductor solid dielectric insulated cable rated 2001 volts up to and including 35,000 volts, nominal. (CMP-6)

Cable, Metal Clad (Type MC). (Metal Clad Cable)

A factory assembly of one or more insulated circuit conductors with or without optical fiber members enclosed in an armor of interlocking metal tape, or a smooth or corrugated metallic sheath. (CMP-6)

Cable, Metallic Conductor. (Metallic Conductor Cable)

A factory assembly of two or more conductors having an overall covering. (CMP-3)

Cable, Mineral-Insulated, Metal-Sheathed (Type MI). (Mineral-Insulated, Metal-Sheathed Cable)

A factory assembly of one or more conductors insulated with a highly compressed refractory mineral insulation and enclosed in a liquidtight and gastight continuous copper or alloy steel sheath. (CMP-6)

Cable, Nonmetallic-Sheathed.

A factory assembly of two or more insulated conductors enclosed within an overall nonmetallic jacket. (CMP-6)

Cable, Nonmetallic-Sheathed (Type NM).

Insulated circuit conductors and a bare, covered, or insulated equipment grounding conductor enclosed within an overall nonmetallic jacket. (CMP-6)

Cable, Nonmetallic-Sheathed (Type NMC).

Insulated circuit conductors and a bare, covered, or insulsated equipment grounding conductor enclosed within an overall, corrosion resistant, nonmetallic jacket. (CMP-6)

Cable, Optical Fiber. (Optical Fiber Cable)

A factory assembly or field assembly of one or more optical fibers having an overall covering. (CMP-16)

Informational Note: A field-assembled optical fiber cable is an assembly of one or more optical fibers within a jacket. The jacket, without optical fibers, is installed in a manner similar to conduit or raceway. Once the jacket is installed, the optical fibers are inserted into the jacket, completing the cable assembly.

Cable, Optical Fiber, Conductive. (Conductive Optical Fiber Cable)

A factory assembly of one or more optical fibers having an overall covering and containing non-current-carrying conductive member(s) such as metallic strength member(s), metallic vapor barrier(s), metallic armor, or metallic sheath. (CMP-16)

Cable, Optical Fiber, Hybrid. (Hybrid Optical Fiber Cable)

A cable containing optical fibers and current-carrying electrical conductors. (CMP-16)

Cable, Optical Fiber, Nonconductive. (Nonconductive Optical Fiber Cable)

A factory assembly of one or more optical fibers having an overall covering and containing no electrically conductive materials. (CMP-16)

Cable, Optical Fiber, Protected. (Protected Optical Fiber Cable)

Optical fiber cable protected from releasing optical radiation into the atmosphere during normal operating conditions and foreseeable malfunctions by additional armoring, conduit, cable tray, or raceway. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Cable, Portable Power Feeder. (Portable Power Feeder Cable)

One or more flexible shielded insulated power conductors enclosed in a flexible covering rated from 2001 to 25,000 volts. (CMP-6)

Cable, Power and Control Tray (Type TC). (Power and Control Tray Cable)

A factory assembly of two or more insulated conductors, with or without associated bare or covered equipment grounding conductors, under a nonmetallic jacket. (CMP-6)

Cable, Power-Limited Tray (Type PLTC). (Power-Limited Tray Cable)

A factory assembly of two or more insulated conductors rated at 300 volts, with or without associated bare or insulated equipment grounding conductors, under a nonmetallic jacket. (CMP-3)

Cable, Service. (Service Cable)

Service conductors made up in the form of a cable. (CMP-10)

Cable, Service Entrance. (Service Entrance Cable)

A single conductor or multiconductor cable provided with an overall covering, primarily used for services. (CMP-6)

Cable, Service Entrance (Type SE).

Service-entrance cable having a flame-retardant, moisture-resistant covering. (CMP-6)

Cable, Service Entrance (Type USE).

Service-entrance cable, identified for underground use, having a moisture-resistant covering, but not required to have a flame-retardant covering. (CMP-6)

Cable, Type P.

A factory assembly of one or more insulated flexible tinned copper conductors, with associated equipment grounding conductor(s), with or without a braided metallic armor and with an overall nonmetallic jacket. (CMP-6)

Cable, Under Carpet. (Under Carpet Cable)

Cables that are intended to be used under carpeting, floor covering, modular tiles, and planks. (722) (CMP-3)

Cable, Underground Feeder and Branch-Circuit (Type UF). (Underground Feeder and Branch-Circuit Cable)

A factory assembly of one or more insulated conductors with an integral or an overall covering of nonmetallic material suitable for direct burial in the earth. (CMP-6)

Cable Assembly, Flat (Type FC). (Flat Cable Assembly)

An assembly of parallel conductors formed integrally with an insulating material web specifically designed for field installation in surface metal raceway. (CMP-6)

Cable Bundle.

A group of cables that are tied together or in contact with one another in a closely packed configuration for at least 1.0 m (40 in.). (CMP-3)

> Informational Note: Random or loose installation of individual cables can result in less heating. Combing of the cables can result in less heat dissipation and more signal cross talk between cables.

Cable Connector.

A connector designed to join flat conductor cables (Type FCC) without using a junction box. (324) (CMP-6)

Cable Connector [as applied to hazardous (classified) locations].

An electrical device that is part of a cable assembly and that, by insertion of two mating configurations, establishes a connection between the conductors of the cable assembly and the conductors of a fixed piece of equipment. (CMP-14)

> Informational Note No. 1: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for information on the use of cable connectors.
>
> Informational Note No. 2: Cable connectors in other than hazardous (classified) locations are referred to as male and female fittings.
>
> Informational Note No. 3: See ANSI/UL 2238, *Cable Assemblies and Fittings for Industrial Control and Signal Distribution* , and ANSI/UL 2237, *Multi-Point Interconnection Power Cable Assemblies for Industrial Machinery* , for examples of standards on male and female fittings in other than hazardous (classified) locations.

Cable Joint.

A connection consisting of an insulation system and a connector where two (or more) medium voltage (Type MV) cables are joined together. (CMP-6)

Cable Management System.

An apparatus designed to control and organize lengths of cable or cord. (CMP-12)

Cable Routing Assembly.

A single channel or connected multiple channels, as well as associated fittings, forming a structural system that is used to support and route communications wires and cables, optical fiber cables, data cables associated with information technology and communications equipment, Class 2, Class 3, Class 4, and Type PLTC cables, and power-limited fire alarm cables in plenum, riser, and general-purpose applications. (CMP-3)

Cable Sheath.

A single or multiple layers of a protective covering that holds and protects the conductors or optical fibers, or both, contained inside. (CMP-3)

Cable System, Fire-Resistive. (Fire-Resistive Cable System)

A cable and components used to ensure survivability of critical circuits for a specified time under fire conditions. (CMP-3)

Cable System, Flat Conductor. (Flat Conductor Cable System)

A complete wiring system for branch circuits that is designed for installation under carpet squares. (324) (CMP-6)

> Informational Note: The FCC system includes Type FCC cable and associated shielding, connectors, terminators, adapters, boxes, and receptacles.

Cable Termination.

A connection consisting of an insulation system and a connector and installed on a medium voltage (Type MV) cable to connect from a cable to a device, such as equipment. (CMP-6)

Cable Tie.

A band or length of material employing a locking device, used for bundling, securing, and/or supporting cable, flexible conduit, or flexible tubing.

> Informational Note: The following are cable tie and cable tie fixing device type designations:
>
> (1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.
>
> (2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tie Fixing Device.

A component, such as a block or bracket, specifically designed to secure cable tie(s) to a mounting surface.

Informational Note: The following are cable tie and cable tie fixing device type designations:

(1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

(2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tie Integral Device.

A single component, as produced, incorporating a cable tie and a cable tie fixing device that are not separable.

Note: The following are cable tie and cable tie fixing device type designations:

(1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

(2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tray System.

A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways. (CMP-8)

Cablebus.

An assembly of units or sections with insulated conductors having associated fittings forming a structural system used to securely fasten or support conductors and conductor terminations in a completely enclosed, ventilated, protective metal housing. This assembly is designed to carry fault current and to withstand the magnetic forces of such current. (CMP-8)

Informational Note: Cablebus is ordinarily assembled at the point of installation from the components furnished or specified by the manufacturer in accordance with instructions for the specific job.

Cannabis Oil Booths.

Enclosed areas used to house cannabis oil equipment and systems.

Informational Note: Cannabis oil booths can be designed to house a single piece or multiple pieces of cannabis oil equipment. Booths range in size and can be large enough to permit entrance of personnel to perform the processing tasks.

Cannabis Oil Extraction Equipment.

Equipment that uses flammable materials (solvents) in the process of extracting the plant oil from the plant material.

Informational Note: Extraction equipment can use flammable materials as solvents to extract the plant oil from the plant material by saturating the plant material in a vented container, sealed container, or pressure vessel. Typical flammable materials used in the extraction process include butane, ethanol, hexane, pentane, propane, and LPG.

Cannabis Oil Post-Processing Equipment.

Equipment that is used in the final processing stages of the extracted plant oil (e.g., vacuum ovens, rotary evaporators, solvent recovery pumps).

Cannabis Oil Preparatory Equipment.

Equipment that is used to prepare the plant material for subsequent extraction of the plant oil (e.g., trimming, deseeding, drying/curing).

Cannabis Oil Systems.

Any combination of cannabis oil equipment needed for the overall extraction process (e.g., cannabis oil preparatory equipment, cannabis oil extraction equipment, cannabis oil booths, cannabis oil post-processing equipment).

Cell (as applied to batteries).

The basic electrochemical unit, characterized by an anode and a cathode, used to receive, store, and deliver electrical energy. (CMP-13)

Cell, Sealed. (Sealed Cell)

A cell that has no provision for the routine addition of water or electrolyte or for external measurement of electrolyte specific gravity and might contain pressure relief venting. (CMP-13)

Cell Line.

An assembly of electrically interconnected electrolytic cells supplied by a source of direct-current power. (CMP-12)

Cell Line Attachments and Auxiliary Equipment.

A term that includes, but is not limited to, auxiliary tanks; process piping; ductwork; structural supports; exposed cell line conductors; conduits and other raceways; pumps, positioning equipment, and cell cutout or bypass electrical devices. Auxiliary equipment includes tools, welding machines, crucibles, and other portable equipment used for operation and maintenance within the electrolytic cell line working zone. In the cell line working zone, auxiliary equipment includes the exposed conductive surfaces of ungrounded cranes and crane-mounted cell-servicing equipment. (668) (CMP-12)

Charge Controller.

Equipment that controls dc voltage or dc current, or both, and that is used to charge a battery or other energy storage device. (CMP-13)

Charger Power Converter.

The device used to convert energy from the power grid to a high-frequency output for wireless power transfer. (625) (CMP-12)

Child Care Facility.

A building or structure, or portion thereof, for educational, supervisory, or personal care services for more than four children 7 years old or less. (406) (CMP-18)

Circuit, Power-Limited. (Power-Limited Circuit)

An electrical circuit that is designed to provide acceptable protection from fire initiation and electrical shock by limiting the amount of power delivered into a fault by the power supply. (CMP-3)

Circuit Breaker.

A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating. (CMP-10)

Informational Note: The automatic opening means can be integral, direct acting with the circuit breaker, or remote from the circuit breaker.

Circuit Breaker, Adjustable. (Adjustable Circuit Breaker)

A qualifying term indicating that the circuit breaker can be set to trip at various values of current, time, or both, within a predetermined range. (CMP-10)

Circuit Breaker, Instantaneous Trip. (Instantaneous Trip Circuit Breaker)

A qualifying term indicating that no delay is purposely introduced in the tripping action of the circuit breaker. (CMP-10)

Circuit Breaker, Inverse Time. (Inverse Time Circuit Breaker)

A qualifying term indicating that there is a delay purposely introduced in the tripping action of the circuit breaker, and the delay decreases as the magnitude of the current increases. (CMP-10)

Circuit Breaker, Nonadjustable. (Nonadjustable Circuit Breaker)

A qualifying term indicating that the circuit breaker does not have any adjustment to alter the value of the current at which it will trip or the time required for its operation. (CMP-10)

Class 1 Circuit.

The portion of the wiring system between the load side of the Class 1 power source and the connected equipment. (CMP-3)

Class 2 Circuit.

The portion of the wiring system between the load side of a Class 2 power source and the connected equipment. (CMP-3)

> Informational Note: The design of a Class 2 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock due to its power limitations.

Class 3 Circuit.

The portion of the wiring system between the load side of a Class 3 power source and the connected equipment. (CMP-3)

> Informational Note: The design of a Class 3 circuit considers safety from a fire initiation standpoint. Since higher levels of voltage and current than a Class 2 circuit are permitted, additional safeguards are specified to provide acceptable protection from electric shock.

Class 4 Circuit.

The portion of the wiring system between the load side of a Class 4 transmitter and the Class 4 receiver or Class 4 utilization equipment, as appropriate. (CMP-3)

> Informational Note No. 1: A Class 4 circuit is also commonly referred to as a fault-managed power circuit.
>
> Informational Note No. 2: Due to the active monitoring and control of the voltage and current provided, a Class 4 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock.

Class 4 Device.

Any active device connected to the Class 4 circuit; examples include a Class 4 transmitter, a Class 4 receiver, or Class 4 utilization equipment. (CMP-3)

Class 4 Power System.

An actively monitored and controlled system consisting of one or more Class 4 transmitters and one or more Class 4 receivers connected by a cabling system. (CMP-3)

Class 4 Receiver.

A device that accepts Class 4 power and converts it for use by utilization equipment. (CMP-3)

Class 4 Transmitter.

A device that sources Class 4 power. (726) (CMP-3)

> Informational Note: A Class 4 transmitter is different from traditional power sources in that it monitors the line for faults (both line-to-line and line-to-ground) and ceases power transmission if a fault is sensed.

Class 4 Utilization Equipment.

Devices that are directly powered by a Class 4 transmitter without the need for a separate Class 4 receiver (the receiver is integrated into the equipment). (CMP-3)

Closed Construction.

Any building, building component, assembly, or system manufactured in such a manner that all concealed parts of processes of manufacture cannot be inspected after installation at the building site without disassembly, damage, or destruction. (545) (CMP-7)

Clothes Closet.

A nonhabitable room or space intended primarily for storage of garments and apparel. (CMP-1)

Clothes Closet Storage Space.

The area within a clothes closet in which combustible materials can be kept. (410) (CMP-18)

Collector Rings.

An assembly of slip rings for transferring electric energy from a stationary to a rotating member. (675) (CMP-7)

Combiner (DC). (dc Combiner) (Direct-Current Combiner)

An enclosure that includes devices used to connect two or more PV system dc circuits in parallel. (690) (CMP-4)

Combustible Dust.

Solid particles that are 500 µm or smaller (i.e., material passing a U.S. No. 35 Standard Sieve as defined in ASTM E11-17, *Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves*) that can form an explosible mixture when suspended in air at standard atmospheric pressure and temperature. [**499:** 3.3.3] (CMP-14)

> Informational Note: See ASTM E1226, *Standard Test Method for Explosibility of Dust Clouds* ; ISO 6184-1, *Explosion protection systems — Part 1: Determination of explosion indices of combustible dusts in air* ; or ANSI/UL 80079-20-2, *Explosive Atmospheres — Part 20-2: Material Characteristics — Combustible Dusts Test Methods* , for procedures for determining the explosibility of dusts. Historically, explosibility has been described as presenting a flash fire or explosion hazard. It could be understood that potential hazards due to the formation of an explosible mixture when suspended in air at standard atmospheric pressure and temperature would include ignition.

Combustible Gas Detection System.

A protection technique utilizing stationary gas detectors in industrial establishments. (CMP-14)

Commissioning.

The process, procedures, and testing used to set up and verify the initial performance, operational controls, safety systems, and sequence of operation of electrical devices and equipment, prior to it being placed into active service. (CMP-13)

Communications, Data. (Data Communications)

The transfer and reception of information in the form of a digital bitstream or a digitized analog signal transmitted over a point-to-point or point-to-multipoint arrangement. (CMP-16)

Communications Circuit.

A metallic, fiber, or wireless circuit that provides voice/data (and associated power) for communications-related services between communications equipment. (CMP-16)

Informational Note: Because communications can be carried over conductors with power, meeting both this definition and the definition for a powering circuit is possible (e.g., a power line communications device may be used on a branch circuit). The addition of data to a power line circuit does not change the treatment of the circuit in this code.

Communications Circuit, Network-Powered Broadband. (Network-Powered Broadband Communications Circuit)

The circuit extending from the communications utility's or service provider's serving terminal or tap up to and including the network interface unit (NIU). (830) (CMP-16)

Informational Note: A typical one-family dwelling network-powered communications circuit consists of a communications drop or communications service cable and an NIU and includes the communications utility's serving terminal or tap where it is not under the exclusive control of the communications utility.

Communications Circuit, Premises. (Premises Communications Circuit)

The circuit that extends voice, audio, video, data, interactive services, telegraph (except radio), and outside wiring for fire alarm and burglar alarm from the service provider's network terminal to the customer's communications equipment. (840) (CMP-16)

Communications Equipment.

The electronic equipment that performs the telecommunications operations for the transmission of audio, video, and data, and includes power equipment (e.g., dc converters, inverters, and batteries), technical support equipment (e.g., computers), and conductors dedicated solely to the operation of the equipment. (CMP-16)

Informational Note: As the telecommunications network transitions to a more data-centric network, computers, routers, servers, and their powering equipment, are becoming essential to the transmission of audio, video, and data and are finding increasing application in communications equipment installations.

Communications Service Provider.

An organization, business, or individual that offers communications service to others. (CMP-16)

Communications System.

The communications equipment, communication circuits, and manual and machine operations necessary for the transmission, movement, and reception of information (e.g., voice, audio, data). (CMP-16)

Communications Utility.

An organization designated or recognized by an entity such as a public service commission or public utility commission, or recognized as such under federal, state, or local law. (CMP-16)

Community Antenna Television Circuit (CATV).

The circuit that extends community antenna television systems for audio, video, data, and interactive services from the service provider's network terminal to the appropriate customer equipment. (CMP-16)

Concealable Nonmetallic Extension.

A listed assembly of two, three, or four insulated circuit conductors within a nonmetallic jacket, an extruded thermoplastic covering, or a sealed nonmetallic covering. The classification includes surface extensions intended for mounting directly on the surface of walls or ceilings and concealed with paint, texture, joint compound, plaster, wallpaper, tile, wall paneling, or other similar materials. (CMP-6)

Concealed.

Rendered inaccessible by the structure or finish of the building. (CMP-1)

Informational Note: Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them.

Concealed Knob-and-Tube Wiring.

A wiring method using knobs, tubes, and flexible nonmetallic tubing for the protection and support of single insulated conductors. (CMP-6)

Conductor, Bare. (Bare Conductor)

A conductor having no covering or electrical insulation whatsoever. (CMP-6)

Conductor, Copper-Clad Aluminum. (Copper-Clad Aluminum Conductor)

Conductor drawn from a copper-clad aluminum rod, with the copper metallurgically bonded to an aluminum core. (CMP-6)

Conductor, Covered. (Covered Conductor)

A conductor encased within material of composition or thickness that is not recognized by this code as electrical insulation. (CMP-6)

Conductor, Insulated. (Insulated Conductor)

A conductor encased within material of composition and thickness that is recognized by this code as electrical insulation. (CMP-6)

Conductor, Insulated. (Insulated Conductor)

Overhead service conductor encased in a polymeric material adequate for the applied nominal voltage and any conductor types described in 310.4. (396) (CMP-6)

Informational Note: See ICEA S-76-474-2011, *Standard for Neutral Supported Power Cable Assemblies with Weather-Resistant Extruded Insulation Rated 600 Volts* , for information about overhead service conductors.

Conductors, Outdoor Overhead. (Outdoor Overhead Conductors)

Single conductors, insulated, covered, or bare, installed outdoors on support structures in free air. (395) (CMP-6)

Conduit, Flexible Metal (FMC). (Flexible Metal Conduit)

A raceway of circular cross section made of helically wound, formed, interlocked metal strip. (CMP-8)

Conduit, High Density Polyethylene (HDPE). (High Density Polyethylene Conduit)

A nonmetallic raceway of circular cross section, with associated couplings, connectors, and fittings for the installation of electrical conductors. (CMP-8)

Conduit, Intermediate Metal (IMC). (Intermediate Metal Conduit)

A steel threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and appropriate fittings. (CMP-8)

Conduit, Liquidtight Flexible Metal (LFMC). (Liquidtight Flexible Metal Conduit)

A raceway of circular cross section having an outer liquidtight, nonmetallic, sunlight-resistant jacket over an inner flexible metal core with associated couplings, connectors, and fittings for the installation of electric conductors. (CMP-8)

Conduit, Liquidtight Flexible Nonmetallic (LFNC). (Liquidtight Flexible Nonmetallic Conduit)

A raceway of circular cross section of various types as follows:

(1) A smooth seamless inner core and cover bonded together and having one or more reinforcement layers between the core and covers, designated as LFNC-A

(2) A smooth inner surface with integral reinforcement within the raceway wall, designated as LFNC-B

(3) A corrugated internal and external surface without integral reinforcement within the raceway wall, designated as LFNC-C

(CMP-8)

Informational Note: FNMC is an alternative designation for LFNC.

Conduit, Nonmetallic Underground with Conductors (NUCC). (Nonmetallic Underground Conduit with Conductors)

A factory assembly of conductors or cables inside a nonmetallic, smooth wall raceway with a circular cross section. (CMP-8)

Conduit, Reinforced Thermosetting Resin (RTRC). (Reinforced Thermosetting Resin Conduit)

A rigid nonmetallic raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables. (CMP-8)

Conduit, Rigid Metal (RMC). (Rigid Metal Conduit)

A threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and appropriate fittings. (CMP -8)

Conduit, Rigid Polyvinyl Chloride (PVC). (Rigid Polyvinyl Chloride Conduit)

A rigid nonmetallic raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables. (CMP-8)

Conduit Body.

A separate portion of a conduit or tubing system that provides access through a removable cover(s) to the interior of the system at a junction of two or more sections of the system or at a terminal point of the system.

Boxes such as FS and FD or larger cast or sheet metal boxes are not classified as conduit bodies. (CMP-8)

Connector.

An electromechanical fitting. (393) (CMP-18)

Connector, Intercell. (Intercell Connector)

An electrically conductive bar or cable used to connect adjacent cells. (CMP-13)

Connector, Intertier. (Intertier Connector)

An electrical conductor used to connect two cells on different tiers of the same rack or different shelves of the same rack. (CMP-13)

Connector, Load. (Load Connector)

An electromechanical connector used for power from the busbar to utilization equipment. (393) (CMP-18)

Connector, Pendant. (Pendant Connector)

An electromechanical or mechanical connector used to suspend low-voltage luminaire or utilization equipment below the grid rail and to supply power to connect from the busbar to utilization equipment. (393) (CMP-18)

Connector, Power Feed. (Power Feed Connector)

An electromechanical connector used to connect the power supply to a power distribution cable, to connect directly to the busbar, or to connect from a power distribution cable to the busbar. (393) (CMP-18)

Connector, Pressure (Solderless). (Pressure Connector)

A device that establishes a connection between two or more conductors or between one or more conductors and a terminal by means of mechanical pressure and without the use of solder. (CMP-1)

Connector, Rail to Rail. (Rail to Rail Connector)

An electromechanical connector used to interconnect busbars from one ceiling grid rail to another grid rail. (393) (CMP-18)

Connector Strip.

A metal wireway containing pendant or flush receptacles. (520) (CMP-15)

Container (as applied to batteries).

A single-cell or multicell vessel or jar that holds the plates, electrolyte, and other elements of a single unit in a battery. (CMP-13)

Continuous Load.

A load where the maximum current is expected to continue for 3 hours or more. (CMP-2)

Control.

The predetermined process of connecting, disconnecting, increasing, or reducing electric power. (130) (CMP-13)

Control Circuit.

The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller but does not carry the main power current. (CMP-11)

Control Circuits, Fault-Tolerant External. (Fault-Tolerant External Control Circuits)

Those control circuits either entering or leaving the fire pump controller enclosure, which if broken, disconnected, or shorted will not prevent the controller from starting the fire pump from all other internal or external means and may cause the controller to start the pump under these conditions. (695) (CMP-13)

Control Device, Emergency Lighting (ELCD). (Emergency Lighting Control Device)

A separate or integral device intended to perform one or more emergency lighting control functions. (700) (CMP-13)

Informational Note: See UL 924, *Emergency Lighting and Power Equipment* , for information covering emergency lighting control devices.

Control Drawing.

A drawing or other document provided by the manufacturer of the intrinsically safe or associated apparatus, or of the nonincendive field wiring apparatus or associated nonincendive field wiring apparatus, that details the allowed interconnections between the intrinsically safe and associated apparatus or between the nonincendive field wiring apparatus or associated nonincendive field wiring apparatus. (CMP-14)

Informational Note: See the following standards for additional information:

(1) ANSI/ISA/UL 120202, *Recommendations for the Preparation, Content, and Organization of Intrinsic Safety Control Drawings*

(2) ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations*

(3) ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"*

(4) ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations*

(5) ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety*

Control Room.

An enclosed control space outside the hoistway, intended for full bodily entry, that contains the elevator motor controller. The room could also contain electrical and/or mechanical equipment used directly in connection with the elevator or dumbwaiter but not the electric driving machine or the hydraulic machine. (620) (CMP-12)

Control Space.

A space inside or outside the hoistway intended to be accessed with or without full bodily entry that contains the elevator motor controller. This space could also contain electrical and/or mechanical equipment used directly in connection with the elevator, dumbwaiter, escalator, moving walk, or platform lift, but not the electrical driving machine or the hydraulic machine. (620) (CMP-12)

Control System.

The overall system governing the starting, stopping, direction of motion, acceleration, speed, and retardation of the moving member. (620) (CMP-12)

Controller.

A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected. (CMP-1)

Controller, Motion. (Motion Controller)

The electrical device(s) for that part of the control system that governs the acceleration, speed, retardation, and stopping of the moving member. (620) (CMP-12)

Informational Note: The motor control function may be integral to the motion controller.

Controller, Motor. (Motor Controller)

Any switch or device that is normally used to start and stop a motor by making and breaking the motor circuit current. (CMP-11)

Controller, Operation. (Operation Controller)

The electrical device(s) for that part of the control system that initiates the starting, stopping, and direction of motion in response to a signal from an operating device. (620) (CMP-12)

Converter, DC-to-DC. (DC-to-DC Converter)

A device that can provide an output dc voltage and current at a higher or lower value than the input dc voltage and current. (CMP-4)

Converter Circuit, DC-to-DC. (DC-to-DC Converter Circuit)

The dc circuit conductors connected to the output of a dc-to-dc converter. (CMP-4)

Converting Device.

That part of the heating equipment that converts input mechanical or electrical energy to the voltage, current, and frequency used for the heating applicator. A converting device consists of equipment using line frequency, all static multipliers, oscillator-type units using vacuum tubes, inverters using solid-state devices, or motor-generator equipment. (665) (CMP-12)

Cooking Unit, Counter-Mounted. (Counter-Mounted Cooking Unit)

A cooking appliance designed for mounting in or on a counter and consisting of one or more heating elements, internal wiring, and built-in or mountable controls. (CMP-2)

Coordination, Selective. (Selective Coordination)

Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the selection and installation of overcurrent protective devices and their ratings or settings for the full range of available overcurrents, from overload to the available fault current, and for the full range of overcurrent protective device opening times associated with those overcurrents. (CMP-10)

Cord, Flexible. (Flexible Cord)

Two or more flexible insulated conductors enclosed in a flexible covering. (CMP-6)

Cord Connector.

A contact device terminated to a flexible cord that accepts an attachment plug or other insertion device. (CMP-6)

Cord Connector [as applied to hazardous (classified) locations].

A fitting intended to terminate a cord to a box or similar device and reduce the strain at points of termination and might include an explosionproof, a dust-ignitionproof, or a flameproof seal. (CMP-14)

Cord Set.

A length of flexible cord having an attachment plug at one end and a cord connector at the other end. (CMP-6)

Corrosive Environment.

Areas or enclosures without adequate ventilation, where electrical equipment is located and pool sanitation chemicals are stored, handled, or dispensed . (680) (CMP-17).

Informational Note No. 1: See *Advisory: Swimming Pool Chemical: Chlorine* , OSWER 90-008.1, June 1990, available from the EPA National Service Center for Environmental Publications (NSCEP) as sanitation chemicals and pool water are considered to pose a risk of corrosion (gradual damage or destruction of materials) due to the presence of oxidizers (e.g., calcium hypochlorite, sodium hypochlorite, bromine, chlorinated isocyanurates) and chlorinating agents that release chlorine when dissolved in water.

Informational Note No. 2: See ANSI/APSP-11, *Standard for Water Quality in Public Pools and Spas* , ANSI/ASHRAE 62.1, Table 6-4 Minimum Exhaust Rates, and *2021 International Swimming Pool and Spa Code (ISPSC)* , Section 324, including associated definitions and requirements concerning adequate ventilation of indoor spaces such as equipment and chemical storage rooms, which can reduce the likelihood of the accumulation of corrosive vapors. Chemicals such as chlorine cause severe corrosive and deteriorating effects on electrical connections, equipment, and enclosures when stored and kept in the same vicinity.

Counter (Countertop).

A fixed or stationary surface typically intended for food or beverage preparation, food or beverage serving, personal lavation, or laundering or a similar surface that presents a routine risk of spillage of larger quantities of liquids upon outlets mounted directly on or in the surface. (CMP-2)

Informational Note No. 1: See UL 498, *Receptacles and Attachment Plugs* , and UL 943, *Ground-Fault Circuit Interrupters* , which establish the performance evaluation criteria and construction criteria.

Informational Note No. 2: See 406.14(E) , 406.14(G)(1) , and 406.14(H) for information on receptacles for counters and countertops distinguished from receptacles for work surfaces.

Crane.

A mechanical device used for lifting or moving boats. [**303:** 3.3.6] (555) (CMP-7)

Critical Branch.

A system of feeders and branch circuits supplying power for task illumination, fixed equipment, select receptacles, and select power circuits serving areas and functions related to patient care that are automatically connected to alternate power sources by one or more transfer switches during interruption of the normal power source. [**99:** 3.3.30] (517) (CMP-15)

Critical Operations Areas, Designated (DCOA). (Designated Critical Operations Areas)

Areas within a facility or site designated as requiring critical operations power. (CMP-13)

Critical Operations Data System.

An information technology equipment system that requires continuous operation for reasons of public safety, emergency management, national security, or business continuity. (645) (CMP-12)

Critical Operations Power Systems (COPS).

Power systems for facilities or parts of facilities that require continuous operation for the reasons of public safety, emergency management, national security, or business continuity. (CMP-13)

Current-Limiting (as applied to overcurrent protection devices).

The ability to, when interrupting currents in its current-limiting range, reduce the current flowing in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit if the device were replaced with a solid conductor having comparable impedance. (CMP-10)

Cutout Box.

An enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the enclosure. (CMP-8)

Data Center, Modular (MDC). (Modular Data Center)

Prefabricated units, rated 1000 volts or less, consisting of an outer enclosure housing multiple racks or cabinets of information technology equipment (ITE) (e.g., servers) and various support equipment, such as electrical service and distribution equipment, HVAC systems, and the like. (646) (CMP-12)

Informational Note: A typical construction may use a standard ISO shipping container or other structure as the outer enclosure, racks or cabinets of ITE, service-entrance equipment and power distribution components, power storage such as a UPS, and an air or liquid cooling system. Modular data centers are intended for fixed installation, either indoors or outdoors, based on their construction and resistance to environmental conditions. MDCs can be configured as an all-in-one system housed in a single equipment enclosure or as a system with the support equipment housed in separate equipment enclosures.

DC Plugging Box.

A dc device consisting of one or more 2-pole, 2-wire, nonpolarized, non-grounding-type receptacles intended to be used on dc circuits only. (530) (CMP-15)

Dead-Front.

Without live parts exposed to a person on the operating side of the equipment. (CMP-9)

Demand Factor.

The ratio of the maximum demand of a system, or part of a system, to the total connected load of a system or the part of the system under consideration. (CMP-2)

Dental Office.

A building or part thereof in which the following occur:

(1) Examinations and minor treatments/procedures performed under the continuous supervision of a dental professional;

(2) Use of limited to minimal sedation and treatment or procedures that do not render the patient incapable of self-preservation under emergency conditions; and

(3) No overnight stays for patients or 24-hour operations.

[**99:** 3.3.38] (CMP-15)

Deploy (Deployed).

The use of portable equipment for the duration required by the event or production for which it is used. (CMP-15)

Device.

A unit of an electrical system, other than a conductor, that carries or controls electric energy as its principal function. (CMP-1)

Dielectric Heating.

Heating of a nominally insulating material due to its own dielectric losses when the material is placed in a varying electric field. (665) (CMP-12)

Disconnecting Means.

A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply. (CMP-1)

Distribution Point (Center Yard Pole) (Meter Pole).

An electrical supply point from which service drops, service conductors, feeders, or branch circuits to buildings or structures utilized under single management are supplied. (547) (CMP-7)

Informational Note: The service point is typically located at the distribution point.

Diversion Controller (Diversion Charge Controller) (Diversion Load Controller).

Equipment that regulates the output of a source or charging process by diverting power to direct-current or alternating-current loads or to an interconnected utility service. (CMP-13)

Diversion Load.

A load connected to a diversion charge controller or diversion load controller, also known as a dump load. (CMP-4)

Docking Facility.

A covered or open, fixed or floating structure that provides access to the water and to which boats are secured. [**303:** 3.3.7] (555) (CMP-7)

Dormitory.

A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities. (CMP 2) [**101:** 3.3.68]

Informational Note: Rooms within dormitories intended for the use of individuals for combined living and sleeping purposes are guest rooms or guest suites. Examples of dormitories are college dormitories, fraternity and sorority houses, and military barracks. [**101:** A.3.3.68] (CMP 2)

Drop Box.

A box containing pendant- or flush-mounted receptacles attached to a multiconductor cable via strain relief or a multipole connector. (520) (CMP-15)

Dust-Ignitionproof.

Equipment enclosed in a manner that excludes dusts and does not permit arcs, sparks, or heat otherwise generated or liberated inside of the enclosure to cause ignition of exterior accumulations or atmospheric suspensions of a specified dust on or in the vicinity of the enclosure. (CMP-14)

Informational Note No. 1: See ANSI/UL 1203, *Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations* , for information on dust-ignitionproof enclosures.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)* , for information on dust-ignitionproof enclosures that are sometimes additionally marked Type 9.

Dusttight.

Enclosures constructed so that dust will not enter under specified test conditions. (CMP-14)

Informational Note No. 1: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)*, and ANSI/UL 50E, *Enclosures for Electrical Equipment, Environmental Considerations* , for additional information on enclosure Types 3, 3X, 3S, 3SX, 4, 4X, 5, 6, 6P, 12, 12K, and 13 that are considered dusttight.

Duty, Continuous. (Continuous Duty)

Operation at a substantially constant load for an indefinitely long time. (CMP-1)

Duty, Intermittent. (Intermittent Duty)

Operation for alternate intervals of (1) load and no load; or (2) load and rest; or (3) load, no load, and rest. (CMP-1)

Duty, Periodic. (Periodic Duty)

Intermittent operation in which the load conditions are regularly recurrent. (CMP-1)

Duty, Short-Time. (Short-Time Duty)

Operation at a substantially constant load for a short and definite, specified time. (CMP-1)

Duty, Varying. (Varying Duty)

Operation at loads, and for intervals of time, both of which may be subject to wide variation. (CMP-1)

Dwelling, One-Family. (One-Family Dwelling)

A building that consists solely of one dwelling unit. (CMP-1)

Dwelling, Two-Family. (Two-Family Dwelling)

A building that consists solely of two dwelling units. (CMP-1)

Dwelling, Multifamily. (Multifamily Dwelling)

A building that contains three or more dwelling units. (CMP-1)

Dwelling Unit.

A single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, and sanitation. (CMP-2)

Electric-Discharge Lighting.

Systems of illumination utilizing fluorescent lamps, high-intensity discharge (HID) lamps, or neon tubing. (CMP-18)

Electric Power Production and Distribution Network.

Power production, distribution, and utilization equipment and facilities, such as electric utility systems that are connected to premises wiring and are external to and not controlled by a system that operates in interactive mode. (CMP-13)

Electric Self-Propelled Vehicle (ESV).

A vehicle or marine vessel, other than an EV, such as farm equipment, boats, aircraft, and golf carts, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. (627) (CMP-12)

Electric Self-Propelled Vehicle Power Export Equipment (ESVPE).

The equipment, including the outlet on the electric self-propelled vehicle (ESV), that is used to provide electrical power at voltages greater than or equal to 30 Vac or 60 Vdc to loads external to the ESV, using the vehicle as the source of supply. (627) (CMP-12)

Informational Note: Electric self-propelled vehicle power export equipment and electric self-propelled vehicle supply equipment or wireless power transfer equipment are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional electric self-propelled vehicle supply equipment (ESVSE) or bidirectional wireless power transfer equipment (WPTE).

Electric Self-Propelled Vehicle Supply Equipment (ESVSE).

Equipment for plug-in charging, including the ungrounded, grounded, and equipment grounding conductors, and the electric self-propelled vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. (627) (CMP-12)

Informational Note: Electric self-propelled vehicle power export equipment and electric self-propelled vehicle supply equipment or wireless power transfer equipment (WPTE) are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional ESVSE or bidirectional WPTE.

Electric Supply Stations.

Locations containing the generating stations and substations, including their associated generator, storage battery, transformer, and switchgear areas. (CMP-4)

Electric Vehicle (EV).

An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and electric motorcycles, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are electric vehicles having a second source of motive power. (CMP-12)

Informational Note: Off-road, self-propelled electric mobile machines, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, and boats are not considered electric vehicles.

Electric Vehicle Connector.

A device that, when electrically coupled (conductive or inductive) to an electric vehicle inlet, establishes an electrical connection to the electric vehicle for the purpose of power transfer and information exchange. (625) (CMP-12)

Informational Note: See 625.48 for further information on interactive systems.

Electric Vehicle Power Export Equipment (EVPE).

The equipment, including the outlet on the electric vehicle, that is used to provide electrical power at voltages greater than or equal to 30 Vac or 60 Vdc to loads external to the electric vehicle, using the electric vehicle as the source of supply. (625) (CMP-12)

Informational Note: Electric vehicle power export equipment and electric vehicle supply equipment or wireless power transfer equipment are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional electric vehicle supply equipment (EVSE) or bidirectional wireless power transfer equipment (WPTE).

Electric Vehicle Supply Equipment (EVSE).

Equipment for plug-in charging, including the ungrounded, grounded, and equipment grounding conductors, and the electric vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. (625) (CMP-12)

Informational Note: Electric vehicle power export equipment and electric vehicle supply equipment or wireless power transfer equipment (WPTE) are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional EVSE or bidirectional WPTE.

Electrical Circuit Protective System.

A system consisting of components and materials intended for installation as protection for specific electrical wiring systems with respect to the disruption of electrical circuit integrity upon exterior fire exposure. (CMP-16)

Electrical Datum Plane.

A specified vertical distance above the normal high-water level at which electrical equipment can be installed and electrical connections can be made. (CMP-7)

Electrical Ducts.

Electrical conduits, or other raceways round in cross section, that are suitable for use underground or embedded in concrete. (CMP-6)

Electrical Life Support Equipment.

Electrically powered equipment whose continuous operation is necessary to maintain a patient's life. [**99** :3.3.45] (517) (CMP-15)

Electrical Resistance Trace Heating "60079-30-1".

Type of protection for the purpose of producing heat on the principle of electrical resistance and typically composed of one or more metallic conductors and/or an electrically conductive material, suitably electrically insulated and protected. (CMP-14)

Informational Note: See ANSI/UL 60079-30-1, *Explosive Atmospheres — Part 30-1: Electrical Resistance Trace Heating — General and Testing Requirements* , for additional information.

Electrically Connected.

A connection capable of carrying current as distinguished from connection through electromagnetic induction. (668) (CMP-12)

Electrified Truck Parking Space.

A truck parking space that has been provided with an electrical system that allows truck operators to connect their vehicles while stopped and to use off-board power sources in order to operate on-board systems such as air conditioning, heating, and appliances, without any engine idling. (626) (CMP-12)

Informational Note: An electrified truck parking space also includes dedicated parking areas for heavy-duty trucks at travel plazas, warehouses, shipper and consignee yards, depot facilities, and border crossings. It does not include areas such as the shoulders of highway ramps and access roads, camping and recreational vehicle sites, residential and commercial parking areas used for automotive parking or other areas where ac power is provided solely for the purpose of connecting automotive and other light electrical loads, such as engine block heaters, and at private residences.

Electrified Truck Parking Space Wiring Systems.

All of the electrical wiring, equipment, and appurtenances related to electrical installations within an electrified truck parking space, including the electrified parking space supply equipment. (626) (CMP-12)

Electrolyte.

The medium that provides the ion transport mechanism between the positive and negative electrodes of a cell. (CMP-13)

Electrolytic Cell.

A tank or vat in which electrochemical reactions are caused by applying electric energy for the purpose of refining or producing usable materials. (668) (CMP-12)

Electrolytic Cell Line Working Zone.

The space envelope wherein operation or maintenance is normally performed on or in the vicinity of exposed energized surfaces of electrolytic cell lines or their attachments. (668) (CMP-12)

Electronic Power Converter.

A device that uses power electronics to convert one form of electrical power into another form of electrical power. (CMP-4)

Informational Note: Examples of electronic power converters include, but are not limited to, inverters, dc-to-dc converters, and electronic charge controllers. These devices have limited current capabilities based on the device ratings at continuous rated power.

Electronically Protected.

A motor provided with electronic control that is an integral part of the motor and protects the motor against dangerous overheating due to failure of the electronic control, overload, and failure to start. (430) (CMP-11)

Emergency Luminaire, Battery-Equipped. (Battery-Equipped Emergency Luminaire)

A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. (CMP-13)

Emergency Luminaire, Directly Controlled (DCEL). (Directly Controlled Emergency Luminaire)

A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13)

Informational Note: See ANSI/UL 924, *Emergency Lighting and Power Equipment* , for information covering directly controlled emergency luminaires.

Emergency Power Supply (EPS).

The source(s) of electric power of the required capacity and quality for an emergency power supply system (EPSS). (CMP-13)

Emergency Power Supply System (EPSS).

A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [**110:** 3.3.4] (CMP-13)

Emergency Systems.

Those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction. These systems are intended to automatically supply illumination, power, or both, to designated areas and equipment in the event of failure of the normal supply or in the event of accident to elements of a system intended to supply, distribute, and control power and illumination essential for safety to human life. (CMP-13)

Encapsulation "m".

Type of protection where electrical parts that could ignite an explosive atmosphere by either sparking or heating are enclosed in a compound in such a way that this explosive atmosphere cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 60079-18, *Explosive atmospheres — Part 18: Equipment protection by encapsulation "m"*, for additional information.

Enclosed.

Surrounded by a case, housing, fence, or wall(s) that prevents persons from accidentally contacting energized parts. (CMP-1)

Enclosed-Break.

Having electrical make-or-break contacts such that, if an internal explosion of the flammable gas or vapor that can enter it occurs, the device will withstand the internal explosion without suffering damage and without communicating the internal explosion to the external flammable gas or vapor. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Enclosure.

The case or housing of apparatus or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage. (CMP-1)

Informational Note: See Table 110.28 for examples of enclosure types.

Energized.

Electrically connected to, or is, a source of voltage. (CMP-1)

Energized, Likely to Become. (Likely to Become Energized)

Conductive material that could become energized because of the failure of electrical insulation or electrical spacing. (CMP-5)

Energy Management System (EMS).

A system that monitors and controls power within an electrical system. (CMP-13)

Energy Storage System (ESS).

One or more devices, assembled together, capable of storing energy to supply electrical energy at a future time. [**855:** 3.3.9] (CMP-13)

Informational Note No. 1: An ESS(s) can include but is not limited to batteries, capacitors, and kinetic energy devices (e.g., flywheels and compressed air). An ESS(s) can include inverters or converters to change voltage levels or to make a change between an ac or a dc system.

Informational Note No. 2: These systems differ from a stationary standby battery installation where a battery spends the majority of the time on continuous float charge or in a high state of charge, in readiness for a discharge event.

Entertainment Device.

A mechanical or electromechanical device that provides an entertainment experience. (522) (CMP-15)

Informational Note: These devices can include animated props, show action equipment, animated figures, and special effects, coordinated with audio and lighting to provide an entertainment experience.

Equipment.

A general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like used as a part of, or in connection with, an electrical installation. (CMP-1)

Equipment, Interconnection. (Interconnection Equipment)

Equipment that performs protective and control functions that enables power sources, or systems supplied by power sources, to operate in parallel with, separate from, and reconnect to systems supplied by other power sources. (CMP-4)

Equipment, Mobile. (Mobile Equipment)

Equipment with electrical components that is suitable to be moved only with mechanical aids or is provided with wheels for movement by a person(s) or powered devices. (513) (CMP-14)

Equipment, Portable. (Portable Equipment)

Equipment fed with portable cords or cables intended to be moved from one place to another. (640) (CMP-12)

Equipment, Portable. (Portable Equipment)

Equipment with electrical components suitable to be moved by a single person without mechanical aids. (511) (CMP-14)

Equipment, Portable. (Portable Equipment)

Equipment fed with portable cords or cables intended to be moved from one place to another. (520) (CMP-15)

Equipment, Portable. (Portable Equipment)

Equipment intended to be moved from one place to another. (530) (CMP-15)

Equipment, Signal. (Signal Equipment)

Includes audible and visual equipment such as chimes, gongs, lights, and displays that convey information to the user. (620) (CMP-12)

Equipment Branch.

A system of feeders and branch circuits arranged for delayed, automatic, or manual connection to the alternate power source and that serves primarily 3-phase power equipment. [**99** :3.3.50] (517) (CMP-15)

Equipment Protection Level (EPL).

Level of protection assigned to equipment based on its likelihood of becoming a source of ignition, and distinguishing the differences between explosive gas atmospheres and explosive dust atmospheres. (CMP-14)

Informational Note: See ANSI/UL 60079-0, *Explosive Atmospheres — Part 0: Equipment — General Requirements* , for additional information.

Equipment Rack.

A framework for the support, enclosure, or both, of equipment; can be portable or stationary. (640) (CMP-12)

Informational Note: See EIA/ECA 310-E-2005, *Cabinets, Racks, Panels and Associated Equipment* , for examples of equipment racks.

Equipotential Plane.

Conductive elements that are connected together to minimize voltage differences. (CMP-7)

Essential Electrical System.

A distribution system designed to ensure continuity of electrical power to designated areas and functions of a health care facility upon loss of one of the on-site or off-site sources with reliability and capacity sufficient to provide effective facility operation consistent with the facility's emergency operations plan. [**99:** 3.3.54] (517) (CMP-15)

Explosionproof Equipment.

Equipment enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor that might occur within it, that is capable of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosion of the gas or vapor within, and that operates at such an external temperature that a surrounding flammable atmosphere will not be ignited. (CMP-14)

Informational Note No. 1: See ANSI/UL 1203, *Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations* , for additional information.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)* , for additional information on explosionproof enclosures that are sometimes additionally marked Type 7.

Exposed (as applied to live parts).

Capable of being inadvertently touched or approached nearer than a safe distance by a person. (CMP-1)

Informational Note: This term applies to parts that are not suitably guarded, isolated, or insulated.

Exposed (as applied to wiring methods).

On or attached to the surface or behind panels designed to allow access. (CMP-1)

Exposed (Optical Fiber Cable Exposed to Accidental Contact).

A conductive optical fiber cable in such a position that, in case of failure of supports or insulation, contact between the cable's non–current-carrying conductive members and an electrical circuit might result. (CMP-16)

Exposed (to Accidental Contact).

A circuit in such a position that, in case of failure of supports or insulation, contact with another circuit may result. (CMP-16)

Exposed Conductive Surfaces.

Those surfaces that are capable of carrying electric current and that are unprotected, uninsulated, unenclosed, or unguarded, permitting personal contact. [**99:** 3.3.54] (517) (CMP-15)

Informational Note: Paint, anodizing, and similar coatings are not considered suitable insulation, unless they are listed for such use.

Externally Operable.

Capable of being operated without exposing the operator to contact with live parts. (CMP-1)

Facility, On-Site Power Production. (On-Site Power Production Facility)

The normal supply of electric power for the site that is expected to be constantly producing power. (695) (CMP-13)

Fastened-in-Place (as applied to electric vehicle power transfer systems and electric self-propelled vehicle power transfer systems).

Mounting means of equipment in which the fastening means are specifically designed to permit removal without the use of a tool. (CMP-12)

Fault-Managed Power (FMP).

A powering system that monitors for faults and controls current delivered to ensure fault energy is limited. (726) (CMP-3)

Informational Note No. 1: The monitoring and control systems differentiate fault-managed power from electric light and power circuits; therefore, alternative requirements to those of Chapters 1 through 4 are given regarding minimum wire sizes, ampacity adjustment and correction factors, overcurrent protection, insulation requirements, and wiring methods and materials.

Informational Note No. 2: A fault-managed power circuit is also commonly referred to as a Class 4 circuit.

Fault Current.

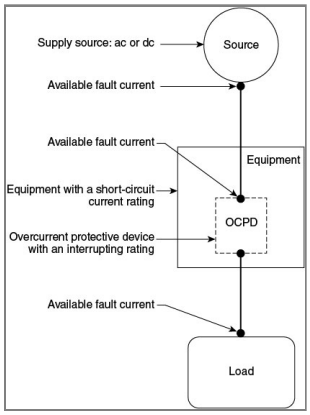
The current delivered at a point on the system during a short-circuit condition. (CMP-10)

Fault Current, Available. (Available Fault Current)

The largest amount of current capable of being delivered at a point on the system during a short-circuit condition. (CMP-10)

Informational Note: A short-circuit can occur during abnormal conditions such as a fault between circuit conductors or a ground fault. See Figure Informational Note 100.1 .

Figure Informational Note 100.1 Available Fault Current.



Fault Protection Device.

An electronic device that is intended for the protection of personnel and functions under fault conditions, such as network-powered broadband communications cable short or open circuit, to limit the current or voltage, or both, for a low-power network-powered broadband communications circuit and provide acceptable protection from electric shock. (830) (CMP-16)

Feeder.

All circuit conductors between the service equipment, the source of a separately derived system, or other power supply source and the final branch-circuit overcurrent protective device. (CMP-10)

Feeder Assembly.

The overhead or under-chassis feeder conductors, including the equipment grounding conductor, together with the necessary fittings and equipment; or the power-supply cord assembly for a mobile home, recreational vehicle, or park trailer, identified for the delivery of energy from the source of electrical supply to the panelboard within the mobile home, recreational vehicle, or park trailer. (CMP-7)

Festoon Lighting.

A string of outdoor lights that is suspended between two points. (CMP-18)

Fibers/Flyings, Combustible. (Combustible Fibers/Flyings)

Fibers/flyings, where any dimension is greater than 500 µm in nominal size, which can form an explosible mixture when suspended in air at standard atmospheric pressure and temperature. [**499:** 3.3.4.1] (CMP-14)

Informational Note No. 1: This definition and Informational Notes No. 2 and No. 3 have been extracted from NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas* . The NFPA 499 reference is in brackets. Only editorial changes were made to the extracted text to make it consistent with this code.

Informational Note No. 2: Section 500.5(D) defines a Class III location. Combustible fibers/flyings can be similar in physical form to ignitible fibers/flyings and protected using the same electrical equipment installation methods. Examples of fibers/flyings include flat platelet-shaped particulate, such as metal flake, and fibrous particulate, such as particle board core material. If the smallest dimension of a combustible material is greater than 500 µm, it is unlikely that the material would be combustible fibers/flyings, as determined by test. Finely divided solids with lengths that are large compared to their diameter or thickness usually do not pass through a 500 µm sieve, yet when tested could potentially be determined to be explosible. [**499:** A.3.3.4.1]

Informational Note No. 3: See ASTM E1226, *Standard Test Method for Explosibility of Dust Clouds* , ISO 6184-1, *Explosion protection systems — Part 1: Determination of explosion indices of combustible dusts in air* , or ISO/IEC/UL 80079-20-2, *Explosive atmospheres — Part 20-2: Material characteristics — Combustible dusts test methods* , for procedures for determining the explosibility of dusts. A material that is found to not present an explosible mixture could still be an ignitible fiber/flying, as defined in this article. Historically, the explosibility condition has been described as presenting a flash fire or explosion hazard. It could be understood that the potential hazard due to the formation of an explosible mixture when suspended in air at standard atmospheric pressure and temperature would include ignition. [**499:** A.3.3.4.1]

Fibers/Flyings, Ignitible. (Ignitible Fibers/Flyings)

Fibers/flyings where any dimension is greater than 500 µm in nominal size, which are not likely to be in suspension in quantities to produce an explosible mixture, but could produce an ignitible layer fire hazard. [**499:** 3.3.4.2] (CMP-14)

Informational Note No. 1: This definition and Informational Note No. 2 have been extracted from NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas* . The NFPA 499 reference is in brackets. Only editorial changes were made to the extracted text to make it consistent with this code.

Informational Note No. 2: Section 500.5 of this code prescribes a Class III location as one where ignitible fibers/flyings are present, but not likely to be in suspension in the air in quantities sufficient to produce ignitible mixtures. This description addresses fibers/flyings that do not present a flash-fire hazard or explosion hazard by test. This could be because those fibers/flyings are too large or too agglomerated to be suspended in air in sufficient concentration, or at all, under typical test conditions. Alternatively, this could be because they burn so slowly that, when suspended in air, they do not propagate combustion at any concentration. In this document the zone classification system includes ignitible fibers/flyings as a fire hazard in a layer, which is not addressed in the IEC zone system (see IEC 60079-10-2, *Explosive atmospheres — Part 10-2: Classification of areas — Explosive dust atmospheres*). Where these are present, the user could also consider installation in accordance with Article 503 of this code. [**499:** A.3.3.4.2]

Field Evaluation Body (FEB).

An organization or part of an organization that performs field evaluations of electrical or other equipment. [**790:** 3.3.4] (CMP-1)

Informational Note: See NFPA 790-2024, *Standard for Competency of Third-Party Field Evaluation Bodies* , provides guidelines for establishing the qualification and competency of a body performing field evaluations of electrical products and assembles with electrical components.

Field Labeled (as applied to evaluated products).

Equipment or materials to which has been attached a label, symbol, or other identifying mark of an FEB indicating the equipment or materials were evaluated and found to comply with requirements as described in an accompanying field evaluation report. [**790:** 3.3.6] (CMP-1)

Fire Alarm Circuit.

The portion of the wiring system between the load side of the overcurrent device or the power-limited supply and the connected equipment of all circuits powered and controlled by the fire alarm system. Fire alarm circuits are classified as either non–power-limited or power-limited. (CMP-3)

Fire Alarm Circuit, Non-Power-Limited (NPLFA). (Non-Power-Limited Fire Alarm Circuit)

A fire alarm circuit powered by a source that is not power limited. (CMP-3)

Informational Note: See 760.41 and 760.43 for requirements for non-power-limited fire alarm circuits.

Fire Alarm Circuit, Power-Limited (PLFA). (Power-Limited Fire Alarm Circuit)

A fire alarm circuit powered by a power-limited source . (CMP-3)

Informational Note: See 760.121 for requirements on power-limited fire alarm circuits.

Fitting.

An accessory such as a locknut, bushing, or other part of a wiring system that is intended primarily to perform a mechanical rather than an electrical function. (CMP-1)

Fixed (as applied to equipment).

Equipment that is fastened or otherwise secured at a specific location. (CMP-17)

Fixed-in-Place (as applied to electric vehicle power transfer systems and electric self-propelled vehicle power transfer systems).

Mounting means of equipment using fasteners that require a tool for removal. (CMP-12)

Flameproof "d".

Type of protection where the enclosure will withstand an internal explosion of a flammable mixture that has penetrated into the interior, without suffering damage and without causing ignition, through any joints or structural openings in the enclosure of an external explosive gas atmosphere consisting of one or more of the gases or vapors for which it is designed. (CMP-14)

Informational Note: See ANSI/UL 60079-1, *Explosive Atmospheres — Part 1: Equipment Protection by Flameproof Enclosures "d"*, for additional information.

Flammable Anesthetics.

Gases or vapors, such as fluroxene, cyclopropane, divinyl ether, ethyl chloride, ethyl ether, and ethylene, that could form flammable or explosive mixtures with air, oxygen, or reducing gases such as nitrous oxide. (517) (CMP-15)

Flexible Bus Systems.

An assembly of flexible insulated bus, with a system of associated fittings used to secure, support, and terminate the bus. (CMP-8)

Informational Note: Flexible bus systems are engineered systems for a specific site location and are ordinarily assembled at the point of installation from the components furnished or specified by the manufacturer.

Flexible Insulated Bus.

A flexible rectangular conductor with an overall insulation. (CMP-8)

Flywheel ESS (FESS).

A mechanical ESS composed of a spinning mass referred to as a rotor and an energy conversion mechanism such as a motor-generator that converts the mechanical energy to electrical energy. (706) (CMP-13)

Informational Note: There are primarily two types of rotor constructions, solid metal mass design and composite fiber design.

Footlight.

A border light installed on or in the stage. (520) (CMP-15)

Forming Shell.

A structure designed to support a wet-niche luminaire assembly and intended for mounting in a pool or fountain structure. (680) (CMP-17)

Fountain.

An ornamental structure or recreational water feature from which one or more jets or streams of water are discharged into the air, including splash pads, ornamental pools, display pools, and reflection pools. The definition does not include drinking water fountains or water coolers. (680) (CMP-17)

Frame.

Chassis rail and any welded addition thereto of metal thickness of 1.35 mm (0.053 in.) or greater. (551) (CMP-7)

Free Air (as applied to conductors).

Open or ventilated environment that allows for heat dissipation and air flow around an installed conductor. (CMP-6)

Fuel Cell.

An electrochemical system that consumes fuel to produce an electric current. In such cells, the main chemical reaction used for producing electric power is not combustion. However, there may be sources of combustion used within the overall cell system, such as reformers/fuel processors. (CMP-4)

Fuel Cell System.

The complete aggregate of equipment used to convert chemical fuel into usable electricity and typically consisting of a reformer, stack, power inverter, and auxiliary equipment. (CMP-4)

Fuse.

An overcurrent protective device with a circuit-opening fusible part that is heated and severed by the passage of overcurrent through it. (CMP-10)

Informational Note: A fuse comprises all the parts that form a unit capable of performing the prescribed functions. It may or may not be the complete device necessary to connect it into an electrical circuit.

Fuse, Electronically Actuated. (Electronically Actuated Fuse)

An overcurrent protective device that generally consists of a control module that provides current-sensing, electronically derived time–current characteristics, energy to initiate tripping, and an interrupting module that interrupts current when an overcurrent occurs. Such fuses may or may not operate in a current-limiting fashion, depending on the type of control selected. (CMP-10)

Fuse, Expulsion. (Expulsion Fuse)

A vented fuse unit in which the expulsion effect of gases produced by the arc and lining of the fuseholder, either alone or aided by a spring, extinguishes the arc. (CMP-10)

Fuse, Nonvented Power. (Nonvented Power Fuse)

A fuse without intentional provision for the escape of arc gases, liquids, or solid particles to the atmosphere during circuit interruption. (CMP-10)

Fuse, Power. (Power Fuse)

A vented, nonvented, or controlled vented fuse unit in which the arc is extinguished by being drawn through solid material, granular material, or liquid, either alone or aided by a spring. (CMP-10)

Fuse, Vented Power. (Vented Power Fuse)

A fuse with provision for the escape of arc gases, liquids, or solid particles to the surrounding atmosphere during circuit interruption. (CMP-10)

Garage.

A building or portion of a building in which one or more self-propelled vehicles can be kept for use, sale, storage, rental, repair, exhibition, or demonstration purposes. (CMP-1)

Informational Note: See 511.1 for commercial garages, repair and storage.

Garage, Major Repair. (Major Repair Garage)

A building or portions of a building where major repairs, such as engine overhauls, painting, body and fender work, welding or grinding, and repairs that require draining or emptying of the motor vehicle fuel tank are performed on motor vehicles, including associated floor space used for offices, parking, or showrooms. [**30A:** 3.3.12.1] (CMP-14)

Garage, Minor Repair. (Minor Repair Garage)

A building or portions of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups, replacement of parts, fluid changes (e.g., oil, antifreeze, transmission fluid, brake fluid, air-conditioning refrigerants), brake system repairs, tire rotation, and similar routine maintenance work, including the associated floor space used for offices, parking, or showrooms. [**30A:** 3.3.12.2] (CMP-14)

General-Purpose Cables, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways are suitable for general-purpose applications and are resistant to the spread of fire. (722) (CMP-3)

Generating Capacity, Inverter. (Inverter Generating Capacity)

The sum of parallel-connected inverter maximum continuous output power at 40°C in watts, kilowatts, volt-amperes, or kilovolt-amperes. (CMP-4)

Generating Station.

A plant wherein electric energy is produced by conversion from some other form of energy (e.g., chemical, nuclear, solar, wind, mechanical, or hydraulic) by means of suitable apparatus. (CMP-4)

Generator (Generator Set).

A machine that converts mechanical energy into electrical energy by means of a prime mover and alternator. (CMP-13)

Generator, On-Site Standby. (On-Site Standby Generator)

A facility producing electric power on site as the alternate supply of electric power. It differs from an on-site power production facility in that it is not constantly producing power. (695) (CMP-13)

Generator Terminals.

The point of connection for the output conductors on the generator (generator set). (445) (CMP-13)

Grid Bus Rail.

A combination of the busbar, the busbar support, and the structural suspended ceiling grid system. (393) (CMP-18)

Ground.

The Earth. (CMP-5)

Ground Fault.

An unintentional, electrically conductive connection between an ungrounded conductor of an electrical circuit and the normally non-current-carrying conductors, metal enclosures, metal raceways, metal equipment, or earth. (CMP-5)

Ground-Fault Circuit Interrupter (GFCI).

A device intended for the protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a ground-fault current exceeds the values established for a Class A device. (CMP-2)

Informational Note: See UL 943, *Standard for Ground-Fault Circuit Interrupters* , for further information. Class A ground-fault circuit interrupters trip when the ground-fault current is 6 mA or higher and do not trip when the ground-fault current is less than 4 mA.

Ground-Fault Circuit Interrupter, Special Purpose (SPGFCI). (Special Purpose Ground-Fault Circuit Interrupter)

A device intended for the detection of ground-fault currents that functions to de-energize a circuit or portion of a circuit within an established period of time established for Class C, D, or E devices. (CMP-2)

Informational Note: See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit Interrupters* , for information on Classes C, D, or E special purpose ground-fault circuit interrupters.

Ground-Fault Current Path.

An electrically conductive path from the point of a ground fault on a wiring system through normally non–current-carrying conductors, grounded conductors, equipment, or the earth to the electrical supply source. (CMP-5)

Informational Note: Examples of ground-fault current paths are any combination of equipment grounding conductors, metallic raceways, metallic cable sheaths, electrical equipment, and any other electrically conductive material such as metal, water, and gas piping; steel framing members; stucco mesh; metal ducting; reinforcing steel; shields of communications cables; grounded conductors; and the earth itself.

Ground-Fault Current Path, Effective. (Effective Ground-Fault Current Path)

An intentionally constructed, low-impedance electrically conductive path designed and intended to carry current during ground-fault events from the point of a ground fault on a wiring system to the electrical supply source and that facilitates the operation of the overcurrent protective device or ground-fault detectors. (CMP-5)

Ground-Fault Detector-Interrupter, dc (GFDI).

A device that provides protection for PV system dc circuits by detecting a ground fault and could interrupt the fault path in the dc circuit. (690) (CMP-4)

Informational Note: See UL 1741, *Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources* , and UL 62109, *Standard for Power Converters for use in Photovoltaic Power Systems* , for further information on GFDI equipment.

Ground-Fault Protection of Equipment (GFPE).

A system intended to provide protection of equipment from damaging line-to-ground fault currents by operating to cause a disconnecting means to open all ungrounded conductors of the faulted circuit. This protection is provided at current levels less than those required to protect conductors from damage through the operation of a supply circuit overcurrent device. (CMP-5)

Grounded (Grounding).

Connected (connecting) to ground or to a conductive body that extends the ground connection. (CMP-5)

Grounded, Functionally. (Functionally Grounded)

A system that has an electrical ground reference for operational purposes that is not solidly grounded. (CMP-4)

Informational Note: A functionally grounded system is often connected to ground through an electronic means internal to an inverter or charge controller that provides ground-fault protection. Examples of operational purposes for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.

Grounded, Solidly. (Solidly Grounded)

Connected to ground without inserting any resistor or impedance device. (CMP-5)

Grounded Conductor.

A system or circuit conductor that is intentionally grounded. (CMP-5)

Informational Note: Although an equipment grounding conductor is grounded, it is not considered a grounded conductor.

Grounded System, Impedance. (Impedance Grounded System)

An electrical system that is grounded by intentionally connecting the system neutral point to ground through an impedance device. (CMP-5)

Grounding Conductor, Equipment (EGC). (Equipment Grounding Conductor)

A conductive path(s) that is part of an effective ground-fault current path and connects normally non-current-carrying metal parts of equipment together and to the system grounded conductor or to the grounding electrode conductor, or both. (CMP-5)

Informational Note No. 1: It is recognized that the equipment grounding conductor also performs bonding.

Informational Note No. 2: See 250.118 for a list of acceptable equipment grounding conductors.

Grounding Conductor, Impedance. (Impedance Grounding Conductor)

A conductor that connects the system neutral point to the impedance device in an impedance grounded system. (CMP-5)

Grounding Electrode.

A conducting object through which a direct connection to earth is established. (CMP-5)

Grounding Electrode Conductor (GEC).

A conductor used to connect the system grounded conductor or the equipment to a grounding electrode or to a point on the grounding electrode system. (CMP-5)

Grouped.

Cables or conductors positioned adjacent to one another but not in continuous contact with each other. (520) (CMP-15)

Guarded.

Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach or contact by persons or objects to a point of danger. (CMP-1)

Guest Room.

An accommodation combining living, sleeping, sanitary, and storage facilities within a compartment. (CMP-2)

Guest Suite.

An accommodation with two or more contiguous rooms comprising a compartment, with or without doors between such rooms, that provides living, sleeping, sanitary, and storage facilities. (CMP-2)

Gutter, Metal Auxiliary. (Metal Auxiliary Gutter)

A sheet metal enclosure used to supplement wiring spaces at meter centers, distribution centers, switchgear, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and busbars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system. (CMP-8)

Gutter, Nonmetallic Auxiliary. (Nonmetallic Auxiliary Gutter)

A flame-retardant, nonmetallic enclosure used to supplement wiring spaces at meter centers, distribution centers, switchgear, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and busbars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system. (CMP-8)

Habitable Room.

A room in a building for living, sleeping, eating, or cooking, but excluding bathrooms, toilet rooms, closets, hallways, storage or utility spaces, and similar areas. (CMP-2)

Handhole Enclosure.

An enclosure for use in underground systems, provided with an open or closed bottom, and sized to allow personnel to reach into, but not enter, for the purpose of installing, operating, or maintaining equipment or wiring or both. (CMP-8)

Hazard Current.

For a given set of connections in an isolated power system, the total current that would flow through a low impedance if it were connected between either isolated conductor and ground. [**99:** 3.3.72] (517) (CMP-15)

Hazard Current, Fault. (Fault Hazard Current)

The hazard current of a given isolated power system with all devices connected except the line isolation monitor. [**99:** 3.3.72.1] (517) (CMP-15)

Monitor Hazard Current.

The hazard current of the line isolation monitor alone. [**99:** 3.3.72.2] (517) (CMP-15)

Total Hazard Current.

The hazard current of a given isolated system with all devices, including the line isolation monitor, connected. [**99:** 3.3.72.3] (517) (CMP-15)

Header.

Transverse metal raceways for electrical conductors, providing access to predetermined cells of a precast cellular concrete floor, thereby permitting the installation of electrical conductors from a distribution center to the floor cells. (CMP-8)

Health Care Facilities.

Buildings, portions of buildings, or mobile enclosures in which human medical, dental, psychiatric, nursing, obstetrical, or surgical care is provided. [**99:** 3.3.73] (CMP-15)

Informational Note: Examples of health care facilities include, but are not limited to, hospitals, nursing homes, limited care facilities, clinics, medical and dental offices, and ambulatory care centers, whether permanent or movable.

Health Care Facility's Governing Body.

The person or persons who have the overall legal responsibility for the operation of a health care facility. [**99:** 3.3.74] (517) (CMP-15)

Heating Equipment.

Any equipment that is used for heating purposes and whose heat is generated by induction or dielectric methods. (665) (CMP-12)

Heating Panel.

A complete assembly provided with a junction box or a length of flexible conduit for connection to a branch circuit. (CMP-17)

Heating Panel Set.

A rigid or nonrigid assembly provided with nonheating leads or a terminal junction assembly identified as being suitable for connection to a wiring system. (CMP-17)

Heating System.

A complete system consisting of components such as heating elements, fastening devices, nonheating circuit wiring, leads, temperature controllers, safety signs, junction boxes, raceways, and fittings. (CMP-17)

Heating System, Impedance. (Impedance Heating System)

A system in which heat is generated in an object, such as a pipe, rod, or combination of such objects serving as a heating element, by causing current to flow through such objects by direct connection to an ac voltage source from an isolating transformer. In some installations the object is embedded in the surface to be heated or constitutes the exposed component to be heated. (CMP-17)

Heating System, Induction. (Induction Heating System)

A system in which heat is generated in a pipeline or vessel wall by inducing current in the pipeline or vessel wall from an external isolated ac field source. (CMP-17)

Heating System, Skin Effect. (Skin-Effect Heating System)

A system in which heat is generated on the inner surface of a ferromagnetic envelope embedded in or fastened to the surface to be heated.

Informational Note: Typically, an electrically insulated conductor is routed through and connected to the envelope at the other end. The envelope and the electrically insulated conductor are connected to an ac voltage source from an isolating transformer. (CMP-17)

Hermetic Refrigerant Motor-Compressor.

A combination consisting of a compressor and motor, both of which are enclosed in the same housing, with no external shaft or shaft seals, with the motor operating in the refrigerant. (CMP-11)

Hoistway.

Any shaftway, hatchway, well hole, or other vertical opening or space in which an elevator or dumbwaiter is designed to operate. (CMP-12)

Hospital.

A building or portion thereof used on a 24-hour basis for the medical, psychiatric, obstetrical, or surgical care of four or more inpatients. [***101*** ; 3.3.152] (CMP-15)

Hydromassage Bathtub.

A permanently installed bathtub equipped with a recirculating piping system, pump, and associated equipment. It is designed so it can accept, circulate, and discharge water upon each use. (680) (CMP-17)

Identified (as applied to equipment).

Recognizable as suitable for the specific purpose, function, use, environment, application, and so forth, where described in a particular code requirement. (CMP-1)

Informational Note: Some examples of ways to determine suitability of equipment for a specific purpose, environment, or application include investigations by a qualified testing laboratory (listing and labeling), an inspection agency, or other organizations concerned with product evaluation.

Increased Safety "e".

Type of protection applied to electrical equipment that does not produce arcs or sparks in normal service and under specified abnormal conditions, in which additional measures are applied to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks. (CMP-14)

Informational Note: See ANSI/UL 60079-7, *Explosive Atmospheres — Part 7: Equipment Protection by Increased Safety "e"*, for additional information.

Induction Heating (Induction Melting) (Induction Welding).

The heating, melting, or welding of a nominally conductive material due to its own I2R losses when the material is placed in a varying electromagnetic field. (665) (CMP-12)

Industrial Control Panel.

An assembly of two or more components consisting of one of the following: (1) power circuit components only, such as motor controllers, overload relays, fused disconnect switches, and circuit breakers; (2) control circuit components only, such as push buttons, pilot lights, selector switches, timers, switches, and control relays; (3) a combination of power and control circuit components. These components, with associated wiring and terminals, are mounted on, or contained within, an enclosure or mounted on a subpanel. (CMP-11)

Informational Note: The industrial control panel does not include the controlled equipment.

Industrial Installation, Supervised. (Supervised Industrial Installation)

The industrial portions of a facility where all of the following conditions are met:

(1) Conditions of maintenance and engineering supervision ensure that only qualified persons monitor and service the system.

(2) The premises wiring system has 2500 kVA or greater of load used in industrial processes, manufacturing activities, or both, as calculated in accordance with Article 120 , Parts II, III, IV, or V.

(3) The premises has at least one service or feeder that is more than 150 volts to ground and more than 300 volts phase-to-phase.

This definition excludes installations in buildings used by the industrial facility for offices, warehouses, garages, machine shops, and recreational facilities that are not an integral part of the industrial plant, substation, or control center. (240) (CMP-10)

Information Technology Equipment (ITE).

Equipment and systems rated 1000 volts or less, normally found in offices or other business establishments and similar environments classified as ordinary locations, that are used for creation and manipulation of data, voice, video, and similar signals. (CMP-12)

Informational Note: See UL 60950-1-2007, *Information Technology Equipment — Safety — Part 1: General Requirements* , or UL 62368-1-2019, *Audio/Video Information and Communication Technology Equipment Part 1: Safety Requirements* , for information on listing requirements for both information technology equipment and communications equipment.

Information Technology Equipment Room.

A room within the information technology equipment area that contains the information technology equipment. [**75:** 3.3.15] (CMP-12)

Innerduct.

A nonmetallic raceway placed within a larger raceway. (CMP-16)

Insulated Bus Pipe (IBP).

A cylindrical solid or hollow conductor with a solid insulation system, having conductive grading layers and a grounding layer imbedded in the insulation, and provided with an overall covering of insulating or metallic material. IBP is also referred to as tubular covered conductor (TCC). (CMP-8)

Insulated Bus Pipe System.

An assembly that includes bus pipe, connectors, fittings, mounting structures, and other fittings and accessories. (CMP-8)

Insulating End.

An insulator designed to electrically insulate the end of a flat conductor cable (Type FCC). (324) (CMP-6)

Interactive Mode (Interactive).

The operating mode for power production sources or microgrids that operate in parallel with and are capable of delivering energy to an electric power production and distribution network or other primary power source. (CMP-4)

Informational Note: Interactive mode is an operational mode of both interactive systems and of equipment such as interactive inverters.

Interrupting Rating.

The highest current at rated voltage that a device is identified to interrupt under standard test conditions. (CMP-10)

Informational Note: Equipment intended to interrupt current at other than fault levels may have its interrupting rating implied in other ratings, such as horsepower or locked rotor current.

Intersystem Bonding Termination (IBT).

A device that provides a means for connecting intersystem bonding conductors for communications systems to the grounding electrode system. (CMP-16)

Intrinsic Safety "i".

Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"*, for additional information.

Intrinsically Safe Apparatus.

Apparatus in which all the circuits are intrinsically safe. (CMP-14)

Informational Note No. 1: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Informational Note No. 2: See ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for installation information.

Intrinsically Safe Circuit.

A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for test conditions.

Intrinsically Safe Circuits, Different. (Different Intrinsically Safe Circuits)

Intrinsically safe circuits in which the possible interconnections have not been evaluated and identified as intrinsically safe. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Intrinsically Safe System.

An assembly of interconnected intrinsically safe apparatus, associated apparatus, and interconnecting cables, in which those parts of the system that might be used in hazardous (classified) locations are intrinsically safe circuits. (CMP-14)

Informational Note No. 1: An intrinsically safe system might include more than one intrinsically safe circuit.

Informational Note No. 2: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* ; and ANSI/UL 60079-25, *Explosive Atmospheres — Part 25: Intrinsically Safe Electrical Systems* , for additional information.

Informational Note No. 3: See ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for installation information.

Invasive Procedure.

Any procedure that penetrates the protective surfaces of a patient's body (i.e., skin, mucous membrane, cornea) and that is performed with an aseptic field (procedural site). [Not included in this category are placement of peripheral intravenous needles or catheters used to administer fluids and/or medications, gastrointestinal endoscopies (i.e., sigmoidoscopies), insertion of urethral catheters, and other similar procedures.] [**99:** 3.3.91] (517) (CMP-15)

Inverter.

Equipment that changes dc to ac. (CMP-4)

Inverter, Interactive. (Interactive Inverter)

Inverter equipment having the capability to operate only in interactive mode. (CMP-13)

Inverter, Multimode. (Multimode Inverter)

Inverter equipment capable of operating in both interactive and island modes. (CMP-4)

Inverter, Stand-alone. (Stand-alone Inverter)

Inverter equipment having the capabilities to operate only in island mode. (CMP-4)

Inverter Input Circuit.

Conductors connected to the dc input of an inverter. (CMP-13)

Inverter Output Circuit.

Conductors connected to the ac output of an inverter. (CMP-13)

Inverter Utilization Output Circuit.

Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)

Irrigation Machine.

An electrically driven or controlled machine, with one or more motors, not hand-portable, and used primarily to transport and distribute water for agricultural purposes. (675) (CMP-7)

Irrigation Machine, Center Pivot. (Center Pivot Irrigation Machine)

A multimotored irrigation machine that revolves around a central pivot and employs alignment switches or similar devices to control individual motors. (675) (CMP-7)

Island Mode.

The operating mode for power production sources or microgrids that allows energy to be supplied to loads that are disconnected from an electric power production and distribution network or other primary power source. (CMP-4)

Isolated (as applied to location).

Not readily accessible to persons unless special means for access are used. (CMP-1)

Isolated Power System.

A system comprising an isolation transformer or its equivalent, a line isolation monitor, and its ungrounded circuit conductors. [**99:** 3.3.93] (517) (CMP-15)

Isolation Transformer.

A transformer of the multiple-winding type, with the primary and secondary windings physically separated, that inductively couples its ungrounded secondary winding to the grounded feeder system that energizes its primary winding. [**99:** 3.3.94] (517) (CMP-15)

Kitchen.

An area with a sink and permanent provisions for food preparation and cooking. (CMP-2)

Labeled.

Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner. (CMP-1)

> Informational Note: If a listed product is of such a size, shape, material, or surface texture that it is not possible to apply legibly the complete label to the product, the complete label may appear on the smallest unit container in which the product is packaged.

Laundry Area.

An area containing or designed to contain a laundry tray, clothes washer, or clothes dryer. (CMP-2)

Leakage-Current Detector-Interrupter (LCDI).

A device provided in a power supply cord or cord set that senses leakage current flowing between or from the cord conductors and interrupts the circuit at a predetermined level of leakage current. (440) (CMP-11)

Legally Required Standby Systems.

Those systems required and so classed as legally required standby by municipal, state, federal, or other codes or by any governmental agency having jurisdiction. These systems are intended to automatically supply power to selected loads (other than those classed as emergency systems) in the event of failure of the normal source. (CMP-13)

Life Safety Branch.

A system of feeders and branch circuits supplying power for lighting, receptacles, and equipment essential for life safety that is automatically connected to alternate power sources by one or more transfer switches during interruption of the normal power source. [**99:** 3.3.97] (517) (CMP-15)

Lighting Assembly, Cord-and-Plug-Connected. (Cord-and-Plug-Connected Lighting Assembly)

A lighting assembly consisting of a luminaire intended for installation in the wall of a spa, hot tub, or storable pool, and a cord-and-plug-connected transformer or power supply. (680) (CMP-17)

Lighting Assembly, Through-Wall. (Through-Wall Lighting Assembly)

A lighting assembly intended for installation above grade, on or through the wall of a pool, consisting of two interconnected groups of components separated by the pool wall. (680) (CMP-17)

Lighting Outlet.

An outlet intended for the direct connection of a lampholder or luminaire. (CMP-18)

Lighting Track. (Track Lighting)

A manufactured assembly designed to support and energize luminaires that are capable of being readily repositioned on the track. Its length can be altered by the addition or subtraction of sections of track. (CMP-18)

Limited Care Facility.

A building or portion of a building used on a 24-hour basis for the housing of four or more persons who are incapable of self-preservation because of age; physical limitation due to accident or illness; or limitations such as intellectual disability/developmental disability, mental illness, or chemical dependency. [***101:*** 3.3.93.2] (CMP-15)

Limited-Energy System.

The equipment and cables of an end-to-end system that are power-restricted to ensure the energy delivered into any fault provides acceptable protection for fire prevention and electric shock. (CMP-3)

Limited Finishing Workstation.

A power-ventilated apparatus that is capable of confining the vapors, mists, residues, dusts, or deposits that are generated by a limited spray application process. Such apparatus is not a spray booth or spray room, as herein defined. [**33:** 3.3.23.1] (CMP-14)

Informational Note: See NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials* , Section 14.3 for information on limited finishing workstations.

Line Isolation Monitor.

A test instrument designed to continually check the balanced and unbalanced impedance from each line of an isolated circuit to ground and equipped with a built-in test circuit to exercise the alarm without adding to the leakage current hazard. [**99:** 3.3.99] (517) (CMP-15)

Liquid Immersion "o".

Type of protection where electrical equipment is immersed in a protective liquid so that an explosive atmosphere that might be above the liquid or outside the enclosure cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 60079-6, *Explosive Atmospheres — Part 6: Equipment Protection by Liquid Immersion "o"* , for additional information.

Listed.

Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose. (CMP-1)

Informational Note: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. Use of the system employed by the listing organization allows the authority having jurisdiction to identify a listed product.

Live Parts.

Energized conductive components. (CMP-1)

Load Management.

The process within an energy management system that limits the total electrical load on an electrical supply system to a set value by adjusting or controlling the individual loads. (CMP-13)

Location, Anesthetizing. (Anesthetizing Location)

Any space within a facility that has been designated for the administration of any flammable or nonflammable inhalation anesthetic agent during examination or treatment, including the use of such agents for relative analgesia. (517) (CMP-15)

Location, Anesthetizing, Flammable. (Flammable Anesthetizing Location)

Any area of the facility that has been designated to be used for the administration of any flammable inhalation anesthetic agents in the normal course of examination or treatment. (517) (CMP-15)

Location, Damp. (Damp Location)

Locations protected from weather and not subject to saturation with water or other liquids but subject to moderate degrees of moisture. (CMP-1)

Informational Note: Examples of such locations include partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns, and some cold-storage warehouses.

Location, Dry. (Dry Location)

A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction. (CMP-1)

Location, Remote. (Remote Location)

A location, other than a motion picture or television studio, where a production is filmed or recorded. (530) (CMP-15)

Location, Wet. (Wet Location)

A location that is one or more of the following:

(1) Unprotected and exposed to weather

(2) Subject to saturation with water or other liquids

(3) Underground

(4) In concrete slabs or masonry in direct contact with the earth

(CMP-1)

Informational Note: A vehicle washing area is an example of a wet location saturated with water or other liquids.

Location, Wet Procedure. (Wet Procedure Location)

The area in a patient care space where a procedure is performed that is normally subject to wet conditions while patients are present, including standing fluids on the floor or drenching of the work area, either of which condition is intimate to the patient or staff. [**99:** 3.3.187] (517) (CMP-15)

Informational Note: Routine housekeeping procedures and incidental spillage of liquids do not define a wet procedure location. [**99:** A.3.3.187]

Locations, Hazardous (Classified). [Hazardous (Classified) Locations]

Locations where fire or explosion hazards might exist due to flammable gases, flammable liquid–produced vapors, combustible liquid–produced vapors, combustible dusts, combustible fiber/flyings, or ignitible fibers/flyings. (CMP-14)

Locations, Unclassified. (Unclassified Locations)

Locations determined to be neither Class I, Division 1; Class I, Division 2; Zone 0; Zone 1; Zone 2; Class II, Division 1; Class II, Division 2; Class III, Division 1; Class III, Division 2; Zone 20; Zone 21; Zone 22; nor any combination thereof. (CMP-14)

Long-Time Rating .

A rating based on an operating interval of 5 minutes or longer. (CMP-15)

Loudspeaker (Speaker).

Equipment that converts an ac electric signal into an acoustic signal. (640) (CMP-12)

Low-Voltage Contact Limit.

A voltage not exceeding the following values:

(1) 15 volts (RMS) for sinusoidal ac

(2) 21.2 volts peak for nonsinusoidal ac

(3) 30 volts for continuous dc

(4) 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz

(CMP-17)

Low-Voltage Suspended Ceiling Power Distribution System.

A system that serves as a support for a finished ceiling surface and consists of a busbar and busbar support system to distribute power to utilization equipment supplied by a Class 2 power supply. (393) (CMP-18)

Luminaire.

Utilization equipment intended to illuminate a space or object(s), to facilitate visual tasks, activities, aesthetics, or security, or a similar purpose. Light-emitting devices such as lamps or LED modules could be removable or replaceable. The equipment can connect directly to the branch circuit (ac or dc) or be used with a separate power source that regulates the voltage, current, or both from the branch circuit. A lampholder itself is not a luminaire. (CMP-18)

Luminaire, Directly Controlled (DCL).

A luminaire containing a control input for a dimming or switching function. (700) (CMP-13)

Luminaire, Dry-Niche. (Dry-Niche Luminaire)

A luminaire intended for installation in the floor or wall of a pool, spa, or fountain in a niche that is sealed against the entry of water. (680) (CMP-17)

Luminaire, No-Niche. (No-Niche Luminaire)

A luminaire intended for installation above or below the water without a niche. (680) (CMP-17)

Luminaire, Wet-Niche. (Wet-Niche Luminaire)

A luminaire intended for installation in a forming shell mounted in a pool or fountain structure where the luminaire will be completely surrounded by water. (680) (CMP-17)

Machine Room.

An enclosed machinery space outside the hoistway, intended for full bodily entry, that contains the electrical driving machine or the hydraulic machine. The room could also contain electrical and/or mechanical equipment used directly in connection with the elevator or dumbwaiter. (620) (CMP-12)

Machine Room and Control Room, Remote. (Remote Machine Room and Control Room)

A machine room or control room that is not attached to the outside perimeter or surface of the walls, ceiling, or floor of the hoistway. (620) (CMP-12)

Machinery, Industrial (Industrial Machine). (Industrial Machinery)

A power-driven machine (or a group of machines working together in a coordinated manner), not portable by hand while working, that is used to process material by cutting; forming; pressure; electrical, thermal, or optical techniques; lamination; or a combination of these processes. It can include associated equipment used to transfer material or tooling, including fixtures, to assemble/disassemble, to inspect or test, or to package. The associated electrical equipment, including the logic controller(s) and associated software or logic together with the machine actuators and sensors, are considered as part of the industrial machine. (CMP-12)

Machinery Space.

A space inside or outside the hoistway, intended to be accessed with or without full bodily entry, that contains the elevator, dumbwaiter, platform lift, or stairway chairlift equipment and could also contain equipment used directly in connection with the elevator, dumbwaiter, platform lift, or stairway chairlift. (620) (CMP-12)

Machinery Space and Control Space, Remote. (Remote Machinery Space and Control Space)

A machinery space or control space that is not within the hoistway, machine room, or control room and that is not attached to the outside perimeter or surface of the walls, ceiling, or floor of the hoistway. (620) (CMP-12)

Manufactured Home.

A structure, transportable in one or more sections, which in the traveling mode is 2.4 m (8 ft) or more in width or 12.2 m (40 ft) or more in length, or when erected on site is 29.77 m^2 (320 ft^2) or more is built on a permanent chassis and is designed to be used as a dwelling with or without a permanent foundation, whether or not connected to the utilities, and includes plumbing, heating, air conditioning, and electrical systems contained therein. The term includes any structure that meets all the requirements of this paragraph except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the regulatory agency. Calculations used to determine the number of square meters (square feet) in a structure are based on the structure's exterior dimensions and include all expandable rooms, cabinets, and other projections containing interior space, but do not include bay windows. [**501:** 1.2.12] (CMP-7)

Informational Note No. 1: Unless otherwise indicated, the term *mobile home* includes manufactured home and excludes park trailers.

Informational Note No. 2: See the applicable building code for definition of the term *permanent foundation* .

Informational Note No. 3: See 24 CFR Part 3280, *Manufactured Home Construction and Safety Standards, of the Federal Department of Housing and Urban Development* , for additional information on the definition.

Manufactured Wiring System.

A system containing component parts that are assembled in the process of manufacture and cannot be inspected at the building site without damage or destruction to the assembly and used for the connection of luminaires, utilization equipment, continuous plug-in type busways, and other devices. (604) (CMP-7)

Marina.

A facility, generally on the waterfront, that stores and services boats in berths, on moorings, and in dry storage or dry stack storage. [**303:** 3.3.13] (555) (CMP-7)

Maximum Output Power.

The maximum power delivered by an amplifier into its rated load as determined under specified test conditions. (640) (CMP-12)

Informational Note: The maximum output power can exceed the manufacturer’s rated output power for the same amplifier.

Maximum Output Power (as applied to wind electric systems).

The maximum 1-minute average power output a wind turbine produces in normal steady-state operation (instantaneous power output can be higher). (694) (CMP-4)

Maximum Voltage.

The greatest difference in potential produced between any two conductors of a wind turbine circuit. (694) (CMP-4)

Maximum Water Level.

The highest level that water can reach before it spills out. (680) (CMP-17)

Medical Office.

A building or part thereof in which the following occur:

(1) Examinations and minor treatments/procedures performed under the continuous supervision of a medical professional;

(2) The use of limited to minimal sedation and treatment or procedures that do not render the patient incapable of self-preservation under emergency conditions; and

(3) No overnight stays for patients or 24-hour operations.

[**99:** 3.3.110] (CMP-15)

Membrane Enclosure.

A temporary enclosure used for the spraying of workpieces that cannot be moved into a spray booth where open spraying is not practical due to proximity to other operations, finish quality, or concerns such as the collection of overspray. (CMP-14)

Informational Note: See NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials* , Chapter 18 for information on the construction and use of membrane enclosures.

Messenger-Supported Wiring.

An exposed wiring support system using a messenger wire to support insulated conductors by any one of the following:

(1) A messenger with rings and saddles for conductor support

(2) A messenger with a field-installed lashing material for conductor support

(3) Factory-assembled aerial cable

(4) Multiplex cables utilizing a bare conductor, factory assembled and twisted with one or more insulated conductors, such as duplex, triplex, or quadruplex type of construction

(CMP-6)

Messenger Wire (Messenger).

A wire that is run along with or integral with a cable or conductor to provide mechanical support for the cable or conductor. (CMP-6)

Metal Shield Connections.

Means of connection for flat conductor cables (Type FCC) designed to electrically and mechanically connect a metal shield to another metal shield, to a receptacle housing or self-contained device, or to a transition assembly. (324) (CMP-6)

Metering Centers (Meter Center).

Panelboards in enclosures also containing one or more meter sockets. (CMP-10)

Microgrid.

An electric power system containing interconnected power production sources and capable of acting as a primary source independent of an electric utility. (CMP-4)

Informational Note: Examples of power sources in microgrids include photovoltaic systems, generators, fuel cell systems, wind electric systems, energy storage systems, electric vehicles used as a source of supply, and electrical power conversion from other energy sources.

Microgrid, Health Care (Health Care Microgrid System). (Health Care Microgrid)

A group of interconnected loads and distributed energy resources within clearly defined boundaries that acts as a single controllable entity with respect to the utility. [**99:** 3.3.75] (517) (CMP-15)

Microgrid Control System (MCS).

A structured control system that manages microgrid operations, functionalities for utility interoperability, islanded operations, and transitions. (CMP-4)

Informational Note: MCS differ from multiple standby generators or uninterruptible power supplies that are evaluated and rated to operate as a single source of backup power upon loss of the primary power source. MCS functions include coordination, transitions, and interoperability between multiple power sources.

Microgrid Interconnect Device (MID).

A device that enables a microgrid system to separate from and reconnect to an interconnected primary power source. (CMP-4)

Mixer.

Equipment used to combine and level match a multiplicity of electronic signals, such as from microphones, electronic instruments, and recorded audio. (640) (CMP-12)

Mobile.

X-ray equipment mounted on a permanent base with wheels and/or casters for moving while completely assembled. (660) (CMP-12)

Mobile Home.

A factory-assembled structure or structures transportable in one or more sections that are built on a permanent chassis and designed to be used as a dwelling without a permanent foundation where connected to the required utilities and that include the plumbing, heating, air-conditioning, and electrical systems contained therein. (CMP-7)

Informational Note: Unless otherwise indicated, the term *mobile home* includes manufactured home and excludes park trailers.

Mobile Home Lot.

A designated portion of a mobile home park designed for the accommodation of one mobile home and its accessory buildings or structures for the exclusive use of its occupants. (550) (CMP-7)

Mobile Home Park.

A contiguous parcel of land that is used for the accommodation of mobile homes that are intended to be occupied. (550) (CMP-7)

Module, AC. (AC Module)

A complete, environmentally protected unit consisting of solar cells, inverter, and other components, designed to produce ac power. (690) (CMP-4)

Module System, AC. (AC Module System)

An assembly of ac modules, wiring methods, materials, and subassemblies that are evaluated, identified, and defined as a system. (690) (CMP-4)

Momentary Rating .

A rating based on an operating interval that does not exceed 5 seconds. (CMP-15)

Monitor.

An electrical or electronic means to observe, record, or detect the operation or condition of the electric power system or apparatus. (130) (CMP-13)

Monopole Circuit.

An electrical subset of a PV system that has two conductors in the output circuit, one positive (+) and one negative (−). (690) (CMP-4)

Monorail.

Overhead track and hoist system for moving material around the boatyard or moving and launching boats. [**303:** 3.3.16] (555) (CMP-7)

Mooring(s).

Any place where a boat is wet stored or berthed. [**303:** 3.3.17] (555) (CMP-7)

Motion Picture Studio (Television Studio).

A building, group of buildings, other structures, and outdoor areas designed, constructed, permanently altered, designated, or approved for the purpose of motion picture or television production. (530) (CMP-15)

Motion Picture Sound Stage.

A building or portion of a building, usually insulated from outside noise and natural light, designed, constructed, or altered for the purpose of image capture. (CMP-15)

Motor Control Center.

An assembly of one or more enclosed sections having a common power bus and principally containing motor control units. (CMP-11)

Motor Fuel Dispensing Facility.

That portion of a property where motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles or marine craft or into approved containers, including all equipment used in connection therewith. [**30A:** 3.3.11] (CMP-14)

> Informational Note: See 511.1 with respect to electrical wiring and equipment for other areas used as lubritoriums, service rooms, repair rooms, offices, salesrooms, compressor rooms, and similar locations.

Multi-Circuit Cable Outlet Enclosure.

An enclosure containing one or more multi-circuit plugs, receptacles, or both. (520) (CMP-15)

Multioutlet Assembly.

A surface, flush, or freestanding assemblage with a raceway and fittings or other enclosure provided with one or more receptacles, for the purpose of supplying power to utilization equipment. (CMP-18)

Nacelle.

An enclosure housing the alternator and other parts of a wind turbine. (694) (CMP-4)

Neon Tubing.

Electric-discharge luminous tubing, including cold cathode luminous tubing, that is manufactured into shapes to illuminate signs, form letters, parts of letters, skeleton tubing, outline lighting, other decorative elements, or art forms and filled with various inert gases. (600) (CMP-18)

Network Interface Unit (NIU).

A device that converts a broadband signal into component voice, audio, video, data, and interactive services signals and provides isolation between the network power and the premises signal circuits. These devices often contain primary and secondary protectors. (CMP-16)

Network Terminal.

A device that converts network-provided signals (optical, electrical, or wireless) into component signals, including voice, audio, video, data, wireless, optical, and interactive services, and is considered a network device on the premises that is connected to a communications service provider and is powered at the premises. (CMP-16)

Neutral Conductor.

The conductor connected to the neutral point of a system that is intended to carry current under normal conditions. (CMP-5)

Neutral Point.

The common point on a wye-connection in a polyphase system or midpoint on a single-phase, 3-wire system, or midpoint of a single-phase portion of a 3-phase delta system, or a midpoint of a 3-wire, direct-current system. (CMP-5)

> Informational Note: At the neutral point of the system, the vectorial sum of the nominal voltages from all other phases within the system that utilize the neutral, with respect to the neutral point, is zero potential.

Nonautomatic.

Requiring human intervention to perform a function. (CMP-1)

Nonincendive Circuit.

A circuit, other than field wiring, in which any arc or thermal effect produced under intended operating conditions of the equipment, is not capable, under specified test conditions, of igniting the flammable gas–air, vapor–air, or dust–air mixture. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Component.

A component having contacts for making or breaking an incendive circuit and the contacting mechanism is constructed so that the component is incapable of igniting the specified flammable gas–air or vapor–air mixture. The housing of such a component is not intended to exclude the flammable atmosphere or contain an explosion. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Equipment.

Equipment having electrical/electronic circuitry that is incapable, under normal operating conditions, of causing ignition of a specified flammable gas–air, vapor–air, or dust–air mixture due to arcing or thermal means. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Field Wiring.

Wiring that enters or leaves an equipment enclosure and, under normal operating conditions of the equipment, is not capable, due to arcing or thermal effects, of igniting the flammable gas–air, vapor–air, or dust–air mixture. Normal operation includes opening, shorting, or grounding the field wiring. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Field Wiring Apparatus.

Apparatus intended to be connected to nonincendive field wiring. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonlinear Load.

A load where the wave shape of the steady-state current does not follow the wave shape of the applied voltage. (CMP-1)

Informational Note: Electronic equipment, electronic/electric-discharge lighting, adjustable-speed drive systems, and similar equipment may be nonlinear loads.

Nonmetallic Extension.

An assembly of two insulated conductors within a nonmetallic jacket or an extruded thermoplastic covering. The classification includes surface extensions intended for mounting directly on the surface of walls or ceilings. (CMP-6)

Nonsparking.

Constructed to minimize the risk of arcs or sparks capable of creating an ignition hazard during conditions of normal operation. (CMP-14)

Informational Note No. 1: The term nonsparking is also referred to as nonarcing.

Informational Note No. 2: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Normal/Emergency Power Source.

A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).

Normal High-Water Level (as applies to electrical datum plane distances).

Natural or Artificially Made Shorelines: An elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial.

Rivers and Streams: The elevation of the top of the bank of the channel. Streams, rivers, and tributaries that are prone to flooding and effects of water runoff shall consider the “bankfull stage” where an established gauge height at a given location along a river or stream, above which a rise in water surface will cause the river or stream to overflow the lowest natural stream bank somewhere in the corresponding reach.

Flood Control Bodies of Water: The flood pool maximum water surface elevation of a reservoir, equal to the elevation of the spillway.

Nonflood Control Bodies of Water: The flowage easement boundary in which the highest water surface elevation defined by the area existing between governmental-owned property line(s) and a contour line with perpetual rights to flood the area in connection with the operation of the reservoir. (CMP-7)

Nurses’ Station.

A space intended to provide a center of nursing activity for a group of nurses serving bed patients, where patient calls are received, nurses dispatched, nurses’ notes written, inpatient charts prepared, and medications prepared for distribution to patients. Where such activities are carried on in more than one location within a nursing unit, all such separate spaces are considered a to be parts of the nurses’ station. (517) (CMP-15)

Nursing Home.

A building or portion of a building used on a 24-hour basis for the housing and nursing care of four or more persons who, because of mental or physical incapacity, might be unable to provide for their own needs and safety without the assistance of another person. [***101*** **:** 3.3.150.2] (CMP-15)

Office Furnishing.

Cubicle panels, partitions, study carrels, workstations, desks, shelving systems, and storage units that may be mechanically and electrically interconnected to form an office furnishing system. (CMP-18)

Oil Immersion.

Electrical equipment immersed in a protective liquid so that an explosive atmosphere that might be above the liquid or outside the enclosure cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Open Wiring on Insulators.

An exposed wiring method using cleats, knobs, tubes, and flexible tubing for the protection and support of single insulated conductors run in or on buildings. (CMP-6)

Operating Device.

The car switch, pushbuttons, key or toggle switch(s), or other devices used to activate the operation controller. (620) (CMP-12)

Operator.

The individual responsible for starting, stopping, and controlling an amusement ride or supervising a concession. (525) (CMP-15)

Optical Radiation.

Electromagnetic radiation at wavelengths in vacuum between the region of transition to X-rays and the region of transition to radio waves that is approximately between 1 nm and 1000 µm. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for information on types of protection that can be applied to minimize the risk of ignition in explosive atmospheres from optical radiation in the wavelength range from 380 nm to 10 µm.

Optical Radiation, Inherently Safe “op is”. (Inherently Safe Optical Radiation “op is”)

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is incapable of producing sufficient energy under normal or specified fault conditions to ignite a specific explosive atmosphere. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optical Radiation, Protected "op pr". (Protected Optical Radiation "op pr")

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is confined inside optical fiber or other transmission medium under normal constructions or constructions with additional mechanical protection based on the assumption that there is no escape of radiation from the confinement. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optical System With Interlock "op sh".

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is confined inside optical fiber or other transmission medium with interlock cutoff provided to reliably reduce the unconfined beam strength to safe levels within a specified time in case the confinement fails and the radiation becomes unconfined. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optional Standby Systems.

Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13)

Organ, Electronic. (Electronic Organ)

A musical instrument that imitates the sound of a pipe organ by producing sound electronically. (CMP-12)

Informational Note: Most new electronic organs produce sound digitally and are called digital organs.

Organ, Pipe. (Pipe Organ)

A musical instrument that produces sound by driving pressurized air (called *wind*) through pipes selected via a keyboard. (CMP-12)

Organ, Pipe Sounding Apparatus. (Pipe Organ Sounding Apparatus) (Pipe Organ Chamber).

The sound-producing part of a pipe organ, including, but not limited to, pipes, chimes, bells, the pressurized air- (wind-) producing equipment (blower), associated controls, and power equipment. (CMP-12)

Outlet.

A point on the wiring system at which current is taken to supply utilization equipment. (CMP-1)

Outlet Box Hood.

A housing shield intended to fit over a faceplate for flush-mounted wiring devices, or an integral component of an outlet box or of a faceplate for flush-mounted wiring devices. The hood does not serve to complete the electrical enclosure; it reduces the risk of water coming in contact with electrical components within the hood, such as attachment plugs, current taps, surge protective devices, direct plug-in transformer units, or wiring devices. (CMP-18)

Outline Lighting.

An arrangement of incandescent lamps, electric-discharge lighting, or other electrically powered light sources to outline or call attention to certain features such as the shape of a building or the decoration of a window. (CMP-18)

Output Cable to the Electric Vehicle.

An assembly consisting of a length of flexible EV cable and an electric vehicle connector (supplying power to the electric vehicle). (625) (CMP-12)

Output Cable to the Primary Pad.

A multiconductor, shielded cable assembly consisting of conductors to carry the high-frequency energy and any status signals between the charger power converter and the primary pad. (625) (CMP-12)

Overcurrent.

Any current in excess of the rated current of equipment or the ampacity of a conductor. It may result from overload, short circuit, or ground fault. (CMP-10)

Informational Note: A current in excess of rating may be accommodated by certain equipment and conductors for a given set of conditions. Therefore, the rules for overcurrent protection are specific for particular situations.

Overcurrent Protective Device, Branch-Circuit. (Branch-Circuit Overcurrent Protective Device)

A device capable of providing protection for service, feeder, and branch circuits and equipment over the full range of overcurrents between its rated current and its interrupting rating. (CMP-10)

Overcurrent Protective Device, Supplementary. (Supplementary Overcurrent Protective Device)

A device intended to provide limited overcurrent protection for specific applications and utilization equipment such as luminaires and appliances. This limited protection is in addition to the protection provided in the required branch circuit by the branch-circuit overcurrent protective device. (CMP-10)

Overhead Gantry.

A structure consisting of horizontal framework, supported by vertical columns spanning above electrified truck parking spaces, that supports equipment, appliances, raceway, and other necessary components for the purpose of supplying electrical, HVAC, internet, communications, and other services to the spaces. (626) (CMP-12)

Overload.

Operation of equipment in excess of normal, full-load rating, or of a conductor in excess of its ampacity that, when it persists for a sufficient length of time, would cause damage or dangerous overheating. A fault, such as a short circuit or ground fault, is not an overload. (CMP-10)

Packaged Therapeutic Tub or Hydrotherapeutic Tank Equipment Assembly.

A factory-fabricated unit consisting of water-circulating, heating, and control equipment mounted on a common base, intended to operate a therapeutic tub or hydrotherapeutic tank. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Panelboard.

A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet, enclosure, or cutout box placed in or against a wall, partition, or other support; and accessible only from the front. (CMP-10)

Panelboard, Enclosed. (Enclosed Panelboard)

An assembly of buses and connections, overcurrent devices, and control apparatus with or without switches or other equipment, installed in a cabinet, cutout box, or enclosure suitable for a panelboard application. (CMP-1)

Park Electrical Wiring Systems.

All of the electrical wiring, luminaires, equipment, and appurtenances related to electrical installations within a mobile home park, including the mobile home service equipment. (550) (CMP-7)

Park Trailer.

A unit that is built on a single chassis mounted on wheels and has a gross trailer area not exceeding 37 m^2 (400 ft^2) in the set-up mode. (552) (CMP-7)

Part-Winding Motors.

A part-winding start induction or synchronous motor is one that is arranged for starting by first energizing part of its primary (armature) winding and, subsequently, energizing the remainder of this winding in one or more steps. A standard part-winding start induction motor is arranged so that one-half of its primary winding can be energized initially, and, subsequently, the remaining half can be energized, both halves then carrying equal current. (CMP 11)

Informational Note: A hermetic refrigerant motor-compressor is not considered a standard part-winding start induction motor.

Passenger Transportation Facilities.

Any area open to the public associated with passenger transportation such as an airport, bus terminal, highway rest stop and service area, marina, seaport, ferry slip, subway station, train station, or port of entry. (CMP-18)

Patient Bed Location.

The location of a patient sleeping bed, or the bed or procedure table of a Category 1 space. [**99:** 3.3.138] (CMP-15)

Patient Care–Related Electrical Equipment.

Electrical equipment appliance that is intended to be used for diagnostic, therapeutic, or monitoring purposes in a patient care vicinity. [**99:** 3.3.139] (517) (CMP-15)

Patient Care Space Category.

Any space of a health care facility wherein patients are intended to be examined or treated. [**99:** 3.3.145] (517) (CMP-15)

Informational Note No. 1: The health care facility's governing body designates patient care space in accordance with the type of patient care anticipated.

Informational Note No. 2: Business offices, corridors, lounges, day rooms, dining rooms, or similar areas typically are not classified as patient care spaces. [**99:** A.3.3.145]

Category 1 Space (Category 1).

Space in which failure of equipment or a system is likely to cause major injury or death of patients, staff, or visitors. [**99:** 3.3.140.1] (CMP-15)

Informational Note: These spaces, formerly known as critical care rooms, are typically where patients are intended to be subjected to invasive procedures and connected to line-operated, patient care–related appliances. Examples include, but are not limited to, special care patient rooms used for critical care, intensive care, and special care treatment rooms such as angiography laboratories, cardiac catheterization laboratories, delivery rooms, operating rooms, post-anesthesia care units, trauma rooms, and other similar rooms. [**99:** A.3.3.140.1]

Category 2 Space (Category 2).

Space in which failure of equipment or a system is likely to cause minor injury to patients, staff, or visitors. [**99:** 3.3.140.2] (CMP-15)

Informational Note: These spaces were formerly known as general care rooms. Examples include, but are not limited to, inpatient bedrooms, dialysis rooms, in vitro fertilization rooms, procedural rooms, and similar rooms. [**99:** A.3.3.140.2]

Category 3 Space (Category 3).

Space in which the failure of equipment or a system is not likely to cause injury to patients, staff, or visitors but can cause discomfort. [**99:** 3.3.140.3] (517) (CMP-15)

Informational Note: These spaces, formerly known as basic care rooms, are typically where basic medical or dental care, treatment, or examinations are performed. Examples include, but are not limited to, examination or treatment rooms in clinics, medical and dental offices, nursing homes, and limited care facilities. [**99:** A.3.3.140.3]

Category 4 Space (Category 4).

Space in which failure of equipment or a system is not likely to have a physical impact on patient care. [**99:** 3.3.140.4] (517) (CMP-15)

Informational Note: These spaces were formerly known as support rooms. Examples of support spaces include, but are not limited to, anesthesia work rooms, sterile supply, laboratories, morgues, waiting rooms, utility rooms, and lounges. [**99:** A.3.3.140.4]

Patient Care Vicinity.

A space, within a location intended for the examination and treatment of patients, extending 1.8 m (6 ft) beyond the normal location of the bed, chair, table, treadmill, or other device that supports the patient during examination and treatment and extending vertically to 2.3 m (7 ft 6 in.) above the floor. [**99:** 3.3.141] (517) (CMP-15)

Patient Equipment Grounding Point.

A jack or terminal that serves as the collection point for redundant grounding of electric appliances serving a patient care vicinity or for grounding other items in order to eliminate electromagnetic interference problems. [**99:** 3.3.142] (517) (CMP-15)

Performance Area.

The stage and audience seating area associated with a temporary stage structure, whether indoors or outdoors, constructed of scaffolding, truss, platforms, or similar devices, that is used for the presentation of theatrical or musical productions or for public presentations. (520) (CMP-15)

Permanent Amusement Attraction.

A ride device, entertainment device, or a combination of both that is installed such that portability or relocation is impracticable. (522) (CMP-15)

Permanently Installed Decorative Fountains and Reflection Pools.

Those that are constructed in the ground, on the ground, or in a building in such a manner that the fountain cannot be readily disassembled for storage, whether or not served by electrical circuits of any nature. These units are primarily constructed for their aesthetic value and are not intended for swimming or wading. (680) (CMP-17)

Personnel Protection System (as applied to EVSE).

A system of personnel protection devices and constructional features that when used together provide protection against electric shock of personnel. (625) (CMP-12)

Phase, Manufactured. (Manufactured Phase)

The phase that originates at the phase converter and is not solidly connected to either of the single-phase input conductors. (CMP-13)

Phase Converter.

An electrical device that converts single-phase power to 3-phase electric power. (CMP-13)

Informational Note: Phase converters have characteristics that modify the starting torque and locked-rotor current of motors served, and consideration is required in selecting a phase converter for a specific load.

Phase Converter, Rotary. (Rotary-Phase Converter)

A device that consists of a rotary transformer and capacitor panel(s) that permits the operation of 3-phase loads from a single-phase supply. (455) (CMP-13)

Phase Converter, Static. (Static-Phase Converter)

A device without rotating parts, sized for a given 3-phase load to permit operation from a single-phase supply. (455) (CMP-13)

Photovoltaic Cell (PV). (Solar Cell).

The basic photovoltaic device that generates dc electricity when exposed to light. (CMP-4)

Pier.

A structure extending over the water and supported on a fixed foundation (fixed pier), or on flotation (floating pier), that provides access to the water. [**303:** 3.3.18] (CMP-7)

Pier, Fixed. (Fixed Pier)

Pier constructed on a permanent, fixed foundation, such as on piles, that permanently establishes the elevation of the structure deck with respect to land. [**303:** 3.3.18.2] (CMP-7)

Pier, Floating. (Floating Pier)

Pier designed with inherent flotation capability that allows the structure to float on the water surface and rise and fall with water level changes. [**303:** 3.3.18.3] (CMP-7)

Pinout Configuration.

The assignment of electrical functions to connector pins in a multicircuit connector. (CMP-15)

Pipeline.

A length of pipe including pumps, valves, flanges, control devices, strainers, and/or similar equipment for conveying fluids. (CMP-17)

Plenum.

A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system. (CMP-3)

Plenum Cable, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways that have adequate fire-resistant and low smoke-producing characteristics and are suitable for use in ducts, plenums, and other spaces used for environmental air. (722) (CMP-3)

Point of Entrance.

The point within a building at which a wire or cable emerges from an external wall, the roof, or the floor. (CMP-16)

Pool.

Manufactured or field-constructed equipment designed to contain water and intended for use by persons for swimming, wading, immersion, recreational, or therapeutic purposes, but not including bodies of water incorporated as part of an industrial process, lakes, lagoons, surf parks, or other natural and artificially made bodies of water that could incorporate swimming and swimming areas. (680) (CMP-17)

> Informational Note: Natural and man-made bodies of water, which includes lakes, lagoons, surf parks, or other similar bodies of water, are addressed in Article 682 .

Pool, Immersion. (Immersion Pool)

A pool for ceremonial or ritual immersion of users, which is designed and intended to have its contents drained or discharged. (680) (CMP-17)

Pool, Permanently Installed Swimming, Wading, Immersion, and Therapeutic. (Permanently Installed Swimming, Wading, Immersion, and Therapeutic Pools)

Those that are permanently constructed or installed in the ground, partially in the ground, above ground, inside of a building, or on a building, whether or not served by electrical circuits. (680) (CMP-17)

Pool, Storable (Storable Immersion Pool). (Storable Pool)

Pools of any water depth, used for swimming, wading, or immersion, installed entirely on or above the ground that are intended to be stored when not in use or are designed for ease of relocation. (680) (CMP-17)

> Informational Note: A storable pool that is installed with a permanent deck around all or a portion of its perimeter is considered a permanently installed pool.

Pool Cover, Electrically Operated. (Electrically Operated Pool Cover)

Motor-driven equipment designed to cover and uncover the water surface of a pool by means of a flexible sheet or rigid frame. (680) (CMP-17)

Pool Lift, Electrically Powered. (Electrically Powered Pool Lift)

An electrically powered lift that provides accessibility for people with disabilities to and from a pool or spa. (680) (CMP-17)

Portable.

A device intended for indoor or outdoor use that is designed to be hand-carried from location to location, or easily transported without the use of other devices or equipment. (625) (CMP-12)

Portable.

X-ray equipment designed to be hand-carried. (660) (CMP-12)

Portable (as applied to equipment).

Equipment that is actually moved or can easily be moved from one place to another in normal use. (680) (CMP-17)

Portable Handlamp.

A cord- and plug-connected luminaire with a handle, and a hook for temporary mounting and hands-free operation. (CMP-18)

Portable Power Distribution Unit.

A power distribution box containing receptacles and overcurrent devices. (520) (CMP-15)

> Informational Note: See ANSI/UL 1640, *Portable Power-Distribution Equipment* , for information on portable power distribution units.

Portable Structures.

Units designed to be moved including, but not limited to, amusement rides, attractions, concessions, tents, trailers, trucks, and similar units. (525) (CMP-15)

Portable Substation.

A portable assembly, usually mounted on a trailer, containing primary and secondary switchgear and a transformer. (530) (CMP-15)

Powder Filling "q".

Type of protection where electrical parts capable of igniting an explosive atmosphere are fixed in position and completely surrounded by filling material (glass or quartz powder) to prevent the ignition of an external explosive atmosphere. (CMP-14)

Informational Note: See ANSI/UL 60079-5, *Explosive Atmospheres — Part 5: Equipment protection by powder filling "q"* , for additional information.

Power Control System (PCS).

Equipment that monitors and controls power within an electrical system to prevent overload of an electrical service, feeder, conductor, or other power distribution equipment. (CMP-13)

Informational Note: A power control system may control generation, energy storage, loads, circuit controllers, or other equipment to manage power and may contain additional protective functions relative to EMS or grid interconnection functions.

Power Outlet.

An enclosed assembly that may include receptacles, circuit breakers, fuseholders, fused switches, buses, and watt-hour meter mounting means; intended to supply and control power to mobile homes, recreational vehicles, park trailers, or boats or to serve as a means for distributing power required to operate mobile or temporarily installed equipment. (CMP-7)

Power Outlet, Marina. (Marina Power Outlet)

An enclosed assembly that can include equipment such as receptacles, circuit breakers, fused switches, fuses, watt-hour meters, panelboards, and monitoring means identified for marina use. (555) (CMP-7)

Power Production Source (Power Source).

Electrical power production equipment other than a utility service, up to the source system disconnecting means. (CMP-4)

Informational Note: Examples of power production sources include engine and wind generators, solar photovoltaic systems, fuel cells, and energy storage systems.

Power Source Output Conductors.

The conductors between power production equipment and the service or other premises wiring. (CMP-4)

Power Sources.

A system of one or more off-site or one or more on-site power generation or storage components intended to provide power to nonessential electrical loads and the essential electrical system. [**99:** 3.3.155] (517) (CMP-15)

Power Supply (as applied to low-voltage suspended ceiling power distribution systems).

A Class 2 power supply connected between the branch-circuit power distribution system and the busbar low-voltage suspended ceiling power distribution system. (393) (CMP-18)

Power-Supply Cord.

An assembly consisting of an attachment plug and a length of flexible cord connected to utilization equipment. (CMP-6)

Premises.

The land and buildings located on the user's side of the point of demarcation between the communications service provider and the user. (800) (CMP-16)

Premises-Powered.

Using power provided locally from the premises. (CMP-16)

Premises Wiring (System).

Interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed. This includes one of the following:

(1) Wiring from the service point to the outlets

(2) Wiring from and including the power source to the outlets if there is no service point

Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment. (CMP-1)

Informational Note: Power sources include, but are not limited to, interconnected or stand-alone batteries, solar photovoltaic systems, other distributed generation systems, or generators.

Pressurized.

The process of supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of combustible dust or ignitible fibers/flyings. (CMP-14)

Pressurized Enclosure "p".

Type of protection for electrical equipment that uses the technique of guarding against the ingress of the external atmosphere, which might be explosive, into an enclosure by maintaining a protective gas therein at a pressure above that of the external atmosphere. (CMP-14)

Informational Note: See ANSI/UL-60079-2, *Explosive Atmospheres — Part 2: Equipment protection by pressurized enclosures "p"*, for additional information.

Pressurized Room "p".

A room volume protected by pressurization and of sufficient size to permit the entry of a person who might occupy the room. (CMP-14)

Informational Note: See ANSI/UL 60079-13, *Explosive Atmospheres — Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"* , for information on the requirements for rooms intended for human entry where pressurization is used as a means of reducing the risk of explosion.

Primary Pad.

A device external to the EV that transfers power via the contactless coupling as part of a wireless power transfer system. (625) (CMP-12)

Primary Source.

An electric utility or another source of power that acts as the main forming and stabilizing source in an electric power system. (CMP-4)

Prime Mover.

The machine that supplies the mechanical horsepower to a generator. (CMP-13)

Process Seal.

A seal between electrical systems and flammable or combustible process fluids where a failure could allow the migration of process fluids into the premises' wiring system. (CMP-14)

Informational Note: See ANSI/UL 122701, *Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids*, for additional information.

Production Areas.

Areas where portable electrical equipment is used to implement the capture of images. (530) (CMP-15)

Projector, Nonprofessional. (Nonprofessional Projector)

Those types of projectors that do not comply with the definition of *Professional-Type Projector*. (540) (CMP-15)

Projector, Professional-Type. (Professional-Type Projector)

A type of projector using 35- or 70-mm film that has a minimum width of 35 mm (1 $^{3}/_{8}$ in.) and has on each edge 212 perforations per meter (5.4 perforations per inch), or a type using carbon arc, xenon, or other light source equipment that develops hazardous gases, dust, or radiation. (540) (CMP-15)

Proscenium.

The wall and arch that separates the stage from the auditorium (i.e., house). (520) (CMP-15)

Protection by Enclosure "t".

Type of protection for explosive dust atmospheres where electrical equipment is provided with an enclosure providing dust ingress protection and a means to limit surface temperatures. (CMP-14)

Informational Note: See ANSI/UL 60079-31, *Explosive Atmospheres — Part 31: Equipment Dust Ignition Protection by Enclosure "t"*, for additional information.

Psychiatric Hospital.

A building used exclusively for the psychiatric care, on a 24-hour basis, of four or more inpatients. (517) (CMP-15)

Purged and Pressurized.

The process of (1) purging, supplying an enclosure with a protective gas at a sufficient flow and positive pressure to reduce the concentration of any flammable gas or vapor initially present to an acceptable level; and (2) pressurization, supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of a flammable gas or vapor, a combustible dust, or an ignitible fiber. (CMP-14)

Informational Note: See NFPA 496-2024, *Standard for Purged and Pressurized Enclosures for Electrical Equipment*, for additional information.

Purpose-Built.

A custom luminaire, a piece of lighting equipment, or an effect that is constructed for a specific purpose and is not serially manufactured or available for general sale. (530) (CMP-15)

PV DC Circuit (PV System DC Circuit).

Any dc conductor in PV source circuits, PV string circuits, and PV dc-to-dc converter circuits. (690) (CMP-4)

PV DC Circuit, Source. (PV Source Circuit)

The PV dc circuit conductors between modules in a PV string circuit, and from PV string circuits or dc combiners, to dc combiners, electronic power converters, or a dc PV system disconnecting means. (690) (CMP-4)

PV DC Circuit, String. (PV String Circuit)

The PV source circuit conductors of one or more series-connected PV modules. (690) (CMP-4)

PV Module (Module) (Solar PV Module).

A complete, environmentally protected unit consisting of solar cells and other components designed to produce dc power. (CMP-4)

PV (Photovoltaic) System (PV System) (Photovoltaic System).

The total components, circuits, and equipment up to and including the PV system disconnecting means that, in combination, convert solar energy into electric energy. (CMP-4)

Qualified Person.

One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved. (CMP-1)

Informational Note: See NFPA *70E*-2024, *Standard for Electrical Safety in the Workplace*, for electrical safety training requirements.

Raceway.

An enclosed channel designed expressly for holding wires, cables, or busbars, with additional functions as permitted in this code. (CMP-8)

Raceway Cell.

A single enclosed tubular space in a cellular metal or concrete floor member, the axis of the cell being parallel to the axis of the floor member. (CMP-8)

Raceway, Cellular Metal Floor. (Cellular Metal Floor Raceway)

The hollow spaces of cellular metal floors, together with suitable fittings, that may be approved as enclosed channel for electrical conductors. (CMP-8)

Raceway, Communications. (Communications Raceway)

An enclosed channel of nonmetallic materials designed expressly for holding communications wires and cables; optical fiber cables; data cables associated with information technology and communications equipment; Class 2, Class 3, Class 4, and Type PLTC cables; and power-limited fire alarm cables in plenum, riser, and general-purpose applications. (CMP-3)

Raceway, Strut-Type Channel. (Strut-Type Channel Raceway)

A metal raceway that is intended to be mounted to the surface of or suspended from a structure, with associated accessories for the installation of electrical conductors and cables. (CMP-8)

Raceway, Surface Metal. (Surface Metal Raceway)

A metal raceway that is intended to be mounted to the surface of a structure, with associated couplings, connectors, boxes, and fittings for the installation of electrical conductors. (CMP-8)

Raceway, Surface Nonmetallic. (Surface Nonmetallic Raceway)

A nonmetallic raceway that is intended to be mounted to the surface of a structure, with associated couplings, connectors, boxes, and fittings for the installation of electrical conductors. (CMP-8)

Raceway, Underfloor. (Underfloor Raceway)

A raceway and associated components designed and intended for installation beneath or flush with the surface of a floor for the installation of cables and electrical conductors. (CMP-8)

Rail.

The structural support for the suspended ceiling system typically forming the ceiling grid supporting the ceiling tile and listed utilization equipment, such as sensors, actuators, A/V devices, and low-voltage luminaires and similar electrical equipment. (393) (CMP-18)

Rainproof.

Constructed, protected, or treated so as to prevent rain from interfering with the successful operation of the apparatus under specified test conditions. (CMP-1)

Raintight.

Constructed or protected so that exposure to a beating rain will not result in the entrance of water under specified test conditions. (CMP-1)

Rated-Load Current (RLC).

The current of a hermetic refrigerant motor-compressor resulting when it is operated at the rated load, rated voltage, and rated frequency of the equipment it serves. (440) (CMP-11)

Rated Output Power.

The amplifier manufacturer's stated or marked output power capability into its rated load. (640) (CMP-12)

Rated Power.

The output power of a wind turbine at its rated wind speed. (694) (CMP-4)

Informational Note: See IEC 61400-12-1, *Power Performance Measurements of Electricity Producing Wind Turbines* , for the method for measuring wind turbine power output.

Receptacle.

A contact device installed at the outlet for the connection of an attachment plug, or for the direct connection of electrical utilization equipment designed to mate with the corresponding contact device. A single receptacle is a single contact device with no other contact device on the same yoke or strap. A multiple receptacle is two or more contact devices on the same yoke or strap. (CMP-18)

Informational Note: A duplex receptacle is an example of a multiple receptacle that has two receptacles on the same yoke or strap.

Receptacle, Weather-Resistant (WR). (Weather-Resistant Receptacle)

A receptacle constructed to be resistant to the adverse effects of damp, wet, or outdoor locations. (CMP-18)

Receptacle, Weight-Supporting Ceiling (WSCR). (Weight-Supporting Ceiling Receptacle)

A contact device installed at an outlet box for the connection and support of luminaries or ceiling-suspended (paddle) fans using a weight-supporting attachment fitting (WSAF). (CMP-18)

Informational Note: See ANSI/NEMA WD 6, *American National Standard for Wiring Devices — Dimensional Specifications* , for the standard configuration of weight-supporting ceiling receptacles and related weight-supporting attachment fittings.

Receptacle Outlet.

An outlet where the branch-circuit conductors are connected to one or more receptacles. (CMP-18)

Reconditioned Equipment.

Electromechanical systems, equipment, apparatus, or components that are restored to operating conditions. This process differs from normal servicing of equipment that remains within a facility, or replacement of listed equipment on a one-to-one basis. (CMP-1)

Informational Note: The term *reconditioned* is frequently referred to as *rebuilt* , *refurbished* , or *remanufactured* .

Recreational Vehicle (RV) (Camping Trailer) (Motor Home) (Travel Trailer) (Truck Camper).

A vehicle or slide-in camper that is primarily designed as temporary living quarters for recreational, camping, or seasonal use; has its own motive power or is mounted on or towed by another vehicle; is regulated by the National Highway Traffic Safety Administration as a vehicle or vehicle equipment; does not require a special highway use permit for operation on the highways; and can be easily transported and set up on a daily basis by an individual. [**1192:** 3.3.52] (551) (CMP-7)

Informational Note: See NFPA 1192-2026, *Standard on Recreational Vehicles* , Informative Annex A, for product types and definitions for motor homes and towable recreational vehicles.

Recreational Vehicle Park.

Any parcel or tract of land under the control of any person, organization, or governmental entity wherein two or more recreational vehicle, recreational park trailer, and/or other camping sites are offered for use by the public or members of an organization for overnight stays. (551) (CMP-7)

Recreational Vehicle Site.

A specific area within a recreational vehicle park or campground that is set aside for use by a camping unit. (551) (CMP-7)

Recreational Vehicle Site Supply Equipment.

A power outlet assembly located near the point of entrance of supply conductors to a recreational vehicle site and intended to constitute the disconnecting means for connected recreational vehicles. (551) (CMP-7)

Recreational Vehicle Stand.

That area of a recreational vehicle site intended for the placement of a recreational vehicle. (551) (CMP-7)

Reference Grounding Point.

The ground bus of the panelboard or isolated power system panel supplying the patient care room. [**99:** 3.3.158] (517) (CMP-15)

Relative Analgesia.

A state of sedation and partial block of pain perception produced in a patient by the inhalation of concentrations of nitrous oxide insufficient to produce loss of consciousness (conscious sedation). (517) (CMP-15)

Relay, Automatic Load Control (ALCR). (Automatic Load Control Relay)

An emergency lighting control device used to set normally dimmed or normally-off switched emergency lighting equipment to full power illumination levels in the event of a loss of the normal supply by bypassing the dimming/switching controls, and to return the emergency lighting equipment to normal status when the device senses the normal supply has been restored. (700) (CMP-13)

Informational Note: See ANSI/UL 924, *Emergency Lighting and Power Equipment* , for the requirements covering automatic load control relays.

Remote-Control Circuit.

Any electrical circuit that controls any other circuit through a relay or an equivalent device. (CMP-3)

Remote Disconnect Control.

An electric device and circuit that controls a disconnecting means through a relay or equivalent device. (645) (CMP-12)

Resistance Heating Element.

A specific separate element to generate heat that is stand-alone, externally attached to, embedded in, integrated with, or internal to the object to be heated. (CMP-17)

Informational Note: Tubular heaters, strip heaters, heating cable, heating tape, heating blankets, immersion heaters, and heating panels are examples of resistance heaters.

Restricted Industrial Establishment [as applied to hazardous (classified) locations].

Establishment with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation. (CMP-14)

Retrofit Kit.

A complete subassembly of parts and devices for field conversion of utilization equipment. (CMP-18)

Retrofit Kit, General Use. (General Use Retrofit Kit)

A kit that includes some, but not all, of the necessary parts to replace the illumination system of a host sign and installation instructions that identify the parts required to complete the subassembly in the field. (600) (CMP-18)

Retrofit Kit, Sign Specific. (Sign Specific Retrofit Kit)

A kit that includes all of the necessary parts and hardware to allow for field installation in a host sign, based on the included installation instructions. (600) (CMP-18)

Reverse Polarity Protection (Backfeed Protection).

A system that prevents two interconnected power supplies, connected positive to negative, from passing current from one power source into a second power source. (393) (CMP-18)

Ride Device.

A device or combination of devices that carry, convey, or direct a person(s) over or through a fixed or restricted course within a defined area for the primary purpose of amusement or entertainment. (522) (CMP-15)

Riser Cable, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways that have fire-resistant characteristics capable of preventing the carrying of fire from floor to floor and are suitable for use in a vertical run in a shaft or from floor to floor. (722) (CMP-3)

Road Show Connection Panel.

A type of patch panel designed to allow for road show connection of portable stage switchboards to fixed lighting outlets by means of permanently installed supplementary circuits. (520) (CMP-15)

Safe Zone.

Low probability of damage other than a slight swelling of the capacitor case, as identified by the case rupture curve of the capacitor. (460) (CMP-11)

Safety Circuit.

The part of a control system containing one or more devices that perform a safety-related function. [**79:** 3.3.95] (CMP-12)

Informational Note: See NFPA 79-2024, *Electrical Standard for Industrial Machinery. Safety-related control system* and *safety interlock circuit* are common terms that can be used to refer to the safety circuit in other standards. The safety circuit can include hard-wired, communication, and software-related components.

Sealable Equipment.

Equipment enclosed in a case or cabinet that is provided with a means of sealing or locking so that live parts cannot be made accessible without opening the enclosure. (CMP-1)

Informational Note: The equipment may or may not be operable without opening the enclosure.

Sealed [as applied to hazardous (classified) locations].

Constructed such that equipment is sealed effectively against entry of an external atmosphere and is not opened during normal operation or for any maintenance activities. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Sealed, Hermetically. (Hermetically Sealed)

Sealed against the entrance of an external atmosphere, such that the seal is made by fusion of metal to metal, ceramic to metal, or glass to metal. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Section Sign.

A sign or outline lighting system, shipped as subassemblies, that requires field-installed wiring between the subassemblies to complete the overall sign. The subassemblies are either physically joined to form a single sign unit or are installed as separate remote parts of an overall sign. (600) (CMP-18)

Selected Receptacles.

A minimal number of receptacles selected by the health care facility's governing body as necessary to provide essential patient care and facility services during loss of normal power. [**99:** 3.3.164] (517) (CMP-15)

Self-Contained Therapeutic Tubs or Hydrotherapeutic Tanks.

A factory-fabricated unit consisting of a therapeutic tub or hydrotherapeutic tank with all water-circulating, heating, and control equipment integral to the unit. Equipment may include pumps, air blowers, heaters, light controls, sanitizer generators, and so forth. (680) (CMP-17)

Separable Power Supply Cable Assembly.

A flexible cord or cable, including ungrounded, grounded, and equipment grounding conductors, provided with a cord connector, an attachment plug, and all other fittings, grommets, or devices installed for the purpose of delivering energy from the source of electrical supply to the truck or transport refrigerated unit (TRU) flanged surface inlet. (626) (CMP-12)

Separately Derived System.

An electrical power supply output, other than a service, having no direct connection(s) to circuit conductors of any other electrical source other than those established by grounding and bonding connections. (CMP-5)

Service.

The conductors and equipment connecting the serving utility to the wiring system of the premises served. (CMP-10)

Service Conductors.

The conductors from the service point to the service disconnecting means. (CMP-10)

Service Conductors, Overhead. (Overhead Service Conductors)

The overhead conductors between the service point and the first point of connection to the service-entrance conductors at the building or other structure. (CMP-10)

Service Conductors, Underground. (Underground Service Conductors)

The underground conductors between the service point and the first point of connection to the service-entrance conductors in a terminal box, meter, or other enclosure, inside or outside the building wall. (CMP-10)

Informational Note: Where there is no terminal box, meter, or other enclosure, the point of connection is considered to be the point of entrance of the service conductors into the building.

Service Disconnect (Service Disconnecting Means).

A device that is connected to service conductors and disconnects the premises wiring system or equipment from the service conductors. (CMP-10)

Service Drop.

The overhead conductors between the serving utility and the service point. (CMP-10)

Service-Entrance Conductor Assembly.

Multiple single-insulated conductors twisted together without an overall covering, other than an optional binder intended only to keep the conductors together. (CMP-6)

Service-Entrance Conductors.

The service conductors between the terminals of the service equipment to the service drop, overhead service conductors, service lateral, or underground service conductors. (CMP-10)

Informational Note: Where service equipment is located outside the building walls, there could be no service-entrance conductors or they might be entirely outside the building.

Service Equipment.

The necessary equipment, consisting of a circuit breaker(s) or switch(es) and fuse(s) and their accessories, connected to the serving utility and intended to constitute the main control and disconnect of the serving utility. (CMP-10)

Service Equipment, Mobile Home. (Mobile Home Service Equipment)

The equipment containing the disconnecting means, overcurrent protective devices, and receptacles or other means for connecting a mobile home feeder assembly. (550) (CMP-7)

Service Lateral.

The underground conductors between the utility electric supply system and the service point. (CMP-10)

Service Point.

The point of connection between the facilities of the serving utility and the premises wiring. (CMP-10)

Informational Note: The service point can be described as the point of demarcation between where the serving utility ends and the premises wiring begins. The serving utility generally specifies the location of the service point based on the conditions of service.

Service Point, Communications. (Communications Service Point)

The point of connection between the communications service provider's network (outside plant) and the premises wiring (inside plant). (CMP-16)

Servicing.

The process of following a manufacturer's set of instructions or applicable industry standards to analyze, adjust, or perform prescribed actions upon equipment with the intention to preserve or restore the operational performance of the equipment. (CMP-1)

Informational Note: Servicing often encompasses maintenance and repair activities.

Shore Power.

The electrical equipment required to power a floating vessel including, but not limited to, the receptacle and cords. (555) (CMP-7)

Shoreline.

The farthest extent of standing water under the applicable conditions that determine the electrical datum plane for the specified body of water. (682) (CMP-7)

Short Circuit.

An abnormal connection (including an arc) of relatively low impedance, whether made accidentally or intentionally, between two or more points of different potential. (CMP-10)

Short-Circuit Current Rating.

The prospective symmetrical fault current at a nominal voltage to which equipment is able to be connected without sustaining damage exceeding defined acceptance criteria. (CMP-10)

Show Window.

Any window, including windows above doors, used or designed to be used for the display of goods or advertising material, whether it is fully or partly enclosed or entirely open at the rear and whether or not it has a platform raised higher than the street floor level. (CMP-2)

Sign, Electric. (Electric Sign)

Electrically operated utilization equipment with words, symbols, art, or advertising designed to convey information or attract attention. (CMP-18)

Sign, Host. (Host Sign)

A sign or outline lighting system already installed in the field that is designated by a retroft kit for field conversion of the illumination system. (600) (CMP-18)

Sign, Photovoltaic (PV) Powered (PV Powered Sign). [Photovoltaic (PV) Powered Sign]

A complete sign powered by solar energy consisting of all components and subassemblies for installation either as an off-grid stand-alone, on-grid interactive, or non-grid interactive system. (600) (CMP-18)

Sign Body.

A portion of a sign that can provide protection from the weather and can additionally serve as an electrical enclosure. (600) (CMP-18)

Signaling Circuit.

Any electrical circuit that energizes signaling equipment. (CMP-3)

Simple Apparatus.

An electrical component or combination of components of simple construction with well-defined electrical parameters that does not generate more than 1.5 volts, 100 mA, and 25 mW, or a passive component that does not dissipate more than 1.3 watts and is compatible with the intrinsic safety of the circuit in which it is used. (CMP-14)

Informational Note No. 1: The following are examples of simple apparatus:

(1) Passive components; for example, switches, instrument connectors, plugs and sockets, junction boxes, resistance temperature devices, and simple semiconductor devices such as LEDs

(2) Sources of stored energy consisting of single components in simple circuits with well-defined parameters; for example, capacitors or inductors, whose values are considered when determining the overall safety of the system

(3) Sources of generated energy; for example, thermocouples and photocells, that do not generate more than 1.5 volts, 100 mA, and 25 mW

Informational Note No. 2: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Single-Pole Separable Connector.

A device that is installed at the ends of portable, flexible, single-conductor cable that is used to establish connection or disconnection between two cables or one cable and a single-pole, panel-mounted separable connector. (CMP-18)

Site-Isolating Device.

A pole-mounted disconnecting means installed at the distribution point for the purposes of isolation, system maintenance, emergency disconnection, or connection of optional standby systems. (547) (CMP-7)

Skeleton Tubing.

Neon tubing that is itself the sign or outline lighting and is not attached to an enclosure or sign body. (600) (CMP-18)

Slip.

A berthing space between or adjacent to piers, wharves, or docks; the water areas associated with boat occupation. [**303:** 3.3.21] (555) (CMP-7)

Informational Note: See the definition of *Berth* for additional information.

Solid-State Phase-Control Dimmer.

A solid-state dimmer where the wave shape of the steady-state current does not follow the wave shape of the applied voltage such that the wave shape is nonlinear. (CMP-15)

Solid-State Sine Wave Dimmer.

A solid-state dimmer where the wave shape of the steady-state current follows the wave shape of the applied voltage such that the wave shape is linear. (CMP-15)

Spa or Hot Tub.

A hydromassage pool, or tub for recreational or therapeutic use, not located in health care facilities, designed for immersion of users, and usually having a filter, heater, and motor-driven blower. It may be installed indoors or outdoors, on the ground or supporting structure, or in the ground or supporting structure. Generally, they are not designed or intended to have its contents drained or discharged after each use. (680) (CMP-17)

Spa or Hot Tub, Packaged Equipment Assembly. (Packaged Spa or Hot Tub Equipment Assembly)

A factory-fabricated unit consisting of water-circulating, heating, and control equipment mounted on a common base, intended to operate a spa or hot tub. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Spa or Hot Tub, Self-Contained. (Self-Contained Spa or Hot Tub)

Factory-fabricated unit consisting of a spa or hot tub vessel with all water-circulating, heating, and control equipment integral to the unit. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Spa or Hot Tub, Storable. (Storable Spa or Hot Tub)

Spas or hot tubs installed entirely on or above the ground that are intended to be stored when not in use and are designed for ease of relocation. (680) (CMP-17)

Space.

A portion of the health care facility designated by the health care facility's governing body that serves a specific purpose. [**99:** 3.3.171] (517) (CMP-15)

Special Permission.

The written consent of the authority having jurisdiction. (CMP-1)

Special Protection "s".

Type of protection that permits design, assessment, and testing of equipment that cannot be fully assessed within a recognized type of protection or combination of recognized types of protection because of functional or operational limitations, but that can be demonstrated to provide the necessary equipment protection level (EPL). (CMP-14)

Informational Note: See ANSI/UL 60079-33, *Explosive Atmospheres — Part 33: Equipment Protection by Special Protection "s"* , for additional information.

Special-Purpose Multi-Circuit Cable System.

A portable branch-circuit distribution system consisting of one or more trunk cables and optional breakout assemblies or multi-circuit outlet enclosures. (520) (CMP-15)

Spider (Cable Splicing Block).

A device that contains busbars that are insulated from each other for the purpose of splicing or distributing power to portable cables and cords that are terminated with single-pole busbar connectors. (530) (CMP-15)

Spin Down.

A shutdown condition of the FESS, where energy is being dissipated and the flywheel rotor is slowing down to a stop. (706) (CMP-13)

Informational Note: A complete stop of a flywheel rotor cannot occur instantaneously because of the high kinetic energy of the rotor, but rather occurs over time as a result of friction forces acting on the rotor.

Splash Pad.

A fountain intended for recreational use by pedestrians and designed to contain no more than 25 mm (1 in.) of water depth. This definition does not include showers intended for hygienic rinsing prior to use of a pool, spa, or other water feature. (680) (CMP-17)

Spray Area.

Any fully enclosed, partly enclosed, or unenclosed area in which flammable or combustible vapors, mists, residues, dusts, or deposits are present due to the operation of spray processes, including:

(1) any area in the direct path of a spray application process;

(2) the interior of a spray booth, spray room, or limited finishing workstation, as herein defined;

(3) the interior of any exhaust plenum, eliminator section, or scrubber section;

(4) the interior of any exhaust duct or exhaust stack leading from a spray application process;

(5) the interior of any air recirculation path up to and including recirculation particulate filters;

(6) any solvent concentrator (pollution abatement) unit or solvent recovery (distillation) unit; and

(7) the inside of a membrane enclosure.

The following are not part of the spray area:

(1) fresh air make-up units;

(2) air supply ducts and air supply plenums;

(3) recirculation air supply ducts downstream of recirculation particulate filters; and

(4) exhaust ducts from solvent concentrator (pollution abatement) units. [**33:** 3.3.2.3] (CMP-14)

Informational Note No. 1: Unenclosed spray areas are locations outside of buildings or are localized operations within a larger room or space. Such areas are normally provided with some local vapor extraction/ventilation system. In automated operations, the area limits are the maximum area in the direct path of spray operations. In manual operations, the area limits are the maximum area of spray when aimed at 90 degrees to the application surface.

Informational Note No. 2: See definitions for *limited finishing workstation* and *membrane enclosure* for additional information.

Spray Area, Outdoor. (Outdoor Spray Area)

A spray area that is outside the confines of a building or that has a canopy or roof that does not limit the dissipation of the heat of a fire or dispersion of flammable vapors and does not restrict fire-fighting access and control. For the purpose of this standard, an outdoor spray area can be treated as an unenclosed spray area as defined in this code. [**33:** 3.3.2.3.1] (CMP-14)

Spray Area, Unenclosed. (Unenclosed Spray Area)

Any spray area that is not confined by a limited finishing workstation, spray booth, or spray room, as herein defined. [**33:** 3.3.2.3.2] (CMP-14)

Spray Booth.

A power-ventilated enclosure for a spray application operation or process that confines and limits the escape of the material being sprayed, including vapors, mists, dusts, and residues that are produced by the spraying operation and conducts or directs these materials to an exhaust system. [**33:** 3.3.19] (CMP-14)

Informational Note: A spray booth is an enclosure or insert within a larger room used for spraying, coating, and/or dipping applications. A spray booth can be fully enclosed or have open front or face and can include a separate conveyor entrance and exit. The spray booth is provided with a dedicated ventilation exhaust with supply air from the larger room or from a dedicated air supply.

Spray Room.

A power-ventilated fully enclosed room with a specified fire resistance rating used exclusively for open spraying of flammable or combustible materials. [**33:** 3.3.20] (CMP-14)

Stage Effect (Special Effect).

An electrical or electromechanical piece of equipment used to simulate a distinctive visual or audible effect, such as a wind machine, lightning simulator, or sunset projector. (CMP-15)

Stage Equipment.

Equipment at any location on the premises integral to the stage production including, but not limited to, equipment for lighting, audio, special effects, rigging, motion control, projection, or video. (520) (CMP-15)

Stage Lighting Hoist.

A motorized lifting device that contains a mounting position for one or more luminaires, with wiring devices for connection of luminaires to branch circuits, and integral flexible cables to allow the luminaires to travel over the lifting range of the hoist while energized. (520) (CMP-15)

Stage Property.

An article or object used as a visual element in a motion picture or television production, except painted backgrounds (scenery) and costumes. (530) (CMP-15)

Stage Set.

A specific area set up with temporary scenery and properties designed and arranged for a particular scene in a motion picture or television production. (CMP-15)

Stage Switchboard, Fixed. (Fixed Stage Switchboard)

A permanently installed switchboard, panelboard, or rack containing dimmers or relays with associated overcurrent protective devices, or overcurrent protective devices alone, used primarily to feed stage equipment. (CMP-15)

Stage Switchboard, Portable. (Portable Stage Switchboard)

A portable rack or pack containing dimmers or relays with associated overcurrent protective devices, or overcurrent protective devices alone, used to feed stage equipment. (520) (CMP-15)

Stand Lamp.

A portable stand that contains a general-purpose luminaire or lampholder with guard for the purpose of providing general illumination on a stage, in an auditorium, or in a studio. (520) (CMP-15)

Stand-Alone System.

A system that is not connected to an electric power production and distribution network. (CMP-4)

Storage, Dry Stack. (Dry Stack Storage)

A facility, either covered or uncovered, constructed of horizontal and vertical structural members designed to allow placement of small boats in defined slots arranged both horizontally and vertically. [**303:** 3.3.24.2] (555) (CMP-7)

Stored-Energy Power Supply System (SEPSS).

A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)

Stranding, Compact. (Compact Stranding)

A conductor stranding method in which each layer of strands is pressed together to minimize the gaps between the strands so the overall diameter of the finished conductor is less than a concentric stranded conductor and less than a compressed stranded conductor. (CMP-6)

Stranding, Compressed. (Compressed Stranding)

A conductor stranding method in which the outer layer of strands is pressed together so the overall diameter of the finished conductor is less than a concentric stranded conductor but greater than a compact stranded conductor. (CMP-6)

Stranding, Concentric. (Concentric Stranding)

A conductor consisting of a straight central strand surrounded by one or more layers of strands, helically laid in a geometric pattern. (CMP-6)

Strip Light.

A luminaire with multiple lamps arranged in a row. (520) (CMP-15)

Structure.

That which is built or constructed, other than equipment. (CMP-1)

Structure, Relocatable. (Relocatable Structure)

A factory-assembled structure or structures transportable in one or more sections that are built on a permanent chassis and designed to be used as other than a dwelling unit without a permanent foundation. (545) (CMP-7)

> Informational Note: Examples of relocatable structures are those units that are equipped for sleeping purposes only, contractor's and other on-site offices, construction job dormitories, studio dressing rooms, banks, clinics, stores, shower facilities and restrooms, training centers, or for the display or demonstration of merchandise or machines.

Subassembly.

Component parts or a segment of a sign, retrofit kit, or outline lighting system that, when assembled, forms a complete unit or product. (600) (CMP-18)

Substation.

An assemblage of equipment (e.g., switches, interrupting devices, circuit breakers, buses, and transformers) through which electric energy is passed for the purpose of distribution, switching, or modifying its characteristics. (CMP-9)

Supervisory Control and Data Acquisition (SCADA).

An electronic system that provides monitoring and controls for the operation of the critical operations power system. (CMP-13)

> Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators.

Support Areas.

Areas, other than fixed production offices, intended to support production and where image capture will not take place. Such areas include, but are not limited to, mobile production offices, storage, and workspaces; vehicles and trailers for cast, makeup, hair, lighting, grip, wardrobe, props, catering, and craft services; and portable restrooms. (530) (CMP-15)

Surge Arrester.

A protective device for limiting surge voltages by discharging or bypassing surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions. (CMP-10)

Surge-Protective Device (SPD).

A protective device for limiting transient voltages by diverting or limiting surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions and is designated as follows:

(1) Type 1: Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service disconnect overcurrent device

(2) Type 2: Permanently connected SPDs intended for installation on the load side of the service disconnect overcurrent device, including SPDs located at the branch panel

(3) Type 3: Point of utilization SPDs

(4) Type 4: Component SPDs, including discrete components, as well as assemblies. (CMP-10)

> Informational Note: See UL 1449, *Standard for Surge Protective Devices* , for further information on SPDs.

Suspended Ceiling Grid.

A system that serves as a support for a finished ceiling surface and other utilization equipment. (393) (CMP-18)

Switch, Bypass Isolation. (Bypass Isolation Switch)

A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of bypass that directly connects the load conductors to a power source and allows the transfer switch to be isolated or disconnected. (CMP-13)

Switch, General-Use. (General-Use Switch)

A switch intended for use in general distribution and branch circuits. It is rated in amperes, and it is capable of interrupting its rated current at its rated voltage. (CMP-10)

Switch, General-Use Snap. (General-Use Snap Switch)

A form of general-use switch constructed so that it can be installed in device boxes or on box covers, or otherwise used in conjunction with wiring systems recognized by this code. (CMP-18)

Switch, Isolating. (Isolating Switch)

A switch intended for isolating an electrical circuit from the source of power. It has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means. (CMP-10)

Switch, Motor-Circuit. (Motor-Circuit Switch)

A switch rated in horsepower that is capable of interrupting the maximum operating overload current of a motor of the same horsepower rating as the switch at the rated voltage. (CMP-11)

Switchboard.

A large single panel, frame, or assembly of panels on which are mounted on the face, back, or both, switches, overcurrent and other protective devices, buses, and usually instruments.(CMP-10)

Informational Note: These assemblies can be accessible from the rear or side as well as from the front and are not intended to be installed in cabinets.

Switchgear.

An assembly completely enclosed on all sides and top with sheet metal (except for ventilating openings and inspection windows) and containing primary power circuit switching, interrupting devices, or both, with buses and connections. The assembly may include control and auxiliary devices. Access to the interior of the enclosure is provided by doors, removable covers, or both. (CMP-10)

Informational Note: All switchgear subject to *NEC* requirements is metal enclosed. Switchgear rated below 1000 V or less may be identified as "low-voltage power circuit breaker switchgear." Switchgear rated over 1000 V may be identified as "metal-enclosed switchgear" or "metal-clad switchgear." Switchgear is available in non–arc-resistant or arc-resistant constructions.

Switching Device (as applied to equipment rated over 1000 volts ac, 1500 volts dc, nominal).

A device designed to close, open, or both, one or more electrical circuits. (CMP-9)

Cutout.

An assembly of a fuse support with either a fuseholder, fuse carrier, or disconnecting blade. The fuseholder or fuse carrier may include a conducting element (fuse link) or may act as the disconnecting blade by the inclusion of a nonfusible member.

Disconnecting Switch (or Isolating Switch).

A mechanical switching device used for isolating a circuit or equipment from a source of power.

Interrupter Switch.

A switching device capable of making, carrying, and interrupting specified currents.

Oil-Filled Cutout.

A cutout in which all or part of the fuse support and its fuse link or disconnecting blade is mounted in oil with complete immersion of the contacts and the fusible portion of the conducting element (fuse link) so that arc interruption by severing of the fuse link or by opening of the contacts will occur under oil.

Oil Switch.

A switching device having contacts that operate under oil (or askarel or other suitable liquid).

Regulator Bypass Switch.

A switching device or combination of switching devices designed to bypass equipment used to control voltage levels or related circuit characteristics.

System Isolation Equipment.

A redundantly monitored, remotely operated contactor-isolating system, packaged to provide the disconnection/isolation function, capable of verifiable operation from multiple remote locations by means of lockout switches, each having the capability of being padlocked in the "off" (open) position. (430) (CMP-11)

Tap Conductor.

A conductor, other than a service conductor, that has overcurrent protection ahead of its point of supply that exceeds the value permitted for similar conductors that are protected as described elsewhere in 240.4 . (240) (CMP-10)

Task Illumination.

Provisions for the minimum lighting required to carry out necessary tasks in the areas described in 517.34(A) , including safe access to supplies and equipment and access to exits. [**99:** 3.3.177] (517) (CMP-15)

Technical Power System.

An electrical distribution system where the equipment grounding conductor is isolated from the premises grounded conductor and the premises equipment grounding conductor except at a single grounded termination point within a branch-circuit panelboard, at the originating (main breaker) branch-circuit panelboard or at the premises grounding electrode. (640) (CMP-12)

Temporary Equipment.

Portable wiring and equipment intended for use with events of a transient or temporary nature where all equipment is presumed to be removed at the conclusion of the event. (640) (CMP-12)

Terminal (as applied to batteries).

That part of a cell, container, or battery to which an external connection is made (commonly identified as post, pillar, pole, or terminal post). (CMP-13)

Thermal Protector (as applied to motors).

A protective device for assembly as an integral part of a motor or motor-compressor that, when properly applied, protects the motor against dangerous overheating due to overload and failure to start. (CMP-11)

Informational Note: The thermal protector may consist of one or more sensing elements integral with the motor or motor-compressor and an external control device.

Thermal Resistivity.

The heat transfer capability through a substance by conduction. (CMP-6)

Informational Note: Thermal resistivity is the reciprocal of thermal conductivity and is designated Rho, which is expressed in the units °C-cm/W.

Thermally Protected (as applied to motors).

A motor or motor-compressor that is provided with a thermal protector. (CMP-11)

Top Shield.

A grounded metal shield covering under-carpet components of the flat conductor cable (Type FCC) system for the purposes of providing protection against physical damage. (324) (CMP-6)

Tower.

A pole or other structure that supports a wind turbine. (694) (CMP-4)

Transfer Switch.

An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)

Transfer Switch, Branch-Circuit Emergency Lighting (BCELTS). (Branch-Circuit Emergency Lighting Transfer Switch)

A device connected on the load side of a branch-circuit overcurrent protective device that transfers only emergency lighting loads from the normal power source to an emergency power source. (700) (CMP-13)

Informational Note: See ANSI/UL 1008, *Transfer Switch Equipment* , for information covering branch-circuit emergency lighting transfer switches.

Transfer Switch, Bypass Isolation. (Bypass Isolation Transfer Switch)

A transfer switch that provides a means to isolate the transfer switch. (CMP-13)

Transfer Switch, Meter-Mounted. (Meter-Mounted Transfer Switch)

A transfer switch connected between the utility meter and the meter base. (CMP-13)

Informational Note: Meter-mounted transfer switches can plug into the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.

Transformer.

Equipment, either single-phase or polyphase, that uses electromagnetic induction to convert current and voltage in a primary circuit into current and voltage in a secondary circuit. (CMP-9)

Transformer Secondary Conductor.

A conductor, other than a service conductor, that originates at the secondary winding terminals of a transformer. (CMP-10)

Transition Assembly.

An assembly to facilitate connection of the flat conductor cable (Type FCC) system to other wiring systems, incorporating (1) a means of electrical interconnection and (2) a suitable box or covering for providing electrical safety and protection against physical damage. (324) (CMP-6)

Transport Refrigerated Unit (TRU).

A trailer or container, with integrated cooling or heating, or both, used for the purpose of maintaining the desired environment of temperature-sensitive goods or products. (626) (CMP-12)

Transportable.

X-ray equipment that is to be installed in a vehicle or that may be readily disassembled for transport in a vehicle. (660) (CMP-12)

Truck.

A motor vehicle designed for the transportation of goods, services, and equipment. (626) (CMP-12)

Truck Coupler.

A truck flanged surface inlet and mating cord connector. (626) (CMP-12)

Truck Flanged Surface Inlet.

The device(s) on the truck into which the connector(s) is inserted to provide electric energy and other services. This device is part of the truck coupler. The truck flanged surface inlet is considered to be part of the truck and not part of the electrified truck parking space supply equipment. (626) (CMP-12)

Trunk Cable.

A portable extension cable containing six or more branch circuits, a male multipole plug, and a female multipole receptacle. (520) (CMP-15)

Tubing, Electrical Metallic (EMT). (Electrical Metallic Tubing)

An unthreaded thinwall raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed utilizing appropriate fittings. (CMP-8)

Tubing, Electrical Nonmetallic (ENT). (Electrical Nonmetallic Tubing)

A nonmetallic, pliable, corrugated raceway of circular cross section with integral or associated couplings, connectors, and fittings for the installation of electrical conductors. It is composed of a material that is resistant to moisture and chemical atmospheres and is flame retardant.

A pliable raceway is a raceway that can be bent by hand with a reasonable force but without other assistance. (CMP-8)

Tubing, Flexible Metallic (FMT). (Flexible Metallic Tubing)

A metal raceway that is circular in cross section, flexible, and liquidtight without a nonmetallic jacket. (CMP-8)

Twofer.

An assembly containing one male plug and two female cord connectors used to connect two loads to one branch circuit. (520) (CMP-15)

Type of Protection “n”.

Type of protection where electrical equipment, in normal operation, is not capable of igniting a surrounding explosive gas atmosphere and a fault capable of causing ignition is not likely to occur. (CMP-14)

Informational Note: See ANSI/UL 60079-15, *Explosive Atmospheres — Part 15: Equipment Protection by Type of Protection “n”* , for additional information.

Ungrounded.

Not connected to ground or to a conductive body that extends the ground connection. (CMP-5)

Uninterruptible Power Supply (UPS).

A device or system that provides quality and continuity of ac power through the use of a stored-energy device as the backup power source for a period of time when the normal power supply is incapable of performing acceptably. (CMP-13)

Unit Equipment.

A battery-equipped emergency luminaire that illuminates only as part of the emergency illumination system and is not illuminated when the normal supply is available. (CMP-13)

Utilization Equipment.

Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes. (CMP-1)

Valve Actuator Motor (VAM) Assemblies.

A manufactured assembly, used to operate a valve, consisting of an actuator motor and other components such as motor controllers, torque switches, limit switches, and overload protection. (430) (CMP-11)

Informational Note: VAMs typically have short-time duty and high-torque characteristics.

Ventilated.

Provided with a means to permit circulation of air sufficient to remove an excess of heat, fumes, or vapors. (CMP-14)

Vessel.

A container such as a barrel, drum, or tank for holding fluids or other material. (CMP-17)

Volatile Flammable Liquid.

A flammable liquid having a flash point below 38°C (100°F), or a flammable liquid whose temperature is above its flash point, or a Class II combustible liquid that has a vapor pressure not exceeding 276 kPa (40 psia) at 38°C (100°F) and whose temperature is above its flash point. (CMP-14)

Voltage (of a circuit).

The greatest root-mean-square (rms) (effective) difference of potential between any two conductors of the circuit concerned. (CMP-1)

Informational Note: Some systems, such as 3-phase 4-wire, single-phase 3-wire, and 3-wire direct current, may have various circuits of various voltages.

Voltage, High. (High Voltage)

A potential difference over 1000 volts ac, 1500 volts dc, nominal. (CMP-9)

Informational Note: Circuits and equipment rated at potential differences of more than 1000 volts ac, 1500 volts dc, and up to 52 kV, are also commonly referred to as medium voltage.

Voltage, Low. (Low Voltage)

An electromotive force rated 24 volts, nominal, or less. (552) (CMP-7)

Voltage, Nominal. (Nominal Voltage)

A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class (e.g., 120/240 volts, 480Y/277 volts, 600 volts). (CMP-1)

Informational Note No. 1: The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment.

Informational Note No. 2: See ANSI C84.1-2011, *Voltage Ratings for Electric Power Systems and Equipment (60 Hz).*

Voltage, Nominal (as applied to battery or cell).(Nominal Voltage)

The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13)

Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.

Voltage to Ground.

For grounded circuits, the voltage between the given conductor and that point or conductor of the circuit that is grounded; for ungrounded circuits, the greatest voltage between the given conductor and any other conductor of the circuit. (CMP-1)

Watertight.

Constructed so that moisture will not enter the enclosure under specified test conditions. (CMP-1)

Weatherproof.

Constructed or protected so that exposure to the weather will not interfere with successful operation. (CMP-1)

Informational Note: Rainproof, raintight, or watertight equipment can fulfill the requirements for weatherproof where varying weather conditions other than wetness, such as snow, ice, dust, or temperature extremes, are not a factor.

Wharf.

A structure at the shoreline that has a platform built along and parallel to a body of water with either an open deck or a superstructure. [**307:** 3.3.28] (555) (CMP-7)

Wind Turbine.

A mechanical device that converts wind energy to electrical energy. (CMP-4)

Wind Turbine Output Circuit. (Turbine Output Circuit)

The circuit conductors between the internal components of a wind turbine (which might include an alternator, integrated rectifier, controller, and/or inverter) and other equipment. (694) (CMP-4)

Wire.

A factory assembly of one or more insulated conductors without an overall covering. (805) (CMP-3)

Wireless Power Transfer (WPT).

The transfer of electrical energy from a power source to an electrical load via magnetic fields by a contactless means between a primary device and a secondary device. (625) (CMP-12)

Wireless Power Transfer Equipment (WPTE).

Equipment installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle without physical electrical contact. (625) (CMP-12)

Informational Note No. 1: The general form of WPTE consists of two physical packages: a control box and a primary pad.

Informational Note No. 2: Electric vehicle power export equipment and wireless power transfer equipment are sometimes contained in one set of equipment, sometimes referred to as a bidirectional WPTE.

Wireways, Metal. (Metal Wireways)

Sheet metal troughs with hinged or removable covers for housing and protecting electrical wires and cable and in which conductors are laid in place after the raceway has been installed as a complete system. (CMP-8)

Wireways, Nonmetallic. (Nonmetallic Wireways)

Flame-retardant, nonmetallic troughs with removable covers for housing and protecting electrical wires and cables in which conductors are laid in place after the raceway has been installed as a complete system. (CMP-8)

Wiring Device.

An electrical device that serves as either a connection point to facilitate the flow of current or as a control device in general distribution and branch circuits. (CMP-18)

Informational Note: Examples of wiring devices include attachment plugs, receptacles, general-use snap switches, pendant switches, surface switches, dimmers, and electronic control switches and lighting control switches.

Work Surface.

A fixed, stationary, or portable surface typically intended for dry use and for tasks other than food or beverage preparation, food or beverage serving, personal lavation, or laundering that presents an incidental risk of spillage of smaller quantities of beverages and other liquids upon outlets mounted directly on or recessed in the surface. (CMP-2)

Informational Note No. 1: See UL 111, *Outline of Investigation for Multioutlet Assemblies* , and UL 962A, *Furniture Power Distribution Units* , which establish the performance evaluation criteria and construction criteria.

Informational Note No. 2: See 406.14(F) , 406.14(G)(1) , and 406.14(H) for information on receptacles for work surfaces distinguished from receptacles for counters and countertops.

Yoke (Strap).

The structural frame of a wiring device, such as a receptacle or switch, that serves as the mounting means. (CMP-18)

Zone.

A physically identifiable area (such as barriers or separation by distance) within an information technology equipment room, with dedicated power and cooling systems for the information technology equipment or systems. (645) (CMP-12)

Statement of Problem and Substantiation for Public Comment

This comment both recommends restoration of the definition of "enclosed panelboard" as it appears in the 2023 edition of the NEC as well as recommending that purview be assigned to CMP-1 which created this definition. This definition should be restored as on the numerous negative ballot statements related to its deletion as well as the panel statement which essentially agreed that "enclosed panelboard" is what a panelboard in fact is when a panelboard that is, by definition, is "...designed to be placed in a cabinet, enclosure, or cutout box..." is placed in a cabinet, enclosure, or cutout box, as designed, per the panel statement phrase "...an “enclosed panelboard” would be “a panelboard in an enclosure.”

Related Item

- FR-8903

Submitter Information Verification

Submitter Full Name: Palmer Hickman
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Submittal Date: Tue Aug 06 17:14:45 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The definition of ‘enclosed panelboard’ was deleted for the first draft due to UL 67 which states that some listed products are marked as ‘enclosed panelboards’ and some are not, which can cause confusion. A proper term would be ‘panelboard enclosure.’ Restoring the definition will add confusion. The correlating committee has purview over the assignment of definitions.

Public Comment No. 864-NFPA 70-2024 [Article 100]

Article 100 Definitions

Scope. This article contains only those definitions essential to the application of this code. It is not intended to include commonly defined general terms or commonly defined technical terms from related codes and standards. An article number in parentheses following the definition indicates that the definition only applies to that article.

Informational Note: A definition that is followed by a reference in brackets has been extracted from one of the following standards. Only editorial changes were made to the extracted text to make it consistent with this code.

(1) NFPA 30A-2024, *Code for Motor Fuel Dispensing Facilities and Repair Garages*

(2) NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials*

(3) NFPA 75-2024, *Standard for the Fire Protection of Information Technology Equipment*

(4) NFPA 79-2024, *Electrical Standard for Industrial Machinery*

(5) NFPA 99-2024, *Health Care Facilities Code*

(6) NFPA 101®-2024, *Life Safety Code®*

(7) NFPA 110-2025, *Standard for Emergency and Standby Power Systems*

(8) NFPA 303-2026, *Fire Protection Standard for Marinas and Boatyards*

(9) NFPA 307-2026, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*

(10) NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*

(11) NFPA 501-2024, *Standard on Manufactured Housing*

(12) NFPA 790-2024, *Standard for Competency of Third-Party Field Evaluation Bodies*

(13) NFPA 1192-2026, *Standard on Recreational Vehicles*

Accessible (as applied to equipment).

Capable of being reached for operation, renewal, and inspection. (CMP-1)

Accessible (as applied to wiring methods).

Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in or blocked by the structure, other electrical equipment, other building systems, or finish of the building. (CMP-1)

Accessible, Readily. (Readily Accessible)

Capable of being reached quickly for operation, renewal, or inspection without requiring those to whom ready access is requisite to take actions, such as to use tools (other than keys), to climb over or under, to remove obstacles, or to resort to portable ladders, and so forth. (CMP-1)

Informational Note: Use of keys is a common practice under controlled or supervised conditions and a common alternative to the ready access requirements under such supervised conditions as provided elsewhere in the *NEC* .

Adapter.

A device used to adapt a circuit from one configuration of an attachment plug or receptacle to another configuration with the same current rating. (520) (CMP-15)

Adjustable Speed Drive.

Power conversion equipment that provides a means of adjusting the speed of an electric motor. (CMP-11)

Informational Note: A variable frequency drive is one type of electronic adjustable speed drive that controls the rotational speed of an ac electric motor by controlling the frequency and voltage of the electrical power supplied to the motor.

Adjustable Speed Drive System.

A combination of an adjustable speed drive, its associated motor(s), and auxiliary equipment. (CMP-11)

Aircraft Painting Hangar.

An aircraft hangar constructed for the express purpose of spraying, coating, and/or dipping applications and provided with dedicated ventilation supply and exhaust. (CMP-14)

Ambulatory Health Care Occupancy.

An occupancy used to provide services or treatment simultaneously to four or more patients that provides, on an outpatient basis, one or more of the following:

(1) Treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others.

(2) Anesthesia that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others.

(3) Treatment for patients who, due to the nature of their injury or illness, are incapable of taking action for self-preservation under emergency conditions without the assistance of others.

[***101*** **:** 3.3.198.1] (517) (CMP-15)

Ampacity.

The maximum current, in amperes, that a conductor can carry continuously under the conditions of use without exceeding its temperature rating. (CMP-6)

Amplifier (Audio Amplifier) (Pre-Amplifier).

Electronic equipment that increases the current or voltage, or both, of an audio signal intended for use by another piece of audio equipment. Amplifier is the term used to denote an audio amplifier. (640) (CMP-12)

Appliance.

Utilization equipment, generally other than industrial, that is normally built in a standardized size or type and is installed or connected as a unit to perform one or more functions such as clothes washing, air-conditioning, food mixing, and deep frying. (CMP-17)

Applicator.

The device used to transfer energy between the output circuit and the object or mass to be heated. (665) (CMP-12)

Approved.

Acceptable to the authority having jurisdiction. (CMP-1)

Arc-Fault Circuit Interrupter (AFCI).

A device intended to provide protection from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to de-energize the circuit when an arc fault is detected. (CMP-2)

Array (PV Array) (Solar PV Array).

A mechanically and electrically integrated grouping of solar PV modules with mounting system, including any attached system components such as inverters or dc-to-dc converters and attached associated wiring. (690) (CMP-4)

Artificially Ventilated Room "v".

A room volume protected by artificial ventilation and of sufficient size to permit the entry of a person who might occupy the room. (CMP-14)

Informational Note: see ANSI/UL 60079-13, *Explosive Atmospheres — Part 13: Equipment Protection by Pressurized Room "p" and Artificially Ventilated Room "v"* , for information on the requirements for rooms intended for human entry where artificial ventilation is used as a means of reducing the risk of explosion.

Askarel.

A generic term for a group of nonflammable synthetic chlorinated hydrocarbons used as electrical insulating media. (CMP-9)

Informational Note: Askarels of various compositional types are used. Under arcing conditions, the gases produced, while consisting predominantly of noncombustible hydrogen chloride, can include varying amounts of combustible gases, depending on the askarel type.

Associated Apparatus.

Apparatus in which the circuits are not necessarily intrinsically safe themselves but that affects the energy in the intrinsically safe circuits and is relied on to maintain intrinsic safety. Such apparatus is one of the following:

(1) Electrical apparatus that has an alternative type of protection for use in the appropriate hazardous (classified) location

(2) Electrical apparatus not so protected that shall not be used within a hazardous (classified) location

(CMP-14)

Informational Note No. 1: Associated apparatus has identified intrinsically safe connections for intrinsically safe apparatus and also might have connections for nonintrinsically safe apparatus.

Informational Note No. 2: An example of associated apparatus is an intrinsic safety barrier, which is a network designed to limit the energy (voltage and current) available to the protected circuit in the hazardous (classified) location under specified fault conditions.

Informational Note No. 3: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* ; and ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for additional information.

Associated Nonincendive Field Wiring Apparatus.

Apparatus in which the circuits are not necessarily nonincendive themselves but that affects the energy in nonincendive field wiring circuits and is relied on to maintain nonincendive energy levels. Such apparatus is one of the following:

(1) Electrical apparatus that has an alternative type of protection for use in the appropriate hazardous (classified) location

(2) Electrical apparatus not so protected that shall not be used within a hazardous (classified) location

(CMP-14)

Informational Note No. 1: Associated nonincendive field wiring apparatus has designated associated nonincendive field wiring apparatus connections for nonincendive field wiring apparatus and also might have connections for other electrical apparatus.

Informational Note No. 2: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Attachment Fitting, Weight-Supporting (WSAF) (Weight-Supporting Attachment Fitting).

A device that, by insertion into a weight-supporting ceiling receptacle, establishes a connection between the conductors of the attached utilization equipment and the branch-circuit conductors connected to the weight-supporting ceiling receptacle. (CMP-18)

Informational Note No. 1: A weight-supporting attachment fitting is different from an attachment plug because no cord is associated with the fitting. A weight-supporting attachment fitting in combination with a weight-supporting ceiling receptacle secures the associated utilization equipment in place and supports its weight.

Informational Note No. 2: See ANSI/NEMA WD 6, *American National Standard for Wiring Devices — Dimensional Specifications* , for the standard configuration of weight-supporting attachment fittings and related weight-supporting ceiling receptacles.

Attachment Plug (Plug Cap) (Plug).

A device that, by insertion in a receptacle, establishes a connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle. (CMP-18)

Audio Autotransformer.

A transformer with a single winding and multiple taps intended for use with an amplifier loudspeaker signal output. (640) (CMP-12)

Audio Signal Processing Equipment (Audio Equipment).

Electrically operated equipment that produces, processes, or both, electronic signals that, when appropriately amplified and reproduced by a loudspeaker, produce an acoustic signal within the range of normal human hearing (typically 20–20 kHz). Within Article 640, the terms equipment and audio equipment are assumed to be equivalent to audio signal processing equipment. (640) (CMP-12)

Informational Note: This equipment includes, but is not limited to, loudspeakers; headphones; pre-amplifiers; microphones and their power supplies; mixers; MIDI (musical instrument digital interface) equipment or other digital control systems; equalizers, compressors, and other audio signal processing equipment; and audio media recording and playback equipment, including turntables, tape decks and disk players (audio and multimedia), synthesizers, tone generators, and electronic organs. Electronic organs and synthesizers may have integral or separate amplification and loudspeakers. With the exception of amplifier outputs, virtually all such equipment is used to process signals (using analog or digital techniques) that have nonhazardous levels of voltage or current.

Audio System.

The totality of all equipment and interconnecting wiring used to fabricate a fully functional audio signal processing, amplification, and reproduction system. (640) (CMP-12)

Audio Transformer.

A transformer with two or more electrically isolated windings and multiple taps intended for use with an amplifier loudspeaker signal output. (640) (CMP-12)

Authority Having Jurisdiction (AHJ).

An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. (CMP-1)

Informational Note: The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

Automatic.

Performing a function without the necessity of human intervention. (CMP-1)

Bathroom.

An area including a sink with one or more of the following: a toilet, a urinal, a tub, a shower, a bidet, or similar plumbing fixtures. (CMP-2)

Battery.

A single cell or a group of cells connected together electrically in series, in parallel, or a combination of both. (CMP-13)

Battery, Flow. (Flow Battery)

An energy storage component that stores its active materials in the form of one or two electrolytes external to the reactor interface. When in use, the electrolytes are transferred between reactor and storage tanks. (706) (CMP-13)

Informational Note: Three commercially available flow battery technologies are zinc air, zinc bromine, and vanadium redox, sometimes referred to as *pumped electrolyte ESS* .

Battery, Sealed. (Sealed Battery)

A battery that has no provision for the routine addition of water or electrolyte or for external measurement of electrolyte specific gravity and might contain pressure relief venting. (CMP-13)

Battery, Stationary Standby. (Stationary Standby Battery)

A battery that spends the majority of the time on continuous float charge or in a high state of charge, in readiness for a discharge event. (CMP-13)

Informational Note: Uninterruptible Power Supply (UPS) batteries are an example that falls under this definition.

Battery-Powered Lighting Units.

Individual unit equipment for backup illumination consisting of a rechargeable battery; a battery-charging means; provisions for one or more lamps mounted on the equipment, or with terminals for remote lamps, or both; and a relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment. (517) (CMP-15)

Berth.

The water space to be occupied by a boat or other vessel alongside or between bulkheads, piers, piles, fixed and floating docks, or any similar access structure. [**303:** 3.3.2] (555) (CMP-7)

Informational Note: See the definition of *Slip* for additional information.

Bipolar Circuit.

A dc circuit that is comprised of two monopole circuits, each having an opposite polarity connected to a common reference point. (CMP-4)

Block.

A square or portion of a city, town, or village enclosed by streets and including the alleys so enclosed, but not any street. (800) (CMP-16)

Boatyard.

A facility used for constructing, repairing, servicing, hauling from the water, storing (on land and in water), and launching of boats. [**303:** 3.3.3] (555) (CMP-7)

Bodies of Water, Artificially Made. (Artificially Made Bodies of Water)

Bodies of water that have been constructed or modified to fit some decorative or commercial purpose such as, but not limited to, aeration ponds, fish farm ponds, storm retention basins, treatment ponds, and irrigation (channel) facilities. Water depths may vary seasonally or be controlled. (682) (CMP-7)

Bodies of Water, Natural. (Natural Bodies of Water)

Bodies of water such as lakes, streams, ponds, rivers, and other naturally occurring bodies of water, which may vary in depth throughout the year. (682) (CMP-7)

Bonded (Bonding).

Connected to establish electrical continuity and conductivity. (CMP-5)

Bonding Conductor (Bonding Jumper).

A conductor that ensures the required electrical conductivity between metal parts that are required to be electrically connected. (CMP-5)

Bonding Conductor, Equipment. (Equipment Bonding Conductor)

The connection between two or more portions of the equipment grounding conductor. (CMP-5)

Bonding Conductor, Grounding Electrode (Grounding Electrode Bonding Jumper). (Grounding Electrode Bonding Conductor)

A conductor, other than the grounding electrode conductor, used to interconnect two or more grounding electrodes to form the grounding electrode system. (CMP-5)

Bonding Conductor, Main (Main Bonding Jumper). (Main Bonding Conductor)

The connection between the grounded circuit conductor and the equipment grounding conductor, or the supply-side bonding conductor, or both, at the service equipment. (CMP-5)

Bonding Conductor, Supply-Side (Supply-Side Bonding Jumper). (Supply-Side Bonding Conductor)

A conductor installed on the supply side of a service or within a service equipment enclosure(s), or for a separately derived system, that ensures the required electrical conductivity between metal parts required to be electrically connected. (CMP-5)

Bonding Conductor, System (System Bonding Jumper). (System Bonding Conductor)

The connection between the grounded circuit conductor and the supply-side bonding conductor, or the equipment grounding conductor, or both, at a separately derived system. (CMP-5)

Bonding Jumper, Impedance. (Impedance Bonding Jumper).

The connection in an impedance grounded system between the equipment grounding conductor(s) and the grounding electrode side of the impedance grounding device. (CMP-5)

Border Light.

A permanently installed overhead strip light. (520) (CMP-15)

Bottom Shield.

A protective layer that is installed between the floor and flat conductor cable (Type FCC) to protect the cable from physical damage and may or may not be incorporated as an integral part of the cable. (324) (CMP-6)

Branch Circuit (Branch-Circuit).

The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s). (CMP-2)

Branch Circuit, Appliance. (Appliance Branch Circuit)

A branch circuit that supplies energy to one or more outlets to which appliances are to be connected and that has no permanently connected luminaires that are not a part of an appliance. (CMP-2)

Branch Circuit, General-Purpose. (General-Purpose Branch Circuit)

A branch circuit that supplies two or more receptacles or outlets for lighting and appliances. (CMP-2)

Branch Circuit, Individual. (Individual Branch Circuit)

A branch circuit that supplies only one utilization equipment. (CMP-2)

Branch Circuit, Motor. (Motor Branch Circuit)

The circuit conductors, including equipment, between the motor branch-circuit short-circuit and ground-fault protective device and an individual motor. (CMP-11)

Branch Circuit, Multiwire. (Multiwire Branch Circuit)

A branch circuit that consists of two or more ungrounded conductors that have a voltage between them, and a neutral conductor that has equal voltage between it and each ungrounded conductor of the circuit and that is connected to the neutral conductor of the system. (CMP-2)

Branch-Circuit Selection Current (BCSC).

The value in amperes to be used instead of the rated-load current in determining the ratings of motor branch-circuit conductors, disconnecting means, controllers, and branch-circuit short-circuit and ground-fault protective devices wherever the running overload protective device permits a sustained current greater than the specified percentage of the rated-load current. The value of branch-circuit selection current will always be equal to or greater than the marked rated-load current. (440) (CMP-11)

Breakout Assembly.

An adapter used to connect a multipole connector containing two or more branch circuits to multiple individual branch-circuit connectors. (520) (CMP-15)

Broadband.

Wide bandwidth data transmission that transports multiple signals, protocols, and traffic types over various media types. (CMP-16)

Building.

A structure that stands alone or that is separated from adjoining structures by fire walls. (CMP-1)

Building, Floating. (Floating Building)

A building that floats on water, is moored in a permanent location, and has a premises wiring system served through connection by permanent wiring to an electrical supply system not located on the premises. (CMP-7)

Building, Manufactured. (Manufactured Building)

Any building that is of closed construction and is made or assembled in manufacturing facilities on or off the building site for installation, or for assembly and installation on the building site, other than manufactured homes, mobile homes, park trailers, or recreational vehicles. (545) (CMP-7)

Building Component.

Any subsystem, subassembly, or other system designed for use in or integral with or as part of a structure, which can include structural, electrical, mechanical, plumbing, and fire protection systems, and other systems affecting health and safety. (545) (CMP-7)

Building System.

Plans, specifications, and documentation for a system of manufactured building or for a type or a system of building components, which can include structural, electrical, mechanical, plumbing, and fire protection systems, and other systems affecting health and safety, and including such variations thereof as are specifically permitted by regulation, and which variations are submitted as part of the building system or amendment thereto. (545) (CMP-7)

Bulkhead.

A vertical structural wall, usually of stone, timber, metal, concrete, or synthetic material, constructed along, and generally parallel to, the shoreline to retain earth as an extension of the upland, and often to provide suitable water depth at the waterside face. [**303:** 3.3.5] (555) (CMP-7)

Bull Switch.

An externally operated wall-mounted safety switch that can contain overcurrent protection and is designed for the connection of portable cables and cords. (530) (CMP-15)

Bundled.

Cables or conductors that are tied, wrapped, taped, or otherwise periodically bound together. (520) (CMP-15)

Busbar (as applied to low-voltage suspended ceiling power distribution systems).

A noninsulated conductor electrically connected to the source of supply and physically supported on an insulator providing a power rail for connection to utilization equipment, such as sensors, actuators, A/V devices, low-voltage luminaire assemblies, and similar electrical equipment. (393) (CMP-18)

Busbar Support (as applied to low-voltage suspended ceiling power distribution systems).

An insulator that runs the length of a section of suspended ceiling bus rail that serves to support and isolate the busbars from the suspended grid rail. (393) (CMP-18)

Busway.

A raceway consisting of a metal enclosure containing factory-mounted, bare or insulated conductors, which are usually copper or aluminum bars, rods, or tubes. (CMP-8)

Cabinet.

An enclosure that is designed for either surface mounting or flush mounting and is provided with a frame, mat, or trim in which a swinging door or doors are or can be hung. (CMP-8)

Cable, Abandoned. (Abandoned Cable)

Installed cable that is not terminated at equipment other than a termination fitting or a connector and is not identified for future use with a tag. (CMP-3)

Informational Note: See 640.6(B) , 645.6(G) , 760.25, 770.25, 790.25, and 800.25 for requirements covering the removal of abandoned cables.

Cable, Armored (Type AC). (Armored Cable)

A fabricated assembly of insulated conductors in a flexible interlocked metallic armor. (CMP-6)

Cable, Circuit Integrity (CI). (Circuit Integrity Cable)

Cable(s) marked with the suffix "-CI" used for remote-control, signaling, power-limited, fire alarm, optical fiber, or communications systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions. (CMP-3)

Informational Note: See 772.4 for power circuits installed for survivability.

Cable, Coaxial. (Coaxial Cable)

A cylindrical assembly composed of a conductor centered inside a metallic tube or shield, separated by a dielectric material, and usually covered by an insulating jacket. (CMP-3)

Cable, Festoon. (Festoon Cable)

Single- and multiple-conductor cable intended for use and installation where flexibility is required. (610) (CMP-12)

Cable, Flat Conductor (Type FCC). (Flat Conductor Cable)

Three or more separate flat copper conductors placed horizontally edge-to-edge and enclosed within an insulating assembly. (324) (CMP-6)

Cable, Instrumentation Tray (Type ITC). (Instrumentation Tray Cable)

A factory assembly of two or more insulated conductors, with or without an equipment grounding conductor(s), enclosed in a nonmetallic sheath. (CMP-3)

Cable, Integrated Gas Spacer (Type IGS). (Integrated Gas Spacer Cable)

A factory assembly of one or more conductors, each individually insulated and enclosed in a loose fit, nonmetallic flexible conduit as an integrated gas spacer cable rated 0 volts through 600 volts. (CMP-6)

Cable, Limited Use. (Limited-Use Cable)

Cables that are intended to be used with protection such as a raceway or for specific restricted applications. (CMP-3)

Informational Note: Limited use cables are denoted by an "X" suffix, for example Types CL2X or CMX.

Cable, Medium Voltage(Type MV). (Medium Voltage Cable)

A single or multiconductor solid dielectric insulated cable rated 2001 volts up to and including 35,000 volts, nominal. (CMP-6)

Cable, Metal Clad (Type MC). (Metal Clad Cable)

A factory assembly of one or more insulated circuit conductors with or without optical fiber members enclosed in an armor of interlocking metal tape, or a smooth or corrugated metallic sheath. (CMP-6)

Cable, Metallic Conductor. (Metallic Conductor Cable)

A factory assembly of two or more conductors having an overall covering. (CMP-3)

Cable, Mineral-Insulated, Metal-Sheathed (Type MI). (Mineral-Insulated, Metal-Sheathed Cable)

A factory assembly of one or more conductors insulated with a highly compressed refractory mineral insulation and enclosed in a liquidtight and gastight continuous copper or alloy steel sheath. (CMP-6)

Cable, Nonmetallic-Sheathed.

A factory assembly of two or more insulated conductors enclosed within an overall nonmetallic jacket. (CMP-6)

Cable, Nonmetallic-Sheathed (Type NM).

Insulated circuit conductors and a bare, covered, or insulated equipment grounding conductor enclosed within an overall nonmetallic jacket. (CMP-6)

Cable, Nonmetallic-Sheathed (Type NMC).

Insulated circuit conductors and a bare, covered, or insulsated equipment grounding conductor enclosed within an overall, corrosion resistant, nonmetallic jacket. (CMP-6)

Cable, Optical Fiber. (Optical Fiber Cable)

A factory assembly or field assembly of one or more optical fibers having an overall covering. (CMP-16)

Informational Note: A field-assembled optical fiber cable is an assembly of one or more optical fibers within a jacket. The jacket, without optical fibers, is installed in a manner similar to conduit or raceway. Once the jacket is installed, the optical fibers are inserted into the jacket, completing the cable assembly.

Cable, Optical Fiber, Conductive. (Conductive Optical Fiber Cable)

A factory assembly of one or more optical fibers having an overall covering and containing non-current-carrying conductive member(s) such as metallic strength member(s), metallic vapor barrier(s), metallic armor, or metallic sheath. (CMP-16)

Cable, Optical Fiber, Hybrid. (Hybrid Optical Fiber Cable)

A cable containing optical fibers and current-carrying electrical conductors. (CMP-16)

Cable, Optical Fiber, Nonconductive. (Nonconductive Optical Fiber Cable)

A factory assembly of one or more optical fibers having an overall covering and containing no electrically conductive materials. (CMP-16)

Cable, Optical Fiber, Protected. (Protected Optical Fiber Cable)

Optical fiber cable protected from releasing optical radiation into the atmosphere during normal operating conditions and foreseeable malfunctions by additional armoring, conduit, cable tray, or raceway. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Cable, Portable Power Feeder. (Portable Power Feeder Cable)

One or more flexible shielded insulated power conductors enclosed in a flexible covering rated from 2001 to 25,000 volts. (CMP-6)

Cable, Power and Control Tray (Type TC). (Power and Control Tray Cable)

A factory assembly of two or more insulated conductors, with or without associated bare or covered equipment grounding conductors, under a nonmetallic jacket. (CMP-6)

Cable, Power-Limited Tray (Type PLTC). (Power-Limited Tray Cable)

A factory assembly of two or more insulated conductors rated at 300 volts, with or without associated bare or insulated equipment grounding conductors, under a nonmetallic jacket. (CMP-3)

Cable, Service. (Service Cable)

Service conductors made up in the form of a cable. (CMP-10)

Cable, Service Entrance. (Service Entrance Cable)

A single conductor or multiconductor cable provided with an overall covering, primarily used for services. (CMP-6)

Cable, Service Entrance (Type SE).

Service-entrance cable having a flame-retardant, moisture-resistant covering. (CMP-6)

Cable, Service Entrance (Type USE).

Service-entrance cable, identified for underground use, having a moisture-resistant covering, but not required to have a flame-retardant covering. (CMP-6)

Cable, Type P.

A factory assembly of one or more insulated flexible tinned copper conductors, with associated equipment grounding conductor(s), with or without a braided metallic armor and with an overall nonmetallic jacket. (CMP-6)

Cable, Under Carpet. (Under Carpet Cable)

Cables that are intended to be used under carpeting, floor covering, modular tiles, and planks. (722) (CMP-3)

Cable, Underground Feeder and Branch-Circuit (Type UF). (Underground Feeder and Branch-Circuit Cable)

A factory assembly of one or more insulated conductors with an integral or an overall covering of nonmetallic material suitable for direct burial in the earth. (CMP-6)

Cable Assembly, Flat (Type FC). (Flat Cable Assembly)

An assembly of parallel conductors formed integrally with an insulating material web specifically designed for field installation in surface metal raceway. (CMP-6)

Cable Bundle.

A group of cables that are tied together or in contact with one another in a closely packed configuration for at least 1.0 m (40 in.). (CMP-3)

Informational Note: Random or loose installation of individual cables can result in less heating. Combing of the cables can result in less heat dissipation and more signal cross talk between cables.

Cable Connector.

A connector designed to join flat conductor cables (Type FCC) without using a junction box. (324) (CMP-6)

Cable Connector [as applied to hazardous (classified) locations].

An electrical device that is part of a cable assembly and that, by insertion of two mating configurations, establishes a connection between the conductors of the cable assembly and the conductors of a fixed piece of equipment. (CMP-14)

Informational Note No. 1: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for information on the use of cable connectors.

Informational Note No. 2: Cable connectors in other than hazardous (classified) locations are referred to as male and female fittings.

Informational Note No. 3: See ANSI/UL 2238, *Cable Assemblies and Fittings for Industrial Control and Signal Distribution* , and ANSI/UL 2237, *Multi-Point Interconnection Power Cable Assemblies for Industrial Machinery* , for examples of standards on male and female fittings in other than hazardous (classified) locations.

Cable Joint.

A connection consisting of an insulation system and a connector where two (or more) medium voltage (Type MV) cables are joined together. (CMP-6)

Cable Management System.

An apparatus designed to control and organize lengths of cable or cord. (CMP-12)

Cable Routing Assembly.

A single channel or connected multiple channels, as well as associated fittings, forming a structural system that is used to support and route communications wires and cables, optical fiber cables, data cables associated with information technology and communications equipment, Class 2, Class 3, Class 4, and Type PLTC cables, and power-limited fire alarm cables in plenum, riser, and general-purpose applications. (CMP-3)

Cable Sheath.

A single or multiple layers of a protective covering that holds and protects the conductors or optical fibers, or both, contained inside. (CMP-3)

Cable System, Fire-Resistive. (Fire-Resistive Cable System)

A cable and components used to ensure survivability of critical circuits for a specified time under fire conditions. (CMP-3)

Cable System, Flat Conductor. (Flat Conductor Cable System)

A complete wiring system for branch circuits that is designed for installation under carpet squares. (324) (CMP-6)

Informational Note: The FCC system includes Type FCC cable and associated shielding, connectors, terminators, adapters, boxes, and receptacles.

Cable Termination.

A connection consisting of an insulation system and a connector and installed on a medium voltage (Type MV) cable to connect from a cable to a device, such as equipment. (CMP-6)

Cable Tie.

A band or length of material employing a locking device, used for bundling, securing, and/or supporting cable, flexible conduit, or flexible tubing.

Informational Note: The following are cable tie and cable tie fixing device type designations:

(1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

(2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tie Fixing Device.

A component, such as a block or bracket, specifically designed to secure cable tie(s) to a mounting surface.

Informational Note: The following are cable tie and cable tie fixing device type designations:

(1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

(2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tie Integral Device.

A single component, as produced, incorporating a cable tie and a cable tie fixing device that are not separable.

Note: The following are cable tie and cable tie fixing device type designations:

(1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

(2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tray System.

A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways. (CMP-8)

Cablebus.

An assembly of units or sections with insulated conductors having associated fittings forming a structural system used to securely fasten or support conductors and conductor terminations in a completely enclosed, ventilated, protective metal housing. This assembly is designed to carry fault current and to withstand the magnetic forces of such current. (CMP-8)

Informational Note: Cablebus is ordinarily assembled at the point of installation from the components furnished or specified by the manufacturer in accordance with instructions for the specific job.

Cannabis Oil Booths.

Enclosed areas used to house cannabis oil equipment and systems.

Informational Note: Cannabis oil booths can be designed to house a single piece or multiple pieces of cannabis oil equipment. Booths range in size and can be large enough to permit entrance of personnel to perform the processing tasks.

Cannabis Oil Extraction Equipment.

Equipment that uses flammable materials (solvents) in the process of extracting the plant oil from the plant material.

Informational Note: Extraction equipment can use flammable materials as solvents to extract the plant oil from the plant material by saturating the plant material in a vented container, sealed container, or pressure vessel. Typical flammable materials used in the extraction process include butane, ethanol, hexane, pentane, propane, and LPG.

Cannabis Oil Post-Processing Equipment.

Equipment that is used in the final processing stages of the extracted plant oil (e.g., vacuum ovens, rotary evaporators, solvent recovery pumps).

Cannabis Oil Preparatory Equipment.

Equipment that is used to prepare the plant material for subsequent extraction of the plant oil (e.g., trimming, deseeding, drying/curing).

Cannabis Oil Systems.

Any combination of cannabis oil equipment needed for the overall extraction process (e.g., cannabis oil preparatory equipment, cannabis oil extraction equipment, cannabis oil booths, cannabis oil post-processing equipment).

Cell (as applied to batteries).

The basic electrochemical unit, characterized by an anode and a cathode, used to receive, store, and deliver electrical energy. (CMP-13)

Cell, Sealed. (Sealed Cell)

A cell that has no provision for the routine addition of water or electrolyte or for external measurement of electrolyte specific gravity and might contain pressure relief venting. (CMP-13)

Cell Line.

An assembly of electrically interconnected electrolytic cells supplied by a source of direct-current power. (CMP-12)

Cell Line Attachments and Auxiliary Equipment.

A term that includes, but is not limited to, auxiliary tanks; process piping; ductwork; structural supports; exposed cell line conductors; conduits and other raceways; pumps, positioning equipment, and cell cutout or bypass electrical devices. Auxiliary equipment includes tools, welding machines, crucibles, and other portable equipment used for operation and maintenance within the electrolytic cell line working zone. In the cell line working zone, auxiliary equipment includes the exposed conductive surfaces of ungrounded cranes and crane-mounted cell-servicing equipment. (668) (CMP-12)

Charge Controller.

Equipment that controls dc voltage or dc current, or both, and that is used to charge a battery or other energy storage device. (CMP-13)

Charger Power Converter.

The device used to convert energy from the power grid to a high-frequency output for wireless power transfer. (625) (CMP-12)

Child Care Facility.

A building or structure, or portion thereof, for educational, supervisory, or personal care services for more than four children 7 years old or less. (406) (CMP-18)

Circuit, Power-Limited. (Power-Limited Circuit)

An electrical circuit that is designed to provide acceptable protection from fire initiation and electrical shock by limiting the amount of power delivered into a fault by the power supply. (CMP-3)

Circuit Breaker.

A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating. (CMP-10)

Informational Note: The automatic opening means can be integral, direct acting with the circuit breaker, or remote from the circuit breaker.

Circuit Breaker, Adjustable. (Adjustable Circuit Breaker)

A qualifying term indicating that the circuit breaker can be set to trip at various values of current, time, or both, within a predetermined range. (CMP-10)

Circuit Breaker, Instantaneous Trip. (Instantaneous Trip Circuit Breaker)

A qualifying term indicating that no delay is purposely introduced in the tripping action of the circuit breaker. (CMP-10)

Circuit Breaker, Inverse Time. (Inverse Time Circuit Breaker)

A qualifying term indicating that there is a delay purposely introduced in the tripping action of the circuit breaker, and the delay decreases as the magnitude of the current increases. (CMP-10)

Circuit Breaker, Nonadjustable. (Nonadjustable Circuit Breaker)

A qualifying term indicating that the circuit breaker does not have any adjustment to alter the value of the current at which it will trip or the time required for its operation. (CMP-10)

Class 1 Circuit.

The portion of the wiring system between the load side of the Class 1 power source and the connected equipment. (CMP-3)

Class 2 Circuit.

The portion of the wiring system between the load side of a Class 2 power source and the connected equipment. (CMP-3)

> Informational Note: The design of a Class 2 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock due to its power limitations.

Class 3 Circuit.

The portion of the wiring system between the load side of a Class 3 power source and the connected equipment. (CMP-3)

> Informational Note: The design of a Class 3 circuit considers safety from a fire initiation standpoint. Since higher levels of voltage and current than a Class 2 circuit are permitted, additional safeguards are specified to provide acceptable protection from electric shock.

Class 4 Circuit.

The portion of the wiring system between the load side of a Class 4 transmitter and the Class 4 receiver or Class 4 utilization equipment, as appropriate. (CMP-3)

> Informational Note No. 1: A Class 4 circuit is also commonly referred to as a fault-managed power circuit.
>
> Informational Note No. 2: Due to the active monitoring and control of the voltage and current provided, a Class 4 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock.

Class 4 Device.

Any active device connected to the Class 4 circuit; examples include a Class 4 transmitter, a Class 4 receiver, or Class 4 utilization equipment. (CMP-3)

Class 4 Power System.

An actively monitored and controlled system consisting of one or more Class 4 transmitters and one or more Class 4 receivers connected by a cabling system. (CMP-3)

Class 4 Receiver.

A device that accepts Class 4 power and converts it for use by utilization equipment. (CMP-3)

Class 4 Transmitter.

A device that sources Class 4 power. (726) (CMP-3)

> Informational Note: A Class 4 transmitter is different from traditional power sources in that it monitors the line for faults (both line-to-line and line-to-ground) and ceases power transmission if a fault is sensed.

Class 4 Utilization Equipment.

Devices that are directly powered by a Class 4 transmitter without the need for a separate Class 4 receiver (the receiver is integrated into the equipment). (CMP-3)

Closed Construction.

Any building, building component, assembly, or system manufactured in such a manner that all concealed parts of processes of manufacture cannot be inspected after installation at the building site without disassembly, damage, or destruction. (545) (CMP-7)

Clothes Closet.

A nonhabitable room or space intended primarily for storage of garments and apparel. (CMP-1)

Clothes Closet Storage Space.

The area within a clothes closet in which combustible materials can be kept. (410) (CMP-18)

Collector Rings.

An assembly of slip rings for transferring electric energy from a stationary to a rotating member. (675) (CMP-7)

Combiner (DC). (dc Combiner) (Direct-Current Combiner)

An enclosure that includes devices used to connect two or more PV system dc circuits in parallel. (690) (CMP-4)

Combustible Dust.

Solid particles that are 500 µm or smaller (i.e., material passing a U.S. No. 35 Standard Sieve as defined in ASTM E11-17, *Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves*) that can form an explosible mixture when suspended in air at standard atmospheric pressure and temperature. [**499:** 3.3.3] (CMP-14)

> Informational Note: See ASTM E1226, *Standard Test Method for Explosibility of Dust Clouds* ; ISO 6184-1, *Explosion protection systems — Part 1: Determination of explosion indices of combustible dusts in air* ; or ANSI/UL 80079-20-2, *Explosive Atmospheres — Part 20-2: Material Characteristics — Combustible Dusts Test Methods* , for procedures for determining the explosibility of dusts. Historically, explosibility has been described as presenting a flash fire or explosion hazard. It could be understood that potential hazards due to the formation of an explosible mixture when suspended in air at standard atmospheric pressure and temperature would include ignition.

Combustible Gas Detection System.

A protection technique utilizing stationary gas detectors in industrial establishments. (CMP-14)

Commissioning.

The process, procedures, and testing used to set up and verify the initial performance, operational controls, safety systems, and sequence of operation of electrical devices and equipment, prior to it being placed into active service. (CMP-13)

Communications, Data. (Data Communications)

The transfer and reception of information in the form of a digital bitstream or a digitized analog signal transmitted over a point-to-point or point-to-multipoint arrangement. (CMP-16)

Communications Circuit.

A metallic, fiber, or wireless circuit that provides voice/data (and associated power) for communications-related services between communications equipment. (CMP-16)

Informational Note: Because communications can be carried over conductors with power, meeting both this definition and the definition for a powering circuit is possible (e.g., a power line communications device may be used on a branch circuit). The addition of data to a power line circuit does not change the treatment of the circuit in this code.

Communications Circuit, Network-Powered Broadband. (Network-Powered Broadband Communications Circuit)

The circuit extending from the communications utility's or service provider's serving terminal or tap up to and including the network interface unit (NIU). (830) (CMP-16)

Informational Note: A typical one-family dwelling network-powered communications circuit consists of a communications drop or communications service cable and an NIU and includes the communications utility's serving terminal or tap where it is not under the exclusive control of the communications utility.

Communications Circuit, Premises. (Premises Communications Circuit)

The circuit that extends voice, audio, video, data, interactive services, telegraph (except radio), and outside wiring for fire alarm and burglar alarm from the service provider's network terminal to the customer's communications equipment. (840) (CMP-16)

Communications Equipment.

The electronic equipment that performs the telecommunications operations for the transmission of audio, video, and data, and includes power equipment (e.g., dc converters, inverters, and batteries), technical support equipment (e.g., computers), and conductors dedicated solely to the operation of the equipment. (CMP-16)

Informational Note: As the telecommunications network transitions to a more data-centric network, computers, routers, servers, and their powering equipment, are becoming essential to the transmission of audio, video, and data and are finding increasing application in communications equipment installations.

Communications Service Provider.

An organization, business, or individual that offers communications service to others. (CMP-16)

Communications System.

The communications equipment, communication circuits, and manual and machine operations necessary for the transmission, movement, and reception of information (e.g., voice, audio, data). (CMP-16)

Communications Utility.

An organization designated or recognized by an entity such as a public service commission or public utility commission, or recognized as such under federal, state, or local law. (CMP-16)

Community Antenna Television Circuit (CATV).

The circuit that extends community antenna television systems for audio, video, data, and interactive services from the service provider's network terminal to the appropriate customer equipment. (CMP-16)

Concealable Nonmetallic Extension.

A listed assembly of two, three, or four insulated circuit conductors within a nonmetallic jacket, an extruded thermoplastic covering, or a sealed nonmetallic covering. The classification includes surface extensions intended for mounting directly on the surface of walls or ceilings and concealed with paint, texture, joint compound, plaster, wallpaper, tile, wall paneling, or other similar materials. (CMP-6)

Concealed.

Rendered inaccessible by the structure or finish of the building. (CMP-1)

Informational Note: Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them.

Concealed Knob-and-Tube Wiring.

A wiring method using knobs, tubes, and flexible nonmetallic tubing for the protection and support of single insulated conductors. (CMP-6)

Conductor, Bare. (Bare Conductor)

A conductor having no covering or electrical insulation whatsoever. (CMP-6)

Conductor, Copper-Clad Aluminum. (Copper-Clad Aluminum Conductor)

Conductor drawn from a copper-clad aluminum rod, with the copper metallurgically bonded to an aluminum core. (CMP-6)

Conductor, Covered. (Covered Conductor)

A conductor encased within material of composition or thickness that is not recognized by this code as electrical insulation. (CMP-6)

Conductor, Insulated. (Insulated Conductor)

A conductor encased within material of composition and thickness that is recognized by this code as electrical insulation. (CMP-6)

Conductor, Insulated. (Insulated Conductor)

Overhead service conductor encased in a polymeric material adequate for the applied nominal voltage and any conductor types described in 310.4. (396) (CMP-6)

Informational Note: See ICEA S-76-474-2011, *Standard for Neutral Supported Power Cable Assemblies with Weather-Resistant Extruded Insulation Rated 600 Volts* , for information about overhead service conductors.

Conductors, Outdoor Overhead. (Outdoor Overhead Conductors)

Single conductors, insulated, covered, or bare, installed outdoors on support structures in free air. (395) (CMP-6)

Conduit, Flexible Metal (FMC). (Flexible Metal Conduit)

A raceway of circular cross section made of helically wound, formed, interlocked metal strip. (CMP-8)

Conduit, High Density Polyethylene (HDPE). (High Density Polyethylene Conduit)

A nonmetallic raceway of circular cross section, with associated couplings, connectors, and fittings for the installation of electrical conductors. (CMP-8)

Conduit, Intermediate Metal (IMC). (Intermediate Metal Conduit)

A steel threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and appropriate fittings. (CMP-8)

Conduit, Liquidtight Flexible Metal (LFMC). (Liquidtight Flexible Metal Conduit)

A raceway of circular cross section having an outer liquidtight, nonmetallic, sunlight-resistant jacket over an inner flexible metal core with associated couplings, connectors, and fittings for the installation of electric conductors. (CMP-8)

Conduit, Liquidtight Flexible Nonmetallic (LFNC). (Liquidtight Flexible Nonmetallic Conduit)

A raceway of circular cross section of various types as follows:

(1) A smooth seamless inner core and cover bonded together and having one or more reinforcement layers between the core and covers, designated as LFNC-A

(2) A smooth inner surface with integral reinforcement within the raceway wall, designated as LFNC-B

(3) A corrugated internal and external surface without integral reinforcement within the raceway wall, designated as LFNC-C

(CMP-8)

Informational Note: FNMC is an alternative designation for LFNC.

Conduit, Nonmetallic Underground with Conductors (NUCC). (Nonmetallic Underground Conduit with Conductors)

A factory assembly of conductors or cables inside a nonmetallic, smooth wall raceway with a circular cross section. (CMP-8)

Conduit, Reinforced Thermosetting Resin (RTRC). (Reinforced Thermosetting Resin Conduit)

A rigid nonmetallic raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables. (CMP-8)

Conduit, Rigid Metal (RMC). (Rigid Metal Conduit)

A threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and appropriate fittings. (CMP -8)

Conduit, Rigid Polyvinyl Chloride (PVC). (Rigid Polyvinyl Chloride Conduit)

A rigid nonmetallic raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables. (CMP-8)

Conduit Body.

A separate portion of a conduit or tubing system that provides access through a removable cover(s) to the interior of the system at a junction of two or more sections of the system or at a terminal point of the system.

Boxes such as FS and FD or larger cast or sheet metal boxes are not classified as conduit bodies. (CMP-8)

Connector.

An electromechanical fitting. (393) (CMP-18)

Connector, Intercell. (Intercell Connector)

An electrically conductive bar or cable used to connect adjacent cells. (CMP-13)

Connector, Intertier. (Intertier Connector)

An electrical conductor used to connect two cells on different tiers of the same rack or different shelves of the same rack. (CMP-13)

Connector, Load. (Load Connector)

An electromechanical connector used for power from the busbar to utilization equipment. (393) (CMP-18)

Connector, Pendant. (Pendant Connector)

An electromechanical or mechanical connector used to suspend low-voltage luminaire or utilization equipment below the grid rail and to supply power to connect from the busbar to utilization equipment. (393) (CMP-18)

Connector, Power Feed. (Power Feed Connector)

An electromechanical connector used to connect the power supply to a power distribution cable, to connect directly to the busbar, or to connect from a power distribution cable to the busbar. (393) (CMP-18)

Connector, Pressure (Solderless). (Pressure Connector)

A device that establishes a connection between two or more conductors or between one or more conductors and a terminal by means of mechanical pressure and without the use of solder. (CMP-1)

Connector, Rail to Rail. (Rail to Rail Connector)

An electromechanical connector used to interconnect busbars from one ceiling grid rail to another grid rail. (393) (CMP-18)

Connector Strip.

A metal wireway containing pendant or flush receptacles. (520) (CMP-15)

Container (as applied to batteries).

A single-cell or multicell vessel or jar that holds the plates, electrolyte, and other elements of a single unit in a battery. (CMP-13)

Continuous Load.

A load where the maximum current is expected to continue for 3 hours or more. (CMP-2)

Control.

The predetermined process of connecting, disconnecting, increasing, or reducing electric power. (130) (CMP-13)

Control Circuit.

The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller but does not carry the main power current. (CMP-11)

Control Circuits, Fault-Tolerant External. (Fault-Tolerant External Control Circuits)

Those control circuits either entering or leaving the fire pump controller enclosure, which if broken, disconnected, or shorted will not prevent the controller from starting the fire pump from all other internal or external means and may cause the controller to start the pump under these conditions. (695) (CMP-13)

Control Device, Emergency Lighting (ELCD). (Emergency Lighting Control Device)

A separate or integral device intended to perform one or more emergency lighting control functions. (700) (CMP-13)

Informational Note: See UL 924, *Emergency Lighting and Power Equipment* , for information covering emergency lighting control devices.

Control Drawing.

A drawing or other document provided by the manufacturer of the intrinsically safe or associated apparatus, or of the nonincendive field wiring apparatus or associated nonincendive field wiring apparatus, that details the allowed interconnections between the intrinsically safe and associated apparatus or between the nonincendive field wiring apparatus or associated nonincendive field wiring apparatus. (CMP-14)

Informational Note: See the following standards for additional information:

(1) ANSI/ISA/UL 120202, *Recommendations for the Preparation, Content, and Organization of Intrinsic Safety Control Drawings*

(2) ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations*

(3) ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"*

(4) ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations*

(5) ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety*

Control Room.

An enclosed control space outside the hoistway, intended for full bodily entry, that contains the elevator motor controller. The room could also contain electrical and/or mechanical equipment used directly in connection with the elevator or dumbwaiter but not the electric driving machine or the hydraulic machine. (620) (CMP-12)

Control Space.

A space inside or outside the hoistway intended to be accessed with or without full bodily entry that contains the elevator motor controller. This space could also contain electrical and/or mechanical equipment used directly in connection with the elevator, dumbwaiter, escalator, moving walk, or platform lift, but not the electrical driving machine or the hydraulic machine. (620) (CMP-12)

Control System.

The overall system governing the starting, stopping, direction of motion, acceleration, speed, and retardation of the moving member. (620) (CMP-12)

Controller.

A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected. (CMP-1)

Controller, Motion. (Motion Controller)

The electrical device(s) for that part of the control system that governs the acceleration, speed, retardation, and stopping of the moving member. (620) (CMP-12)

Informational Note: The motor control function may be integral to the motion controller.

Controller, Motor. (Motor Controller)

Any switch or device that is normally used to start and stop a motor by making and breaking the motor circuit current. (CMP-11)

Controller, Operation. (Operation Controller)

The electrical device(s) for that part of the control system that initiates the starting, stopping, and direction of motion in response to a signal from an operating device. (620) (CMP-12)

Converter, DC-to-DC. (DC-to-DC Converter)

A device that can provide an output dc voltage and current at a higher or lower value than the input dc voltage and current. (CMP-4)

Converter Circuit, DC-to-DC. (DC-to-DC Converter Circuit)

The dc circuit conductors connected to the output of a dc-to-dc converter. (CMP-4)

Converting Device.

That part of the heating equipment that converts input mechanical or electrical energy to the voltage, current, and frequency used for the heating applicator. A converting device consists of equipment using line frequency, all static multipliers, oscillator-type units using vacuum tubes, inverters using solid-state devices, or motor-generator equipment. (665) (CMP-12)

Cooking Unit, Counter-Mounted. (Counter-Mounted Cooking Unit)

A cooking appliance designed for mounting in or on a counter and consisting of one or more heating elements, internal wiring, and built-in or mountable controls. (CMP-2)

Coordination, Selective. (Selective Coordination)

Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the selection and installation of overcurrent protective devices and their ratings or settings for the full range of available overcurrents, from overload to the available fault current, and for the full range of overcurrent protective device opening times associated with those overcurrents. (CMP-10)

Cord, Flexible. (Flexible Cord)

Two or more flexible insulated conductors enclosed in a flexible covering. (CMP-6)

Cord Connector.

A contact device terminated to a flexible cord that accepts an attachment plug or other insertion device. (CMP-6)

Cord Connector [as applied to hazardous (classified) locations].

A fitting intended to terminate a cord to a box or similar device and reduce the strain at points of termination and might include an explosionproof, a dust-ignitionproof, or a flameproof seal. (CMP-14)

Cord Set.

A length of flexible cord having an attachment plug at one end and a cord connector at the other end. (CMP-6)

Corrosive Environment.

Areas or enclosures without adequate ventilation, where electrical equipment is located and pool sanitation chemicals are stored, handled, or dispensed . (680) (CMP-17).

Informational Note No. 1: See *Advisory: Swimming Pool Chemical: Chlorine* , OSWER 90-008.1, June 1990, available from the EPA National Service Center for Environmental Publications (NSCEP) as sanitation chemicals and pool water are considered to pose a risk of corrosion (gradual damage or destruction of materials) due to the presence of oxidizers (e.g., calcium hypochlorite, sodium hypochlorite, bromine, chlorinated isocyanurates) and chlorinating agents that release chlorine when dissolved in water.

Informational Note No. 2: See ANSI/APSP-11, *Standard for Water Quality in Public Pools and Spas* , ANSI/ASHRAE 62.1, Table 6-4 Minimum Exhaust Rates, and *2021 International Swimming Pool and Spa Code (ISPSC)* , Section 324, including associated definitions and requirements concerning adequate ventilation of indoor spaces such as equipment and chemical storage rooms, which can reduce the likelihood of the accumulation of corrosive vapors. Chemicals such as chlorine cause severe corrosive and deteriorating effects on electrical connections, equipment, and enclosures when stored and kept in the same vicinity.

Counter (Countertop).

A fixed or stationary surface typically intended for food or beverage preparation, food or beverage serving, personal lavation, or laundering or a similar surface that presents a routine risk of spillage of larger quantities of liquids upon outlets mounted directly on or in the surface. (CMP-2)

Informational Note No. 1: See UL 498, *Receptacles and Attachment Plugs* , and UL 943, *Ground-Fault Circuit Interrupters* , which establish the performance evaluation criteria and construction criteria.

Informational Note No. 2: See 406.14(E) , 406.14(G)(1) , and 406.14(H) for information on receptacles for counters and countertops distinguished from receptacles for work surfaces.

Crane.

A mechanical device used for lifting or moving boats. [**303:** 3.3.6] (555) (CMP-7)

Critical Branch.

A system of feeders and branch circuits supplying power for task illumination, fixed equipment, select receptacles, and select power circuits serving areas and functions related to patient care that are automatically connected to alternate power sources by one or more transfer switches during interruption of the normal power source. [**99:** 3.3.30] (517) (CMP-15)

Critical Operations Areas, Designated (DCOA). (Designated Critical Operations Areas)

Areas within a facility or site designated as requiring critical operations power. (CMP-13)

Critical Operations Data System.

An information technology equipment system that requires continuous operation for reasons of public safety, emergency management, national security, or business continuity. (645) (CMP-12)

Critical Operations Power Systems (COPS).

Power systems for facilities or parts of facilities that require continuous operation for the reasons of public safety, emergency management, national security, or business continuity. (CMP-13)

Current-Limiting (as applied to overcurrent protection devices).

The ability to, when interrupting currents in its current-limiting range, reduce the current flowing in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit if the device were replaced with a solid conductor having comparable impedance. (CMP-10)

Cutout Box.

An enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the enclosure. (CMP-8)

Data Center, Modular (MDC). (Modular Data Center)

Prefabricated units, rated 1000 volts or less, consisting of an outer enclosure housing multiple racks or cabinets of information technology equipment (ITE) (e.g., servers) and various support equipment, such as electrical service and distribution equipment, HVAC systems, and the like. (646) (CMP-12)

Informational Note: A typical construction may use a standard ISO shipping container or other structure as the outer enclosure, racks or cabinets of ITE, service-entrance equipment and power distribution components, power storage such as a UPS, and an air or liquid cooling system. Modular data centers are intended for fixed installation, either indoors or outdoors, based on their construction and resistance to environmental conditions. MDCs can be configured as an all-in-one system housed in a single equipment enclosure or as a system with the support equipment housed in separate equipment enclosures.

DC Plugging Box.

A dc device consisting of one or more 2-pole, 2-wire, nonpolarized, non-grounding-type receptacles intended to be used on dc circuits only. (530) (CMP-15)

Dead-Front.

Without live parts exposed to a person on the operating side of the equipment. (CMP-9)

Demand Factor.

The ratio of the maximum demand of a system, or part of a system, to the total connected load of a system or the part of the system under consideration. (CMP-2)

Dental Office.

A building or part thereof in which the following occur:

(1) Examinations and minor treatments/procedures performed under the continuous supervision of a dental professional;

(2) Use of limited to minimal sedation and treatment or procedures that do not render the patient incapable of self-preservation under emergency conditions; and

(3) No overnight stays for patients or 24-hour operations.

[**99:** 3.3.38] (CMP-15)

Deploy (Deployed).

The use of portable equipment for the duration required by the event or production for which it is used. (CMP-15)

Device.

A unit of an electrical system, other than a conductor, that carries or controls electric energy as its principal function. (CMP-1)

Dielectric Heating.

Heating of a nominally insulating material due to its own dielectric losses when the material is placed in a varying electric field. (665) (CMP-12)

Disconnecting Means.

A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply. (CMP-1)

Distribution Point (Center Yard Pole) (Meter Pole).

An electrical supply point from which service drops, service conductors, feeders, or branch circuits to buildings or structures utilized under single management are supplied. (547) (CMP-7)

Informational Note: The service point is typically located at the distribution point.

Diversion Controller (Diversion Charge Controller) (Diversion Load Controller).

Equipment that regulates the output of a source or charging process by diverting power to direct-current or alternating-current loads or to an interconnected utility service. (CMP-13)

Diversion Load.

A load connected to a diversion charge controller or diversion load controller, also known as a dump load. (CMP-4)

Docking Facility.

A covered or open, fixed or floating structure that provides access to the water and to which boats are secured. [**303:** 3.3.7] (555) (CMP-7)

Dormitory.

A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities. (CMP 2) [**101:** 3.3.68]

Informational Note: Rooms within dormitories intended for the use of individuals for combined living and sleeping purposes are guest rooms or guest suites. Examples of dormitories are college dormitories, fraternity and sorority houses, and military barracks. [**101:** A.3.3.68] (CMP 2)

Drop Box.

A box containing pendant- or flush-mounted receptacles attached to a multiconductor cable via strain relief or a multipole connector. (520) (CMP-15)

Dust-Ignitionproof.

Equipment enclosed in a manner that excludes dusts and does not permit arcs, sparks, or heat otherwise generated or liberated inside of the enclosure to cause ignition of exterior accumulations or atmospheric suspensions of a specified dust on or in the vicinity of the enclosure. (CMP-14)

Informational Note No. 1: See ANSI/UL 1203, *Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations* , for information on dust-ignitionproof enclosures.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)* , for information on dust-ignitionproof enclosures that are sometimes additionally marked Type 9.

Dusttight.

Enclosures constructed so that dust will not enter under specified test conditions. (CMP-14)

Informational Note No. 1: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)*, and ANSI/UL 50E, *Enclosures for Electrical Equipment, Environmental Considerations* , for additional information on enclosure Types 3, 3X, 3S, 3SX, 4, 4X, 5, 6, 6P, 12, 12K, and 13 that are considered dusttight.

Duty, Continuous. (Continuous Duty)

Operation at a substantially constant load for an indefinitely long time. (CMP-1)

Duty, Intermittent. (Intermittent Duty)

Operation for alternate intervals of (1) load and no load; or (2) load and rest; or (3) load, no load, and rest. (CMP-1)

Duty, Periodic. (Periodic Duty)

Intermittent operation in which the load conditions are regularly recurrent. (CMP-1)

Duty, Short-Time. (Short-Time Duty)

Operation at a substantially constant load for a short and definite, specified time. (CMP-1)

Duty, Varying. (Varying Duty)

Operation at loads, and for intervals of time, both of which may be subject to wide variation. (CMP-1)

Dwelling, One-Family. (One-Family Dwelling)

A building that consists solely of one dwelling unit. (CMP-1)

Dwelling, Two-Family. (Two-Family Dwelling)

A building that consists solely of two dwelling units. (CMP-1)

Dwelling, Multifamily. (Multifamily Dwelling)

A building that contains three or more dwelling units. (CMP-1)

Dwelling Unit.

A single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, and sanitation. (CMP-2)

Electric-Discharge Lighting.

Systems of illumination utilizing fluorescent lamps, high-intensity discharge (HID) lamps, or neon tubing. (CMP-18)

Electric Power Production and Distribution Network.

Power production, distribution, and utilization equipment and facilities, such as electric utility systems that are connected to premises wiring and are external to and not controlled by a system that operates in interactive mode. (CMP-13)

Electric Self-Propelled Vehicle (ESV).

A vehicle or marine vessel, other than an EV, such as farm equipment, boats, aircraft, and golf carts, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. (627) (CMP-12)

Electric Self-Propelled Vehicle Power Export Equipment (ESVPE).

The equipment, including the outlet on the electric self-propelled vehicle (ESV), that is used to provide electrical power at voltages greater than or equal to 30 Vac or 60 Vdc to loads external to the ESV, using the vehicle as the source of supply. (627) (CMP-12)

Informational Note: Electric self-propelled vehicle power export equipment and electric self-propelled vehicle supply equipment or wireless power transfer equipment are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional electric self-propelled vehicle supply equipment (ESVSE) or bidirectional wireless power transfer equipment (WPTE).

Electric Self-Propelled Vehicle Supply Equipment (ESVSE).

Equipment for plug-in charging, including the ungrounded, grounded, and equipment grounding conductors, and the electric self-propelled vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. (627) (CMP-12)

Informational Note: Electric self-propelled vehicle power export equipment and electric self-propelled vehicle supply equipment or wireless power transfer equipment (WPTE) are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional ESVSE or bidirectional WPTE.

Electric Supply Stations.

Locations containing the generating stations and substations, including their associated generator, storage battery, transformer, and switchgear areas. (CMP-4)

Electric Vehicle (EV).

An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and electric motorcycles, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are electric vehicles having a second source of motive power. (CMP-12)

Informational Note: Off-road, self-propelled electric mobile machines, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, and boats are not considered electric vehicles.

Electric Vehicle Connector.

A device that, when electrically coupled (conductive or inductive) to an electric vehicle inlet, establishes an electrical connection to the electric vehicle for the purpose of power transfer and information exchange. (625) (CMP-12)

Informational Note: See 625.48 for further information on interactive systems.

Electric Vehicle Power Export Equipment (EVPE).

The equipment, including the outlet on the electric vehicle, that is used to provide electrical power at voltages greater than or equal to 30 Vac or 60 Vdc to loads external to the electric vehicle, using the electric vehicle as the source of supply. (625) (CMP-12)

Informational Note: Electric vehicle power export equipment and electric vehicle supply equipment or wireless power transfer equipment are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional electric vehicle supply equipment (EVSE) or bidirectional wireless power transfer equipment (WPTE).

Electric Vehicle Supply Equipment (EVSE).

Equipment for plug-in charging, including the ungrounded, grounded, and equipment grounding conductors, and the electric vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. (625) (CMP-12)

Informational Note: Electric vehicle power export equipment and electric vehicle supply equipment or wireless power transfer equipment (WPTE) are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional EVSE or bidirectional WPTE.

Electrical Circuit Protective System.

A system consisting of components and materials intended for installation as protection for specific electrical wiring systems with respect to the disruption of electrical circuit integrity upon exterior fire exposure. (CMP-16)

Electrical Datum Plane.

A specified vertical distance above the normal high-water level at which electrical equipment can be installed and electrical connections can be made. (CMP-7)

Electrical Ducts.

Electrical conduits, or other raceways round in cross section, that are suitable for use underground or embedded in concrete. (CMP-6)

Electrical Life Support Equipment.

Electrically powered equipment whose continuous operation is necessary to maintain a patient's life. [**99** :3.3.45] (517) (CMP-15)

Electrical Resistance Trace Heating "60079-30-1".

Type of protection for the purpose of producing heat on the principle of electrical resistance and typically composed of one or more metallic conductors and/or an electrically conductive material, suitably electrically insulated and protected. (CMP-14)

Informational Note: See ANSI/UL 60079-30-1, *Explosive Atmospheres — Part 30-1: Electrical Resistance Trace Heating — General and Testing Requirements* , for additional information.

Electrically Connected.

A connection capable of carrying current as distinguished from connection through electromagnetic induction. (668) (CMP-12)

Electrified Truck Parking Space.

A truck parking space that has been provided with an electrical system that allows truck operators to connect their vehicles while stopped and to use off-board power sources in order to operate on-board systems such as air conditioning, heating, and appliances, without any engine idling. (626) (CMP-12)

Informational Note: An electrified truck parking space also includes dedicated parking areas for heavy-duty trucks at travel plazas, warehouses, shipper and consignee yards, depot facilities, and border crossings. It does not include areas such as the shoulders of highway ramps and access roads, camping and recreational vehicle sites, residential and commercial parking areas used for automotive parking or other areas where ac power is provided solely for the purpose of connecting automotive and other light electrical loads, such as engine block heaters, and at private residences.

Electrified Truck Parking Space Wiring Systems.

All of the electrical wiring, equipment, and appurtenances related to electrical installations within an electrified truck parking space, including the electrified parking space supply equipment. (626) (CMP-12)

Electrolyte.

The medium that provides the ion transport mechanism between the positive and negative electrodes of a cell. (CMP-13)

Electrolytic Cell.

A tank or vat in which electrochemical reactions are caused by applying electric energy for the purpose of refining or producing usable materials. (668) (CMP-12)

Electrolytic Cell Line Working Zone.

The space envelope wherein operation or maintenance is normally performed on or in the vicinity of exposed energized surfaces of electrolytic cell lines or their attachments. (668) (CMP-12)

Electronic Power Converter.

A device that uses power electronics to convert one form of electrical power into another form of electrical power. (CMP-4)

Informational Note: Examples of electronic power converters include, but are not limited to, inverters, dc-to-dc converters, and electronic charge controllers. These devices have limited current capabilities based on the device ratings at continuous rated power.

Electronically Protected.

A motor provided with electronic control that is an integral part of the motor and protects the motor against dangerous overheating due to failure of the electronic control, overload, and failure to start. (430) (CMP-11)

Emergency Luminaire, Battery-Equipped. (Battery-Equipped Emergency Luminaire)

A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. (CMP-13)

Emergency Luminaire, Directly Controlled (DCEL). (Directly Controlled Emergency Luminaire)

A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13)

Informational Note: See ANSI/UL 924, *Emergency Lighting and Power Equipment* , for information covering directly controlled emergency luminaires.

Emergency Power Supply (EPS).

The source(s) of electric power of the required capacity and quality for an emergency power supply system (EPSS). (CMP-13)

Emergency Power Supply System (EPSS).

A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [**110:** 3.3.4] (CMP-13)

Emergency Systems.

Those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction. These systems are intended to automatically supply illumination, power, or both, to designated areas and equipment in the event of failure of the normal supply or in the event of accident to elements of a system intended to supply, distribute, and control power and illumination essential for safety to human life. (CMP-13)

Encapsulation "m".

Type of protection where electrical parts that could ignite an explosive atmosphere by either sparking or heating are enclosed in a compound in such a way that this explosive atmosphere cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 60079-18, *Explosive atmospheres — Part 18: Equipment protection by encapsulation "m"*, for additional information.

Enclosed.

Surrounded by a case, housing, fence, or wall(s) that prevents persons from accidentally contacting energized parts. (CMP-1)

Enclosed-Break.

Having electrical make-or-break contacts such that, if an internal explosion of the flammable gas or vapor that can enter it occurs, the device will withstand the internal explosion without suffering damage and without communicating the internal explosion to the external flammable gas or vapor. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Enclosure.

The case or housing of apparatus or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage. (CMP-1)

Informational Note: See Table 110.28 for examples of enclosure types.

Energized.

Electrically connected to, or is, a source of voltage. (CMP-1)

Energized, Likely to Become. (Likely to Become Energized)

Conductive material that could become energized because of the failure of electrical insulation or electrical spacing. (CMP-5)

Energy Management System (EMS).

A system that monitors and controls power within an electrical system. (CMP-13)

Energy Storage System (ESS).

One or more devices, assembled together, capable of storing energy to supply electrical energy at a future time. [**855:** 3.3.9] (CMP-13)

Informational Note No. 1: An ESS(s) can include but is not limited to batteries, capacitors, and kinetic energy devices (e.g., flywheels and compressed air). An ESS(s) can include inverters or converters to change voltage levels or to make a change between an ac or a dc system.

Informational Note No. 2: These systems differ from a stationary standby battery installation where a battery spends the majority of the time on continuous float charge or in a high state of charge, in readiness for a discharge event.

Entertainment Device.

A mechanical or electromechanical device that provides an entertainment experience. (522) (CMP-15)

Informational Note: These devices can include animated props, show action equipment, animated figures, and special effects, coordinated with audio and lighting to provide an entertainment experience.

Equipment.

A general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like used as a part of, or in connection with, an electrical installation. (CMP-1)

Equipment, Interconnection. (Interconnection Equipment)

Equipment that performs protective and control functions that enables power sources, or systems supplied by power sources, to operate in parallel with, separate from, and reconnect to systems supplied by other power sources. (CMP-4)

Equipment, Mobile. (Mobile Equipment)

Equipment with electrical components that is suitable to be moved only with mechanical aids or is provided with wheels for movement by a person(s) or powered devices. (513) (CMP-14)

Equipment, Portable. (Portable Equipment)

Equipment fed with portable cords or cables intended to be moved from one place to another. (640) (CMP-12)

Equipment, Portable. (Portable Equipment)

Equipment with electrical components suitable to be moved by a single person without mechanical aids. (511) (CMP-14)

Equipment, Portable. (Portable Equipment)

Equipment fed with portable cords or cables intended to be moved from one place to another. (520) (CMP-15)

Equipment, Portable. (Portable Equipment)

Equipment intended to be moved from one place to another. (530) (CMP-15)

Equipment, Signal. (Signal Equipment)

Includes audible and visual equipment such as chimes, gongs, lights, and displays that convey information to the user. (620) (CMP-12)

Equipment Branch.

A system of feeders and branch circuits arranged for delayed, automatic, or manual connection to the alternate power source and that serves primarily 3-phase power equipment. [**99** :3.3.50] (517) (CMP-15)

Equipment Protection Level (EPL).

Level of protection assigned to equipment based on its likelihood of becoming a source of ignition, and distinguishing the differences between explosive gas atmospheres and explosive dust atmospheres. (CMP-14)

Informational Note: See ANSI/UL 60079-0, *Explosive Atmospheres — Part 0: Equipment — General Requirements* , for additional information.

Equipment Rack.

A framework for the support, enclosure, or both, of equipment; can be portable or stationary. (640) (CMP-12)

Informational Note: See EIA/ECA 310-E-2005, *Cabinets, Racks, Panels and Associated Equipment* , for examples of equipment racks.

Equipotential Plane.

Conductive elements that are connected together to minimize voltage differences. (CMP-7)

Essential Electrical System.

A distribution system designed to ensure continuity of electrical power to designated areas and functions of a health care facility upon loss of one of the on-site or off-site sources with reliability and capacity sufficient to provide effective facility operation consistent with the facility's emergency operations plan. [**99:** 3.3.54] (517) (CMP-15)

Explosionproof Equipment.

Equipment enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor that might occur within it, that is capable of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosion of the gas or vapor within, and that operates at such an external temperature that a surrounding flammable atmosphere will not be ignited. (CMP-14)

Informational Note No. 1: See ANSI/UL 1203, *Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations* , for additional information.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)* , for additional information on explosionproof enclosures that are sometimes additionally marked Type 7.

Exposed (as applied to live parts).

Capable of being inadvertently touched or approached nearer than a safe distance by a person. (CMP-1)

Informational Note: This term applies to parts that are not suitably guarded, isolated, or insulated.

Exposed (as applied to wiring methods).

On or attached to the surface or behind panels designed to allow access. (CMP-1)

Exposed (Optical Fiber Cable Exposed to Accidental Contact).

A conductive optical fiber cable in such a position that, in case of failure of supports or insulation, contact between the cable's non–current-carrying conductive members and an electrical circuit might result. (CMP-16)

Exposed (to Accidental Contact).

A circuit in such a position that, in case of failure of supports or insulation, contact with another circuit may result. (CMP-16)

Exposed Conductive Surfaces.

Those surfaces that are capable of carrying electric current and that are unprotected, uninsulated, unenclosed, or unguarded, permitting personal contact. [**99:** 3.3.54] (517) (CMP-15)

Informational Note: Paint, anodizing, and similar coatings are not considered suitable insulation, unless they are listed for such use.

Externally Operable.

Capable of being operated without exposing the operator to contact with live parts. (CMP-1)

Facility, On-Site Power Production. (On-Site Power Production Facility)

The normal supply of electric power for the site that is expected to be constantly producing power. (695) (CMP-13)

Fastened-in-Place (as applied to electric vehicle power transfer systems and electric self-propelled vehicle power transfer systems).

Mounting means of equipment in which the fastening means are specifically designed to permit removal without the use of a tool. (CMP-12)

Fault-Managed Power (FMP).

A powering system that monitors for faults and controls current delivered to ensure fault energy is limited. (726) (CMP-3)

Informational Note No. 1: The monitoring and control systems differentiate fault-managed power from electric light and power circuits; therefore, alternative requirements to those of Chapters 1 through 4 are given regarding minimum wire sizes, ampacity adjustment and correction factors, overcurrent protection, insulation requirements, and wiring methods and materials.

Informational Note No. 2: A fault-managed power circuit is also commonly referred to as a Class 4 circuit.

Fault Current.

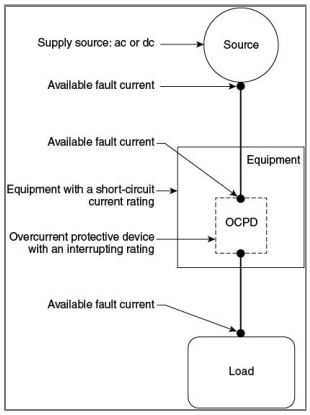
The current delivered at a point on the system during a short-circuit condition. (CMP-10)

Fault Current, Available. (Available Fault Current)

The largest amount of current capable of being delivered at a point on the system during a short-circuit condition. (CMP-10)

Informational Note: A short-circuit can occur during abnormal conditions such as a fault between circuit conductors or a ground fault. See Figure Informational Note 100.1 .

Figure Informational Note 100.1 Available Fault Current.



Fault Protection Device.

An electronic device that is intended for the protection of personnel and functions under fault conditions, such as network-powered broadband communications cable short or open circuit, to limit the current or voltage, or both, for a low-power network-powered broadband communications circuit and provide acceptable protection from electric shock. (830) (CMP-16)

Feeder.

All circuit conductors between the service equipment, the source of a separately derived system, or other power supply source and the final branch-circuit overcurrent protective device. (CMP-10)

Feeder Assembly.

The overhead or under-chassis feeder conductors, including the equipment grounding conductor, together with the necessary fittings and equipment; or the power-supply cord assembly for a mobile home, recreational vehicle, or park trailer, identified for the delivery of energy from the source of electrical supply to the panelboard within the mobile home, recreational vehicle, or park trailer. (CMP-7)

Festoon Lighting.

A string of outdoor lights that is suspended between two points. (CMP-18)

Fibers/Flyings, Combustible. (Combustible Fibers/Flyings)

Fibers/flyings, where any dimension is greater than 500 µm in nominal size, which can form an explosible mixture when suspended in air at standard atmospheric pressure and temperature. [**499:** 3.3.4.1] (CMP-14)

Informational Note No. 1: This definition and Informational Notes No. 2 and No. 3 have been extracted from NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas* . The NFPA 499 reference is in brackets. Only editorial changes were made to the extracted text to make it consistent with this code.

Informational Note No. 2: Section 500.5(D) defines a Class III location. Combustible fibers/flyings can be similar in physical form to ignitible fibers/flyings and protected using the same electrical equipment installation methods. Examples of fibers/flyings include flat platelet-shaped particulate, such as metal flake, and fibrous particulate, such as particle board core material. If the smallest dimension of a combustible material is greater than 500 µm, it is unlikely that the material would be combustible fibers/flyings, as determined by test. Finely divided solids with lengths that are large compared to their diameter or thickness usually do not pass through a 500 µm sieve, yet when tested could potentially be determined to be explosible. [**499:** A.3.3.4.1]

Informational Note No. 3: See ASTM E1226, *Standard Test Method for Explosibility of Dust Clouds* , ISO 6184-1, *Explosion protection systems — Part 1: Determination of explosion indices of combustible dusts in air* , or ISO/IEC/UL 80079-20-2, *Explosive atmospheres — Part 20-2: Material characteristics — Combustible dusts test methods* , for procedures for determining the explosibility of dusts. A material that is found to not present an explosible mixture could still be an ignitible fiber/flying, as defined in this article. Historically, the explosibility condition has been described as presenting a flash fire or explosion hazard. It could be understood that the potential hazard due to the formation of an explosible mixture when suspended in air at standard atmospheric pressure and temperature would include ignition. [**499:** A.3.3.4.1]

Fibers/Flyings, Ignitible. (Ignitible Fibers/Flyings)

Fibers/flyings where any dimension is greater than 500 µm in nominal size, which are not likely to be in suspension in quantities to produce an explosible mixture, but could produce an ignitible layer fire hazard. [**499:** 3.3.4.2] (CMP-14)

Informational Note No. 1: This definition and Informational Note No. 2 have been extracted from NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas* . The NFPA 499 reference is in brackets. Only editorial changes were made to the extracted text to make it consistent with this code.

Informational Note No. 2: Section 500.5 of this code prescribes a Class III location as one where ignitible fibers/flyings are present, but not likely to be in suspension in the air in quantities sufficient to produce ignitible mixtures. This description addresses fibers/flyings that do not present a flash-fire hazard or explosion hazard by test. This could be because those fibers/flyings are too large or too agglomerated to be suspended in air in sufficient concentration, or at all, under typical test conditions. Alternatively, this could be because they burn so slowly that, when suspended in air, they do not propagate combustion at any concentration. In this document the zone classification system includes ignitible fibers/flyings as a fire hazard in a layer, which is not addressed in the IEC zone system (see IEC 60079-10-2, *Explosive atmospheres — Part 10-2: Classification of areas — Explosive dust atmospheres*). Where these are present, the user could also consider installation in accordance with Article 503 of this code. [**499:** A.3.3.4.2]

Field Evaluation Body (FEB).

An organization or part of an organization that performs field evaluations of electrical or other equipment. [**790:** 3.3.4] (CMP-1)

Informational Note: See NFPA 790-2024, *Standard for Competency of Third-Party Field Evaluation Bodies* , provides guidelines for establishing the qualification and competency of a body performing field evaluations of electrical products and assembles with electrical components.

Field Labeled (as applied to evaluated products).

Equipment or materials to which has been attached a label, symbol, or other identifying mark of an FEB indicating the equipment or materials were evaluated and found to comply with requirements as described in an accompanying field evaluation report. [**790:** 3.3.6] (CMP-1)

Fire Alarm Circuit.

The portion of the wiring system between the load side of the overcurrent device or the power-limited supply and the connected equipment of all circuits powered and controlled by the fire alarm system. Fire alarm circuits are classified as either non–power-limited or power-limited. (CMP-3)

Fire Alarm Circuit, Non-Power-Limited (NPLFA). (Non-Power-Limited Fire Alarm Circuit)

A fire alarm circuit powered by a source that is not power limited. (CMP-3)

Informational Note: See 760.41 and 760.43 for requirements for non-power-limited fire alarm circuits.

Fire Alarm Circuit, Power-Limited (PLFA). (Power-Limited Fire Alarm Circuit)

A fire alarm circuit powered by a power-limited source . (CMP-3)

Informational Note: See 760.121 for requirements on power-limited fire alarm circuits.

Fitting.

An accessory such as a locknut, bushing, or other part of a wiring system that is intended primarily to perform a mechanical rather than an electrical function. (CMP-1)

Fixed (as applied to equipment).

Equipment that is fastened or otherwise secured at a specific location. (CMP-17)

Fixed-in-Place (as applied to electric vehicle power transfer systems and electric self-propelled vehicle power transfer systems).

Mounting means of equipment using fasteners that require a tool for removal. (CMP-12)

Flameproof "d".

Type of protection where the enclosure will withstand an internal explosion of a flammable mixture that has penetrated into the interior, without suffering damage and without causing ignition, through any joints or structural openings in the enclosure of an external explosive gas atmosphere consisting of one or more of the gases or vapors for which it is designed. (CMP-14)

Informational Note: See ANSI/UL 60079-1, *Explosive Atmospheres — Part 1: Equipment Protection by Flameproof Enclosures "d"*, for additional information.

Flammable Anesthetics.

Gases or vapors, such as fluroxene, cyclopropane, divinyl ether, ethyl chloride, ethyl ether, and ethylene, that could form flammable or explosive mixtures with air, oxygen, or reducing gases such as nitrous oxide. (517) (CMP-15)

Flexible Bus Systems.

An assembly of flexible insulated bus, with a system of associated fittings used to secure, support, and terminate the bus. (CMP-8)

Informational Note: Flexible bus systems are engineered systems for a specific site location and are ordinarily assembled at the point of installation from the components furnished or specified by the manufacturer.

Flexible Insulated Bus.

A flexible rectangular conductor with an overall insulation. (CMP-8)

Flywheel ESS (FESS).

A mechanical ESS composed of a spinning mass referred to as a rotor and an energy conversion mechanism such as a motor-generator that converts the mechanical energy to electrical energy. (706) (CMP-13)

Informational Note: There are primarily two types of rotor constructions, solid metal mass design and composite fiber design.

Footlight.

A border light installed on or in the stage. (520) (CMP-15)

Forming Shell.

A structure designed to support a wet-niche luminaire assembly and intended for mounting in a pool or fountain structure. (680) (CMP-17)

Fountain.

An ornamental structure or recreational water feature from which one or more jets or streams of water are discharged into the air, including splash pads, ornamental pools, display pools, and reflection pools. The definition does not include drinking water fountains or water coolers. (680) (CMP-17)

Frame.

Chassis rail and any welded addition thereto of metal thickness of 1.35 mm (0.053 in.) or greater. (551) (CMP-7)

Free Air (as applied to conductors).

Open or ventilated environment that allows for heat dissipation and air flow around an installed conductor. (CMP-6)

Fuel Cell.

An electrochemical system that consumes fuel to produce an electric current. In such cells, the main chemical reaction used for producing electric power is not combustion. However, there may be sources of combustion used within the overall cell system, such as reformers/fuel processors. (CMP-4)

Fuel Cell System.

The complete aggregate of equipment used to convert chemical fuel into usable electricity and typically consisting of a reformer, stack, power inverter, and auxiliary equipment. (CMP-4)

Fuse.

An overcurrent protective device with a circuit-opening fusible part that is heated and severed by the passage of overcurrent through it. (CMP-10)

Informational Note: A fuse comprises all the parts that form a unit capable of performing the prescribed functions. It may or may not be the complete device necessary to connect it into an electrical circuit.

Fuse, Electronically Actuated. (Electronically Actuated Fuse)

An overcurrent protective device that generally consists of a control module that provides current-sensing, electronically derived time–current characteristics, energy to initiate tripping, and an interrupting module that interrupts current when an overcurrent occurs. Such fuses may or may not operate in a current-limiting fashion, depending on the type of control selected. (CMP-10)

Fuse, Expulsion. (Expulsion Fuse)

A vented fuse unit in which the expulsion effect of gases produced by the arc and lining of the fuseholder, either alone or aided by a spring, extinguishes the arc. (CMP-10)

Fuse, Nonvented Power. (Nonvented Power Fuse)

A fuse without intentional provision for the escape of arc gases, liquids, or solid particles to the atmosphere during circuit interruption. (CMP-10)

Fuse, Power. (Power Fuse)

A vented, nonvented, or controlled vented fuse unit in which the arc is extinguished by being drawn through solid material, granular material, or liquid, either alone or aided by a spring. (CMP-10)

Fuse, Vented Power. (Vented Power Fuse)

A fuse with provision for the escape of arc gases, liquids, or solid particles to the surrounding atmosphere during circuit interruption. (CMP-10)

Garage.

A building or portion of a building in which one or more self-propelled vehicles can be kept for use, sale, storage, rental, repair, exhibition, or demonstration purposes. (CMP-1)

Informational Note: See 511.1 for commercial garages, repair and storage.

Garage, Major Repair. (Major Repair Garage)

A building or portions of a building where major repairs, such as engine overhauls, painting, body and fender work, welding or grinding, and repairs that require draining or emptying of the motor vehicle fuel tank are performed on motor vehicles, including associated floor space used for offices, parking, or showrooms. [**30A:** 3.3.12.1] (CMP-14)

Garage, Minor Repair. (Minor Repair Garage)

A building or portions of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups, replacement of parts, fluid changes (e.g., oil, antifreeze, transmission fluid, brake fluid, air-conditioning refrigerants), brake system repairs, tire rotation, and similar routine maintenance work, including the associated floor space used for offices, parking, or showrooms. [**30A:** 3.3.12.2] (CMP-14)

General-Purpose Cables, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways are suitable for general-purpose applications and are resistant to the spread of fire. (722) (CMP-3)

Generating Capacity, Inverter. (Inverter Generating Capacity)

The sum of parallel-connected inverter maximum continuous output power at 40°C in watts, kilowatts, volt-amperes, or kilovolt-amperes. (CMP-4)

Generating Station.

A plant wherein electric energy is produced by conversion from some other form of energy (e.g., chemical, nuclear, solar, wind, mechanical, or hydraulic) by means of suitable apparatus. (CMP-4)

Generator (Generator Set).

A machine that converts mechanical energy into electrical energy by means of a prime mover and alternator. (CMP-13)

Generator, On-Site Standby. (On-Site Standby Generator)

A facility producing electric power on site as the alternate supply of electric power. It differs from an on-site power production facility in that it is not constantly producing power. (695) (CMP-13)

Generator Terminals.

The point of connection for the output conductors on the generator (generator set). (445) (CMP-13)

Grid Bus Rail.

A combination of the busbar, the busbar support, and the structural suspended ceiling grid system. (393) (CMP-18)

Ground.

The Earth. (CMP-5)

Ground Fault.

An unintentional, electrically conductive connection between an ungrounded conductor of an electrical circuit and the normally non-current-carrying conductors, metal enclosures, metal raceways, metal equipment, or earth. (CMP-5)

Ground-Fault Circuit Interrupter (GFCI).

A device intended for the protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a ground-fault current exceeds the values established for a Class A device. (CMP-2)

Informational Note: See UL 943, *Standard for Ground-Fault Circuit Interrupters* , for further information. Class A ground-fault circuit interrupters trip when the ground-fault current is 6 mA or higher and do not trip when the ground-fault current is less than 4 mA.

Ground-Fault Circuit Interrupter, Special Purpose (SPGFCI). (Special Purpose Ground-Fault Circuit Interrupter)

A device intended for the detection of ground-fault currents that functions to de-energize a circuit or portion of a circuit within an established period of time established for Class C, D, or E devices. (CMP-2)

Informational Note: See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit Interrupters* , for information on Classes C, D, or E special purpose ground-fault circuit interrupters.

Ground-Fault Current Path.

An electrically conductive path from the point of a ground fault on a wiring system through normally non–current-carrying conductors, grounded conductors, equipment, or the earth to the electrical supply source. (CMP-5)

Informational Note: Examples of ground-fault current paths are any combination of equipment grounding conductors, metallic raceways, metallic cable sheaths, electrical equipment, and any other electrically conductive material such as metal, water, and gas piping; steel framing members; stucco mesh; metal ducting; reinforcing steel; shields of communications cables; grounded conductors; and the earth itself.

Ground-Fault Current Path, Effective. (Effective Ground-Fault Current Path)

An intentionally constructed, low-impedance electrically conductive path designed and intended to carry current during ground-fault events from the point of a ground fault on a wiring system to the electrical supply source and that facilitates the operation of the overcurrent protective device or ground-fault detectors. (CMP-5)

Ground-Fault Detector-Interrupter, dc (GFDI).

A device that provides protection for PV system dc circuits by detecting a ground fault and could interrupt the fault path in the dc circuit. (690) (CMP-4)

Informational Note: See UL 1741, *Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources* , and UL 62109, *Standard for Power Converters for use in Photovoltaic Power Systems* , for further information on GFDI equipment.

Ground-Fault Protection of Equipment (GFPE).

A system intended to provide protection of equipment from damaging line-to-ground fault currents by operating to cause a disconnecting means to open all ungrounded conductors of the faulted circuit. This protection is provided at current levels less than those required to protect conductors from damage through the operation of a supply circuit overcurrent device. (CMP-5)

Grounded (Grounding).

Connected (connecting) to ground or to a conductive body that extends the ground connection. (CMP-5)

Grounded, Functionally. (Functionally Grounded)

A system that has an electrical ground reference for operational purposes that is not solidly grounded. (CMP-4)

Informational Note: A functionally grounded system is often connected to ground through an electronic means internal to an inverter or charge controller that provides ground-fault protection. Examples of operational purposes for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.

Grounded, Solidly. (Solidly Grounded)

Connected to ground without inserting any resistor or impedance device. (CMP-5)

Grounded Conductor.

A system or circuit conductor that is intentionally grounded. (CMP-5)

Informational Note: Although an equipment grounding conductor is grounded, it is not considered a grounded conductor.

Grounded System, Impedance. (Impedance Grounded System)

An electrical system that is grounded by intentionally connecting the system neutral point to ground through an impedance device. (CMP-5)

Grounding Conductor, Equipment (EGC). (Equipment Grounding Conductor)

A conductive path(s) that is part of an effective ground-fault current path and connects normally non-current-carrying metal parts of equipment together and to the system grounded conductor or to the grounding electrode conductor, or both. (CMP-5)

Informational Note No. 1: It is recognized that the equipment grounding conductor also performs bonding.

Informational Note No. 2: See 250.118 for a list of acceptable equipment grounding conductors.

Grounding Conductor, Impedance. (Impedance Grounding Conductor)

A conductor that connects the system neutral point to the impedance device in an impedance grounded system. (CMP-5)

Grounding Electrode.

A conducting object through which a direct connection to earth is established. (CMP-5)

Grounding Electrode Conductor (GEC).

A conductor used to connect the system grounded conductor or the equipment to a grounding electrode or to a point on the grounding electrode system. (CMP-5)

Grouped.

Cables or conductors positioned adjacent to one another but not in continuous contact with each other. (520) (CMP-15)

Guarded.

Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach or contact by persons or objects to a point of danger. (CMP-1)

Guest Room.

An accommodation combining living, sleeping, sanitary, and storage facilities within a compartment. (CMP-2)

Guest Suite.

An accommodation with two or more contiguous rooms comprising a compartment, with or without doors between such rooms, that provides living, sleeping, sanitary, and storage facilities. (CMP-2)

Gutter, Metal Auxiliary. (Metal Auxiliary Gutter)

A sheet metal enclosure used to supplement wiring spaces at meter centers, distribution centers, switchgear, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and busbars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system. (CMP-8)

Gutter, Nonmetallic Auxiliary. (Nonmetallic Auxiliary Gutter)

A flame-retardant, nonmetallic enclosure used to supplement wiring spaces at meter centers, distribution centers, switchgear, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and busbars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system. (CMP-8)

Habitable Room.

A room in a building for living, sleeping, eating, or cooking, but excluding bathrooms, toilet rooms, closets, hallways, storage or utility spaces, and similar areas. (CMP-2)

Handhole Enclosure.

An enclosure for use in underground systems, provided with an open or closed bottom, and sized to allow personnel to reach into, but not enter, for the purpose of installing, operating, or maintaining equipment or wiring or both. (CMP-8)

Hazard Current.

For a given set of connections in an isolated power system, the total current that would flow through a low impedance if it were connected between either isolated conductor and ground. [**99:** 3.3.72] (517) (CMP-15)

Hazard Current, Fault. (Fault Hazard Current)

The hazard current of a given isolated power system with all devices connected except the line isolation monitor. [**99:** 3.3.72.1] (517) (CMP-15)

Monitor Hazard Current.

The hazard current of the line isolation monitor alone. [**99:** 3.3.72.2] (517) (CMP-15)

Total Hazard Current.

The hazard current of a given isolated system with all devices, including the line isolation monitor, connected. [**99:** 3.3.72.3] (517) (CMP-15)

Header.

Transverse metal raceways for electrical conductors, providing access to predetermined cells of a precast cellular concrete floor, thereby permitting the installation of electrical conductors from a distribution center to the floor cells. (CMP-8)

Health Care Facilities.

Buildings, portions of buildings, or mobile enclosures in which human medical, dental, psychiatric, nursing, obstetrical, or surgical care is provided. [**99:** 3.3.73] (CMP-15)

Informational Note: Examples of health care facilities include, but are not limited to, hospitals, nursing homes, limited care facilities, clinics, medical and dental offices, and ambulatory care centers, whether permanent or movable.

Health Care Facility's Governing Body.

The person or persons who have the overall legal responsibility for the operation of a health care facility. [**99:** 3.3.74] (517) (CMP-15)

Heating Equipment.

Any equipment that is used for heating purposes and whose heat is generated by induction or dielectric methods. (665) (CMP-12)

Heating Panel.

A complete assembly provided with a junction box or a length of flexible conduit for connection to a branch circuit. (CMP-17)

Heating Panel Set.

A rigid or nonrigid assembly provided with nonheating leads or a terminal junction assembly identified as being suitable for connection to a wiring system. (CMP-17)

Heating System.

A complete system consisting of components such as heating elements, fastening devices, nonheating circuit wiring, leads, temperature controllers, safety signs, junction boxes, raceways, and fittings. (CMP-17)

Heating System, Impedance. (Impedance Heating System)

A system in which heat is generated in an object, such as a pipe, rod, or combination of such objects serving as a heating element, by causing current to flow through such objects by direct connection to an ac voltage source from an isolating transformer. In some installations the object is embedded in the surface to be heated or constitutes the exposed component to be heated. (CMP-17)

Heating System, Induction. (Induction Heating System)

A system in which heat is generated in a pipeline or vessel wall by inducing current in the pipeline or vessel wall from an external isolated ac field source. (CMP-17)

Heating System, Skin Effect. (Skin-Effect Heating System)

A system in which heat is generated on the inner surface of a ferromagnetic envelope embedded in or fastened to the surface to be heated.

Informational Note: Typically, an electrically insulated conductor is routed through and connected to the envelope at the other end. The envelope and the electrically insulated conductor are connected to an ac voltage source from an isolating transformer. (CMP-17)

Hermetic Refrigerant Motor-Compressor.

A combination consisting of a compressor and motor, both of which are enclosed in the same housing, with no external shaft or shaft seals, with the motor operating in the refrigerant. (CMP-11)

Hoistway.

Any shaftway, hatchway, well hole, or other vertical opening or space in which an elevator or dumbwaiter is designed to operate. (CMP-12)

Hospital.

A building or portion thereof used on a 24-hour basis for the medical, psychiatric, obstetrical, or surgical care of four or more inpatients. [***101*** ; 3.3.152] (CMP-15)

Hydromassage Bathtub.

A permanently installed bathtub equipped with a recirculating piping system, pump, and associated equipment. It is designed so it can accept, circulate, and discharge water upon each use. (680) (CMP-17)

Identified (as applied to equipment).

Recognizable as suitable for the specific purpose, function, use, environment, application, and so forth, where described in a particular code requirement. (CMP-1)

Informational Note: Some examples of ways to determine suitability of equipment for a specific purpose, environment, or application include investigations by a qualified testing laboratory (listing and labeling), an inspection agency, or other organizations concerned with product evaluation.

Increased Safety "e".

Type of protection applied to electrical equipment that does not produce arcs or sparks in normal service and under specified abnormal conditions, in which additional measures are applied to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks. (CMP-14)

Informational Note: See ANSI/UL 60079-7, *Explosive Atmospheres — Part 7: Equipment Protection by Increased Safety "e"*, for additional information.

Induction Heating (Induction Melting) (Induction Welding).

The heating, melting, or welding of a nominally conductive material due to its own I2R losses when the material is placed in a varying electromagnetic field. (665) (CMP-12)

Industrial Control Panel.

An assembly of two or more components consisting of one of the following: (1) power circuit components only, such as motor controllers, overload relays, fused disconnect switches, and circuit breakers; (2) control circuit components only, such as push buttons, pilot lights, selector switches, timers, switches, and control relays; (3) a combination of power and control circuit components. These components, with associated wiring and terminals, are mounted on, or contained within, an enclosure or mounted on a subpanel. (CMP-11)

Informational Note: The industrial control panel does not include the controlled equipment.

Industrial Installation, Supervised. (Supervised Industrial Installation)

The industrial portions of a facility where all of the following conditions are met:

(1) Conditions of maintenance and engineering supervision ensure that only qualified persons monitor and service the system.

(2) The premises wiring system has 2500 kVA or greater of load used in industrial processes, manufacturing activities, or both, as calculated in accordance with Article 120 , Parts II, III, IV, or V.

(3) The premises has at least one service or feeder that is more than 150 volts to ground and more than 300 volts phase-to-phase.

This definition excludes installations in buildings used by the industrial facility for offices, warehouses, garages, machine shops, and recreational facilities that are not an integral part of the industrial plant, substation, or control center. (240) (CMP-10)

Information Technology Equipment (ITE).

Equipment and systems rated 1000 volts or less, normally found in offices or other business establishments and similar environments classified as ordinary locations, that are used for creation and manipulation of data, voice, video, and similar signals. (CMP-12)

Informational Note: See UL 60950-1-2007, *Information Technology Equipment — Safety — Part 1: General Requirements* , or UL 62368-1-2019, *Audio/Video Information and Communication Technology Equipment Part 1: Safety Requirements* , for information on listing requirements for both information technology equipment and communications equipment.

Information Technology Equipment Room.

A room within the information technology equipment area that contains the information technology equipment. [**75:** 3.3.15] (CMP-12)

Innerduct.

A nonmetallic raceway placed within a larger raceway. (CMP-16)

Insulated Bus Pipe (IBP).

A cylindrical solid or hollow conductor with a solid insulation system, having conductive grading layers and a grounding layer imbedded in the insulation, and provided with an overall covering of insulating or metallic material. IBP is also referred to as tubular covered conductor (TCC). (CMP-8)

Insulated Bus Pipe System.

An assembly that includes bus pipe, connectors, fittings, mounting structures, and other fittings and accessories. (CMP-8)

Insulating End.

An insulator designed to electrically insulate the end of a flat conductor cable (Type FCC). (324) (CMP-6)

Interactive Mode (Interactive).

The operating mode for power production sources or microgrids that operate in parallel with and are capable of delivering energy to an electric power production and distribution network or other primary power source. (CMP-4)

Informational Note: Interactive mode is an operational mode of both interactive systems and of equipment such as interactive inverters.

Interrupting Rating.

The highest current at rated voltage that a device is identified to interrupt under standard test conditions. (CMP-10)

Informational Note: Equipment intended to interrupt current at other than fault levels may have its interrupting rating implied in other ratings, such as horsepower or locked rotor current.

Intersystem Bonding Termination (IBT).

A device that provides a means for connecting intersystem bonding conductors for communications systems to the grounding electrode system. (CMP-16)

Intrinsic Safety "i".

Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"*, for additional information.

Intrinsically Safe Apparatus.

Apparatus in which all the circuits are intrinsically safe. (CMP-14)

Informational Note No. 1: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Informational Note No. 2: See ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for installation information.

Intrinsically Safe Circuit.

A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for test conditions.

Intrinsically Safe Circuits, Different. (Different Intrinsically Safe Circuits)

Intrinsically safe circuits in which the possible interconnections have not been evaluated and identified as intrinsically safe. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Intrinsically Safe System.

An assembly of interconnected intrinsically safe apparatus, associated apparatus, and interconnecting cables, in which those parts of the system that might be used in hazardous (classified) locations are intrinsically safe circuits. (CMP-14)

Informational Note No. 1: An intrinsically safe system might include more than one intrinsically safe circuit.

Informational Note No. 2: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* ; and ANSI/UL 60079-25, *Explosive Atmospheres — Part 25: Intrinsically Safe Electrical Systems* , for additional information.

Informational Note No. 3: See ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for installation information.

Invasive Procedure.

Any procedure that penetrates the protective surfaces of a patient's body (i.e., skin, mucous membrane, cornea) and that is performed with an aseptic field (procedural site). [Not included in this category are placement of peripheral intravenous needles or catheters used to administer fluids and/or medications, gastrointestinal endoscopies (i.e., sigmoidoscopies), insertion of urethral catheters, and other similar procedures.] [**99:** 3.3.91] (517) (CMP-15)

Inverter.

Equipment that changes dc to ac. (CMP-4)

Inverter, Interactive. (Interactive Inverter)

Inverter equipment having the capability to operate only in interactive mode. (CMP-13)

Inverter, Multimode. (Multimode Inverter)

Inverter equipment capable of operating in both interactive and island modes. (CMP-4)

Inverter, Stand-alone. (Stand-alone Inverter)

Inverter equipment having the capabilities to operate only in island mode. (CMP-4)

Inverter Input Circuit.

Conductors connected to the dc input of an inverter. (CMP-13)

Inverter Output Circuit.

Conductors connected to the ac output of an inverter. (CMP-13)

Inverter Utilization Output Circuit.

Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)

Irrigation Machine.

An electrically driven or controlled machine, with one or more motors, not hand-portable, and used primarily to transport and distribute water for agricultural purposes. (675) (CMP-7)

Irrigation Machine, Center Pivot. (Center Pivot Irrigation Machine)

A multimotored irrigation machine that revolves around a central pivot and employs alignment switches or similar devices to control individual motors. (675) (CMP-7)

Island Mode.

The operating mode for power production sources or microgrids that allows energy to be supplied to loads that are disconnected from an electric power production and distribution network or other primary power source. (CMP-4)

Isolated (as applied to location).

Not readily accessible to persons unless special means for access are used. (CMP-1)

Isolated Power System.

A system comprising an isolation transformer or its equivalent, a line isolation monitor, and its ungrounded circuit conductors. [**99:** 3.3.93] (517) (CMP-15)

Isolation Transformer.

A transformer of the multiple-winding type, with the primary and secondary windings physically separated, that inductively couples its ungrounded secondary winding to the grounded feeder system that energizes its primary winding. [**99:** 3.3.94] (517) (CMP-15)

Kitchen.

An area with a sink and permanent provisions for food preparation and cooking. (CMP-2)

Labeled.

Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner. (CMP-1)

> Informational Note: If a listed product is of such a size, shape, material, or surface texture that it is not possible to apply legibly the complete label to the product, the complete label may appear on the smallest unit container in which the product is packaged.

Laundry Area.

An area containing or designed to contain a laundry tray, clothes washer, or clothes dryer. (CMP-2)

Leakage-Current Detector-Interrupter (LCDI).

A device provided in a power supply cord or cord set that senses leakage current flowing between or from the cord conductors and interrupts the circuit at a predetermined level of leakage current. (440) (CMP-11)

Legally Required Standby Systems.

Those systems required and so classed as legally required standby by municipal, state, federal, or other codes or by any governmental agency having jurisdiction. These systems are intended to automatically supply power to selected loads (other than those classed as emergency systems) in the event of failure of the normal source. (CMP-13)

Life Safety Branch.

A system of feeders and branch circuits supplying power for lighting, receptacles, and equipment essential for life safety that is automatically connected to alternate power sources by one or more transfer switches during interruption of the normal power source. [**99:** 3.3.97] (517) (CMP-15)

Lighting Assembly, Cord-and-Plug-Connected. (Cord-and-Plug-Connected Lighting Assembly)

A lighting assembly consisting of a luminaire intended for installation in the wall of a spa, hot tub, or storable pool, and a cord-and-plug-connected transformer or power supply. (680) (CMP-17)

Lighting Assembly, Through-Wall. (Through-Wall Lighting Assembly)

A lighting assembly intended for installation above grade, on or through the wall of a pool, consisting of two interconnected groups of components separated by the pool wall. (680) (CMP-17)

Lighting Outlet.

An outlet intended for the direct connection of a lampholder or luminaire. (CMP-18)

Lighting Track. (Track Lighting)

A manufactured assembly designed to support and energize luminaires that are capable of being readily repositioned on the track. Its length can be altered by the addition or subtraction of sections of track. (CMP-18)

Limited Care Facility.

A building or portion of a building used on a 24-hour basis for the housing of four or more persons who are incapable of self-preservation because of age; physical limitation due to accident or illness; or limitations such as intellectual disability/developmental disability, mental illness, or chemical dependency. [***101:*** 3.3.93.2] (CMP-15)

Limited-Energy System.

The equipment and cables of an end-to-end system that are power-restricted to ensure the energy delivered into any fault provides acceptable protection for fire prevention and electric shock. (CMP-3)

Limited Finishing Workstation.

A power-ventilated apparatus that is capable of confining the vapors, mists, residues, dusts, or deposits that are generated by a limited spray application process. Such apparatus is not a spray booth or spray room, as herein defined. [**33:** 3.3.23.1] (CMP-14)

Informational Note: See NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials* , Section 14.3 for information on limited finishing workstations.

Line Isolation Monitor.

A test instrument designed to continually check the balanced and unbalanced impedance from each line of an isolated circuit to ground and equipped with a built-in test circuit to exercise the alarm without adding to the leakage current hazard. [**99:** 3.3.99] (517) (CMP-15)

Liquid Immersion "o".

Type of protection where electrical equipment is immersed in a protective liquid so that an explosive atmosphere that might be above the liquid or outside the enclosure cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 60079-6, *Explosive Atmospheres — Part 6: Equipment Protection by Liquid Immersion "o"* , for additional information.

Listed.

Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose. (CMP-1)

Informational Note: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. Use of the system employed by the listing organization allows the authority having jurisdiction to identify a listed product.

Live Parts.

Energized conductive components. (CMP-1)

Load Management.

The process within an energy management system that limits the total electrical load on an electrical supply system to a set value by adjusting or controlling the individual loads. (CMP-13)

Location, Anesthetizing. (Anesthetizing Location)

Any space within a facility that has been designated for the administration of any flammable or nonflammable inhalation anesthetic agent during examination or treatment, including the use of such agents for relative analgesia. (517) (CMP-15)

Location, Anesthetizing, Flammable. (Flammable Anesthetizing Location)

Any area of the facility that has been designated to be used for the administration of any flammable inhalation anesthetic agents in the normal course of examination or treatment. (517) (CMP-15)

Location, Damp. (Damp Location)

Locations protected from weather and not subject to saturation with water or other liquids but subject to moderate degrees of moisture. (CMP-1)

Informational Note: Examples of such locations include partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns, and some cold-storage warehouses.

Location, Dry. (Dry Location)

A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction. (CMP-1)

Location, Remote. (Remote Location)

A location, other than a motion picture or television studio, where a production is filmed or recorded. (530) (CMP-15)

Location, Wet. (Wet Location)

A location that is one or more of the following:

(1) Unprotected and exposed to weather

(2) Subject to saturation with water or other liquids

(3) Underground

(4) In concrete slabs or masonry in direct contact with the earth

(CMP-1)

Informational Note: A vehicle washing area is an example of a wet location saturated with water or other liquids.

Location, Wet Procedure. (Wet Procedure Location)

The area in a patient care space where a procedure is performed that is normally subject to wet conditions while patients are present, including standing fluids on the floor or drenching of the work area, either of which condition is intimate to the patient or staff. [**99:** 3.3.187] (517) (CMP-15)

Informational Note: Routine housekeeping procedures and incidental spillage of liquids do not define a wet procedure location. [**99:** A.3.3.187]

Locations, Hazardous (Classified). [Hazardous (Classified) Locations]

Locations where fire or explosion hazards might exist due to flammable gases, flammable liquid–produced vapors, combustible liquid–produced vapors, combustible dusts, combustible fiber/flyings, or ignitible fibers/flyings. (CMP-14)

Locations, Unclassified. (Unclassified Locations)

Locations determined to be neither Class I, Division 1; Class I, Division 2; Zone 0; Zone 1; Zone 2; Class II, Division 1; Class II, Division 2; Class III, Division 1; Class III, Division 2; Zone 20; Zone 21; Zone 22; nor any combination thereof. (CMP-14)

Long-Time Rating .

A rating based on an operating interval of 5 minutes or longer. (CMP-15)

Loudspeaker (Speaker).

Equipment that converts an ac electric signal into an acoustic signal. (640) (CMP-12)

Low-Voltage Contact Limit.

A voltage not exceeding the following values:

(1) 15 volts (RMS) for sinusoidal ac

(2) 21.2 volts peak for nonsinusoidal ac

(3) 30 volts for continuous dc

(4) 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz

(CMP-17)

Low-Voltage Suspended Ceiling Power Distribution System.

A system that serves as a support for a finished ceiling surface and consists of a busbar and busbar support system to distribute power to utilization equipment supplied by a Class 2 power supply. (393) (CMP-18)

Luminaire.

Utilization equipment intended to illuminate a space or object(s), to facilitate visual tasks, activities, aesthetics, or security, or a similar purpose. Light-emitting devices such as lamps or LED modules could be removable or replaceable. The equipment can connect directly to the branch circuit (ac or dc) or be used with a separate power source that regulates the voltage, current, or both from the branch circuit. A lampholder itself is not a luminaire. (CMP-18)

Luminaire, Directly Controlled (DCL).

A luminaire containing a control input for a dimming or switching function. (700) (CMP-13)

Luminaire, Dry-Niche. (Dry-Niche Luminaire)

A luminaire intended for installation in the floor or wall of a pool, spa, or fountain in a niche that is sealed against the entry of water. (680) (CMP-17)

Luminaire, No-Niche. (No-Niche Luminaire)

A luminaire intended for installation above or below the water without a niche. (680) (CMP-17)

Luminaire, Wet-Niche. (Wet-Niche Luminaire)

A luminaire intended for installation in a forming shell mounted in a pool or fountain structure where the luminaire will be completely surrounded by water. (680) (CMP-17)

Machine Room.

An enclosed machinery space outside the hoistway, intended for full bodily entry, that contains the electrical driving machine or the hydraulic machine. The room could also contain electrical and/or mechanical equipment used directly in connection with the elevator or dumbwaiter. (620) (CMP-12)

Machine Room and Control Room, Remote. (Remote Machine Room and Control Room)

A machine room or control room that is not attached to the outside perimeter or surface of the walls, ceiling, or floor of the hoistway. (620) (CMP-12)

Machinery, Industrial (Industrial Machine). (Industrial Machinery)

A power-driven machine (or a group of machines working together in a coordinated manner), not portable by hand while working, that is used to process material by cutting; forming; pressure; electrical, thermal, or optical techniques; lamination; or a combination of these processes. It can include associated equipment used to transfer material or tooling, including fixtures, to assemble/disassemble, to inspect or test, or to package. The associated electrical equipment, including the logic controller(s) and associated software or logic together with the machine actuators and sensors, are considered as part of the industrial machine. (CMP-12)

Machinery Space.

A space inside or outside the hoistway, intended to be accessed with or without full bodily entry, that contains the elevator, dumbwaiter, platform lift, or stairway chairlift equipment and could also contain equipment used directly in connection with the elevator, dumbwaiter, platform lift, or stairway chairlift. (620) (CMP-12)

Machinery Space and Control Space, Remote. (Remote Machinery Space and Control Space)

A machinery space or control space that is not within the hoistway, machine room, or control room and that is not attached to the outside perimeter or surface of the walls, ceiling, or floor of the hoistway. (620) (CMP-12)

Manufactured Home.

A structure, transportable in one or more sections, which in the traveling mode is 2.4 m (8 ft) or more in width or 12.2 m (40 ft) or more in length, or when erected on site is 29.77 m^2 (320 ft^2) or more is built on a permanent chassis and is designed to be used as a dwelling with or without a permanent foundation, whether or not connected to the utilities, and includes plumbing, heating, air conditioning, and electrical systems contained therein. The term includes any structure that meets all the requirements of this paragraph except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the regulatory agency. Calculations used to determine the number of square meters (square feet) in a structure are based on the structure's exterior dimensions and include all expandable rooms, cabinets, and other projections containing interior space, but do not include bay windows. [**501:** 1.2.12] (CMP-7)

Informational Note No. 1: Unless otherwise indicated, the term *mobile home* includes manufactured home and excludes park trailers.

Informational Note No. 2: See the applicable building code for definition of the term *permanent foundation* .

Informational Note No. 3: See 24 CFR Part 3280, *Manufactured Home Construction and Safety Standards, of the Federal Department of Housing and Urban Development* , for additional information on the definition.

Manufactured Wiring System.

A system containing component parts that are assembled in the process of manufacture and cannot be inspected at the building site without damage or destruction to the assembly and used for the connection of luminaires, utilization equipment, continuous plug-in type busways, and other devices. (604) (CMP-7)

Marina.

A facility, generally on the waterfront, that stores and services boats in berths, on moorings, and in dry storage or dry stack storage. [**303:** 3.3.13] (555) (CMP-7)

Maximum Output Power.

The maximum power delivered by an amplifier into its rated load as determined under specified test conditions. (640) (CMP-12)

Informational Note: The maximum output power can exceed the manufacturer's rated output power for the same amplifier.

Maximum Output Power (as applied to wind electric systems).

The maximum 1-minute average power output a wind turbine produces in normal steady-state operation (instantaneous power output can be higher). (694) (CMP-4)

Maximum Voltage.

The greatest difference in potential produced between any two conductors of a wind turbine circuit. (694) (CMP-4)

Maximum Water Level.

The highest level that water can reach before it spills out. (680) (CMP-17)

Medical Office.

A building or part thereof in which the following occur:

(1) Examinations and minor treatments/procedures performed under the continuous supervision of a medical professional;

(2) The use of limited to minimal sedation and treatment or procedures that do not render the patient incapable of self-preservation under emergency conditions; and

(3) No overnight stays for patients or 24-hour operations.

[**99:** 3.3.110] (CMP-15)

Membrane Enclosure.

A temporary enclosure used for the spraying of workpieces that cannot be moved into a spray booth where open spraying is not practical due to proximity to other operations, finish quality, or concerns such as the collection of overspray. (CMP-14)

Informational Note: See NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials* , Chapter 18 for information on the construction and use of membrane enclosures.

Messenger-Supported Wiring.

An exposed wiring support system using a messenger wire to support insulated conductors by any one of the following:

(1) A messenger with rings and saddles for conductor support

(2) A messenger with a field-installed lashing material for conductor support

(3) Factory-assembled aerial cable

(4) Multiplex cables utilizing a bare conductor, factory assembled and twisted with one or more insulated conductors, such as duplex, triplex, or quadruplex type of construction

(CMP-6)

Messenger Wire (Messenger).

A wire that is run along with or integral with a cable or conductor to provide mechanical support for the cable or conductor. (CMP-6)

Metal Shield Connections.

Means of connection for flat conductor cables (Type FCC) designed to electrically and mechanically connect a metal shield to another metal shield, to a receptacle housing or self-contained device, or to a transition assembly. (324) (CMP-6)

Metering Centers (Meter Center).

Panelboards in enclosures also containing one or more meter sockets. (CMP-10)

Microgrid.

An electric power system containing interconnected power production sources and capable of acting as a primary source independent of an electric utility. (CMP-4)

Informational Note: Examples of power sources in microgrids include photovoltaic systems, generators, fuel cell systems, wind electric systems, energy storage systems, electric vehicles used as a source of supply, and electrical power conversion from other energy sources.

Microgrid, Health Care (Health Care Microgrid System). (Health Care Microgrid)

A group of interconnected loads and distributed energy resources within clearly defined boundaries that acts as a single controllable entity with respect to the utility. [**99:** 3.3.75] (517) (CMP-15)

Microgrid Control System (MCS).

A structured control system that manages microgrid operations, functionalities for utility interoperability, islanded operations, and transitions. (CMP-4)

Informational Note: MCS differ from multiple standby generators or uninterruptible power supplies that are evaluated and rated to operate as a single source of backup power upon loss of the primary power source. MCS functions include coordination, transitions, and interoperability between multiple power sources.

Microgrid Interconnect Device (MID).

A device that enables a microgrid system to separate from and reconnect to an interconnected primary power source. (CMP-4)

Mixer.

Equipment used to combine and level match a multiplicity of electronic signals, such as from microphones, electronic instruments, and recorded audio. (640) (CMP-12)

Mobile.

X-ray equipment mounted on a permanent base with wheels and/or casters for moving while completely assembled. (660) (CMP-12)

Mobile Home.

A factory-assembled structure or structures transportable in one or more sections that are built on a permanent chassis and designed to be used as a dwelling without a permanent foundation where connected to the required utilities and that include the plumbing, heating, air-conditioning, and electrical systems contained therein. (CMP-7)

Informational Note: Unless otherwise indicated, the term *mobile home* includes manufactured home and excludes park trailers.

Mobile Home Lot.

A designated portion of a mobile home park designed for the accommodation of one mobile home and its accessory buildings or structures for the exclusive use of its occupants. (550) (CMP-7)

Mobile Home Park.

A contiguous parcel of land that is used for the accommodation of mobile homes that are intended to be occupied. (550) (CMP-7)

Module, AC. (AC Module)

A complete, environmentally protected unit consisting of solar cells, inverter, and other components, designed to produce ac power. (690) (CMP-4)

Module System, AC. (AC Module System)

An assembly of ac modules, wiring methods, materials, and subassemblies that are evaluated, identified, and defined as a system. (690) (CMP-4)

Momentary Rating .

A rating based on an operating interval that does not exceed 5 seconds. (CMP-15)

Monitor.

An electrical or electronic means to observe, record, or detect the operation or condition of the electric power system or apparatus. (130) (CMP-13)

Monopole Circuit.

An electrical subset of a PV system that has two conductors in the output circuit, one positive (+) and one negative (−). (690) (CMP-4)

Monorail.

Overhead track and hoist system for moving material around the boatyard or moving and launching boats. [**303:** 3.3.16] (555) (CMP-7)

Mooring(s).

Any place where a boat is wet stored or berthed. [**303:** 3.3.17] (555) (CMP-7)

Motion Picture Studio (Television Studio).

A building, group of buildings, other structures, and outdoor areas designed, constructed, permanently altered, designated, or approved for the purpose of motion picture or television production. (530) (CMP-15)

Motion Picture Sound Stage.

A building or portion of a building, usually insulated from outside noise and natural light, designed, constructed, or altered for the purpose of image capture. (CMP-15)

Motor Control Center.

An assembly of one or more enclosed sections having a common power bus and principally containing motor control units. (CMP-11)

Motor Fuel Dispensing Facility.

That portion of a property where motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles or marine craft or into approved containers, including all equipment used in connection therewith. [**30A:** 3.3.11] (CMP-14)

> Informational Note: See 511.1 with respect to electrical wiring and equipment for other areas used as lubritoriums, service rooms, repair rooms, offices, salesrooms, compressor rooms, and similar locations.

Multi-Circuit Cable Outlet Enclosure.

An enclosure containing one or more multi-circuit plugs, receptacles, or both. (520) (CMP-15)

Multioutlet Assembly.

A surface, flush, or freestanding assemblage with a raceway and fittings or other enclosure provided with one or more receptacles, for the purpose of supplying power to utilization equipment. (CMP-18)

Nacelle.

An enclosure housing the alternator and other parts of a wind turbine. (694) (CMP-4)

Neon Tubing.

Electric-discharge luminous tubing, including cold cathode luminous tubing, that is manufactured into shapes to illuminate signs, form letters, parts of letters, skeleton tubing, outline lighting, other decorative elements, or art forms and filled with various inert gases. (600) (CMP-18)

Network Interface Unit (NIU).

A device that converts a broadband signal into component voice, audio, video, data, and interactive services signals and provides isolation between the network power and the premises signal circuits. These devices often contain primary and secondary protectors. (CMP-16)

Network Terminal.

A device that converts network-provided signals (optical, electrical, or wireless) into component signals, including voice, audio, video, data, wireless, optical, and interactive services, and is considered a network device on the premises that is connected to a communications service provider and is powered at the premises. (CMP-16)

Neutral Conductor.

The conductor connected to the neutral point of a system that is intended to carry current under normal conditions. (CMP-5)

Neutral Point.

The common point on a wye-connection in a polyphase system or midpoint on a single-phase, 3-wire system, or midpoint of a single-phase portion of a 3-phase delta system, or a midpoint of a 3-wire, direct-current system. (CMP-5)

> Informational Note: At the neutral point of the system, the vectorial sum of the nominal voltages from all other phases within the system that utilize the neutral, with respect to the neutral point, is zero potential.

Nonautomatic.

Requiring human intervention to perform a function. (CMP-1)

Nonincendive Circuit.

A circuit, other than field wiring, in which any arc or thermal effect produced under intended operating conditions of the equipment, is not capable, under specified test conditions, of igniting the flammable gas–air, vapor–air, or dust–air mixture. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Component.

A component having contacts for making or breaking an incendive circuit and the contacting mechanism is constructed so that the component is incapable of igniting the specified flammable gas–air or vapor–air mixture. The housing of such a component is not intended to exclude the flammable atmosphere or contain an explosion. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Equipment.

Equipment having electrical/electronic circuitry that is incapable, under normal operating conditions, of causing ignition of a specified flammable gas–air, vapor–air, or dust–air mixture due to arcing or thermal means. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Field Wiring.

Wiring that enters or leaves an equipment enclosure and, under normal operating conditions of the equipment, is not capable, due to arcing or thermal effects, of igniting the flammable gas–air, vapor–air, or dust–air mixture. Normal operation includes opening, shorting, or grounding the field wiring. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Field Wiring Apparatus.

Apparatus intended to be connected to nonincendive field wiring. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonlinear Load.

A load where the wave shape of the steady-state current does not follow the wave shape of the applied voltage. (CMP-1)

Informational Note: Electronic equipment, electronic/electric-discharge lighting, adjustable-speed drive systems, and similar equipment may be nonlinear loads.

Nonmetallic Extension.

An assembly of two insulated conductors within a nonmetallic jacket or an extruded thermoplastic covering. The classification includes surface extensions intended for mounting directly on the surface of walls or ceilings. (CMP-6)

Nonsparking.

Constructed to minimize the risk of arcs or sparks capable of creating an ignition hazard during conditions of normal operation. (CMP-14)

Informational Note No. 1: The term nonsparking is also referred to as nonarcing.

Informational Note No. 2: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Normal/Emergency Power Source.

A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).

Normal High-Water Level (as applies to electrical datum plane distances).

Natural or Artificially Made Shorelines: An elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial.

Rivers and Streams: The elevation of the top of the bank of the channel. Streams, rivers, and tributaries that are prone to flooding and effects of water runoff shall consider the “bankfull stage” where an established gauge height at a given location along a river or stream, above which a rise in water surface will cause the river or stream to overflow the lowest natural stream bank somewhere in the corresponding reach.

Flood Control Bodies of Water: The flood pool maximum water surface elevation of a reservoir, equal to the elevation of the spillway.

Nonflood Control Bodies of Water: The flowage easement boundary in which the highest water surface elevation defined by the area existing between governmental-owned property line(s) and a contour line with perpetual rights to flood the area in connection with the operation of the reservoir. (CMP-7)

Nurses’ Station.

A space intended to provide a center of nursing activity for a group of nurses serving bed patients, where patient calls are received, nurses dispatched, nurses’ notes written, inpatient charts prepared, and medications prepared for distribution to patients. Where such activities are carried on in more than one location within a nursing unit, all such separate spaces are considered a to be parts of the nurses’ station. (517) (CMP-15)

Nursing Home.

A building or portion of a building used on a 24-hour basis for the housing and nursing care of four or more persons who, because of mental or physical incapacity, might be unable to provide for their own needs and safety without the assistance of another person. [***101*** **:** 3.3.150.2] (CMP-15)

Office Furnishing.

Cubicle panels, partitions, study carrels, workstations, desks, shelving systems, and storage units that may be mechanically and electrically interconnected to form an office furnishing system. (CMP-18)

Oil Immersion.

Electrical equipment immersed in a protective liquid so that an explosive atmosphere that might be above the liquid or outside the enclosure cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Open Wiring on Insulators.

An exposed wiring method using cleats, knobs, tubes, and flexible tubing for the protection and support of single insulated conductors run in or on buildings. (CMP-6)

Operating Device.

The car switch, pushbuttons, key or toggle switch(s), or other devices used to activate the operation controller. (620) (CMP-12)

Operator.

The individual responsible for starting, stopping, and controlling an amusement ride or supervising a concession. (525) (CMP-15)

Optical Radiation.

Electromagnetic radiation at wavelengths in vacuum between the region of transition to X-rays and the region of transition to radio waves that is approximately between 1 nm and 1000 µm. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for information on types of protection that can be applied to minimize the risk of ignition in explosive atmospheres from optical radiation in the wavelength range from 380 nm to 10 µm.

Optical Radiation, Inherently Safe “op is”. (Inherently Safe Optical Radiation “op is”)

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is incapable of producing sufficient energy under normal or specified fault conditions to ignite a specific explosive atmosphere. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optical Radiation, Protected “op pr”. (Protected Optical Radiation “op pr”)

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is confined inside optical fiber or other transmission medium under normal constructions or constructions with additional mechanical protection based on the assumption that there is no escape of radiation from the confinement. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optical System With Interlock “op sh”.

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is confined inside optical fiber or other transmission medium with interlock cutoff provided to reliably reduce the unconfined beam strength to safe levels within a specified time in case the confinement fails and the radiation becomes unconfined. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optional Standby Systems.

Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13)

Organ, Electronic. (Electronic Organ)

A musical instrument that imitates the sound of a pipe organ by producing sound electronically. (CMP-12)

Informational Note: Most new electronic organs produce sound digitally and are called digital organs.

Organ, Pipe. (Pipe Organ)

A musical instrument that produces sound by driving pressurized air (called *wind*) through pipes selected via a keyboard. (CMP-12)

Organ, Pipe Sounding Apparatus. (Pipe Organ Sounding Apparatus) (Pipe Organ Chamber).

The sound-producing part of a pipe organ, including, but not limited to, pipes, chimes, bells, the pressurized air- (wind-) producing equipment (blower), associated controls, and power equipment. (CMP-12)

Outlet.

A point on the wiring system at which current is taken to supply utilization equipment. (CMP-1)

Outlet Box Hood.

A housing shield intended to fit over a faceplate for flush-mounted wiring devices, or an integral component of an outlet box or of a faceplate for flush-mounted wiring devices. The hood does not serve to complete the electrical enclosure; it reduces the risk of water coming in contact with electrical components within the hood, such as attachment plugs, current taps, surge protective devices, direct plug-in transformer units, or wiring devices. (CMP-18)

Outline Lighting.

An arrangement of incandescent lamps, electric-discharge lighting, or other electrically powered light sources to outline or call attention to certain features such as the shape of a building or the decoration of a window. (CMP-18)

Output Cable to the Electric Vehicle.

An assembly consisting of a length of flexible EV cable and an electric vehicle connector (supplying power to the electric vehicle). (625) (CMP-12)

Output Cable to the Primary Pad.

A multiconductor, shielded cable assembly consisting of conductors to carry the high-frequency energy and any status signals between the charger power converter and the primary pad. (625) (CMP-12)

Overcurrent.

Any current in excess of the rated current of equipment or the ampacity of a conductor. It may result from overload, short circuit, or ground fault. (CMP-10)

Informational Note: A current in excess of rating may be accommodated by certain equipment and conductors for a given set of conditions. Therefore, the rules for overcurrent protection are specific for particular situations.

Overcurrent Protective Device, Branch-Circuit. (Branch-Circuit Overcurrent Protective Device)

A device capable of providing protection for service, feeder, and branch circuits and equipment over the full range of overcurrents between its rated current and its interrupting rating. (CMP-10)

Overcurrent Protective Device, Supplementary. (Supplementary Overcurrent Protective Device)

A device intended to provide limited overcurrent protection for specific applications and utilization equipment such as luminaires and appliances. This limited protection is in addition to the protection provided in the required branch circuit by the branch-circuit overcurrent protective device. (CMP-10)

Overhead Gantry.

A structure consisting of horizontal framework, supported by vertical columns spanning above electrified truck parking spaces, that supports equipment, appliances, raceway, and other necessary components for the purpose of supplying electrical, HVAC, internet, communications, and other services to the spaces. (626) (CMP-12)

Overload.

Operation of equipment in excess of normal, full-load rating, or of a conductor in excess of its ampacity that, when it persists for a sufficient length of time, would cause damage or dangerous overheating. A fault, such as a short circuit or ground fault, is not an overload. (CMP-10)

Packaged Therapeutic Tub or Hydrotherapeutic Tank Equipment Assembly.

A factory-fabricated unit consisting of water-circulating, heating, and control equipment mounted on a common base, intended to operate a therapeutic tub or hydrotherapeutic tank. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Panelboard.

A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet, enclosure, or cutout box placed in or against a wall, partition, or other support; and accessible only from the front. (CMP-10)

Panelboard, Placed. (Placed Panelboard)

An assembly where a panelboard is placed in a cabinet, cutout box, or enclosure approved for the application. (CMP-1)

Park Electrical Wiring Systems.

All of the electrical wiring, luminaires, equipment, and appurtenances related to electrical installations within a mobile home park, including the mobile home service equipment. (550) (CMP-7)

Park Trailer.

A unit that is built on a single chassis mounted on wheels and has a gross trailer area not exceeding 37 m^2 (400 ft^2) in the set-up mode. (552) (CMP-7)

Part-Winding Motors.

A part-winding start induction or synchronous motor is one that is arranged for starting by first energizing part of its primary (armature) winding and, subsequently, energizing the remainder of this winding in one or more steps. A standard part-winding start induction motor is arranged so that one-half of its primary winding can be energized initially, and, subsequently, the remaining half can be energized, both halves then carrying equal current. (CMP 11)

Informational Note: A hermetic refrigerant motor-compressor is not considered a standard part-winding start induction motor.

Passenger Transportation Facilities.

Any area open to the public associated with passenger transportation such as an airport, bus terminal, highway rest stop and service area, marina, seaport, ferry slip, subway station, train station, or port of entry. (CMP-18)

Patient Bed Location.

The location of a patient sleeping bed, or the bed or procedure table of a Category 1 space. [**99:** 3.3.138] (CMP-15)

Patient Care–Related Electrical Equipment.

Electrical equipment appliance that is intended to be used for diagnostic, therapeutic, or monitoring purposes in a patient care vicinity. [**99:** 3.3.139] (517) (CMP-15)

Patient Care Space Category.

Any space of a health care facility wherein patients are intended to be examined or treated. [**99:** 3.3.145] (517) (CMP-15)

Informational Note No. 1: The health care facility's governing body designates patient care space in accordance with the type of patient care anticipated.

Informational Note No. 2: Business offices, corridors, lounges, day rooms, dining rooms, or similar areas typically are not classified as patient care spaces. [**99:** A.3.3.145]

Category 1 Space (Category 1).

Space in which failure of equipment or a system is likely to cause major injury or death of patients, staff, or visitors. [**99:** 3.3.140.1] (CMP-15)

Informational Note: These spaces, formerly known as critical care rooms, are typically where patients are intended to be subjected to invasive procedures and connected to line-operated, patient care–related appliances. Examples include, but are not limited to, special care patient rooms used for critical care, intensive care, and special care treatment rooms such as angiography laboratories, cardiac catheterization laboratories, delivery rooms, operating rooms, post-anesthesia care units, trauma rooms, and other similar rooms. [**99:** A.3.3.140.1]

Category 2 Space (Category 2).

Space in which failure of equipment or a system is likely to cause minor injury to patients, staff, or visitors. [**99:** 3.3.140.2] (CMP-15)

Informational Note: These spaces were formerly known as general care rooms. Examples include, but are not limited to, inpatient bedrooms, dialysis rooms, in vitro fertilization rooms, procedural rooms, and similar rooms. [**99:** A.3.3.140.2]

Category 3 Space (Category 3).

Space in which the failure of equipment or a system is not likely to cause injury to patients, staff, or visitors but can cause discomfort. [**99:** 3.3.140.3] (517) (CMP-15)

Informational Note: These spaces, formerly known as basic care rooms, are typically where basic medical or dental care, treatment, or examinations are performed. Examples include, but are not limited to, examination or treatment rooms in clinics, medical and dental offices, nursing homes, and limited care facilities. [**99:** A.3.3.140.3]

Category 4 Space (Category 4).

Space in which failure of equipment or a system is not likely to have a physical impact on patient care. [**99:** 3.3.140.4] (517) (CMP-15)

Informational Note: These spaces were formerly known as support rooms. Examples of support spaces include, but are not limited to, anesthesia work rooms, sterile supply, laboratories, morgues, waiting rooms, utility rooms, and lounges. [**99:** A.3.3.140.4]

Patient Care Vicinity.

A space, within a location intended for the examination and treatment of patients, extending 1.8 m (6 ft) beyond the normal location of the bed, chair, table, treadmill, or other device that supports the patient during examination and treatment and extending vertically to 2.3 m (7 ft 6 in.) above the floor. [**99:** 3.3.141] (517) (CMP-15)

Patient Equipment Grounding Point.

A jack or terminal that serves as the collection point for redundant grounding of electric appliances serving a patient care vicinity or for grounding other items in order to eliminate electromagnetic interference problems. [**99:** 3.3.142] (517) (CMP-15)

Performance Area.

The stage and audience seating area associated with a temporary stage structure, whether indoors or outdoors, constructed of scaffolding, truss, platforms, or similar devices, that is used for the presentation of theatrical or musical productions or for public presentations. (520) (CMP-15)

Permanent Amusement Attraction.

A ride device, entertainment device, or a combination of both that is installed such that portability or relocation is impracticable. (522) (CMP-15)

Permanently Installed Decorative Fountains and Reflection Pools.

Those that are constructed in the ground, on the ground, or in a building in such a manner that the fountain cannot be readily disassembled for storage, whether or not served by electrical circuits of any nature. These units are primarily constructed for their aesthetic value and are not intended for swimming or wading. (680) (CMP-17)

Personnel Protection System (as applied to EVSE).

A system of personnel protection devices and constructional features that when used together provide protection against electric shock of personnel. (625) (CMP-12)

Phase, Manufactured. (Manufactured Phase)

The phase that originates at the phase converter and is not solidly connected to either of the single-phase input conductors. (CMP-13)

Phase Converter.

An electrical device that converts single-phase power to 3-phase electric power. (CMP-13)

Informational Note: Phase converters have characteristics that modify the starting torque and locked-rotor current of motors served, and consideration is required in selecting a phase converter for a specific load.

Phase Converter, Rotary. (Rotary-Phase Converter)

A device that consists of a rotary transformer and capacitor panel(s) that permits the operation of 3-phase loads from a single-phase supply. (455) (CMP-13)

Phase Converter, Static. (Static-Phase Converter)

A device without rotating parts, sized for a given 3-phase load to permit operation from a single-phase supply. (455) (CMP-13)

Photovoltaic Cell (PV). (Solar Cell).

The basic photovoltaic device that generates dc electricity when exposed to light. (CMP-4)

Pier.

A structure extending over the water and supported on a fixed foundation (fixed pier), or on flotation (floating pier), that provides access to the water. [**303:** 3.3.18] (CMP-7)

Pier, Fixed. (Fixed Pier)

Pier constructed on a permanent, fixed foundation, such as on piles, that permanently establishes the elevation of the structure deck with respect to land. [**303:** 3.3.18.2] (CMP-7)

Pier, Floating. (Floating Pier)

Pier designed with inherent flotation capability that allows the structure to float on the water surface and rise and fall with water level changes. [**303:** 3.3.18.3] (CMP-7)

Pinout Configuration.

The assignment of electrical functions to connector pins in a multicircuit connector. (CMP-15)

Pipeline.

A length of pipe including pumps, valves, flanges, control devices, strainers, and/or similar equipment for conveying fluids. (CMP-17)

Plenum.

A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system. (CMP-3)

Plenum Cable, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways that have adequate fire-resistant and low smoke-producing characteristics and are suitable for use in ducts, plenums, and other spaces used for environmental air. (722) (CMP-3)

Point of Entrance.

The point within a building at which a wire or cable emerges from an external wall, the roof, or the floor. (CMP-16)

Pool.

Manufactured or field-constructed equipment designed to contain water and intended for use by persons for swimming, wading, immersion, recreational, or therapeutic purposes, but not including bodies of water incorporated as part of an industrial process, lakes, lagoons, surf parks, or other natural and artificially made bodies of water that could incorporate swimming and swimming areas. (680) (CMP-17)

> Informational Note: Natural and man-made bodies of water, which includes lakes, lagoons, surf parks, or other similar bodies of water, are addressed in Article 682 .

Pool, Immersion. (Immersion Pool)

A pool for ceremonial or ritual immersion of users, which is designed and intended to have its contents drained or discharged. (680) (CMP-17)

Pool, Permanently Installed Swimming, Wading, Immersion, and Therapeutic. (Permanently Installed Swimming, Wading, Immersion, and Therapeutic Pools)

Those that are permanently constructed or installed in the ground, partially in the ground, above ground, inside of a building, or on a building, whether or not served by electrical circuits. (680) (CMP-17)

Pool, Storable (Storable Immersion Pool). (Storable Pool)

Pools of any water depth, used for swimming, wading, or immersion, installed entirely on or above the ground that are intended to be stored when not in use or are designed for ease of relocation. (680) (CMP-17)

> Informational Note: A storable pool that is installed with a permanent deck around all or a portion of its perimeter is considered a permanently installed pool.

Pool Cover, Electrically Operated. (Electrically Operated Pool Cover)

Motor-driven equipment designed to cover and uncover the water surface of a pool by means of a flexible sheet or rigid frame. (680) (CMP-17)

Pool Lift, Electrically Powered. (Electrically Powered Pool Lift)

An electrically powered lift that provides accessibility for people with disabilities to and from a pool or spa. (680) (CMP-17)

Portable.

A device intended for indoor or outdoor use that is designed to be hand-carried from location to location, or easily transported without the use of other devices or equipment. (625) (CMP-12)

Portable.

X-ray equipment designed to be hand-carried. (660) (CMP-12)

Portable (as applied to equipment).

Equipment that is actually moved or can easily be moved from one place to another in normal use. (680) (CMP-17)

Portable Handlamp.

A cord- and plug-connected luminaire with a handle, and a hook for temporary mounting and hands-free operation. (CMP-18)

Portable Power Distribution Unit.

A power distribution box containing receptacles and overcurrent devices. (520) (CMP-15)

> Informational Note: See ANSI/UL 1640, *Portable Power-Distribution Equipment* , for information on portable power distribution units.

Portable Structures.

Units designed to be moved including, but not limited to, amusement rides, attractions, concessions, tents, trailers, trucks, and similar units. (525) (CMP-15)

Portable Substation.

A portable assembly, usually mounted on a trailer, containing primary and secondary switchgear and a transformer. (530) (CMP-15)

Powder Filling "q".

Type of protection where electrical parts capable of igniting an explosive atmosphere are fixed in position and completely surrounded by filling material (glass or quartz powder) to prevent the ignition of an external explosive atmosphere. (CMP-14)

Informational Note: See ANSI/UL 60079-5, *Explosive Atmospheres — Part 5: Equipment protection by powder filling "q"* , for additional information.

Power Control System (PCS).

Equipment that monitors and controls power within an electrical system to prevent overload of an electrical service, feeder, conductor, or other power distribution equipment. (CMP-13)

Informational Note: A power control system may control generation, energy storage, loads, circuit controllers, or other equipment to manage power and may contain additional protective functions relative to EMS or grid interconnection functions.

Power Outlet.

An enclosed assembly that may include receptacles, circuit breakers, fuseholders, fused switches, buses, and watt-hour meter mounting means; intended to supply and control power to mobile homes, recreational vehicles, park trailers, or boats or to serve as a means for distributing power required to operate mobile or temporarily installed equipment. (CMP-7)

Power Outlet, Marina. (Marina Power Outlet)

An enclosed assembly that can include equipment such as receptacles, circuit breakers, fused switches, fuses, watt-hour meters, panelboards, and monitoring means identified for marina use. (555) (CMP-7)

Power Production Source (Power Source).

Electrical power production equipment other than a utility service, up to the source system disconnecting means. (CMP-4)

Informational Note: Examples of power production sources include engine and wind generators, solar photovoltaic systems, fuel cells, and energy storage systems.

Power Source Output Conductors.

The conductors between power production equipment and the service or other premises wiring. (CMP-4)

Power Sources.

A system of one or more off-site or one or more on-site power generation or storage components intended to provide power to nonessential electrical loads and the essential electrical system. [**99:** 3.3.155] (517) (CMP-15)

Power Supply (as applied to low-voltage suspended ceiling power distribution systems).

A Class 2 power supply connected between the branch-circuit power distribution system and the busbar low-voltage suspended ceiling power distribution system. (393) (CMP-18)

Power-Supply Cord.

An assembly consisting of an attachment plug and a length of flexible cord connected to utilization equipment. (CMP-6)

Premises.

The land and buildings located on the user's side of the point of demarcation between the communications service provider and the user. (800) (CMP-16)

Premises-Powered.

Using power provided locally from the premises. (CMP-16)

Premises Wiring (System).

Interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed. This includes one of the following:

(1) Wiring from the service point to the outlets

(2) Wiring from and including the power source to the outlets if there is no service point

Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment. (CMP-1)

Informational Note: Power sources include, but are not limited to, interconnected or stand-alone batteries, solar photovoltaic systems, other distributed generation systems, or generators.

Pressurized.

The process of supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of combustible dust or ignitible fibers/flyings. (CMP-14)

Pressurized Enclosure "p".

Type of protection for electrical equipment that uses the technique of guarding against the ingress of the external atmosphere, which might be explosive, into an enclosure by maintaining a protective gas therein at a pressure above that of the external atmosphere. (CMP-14)

Informational Note: See ANSI/UL-60079-2, *Explosive Atmospheres — Part 2: Equipment protection by pressurized enclosures "p"*, for additional information.

Pressurized Room "p".

A room volume protected by pressurization and of sufficient size to permit the entry of a person who might occupy the room. (CMP-14)

Informational Note: See ANSI/UL 60079-13, *Explosive Atmospheres — Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"* , for information on the requirements for rooms intended for human entry where pressurization is used as a means of reducing the risk of explosion.

Primary Pad.

A device external to the EV that transfers power via the contactless coupling as part of a wireless power transfer system. (625) (CMP-12)

Primary Source.

An electric utility or another source of power that acts as the main forming and stabilizing source in an electric power system. (CMP-4)

Prime Mover.

The machine that supplies the mechanical horsepower to a generator. (CMP-13)

Process Seal.

A seal between electrical systems and flammable or combustible process fluids where a failure could allow the migration of process fluids into the premises' wiring system. (CMP-14)

Informational Note: See ANSI/UL 122701, *Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids*, for additional information.

Production Areas.

Areas where portable electrical equipment is used to implement the capture of images. (530) (CMP-15)

Projector, Nonprofessional. (Nonprofessional Projector)

Those types of projectors that do not comply with the definition of *Professional-Type Projector*. (540) (CMP-15)

Projector, Professional-Type. (Professional-Type Projector)

A type of projector using 35- or 70-mm film that has a minimum width of 35 mm (1 $^{3}/_{8}$ in.) and has on each edge 212 perforations per meter (5.4 perforations per inch), or a type using carbon arc, xenon, or other light source equipment that develops hazardous gases, dust, or radiation. (540) (CMP-15)

Proscenium.

The wall and arch that separates the stage from the auditorium (i.e., house). (520) (CMP-15)

Protection by Enclosure "t".

Type of protection for explosive dust atmospheres where electrical equipment is provided with an enclosure providing dust ingress protection and a means to limit surface temperatures. (CMP-14)

Informational Note: See ANSI/UL 60079-31, *Explosive Atmospheres — Part 31: Equipment Dust Ignition Protection by Enclosure "t"*, for additional information.

Psychiatric Hospital.

A building used exclusively for the psychiatric care, on a 24-hour basis, of four or more inpatients. (517) (CMP-15)

Purged and Pressurized.

The process of (1) purging, supplying an enclosure with a protective gas at a sufficient flow and positive pressure to reduce the concentration of any flammable gas or vapor initially present to an acceptable level; and (2) pressurization, supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of a flammable gas or vapor, a combustible dust, or an ignitible fiber. (CMP-14)

Informational Note: See NFPA 496-2024, *Standard for Purged and Pressurized Enclosures for Electrical Equipment*, for additional information.

Purpose-Built.

A custom luminaire, a piece of lighting equipment, or an effect that is constructed for a specific purpose and is not serially manufactured or available for general sale. (530) (CMP-15)

PV DC Circuit (PV System DC Circuit).

Any dc conductor in PV source circuits, PV string circuits, and PV dc-to-dc converter circuits. (690) (CMP-4)

PV DC Circuit, Source. (PV Source Circuit)

The PV dc circuit conductors between modules in a PV string circuit, and from PV string circuits or dc combiners, to dc combiners, electronic power converters, or a dc PV system disconnecting means. (690) (CMP-4)

PV DC Circuit, String. (PV String Circuit)

The PV source circuit conductors of one or more series-connected PV modules. (690) (CMP-4)

PV Module (Module) (Solar PV Module).

A complete, environmentally protected unit consisting of solar cells and other components designed to produce dc power. (CMP-4)

PV (Photovoltaic) System (PV System) (Photovoltaic System).

The total components, circuits, and equipment up to and including the PV system disconnecting means that, in combination, convert solar energy into electric energy. (CMP-4)

Qualified Person.

One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved. (CMP-1)

Informational Note: See NFPA *70E*-2024, *Standard for Electrical Safety in the Workplace*, for electrical safety training requirements.

Raceway.

An enclosed channel designed expressly for holding wires, cables, or busbars, with additional functions as permitted in this code. (CMP-8)

Raceway Cell.

A single enclosed tubular space in a cellular metal or concrete floor member, the axis of the cell being parallel to the axis of the floor member. (CMP-8)

Raceway, Cellular Metal Floor. (Cellular Metal Floor Raceway)

The hollow spaces of cellular metal floors, together with suitable fittings, that may be approved as enclosed channel for electrical conductors. (CMP-8)

Raceway, Communications. (Communications Raceway)

An enclosed channel of nonmetallic materials designed expressly for holding communications wires and cables; optical fiber cables; data cables associated with information technology and communications equipment; Class 2, Class 3, Class 4, and Type PLTC cables; and power-limited fire alarm cables in plenum, riser, and general-purpose applications. (CMP-3)

Raceway, Strut-Type Channel. (Strut-Type Channel Raceway)

A metal raceway that is intended to be mounted to the surface of or suspended from a structure, with associated accessories for the installation of electrical conductors and cables. (CMP-8)

Raceway, Surface Metal. (Surface Metal Raceway)

A metal raceway that is intended to be mounted to the surface of a structure, with associated couplings, connectors, boxes, and fittings for the installation of electrical conductors. (CMP-8)

Raceway, Surface Nonmetallic. (Surface Nonmetallic Raceway)

A nonmetallic raceway that is intended to be mounted to the surface of a structure, with associated couplings, connectors, boxes, and fittings for the installation of electrical conductors. (CMP-8)

Raceway, Underfloor. (Underfloor Raceway)

A raceway and associated components designed and intended for installation beneath or flush with the surface of a floor for the installation of cables and electrical conductors. (CMP-8)

Rail.

The structural support for the suspended ceiling system typically forming the ceiling grid supporting the ceiling tile and listed utilization equipment, such as sensors, actuators, A/V devices, and low-voltage luminaires and similar electrical equipment. (393) (CMP-18)

Rainproof.

Constructed, protected, or treated so as to prevent rain from interfering with the successful operation of the apparatus under specified test conditions. (CMP-1)

Raintight.

Constructed or protected so that exposure to a beating rain will not result in the entrance of water under specified test conditions. (CMP-1)

Rated-Load Current (RLC).

The current of a hermetic refrigerant motor-compressor resulting when it is operated at the rated load, rated voltage, and rated frequency of the equipment it serves. (440) (CMP-11)

Rated Output Power.

The amplifier manufacturer's stated or marked output power capability into its rated load. (640) (CMP-12)

Rated Power.

The output power of a wind turbine at its rated wind speed. (694) (CMP-4)

Informational Note: See IEC 61400-12-1, *Power Performance Measurements of Electricity Producing Wind Turbines* , for the method for measuring wind turbine power output.

Receptacle.

A contact device installed at the outlet for the connection of an attachment plug, or for the direct connection of electrical utilization equipment designed to mate with the corresponding contact device. A single receptacle is a single contact device with no other contact device on the same yoke or strap. A multiple receptacle is two or more contact devices on the same yoke or strap. (CMP-18)

Informational Note: A duplex receptacle is an example of a multiple receptacle that has two receptacles on the same yoke or strap.

Receptacle, Weather-Resistant (WR). (Weather-Resistant Receptacle)

A receptacle constructed to be resistant to the adverse effects of damp, wet, or outdoor locations. (CMP-18)

Receptacle, Weight-Supporting Ceiling (WSCR). (Weight-Supporting Ceiling Receptacle)

A contact device installed at an outlet box for the connection and support of luminaries or ceiling-suspended (paddle) fans using a weight-supporting attachment fitting (WSAF). (CMP-18)

Informational Note: See ANSI/NEMA WD 6, *American National Standard for Wiring Devices — Dimensional Specifications* , for the standard configuration of weight-supporting ceiling receptacles and related weight-supporting attachment fittings.

Receptacle Outlet.

An outlet where the branch-circuit conductors are connected to one or more receptacles. (CMP-18)

Reconditioned Equipment.

Electromechanical systems, equipment, apparatus, or components that are restored to operating conditions. This process differs from normal servicing of equipment that remains within a facility, or replacement of listed equipment on a one-to-one basis. (CMP-1)

Informational Note: The term *reconditioned* is frequently referred to as *rebuilt* , *refurbished* , or *remanufactured* .

Recreational Vehicle (RV) (Camping Trailer) (Motor Home) (Travel Trailer) (Truck Camper).

A vehicle or slide-in camper that is primarily designed as temporary living quarters for recreational, camping, or seasonal use; has its own motive power or is mounted on or towed by another vehicle; is regulated by the National Highway Traffic Safety Administration as a vehicle or vehicle equipment; does not require a special highway use permit for operation on the highways; and can be easily transported and set up on a daily basis by an individual. [**1192:** 3.3.52] (551) (CMP-7)

Informational Note: See NFPA 1192-2026, *Standard on Recreational Vehicles* , Informative Annex A, for product types and definitions for motor homes and towable recreational vehicles.

Recreational Vehicle Park.

Any parcel or tract of land under the control of any person, organization, or governmental entity wherein two or more recreational vehicle, recreational park trailer, and/or other camping sites are offered for use by the public or members of an organization for overnight stays. (551) (CMP-7)

Recreational Vehicle Site.

A specific area within a recreational vehicle park or campground that is set aside for use by a camping unit. (551) (CMP-7)

Recreational Vehicle Site Supply Equipment.

A power outlet assembly located near the point of entrance of supply conductors to a recreational vehicle site and intended to constitute the disconnecting means for connected recreational vehicles. (551) (CMP-7)

Recreational Vehicle Stand.

That area of a recreational vehicle site intended for the placement of a recreational vehicle. (551) (CMP-7)

Reference Grounding Point.

The ground bus of the panelboard or isolated power system panel supplying the patient care room. [**99:** 3.3.158] (517) (CMP-15)

Relative Analgesia.

A state of sedation and partial block of pain perception produced in a patient by the inhalation of concentrations of nitrous oxide insufficient to produce loss of consciousness (conscious sedation). (517) (CMP-15)

Relay, Automatic Load Control (ALCR). (Automatic Load Control Relay)

An emergency lighting control device used to set normally dimmed or normally-off switched emergency lighting equipment to full power illumination levels in the event of a loss of the normal supply by bypassing the dimming/switching controls, and to return the emergency lighting equipment to normal status when the device senses the normal supply has been restored. (700) (CMP-13)

Informational Note: See ANSI/UL 924, *Emergency Lighting and Power Equipment* , for the requirements covering automatic load control relays.

Remote-Control Circuit.

Any electrical circuit that controls any other circuit through a relay or an equivalent device. (CMP-3)

Remote Disconnect Control.

An electric device and circuit that controls a disconnecting means through a relay or equivalent device. (645) (CMP-12)

Resistance Heating Element.

A specific separate element to generate heat that is stand-alone, externally attached to, embedded in, integrated with, or internal to the object to be heated. (CMP-17)

Informational Note: Tubular heaters, strip heaters, heating cable, heating tape, heating blankets, immersion heaters, and heating panels are examples of resistance heaters.

Restricted Industrial Establishment [as applied to hazardous (classified) locations].

Establishment with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation. (CMP-14)

Retrofit Kit.

A complete subassembly of parts and devices for field conversion of utilization equipment. (CMP-18)

Retrofit Kit, General Use. (General Use Retrofit Kit)

A kit that includes some, but not all, of the necessary parts to replace the illumination system of a host sign and installation instructions that identify the parts required to complete the subassembly in the field. (600) (CMP-18)

Retrofit Kit, Sign Specific. (Sign Specific Retrofit Kit)

A kit that includes all of the necessary parts and hardware to allow for field installation in a host sign, based on the included installation instructions. (600) (CMP-18)

Reverse Polarity Protection (Backfeed Protection).

A system that prevents two interconnected power supplies, connected positive to negative, from passing current from one power source into a second power source. (393) (CMP-18)

Ride Device.

A device or combination of devices that carry, convey, or direct a person(s) over or through a fixed or restricted course within a defined area for the primary purpose of amusement or entertainment. (522) (CMP-15)

Riser Cable, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways that have fire-resistant characteristics capable of preventing the carrying of fire from floor to floor and are suitable for use in a vertical run in a shaft or from floor to floor. (722) (CMP-3)

Road Show Connection Panel.

A type of patch panel designed to allow for road show connection of portable stage switchboards to fixed lighting outlets by means of permanently installed supplementary circuits. (520) (CMP-15)

Safe Zone.

Low probability of damage other than a slight swelling of the capacitor case, as identified by the case rupture curve of the capacitor. (460) (CMP-11)

Safety Circuit.

The part of a control system containing one or more devices that perform a safety-related function. [**79:** 3.3.95] (CMP-12)

Informational Note: See NFPA 79-2024, *Electrical Standard for Industrial Machinery. Safety-related control system* and *safety interlock circuit* are common terms that can be used to refer to the safety circuit in other standards. The safety circuit can include hard-wired, communication, and software-related components.

Sealable Equipment.

Equipment enclosed in a case or cabinet that is provided with a means of sealing or locking so that live parts cannot be made accessible without opening the enclosure. (CMP-1)

Informational Note: The equipment may or may not be operable without opening the enclosure.

Sealed [as applied to hazardous (classified) locations].

Constructed such that equipment is sealed effectively against entry of an external atmosphere and is not opened during normal operation or for any maintenance activities. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Sealed, Hermetically. (Hermetically Sealed)

Sealed against the entrance of an external atmosphere, such that the seal is made by fusion of metal to metal, ceramic to metal, or glass to metal. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Section Sign.

A sign or outline lighting system, shipped as subassemblies, that requires field-installed wiring between the subassemblies to complete the overall sign. The subassemblies are either physically joined to form a single sign unit or are installed as separate remote parts of an overall sign. (600) (CMP-18)

Selected Receptacles.

A minimal number of receptacles selected by the health care facility's governing body as necessary to provide essential patient care and facility services during loss of normal power. [**99:** 3.3.164] (517) (CMP-15)

Self-Contained Therapeutic Tubs or Hydrotherapeutic Tanks.

A factory-fabricated unit consisting of a therapeutic tub or hydrotherapeutic tank with all water-circulating, heating, and control equipment integral to the unit. Equipment may include pumps, air blowers, heaters, light controls, sanitizer generators, and so forth. (680) (CMP-17)

Separable Power Supply Cable Assembly.

A flexible cord or cable, including ungrounded, grounded, and equipment grounding conductors, provided with a cord connector, an attachment plug, and all other fittings, grommets, or devices installed for the purpose of delivering energy from the source of electrical supply to the truck or transport refrigerated unit (TRU) flanged surface inlet. (626) (CMP-12)

Separately Derived System.

An electrical power supply output, other than a service, having no direct connection(s) to circuit conductors of any other electrical source other than those established by grounding and bonding connections. (CMP-5)

Service.

The conductors and equipment connecting the serving utility to the wiring system of the premises served. (CMP-10)

Service Conductors.

The conductors from the service point to the service disconnecting means. (CMP-10)

Service Conductors, Overhead. (Overhead Service Conductors)

The overhead conductors between the service point and the first point of connection to the service-entrance conductors at the building or other structure. (CMP-10)

Service Conductors, Underground. (Underground Service Conductors)

The underground conductors between the service point and the first point of connection to the service-entrance conductors in a terminal box, meter, or other enclosure, inside or outside the building wall. (CMP-10)

Informational Note: Where there is no terminal box, meter, or other enclosure, the point of connection is considered to be the point of entrance of the service conductors into the building.

Service Disconnect (Service Disconnecting Means).

A device that is connected to service conductors and disconnects the premises wiring system or equipment from the service conductors. (CMP-10)

Service Drop.

The overhead conductors between the serving utility and the service point. (CMP-10)

Service-Entrance Conductor Assembly.

Multiple single-insulated conductors twisted together without an overall covering, other than an optional binder intended only to keep the conductors together. (CMP-6)

Service-Entrance Conductors.

The service conductors between the terminals of the service equipment to the service drop, overhead service conductors, service lateral, or underground service conductors. (CMP-10)

Informational Note: Where service equipment is located outside the building walls, there could be no service-entrance conductors or they might be entirely outside the building.

Service Equipment.

The necessary equipment, consisting of a circuit breaker(s) or switch(es) and fuse(s) and their accessories, connected to the serving utility and intended to constitute the main control and disconnect of the serving utility. (CMP-10)

Service Equipment, Mobile Home. (Mobile Home Service Equipment)

The equipment containing the disconnecting means, overcurrent protective devices, and receptacles or other means for connecting a mobile home feeder assembly. (550) (CMP-7)

Service Lateral.

The underground conductors between the utility electric supply system and the service point. (CMP-10)

Service Point.

The point of connection between the facilities of the serving utility and the premises wiring. (CMP-10)

Informational Note: The service point can be described as the point of demarcation between where the serving utility ends and the premises wiring begins. The serving utility generally specifies the location of the service point based on the conditions of service.

Service Point, Communications. (Communications Service Point)

The point of connection between the communications service provider's network (outside plant) and the premises wiring (inside plant). (CMP-16)

Servicing.

The process of following a manufacturer's set of instructions or applicable industry standards to analyze, adjust, or perform prescribed actions upon equipment with the intention to preserve or restore the operational performance of the equipment. (CMP-1)

Informational Note: Servicing often encompasses maintenance and repair activities.

Shore Power.

The electrical equipment required to power a floating vessel including, but not limited to, the receptacle and cords. (555) (CMP-7)

Shoreline.

The farthest extent of standing water under the applicable conditions that determine the electrical datum plane for the specified body of water. (682) (CMP-7)

Short Circuit.

An abnormal connection (including an arc) of relatively low impedance, whether made accidentally or intentionally, between two or more points of different potential. (CMP-10)

Short-Circuit Current Rating.

The prospective symmetrical fault current at a nominal voltage to which equipment is able to be connected without sustaining damage exceeding defined acceptance criteria. (CMP-10)

Show Window.

Any window, including windows above doors, used or designed to be used for the display of goods or advertising material, whether it is fully or partly enclosed or entirely open at the rear and whether or not it has a platform raised higher than the street floor level. (CMP-2)

Sign, Electric. (Electric Sign)

Electrically operated utilization equipment with words, symbols, art, or advertising designed to convey information or attract attention. (CMP-18)

Sign, Host. (Host Sign)

A sign or outline lighting system already installed in the field that is designated by a retroft kit for field conversion of the illumination system. (600) (CMP-18)

Sign, Photovoltaic (PV) Powered (PV Powered Sign). [Photovoltaic (PV) Powered Sign]

A complete sign powered by solar energy consisting of all components and subassemblies for installation either as an off-grid stand-alone, on-grid interactive, or non-grid interactive system. (600) (CMP-18)

Sign Body.

A portion of a sign that can provide protection from the weather and can additionally serve as an electrical enclosure. (600) (CMP-18)

Signaling Circuit.

Any electrical circuit that energizes signaling equipment. (CMP-3)

Simple Apparatus.

An electrical component or combination of components of simple construction with well-defined electrical parameters that does not generate more than 1.5 volts, 100 mA, and 25 mW, or a passive component that does not dissipate more than 1.3 watts and is compatible with the intrinsic safety of the circuit in which it is used. (CMP-14)

Informational Note No. 1: The following are examples of simple apparatus:

(1) Passive components; for example, switches, instrument connectors, plugs and sockets, junction boxes, resistance temperature devices, and simple semiconductor devices such as LEDs

(2) Sources of stored energy consisting of single components in simple circuits with well-defined parameters; for example, capacitors or inductors, whose values are considered when determining the overall safety of the system

(3) Sources of generated energy; for example, thermocouples and photocells, that do not generate more than 1.5 volts, 100 mA, and 25 mW

Informational Note No. 2: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Single-Pole Separable Connector.

A device that is installed at the ends of portable, flexible, single-conductor cable that is used to establish connection or disconnection between two cables or one cable and a single-pole, panel-mounted separable connector. (CMP-18)

Site-Isolating Device.

A pole-mounted disconnecting means installed at the distribution point for the purposes of isolation, system maintenance, emergency disconnection, or connection of optional standby systems. (547) (CMP-7)

Skeleton Tubing.

Neon tubing that is itself the sign or outline lighting and is not attached to an enclosure or sign body. (600) (CMP-18)

Slip.

A berthing space between or adjacent to piers, wharves, or docks; the water areas associated with boat occupation. [**303:** 3.3.21] (555) (CMP-7)

Informational Note: See the definition of *Berth* for additional information.

Solid-State Phase-Control Dimmer.

A solid-state dimmer where the wave shape of the steady-state current does not follow the wave shape of the applied voltage such that the wave shape is nonlinear. (CMP-15)

Solid-State Sine Wave Dimmer.

A solid-state dimmer where the wave shape of the steady-state current follows the wave shape of the applied voltage such that the wave shape is linear. (CMP-15)

Spa or Hot Tub.

A hydromassage pool, or tub for recreational or therapeutic use, not located in health care facilities, designed for immersion of users, and usually having a filter, heater, and motor-driven blower. It may be installed indoors or outdoors, on the ground or supporting structure, or in the ground or supporting structure. Generally, they are not designed or intended to have its contents drained or discharged after each use. (680) (CMP-17)

Spa or Hot Tub, Packaged Equipment Assembly. (Packaged Spa or Hot Tub Equipment Assembly)

A factory-fabricated unit consisting of water-circulating, heating, and control equipment mounted on a common base, intended to operate a spa or hot tub. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Spa or Hot Tub, Self-Contained. (Self-Contained Spa or Hot Tub)

Factory-fabricated unit consisting of a spa or hot tub vessel with all water-circulating, heating, and control equipment integral to the unit. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Spa or Hot Tub, Storable. (Storable Spa or Hot Tub)

Spas or hot tubs installed entirely on or above the ground that are intended to be stored when not in use and are designed for ease of relocation. (680) (CMP-17)

Space.

A portion of the health care facility designated by the health care facility's governing body that serves a specific purpose. [**99:** 3.3.171] (517) (CMP-15)

Special Permission.

The written consent of the authority having jurisdiction. (CMP-1)

Special Protection "s".

Type of protection that permits design, assessment, and testing of equipment that cannot be fully assessed within a recognized type of protection or combination of recognized types of protection because of functional or operational limitations, but that can be demonstrated to provide the necessary equipment protection level (EPL). (CMP-14)

Informational Note: See ANSI/UL 60079-33, *Explosive Atmospheres — Part 33: Equipment Protection by Special Protection "s"* , for additional information.

Special-Purpose Multi-Circuit Cable System.

A portable branch-circuit distribution system consisting of one or more trunk cables and optional breakout assemblies or multi-circuit outlet enclosures. (520) (CMP-15)

Spider (Cable Splicing Block).

A device that contains busbars that are insulated from each other for the purpose of splicing or distributing power to portable cables and cords that are terminated with single-pole busbar connectors. (530) (CMP-15)

Spin Down.

A shutdown condition of the FESS, where energy is being dissipated and the flywheel rotor is slowing down to a stop. (706) (CMP-13)

Informational Note: A complete stop of a flywheel rotor cannot occur instantaneously because of the high kinetic energy of the rotor, but rather occurs over time as a result of friction forces acting on the rotor.

Splash Pad.

A fountain intended for recreational use by pedestrians and designed to contain no more than 25 mm (1 in.) of water depth. This definition does not include showers intended for hygienic rinsing prior to use of a pool, spa, or other water feature. (680) (CMP-17)

Spray Area.

Any fully enclosed, partly enclosed, or unenclosed area in which flammable or combustible vapors, mists, residues, dusts, or deposits are present due to the operation of spray processes, including:

(1) any area in the direct path of a spray application process;

(2) the interior of a spray booth, spray room, or limited finishing workstation, as herein defined;

(3) the interior of any exhaust plenum, eliminator section, or scrubber section;

(4) the interior of any exhaust duct or exhaust stack leading from a spray application process;

(5) the interior of any air recirculation path up to and including recirculation particulate filters;

(6) any solvent concentrator (pollution abatement) unit or solvent recovery (distillation) unit; and

(7) the inside of a membrane enclosure.

The following are not part of the spray area:

(1) fresh air make-up units;

(2) air supply ducts and air supply plenums;

(3) recirculation air supply ducts downstream of recirculation particulate filters; and

(4) exhaust ducts from solvent concentrator (pollution abatement) units. [**33:** 3.3.2.3] (CMP-14)

Informational Note No. 1: Unenclosed spray areas are locations outside of buildings or are localized operations within a larger room or space. Such areas are normally provided with some local vapor extraction/ventilation system. In automated operations, the area limits are the maximum area in the direct path of spray operations. In manual operations, the area limits are the maximum area of spray when aimed at 90 degrees to the application surface.

Informational Note No. 2: See definitions for *limited finishing workstation* and *membrane enclosure* for additional information.

Spray Area, Outdoor. (Outdoor Spray Area)

A spray area that is outside the confines of a building or that has a canopy or roof that does not limit the dissipation of the heat of a fire or dispersion of flammable vapors and does not restrict fire-fighting access and control. For the purpose of this standard, an outdoor spray area can be treated as an unenclosed spray area as defined in this code. [**33:** 3.3.2.3.1] (CMP-14)

Spray Area, Unenclosed. (Unenclosed Spray Area)

Any spray area that is not confined by a limited finishing workstation, spray booth, or spray room, as herein defined. [**33:** 3.3.2.3.2] (CMP-14)

Spray Booth.

A power-ventilated enclosure for a spray application operation or process that confines and limits the escape of the material being sprayed, including vapors, mists, dusts, and residues that are produced by the spraying operation and conducts or directs these materials to an exhaust system. [**33:** 3.3.19] (CMP-14)

Informational Note: A spray booth is an enclosure or insert within a larger room used for spraying, coating, and/or dipping applications. A spray booth can be fully enclosed or have open front or face and can include a separate conveyor entrance and exit. The spray booth is provided with a dedicated ventilation exhaust with supply air from the larger room or from a dedicated air supply.

Spray Room.

A power-ventilated fully enclosed room with a specified fire resistance rating used exclusively for open spraying of flammable or combustible materials. [**33:** 3.3.20] (CMP-14)

Stage Effect (Special Effect).

An electrical or electromechanical piece of equipment used to simulate a distinctive visual or audible effect, such as a wind machine, lightning simulator, or sunset projector. (CMP-15)

Stage Equipment.

Equipment at any location on the premises integral to the stage production including, but not limited to, equipment for lighting, audio, special effects, rigging, motion control, projection, or video. (520) (CMP-15)

Stage Lighting Hoist.

A motorized lifting device that contains a mounting position for one or more luminaires, with wiring devices for connection of luminaires to branch circuits, and integral flexible cables to allow the luminaires to travel over the lifting range of the hoist while energized. (520) (CMP-15)

Stage Property.

An article or object used as a visual element in a motion picture or television production, except painted backgrounds (scenery) and costumes. (530) (CMP-15)

Stage Set.

A specific area set up with temporary scenery and properties designed and arranged for a particular scene in a motion picture or television production. (CMP-15)

Stage Switchboard, Fixed. (Fixed Stage Switchboard)

A permanently installed switchboard, panelboard, or rack containing dimmers or relays with associated overcurrent protective devices, or overcurrent protective devices alone, used primarily to feed stage equipment. (CMP-15)

Stage Switchboard, Portable. (Portable Stage Switchboard)

A portable rack or pack containing dimmers or relays with associated overcurrent protective devices, or overcurrent protective devices alone, used to feed stage equipment. (520) (CMP-15)

Stand Lamp.

A portable stand that contains a general-purpose luminaire or lampholder with guard for the purpose of providing general illumination on a stage, in an auditorium, or in a studio. (520) (CMP-15)

Stand-Alone System.

A system that is not connected to an electric power production and distribution network. (CMP-4)

Storage, Dry Stack. (Dry Stack Storage)

A facility, either covered or uncovered, constructed of horizontal and vertical structural members designed to allow placement of small boats in defined slots arranged both horizontally and vertically. [**303:** 3.3.24.2] (555) (CMP-7)

Stored-Energy Power Supply System (SEPSS).

A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)

Stranding, Compact. (Compact Stranding)

A conductor stranding method in which each layer of strands is pressed together to minimize the gaps between the strands so the overall diameter of the finished conductor is less than a concentric stranded conductor and less than a compressed stranded conductor. (CMP-6)

Stranding, Compressed. (Compressed Stranding)

A conductor stranding method in which the outer layer of strands is pressed together so the overall diameter of the finished conductor is less than a concentric stranded conductor but greater than a compact stranded conductor. (CMP-6)

Stranding, Concentric. (Concentric Stranding)

A conductor consisting of a straight central strand surrounded by one or more layers of strands, helically laid in a geometric pattern. (CMP-6)

Strip Light.

A luminaire with multiple lamps arranged in a row. (520) (CMP-15)

Structure.

That which is built or constructed, other than equipment. (CMP-1)

Structure, Relocatable. (Relocatable Structure)

A factory-assembled structure or structures transportable in one or more sections that are built on a permanent chassis and designed to be used as other than a dwelling unit without a permanent foundation. (545) (CMP-7)

> Informational Note: Examples of relocatable structures are those units that are equipped for sleeping purposes only, contractor's and other on-site offices, construction job dormitories, studio dressing rooms, banks, clinics, stores, shower facilities and restrooms, training centers, or for the display or demonstration of merchandise or machines.

Subassembly.

Component parts or a segment of a sign, retrofit kit, or outline lighting system that, when assembled, forms a complete unit or product. (600) (CMP-18)

Substation.

An assemblage of equipment (e.g., switches, interrupting devices, circuit breakers, buses, and transformers) through which electric energy is passed for the purpose of distribution, switching, or modifying its characteristics. (CMP-9)

Supervisory Control and Data Acquisition (SCADA).

An electronic system that provides monitoring and controls for the operation of the critical operations power system. (CMP-13)

> Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators.

Support Areas.

Areas, other than fixed production offices, intended to support production and where image capture will not take place. Such areas include, but are not limited to, mobile production offices, storage, and workspaces; vehicles and trailers for cast, makeup, hair, lighting, grip, wardrobe, props, catering, and craft services; and portable restrooms. (530) (CMP-15)

Surge Arrester.

A protective device for limiting surge voltages by discharging or bypassing surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions. (CMP-10)

Surge-Protective Device (SPD).

A protective device for limiting transient voltages by diverting or limiting surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions and is designated as follows:

(1) Type 1: Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service disconnect overcurrent device

(2) Type 2: Permanently connected SPDs intended for installation on the load side of the service disconnect overcurrent device, including SPDs located at the branch panel

(3) Type 3: Point of utilization SPDs

(4) Type 4: Component SPDs, including discrete components, as well as assemblies. (CMP-10)

> Informational Note: See UL 1449, *Standard for Surge Protective Devices* , for further information on SPDs.

Suspended Ceiling Grid.

A system that serves as a support for a finished ceiling surface and other utilization equipment. (393) (CMP-18)

Switch, Bypass Isolation. (Bypass Isolation Switch)

A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of bypass that directly connects the load conductors to a power source and allows the transfer switch to be isolated or disconnected. (CMP-13)

Switch, General-Use. (General-Use Switch)

A switch intended for use in general distribution and branch circuits. It is rated in amperes, and it is capable of interrupting its rated current at its rated voltage. (CMP-10)

Switch, General-Use Snap. (General-Use Snap Switch)

A form of general-use switch constructed so that it can be installed in device boxes or on box covers, or otherwise used in conjunction with wiring systems recognized by this code. (CMP-18)

Switch, Isolating. (Isolating Switch)

A switch intended for isolating an electrical circuit from the source of power. It has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means. (CMP-10)

Switch, Motor-Circuit. (Motor-Circuit Switch)

A switch rated in horsepower that is capable of interrupting the maximum operating overload current of a motor of the same horsepower rating as the switch at the rated voltage. (CMP-11)

Switchboard.

A large single panel, frame, or assembly of panels on which are mounted on the face, back, or both, switches, overcurrent and other protective devices, buses, and usually instruments.(CMP-10)

Informational Note: These assemblies can be accessible from the rear or side as well as from the front and are not intended to be installed in cabinets.

Switchgear.

An assembly completely enclosed on all sides and top with sheet metal (except for ventilating openings and inspection windows) and containing primary power circuit switching, interrupting devices, or both, with buses and connections. The assembly may include control and auxiliary devices. Access to the interior of the enclosure is provided by doors, removable covers, or both. (CMP-10)

Informational Note: All switchgear subject to *NEC* requirements is metal enclosed. Switchgear rated below 1000 V or less may be identified as "low-voltage power circuit breaker switchgear." Switchgear rated over 1000 V may be identified as "metal-enclosed switchgear" or "metal-clad switchgear." Switchgear is available in non–arc-resistant or arc-resistant constructions.

Switching Device (as applied to equipment rated over 1000 volts ac, 1500 volts dc, nominal).

A device designed to close, open, or both, one or more electrical circuits. (CMP-9)

Cutout.

An assembly of a fuse support with either a fuseholder, fuse carrier, or disconnecting blade. The fuseholder or fuse carrier may include a conducting element (fuse link) or may act as the disconnecting blade by the inclusion of a nonfusible member.

Disconnecting Switch (or Isolating Switch).

A mechanical switching device used for isolating a circuit or equipment from a source of power.

Interrupter Switch.

A switching device capable of making, carrying, and interrupting specified currents.

Oil-Filled Cutout.

A cutout in which all or part of the fuse support and its fuse link or disconnecting blade is mounted in oil with complete immersion of the contacts and the fusible portion of the conducting element (fuse link) so that arc interruption by severing of the fuse link or by opening of the contacts will occur under oil.

Oil Switch.

A switching device having contacts that operate under oil (or askarel or other suitable liquid).

Regulator Bypass Switch.

A switching device or combination of switching devices designed to bypass equipment used to control voltage levels or related circuit characteristics.

System Isolation Equipment.

A redundantly monitored, remotely operated contactor-isolating system, packaged to provide the disconnection/isolation function, capable of verifiable operation from multiple remote locations by means of lockout switches, each having the capability of being padlocked in the "off" (open) position. (430) (CMP-11)

Tap Conductor.

A conductor, other than a service conductor, that has overcurrent protection ahead of its point of supply that exceeds the value permitted for similar conductors that are protected as described elsewhere in 240.4 . (240) (CMP-10)

Task Illumination.

Provisions for the minimum lighting required to carry out necessary tasks in the areas described in 517.34(A) , including safe access to supplies and equipment and access to exits. [**99:** 3.3.177] (517) (CMP-15)

Technical Power System.

An electrical distribution system where the equipment grounding conductor is isolated from the premises grounded conductor and the premises equipment grounding conductor except at a single grounded termination point within a branch-circuit panelboard, at the originating (main breaker) branch-circuit panelboard or at the premises grounding electrode. (640) (CMP-12)

Temporary Equipment.

Portable wiring and equipment intended for use with events of a transient or temporary nature where all equipment is presumed to be removed at the conclusion of the event. (640) (CMP-12)

Terminal (as applied to batteries).

That part of a cell, container, or battery to which an external connection is made (commonly identified as post, pillar, pole, or terminal post). (CMP-13)

Thermal Protector (as applied to motors).

A protective device for assembly as an integral part of a motor or motor-compressor that, when properly applied, protects the motor against dangerous overheating due to overload and failure to start. (CMP-11)

Informational Note: The thermal protector may consist of one or more sensing elements integral with the motor or motor-compressor and an external control device.

Thermal Resistivity.

The heat transfer capability through a substance by conduction. (CMP-6)

Informational Note: Thermal resistivity is the reciprocal of thermal conductivity and is designated Rho, which is expressed in the units °C-cm/W.

Thermally Protected (as applied to motors).

A motor or motor-compressor that is provided with a thermal protector. (CMP-11)

Top Shield.

A grounded metal shield covering under-carpet components of the flat conductor cable (Type FCC) system for the purposes of providing protection against physical damage. (324) (CMP-6)

Tower.

A pole or other structure that supports a wind turbine. (694) (CMP-4)

Transfer Switch.

An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)

Transfer Switch, Branch-Circuit Emergency Lighting (BCELTS). (Branch-Circuit Emergency Lighting Transfer Switch)

A device connected on the load side of a branch-circuit overcurrent protective device that transfers only emergency lighting loads from the normal power source to an emergency power source. (700) (CMP-13)

Informational Note: See ANSI/UL 1008, *Transfer Switch Equipment* , for information covering branch-circuit emergency lighting transfer switches.

Transfer Switch, Bypass Isolation. (Bypass Isolation Transfer Switch)

A transfer switch that provides a means to isolate the transfer switch. (CMP-13)

Transfer Switch, Meter-Mounted. (Meter-Mounted Transfer Switch)

A transfer switch connected between the utility meter and the meter base. (CMP-13)

Informational Note: Meter-mounted transfer switches can plug into the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.

Transformer.

Equipment, either single-phase or polyphase, that uses electromagnetic induction to convert current and voltage in a primary circuit into current and voltage in a secondary circuit. (CMP-9)

Transformer Secondary Conductor.

A conductor, other than a service conductor, that originates at the secondary winding terminals of a transformer. (CMP-10)

Transition Assembly.

An assembly to facilitate connection of the flat conductor cable (Type FCC) system to other wiring systems, incorporating (1) a means of electrical interconnection and (2) a suitable box or covering for providing electrical safety and protection against physical damage. (324) (CMP-6)

Transport Refrigerated Unit (TRU).

A trailer or container, with integrated cooling or heating, or both, used for the purpose of maintaining the desired environment of temperature-sensitive goods or products. (626) (CMP-12)

Transportable.

X-ray equipment that is to be installed in a vehicle or that may be readily disassembled for transport in a vehicle. (660) (CMP-12)

Truck.

A motor vehicle designed for the transportation of goods, services, and equipment. (626) (CMP-12)

Truck Coupler.

A truck flanged surface inlet and mating cord connector. (626) (CMP-12)

Truck Flanged Surface Inlet.

The device(s) on the truck into which the connector(s) is inserted to provide electric energy and other services. This device is part of the truck coupler. The truck flanged surface inlet is considered to be part of the truck and not part of the electrified truck parking space supply equipment. (626) (CMP-12)

Trunk Cable.

A portable extension cable containing six or more branch circuits, a male multipole plug, and a female multipole receptacle. (520) (CMP-15)

Tubing, Electrical Metallic (EMT). (Electrical Metallic Tubing)

An unthreaded thinwall raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed utilizing appropriate fittings. (CMP-8)

Tubing, Electrical Nonmetallic (ENT). (Electrical Nonmetallic Tubing)

A nonmetallic, pliable, corrugated raceway of circular cross section with integral or associated couplings, connectors, and fittings for the installation of electrical conductors. It is composed of a material that is resistant to moisture and chemical atmospheres and is flame retardant.

A pliable raceway is a raceway that can be bent by hand with a reasonable force but without other assistance. (CMP-8)

Tubing, Flexible Metallic (FMT). (Flexible Metallic Tubing)

A metal raceway that is circular in cross section, flexible, and liquidtight without a nonmetallic jacket. (CMP-8)

Twofer.

An assembly containing one male plug and two female cord connectors used to connect two loads to one branch circuit. (520) (CMP-15)

Type of Protection “n”.

Type of protection where electrical equipment, in normal operation, is not capable of igniting a surrounding explosive gas atmosphere and a fault capable of causing ignition is not likely to occur. (CMP-14)

Informational Note: See ANSI/UL 60079-15, *Explosive Atmospheres — Part 15: Equipment Protection by Type of Protection “n”* , for additional information.

Ungrounded.

Not connected to ground or to a conductive body that extends the ground connection. (CMP-5)

Uninterruptible Power Supply (UPS).

A device or system that provides quality and continuity of ac power through the use of a stored-energy device as the backup power source for a period of time when the normal power supply is incapable of performing acceptably. (CMP-13)

Unit Equipment.

A battery-equipped emergency luminaire that illuminates only as part of the emergency illumination system and is not illuminated when the normal supply is available. (CMP-13)

Utilization Equipment.

Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes. (CMP-1)

Valve Actuator Motor (VAM) Assemblies.

A manufactured assembly, used to operate a valve, consisting of an actuator motor and other components such as motor controllers, torque switches, limit switches, and overload protection. (430) (CMP-11)

Informational Note: VAMs typically have short-time duty and high-torque characteristics.

Ventilated.

Provided with a means to permit circulation of air sufficient to remove an excess of heat, fumes, or vapors. (CMP-14)

Vessel.

A container such as a barrel, drum, or tank for holding fluids or other material. (CMP-17)

Volatile Flammable Liquid.

A flammable liquid having a flash point below 38°C (100°F), or a flammable liquid whose temperature is above its flash point, or a Class II combustible liquid that has a vapor pressure not exceeding 276 kPa (40 psia) at 38°C (100°F) and whose temperature is above its flash point. (CMP-14)

Voltage (of a circuit).

The greatest root-mean-square (rms) (effective) difference of potential between any two conductors of the circuit concerned. (CMP-1)

Informational Note: Some systems, such as 3-phase 4-wire, single-phase 3-wire, and 3-wire direct current, may have various circuits of various voltages.

Voltage, High. (High Voltage)

A potential difference over 1000 volts ac, 1500 volts dc, nominal. (CMP-9)

Informational Note: Circuits and equipment rated at potential differences of more than 1000 volts ac, 1500 volts dc, and up to 52 kV, are also commonly referred to as medium voltage.

Voltage, Low. (Low Voltage)

An electromotive force rated 24 volts, nominal, or less. (552) (CMP-7)

Voltage, Nominal. (Nominal Voltage)

A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class (e.g., 120/240 volts, 480Y/277 volts, 600 volts). (CMP-1)

Informational Note No. 1: The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment.

Informational Note No. 2: See ANSI C84.1-2011, *Voltage Ratings for Electric Power Systems and Equipment (60 Hz).*

Voltage, Nominal (as applied to battery or cell).(Nominal Voltage)

The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13)

Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.

Voltage to Ground.

For grounded circuits, the voltage between the given conductor and that point or conductor of the circuit that is grounded; for ungrounded circuits, the greatest voltage between the given conductor and any other conductor of the circuit. (CMP-1)

Watertight.

Constructed so that moisture will not enter the enclosure under specified test conditions. (CMP-1)

Weatherproof.

Constructed or protected so that exposure to the weather will not interfere with successful operation. (CMP-1)

Informational Note: Rainproof, raintight, or watertight equipment can fulfill the requirements for weatherproof where varying weather conditions other than wetness, such as snow, ice, dust, or temperature extremes, are not a factor.

Wharf.

A structure at the shoreline that has a platform built along and parallel to a body of water with either an open deck or a superstructure. [**307:** 3.3.28] (555) (CMP-7)

Wind Turbine.

A mechanical device that converts wind energy to electrical energy. (CMP-4)

Wind Turbine Output Circuit. (Turbine Output Circuit)

The circuit conductors between the internal components of a wind turbine (which might include an alternator, integrated rectifier, controller, and/or inverter) and other equipment. (694) (CMP-4)

Wire.

A factory assembly of one or more insulated conductors without an overall covering. (805) (CMP-3)

Wireless Power Transfer (WPT).

The transfer of electrical energy from a power source to an electrical load via magnetic fields by a contactless means between a primary device and a secondary device. (625) (CMP-12)

Wireless Power Transfer Equipment (WPTE).

Equipment installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle without physical electrical contact. (625) (CMP-12)

Informational Note No. 1: The general form of WPTE consists of two physical packages: a control box and a primary pad.

Informational Note No. 2: Electric vehicle power export equipment and wireless power transfer equipment are sometimes contained in one set of equipment, sometimes referred to as a bidirectional WPTE.

Wireways, Metal. (Metal Wireways)

Sheet metal troughs with hinged or removable covers for housing and protecting electrical wires and cable and in which conductors are laid in place after the raceway has been installed as a complete system. (CMP-8)

Wireways, Nonmetallic. (Nonmetallic Wireways)

Flame-retardant, nonmetallic troughs with removable covers for housing and protecting electrical wires and cables in which conductors are laid in place after the raceway has been installed as a complete system. (CMP-8)

Wiring Device.

An electrical device that serves as either a connection point to facilitate the flow of current or as a control device in general distribution and branch circuits. (CMP-18)

Informational Note: Examples of wiring devices include attachment plugs, receptacles, general-use snap switches, pendant switches, surface switches, dimmers, and electronic control switches and lighting control switches.

Work Surface.

A fixed, stationary, or portable surface typically intended for dry use and for tasks other than food or beverage preparation, food or beverage serving, personal lavation, or laundering that presents an incidental risk of spillage of smaller quantities of beverages and other liquids upon outlets mounted directly on or recessed in the surface. (CMP-2)

Informational Note No. 1: See UL 111, *Outline of Investigation for Multioutlet Assemblies* , and UL 962A, *Furniture Power Distribution Units* , which establish the performance evaluation criteria and construction criteria.

Informational Note No. 2: See 406.14(F) , 406.14(G)(1) , and 406.14(H) for information on receptacles for work surfaces distinguished from receptacles for counters and countertops.

Yoke (Strap).

The structural frame of a wiring device, such as a receptacle or switch, that serves as the mounting means. (CMP-18)

Zone.

A physically identifiable area (such as barriers or separation by distance) within an information technology equipment room, with dedicated power and cooling systems for the information technology equipment or systems. (645) (CMP-12)

Statement of Problem and Substantiation for Public Comment

A panelboard is a defined term and is defined as follows: “A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet, enclosure, or cutout box placed in or against a wall, partition, or other support; and accessible only from the front.” Accordingly, what a panelboard is does not need to be restated within the definition of panelboard. Note that a key phrase in the definition of panelboard is “…designed to be placed in…” Accordingly, once the panelboard is actually “placed in” “a cabinet, enclosure, or cutout box” per this definition, it is no longer a panelboard which is, by definition, “…designed to be placed in a cabinet, enclosure, or cutout box…” – it is then something other than a panelboard. The phrase “an assembly” recognizes that this panelboard is actually assembled by “placing” the panelboard in a cabinet, enclosure, or cutout box. Notably, the panelboard is no longer stand-alone – it is now two distinct pieces of electrical equipment that have been combined by placing one in the other; a panelboard “placed in” either a cabinet, enclosure, or cutout box. Further, the defined term “approved” was used rather than the possibly unenforceable and vague term “suitable” per Table 3.2.1 in the NEC Style Manual. Importantly, this definition of “placed panelboard” differs significantly from, and is not in conflict with, the defined term “enclosed panelboard” in UL 67 for a number of reasons including, but not limited to, that “placed panelboard” rather than “enclosed panelboard” is being defined, that “placed in” was used rather than “installed in” to match the NEC definition of panelboard where “…designed to be placed in…” is used, and that “suitable” is replaced with “approved” (a defined term) to comply with Table 3.2.1 of the NEC Style Manual to remove this possibly vague and unenforceable word. It is recommended that this definition be assigned to CMP1 as the term is used in multiple NEC articles, including the general requirements within Article 110 which apply to Chapters 1-8 of the NEC.

Related Item

- FR-8903

Submitter Information Verification

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State:
Zip:

Submittal Date: Tue Aug 06 17:39:39 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The terms "panelboard" and "enclosure" are presently defined in the NEC and can be used to adequately describe either a panelboard or a panelboard inside an enclosure. The proposed definition would cause additional confusion. The correlating committee has purview over the assignment of definitions.

Public Comment No. 865-NFPA 70-2024 [Article 100]

Article 100 Definitions

Scope. This article contains only those definitions essential to the application of this code. It is not intended to include commonly defined general terms or commonly defined technical terms from related codes and standards. An article number in parentheses following the definition indicates that the definition only applies to that article.

Informational Note: A definition that is followed by a reference in brackets has been extracted from one of the following standards. Only editorial changes were made to the extracted text to make it consistent with this code.

(1) NFPA 30A-2024, *Code for Motor Fuel Dispensing Facilities and Repair Garages*

(2) NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials*

(3) NFPA 75-2024, *Standard for the Fire Protection of Information Technology Equipment*

(4) NFPA 79-2024, *Electrical Standard for Industrial Machinery*

(5) NFPA 99-2024, *Health Care Facilities Code*

(6) NFPA 101®-2024, *Life Safety Code®*

(7) NFPA 110-2025, *Standard for Emergency and Standby Power Systems*

(8) NFPA 303-2026, *Fire Protection Standard for Marinas and Boatyards*

(9) NFPA 307-2026, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*

(10) NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*

(11) NFPA 501-2024, *Standard on Manufactured Housing*

(12) NFPA 790-2024, *Standard for Competency of Third-Party Field Evaluation Bodies*

(13) NFPA 1192-2026, *Standard on Recreational Vehicles*

Accessible (as applied to equipment).

Capable of being reached for operation, renewal, and inspection. (CMP-1)

Accessible (as applied to wiring methods).

Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in or blocked by the structure, other electrical equipment, other building systems, or finish of the building. (CMP-1)

Accessible, Readily. (Readily Accessible)

Capable of being reached quickly for operation, renewal, or inspection without requiring those to whom ready access is requisite to take actions, such as to use tools (other than keys), to climb over or under, to remove obstacles, or to resort to portable ladders, and so forth. (CMP-1)

Informational Note: Use of keys is a common practice under controlled or supervised conditions and a common alternative to the ready access requirements under such supervised conditions as provided elsewhere in the *NEC* .

Adapter.

A device used to adapt a circuit from one configuration of an attachment plug or receptacle to another configuration with the same current rating. (520) (CMP-15)

Adjustable Speed Drive.

Power conversion equipment that provides a means of adjusting the speed of an electric motor. (CMP-11)

Informational Note: A variable frequency drive is one type of electronic adjustable speed drive that controls the rotational speed of an ac electric motor by controlling the frequency and voltage of the electrical power supplied to the motor.

Adjustable Speed Drive System.

A combination of an adjustable speed drive, its associated motor(s), and auxiliary equipment. (CMP-11)

Aircraft Painting Hangar.

An aircraft hangar constructed for the express purpose of spraying, coating, and/or dipping applications and provided with dedicated ventilation supply and exhaust. (CMP-14)

Ambulatory Health Care Occupancy.

An occupancy used to provide services or treatment simultaneously to four or more patients that provides, on an outpatient basis, one or more of the following:

(1) Treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others.

(2) Anesthesia that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others.

(3) Treatment for patients who, due to the nature of their injury or illness, are incapable of taking action for self-preservation under emergency conditions without the assistance of others.

[***101*** **:** 3.3.198.1] (517) (CMP-15)

Ampacity.

The maximum current, in amperes, that a conductor can carry continuously under the conditions of use without exceeding its temperature rating. (CMP-6)

Amplifier (Audio Amplifier) (Pre-Amplifier).

Electronic equipment that increases the current or voltage, or both, of an audio signal intended for use by another piece of audio equipment. Amplifier is the term used to denote an audio amplifier. (640) (CMP-12)

Appliance.

Utilization equipment, generally other than industrial, that is normally built in a standardized size or type and is installed or connected as a unit to perform one or more functions such as clothes washing, air-conditioning, food mixing, and deep frying. (CMP-17)

Applicator.

The device used to transfer energy between the output circuit and the object or mass to be heated. (665) (CMP-12)

Approved.

Acceptable to the authority having jurisdiction. (CMP-1)

Arc-Fault Circuit Interrupter (AFCI).

A device intended to provide protection from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to de-energize the circuit when an arc fault is detected. (CMP-2)

Array (PV Array) (Solar PV Array).

A mechanically and electrically integrated grouping of solar PV modules with mounting system, including any attached system components such as inverters or dc-to-dc converters and attached associated wiring. (690) (CMP-4)

Artificially Ventilated Room "v".

A room volume protected by artificial ventilation and of sufficient size to permit the entry of a person who might occupy the room. (CMP-14)

Informational Note: see ANSI/UL 60079-13, *Explosive Atmospheres — Part 13: Equipment Protection by Pressurized Room "p" and Artificially Ventilated Room "v"* , for information on the requirements for rooms intended for human entry where artificial ventilation is used as a means of reducing the risk of explosion.

Askarel.

A generic term for a group of nonflammable synthetic chlorinated hydrocarbons used as electrical insulating media. (CMP-9)

Informational Note: Askarels of various compositional types are used. Under arcing conditions, the gases produced, while consisting predominantly of noncombustible hydrogen chloride, can include varying amounts of combustible gases, depending on the askarel type.

Associated Apparatus.

Apparatus in which the circuits are not necessarily intrinsically safe themselves but that affects the energy in the intrinsically safe circuits and is relied on to maintain intrinsic safety. Such apparatus is one of the following:

(1) Electrical apparatus that has an alternative type of protection for use in the appropriate hazardous (classified) location

(2) Electrical apparatus not so protected that shall not be used within a hazardous (classified) location

(CMP-14)

Informational Note No. 1: Associated apparatus has identified intrinsically safe connections for intrinsically safe apparatus and also might have connections for nonintrinsically safe apparatus.

Informational Note No. 2: An example of associated apparatus is an intrinsic safety barrier, which is a network designed to limit the energy (voltage and current) available to the protected circuit in the hazardous (classified) location under specified fault conditions.

Informational Note No. 3: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* ; and ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for additional information.

Associated Nonincendive Field Wiring Apparatus.

Apparatus in which the circuits are not necessarily nonincendive themselves but that affects the energy in nonincendive field wiring circuits and is relied on to maintain nonincendive energy levels. Such apparatus is one of the following:

(1) Electrical apparatus that has an alternative type of protection for use in the appropriate hazardous (classified) location

(2) Electrical apparatus not so protected that shall not be used within a hazardous (classified) location

(CMP-14)

Informational Note No. 1: Associated nonincendive field wiring apparatus has designated associated nonincendive field wiring apparatus connections for nonincendive field wiring apparatus and also might have connections for other electrical apparatus.

Informational Note No. 2: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Attachment Fitting, Weight-Supporting (WSAF) (Weight-Supporting Attachment Fitting).

A device that, by insertion into a weight-supporting ceiling receptacle, establishes a connection between the conductors of the attached utilization equipment and the branch-circuit conductors connected to the weight-supporting ceiling receptacle. (CMP-18)

Informational Note No. 1: A weight-supporting attachment fitting is different from an attachment plug because no cord is associated with the fitting. A weight-supporting attachment fitting in combination with a weight-supporting ceiling receptacle secures the associated utilization equipment in place and supports its weight.

Informational Note No. 2: See ANSI/NEMA WD 6, *American National Standard for Wiring Devices — Dimensional Specifications* , for the standard configuration of weight-supporting attachment fittings and related weight-supporting ceiling receptacles.

Attachment Plug (Plug Cap) (Plug).

A device that, by insertion in a receptacle, establishes a connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle. (CMP-18)

Audio Autotransformer.

A transformer with a single winding and multiple taps intended for use with an amplifier loudspeaker signal output. (640) (CMP-12)

Audio Signal Processing Equipment (Audio Equipment).

Electrically operated equipment that produces, processes, or both, electronic signals that, when appropriately amplified and reproduced by a loudspeaker, produce an acoustic signal within the range of normal human hearing (typically 20–20 kHz). Within Article 640, the terms equipment and audio equipment are assumed to be equivalent to audio signal processing equipment. (640) (CMP-12)

Informational Note: This equipment includes, but is not limited to, loudspeakers; headphones; pre-amplifiers; microphones and their power supplies; mixers; MIDI (musical instrument digital interface) equipment or other digital control systems; equalizers, compressors, and other audio signal processing equipment; and audio media recording and playback equipment, including turntables, tape decks and disk players (audio and multimedia), synthesizers, tone generators, and electronic organs. Electronic organs and synthesizers may have integral or separate amplification and loudspeakers. With the exception of amplifier outputs, virtually all such equipment is used to process signals (using analog or digital techniques) that have nonhazardous levels of voltage or current.

Audio System.

The totality of all equipment and interconnecting wiring used to fabricate a fully functional audio signal processing, amplification, and reproduction system. (640) (CMP-12)

Audio Transformer.

A transformer with two or more electrically isolated windings and multiple taps intended for use with an amplifier loudspeaker signal output. (640) (CMP-12)

Authority Having Jurisdiction (AHJ).

An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. (CMP-1)

Informational Note: The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

Automatic.

Performing a function without the necessity of human intervention. (CMP-1)

Bathroom.

An area including a sink with one or more of the following: a toilet, a urinal, a tub, a shower, a bidet, or similar plumbing fixtures. (CMP-2)

Battery.

A single cell or a group of cells connected together electrically in series, in parallel, or a combination of both. (CMP-13)

Battery, Flow. (Flow Battery)

An energy storage component that stores its active materials in the form of one or two electrolytes external to the reactor interface. When in use, the electrolytes are transferred between reactor and storage tanks. (706) (CMP-13)

Informational Note: Three commercially available flow battery technologies are zinc air, zinc bromine, and vanadium redox, sometimes referred to as *pumped electrolyte ESS* .

Battery, Sealed. (Sealed Battery)

A battery that has no provision for the routine addition of water or electrolyte or for external measurement of electrolyte specific gravity and might contain pressure relief venting. (CMP-13)

Battery, Stationary Standby. (Stationary Standby Battery)

A battery that spends the majority of the time on continuous float charge or in a high state of charge, in readiness for a discharge event. (CMP-13)

Informational Note: Uninterruptible Power Supply (UPS) batteries are an example that falls under this definition.

Battery-Powered Lighting Units.

Individual unit equipment for backup illumination consisting of a rechargeable battery; a battery-charging means; provisions for one or more lamps mounted on the equipment, or with terminals for remote lamps, or both; and a relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment. (517) (CMP-15)

Berth.

The water space to be occupied by a boat or other vessel alongside or between bulkheads, piers, piles, fixed and floating docks, or any similar access structure. [**303:** 3.3.2] (555) (CMP-7)

Informational Note: See the definition of *Slip* for additional information.

Bipolar Circuit.

A dc circuit that is comprised of two monopole circuits, each having an opposite polarity connected to a common reference point. (CMP-4)

Block.

A square or portion of a city, town, or village enclosed by streets and including the alleys so enclosed, but not any street. (800) (CMP-16)

Boatyard.

A facility used for constructing, repairing, servicing, hauling from the water, storing (on land and in water), and launching of boats. [**303:** 3.3.3] (555) (CMP-7)

Bodies of Water, Artificially Made. (Artificially Made Bodies of Water)

Bodies of water that have been constructed or modified to fit some decorative or commercial purpose such as, but not limited to, aeration ponds, fish farm ponds, storm retention basins, treatment ponds, and irrigation (channel) facilities. Water depths may vary seasonally or be controlled. (682) (CMP-7)

Bodies of Water, Natural. (Natural Bodies of Water)

Bodies of water such as lakes, streams, ponds, rivers, and other naturally occurring bodies of water, which may vary in depth throughout the year. (682) (CMP-7)

Bonded (Bonding).

Connected to establish electrical continuity and conductivity. (CMP-5)

Bonding Conductor (Bonding Jumper).

A conductor that ensures the required electrical conductivity between metal parts that are required to be electrically connected. (CMP-5)

Bonding Conductor, Equipment. (Equipment Bonding Conductor)

The connection between two or more portions of the equipment grounding conductor. (CMP-5)

Bonding Conductor, Grounding Electrode (Grounding Electrode Bonding Jumper). (Grounding Electrode Bonding Conductor)

A conductor, other than the grounding electrode conductor, used to interconnect two or more grounding electrodes to form the grounding electrode system. (CMP-5)

Bonding Conductor, Main (Main Bonding Jumper). (Main Bonding Conductor)

The connection between the grounded circuit conductor and the equipment grounding conductor, or the supply-side bonding conductor, or both, at the service equipment. (CMP-5)

Bonding Conductor, Supply-Side (Supply-Side Bonding Jumper). (Supply-Side Bonding Conductor)

A conductor installed on the supply side of a service or within a service equipment enclosure(s), or for a separately derived system, that ensures the required electrical conductivity between metal parts required to be electrically connected. (CMP-5)

Bonding Conductor, System (System Bonding Jumper). (System Bonding Conductor)

The connection between the grounded circuit conductor and the supply-side bonding conductor, or the equipment grounding conductor, or both, at a separately derived system. (CMP-5)

Bonding Jumper, Impedance. (Impedance Bonding Jumper).

The connection in an impedance grounded system between the equipment grounding conductor(s) and the grounding electrode side of the impedance grounding device. (CMP-5)

Border Light.

A permanently installed overhead strip light. (520) (CMP-15)

Bottom Shield.

A protective layer that is installed between the floor and flat conductor cable (Type FCC) to protect the cable from physical damage and may or may not be incorporated as an integral part of the cable. (324) (CMP-6)

Branch Circuit (Branch-Circuit).

The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s). (CMP-2)

Branch Circuit, Appliance. (Appliance Branch Circuit)

A branch circuit that supplies energy to one or more outlets to which appliances are to be connected and that has no permanently connected luminaires that are not a part of an appliance. (CMP-2)

Branch Circuit, General-Purpose. (General-Purpose Branch Circuit)

A branch circuit that supplies two or more receptacles or outlets for lighting and appliances. (CMP-2)

Branch Circuit, Individual. (Individual Branch Circuit)

A branch circuit that supplies only one utilization equipment. (CMP-2)

Branch Circuit, Motor. (Motor Branch Circuit)

The circuit conductors, including equipment, between the motor branch-circuit short-circuit and ground-fault protective device and an individual motor. (CMP-11)

Branch Circuit, Multiwire. (Multiwire Branch Circuit)

A branch circuit that consists of two or more ungrounded conductors that have a voltage between them, and a neutral conductor that has equal voltage between it and each ungrounded conductor of the circuit and that is connected to the neutral conductor of the system. (CMP-2)

Branch-Circuit Selection Current (BCSC).

The value in amperes to be used instead of the rated-load current in determining the ratings of motor branch-circuit conductors, disconnecting means, controllers, and branch-circuit short-circuit and ground-fault protective devices wherever the running overload protective device permits a sustained current greater than the specified percentage of the rated-load current. The value of branch-circuit selection current will always be equal to or greater than the marked rated-load current. (440) (CMP-11)

Breakout Assembly.

An adapter used to connect a multipole connector containing two or more branch circuits to multiple individual branch-circuit connectors. (520) (CMP-15)

Broadband.

Wide bandwidth data transmission that transports multiple signals, protocols, and traffic types over various media types. (CMP-16)

Building.

A structure that stands alone or that is separated from adjoining structures by fire walls. (CMP-1)

Building, Floating. (Floating Building)

A building that floats on water, is moored in a permanent location, and has a premises wiring system served through connection by permanent wiring to an electrical supply system not located on the premises. (CMP-7)

Building, Manufactured. (Manufactured Building)

Any building that is of closed construction and is made or assembled in manufacturing facilities on or off the building site for installation, or for assembly and installation on the building site, other than manufactured homes, mobile homes, park trailers, or recreational vehicles. (545) (CMP-7)

Building Component.

Any subsystem, subassembly, or other system designed for use in or integral with or as part of a structure, which can include structural, electrical, mechanical, plumbing, and fire protection systems, and other systems affecting health and safety. (545) (CMP-7)

Building System.

Plans, specifications, and documentation for a system of manufactured building or for a type or a system of building components, which can include structural, electrical, mechanical, plumbing, and fire protection systems, and other systems affecting health and safety, and including such variations thereof as are specifically permitted by regulation, and which variations are submitted as part of the building system or amendment thereto. (545) (CMP-7)

Bulkhead.

A vertical structural wall, usually of stone, timber, metal, concrete, or synthetic material, constructed along, and generally parallel to, the shoreline to retain earth as an extension of the upland, and often to provide suitable water depth at the waterside face. [**303:** 3.3.5] (555) (CMP-7)

Bull Switch.

An externally operated wall-mounted safety switch that can contain overcurrent protection and is designed for the connection of portable cables and cords. (530) (CMP-15)

Bundled.

Cables or conductors that are tied, wrapped, taped, or otherwise periodically bound together. (520) (CMP-15)

Busbar (as applied to low-voltage suspended ceiling power distribution systems).

A noninsulated conductor electrically connected to the source of supply and physically supported on an insulator providing a power rail for connection to utilization equipment, such as sensors, actuators, A/V devices, low-voltage luminaire assemblies, and similar electrical equipment. (393) (CMP-18)

Busbar Support (as applied to low-voltage suspended ceiling power distribution systems).

An insulator that runs the length of a section of suspended ceiling bus rail that serves to support and isolate the busbars from the suspended grid rail. (393) (CMP-18)

Busway.

A raceway consisting of a metal enclosure containing factory-mounted, bare or insulated conductors, which are usually copper or aluminum bars, rods, or tubes. (CMP-8)

Cabinet.

An enclosure that is designed for either surface mounting or flush mounting and is provided with a frame, mat, or trim in which a swinging door or doors are or can be hung. (CMP-8)

Cable, Abandoned. (Abandoned Cable)

Installed cable that is not terminated at equipment other than a termination fitting or a connector and is not identified for future use with a tag. (CMP-3)

Informational Note: See 640.6(B) , 645.6(G) , 760.25, 770.25, 790.25, and 800.25 for requirements covering the removal of abandoned cables.

Cable, Armored (Type AC). (Armored Cable)

A fabricated assembly of insulated conductors in a flexible interlocked metallic armor. (CMP-6)

Cable, Circuit Integrity (CI). (Circuit Integrity Cable)

Cable(s) marked with the suffix "-CI" used for remote-control, signaling, power-limited, fire alarm, optical fiber, or communications systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions. (CMP-3)

Informational Note: See 772.4 for power circuits installed for survivability.

Cable, Coaxial. (Coaxial Cable)

A cylindrical assembly composed of a conductor centered inside a metallic tube or shield, separated by a dielectric material, and usually covered by an insulating jacket. (CMP-3)

Cable, Festoon. (Festoon Cable)

Single- and multiple-conductor cable intended for use and installation where flexibility is required. (610) (CMP-12)

Cable, Flat Conductor (Type FCC). (Flat Conductor Cable)

Three or more separate flat copper conductors placed horizontally edge-to-edge and enclosed within an insulating assembly. (324) (CMP-6)

Cable, Instrumentation Tray (Type ITC). (Instrumentation Tray Cable)

A factory assembly of two or more insulated conductors, with or without an equipment grounding conductor(s), enclosed in a nonmetallic sheath. (CMP-3)

Cable, Integrated Gas Spacer (Type IGS). (Integrated Gas Spacer Cable)

A factory assembly of one or more conductors, each individually insulated and enclosed in a loose fit, nonmetallic flexible conduit as an integrated gas spacer cable rated 0 volts through 600 volts. (CMP-6)

Cable, Limited Use. (Limited-Use Cable)

Cables that are intended to be used with protection such as a raceway or for specific restricted applications. (CMP-3)

Informational Note: Limited use cables are denoted by an "X" suffix, for example Types CL2X or CMX.

Cable, Medium Voltage(Type MV). (Medium Voltage Cable)

A single or multiconductor solid dielectric insulated cable rated 2001 volts up to and including 35,000 volts, nominal. (CMP-6)

Cable, Metal Clad (Type MC). (Metal Clad Cable)

A factory assembly of one or more insulated circuit conductors with or without optical fiber members enclosed in an armor of interlocking metal tape, or a smooth or corrugated metallic sheath. (CMP-6)

Cable, Metallic Conductor. (Metallic Conductor Cable)

A factory assembly of two or more conductors having an overall covering. (CMP-3)

Cable, Mineral-Insulated, Metal-Sheathed (Type MI). (Mineral-Insulated, Metal-Sheathed Cable)

A factory assembly of one or more conductors insulated with a highly compressed refractory mineral insulation and enclosed in a liquidtight and gastight continuous copper or alloy steel sheath. (CMP-6)

Cable, Nonmetallic-Sheathed.

A factory assembly of two or more insulated conductors enclosed within an overall nonmetallic jacket. (CMP-6)

Cable, Nonmetallic-Sheathed (Type NM).

Insulated circuit conductors and a bare, covered, or insulated equipment grounding conductor enclosed within an overall nonmetallic jacket. (CMP-6)

Cable, Nonmetallic-Sheathed (Type NMC).

Insulated circuit conductors and a bare, covered, or insulsated equipment grounding conductor enclosed within an overall, corrosion resistant, nonmetallic jacket. (CMP-6)

Cable, Optical Fiber. (Optical Fiber Cable)

A factory assembly or field assembly of one or more optical fibers having an overall covering. (CMP-16)

Informational Note: A field-assembled optical fiber cable is an assembly of one or more optical fibers within a jacket. The jacket, without optical fibers, is installed in a manner similar to conduit or raceway. Once the jacket is installed, the optical fibers are inserted into the jacket, completing the cable assembly.

Cable, Optical Fiber, Conductive. (Conductive Optical Fiber Cable)

A factory assembly of one or more optical fibers having an overall covering and containing non-current-carrying conductive member(s) such as metallic strength member(s), metallic vapor barrier(s), metallic armor, or metallic sheath. (CMP-16)

Cable, Optical Fiber, Hybrid. (Hybrid Optical Fiber Cable)

A cable containing optical fibers and current-carrying electrical conductors. (CMP-16)

Cable, Optical Fiber, Nonconductive. (Nonconductive Optical Fiber Cable)

A factory assembly of one or more optical fibers having an overall covering and containing no electrically conductive materials. (CMP-16)

Cable, Optical Fiber, Protected. (Protected Optical Fiber Cable)

Optical fiber cable protected from releasing optical radiation into the atmosphere during normal operating conditions and foreseeable malfunctions by additional armoring, conduit, cable tray, or raceway. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Cable, Portable Power Feeder. (Portable Power Feeder Cable)

One or more flexible shielded insulated power conductors enclosed in a flexible covering rated from 2001 to 25,000 volts. (CMP-6)

Cable, Power and Control Tray (Type TC). (Power and Control Tray Cable)

A factory assembly of two or more insulated conductors, with or without associated bare or covered equipment grounding conductors, under a nonmetallic jacket. (CMP-6)

Cable, Power-Limited Tray (Type PLTC). (Power-Limited Tray Cable)

A factory assembly of two or more insulated conductors rated at 300 volts, with or without associated bare or insulated equipment grounding conductors, under a nonmetallic jacket. (CMP-3)

Cable, Service. (Service Cable)

Service conductors made up in the form of a cable. (CMP-10)

Cable, Service Entrance. (Service Entrance Cable)

A single conductor or multiconductor cable provided with an overall covering, primarily used for services. (CMP-6)

Cable, Service Entrance (Type SE).

Service-entrance cable having a flame-retardant, moisture-resistant covering. (CMP-6)

Cable, Service Entrance (Type USE).

Service-entrance cable, identified for underground use, having a moisture-resistant covering, but not required to have a flame-retardant covering. (CMP-6)

Cable, Type P.

A factory assembly of one or more insulated flexible tinned copper conductors, with associated equipment grounding conductor(s), with or without a braided metallic armor and with an overall nonmetallic jacket. (CMP-6)

Cable, Under Carpet. (Under Carpet Cable)

Cables that are intended to be used under carpeting, floor covering, modular tiles, and planks. (722) (CMP-3)

Cable, Underground Feeder and Branch-Circuit (Type UF). (Underground Feeder and Branch-Circuit Cable)

A factory assembly of one or more insulated conductors with an integral or an overall covering of nonmetallic material suitable for direct burial in the earth. (CMP-6)

Cable Assembly, Flat (Type FC). (Flat Cable Assembly)

An assembly of parallel conductors formed integrally with an insulating material web specifically designed for field installation in surface metal raceway. (CMP-6)

Cable Bundle.

A group of cables that are tied together or in contact with one another in a closely packed configuration for at least 1.0 m (40 in.). (CMP-3)

> Informational Note: Random or loose installation of individual cables can result in less heating. Combing of the cables can result in less heat dissipation and more signal cross talk between cables.

Cable Connector.

A connector designed to join flat conductor cables (Type FCC) without using a junction box. (324) (CMP-6)

Cable Connector [as applied to hazardous (classified) locations].

An electrical device that is part of a cable assembly and that, by insertion of two mating configurations, establishes a connection between the conductors of the cable assembly and the conductors of a fixed piece of equipment. (CMP-14)

> Informational Note No. 1: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for information on the use of cable connectors.
>
> Informational Note No. 2: Cable connectors in other than hazardous (classified) locations are referred to as male and female fittings.
>
> Informational Note No. 3: See ANSI/UL 2238, *Cable Assemblies and Fittings for Industrial Control and Signal Distribution* , and ANSI/UL 2237, *Multi-Point Interconnection Power Cable Assemblies for Industrial Machinery* , for examples of standards on male and female fittings in other than hazardous (classified) locations.

Cable Joint.

A connection consisting of an insulation system and a connector where two (or more) medium voltage (Type MV) cables are joined together. (CMP-6)

Cable Management System.

An apparatus designed to control and organize lengths of cable or cord. (CMP-12)

Cable Routing Assembly.

A single channel or connected multiple channels, as well as associated fittings, forming a structural system that is used to support and route communications wires and cables, optical fiber cables, data cables associated with information technology and communications equipment, Class 2, Class 3, Class 4, and Type PLTC cables, and power-limited fire alarm cables in plenum, riser, and general-purpose applications. (CMP-3)

Cable Sheath.

A single or multiple layers of a protective covering that holds and protects the conductors or optical fibers, or both, contained inside. (CMP-3)

Cable System, Fire-Resistive. (Fire-Resistive Cable System)

A cable and components used to ensure survivability of critical circuits for a specified time under fire conditions. (CMP-3)

Cable System, Flat Conductor. (Flat Conductor Cable System)

A complete wiring system for branch circuits that is designed for installation under carpet squares. (324) (CMP-6)

> Informational Note: The FCC system includes Type FCC cable and associated shielding, connectors, terminators, adapters, boxes, and receptacles.

Cable Termination.

A connection consisting of an insulation system and a connector and installed on a medium voltage (Type MV) cable to connect from a cable to a device, such as equipment. (CMP-6)

Cable Tie.

A band or length of material employing a locking device, used for bundling, securing, and/or supporting cable, flexible conduit, or flexible tubing.

> Informational Note: The following are cable tie and cable tie fixing device type designations:
>
> (1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.
>
> (2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tie Fixing Device.

A component, such as a block or bracket, specifically designed to secure cable tie(s) to a mounting surface.

Informational Note: The following are cable tie and cable tie fixing device type designations:

(1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

(2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tie Integral Device.

A single component, as produced, incorporating a cable tie and a cable tie fixing device that are not separable.

Note: The following are cable tie and cable tie fixing device type designations:

(1) Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

(2) Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Cable Tray System.

A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways. (CMP-8)

Cablebus.

An assembly of units or sections with insulated conductors having associated fittings forming a structural system used to securely fasten or support conductors and conductor terminations in a completely enclosed, ventilated, protective metal housing. This assembly is designed to carry fault current and to withstand the magnetic forces of such current. (CMP-8)

Informational Note: Cablebus is ordinarily assembled at the point of installation from the components furnished or specified by the manufacturer in accordance with instructions for the specific job.

Cannabis Oil Booths.

Enclosed areas used to house cannabis oil equipment and systems.

Informational Note: Cannabis oil booths can be designed to house a single piece or multiple pieces of cannabis oil equipment. Booths range in size and can be large enough to permit entrance of personnel to perform the processing tasks.

Cannabis Oil Extraction Equipment.

Equipment that uses flammable materials (solvents) in the process of extracting the plant oil from the plant material.

Informational Note: Extraction equipment can use flammable materials as solvents to extract the plant oil from the plant material by saturating the plant material in a vented container, sealed container, or pressure vessel. Typical flammable materials used in the extraction process include butane, ethanol, hexane, pentane, propane, and LPG.

Cannabis Oil Post-Processing Equipment.

Equipment that is used in the final processing stages of the extracted plant oil (e.g., vacuum ovens, rotary evaporators, solvent recovery pumps).

Cannabis Oil Preparatory Equipment.

Equipment that is used to prepare the plant material for subsequent extraction of the plant oil (e.g., trimming, deseeding, drying/curing).

Cannabis Oil Systems.

Any combination of cannabis oil equipment needed for the overall extraction process (e.g., cannabis oil preparatory equipment, cannabis oil extraction equipment, cannabis oil booths, cannabis oil post-processing equipment).

Cell (as applied to batteries).

The basic electrochemical unit, characterized by an anode and a cathode, used to receive, store, and deliver electrical energy. (CMP-13)

Cell, Sealed. (Sealed Cell)

A cell that has no provision for the routine addition of water or electrolyte or for external measurement of electrolyte specific gravity and might contain pressure relief venting. (CMP-13)

Cell Line.

An assembly of electrically interconnected electrolytic cells supplied by a source of direct-current power. (CMP-12)

Cell Line Attachments and Auxiliary Equipment.

A term that includes, but is not limited to, auxiliary tanks; process piping; ductwork; structural supports; exposed cell line conductors; conduits and other raceways; pumps, positioning equipment, and cell cutout or bypass electrical devices. Auxiliary equipment includes tools, welding machines, crucibles, and other portable equipment used for operation and maintenance within the electrolytic cell line working zone. In the cell line working zone, auxiliary equipment includes the exposed conductive surfaces of ungrounded cranes and crane-mounted cell-servicing equipment. (668) (CMP-12)

Charge Controller.

Equipment that controls dc voltage or dc current, or both, and that is used to charge a battery or other energy storage device. (CMP-13)

Charger Power Converter.

The device used to convert energy from the power grid to a high-frequency output for wireless power transfer. (625) (CMP-12)

Child Care Facility.

A building or structure, or portion thereof, for educational, supervisory, or personal care services for more than four children 7 years old or less. (406) (CMP-18)

Circuit, Power-Limited. (Power-Limited Circuit)

An electrical circuit that is designed to provide acceptable protection from fire initiation and electrical shock by limiting the amount of power delivered into a fault by the power supply. (CMP-3)

Circuit Breaker.

A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating. (CMP-10)

Informational Note: The automatic opening means can be integral, direct acting with the circuit breaker, or remote from the circuit breaker.

Circuit Breaker, Adjustable. (Adjustable Circuit Breaker)

A qualifying term indicating that the circuit breaker can be set to trip at various values of current, time, or both, within a predetermined range. (CMP-10)

Circuit Breaker, Instantaneous Trip. (Instantaneous Trip Circuit Breaker)

A qualifying term indicating that no delay is purposely introduced in the tripping action of the circuit breaker. (CMP-10)

Circuit Breaker, Inverse Time. (Inverse Time Circuit Breaker)

A qualifying term indicating that there is a delay purposely introduced in the tripping action of the circuit breaker, and the delay decreases as the magnitude of the current increases. (CMP-10)

Circuit Breaker, Nonadjustable. (Nonadjustable Circuit Breaker)

A qualifying term indicating that the circuit breaker does not have any adjustment to alter the value of the current at which it will trip or the time required for its operation. (CMP-10)

Class 1 Circuit.

The portion of the wiring system between the load side of the Class 1 power source and the connected equipment. (CMP-3)

Class 2 Circuit.

The portion of the wiring system between the load side of a Class 2 power source and the connected equipment. (CMP-3)

> Informational Note: The design of a Class 2 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock due to its power limitations.

Class 3 Circuit.

The portion of the wiring system between the load side of a Class 3 power source and the connected equipment. (CMP-3)

> Informational Note: The design of a Class 3 circuit considers safety from a fire initiation standpoint. Since higher levels of voltage and current than a Class 2 circuit are permitted, additional safeguards are specified to provide acceptable protection from electric shock.

Class 4 Circuit.

The portion of the wiring system between the load side of a Class 4 transmitter and the Class 4 receiver or Class 4 utilization equipment, as appropriate. (CMP-3)

> Informational Note No. 1: A Class 4 circuit is also commonly referred to as a fault-managed power circuit.
>
> Informational Note No. 2: Due to the active monitoring and control of the voltage and current provided, a Class 4 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock.

Class 4 Device.

Any active device connected to the Class 4 circuit; examples include a Class 4 transmitter, a Class 4 receiver, or Class 4 utilization equipment. (CMP-3)

Class 4 Power System.

An actively monitored and controlled system consisting of one or more Class 4 transmitters and one or more Class 4 receivers connected by a cabling system. (CMP-3)

Class 4 Receiver.

A device that accepts Class 4 power and converts it for use by utilization equipment. (CMP-3)

Class 4 Transmitter.

A device that sources Class 4 power. (726) (CMP-3)

> Informational Note: A Class 4 transmitter is different from traditional power sources in that it monitors the line for faults (both line-to-line and line-to-ground) and ceases power transmission if a fault is sensed.

Class 4 Utilization Equipment.

Devices that are directly powered by a Class 4 transmitter without the need for a separate Class 4 receiver (the receiver is integrated into the equipment). (CMP-3)

Closed Construction.

Any building, building component, assembly, or system manufactured in such a manner that all concealed parts of processes of manufacture cannot be inspected after installation at the building site without disassembly, damage, or destruction. (545) (CMP-7)

Clothes Closet.

A nonhabitable room or space intended primarily for storage of garments and apparel. (CMP-1)

Clothes Closet Storage Space.

The area within a clothes closet in which combustible materials can be kept. (410) (CMP-18)

Collector Rings.

An assembly of slip rings for transferring electric energy from a stationary to a rotating member. (675) (CMP-7)

Combiner (DC). (dc Combiner) (Direct-Current Combiner)

An enclosure that includes devices used to connect two or more PV system dc circuits in parallel. (690) (CMP-4)

Combustible Dust.

Solid particles that are 500 µm or smaller (i.e., material passing a U.S. No. 35 Standard Sieve as defined in ASTM E11-17, *Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves*) that can form an explosible mixture when suspended in air at standard atmospheric pressure and temperature. [**499:** 3.3.3] (CMP-14)

> Informational Note: See ASTM E1226, *Standard Test Method for Explosibility of Dust Clouds* ; ISO 6184-1, *Explosion protection systems — Part 1: Determination of explosion indices of combustible dusts in air* ; or ANSI/UL 80079-20-2, *Explosive Atmospheres — Part 20-2: Material Characteristics — Combustible Dusts Test Methods* , for procedures for determining the explosibility of dusts. Historically, explosibility has been described as presenting a flash fire or explosion hazard. It could be understood that potential hazards due to the formation of an explosible mixture when suspended in air at standard atmospheric pressure and temperature would include ignition.

Combustible Gas Detection System.

A protection technique utilizing stationary gas detectors in industrial establishments. (CMP-14)

Commissioning.

The process, procedures, and testing used to set up and verify the initial performance, operational controls, safety systems, and sequence of operation of electrical devices and equipment, prior to it being placed into active service. (CMP-13)

Communications, Data. (Data Communications)

The transfer and reception of information in the form of a digital bitstream or a digitized analog signal transmitted over a point-to-point or point-to-multipoint arrangement. (CMP-16)

Communications Circuit.

A metallic, fiber, or wireless circuit that provides voice/data (and associated power) for communications-related services between communications equipment. (CMP-16)

Informational Note: Because communications can be carried over conductors with power, meeting both this definition and the definition for a powering circuit is possible (e.g., a power line communications device may be used on a branch circuit). The addition of data to a power line circuit does not change the treatment of the circuit in this code.

Communications Circuit, Network-Powered Broadband. (Network-Powered Broadband Communications Circuit)

The circuit extending from the communications utility's or service provider's serving terminal or tap up to and including the network interface unit (NIU). (830) (CMP-16)

Informational Note: A typical one-family dwelling network-powered communications circuit consists of a communications drop or communications service cable and an NIU and includes the communications utility's serving terminal or tap where it is not under the exclusive control of the communications utility.

Communications Circuit, Premises. (Premises Communications Circuit)

The circuit that extends voice, audio, video, data, interactive services, telegraph (except radio), and outside wiring for fire alarm and burglar alarm from the service provider's network terminal to the customer's communications equipment. (840) (CMP-16)

Communications Equipment.

The electronic equipment that performs the telecommunications operations for the transmission of audio, video, and data, and includes power equipment (e.g., dc converters, inverters, and batteries), technical support equipment (e.g., computers), and conductors dedicated solely to the operation of the equipment. (CMP-16)

Informational Note: As the telecommunications network transitions to a more data-centric network, computers, routers, servers, and their powering equipment, are becoming essential to the transmission of audio, video, and data and are finding increasing application in communications equipment installations.

Communications Service Provider.

An organization, business, or individual that offers communications service to others. (CMP-16)

Communications System.

The communications equipment, communication circuits, and manual and machine operations necessary for the transmission, movement, and reception of information (e.g., voice, audio, data). (CMP-16)

Communications Utility.

An organization designated or recognized by an entity such as a public service commission or public utility commission, or recognized as such under federal, state, or local law. (CMP-16)

Community Antenna Television Circuit (CATV).

The circuit that extends community antenna television systems for audio, video, data, and interactive services from the service provider's network terminal to the appropriate customer equipment. (CMP-16)

Concealable Nonmetallic Extension.

A listed assembly of two, three, or four insulated circuit conductors within a nonmetallic jacket, an extruded thermoplastic covering, or a sealed nonmetallic covering. The classification includes surface extensions intended for mounting directly on the surface of walls or ceilings and concealed with paint, texture, joint compound, plaster, wallpaper, tile, wall paneling, or other similar materials. (CMP-6)

Concealed.

Rendered inaccessible by the structure or finish of the building. (CMP-1)

Informational Note: Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them.

Concealed Knob-and-Tube Wiring.

A wiring method using knobs, tubes, and flexible nonmetallic tubing for the protection and support of single insulated conductors. (CMP-6)

Conductor, Bare. (Bare Conductor)

A conductor having no covering or electrical insulation whatsoever. (CMP-6)

Conductor, Copper-Clad Aluminum. (Copper-Clad Aluminum Conductor)

Conductor drawn from a copper-clad aluminum rod, with the copper metallurgically bonded to an aluminum core. (CMP-6)

Conductor, Covered. (Covered Conductor)

A conductor encased within material of composition or thickness that is not recognized by this code as electrical insulation. (CMP-6)

Conductor, Insulated. (Insulated Conductor)

A conductor encased within material of composition and thickness that is recognized by this code as electrical insulation. (CMP-6)

Conductor, Insulated. (Insulated Conductor)

Overhead service conductor encased in a polymeric material adequate for the applied nominal voltage and any conductor types described in 310.4. (396) (CMP-6)

Informational Note: See ICEA S-76-474-2011, *Standard for Neutral Supported Power Cable Assemblies with Weather-Resistant Extruded Insulation Rated 600 Volts* , for information about overhead service conductors.

Conductors, Outdoor Overhead. (Outdoor Overhead Conductors)

Single conductors, insulated, covered, or bare, installed outdoors on support structures in free air. (395) (CMP-6)

Conduit, Flexible Metal (FMC). (Flexible Metal Conduit)

A raceway of circular cross section made of helically wound, formed, interlocked metal strip. (CMP-8)

Conduit, High Density Polyethylene (HDPE). (High Density Polyethylene Conduit)

A nonmetallic raceway of circular cross section, with associated couplings, connectors, and fittings for the installation of electrical conductors. (CMP-8)

Conduit, Intermediate Metal (IMC). (Intermediate Metal Conduit)

A steel threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and appropriate fittings. (CMP-8)

Conduit, Liquidtight Flexible Metal (LFMC). (Liquidtight Flexible Metal Conduit)

A raceway of circular cross section having an outer liquidtight, nonmetallic, sunlight-resistant jacket over an inner flexible metal core with associated couplings, connectors, and fittings for the installation of electric conductors. (CMP-8)

Conduit, Liquidtight Flexible Nonmetallic (LFNC). (Liquidtight Flexible Nonmetallic Conduit)

A raceway of circular cross section of various types as follows:

(1) A smooth seamless inner core and cover bonded together and having one or more reinforcement layers between the core and covers, designated as LFNC-A

(2) A smooth inner surface with integral reinforcement within the raceway wall, designated as LFNC-B

(3) A corrugated internal and external surface without integral reinforcement within the raceway wall, designated as LFNC-C

(CMP-8)

Informational Note: FNMC is an alternative designation for LFNC.

Conduit, Nonmetallic Underground with Conductors (NUCC). (Nonmetallic Underground Conduit with Conductors)

A factory assembly of conductors or cables inside a nonmetallic, smooth wall raceway with a circular cross section. (CMP-8)

Conduit, Reinforced Thermosetting Resin (RTRC). (Reinforced Thermosetting Resin Conduit)

A rigid nonmetallic raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables. (CMP-8)

Conduit, Rigid Metal (RMC). (Rigid Metal Conduit)

A threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and appropriate fittings. (CMP -8)

Conduit, Rigid Polyvinyl Chloride (PVC). (Rigid Polyvinyl Chloride Conduit)

A rigid nonmetallic raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables. (CMP-8)

Conduit Body.

A separate portion of a conduit or tubing system that provides access through a removable cover(s) to the interior of the system at a junction of two or more sections of the system or at a terminal point of the system.

Boxes such as FS and FD or larger cast or sheet metal boxes are not classified as conduit bodies. (CMP-8)

Connector.

An electromechanical fitting. (393) (CMP-18)

Connector, Intercell. (Intercell Connector)

An electrically conductive bar or cable used to connect adjacent cells. (CMP-13)

Connector, Intertier. (Intertier Connector)

An electrical conductor used to connect two cells on different tiers of the same rack or different shelves of the same rack. (CMP-13)

Connector, Load. (Load Connector)

An electromechanical connector used for power from the busbar to utilization equipment. (393) (CMP-18)

Connector, Pendant. (Pendant Connector)

An electromechanical or mechanical connector used to suspend low-voltage luminaire or utilization equipment below the grid rail and to supply power to connect from the busbar to utilization equipment. (393) (CMP-18)

Connector, Power Feed. (Power Feed Connector)

An electromechanical connector used to connect the power supply to a power distribution cable, to connect directly to the busbar, or to connect from a power distribution cable to the busbar. (393) (CMP-18)

Connector, Pressure (Solderless). (Pressure Connector)

A device that establishes a connection between two or more conductors or between one or more conductors and a terminal by means of mechanical pressure and without the use of solder. (CMP-1)

Connector, Rail to Rail. (Rail to Rail Connector)

An electromechanical connector used to interconnect busbars from one ceiling grid rail to another grid rail. (393) (CMP-18)

Connector Strip.

A metal wireway containing pendant or flush receptacles. (520) (CMP-15)

Container (as applied to batteries).

A single-cell or multicell vessel or jar that holds the plates, electrolyte, and other elements of a single unit in a battery. (CMP-13)

Continuous Load.

A load where the maximum current is expected to continue for 3 hours or more. (CMP-2)

Control.

The predetermined process of connecting, disconnecting, increasing, or reducing electric power. (130) (CMP-13)

Control Circuit.

The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller but does not carry the main power current. (CMP-11)

Control Circuits, Fault-Tolerant External. (Fault-Tolerant External Control Circuits)

Those control circuits either entering or leaving the fire pump controller enclosure, which if broken, disconnected, or shorted will not prevent the controller from starting the fire pump from all other internal or external means and may cause the controller to start the pump under these conditions. (695) (CMP-13)

Control Device, Emergency Lighting (ELCD). (Emergency Lighting Control Device)

A separate or integral device intended to perform one or more emergency lighting control functions. (700) (CMP-13)

Informational Note: See UL 924, *Emergency Lighting and Power Equipment* , for information covering emergency lighting control devices.

Control Drawing.

A drawing or other document provided by the manufacturer of the intrinsically safe or associated apparatus, or of the nonincendive field wiring apparatus or associated nonincendive field wiring apparatus, that details the allowed interconnections between the intrinsically safe and associated apparatus or between the nonincendive field wiring apparatus or associated nonincendive field wiring apparatus. (CMP-14)

Informational Note: See the following standards for additional information:

(1) ANSI/ISA/UL 120202, *Recommendations for the Preparation, Content, and Organization of Intrinsic Safety Control Drawings*

(2) ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations*

(3) ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"*

(4) ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations*

(5) ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety*

Control Room.

An enclosed control space outside the hoistway, intended for full bodily entry, that contains the elevator motor controller. The room could also contain electrical and/or mechanical equipment used directly in connection with the elevator or dumbwaiter but not the electric driving machine or the hydraulic machine. (620) (CMP-12)

Control Space.

A space inside or outside the hoistway intended to be accessed with or without full bodily entry that contains the elevator motor controller. This space could also contain electrical and/or mechanical equipment used directly in connection with the elevator, dumbwaiter, escalator, moving walk, or platform lift, but not the electrical driving machine or the hydraulic machine. (620) (CMP-12)

Control System.

The overall system governing the starting, stopping, direction of motion, acceleration, speed, and retardation of the moving member. (620) (CMP-12)

Controller.

A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected. (CMP-1)

Controller, Motion. (Motion Controller)

The electrical device(s) for that part of the control system that governs the acceleration, speed, retardation, and stopping of the moving member. (620) (CMP-12)

Informational Note: The motor control function may be integral to the motion controller.

Controller, Motor. (Motor Controller)

Any switch or device that is normally used to start and stop a motor by making and breaking the motor circuit current. (CMP-11)

Controller, Operation. (Operation Controller)

The electrical device(s) for that part of the control system that initiates the starting, stopping, and direction of motion in response to a signal from an operating device. (620) (CMP-12)

Converter, DC-to-DC. (DC-to-DC Converter)

A device that can provide an output dc voltage and current at a higher or lower value than the input dc voltage and current. (CMP-4)

Converter Circuit, DC-to-DC. (DC-to-DC Converter Circuit)

The dc circuit conductors connected to the output of a dc-to-dc converter. (CMP-4)

Converting Device.

That part of the heating equipment that converts input mechanical or electrical energy to the voltage, current, and frequency used for the heating applicator. A converting device consists of equipment using line frequency, all static multipliers, oscillator-type units using vacuum tubes, inverters using solid-state devices, or motor-generator equipment. (665) (CMP-12)

Cooking Unit, Counter-Mounted. (Counter-Mounted Cooking Unit)

A cooking appliance designed for mounting in or on a counter and consisting of one or more heating elements, internal wiring, and built-in or mountable controls. (CMP-2)

Coordination, Selective. (Selective Coordination)

Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the selection and installation of overcurrent protective devices and their ratings or settings for the full range of available overcurrents, from overload to the available fault current, and for the full range of overcurrent protective device opening times associated with those overcurrents. (CMP-10)

Cord, Flexible. (Flexible Cord)

Two or more flexible insulated conductors enclosed in a flexible covering. (CMP-6)

Cord Connector.

A contact device terminated to a flexible cord that accepts an attachment plug or other insertion device. (CMP-6)

Cord Connector [as applied to hazardous (classified) locations].

A fitting intended to terminate a cord to a box or similar device and reduce the strain at points of termination and might include an explosionproof, a dust-ignitionproof, or a flameproof seal. (CMP-14)

Cord Set.

A length of flexible cord having an attachment plug at one end and a cord connector at the other end. (CMP-6)

Corrosive Environment.

Areas or enclosures without adequate ventilation, where electrical equipment is located and pool sanitation chemicals are stored, handled, or dispensed . (680) (CMP-17).

Informational Note No. 1: See *Advisory: Swimming Pool Chemical: Chlorine* , OSWER 90-008.1, June 1990, available from the EPA National Service Center for Environmental Publications (NSCEP) as sanitation chemicals and pool water are considered to pose a risk of corrosion (gradual damage or destruction of materials) due to the presence of oxidizers (e.g., calcium hypochlorite, sodium hypochlorite, bromine, chlorinated isocyanurates) and chlorinating agents that release chlorine when dissolved in water.

Informational Note No. 2: See ANSI/APSP-11, *Standard for Water Quality in Public Pools and Spas* , ANSI/ASHRAE 62.1, Table 6-4 Minimum Exhaust Rates, and *2021 International Swimming Pool and Spa Code (ISPSC)* , Section 324, including associated definitions and requirements concerning adequate ventilation of indoor spaces such as equipment and chemical storage rooms, which can reduce the likelihood of the accumulation of corrosive vapors. Chemicals such as chlorine cause severe corrosive and deteriorating effects on electrical connections, equipment, and enclosures when stored and kept in the same vicinity.

Counter (Countertop).

A fixed or stationary surface typically intended for food or beverage preparation, food or beverage serving, personal lavation, or laundering or a similar surface that presents a routine risk of spillage of larger quantities of liquids upon outlets mounted directly on or in the surface. (CMP-2)

Informational Note No. 1: See UL 498, *Receptacles and Attachment Plugs* , and UL 943, *Ground-Fault Circuit Interrupters* , which establish the performance evaluation criteria and construction criteria.

Informational Note No. 2: See 406.14(E) , 406.14(G)(1) , and 406.14(H) for information on receptacles for counters and countertops distinguished from receptacles for work surfaces.

Crane.

A mechanical device used for lifting or moving boats. [**303:** 3.3.6] (555) (CMP-7)

Critical Branch.

A system of feeders and branch circuits supplying power for task illumination, fixed equipment, select receptacles, and select power circuits serving areas and functions related to patient care that are automatically connected to alternate power sources by one or more transfer switches during interruption of the normal power source. [**99:** 3.3.30] (517) (CMP-15)

Critical Operations Areas, Designated (DCOA). (Designated Critical Operations Areas)

Areas within a facility or site designated as requiring critical operations power. (CMP-13)

Critical Operations Data System.

An information technology equipment system that requires continuous operation for reasons of public safety, emergency management, national security, or business continuity. (645) (CMP-12)

Critical Operations Power Systems (COPS).

Power systems for facilities or parts of facilities that require continuous operation for the reasons of public safety, emergency management, national security, or business continuity. (CMP-13)

Current-Limiting (as applied to overcurrent protection devices).

The ability to, when interrupting currents in its current-limiting range, reduce the current flowing in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit if the device were replaced with a solid conductor having comparable impedance. (CMP-10)

Cutout Box.

An enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the enclosure. (CMP-8)

Data Center, Modular (MDC). (Modular Data Center)

Prefabricated units, rated 1000 volts or less, consisting of an outer enclosure housing multiple racks or cabinets of information technology equipment (ITE) (e.g., servers) and various support equipment, such as electrical service and distribution equipment, HVAC systems, and the like. (646) (CMP-12)

Informational Note: A typical construction may use a standard ISO shipping container or other structure as the outer enclosure, racks or cabinets of ITE, service-entrance equipment and power distribution components, power storage such as a UPS, and an air or liquid cooling system. Modular data centers are intended for fixed installation, either indoors or outdoors, based on their construction and resistance to environmental conditions. MDCs can be configured as an all-in-one system housed in a single equipment enclosure or as a system with the support equipment housed in separate equipment enclosures.

DC Plugging Box.

A dc device consisting of one or more 2-pole, 2-wire, nonpolarized, non-grounding-type receptacles intended to be used on dc circuits only. (530) (CMP-15)

Dead-Front.

Without live parts exposed to a person on the operating side of the equipment. (CMP-9)

Demand Factor.

The ratio of the maximum demand of a system, or part of a system, to the total connected load of a system or the part of the system under consideration. (CMP-2)

Dental Office.

A building or part thereof in which the following occur:

(1) Examinations and minor treatments/procedures performed under the continuous supervision of a dental professional;

(2) Use of limited to minimal sedation and treatment or procedures that do not render the patient incapable of self-preservation under emergency conditions; and

(3) No overnight stays for patients or 24-hour operations.

[**99:** 3.3.38] (CMP-15)

Deploy (Deployed).

The use of portable equipment for the duration required by the event or production for which it is used. (CMP-15)

Device.

A unit of an electrical system, other than a conductor, that carries or controls electric energy as its principal function. (CMP-1)

Dielectric Heating.

Heating of a nominally insulating material due to its own dielectric losses when the material is placed in a varying electric field. (665) (CMP-12)

Disconnecting Means.

A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply. (CMP-1)

Distribution Point (Center Yard Pole) (Meter Pole).

An electrical supply point from which service drops, service conductors, feeders, or branch circuits to buildings or structures utilized under single management are supplied. (547) (CMP-7)

Informational Note: The service point is typically located at the distribution point.

Diversion Controller (Diversion Charge Controller) (Diversion Load Controller).

Equipment that regulates the output of a source or charging process by diverting power to direct-current or alternating-current loads or to an interconnected utility service. (CMP-13)

Diversion Load.

A load connected to a diversion charge controller or diversion load controller, also known as a dump load. (CMP-4)

Docking Facility.

A covered or open, fixed or floating structure that provides access to the water and to which boats are secured. [**303:** 3.3.7] (555) (CMP-7)

Dormitory.

A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities. (CMP 2) [**101:** 3.3.68]

Informational Note: Rooms within dormitories intended for the use of individuals for combined living and sleeping purposes are guest rooms or guest suites. Examples of dormitories are college dormitories, fraternity and sorority houses, and military barracks. [**101:** A.3.3.68] (CMP 2)

Drop Box.

A box containing pendant- or flush-mounted receptacles attached to a multiconductor cable via strain relief or a multipole connector. (520) (CMP-15)

Dust-Ignitionproof.

Equipment enclosed in a manner that excludes dusts and does not permit arcs, sparks, or heat otherwise generated or liberated inside of the enclosure to cause ignition of exterior accumulations or atmospheric suspensions of a specified dust on or in the vicinity of the enclosure. (CMP-14)

Informational Note No. 1: See ANSI/UL 1203, *Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations* , for information on dust-ignitionproof enclosures.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)* , for information on dust-ignitionproof enclosures that are sometimes additionally marked Type 9.

Dusttight.

Enclosures constructed so that dust will not enter under specified test conditions. (CMP-14)

Informational Note No. 1: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)*, and ANSI/UL 50E, *Enclosures for Electrical Equipment, Environmental Considerations* , for additional information on enclosure Types 3, 3X, 3S, 3SX, 4, 4X, 5, 6, 6P, 12, 12K, and 13 that are considered dusttight.

Duty, Continuous. (Continuous Duty)

Operation at a substantially constant load for an indefinitely long time. (CMP-1)

Duty, Intermittent. (Intermittent Duty)

Operation for alternate intervals of (1) load and no load; or (2) load and rest; or (3) load, no load, and rest. (CMP-1)

Duty, Periodic. (Periodic Duty)

Intermittent operation in which the load conditions are regularly recurrent. (CMP-1)

Duty, Short-Time. (Short-Time Duty)

Operation at a substantially constant load for a short and definite, specified time. (CMP-1)

Duty, Varying. (Varying Duty)

Operation at loads, and for intervals of time, both of which may be subject to wide variation. (CMP-1)

Dwelling, One-Family. (One-Family Dwelling)

A building that consists solely of one dwelling unit. (CMP-1)

Dwelling, Two-Family. (Two-Family Dwelling)

A building that consists solely of two dwelling units. (CMP-1)

Dwelling, Multifamily. (Multifamily Dwelling)

A building that contains three or more dwelling units. (CMP-1)

Dwelling Unit.

A single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, and sanitation. (CMP-2)

Electric-Discharge Lighting.

Systems of illumination utilizing fluorescent lamps, high-intensity discharge (HID) lamps, or neon tubing. (CMP-18)

Electric Power Production and Distribution Network.

Power production, distribution, and utilization equipment and facilities, such as electric utility systems that are connected to premises wiring and are external to and not controlled by a system that operates in interactive mode. (CMP-13)

Electric Self-Propelled Vehicle (ESV).

A vehicle or marine vessel, other than an EV, such as farm equipment, boats, aircraft, and golf carts, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. (627) (CMP-12)

Electric Self-Propelled Vehicle Power Export Equipment (ESVPE).

The equipment, including the outlet on the electric self-propelled vehicle (ESV), that is used to provide electrical power at voltages greater than or equal to 30 Vac or 60 Vdc to loads external to the ESV, using the vehicle as the source of supply. (627) (CMP-12)

Informational Note: Electric self-propelled vehicle power export equipment and electric self-propelled vehicle supply equipment or wireless power transfer equipment are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional electric self-propelled vehicle supply equipment (ESVSE) or bidirectional wireless power transfer equipment (WPTE).

Electric Self-Propelled Vehicle Supply Equipment (ESVSE).

Equipment for plug-in charging, including the ungrounded, grounded, and equipment grounding conductors, and the electric self-propelled vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. (627) (CMP-12)

Informational Note: Electric self-propelled vehicle power export equipment and electric self-propelled vehicle supply equipment or wireless power transfer equipment (WPTE) are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional ESVSE or bidirectional WPTE.

Electric Supply Stations.

Locations containing the generating stations and substations, including their associated generator, storage battery, transformer, and switchgear areas. (CMP-4)

Electric Vehicle (EV).

An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and electric motorcycles, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are electric vehicles having a second source of motive power. (CMP-12)

Informational Note: Off-road, self-propelled electric mobile machines, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, and boats are not considered electric vehicles.

Electric Vehicle Connector.

A device that, when electrically coupled (conductive or inductive) to an electric vehicle inlet, establishes an electrical connection to the electric vehicle for the purpose of power transfer and information exchange. (625) (CMP-12)

Informational Note: See 625.48 for further information on interactive systems.

Electric Vehicle Power Export Equipment (EVPE).

The equipment, including the outlet on the electric vehicle, that is used to provide electrical power at voltages greater than or equal to 30 Vac or 60 Vdc to loads external to the electric vehicle, using the electric vehicle as the source of supply. (625) (CMP-12)

Informational Note: Electric vehicle power export equipment and electric vehicle supply equipment or wireless power transfer equipment are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional electric vehicle supply equipment (EVSE) or bidirectional wireless power transfer equipment (WPTE).

Electric Vehicle Supply Equipment (EVSE).

Equipment for plug-in charging, including the ungrounded, grounded, and equipment grounding conductors, and the electric vehicle connectors, attachment plugs, personnel protection system, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. (625) (CMP-12)

Informational Note: Electric vehicle power export equipment and electric vehicle supply equipment or wireless power transfer equipment (WPTE) are sometimes contained in one piece of equipment, sometimes referred to as a bidirectional EVSE or bidirectional WPTE.

Electrical Circuit Protective System.

A system consisting of components and materials intended for installation as protection for specific electrical wiring systems with respect to the disruption of electrical circuit integrity upon exterior fire exposure. (CMP-16)

Electrical Datum Plane.

A specified vertical distance above the normal high-water level at which electrical equipment can be installed and electrical connections can be made. (CMP-7)

Electrical Ducts.

Electrical conduits, or other raceways round in cross section, that are suitable for use underground or embedded in concrete. (CMP-6)

Electrical Life Support Equipment.

Electrically powered equipment whose continuous operation is necessary to maintain a patient's life. [**99** :3.3.45] (517) (CMP-15)

Electrical Resistance Trace Heating "60079-30-1".

Type of protection for the purpose of producing heat on the principle of electrical resistance and typically composed of one or more metallic conductors and/or an electrically conductive material, suitably electrically insulated and protected. (CMP-14)

Informational Note: See ANSI/UL 60079-30-1, *Explosive Atmospheres — Part 30-1: Electrical Resistance Trace Heating — General and Testing Requirements* , for additional information.

Electrically Connected.

A connection capable of carrying current as distinguished from connection through electromagnetic induction. (668) (CMP-12)

Electrified Truck Parking Space.

A truck parking space that has been provided with an electrical system that allows truck operators to connect their vehicles while stopped and to use off-board power sources in order to operate on-board systems such as air conditioning, heating, and appliances, without any engine idling. (626) (CMP-12)

Informational Note: An electrified truck parking space also includes dedicated parking areas for heavy-duty trucks at travel plazas, warehouses, shipper and consignee yards, depot facilities, and border crossings. It does not include areas such as the shoulders of highway ramps and access roads, camping and recreational vehicle sites, residential and commercial parking areas used for automotive parking or other areas where ac power is provided solely for the purpose of connecting automotive and other light electrical loads, such as engine block heaters, and at private residences.

Electrified Truck Parking Space Wiring Systems.

All of the electrical wiring, equipment, and appurtenances related to electrical installations within an electrified truck parking space, including the electrified parking space supply equipment. (626) (CMP-12)

Electrolyte.

The medium that provides the ion transport mechanism between the positive and negative electrodes of a cell. (CMP-13)

Electrolytic Cell.

A tank or vat in which electrochemical reactions are caused by applying electric energy for the purpose of refining or producing usable materials. (668) (CMP-12)

Electrolytic Cell Line Working Zone.

The space envelope wherein operation or maintenance is normally performed on or in the vicinity of exposed energized surfaces of electrolytic cell lines or their attachments. (668) (CMP-12)

Electronic Power Converter.

A device that uses power electronics to convert one form of electrical power into another form of electrical power. (CMP-4)

Informational Note: Examples of electronic power converters include, but are not limited to, inverters, dc-to-dc converters, and electronic charge controllers. These devices have limited current capabilities based on the device ratings at continuous rated power.

Electronically Protected.

A motor provided with electronic control that is an integral part of the motor and protects the motor against dangerous overheating due to failure of the electronic control, overload, and failure to start. (430) (CMP-11)

Emergency Luminaire, Battery-Equipped. (Battery-Equipped Emergency Luminaire)

A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. (CMP-13)

Emergency Luminaire, Directly Controlled (DCEL). (Directly Controlled Emergency Luminaire)

A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13)

Informational Note: See ANSI/UL 924, *Emergency Lighting and Power Equipment* , for information covering directly controlled emergency luminaires.

Emergency Power Supply (EPS).

The source(s) of electric power of the required capacity and quality for an emergency power supply system (EPSS). (CMP-13)

Emergency Power Supply System (EPSS).

A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [**110:** 3.3.4] (CMP-13)

Emergency Systems.

Those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction. These systems are intended to automatically supply illumination, power, or both, to designated areas and equipment in the event of failure of the normal supply or in the event of accident to elements of a system intended to supply, distribute, and control power and illumination essential for safety to human life. (CMP-13)

Encapsulation "m".

Type of protection where electrical parts that could ignite an explosive atmosphere by either sparking or heating are enclosed in a compound in such a way that this explosive atmosphere cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 60079-18, *Explosive atmospheres — Part 18: Equipment protection by encapsulation "m"*, for additional information.

Enclosed.

Surrounded by a case, housing, fence, or wall(s) that prevents persons from accidentally contacting energized parts. (CMP-1)

Enclosed-Break.

Having electrical make-or-break contacts such that, if an internal explosion of the flammable gas or vapor that can enter it occurs, the device will withstand the internal explosion without suffering damage and without communicating the internal explosion to the external flammable gas or vapor. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Enclosure.

The case or housing of apparatus or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage. (CMP-1)

Informational Note: See Table 110.28 for examples of enclosure types.

Energized.

Electrically connected to, or is, a source of voltage. (CMP-1)

Energized, Likely to Become. (Likely to Become Energized)

Conductive material that could become energized because of the failure of electrical insulation or electrical spacing. (CMP-5)

Energy Management System (EMS).

A system that monitors and controls power within an electrical system. (CMP-13)

Energy Storage System (ESS).

One or more devices, assembled together, capable of storing energy to supply electrical energy at a future time. [**855:** 3.3.9] (CMP-13)

Informational Note No. 1: An ESS(s) can include but is not limited to batteries, capacitors, and kinetic energy devices (e.g., flywheels and compressed air). An ESS(s) can include inverters or converters to change voltage levels or to make a change between an ac or a dc system.

Informational Note No. 2: These systems differ from a stationary standby battery installation where a battery spends the majority of the time on continuous float charge or in a high state of charge, in readiness for a discharge event.

Entertainment Device.

A mechanical or electromechanical device that provides an entertainment experience. (522) (CMP-15)

Informational Note: These devices can include animated props, show action equipment, animated figures, and special effects, coordinated with audio and lighting to provide an entertainment experience.

Equipment.

A general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like used as a part of, or in connection with, an electrical installation. (CMP-1)

Equipment, Interconnection. (Interconnection Equipment)

Equipment that performs protective and control functions that enables power sources, or systems supplied by power sources, to operate in parallel with, separate from, and reconnect to systems supplied by other power sources. (CMP-4)

Equipment, Mobile. (Mobile Equipment)

Equipment with electrical components that is suitable to be moved only with mechanical aids or is provided with wheels for movement by a person(s) or powered devices. (513) (CMP-14)

Equipment, Portable. (Portable Equipment)

Equipment fed with portable cords or cables intended to be moved from one place to another. (640) (CMP-12)

Equipment, Portable. (Portable Equipment)

Equipment with electrical components suitable to be moved by a single person without mechanical aids. (511) (CMP-14)

Equipment, Portable. (Portable Equipment)

Equipment fed with portable cords or cables intended to be moved from one place to another. (520) (CMP-15)

Equipment, Portable. (Portable Equipment)

Equipment intended to be moved from one place to another. (530) (CMP-15)

Equipment, Signal. (Signal Equipment)

Includes audible and visual equipment such as chimes, gongs, lights, and displays that convey information to the user. (620) (CMP-12)

Equipment Branch.

A system of feeders and branch circuits arranged for delayed, automatic, or manual connection to the alternate power source and that serves primarily 3-phase power equipment. [**99** :3.3.50] (517) (CMP-15)

Equipment Protection Level (EPL).

Level of protection assigned to equipment based on its likelihood of becoming a source of ignition, and distinguishing the differences between explosive gas atmospheres and explosive dust atmospheres. (CMP-14)

Informational Note: See ANSI/UL 60079-0, *Explosive Atmospheres — Part 0: Equipment — General Requirements* , for additional information.

Equipment Rack.

A framework for the support, enclosure, or both, of equipment; can be portable or stationary. (640) (CMP-12)

Informational Note: See EIA/ECA 310-E-2005, *Cabinets, Racks, Panels and Associated Equipment* , for examples of equipment racks.

Equipotential Plane.

Conductive elements that are connected together to minimize voltage differences. (CMP-7)

Essential Electrical System.

A distribution system designed to ensure continuity of electrical power to designated areas and functions of a health care facility upon loss of one of the on-site or off-site sources with reliability and capacity sufficient to provide effective facility operation consistent with the facility's emergency operations plan. [**99:** 3.3.54] (517) (CMP-15)

Explosionproof Equipment.

Equipment enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor that might occur within it, that is capable of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosion of the gas or vapor within, and that operates at such an external temperature that a surrounding flammable atmosphere will not be ignited. (CMP-14)

Informational Note No. 1: See ANSI/UL 1203, *Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations* , for additional information.

Informational Note No. 2: See NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)* , for additional information on explosionproof enclosures that are sometimes additionally marked Type 7.

Exposed (as applied to live parts).

Capable of being inadvertently touched or approached nearer than a safe distance by a person. (CMP-1)

Informational Note: This term applies to parts that are not suitably guarded, isolated, or insulated.

Exposed (as applied to wiring methods).

On or attached to the surface or behind panels designed to allow access. (CMP-1)

Exposed (Optical Fiber Cable Exposed to Accidental Contact).

A conductive optical fiber cable in such a position that, in case of failure of supports or insulation, contact between the cable's non–current-carrying conductive members and an electrical circuit might result. (CMP-16)

Exposed (to Accidental Contact).

A circuit in such a position that, in case of failure of supports or insulation, contact with another circuit may result. (CMP-16)

Exposed Conductive Surfaces.

Those surfaces that are capable of carrying electric current and that are unprotected, uninsulated, unenclosed, or unguarded, permitting personal contact. [**99:** 3.3.54] (517) (CMP-15)

Informational Note: Paint, anodizing, and similar coatings are not considered suitable insulation, unless they are listed for such use.

Externally Operable.

Capable of being operated without exposing the operator to contact with live parts. (CMP-1)

Facility, On-Site Power Production. (On-Site Power Production Facility)

The normal supply of electric power for the site that is expected to be constantly producing power. (695) (CMP-13)

Fastened-in-Place (as applied to electric vehicle power transfer systems and electric self-propelled vehicle power transfer systems).

Mounting means of equipment in which the fastening means are specifically designed to permit removal without the use of a tool. (CMP-12)

Fault-Managed Power (FMP).

A powering system that monitors for faults and controls current delivered to ensure fault energy is limited. (726) (CMP-3)

Informational Note No. 1: The monitoring and control systems differentiate fault-managed power from electric light and power circuits; therefore, alternative requirements to those of Chapters 1 through 4 are given regarding minimum wire sizes, ampacity adjustment and correction factors, overcurrent protection, insulation requirements, and wiring methods and materials.

Informational Note No. 2: A fault-managed power circuit is also commonly referred to as a Class 4 circuit.

Fault Current.

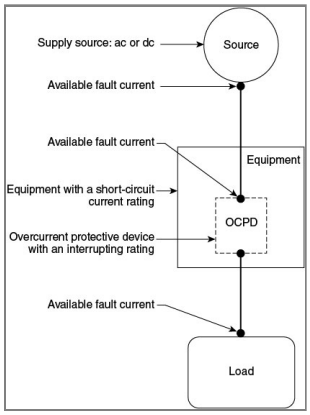
The current delivered at a point on the system during a short-circuit condition. (CMP-10)

Fault Current, Available. (Available Fault Current)

The largest amount of current capable of being delivered at a point on the system during a short-circuit condition. (CMP-10)

Informational Note: A short-circuit can occur during abnormal conditions such as a fault between circuit conductors or a ground fault. See Figure Informational Note 100.1 .

Figure Informational Note 100.1 Available Fault Current.



Fault Protection Device.

An electronic device that is intended for the protection of personnel and functions under fault conditions, such as network-powered broadband communications cable short or open circuit, to limit the current or voltage, or both, for a low-power network-powered broadband communications circuit and provide acceptable protection from electric shock. (830) (CMP-16)

Feeder.

All circuit conductors between the service equipment, the source of a separately derived system, or other power supply source and the final branch-circuit overcurrent protective device. (CMP-10)

Feeder Assembly.

The overhead or under-chassis feeder conductors, including the equipment grounding conductor, together with the necessary fittings and equipment; or the power-supply cord assembly for a mobile home, recreational vehicle, or park trailer, identified for the delivery of energy from the source of electrical supply to the panelboard within the mobile home, recreational vehicle, or park trailer. (CMP-7)

Festoon Lighting.

A string of outdoor lights that is suspended between two points. (CMP-18)

Fibers/Flyings, Combustible. (Combustible Fibers/Flyings)

Fibers/flyings, where any dimension is greater than 500 µm in nominal size, which can form an explosible mixture when suspended in air at standard atmospheric pressure and temperature. [**499:** 3.3.4.1] (CMP-14)

Informational Note No. 1: This definition and Informational Notes No. 2 and No. 3 have been extracted from NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas* . The NFPA 499 reference is in brackets. Only editorial changes were made to the extracted text to make it consistent with this code.

Informational Note No. 2: Section 500.5(D) defines a Class III location. Combustible fibers/flyings can be similar in physical form to ignitible fibers/flyings and protected using the same electrical equipment installation methods. Examples of fibers/flyings include flat platelet-shaped particulate, such as metal flake, and fibrous particulate, such as particle board core material. If the smallest dimension of a combustible material is greater than 500 µm, it is unlikely that the material would be combustible fibers/flyings, as determined by test. Finely divided solids with lengths that are large compared to their diameter or thickness usually do not pass through a 500 µm sieve, yet when tested could potentially be determined to be explosible. [**499:** A.3.3.4.1]

Informational Note No. 3: See ASTM E1226, *Standard Test Method for Explosibility of Dust Clouds* , ISO 6184-1, *Explosion protection systems — Part 1: Determination of explosion indices of combustible dusts in air* , or ISO/IEC/UL 80079-20-2, *Explosive atmospheres — Part 20-2: Material characteristics — Combustible dusts test methods* , for procedures for determining the explosibility of dusts. A material that is found to not present an explosible mixture could still be an ignitible fiber/flying, as defined in this article. Historically, the explosibility condition has been described as presenting a flash fire or explosion hazard. It could be understood that the potential hazard due to the formation of an explosible mixture when suspended in air at standard atmospheric pressure and temperature would include ignition. [**499:** A.3.3.4.1]

Fibers/Flyings, Ignitible. (Ignitible Fibers/Flyings)

Fibers/flyings where any dimension is greater than 500 µm in nominal size, which are not likely to be in suspension in quantities to produce an explosible mixture, but could produce an ignitible layer fire hazard. [**499:** 3.3.4.2] (CMP-14)

Informational Note No. 1: This definition and Informational Note No. 2 have been extracted from NFPA 499-2024, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas* . The NFPA 499 reference is in brackets. Only editorial changes were made to the extracted text to make it consistent with this code.

Informational Note No. 2: Section 500.5 of this code prescribes a Class III location as one where ignitible fibers/flyings are present, but not likely to be in suspension in the air in quantities sufficient to produce ignitible mixtures. This description addresses fibers/flyings that do not present a flash-fire hazard or explosion hazard by test. This could be because those fibers/flyings are too large or too agglomerated to be suspended in air in sufficient concentration, or at all, under typical test conditions. Alternatively, this could be because they burn so slowly that, when suspended in air, they do not propagate combustion at any concentration. In this document the zone classification system includes ignitible fibers/flyings as a fire hazard in a layer, which is not addressed in the IEC zone system (see IEC 60079-10-2, *Explosive atmospheres — Part 10-2: Classification of areas — Explosive dust atmospheres*). Where these are present, the user could also consider installation in accordance with Article 503 of this code. [**499:** A.3.3.4.2]

Field Evaluation Body (FEB).

An organization or part of an organization that performs field evaluations of electrical or other equipment. [**790:** 3.3.4] (CMP-1)

Informational Note: See NFPA 790-2024, *Standard for Competency of Third-Party Field Evaluation Bodies* , provides guidelines for establishing the qualification and competency of a body performing field evaluations of electrical products and assembles with electrical components.

Field Labeled (as applied to evaluated products).

Equipment or materials to which has been attached a label, symbol, or other identifying mark of an FEB indicating the equipment or materials were evaluated and found to comply with requirements as described in an accompanying field evaluation report. [**790:** 3.3.6] (CMP-1)

Fire Alarm Circuit.

The portion of the wiring system between the load side of the overcurrent device or the power-limited supply and the connected equipment of all circuits powered and controlled by the fire alarm system. Fire alarm circuits are classified as either non–power-limited or power-limited. (CMP-3)

Fire Alarm Circuit, Non-Power-Limited (NPLFA). (Non-Power-Limited Fire Alarm Circuit)

A fire alarm circuit powered by a source that is not power limited. (CMP-3)

Informational Note: See 760.41 and 760.43 for requirements for non-power-limited fire alarm circuits.

Fire Alarm Circuit, Power-Limited (PLFA). (Power-Limited Fire Alarm Circuit)

A fire alarm circuit powered by a power-limited source . (CMP-3)

Informational Note: See 760.121 for requirements on power-limited fire alarm circuits.

Fitting.

An accessory such as a locknut, bushing, or other part of a wiring system that is intended primarily to perform a mechanical rather than an electrical function. (CMP-1)

Fixed (as applied to equipment).

Equipment that is fastened or otherwise secured at a specific location. (CMP-17)

Fixed-in-Place (as applied to electric vehicle power transfer systems and electric self-propelled vehicle power transfer systems).

Mounting means of equipment using fasteners that require a tool for removal. (CMP-12)

Flameproof "d".

Type of protection where the enclosure will withstand an internal explosion of a flammable mixture that has penetrated into the interior, without suffering damage and without causing ignition, through any joints or structural openings in the enclosure of an external explosive gas atmosphere consisting of one or more of the gases or vapors for which it is designed. (CMP-14)

Informational Note: See ANSI/UL 60079-1, *Explosive Atmospheres — Part 1: Equipment Protection by Flameproof Enclosures "d"*, for additional information.

Flammable Anesthetics.

Gases or vapors, such as fluroxene, cyclopropane, divinyl ether, ethyl chloride, ethyl ether, and ethylene, that could form flammable or explosive mixtures with air, oxygen, or reducing gases such as nitrous oxide. (517) (CMP-15)

Flexible Bus Systems.

An assembly of flexible insulated bus, with a system of associated fittings used to secure, support, and terminate the bus. (CMP-8)

Informational Note: Flexible bus systems are engineered systems for a specific site location and are ordinarily assembled at the point of installation from the components furnished or specified by the manufacturer.

Flexible Insulated Bus.

A flexible rectangular conductor with an overall insulation. (CMP-8)

Flywheel ESS (FESS).

A mechanical ESS composed of a spinning mass referred to as a rotor and an energy conversion mechanism such as a motor-generator that converts the mechanical energy to electrical energy. (706) (CMP-13)

Informational Note: There are primarily two types of rotor constructions, solid metal mass design and composite fiber design.

Footlight.

A border light installed on or in the stage. (520) (CMP-15)

Forming Shell.

A structure designed to support a wet-niche luminaire assembly and intended for mounting in a pool or fountain structure. (680) (CMP-17)

Fountain.

An ornamental structure or recreational water feature from which one or more jets or streams of water are discharged into the air, including splash pads, ornamental pools, display pools, and reflection pools. The definition does not include drinking water fountains or water coolers. (680) (CMP-17)

Frame.

Chassis rail and any welded addition thereto of metal thickness of 1.35 mm (0.053 in.) or greater. (551) (CMP-7)

Free Air (as applied to conductors).

Open or ventilated environment that allows for heat dissipation and air flow around an installed conductor. (CMP-6)

Fuel Cell.

An electrochemical system that consumes fuel to produce an electric current. In such cells, the main chemical reaction used for producing electric power is not combustion. However, there may be sources of combustion used within the overall cell system, such as reformers/fuel processors. (CMP-4)

Fuel Cell System.

The complete aggregate of equipment used to convert chemical fuel into usable electricity and typically consisting of a reformer, stack, power inverter, and auxiliary equipment. (CMP-4)

Fuse.

An overcurrent protective device with a circuit-opening fusible part that is heated and severed by the passage of overcurrent through it. (CMP-10)

Informational Note: A fuse comprises all the parts that form a unit capable of performing the prescribed functions. It may or may not be the complete device necessary to connect it into an electrical circuit.

Fuse, Electronically Actuated. (Electronically Actuated Fuse)

An overcurrent protective device that generally consists of a control module that provides current-sensing, electronically derived time–current characteristics, energy to initiate tripping, and an interrupting module that interrupts current when an overcurrent occurs. Such fuses may or may not operate in a current-limiting fashion, depending on the type of control selected. (CMP-10)

Fuse, Expulsion. (Expulsion Fuse)

A vented fuse unit in which the expulsion effect of gases produced by the arc and lining of the fuseholder, either alone or aided by a spring, extinguishes the arc. (CMP-10)

Fuse, Nonvented Power. (Nonvented Power Fuse)

A fuse without intentional provision for the escape of arc gases, liquids, or solid particles to the atmosphere during circuit interruption. (CMP-10)

Fuse, Power. (Power Fuse)

A vented, nonvented, or controlled vented fuse unit in which the arc is extinguished by being drawn through solid material, granular material, or liquid, either alone or aided by a spring. (CMP-10)

Fuse, Vented Power. (Vented Power Fuse)

A fuse with provision for the escape of arc gases, liquids, or solid particles to the surrounding atmosphere during circuit interruption. (CMP-10)

Garage.

A building or portion of a building in which one or more self-propelled vehicles can be kept for use, sale, storage, rental, repair, exhibition, or demonstration purposes. (CMP-1)

Informational Note: See 511.1 for commercial garages, repair and storage.

Garage, Major Repair. (Major Repair Garage)

A building or portions of a building where major repairs, such as engine overhauls, painting, body and fender work, welding or grinding, and repairs that require draining or emptying of the motor vehicle fuel tank are performed on motor vehicles, including associated floor space used for offices, parking, or showrooms. [**30A:** 3.3.12.1] (CMP-14)

Garage, Minor Repair. (Minor Repair Garage)

A building or portions of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups, replacement of parts, fluid changes (e.g., oil, antifreeze, transmission fluid, brake fluid, air-conditioning refrigerants), brake system repairs, tire rotation, and similar routine maintenance work, including the associated floor space used for offices, parking, or showrooms. [**30A:** 3.3.12.2] (CMP-14)

General-Purpose Cables, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways are suitable for general-purpose applications and are resistant to the spread of fire. (722) (CMP-3)

Generating Capacity, Inverter. (Inverter Generating Capacity)

The sum of parallel-connected inverter maximum continuous output power at 40°C in watts, kilowatts, volt-amperes, or kilovolt-amperes. (CMP-4)

Generating Station.

A plant wherein electric energy is produced by conversion from some other form of energy (e.g., chemical, nuclear, solar, wind, mechanical, or hydraulic) by means of suitable apparatus. (CMP-4)

Generator (Generator Set).

A machine that converts mechanical energy into electrical energy by means of a prime mover and alternator. (CMP-13)

Generator, On-Site Standby. (On-Site Standby Generator)

A facility producing electric power on site as the alternate supply of electric power. It differs from an on-site power production facility in that it is not constantly producing power. (695) (CMP-13)

Generator Terminals.

The point of connection for the output conductors on the generator (generator set). (445) (CMP-13)

Grid Bus Rail.

A combination of the busbar, the busbar support, and the structural suspended ceiling grid system. (393) (CMP-18)

Ground.

The Earth. (CMP-5)

Ground Fault.

An unintentional, electrically conductive connection between an ungrounded conductor of an electrical circuit and the normally non-current-carrying conductors, metal enclosures, metal raceways, metal equipment, or earth. (CMP-5)

Ground-Fault Circuit Interrupter (GFCI).

A device intended for the protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a ground-fault current exceeds the values established for a Class A device. (CMP-2)

Informational Note: See UL 943, *Standard for Ground-Fault Circuit Interrupters* , for further information. Class A ground-fault circuit interrupters trip when the ground-fault current is 6 mA or higher and do not trip when the ground-fault current is less than 4 mA.

Ground-Fault Circuit Interrupter, Special Purpose (SPGFCI). (Special Purpose Ground-Fault Circuit Interrupter)

A device intended for the detection of ground-fault currents that functions to de-energize a circuit or portion of a circuit within an established period of time established for Class C, D, or E devices. (CMP-2)

Informational Note: See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit Interrupters* , for information on Classes C, D, or E special purpose ground-fault circuit interrupters.

Ground-Fault Current Path.

An electrically conductive path from the point of a ground fault on a wiring system through normally non–current-carrying conductors, grounded conductors, equipment, or the earth to the electrical supply source. (CMP-5)

Informational Note: Examples of ground-fault current paths are any combination of equipment grounding conductors, metallic raceways, metallic cable sheaths, electrical equipment, and any other electrically conductive material such as metal, water, and gas piping; steel framing members; stucco mesh; metal ducting; reinforcing steel; shields of communications cables; grounded conductors; and the earth itself.

Ground-Fault Current Path, Effective. (Effective Ground-Fault Current Path)

An intentionally constructed, low-impedance electrically conductive path designed and intended to carry current during ground-fault events from the point of a ground fault on a wiring system to the electrical supply source and that facilitates the operation of the overcurrent protective device or ground-fault detectors. (CMP-5)

Ground-Fault Detector-Interrupter, dc (GFDI).

A device that provides protection for PV system dc circuits by detecting a ground fault and could interrupt the fault path in the dc circuit. (690) (CMP-4)

Informational Note: See UL 1741, *Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources* , and UL 62109, *Standard for Power Converters for use in Photovoltaic Power Systems* , for further information on GFDI equipment.

Ground-Fault Protection of Equipment (GFPE).

A system intended to provide protection of equipment from damaging line-to-ground fault currents by operating to cause a disconnecting means to open all ungrounded conductors of the faulted circuit. This protection is provided at current levels less than those required to protect conductors from damage through the operation of a supply circuit overcurrent device. (CMP-5)

Grounded (Grounding).

Connected (connecting) to ground or to a conductive body that extends the ground connection. (CMP-5)

Grounded, Functionally. (Functionally Grounded)

A system that has an electrical ground reference for operational purposes that is not solidly grounded. (CMP-4)

Informational Note: A functionally grounded system is often connected to ground through an electronic means internal to an inverter or charge controller that provides ground-fault protection. Examples of operational purposes for functionally grounded systems include ground-fault detection and performance-related issues for some power sources.

Grounded, Solidly. (Solidly Grounded)

Connected to ground without inserting any resistor or impedance device. (CMP-5)

Grounded Conductor.

A system or circuit conductor that is intentionally grounded. (CMP-5)

Informational Note: Although an equipment grounding conductor is grounded, it is not considered a grounded conductor.

Grounded System, Impedance. (Impedance Grounded System)

An electrical system that is grounded by intentionally connecting the system neutral point to ground through an impedance device. (CMP-5)

Grounding Conductor, Equipment (EGC). (Equipment Grounding Conductor)

A conductive path(s) that is part of an effective ground-fault current path and connects normally non-current-carrying metal parts of equipment together and to the system grounded conductor or to the grounding electrode conductor, or both. (CMP-5)

Informational Note No. 1: It is recognized that the equipment grounding conductor also performs bonding.

Informational Note No. 2: See 250.118 for a list of acceptable equipment grounding conductors.

Grounding Conductor, Impedance. (Impedance Grounding Conductor)

A conductor that connects the system neutral point to the impedance device in an impedance grounded system. (CMP-5)

Grounding Electrode.

A conducting object through which a direct connection to earth is established. (CMP-5)

Grounding Electrode Conductor (GEC).

A conductor used to connect the system grounded conductor or the equipment to a grounding electrode or to a point on the grounding electrode system. (CMP-5)

Grouped.

Cables or conductors positioned adjacent to one another but not in continuous contact with each other. (520) (CMP-15)

Guarded.

Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach or contact by persons or objects to a point of danger. (CMP-1)

Guest Room.

An accommodation combining living, sleeping, sanitary, and storage facilities within a compartment. (CMP-2)

Guest Suite.

An accommodation with two or more contiguous rooms comprising a compartment, with or without doors between such rooms, that provides living, sleeping, sanitary, and storage facilities. (CMP-2)

Gutter, Metal Auxiliary. (Metal Auxiliary Gutter)

A sheet metal enclosure used to supplement wiring spaces at meter centers, distribution centers, switchgear, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and busbars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system. (CMP-8)

Gutter, Nonmetallic Auxiliary. (Nonmetallic Auxiliary Gutter)

A flame-retardant, nonmetallic enclosure used to supplement wiring spaces at meter centers, distribution centers, switchgear, switchboards, and similar points of wiring systems. The enclosure has hinged or removable covers for housing and protecting electrical wires, cable, and busbars. The enclosure is designed for conductors to be laid or set in place after the enclosures have been installed as a complete system. (CMP-8)

Habitable Room.

A room in a building for living, sleeping, eating, or cooking, but excluding bathrooms, toilet rooms, closets, hallways, storage or utility spaces, and similar areas. (CMP-2)

Handhole Enclosure.

An enclosure for use in underground systems, provided with an open or closed bottom, and sized to allow personnel to reach into, but not enter, for the purpose of installing, operating, or maintaining equipment or wiring or both. (CMP-8)

Hazard Current.

For a given set of connections in an isolated power system, the total current that would flow through a low impedance if it were connected between either isolated conductor and ground. [**99:** 3.3.72] (517) (CMP-15)

Hazard Current, Fault. (Fault Hazard Current)

The hazard current of a given isolated power system with all devices connected except the line isolation monitor. [**99:** 3.3.72.1] (517) (CMP-15)

Monitor Hazard Current.

The hazard current of the line isolation monitor alone. [**99:** 3.3.72.2] (517) (CMP-15)

Total Hazard Current.

The hazard current of a given isolated system with all devices, including the line isolation monitor, connected. [**99:** 3.3.72.3] (517) (CMP-15)

Header.

Transverse metal raceways for electrical conductors, providing access to predetermined cells of a precast cellular concrete floor, thereby permitting the installation of electrical conductors from a distribution center to the floor cells. (CMP-8)

Health Care Facilities.

Buildings, portions of buildings, or mobile enclosures in which human medical, dental, psychiatric, nursing, obstetrical, or surgical care is provided. [**99:** 3.3.73] (CMP-15)

Informational Note: Examples of health care facilities include, but are not limited to, hospitals, nursing homes, limited care facilities, clinics, medical and dental offices, and ambulatory care centers, whether permanent or movable.

Health Care Facility's Governing Body.

The person or persons who have the overall legal responsibility for the operation of a health care facility. [**99:** 3.3.74] (517) (CMP-15)

Heating Equipment.

Any equipment that is used for heating purposes and whose heat is generated by induction or dielectric methods. (665) (CMP-12)

Heating Panel.

A complete assembly provided with a junction box or a length of flexible conduit for connection to a branch circuit. (CMP-17)

Heating Panel Set.

A rigid or nonrigid assembly provided with nonheating leads or a terminal junction assembly identified as being suitable for connection to a wiring system. (CMP-17)

Heating System.

A complete system consisting of components such as heating elements, fastening devices, nonheating circuit wiring, leads, temperature controllers, safety signs, junction boxes, raceways, and fittings. (CMP-17)

Heating System, Impedance. (Impedance Heating System)

A system in which heat is generated in an object, such as a pipe, rod, or combination of such objects serving as a heating element, by causing current to flow through such objects by direct connection to an ac voltage source from an isolating transformer. In some installations the object is embedded in the surface to be heated or constitutes the exposed component to be heated. (CMP-17)

Heating System, Induction. (Induction Heating System)

A system in which heat is generated in a pipeline or vessel wall by inducing current in the pipeline or vessel wall from an external isolated ac field source. (CMP-17)

Heating System, Skin Effect. (Skin-Effect Heating System)

A system in which heat is generated on the inner surface of a ferromagnetic envelope embedded in or fastened to the surface to be heated.

Informational Note: Typically, an electrically insulated conductor is routed through and connected to the envelope at the other end. The envelope and the electrically insulated conductor are connected to an ac voltage source from an isolating transformer. (CMP-17)

Hermetic Refrigerant Motor-Compressor.

A combination consisting of a compressor and motor, both of which are enclosed in the same housing, with no external shaft or shaft seals, with the motor operating in the refrigerant. (CMP-11)

Hoistway.

Any shaftway, hatchway, well hole, or other vertical opening or space in which an elevator or dumbwaiter is designed to operate. (CMP-12)

Hospital.

A building or portion thereof used on a 24-hour basis for the medical, psychiatric, obstetrical, or surgical care of four or more inpatients. [***101*** ; 3.3.152] (CMP-15)

Hydromassage Bathtub.

A permanently installed bathtub equipped with a recirculating piping system, pump, and associated equipment. It is designed so it can accept, circulate, and discharge water upon each use. (680) (CMP-17)

Identified (as applied to equipment).

Recognizable as suitable for the specific purpose, function, use, environment, application, and so forth, where described in a particular code requirement. (CMP-1)

Informational Note: Some examples of ways to determine suitability of equipment for a specific purpose, environment, or application include investigations by a qualified testing laboratory (listing and labeling), an inspection agency, or other organizations concerned with product evaluation.

Increased Safety "e".

Type of protection applied to electrical equipment that does not produce arcs or sparks in normal service and under specified abnormal conditions, in which additional measures are applied to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks. (CMP-14)

Informational Note: See ANSI/UL 60079-7, *Explosive Atmospheres — Part 7: Equipment Protection by Increased Safety "e"*, for additional information.

Induction Heating (Induction Melting) (Induction Welding).

The heating, melting, or welding of a nominally conductive material due to its own I2R losses when the material is placed in a varying electromagnetic field. (665) (CMP-12)

Industrial Control Panel.

An assembly of two or more components consisting of one of the following: (1) power circuit components only, such as motor controllers, overload relays, fused disconnect switches, and circuit breakers; (2) control circuit components only, such as push buttons, pilot lights, selector switches, timers, switches, and control relays; (3) a combination of power and control circuit components. These components, with associated wiring and terminals, are mounted on, or contained within, an enclosure or mounted on a subpanel. (CMP-11)

Informational Note: The industrial control panel does not include the controlled equipment.

Industrial Installation, Supervised. (Supervised Industrial Installation)

The industrial portions of a facility where all of the following conditions are met:

(1) Conditions of maintenance and engineering supervision ensure that only qualified persons monitor and service the system.

(2) The premises wiring system has 2500 kVA or greater of load used in industrial processes, manufacturing activities, or both, as calculated in accordance with Article 120 , Parts II, III, IV, or V.

(3) The premises has at least one service or feeder that is more than 150 volts to ground and more than 300 volts phase-to-phase.

This definition excludes installations in buildings used by the industrial facility for offices, warehouses, garages, machine shops, and recreational facilities that are not an integral part of the industrial plant, substation, or control center. (240) (CMP-10)

Information Technology Equipment (ITE).

Equipment and systems rated 1000 volts or less, normally found in offices or other business establishments and similar environments classified as ordinary locations, that are used for creation and manipulation of data, voice, video, and similar signals. (CMP-12)

Informational Note: See UL 60950-1-2007, *Information Technology Equipment — Safety — Part 1: General Requirements* , or UL 62368-1-2019, *Audio/Video Information and Communication Technology Equipment Part 1: Safety Requirements* , for information on listing requirements for both information technology equipment and communications equipment.

Information Technology Equipment Room.

A room within the information technology equipment area that contains the information technology equipment. [**75:** 3.3.15] (CMP-12)

Innerduct.

A nonmetallic raceway placed within a larger raceway. (CMP-16)

Insulated Bus Pipe (IBP).

A cylindrical solid or hollow conductor with a solid insulation system, having conductive grading layers and a grounding layer imbedded in the insulation, and provided with an overall covering of insulating or metallic material. IBP is also referred to as tubular covered conductor (TCC). (CMP-8)

Insulated Bus Pipe System.

An assembly that includes bus pipe, connectors, fittings, mounting structures, and other fittings and accessories. (CMP-8)

Insulating End.

An insulator designed to electrically insulate the end of a flat conductor cable (Type FCC). (324) (CMP-6)

Interactive Mode (Interactive).

The operating mode for power production sources or microgrids that operate in parallel with and are capable of delivering energy to an electric power production and distribution network or other primary power source. (CMP-4)

Informational Note: Interactive mode is an operational mode of both interactive systems and of equipment such as interactive inverters.

Interrupting Rating.

The highest current at rated voltage that a device is identified to interrupt under standard test conditions. (CMP-10)

Informational Note: Equipment intended to interrupt current at other than fault levels may have its interrupting rating implied in other ratings, such as horsepower or locked rotor current.

Intersystem Bonding Termination (IBT).

A device that provides a means for connecting intersystem bonding conductors for communications systems to the grounding electrode system. (CMP-16)

Intrinsic Safety "i".

Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"*, for additional information.

Intrinsically Safe Apparatus.

Apparatus in which all the circuits are intrinsically safe. (CMP-14)

Informational Note No. 1: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Informational Note No. 2: See ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for installation information.

Intrinsically Safe Circuit.

A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for test conditions.

Intrinsically Safe Circuits, Different. (Different Intrinsically Safe Circuits)

Intrinsically safe circuits in which the possible interconnections have not been evaluated and identified as intrinsically safe. (CMP-14)

Informational Note: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Intrinsically Safe System.

An assembly of interconnected intrinsically safe apparatus, associated apparatus, and interconnecting cables, in which those parts of the system that might be used in hazardous (classified) locations are intrinsically safe circuits. (CMP-14)

Informational Note No. 1: An intrinsically safe system might include more than one intrinsically safe circuit.

Informational Note No. 2: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* ; ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* ; and ANSI/UL 60079-25, *Explosive Atmospheres — Part 25: Intrinsically Safe Electrical Systems* , for additional information.

Informational Note No. 3: See ANSI/ISA RP 12.06.01, *Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety* , for installation information.

Invasive Procedure.

Any procedure that penetrates the protective surfaces of a patient's body (i.e., skin, mucous membrane, cornea) and that is performed with an aseptic field (procedural site). [Not included in this category are placement of peripheral intravenous needles or catheters used to administer fluids and/or medications, gastrointestinal endoscopies (i.e., sigmoidoscopies), insertion of urethral catheters, and other similar procedures.] [**99:** 3.3.91] (517) (CMP-15)

Inverter.

Equipment that changes dc to ac. (CMP-4)

Inverter, Interactive. (Interactive Inverter)

Inverter equipment having the capability to operate only in interactive mode. (CMP-13)

Inverter, Multimode. (Multimode Inverter)

Inverter equipment capable of operating in both interactive and island modes. (CMP-4)

Inverter, Stand-alone. (Stand-alone Inverter)

Inverter equipment having the capabilities to operate only in island mode. (CMP-4)

Inverter Input Circuit.

Conductors connected to the dc input of an inverter. (CMP-13)

Inverter Output Circuit.

Conductors connected to the ac output of an inverter. (CMP-13)

Inverter Utilization Output Circuit.

Conductors between the multimode or stand-alone inverter and utilization equipment. (706) (CMP-13)

Irrigation Machine.

An electrically driven or controlled machine, with one or more motors, not hand-portable, and used primarily to transport and distribute water for agricultural purposes. (675) (CMP-7)

Irrigation Machine, Center Pivot. (Center Pivot Irrigation Machine)

A multimotored irrigation machine that revolves around a central pivot and employs alignment switches or similar devices to control individual motors. (675) (CMP-7)

Island Mode.

The operating mode for power production sources or microgrids that allows energy to be supplied to loads that are disconnected from an electric power production and distribution network or other primary power source. (CMP-4)

Isolated (as applied to location).

Not readily accessible to persons unless special means for access are used. (CMP-1)

Isolated Power System.

A system comprising an isolation transformer or its equivalent, a line isolation monitor, and its ungrounded circuit conductors. [**99:** 3.3.93] (517) (CMP-15)

Isolation Transformer.

A transformer of the multiple-winding type, with the primary and secondary windings physically separated, that inductively couples its ungrounded secondary winding to the grounded feeder system that energizes its primary winding. [**99:** 3.3.94] (517) (CMP-15)

Kitchen.

An area with a sink and permanent provisions for food preparation and cooking. (CMP-2)

Labeled.

Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner. (CMP-1)

> Informational Note: If a listed product is of such a size, shape, material, or surface texture that it is not possible to apply legibly the complete label to the product, the complete label may appear on the smallest unit container in which the product is packaged.

Laundry Area.

An area containing or designed to contain a laundry tray, clothes washer, or clothes dryer. (CMP-2)

Leakage-Current Detector-Interrupter (LCDI).

A device provided in a power supply cord or cord set that senses leakage current flowing between or from the cord conductors and interrupts the circuit at a predetermined level of leakage current. (440) (CMP-11)

Legally Required Standby Systems.

Those systems required and so classed as legally required standby by municipal, state, federal, or other codes or by any governmental agency having jurisdiction. These systems are intended to automatically supply power to selected loads (other than those classed as emergency systems) in the event of failure of the normal source. (CMP-13)

Life Safety Branch.

A system of feeders and branch circuits supplying power for lighting, receptacles, and equipment essential for life safety that is automatically connected to alternate power sources by one or more transfer switches during interruption of the normal power source. [**99:** 3.3.97] (517) (CMP-15)

Lighting Assembly, Cord-and-Plug-Connected. (Cord-and-Plug-Connected Lighting Assembly)

A lighting assembly consisting of a luminaire intended for installation in the wall of a spa, hot tub, or storable pool, and a cord-and-plug-connected transformer or power supply. (680) (CMP-17)

Lighting Assembly, Through-Wall. (Through-Wall Lighting Assembly)

A lighting assembly intended for installation above grade, on or through the wall of a pool, consisting of two interconnected groups of components separated by the pool wall. (680) (CMP-17)

Lighting Outlet.

An outlet intended for the direct connection of a lampholder or luminaire. (CMP-18)

Lighting Track. (Track Lighting)

A manufactured assembly designed to support and energize luminaires that are capable of being readily repositioned on the track. Its length can be altered by the addition or subtraction of sections of track. (CMP-18)

Limited Care Facility.

A building or portion of a building used on a 24-hour basis for the housing of four or more persons who are incapable of self-preservation because of age; physical limitation due to accident or illness; or limitations such as intellectual disability/developmental disability, mental illness, or chemical dependency. [***101:*** 3.3.93.2] (CMP-15)

Limited-Energy System.

The equipment and cables of an end-to-end system that are power-restricted to ensure the energy delivered into any fault provides acceptable protection for fire prevention and electric shock. (CMP-3)

Limited Finishing Workstation.

A power-ventilated apparatus that is capable of confining the vapors, mists, residues, dusts, or deposits that are generated by a limited spray application process. Such apparatus is not a spray booth or spray room, as herein defined. [**33:** 3.3.23.1] (CMP-14)

Informational Note: See NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials* , Section 14.3 for information on limited finishing workstations.

Line Isolation Monitor.

A test instrument designed to continually check the balanced and unbalanced impedance from each line of an isolated circuit to ground and equipped with a built-in test circuit to exercise the alarm without adding to the leakage current hazard. [**99:** 3.3.99] (517) (CMP-15)

Liquid Immersion "o".

Type of protection where electrical equipment is immersed in a protective liquid so that an explosive atmosphere that might be above the liquid or outside the enclosure cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 60079-6, *Explosive Atmospheres — Part 6: Equipment Protection by Liquid Immersion "o"* , for additional information.

Listed.

Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose. (CMP-1)

Informational Note: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. Use of the system employed by the listing organization allows the authority having jurisdiction to identify a listed product.

Live Parts.

Energized conductive components. (CMP-1)

Load Management.

The process within an energy management system that limits the total electrical load on an electrical supply system to a set value by adjusting or controlling the individual loads. (CMP-13)

Location, Anesthetizing. (Anesthetizing Location)

Any space within a facility that has been designated for the administration of any flammable or nonflammable inhalation anesthetic agent during examination or treatment, including the use of such agents for relative analgesia. (517) (CMP-15)

Location, Anesthetizing, Flammable. (Flammable Anesthetizing Location)

Any area of the facility that has been designated to be used for the administration of any flammable inhalation anesthetic agents in the normal course of examination or treatment. (517) (CMP-15)

Location, Damp. (Damp Location)

Locations protected from weather and not subject to saturation with water or other liquids but subject to moderate degrees of moisture. (CMP-1)

Informational Note: Examples of such locations include partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns, and some cold-storage warehouses.

Location, Dry. (Dry Location)

A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction. (CMP-1)

Location, Remote. (Remote Location)

A location, other than a motion picture or television studio, where a production is filmed or recorded. (530) (CMP-15)

Location, Wet. (Wet Location)

A location that is one or more of the following:

(1) Unprotected and exposed to weather

(2) Subject to saturation with water or other liquids

(3) Underground

(4) In concrete slabs or masonry in direct contact with the earth

(CMP-1)

Informational Note: A vehicle washing area is an example of a wet location saturated with water or other liquids.

Location, Wet Procedure. (Wet Procedure Location)

The area in a patient care space where a procedure is performed that is normally subject to wet conditions while patients are present, including standing fluids on the floor or drenching of the work area, either of which condition is intimate to the patient or staff. [**99:** 3.3.187] (517) (CMP-15)

Informational Note: Routine housekeeping procedures and incidental spillage of liquids do not define a wet procedure location. [**99:** A.3.3.187]

Locations, Hazardous (Classified). [Hazardous (Classified) Locations]

Locations where fire or explosion hazards might exist due to flammable gases, flammable liquid–produced vapors, combustible liquid–produced vapors, combustible dusts, combustible fiber/flyings, or ignitible fibers/flyings. (CMP-14)

Locations, Unclassified. (Unclassified Locations)

Locations determined to be neither Class I, Division 1; Class I, Division 2; Zone 0; Zone 1; Zone 2; Class II, Division 1; Class II, Division 2; Class III, Division 1; Class III, Division 2; Zone 20; Zone 21; Zone 22; nor any combination thereof. (CMP-14)

Long-Time Rating .

A rating based on an operating interval of 5 minutes or longer. (CMP-15)

Loudspeaker (Speaker).

Equipment that converts an ac electric signal into an acoustic signal. (640) (CMP-12)

Low-Voltage Contact Limit.

A voltage not exceeding the following values:

(1) 15 volts (RMS) for sinusoidal ac

(2) 21.2 volts peak for nonsinusoidal ac

(3) 30 volts for continuous dc

(4) 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz

(CMP-17)

Low-Voltage Suspended Ceiling Power Distribution System.

A system that serves as a support for a finished ceiling surface and consists of a busbar and busbar support system to distribute power to utilization equipment supplied by a Class 2 power supply. (393) (CMP-18)

Luminaire.

Utilization equipment intended to illuminate a space or object(s), to facilitate visual tasks, activities, aesthetics, or security, or a similar purpose. Light-emitting devices such as lamps or LED modules could be removable or replaceable. The equipment can connect directly to the branch circuit (ac or dc) or be used with a separate power source that regulates the voltage, current, or both from the branch circuit. A lampholder itself is not a luminaire. (CMP-18)

Luminaire, Directly Controlled (DCL).

A luminaire containing a control input for a dimming or switching function. (700) (CMP-13)

Luminaire, Dry-Niche. (Dry-Niche Luminaire)

A luminaire intended for installation in the floor or wall of a pool, spa, or fountain in a niche that is sealed against the entry of water. (680) (CMP-17)

Luminaire, No-Niche. (No-Niche Luminaire)

A luminaire intended for installation above or below the water without a niche. (680) (CMP-17)

Luminaire, Wet-Niche. (Wet-Niche Luminaire)

A luminaire intended for installation in a forming shell mounted in a pool or fountain structure where the luminaire will be completely surrounded by water. (680) (CMP-17)

Machine Room.

An enclosed machinery space outside the hoistway, intended for full bodily entry, that contains the electrical driving machine or the hydraulic machine. The room could also contain electrical and/or mechanical equipment used directly in connection with the elevator or dumbwaiter. (620) (CMP-12)

Machine Room and Control Room, Remote. (Remote Machine Room and Control Room)

A machine room or control room that is not attached to the outside perimeter or surface of the walls, ceiling, or floor of the hoistway. (620) (CMP-12)

Machinery, Industrial (Industrial Machine). (Industrial Machinery)

A power-driven machine (or a group of machines working together in a coordinated manner), not portable by hand while working, that is used to process material by cutting; forming; pressure; electrical, thermal, or optical techniques; lamination; or a combination of these processes. It can include associated equipment used to transfer material or tooling, including fixtures, to assemble/disassemble, to inspect or test, or to package. The associated electrical equipment, including the logic controller(s) and associated software or logic together with the machine actuators and sensors, are considered as part of the industrial machine. (CMP-12)

Machinery Space.

A space inside or outside the hoistway, intended to be accessed with or without full bodily entry, that contains the elevator, dumbwaiter, platform lift, or stairway chairlift equipment and could also contain equipment used directly in connection with the elevator, dumbwaiter, platform lift, or stairway chairlift. (620) (CMP-12)

Machinery Space and Control Space, Remote. (Remote Machinery Space and Control Space)

A machinery space or control space that is not within the hoistway, machine room, or control room and that is not attached to the outside perimeter or surface of the walls, ceiling, or floor of the hoistway. (620) (CMP-12)

Manufactured Home.

A structure, transportable in one or more sections, which in the traveling mode is 2.4 m (8 ft) or more in width or 12.2 m (40 ft) or more in length, or when erected on site is 29.77 m^2 (320 ft^2) or more is built on a permanent chassis and is designed to be used as a dwelling with or without a permanent foundation, whether or not connected to the utilities, and includes plumbing, heating, air conditioning, and electrical systems contained therein. The term includes any structure that meets all the requirements of this paragraph except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the regulatory agency. Calculations used to determine the number of square meters (square feet) in a structure are based on the structure's exterior dimensions and include all expandable rooms, cabinets, and other projections containing interior space, but do not include bay windows. [**501:** 1.2.12] (CMP-7)

Informational Note No. 1: Unless otherwise indicated, the term *mobile home* includes manufactured home and excludes park trailers.

Informational Note No. 2: See the applicable building code for definition of the term *permanent foundation* .

Informational Note No. 3: See 24 CFR Part 3280, *Manufactured Home Construction and Safety Standards, of the Federal Department of Housing and Urban Development* , for additional information on the definition.

Manufactured Wiring System.

A system containing component parts that are assembled in the process of manufacture and cannot be inspected at the building site without damage or destruction to the assembly and used for the connection of luminaires, utilization equipment, continuous plug-in type busways, and other devices. (604) (CMP-7)

Marina.

A facility, generally on the waterfront, that stores and services boats in berths, on moorings, and in dry storage or dry stack storage. [**303:** 3.3.13] (555) (CMP-7)

Maximum Output Power.

The maximum power delivered by an amplifier into its rated load as determined under specified test conditions. (640) (CMP-12)

Informational Note: The maximum output power can exceed the manufacturer's rated output power for the same amplifier.

Maximum Output Power (as applied to wind electric systems).

The maximum 1-minute average power output a wind turbine produces in normal steady-state operation (instantaneous power output can be higher). (694) (CMP-4)

Maximum Voltage.

The greatest difference in potential produced between any two conductors of a wind turbine circuit. (694) (CMP-4)

Maximum Water Level.

The highest level that water can reach before it spills out. (680) (CMP-17)

Medical Office.

A building or part thereof in which the following occur:

(1) Examinations and minor treatments/procedures performed under the continuous supervision of a medical professional;

(2) The use of limited to minimal sedation and treatment or procedures that do not render the patient incapable of self-preservation under emergency conditions; and

(3) No overnight stays for patients or 24-hour operations.

[**99:** 3.3.110] (CMP-15)

Membrane Enclosure.

A temporary enclosure used for the spraying of workpieces that cannot be moved into a spray booth where open spraying is not practical due to proximity to other operations, finish quality, or concerns such as the collection of overspray. (CMP-14)

Informational Note: See NFPA 33-2024, *Standard for Spray Application Using Flammable or Combustible Materials* , Chapter 18 for information on the construction and use of membrane enclosures.

Messenger-Supported Wiring.

An exposed wiring support system using a messenger wire to support insulated conductors by any one of the following:

(1) A messenger with rings and saddles for conductor support

(2) A messenger with a field-installed lashing material for conductor support

(3) Factory-assembled aerial cable

(4) Multiplex cables utilizing a bare conductor, factory assembled and twisted with one or more insulated conductors, such as duplex, triplex, or quadruplex type of construction

(CMP-6)

Messenger Wire (Messenger).

A wire that is run along with or integral with a cable or conductor to provide mechanical support for the cable or conductor. (CMP-6)

Metal Shield Connections.

Means of connection for flat conductor cables (Type FCC) designed to electrically and mechanically connect a metal shield to another metal shield, to a receptacle housing or self-contained device, or to a transition assembly. (324) (CMP-6)

Metering Centers (Meter Center).

Panelboards in enclosures also containing one or more meter sockets. (CMP-10)

Microgrid.

An electric power system containing interconnected power production sources and capable of acting as a primary source independent of an electric utility. (CMP-4)

Informational Note: Examples of power sources in microgrids include photovoltaic systems, generators, fuel cell systems, wind electric systems, energy storage systems, electric vehicles used as a source of supply, and electrical power conversion from other energy sources.

Microgrid, Health Care (Health Care Microgrid System). (Health Care Microgrid)

A group of interconnected loads and distributed energy resources within clearly defined boundaries that acts as a single controllable entity with respect to the utility. [**99:** 3.3.75] (517) (CMP-15)

Microgrid Control System (MCS).

A structured control system that manages microgrid operations, functionalities for utility interoperability, islanded operations, and transitions. (CMP-4)

Informational Note: MCS differ from multiple standby generators or uninterruptible power supplies that are evaluated and rated to operate as a single source of backup power upon loss of the primary power source. MCS functions include coordination, transitions, and interoperability between multiple power sources.

Microgrid Interconnect Device (MID).

A device that enables a microgrid system to separate from and reconnect to an interconnected primary power source. (CMP-4)

Mixer.

Equipment used to combine and level match a multiplicity of electronic signals, such as from microphones, electronic instruments, and recorded audio. (640) (CMP-12)

Mobile.

X-ray equipment mounted on a permanent base with wheels and/or casters for moving while completely assembled. (660) (CMP-12)

Mobile Home.

A factory-assembled structure or structures transportable in one or more sections that are built on a permanent chassis and designed to be used as a dwelling without a permanent foundation where connected to the required utilities and that include the plumbing, heating, air-conditioning, and electrical systems contained therein. (CMP-7)

Informational Note: Unless otherwise indicated, the term *mobile home* includes manufactured home and excludes park trailers.

Mobile Home Lot.

A designated portion of a mobile home park designed for the accommodation of one mobile home and its accessory buildings or structures for the exclusive use of its occupants. (550) (CMP-7)

Mobile Home Park.

A contiguous parcel of land that is used for the accommodation of mobile homes that are intended to be occupied. (550) (CMP-7)

Module, AC. (AC Module)

A complete, environmentally protected unit consisting of solar cells, inverter, and other components, designed to produce ac power. (690) (CMP-4)

Module System, AC. (AC Module System)

An assembly of ac modules, wiring methods, materials, and subassemblies that are evaluated, identified, and defined as a system. (690) (CMP-4)

Momentary Rating .

A rating based on an operating interval that does not exceed 5 seconds. (CMP-15)

Monitor.

An electrical or electronic means to observe, record, or detect the operation or condition of the electric power system or apparatus. (130) (CMP-13)

Monopole Circuit.

An electrical subset of a PV system that has two conductors in the output circuit, one positive (+) and one negative (−). (690) (CMP-4)

Monorail.

Overhead track and hoist system for moving material around the boatyard or moving and launching boats. [**303:** 3.3.16] (555) (CMP-7)

Mooring(s).

Any place where a boat is wet stored or berthed. [**303:** 3.3.17] (555) (CMP-7)

Motion Picture Studio (Television Studio).

A building, group of buildings, other structures, and outdoor areas designed, constructed, permanently altered, designated, or approved for the purpose of motion picture or television production. (530) (CMP-15)

Motion Picture Sound Stage.

A building or portion of a building, usually insulated from outside noise and natural light, designed, constructed, or altered for the purpose of image capture. (CMP-15)

Motor Control Center.

An assembly of one or more enclosed sections having a common power bus and principally containing motor control units. (CMP-11)

Motor Fuel Dispensing Facility.

That portion of a property where motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles or marine craft or into approved containers, including all equipment used in connection therewith. [**30A:** 3.3.11] (CMP-14)

> Informational Note: See 511.1 with respect to electrical wiring and equipment for other areas used as lubritoriums, service rooms, repair rooms, offices, salesrooms, compressor rooms, and similar locations.

Multi-Circuit Cable Outlet Enclosure.

An enclosure containing one or more multi-circuit plugs, receptacles, or both. (520) (CMP-15)

Multioutlet Assembly.

A surface, flush, or freestanding assemblage with a raceway and fittings or other enclosure provided with one or more receptacles, for the purpose of supplying power to utilization equipment. (CMP-18)

Nacelle.

An enclosure housing the alternator and other parts of a wind turbine. (694) (CMP-4)

Neon Tubing.

Electric-discharge luminous tubing, including cold cathode luminous tubing, that is manufactured into shapes to illuminate signs, form letters, parts of letters, skeleton tubing, outline lighting, other decorative elements, or art forms and filled with various inert gases. (600) (CMP-18)

Network Interface Unit (NIU).

A device that converts a broadband signal into component voice, audio, video, data, and interactive services signals and provides isolation between the network power and the premises signal circuits. These devices often contain primary and secondary protectors. (CMP-16)

Network Terminal.

A device that converts network-provided signals (optical, electrical, or wireless) into component signals, including voice, audio, video, data, wireless, optical, and interactive services, and is considered a network device on the premises that is connected to a communications service provider and is powered at the premises. (CMP-16)

Neutral Conductor.

The conductor connected to the neutral point of a system that is intended to carry current under normal conditions. (CMP-5)

Neutral Point.

The common point on a wye-connection in a polyphase system or midpoint on a single-phase, 3-wire system, or midpoint of a single-phase portion of a 3-phase delta system, or a midpoint of a 3-wire, direct-current system. (CMP-5)

> Informational Note: At the neutral point of the system, the vectorial sum of the nominal voltages from all other phases within the system that utilize the neutral, with respect to the neutral point, is zero potential.

Nonautomatic.

Requiring human intervention to perform a function. (CMP-1)

Nonincendive Circuit.

A circuit, other than field wiring, in which any arc or thermal effect produced under intended operating conditions of the equipment, is not capable, under specified test conditions, of igniting the flammable gas–air, vapor–air, or dust–air mixture. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Component.

A component having contacts for making or breaking an incendive circuit and the contacting mechanism is constructed so that the component is incapable of igniting the specified flammable gas–air or vapor–air mixture. The housing of such a component is not intended to exclude the flammable atmosphere or contain an explosion. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Equipment.

Equipment having electrical/electronic circuitry that is incapable, under normal operating conditions, of causing ignition of a specified flammable gas–air, vapor–air, or dust–air mixture due to arcing or thermal means. (CMP-14)

> Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Field Wiring.

Wiring that enters or leaves an equipment enclosure and, under normal operating conditions of the equipment, is not capable, due to arcing or thermal effects, of igniting the flammable gas–air, vapor–air, or dust–air mixture. Normal operation includes opening, shorting, or grounding the field wiring. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonincendive Field Wiring Apparatus.

Apparatus intended to be connected to nonincendive field wiring. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Nonlinear Load.

A load where the wave shape of the steady-state current does not follow the wave shape of the applied voltage. (CMP-1)

Informational Note: Electronic equipment, electronic/electric-discharge lighting, adjustable-speed drive systems, and similar equipment may be nonlinear loads.

Nonmetallic Extension.

An assembly of two insulated conductors within a nonmetallic jacket or an extruded thermoplastic covering. The classification includes surface extensions intended for mounting directly on the surface of walls or ceilings. (CMP-6)

Nonsparking.

Constructed to minimize the risk of arcs or sparks capable of creating an ignition hazard during conditions of normal operation. (CMP-14)

Informational Note No. 1: The term nonsparking is also referred to as nonarcing.

Informational Note No. 2: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Normal/Emergency Power Source.

A power source on the output side of a transfer switch or uninterruptible power supply that is automatically available upon loss of normal power. (700) (CMP-13).

Normal High-Water Level (as applies to electrical datum plane distances).

Natural or Artificially Made Shorelines: An elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial.

Rivers and Streams: The elevation of the top of the bank of the channel. Streams, rivers, and tributaries that are prone to flooding and effects of water runoff shall consider the “bankfull stage” where an established gauge height at a given location along a river or stream, above which a rise in water surface will cause the river or stream to overflow the lowest natural stream bank somewhere in the corresponding reach.

Flood Control Bodies of Water: The flood pool maximum water surface elevation of a reservoir, equal to the elevation of the spillway.

Nonflood Control Bodies of Water: The flowage easement boundary in which the highest water surface elevation defined by the area existing between governmental-owned property line(s) and a contour line with perpetual rights to flood the area in connection with the operation of the reservoir. (CMP-7)

Nurses’ Station.

A space intended to provide a center of nursing activity for a group of nurses serving bed patients, where patient calls are received, nurses dispatched, nurses’ notes written, inpatient charts prepared, and medications prepared for distribution to patients. Where such activities are carried on in more than one location within a nursing unit, all such separate spaces are considered a to be parts of the nurses’ station. (517) (CMP-15)

Nursing Home.

A building or portion of a building used on a 24-hour basis for the housing and nursing care of four or more persons who, because of mental or physical incapacity, might be unable to provide for their own needs and safety without the assistance of another person. [***101*** **:** 3.3.150.2] (CMP-15)

Office Furnishing.

Cubicle panels, partitions, study carrels, workstations, desks, shelving systems, and storage units that may be mechanically and electrically interconnected to form an office furnishing system. (CMP-18)

Oil Immersion.

Electrical equipment immersed in a protective liquid so that an explosive atmosphere that might be above the liquid or outside the enclosure cannot be ignited. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Open Wiring on Insulators.

An exposed wiring method using cleats, knobs, tubes, and flexible tubing for the protection and support of single insulated conductors run in or on buildings. (CMP-6)

Operating Device.

The car switch, pushbuttons, key or toggle switch(s), or other devices used to activate the operation controller. (620) (CMP-12)

Operator.

The individual responsible for starting, stopping, and controlling an amusement ride or supervising a concession. (525) (CMP-15)

Optical Radiation.

Electromagnetic radiation at wavelengths in vacuum between the region of transition to X-rays and the region of transition to radio waves that is approximately between 1 nm and 1000 µm. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for information on types of protection that can be applied to minimize the risk of ignition in explosive atmospheres from optical radiation in the wavelength range from 380 nm to 10 µm.

Optical Radiation, Inherently Safe “op is”. (Inherently Safe Optical Radiation “op is”)

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is incapable of producing sufficient energy under normal or specified fault conditions to ignite a specific explosive atmosphere. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optical Radiation, Protected “op pr”. (Protected Optical Radiation “op pr”)

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is confined inside optical fiber or other transmission medium under normal constructions or constructions with additional mechanical protection based on the assumption that there is no escape of radiation from the confinement. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optical System With Interlock “op sh”.

Type of protection to minimize the risk of ignition in explosive atmospheres from optical radiation where visible or infrared radiation is confined inside optical fiber or other transmission medium with interlock cutoff provided to reliably reduce the unconfined beam strength to safe levels within a specified time in case the confinement fails and the radiation becomes unconfined. (CMP-14)

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation* , for additional information.

Optional Standby Systems.

Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13)

Organ, Electronic. (Electronic Organ)

A musical instrument that imitates the sound of a pipe organ by producing sound electronically. (CMP-12)

Informational Note: Most new electronic organs produce sound digitally and are called digital organs.

Organ, Pipe. (Pipe Organ)

A musical instrument that produces sound by driving pressurized air (called *wind*) through pipes selected via a keyboard. (CMP-12)

Organ, Pipe Sounding Apparatus. (Pipe Organ Sounding Apparatus) (Pipe Organ Chamber).

The sound-producing part of a pipe organ, including, but not limited to, pipes, chimes, bells, the pressurized air- (wind-) producing equipment (blower), associated controls, and power equipment. (CMP-12)

Outlet.

A point on the wiring system at which current is taken to supply utilization equipment. (CMP-1)

Outlet Box Hood.

A housing shield intended to fit over a faceplate for flush-mounted wiring devices, or an integral component of an outlet box or of a faceplate for flush-mounted wiring devices. The hood does not serve to complete the electrical enclosure; it reduces the risk of water coming in contact with electrical components within the hood, such as attachment plugs, current taps, surge protective devices, direct plug-in transformer units, or wiring devices. (CMP-18)

Outline Lighting.

An arrangement of incandescent lamps, electric-discharge lighting, or other electrically powered light sources to outline or call attention to certain features such as the shape of a building or the decoration of a window. (CMP-18)

Output Cable to the Electric Vehicle.

An assembly consisting of a length of flexible EV cable and an electric vehicle connector (supplying power to the electric vehicle). (625) (CMP-12)

Output Cable to the Primary Pad.

A multiconductor, shielded cable assembly consisting of conductors to carry the high-frequency energy and any status signals between the charger power converter and the primary pad. (625) (CMP-12)

Overcurrent.

Any current in excess of the rated current of equipment or the ampacity of a conductor. It may result from overload, short circuit, or ground fault. (CMP-10)

Informational Note: A current in excess of rating may be accommodated by certain equipment and conductors for a given set of conditions. Therefore, the rules for overcurrent protection are specific for particular situations.

Overcurrent Protective Device, Branch-Circuit. (Branch-Circuit Overcurrent Protective Device)

A device capable of providing protection for service, feeder, and branch circuits and equipment over the full range of overcurrents between its rated current and its interrupting rating. (CMP-10)

Overcurrent Protective Device, Supplementary. (Supplementary Overcurrent Protective Device)

A device intended to provide limited overcurrent protection for specific applications and utilization equipment such as luminaires and appliances. This limited protection is in addition to the protection provided in the required branch circuit by the branch-circuit overcurrent protective device. (CMP-10)

Overhead Gantry.

A structure consisting of horizontal framework, supported by vertical columns spanning above electrified truck parking spaces, that supports equipment, appliances, raceway, and other necessary components for the purpose of supplying electrical, HVAC, internet, communications, and other services to the spaces. (626) (CMP-12)

Overload.

Operation of equipment in excess of normal, full-load rating, or of a conductor in excess of its ampacity that, when it persists for a sufficient length of time, would cause damage or dangerous overheating. A fault, such as a short circuit or ground fault, is not an overload. (CMP-10)

Packaged Therapeutic Tub or Hydrotherapeutic Tank Equipment Assembly.

A factory-fabricated unit consisting of water-circulating, heating, and control equipment mounted on a common base, intended to operate a therapeutic tub or hydrotherapeutic tank. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Panelboard.

A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet, enclosure, or cutout box placed in or against a wall, partition, or other support; and accessible only from the front. (CMP-10)

Panelboard, Installed. (Installed Panelboard)

An assembly where a panelboard is installed in a cabinet, cutout box, or enclosure approved for the application. (CMP-1)

Park Electrical Wiring Systems.

All of the electrical wiring, luminaires, equipment, and appurtenances related to electrical installations within a mobile home park, including the mobile home service equipment. (550) (CMP-7)

Park Trailer.

A unit that is built on a single chassis mounted on wheels and has a gross trailer area not exceeding 37 m^2 (400 ft^2) in the set-up mode. (552) (CMP-7)

Part-Winding Motors.

A part-winding start induction or synchronous motor is one that is arranged for starting by first energizing part of its primary (armature) winding and, subsequently, energizing the remainder of this winding in one or more steps. A standard part-winding start induction motor is arranged so that one-half of its primary winding can be energized initially, and, subsequently, the remaining half can be energized, both halves then carrying equal current. (CMP 11)

Informational Note: A hermetic refrigerant motor-compressor is not considered a standard part-winding start induction motor.

Passenger Transportation Facilities.

Any area open to the public associated with passenger transportation such as an airport, bus terminal, highway rest stop and service area, marina, seaport, ferry slip, subway station, train station, or port of entry. (CMP-18)

Patient Bed Location.

The location of a patient sleeping bed, or the bed or procedure table of a Category 1 space. [**99:** 3.3.138] (CMP-15)

Patient Care–Related Electrical Equipment.

Electrical equipment appliance that is intended to be used for diagnostic, therapeutic, or monitoring purposes in a patient care vicinity. [**99:** 3.3.139] (517) (CMP-15)

Patient Care Space Category.

Any space of a health care facility wherein patients are intended to be examined or treated. [**99:** 3.3.145] (517) (CMP-15)

Informational Note No. 1: The health care facility's governing body designates patient care space in accordance with the type of patient care anticipated.

Informational Note No. 2: Business offices, corridors, lounges, day rooms, dining rooms, or similar areas typically are not classified as patient care spaces. [**99:** A.3.3.145]

Category 1 Space (Category 1).

Space in which failure of equipment or a system is likely to cause major injury or death of patients, staff, or visitors. [**99:** 3.3.140.1] (CMP-15)

Informational Note: These spaces, formerly known as critical care rooms, are typically where patients are intended to be subjected to invasive procedures and connected to line-operated, patient care–related appliances. Examples include, but are not limited to, special care patient rooms used for critical care, intensive care, and special care treatment rooms such as angiography laboratories, cardiac catheterization laboratories, delivery rooms, operating rooms, post-anesthesia care units, trauma rooms, and other similar rooms. [**99:** A.3.3.140.1]

Category 2 Space (Category 2).

Space in which failure of equipment or a system is likely to cause minor injury to patients, staff, or visitors. [**99:** 3.3.140.2] (CMP-15)

Informational Note: These spaces were formerly known as general care rooms. Examples include, but are not limited to, inpatient bedrooms, dialysis rooms, in vitro fertilization rooms, procedural rooms, and similar rooms. [**99:** A.3.3.140.2]

Category 3 Space (Category 3).

Space in which the failure of equipment or a system is not likely to cause injury to patients, staff, or visitors but can cause discomfort. [**99:** 3.3.140.3] (517) (CMP-15)

Informational Note: These spaces, formerly known as basic care rooms, are typically where basic medical or dental care, treatment, or examinations are performed. Examples include, but are not limited to, examination or treatment rooms in clinics, medical and dental offices, nursing homes, and limited care facilities. [**99:** A.3.3.140.3]

Category 4 Space (Category 4).

Space in which failure of equipment or a system is not likely to have a physical impact on patient care. [**99:** 3.3.140.4] (517) (CMP-15)

Informational Note: These spaces were formerly known as support rooms. Examples of support spaces include, but are not limited to, anesthesia work rooms, sterile supply, laboratories, morgues, waiting rooms, utility rooms, and lounges. [**99:** A.3.3.140.4]

Patient Care Vicinity.

A space, within a location intended for the examination and treatment of patients, extending 1.8 m (6 ft) beyond the normal location of the bed, chair, table, treadmill, or other device that supports the patient during examination and treatment and extending vertically to 2.3 m (7 ft 6 in.) above the floor. [**99:** 3.3.141] (517) (CMP-15)

Patient Equipment Grounding Point.

A jack or terminal that serves as the collection point for redundant grounding of electric appliances serving a patient care vicinity or for grounding other items in order to eliminate electromagnetic interference problems. [**99:** 3.3.142] (517) (CMP-15)

Performance Area.

The stage and audience seating area associated with a temporary stage structure, whether indoors or outdoors, constructed of scaffolding, truss, platforms, or similar devices, that is used for the presentation of theatrical or musical productions or for public presentations. (520) (CMP-15)

Permanent Amusement Attraction.

A ride device, entertainment device, or a combination of both that is installed such that portability or relocation is impracticable. (522) (CMP-15)

Permanently Installed Decorative Fountains and Reflection Pools.

Those that are constructed in the ground, on the ground, or in a building in such a manner that the fountain cannot be readily disassembled for storage, whether or not served by electrical circuits of any nature. These units are primarily constructed for their aesthetic value and are not intended for swimming or wading. (680) (CMP-17)

Personnel Protection System (as applied to EVSE).

A system of personnel protection devices and constructional features that when used together provide protection against electric shock of personnel. (625) (CMP-12)

Phase, Manufactured. (Manufactured Phase)

The phase that originates at the phase converter and is not solidly connected to either of the single-phase input conductors. (CMP-13)

Phase Converter.

An electrical device that converts single-phase power to 3-phase electric power. (CMP-13)

Informational Note: Phase converters have characteristics that modify the starting torque and locked-rotor current of motors served, and consideration is required in selecting a phase converter for a specific load.

Phase Converter, Rotary. (Rotary-Phase Converter)

A device that consists of a rotary transformer and capacitor panel(s) that permits the operation of 3-phase loads from a single-phase supply. (455) (CMP-13)

Phase Converter, Static. (Static-Phase Converter)

A device without rotating parts, sized for a given 3-phase load to permit operation from a single-phase supply. (455) (CMP-13)

Photovoltaic Cell (PV). (Solar Cell).

The basic photovoltaic device that generates dc electricity when exposed to light. (CMP-4)

Pier.

A structure extending over the water and supported on a fixed foundation (fixed pier), or on flotation (floating pier), that provides access to the water. [**303:** 3.3.18] (CMP-7)

Pier, Fixed. (Fixed Pier)

Pier constructed on a permanent, fixed foundation, such as on piles, that permanently establishes the elevation of the structure deck with respect to land. [**303:** 3.3.18.2] (CMP-7)

Pier, Floating. (Floating Pier)

Pier designed with inherent flotation capability that allows the structure to float on the water surface and rise and fall with water level changes. [**303:** 3.3.18.3] (CMP-7)

Pinout Configuration.

The assignment of electrical functions to connector pins in a multicircuit connector. (CMP-15)

Pipeline.

A length of pipe including pumps, valves, flanges, control devices, strainers, and/or similar equipment for conveying fluids. (CMP-17)

Plenum.

A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system. (CMP-3)

Plenum Cable, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways that have adequate fire-resistant and low smoke-producing characteristics and are suitable for use in ducts, plenums, and other spaces used for environmental air. (722) (CMP-3)

Point of Entrance.

The point within a building at which a wire or cable emerges from an external wall, the roof, or the floor. (CMP-16)

Pool.

Manufactured or field-constructed equipment designed to contain water and intended for use by persons for swimming, wading, immersion, recreational, or therapeutic purposes, but not including bodies of water incorporated as part of an industrial process, lakes, lagoons, surf parks, or other natural and artificially made bodies of water that could incorporate swimming and swimming areas. (680) (CMP-17)

> Informational Note: Natural and man-made bodies of water, which includes lakes, lagoons, surf parks, or other similar bodies of water, are addressed in Article 682 .

Pool, Immersion. (Immersion Pool)

A pool for ceremonial or ritual immersion of users, which is designed and intended to have its contents drained or discharged. (680) (CMP-17)

Pool, Permanently Installed Swimming, Wading, Immersion, and Therapeutic. (Permanently Installed Swimming, Wading, Immersion, and Therapeutic Pools)

Those that are permanently constructed or installed in the ground, partially in the ground, above ground, inside of a building, or on a building, whether or not served by electrical circuits. (680) (CMP-17)

Pool, Storable (Storable Immersion Pool). (Storable Pool)

Pools of any water depth, used for swimming, wading, or immersion, installed entirely on or above the ground that are intended to be stored when not in use or are designed for ease of relocation. (680) (CMP-17)

> Informational Note: A storable pool that is installed with a permanent deck around all or a portion of its perimeter is considered a permanently installed pool.

Pool Cover, Electrically Operated. (Electrically Operated Pool Cover)

Motor-driven equipment designed to cover and uncover the water surface of a pool by means of a flexible sheet or rigid frame. (680) (CMP-17)

Pool Lift, Electrically Powered. (Electrically Powered Pool Lift)

An electrically powered lift that provides accessibility for people with disabilities to and from a pool or spa. (680) (CMP-17)

Portable.

A device intended for indoor or outdoor use that is designed to be hand-carried from location to location, or easily transported without the use of other devices or equipment. (625) (CMP-12)

Portable.

X-ray equipment designed to be hand-carried. (660) (CMP-12)

Portable (as applied to equipment).

Equipment that is actually moved or can easily be moved from one place to another in normal use. (680) (CMP-17)

Portable Handlamp.

A cord- and plug-connected luminaire with a handle, and a hook for temporary mounting and hands-free operation. (CMP-18)

Portable Power Distribution Unit.

A power distribution box containing receptacles and overcurrent devices. (520) (CMP-15)

> Informational Note: See ANSI/UL 1640, *Portable Power-Distribution Equipment* , for information on portable power distribution units.

Portable Structures.

Units designed to be moved including, but not limited to, amusement rides, attractions, concessions, tents, trailers, trucks, and similar units. (525) (CMP-15)

Portable Substation.

A portable assembly, usually mounted on a trailer, containing primary and secondary switchgear and a transformer. (530) (CMP-15)

Powder Filling "q".

Type of protection where electrical parts capable of igniting an explosive atmosphere are fixed in position and completely surrounded by filling material (glass or quartz powder) to prevent the ignition of an external explosive atmosphere. (CMP-14)

Informational Note: See ANSI/UL 60079-5, *Explosive Atmospheres — Part 5: Equipment protection by powder filling "q"* , for additional information.

Power Control System (PCS).

Equipment that monitors and controls power within an electrical system to prevent overload of an electrical service, feeder, conductor, or other power distribution equipment. (CMP-13)

Informational Note: A power control system may control generation, energy storage, loads, circuit controllers, or other equipment to manage power and may contain additional protective functions relative to EMS or grid interconnection functions.

Power Outlet.

An enclosed assembly that may include receptacles, circuit breakers, fuseholders, fused switches, buses, and watt-hour meter mounting means; intended to supply and control power to mobile homes, recreational vehicles, park trailers, or boats or to serve as a means for distributing power required to operate mobile or temporarily installed equipment. (CMP-7)

Power Outlet, Marina. (Marina Power Outlet)

An enclosed assembly that can include equipment such as receptacles, circuit breakers, fused switches, fuses, watt-hour meters, panelboards, and monitoring means identified for marina use. (555) (CMP-7)

Power Production Source (Power Source).

Electrical power production equipment other than a utility service, up to the source system disconnecting means. (CMP-4)

Informational Note: Examples of power production sources include engine and wind generators, solar photovoltaic systems, fuel cells, and energy storage systems.

Power Source Output Conductors.

The conductors between power production equipment and the service or other premises wiring. (CMP-4)

Power Sources.

A system of one or more off-site or one or more on-site power generation or storage components intended to provide power to nonessential electrical loads and the essential electrical system. [**99:** 3.3.155] (517) (CMP-15)

Power Supply (as applied to low-voltage suspended ceiling power distribution systems).

A Class 2 power supply connected between the branch-circuit power distribution system and the busbar low-voltage suspended ceiling power distribution system. (393) (CMP-18)

Power-Supply Cord.

An assembly consisting of an attachment plug and a length of flexible cord connected to utilization equipment. (CMP-6)

Premises.

The land and buildings located on the user's side of the point of demarcation between the communications service provider and the user. (800) (CMP-16)

Premises-Powered.

Using power provided locally from the premises. (CMP-16)

Premises Wiring (System).

Interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed. This includes one of the following:

(1) Wiring from the service point to the outlets

(2) Wiring from and including the power source to the outlets if there is no service point

Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment. (CMP-1)

Informational Note: Power sources include, but are not limited to, interconnected or stand-alone batteries, solar photovoltaic systems, other distributed generation systems, or generators.

Pressurized.

The process of supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of combustible dust or ignitible fibers/flyings. (CMP-14)

Pressurized Enclosure "p".

Type of protection for electrical equipment that uses the technique of guarding against the ingress of the external atmosphere, which might be explosive, into an enclosure by maintaining a protective gas therein at a pressure above that of the external atmosphere. (CMP-14)

Informational Note: See ANSI/UL-60079-2, *Explosive Atmospheres — Part 2: Equipment protection by pressurized enclosures "p"*, for additional information.

Pressurized Room "p".

A room volume protected by pressurization and of sufficient size to permit the entry of a person who might occupy the room. (CMP-14)

Informational Note: See ANSI/UL 60079-13, *Explosive Atmospheres — Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"* , for information on the requirements for rooms intended for human entry where pressurization is used as a means of reducing the risk of explosion.

Primary Pad.

A device external to the EV that transfers power via the contactless coupling as part of a wireless power transfer system. (625) (CMP-12)

Primary Source.

An electric utility or another source of power that acts as the main forming and stabilizing source in an electric power system. (CMP-4)

Prime Mover.

The machine that supplies the mechanical horsepower to a generator. (CMP-13)

Process Seal.

A seal between electrical systems and flammable or combustible process fluids where a failure could allow the migration of process fluids into the premises' wiring system. (CMP-14)

Informational Note: See ANSI/UL 122701, *Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids*, for additional information.

Production Areas.

Areas where portable electrical equipment is used to implement the capture of images. (530) (CMP-15)

Projector, Nonprofessional. (Nonprofessional Projector)

Those types of projectors that do not comply with the definition of *Professional-Type Projector*. (540) (CMP-15)

Projector, Professional-Type. (Professional-Type Projector)

A type of projector using 35- or 70-mm film that has a minimum width of 35 mm (1 $^{3}/_{8}$ in.) and has on each edge 212 perforations per meter (5.4 perforations per inch), or a type using carbon arc, xenon, or other light source equipment that develops hazardous gases, dust, or radiation. (540) (CMP-15)

Proscenium.

The wall and arch that separates the stage from the auditorium (i.e., house). (520) (CMP-15)

Protection by Enclosure "t".

Type of protection for explosive dust atmospheres where electrical equipment is provided with an enclosure providing dust ingress protection and a means to limit surface temperatures. (CMP-14)

Informational Note: See ANSI/UL 60079-31, *Explosive Atmospheres — Part 31: Equipment Dust Ignition Protection by Enclosure "t"*, for additional information.

Psychiatric Hospital.

A building used exclusively for the psychiatric care, on a 24-hour basis, of four or more inpatients. (517) (CMP-15)

Purged and Pressurized.

The process of (1) purging, supplying an enclosure with a protective gas at a sufficient flow and positive pressure to reduce the concentration of any flammable gas or vapor initially present to an acceptable level; and (2) pressurization, supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of a flammable gas or vapor, a combustible dust, or an ignitible fiber. (CMP-14)

Informational Note: See NFPA 496-2024, *Standard for Purged and Pressurized Enclosures for Electrical Equipment*, for additional information.

Purpose-Built.

A custom luminaire, a piece of lighting equipment, or an effect that is constructed for a specific purpose and is not serially manufactured or available for general sale. (530) (CMP-15)

PV DC Circuit (PV System DC Circuit).

Any dc conductor in PV source circuits, PV string circuits, and PV dc-to-dc converter circuits. (690) (CMP-4)

PV DC Circuit, Source. (PV Source Circuit)

The PV dc circuit conductors between modules in a PV string circuit, and from PV string circuits or dc combiners, to dc combiners, electronic power converters, or a dc PV system disconnecting means. (690) (CMP-4)

PV DC Circuit, String. (PV String Circuit)

The PV source circuit conductors of one or more series-connected PV modules. (690) (CMP-4)

PV Module (Module) (Solar PV Module).

A complete, environmentally protected unit consisting of solar cells and other components designed to produce dc power. (CMP-4)

PV (Photovoltaic) System (PV System) (Photovoltaic System).

The total components, circuits, and equipment up to and including the PV system disconnecting means that, in combination, convert solar energy into electric energy. (CMP-4)

Qualified Person.

One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved. (CMP-1)

Informational Note: See NFPA *70E*-2024, *Standard for Electrical Safety in the Workplace*, for electrical safety training requirements.

Raceway.

An enclosed channel designed expressly for holding wires, cables, or busbars, with additional functions as permitted in this code. (CMP-8)

Raceway Cell.

A single enclosed tubular space in a cellular metal or concrete floor member, the axis of the cell being parallel to the axis of the floor member. (CMP-8)

Raceway, Cellular Metal Floor. (Cellular Metal Floor Raceway)

The hollow spaces of cellular metal floors, together with suitable fittings, that may be approved as enclosed channel for electrical conductors. (CMP-8)

Raceway, Communications. (Communications Raceway)

An enclosed channel of nonmetallic materials designed expressly for holding communications wires and cables; optical fiber cables; data cables associated with information technology and communications equipment; Class 2, Class 3, Class 4, and Type PLTC cables; and power-limited fire alarm cables in plenum, riser, and general-purpose applications. (CMP-3)

Raceway, Strut-Type Channel. (Strut-Type Channel Raceway)

A metal raceway that is intended to be mounted to the surface of or suspended from a structure, with associated accessories for the installation of electrical conductors and cables. (CMP-8)

Raceway, Surface Metal. (Surface Metal Raceway)

A metal raceway that is intended to be mounted to the surface of a structure, with associated couplings, connectors, boxes, and fittings for the installation of electrical conductors. (CMP-8)

Raceway, Surface Nonmetallic. (Surface Nonmetallic Raceway)

A nonmetallic raceway that is intended to be mounted to the surface of a structure, with associated couplings, connectors, boxes, and fittings for the installation of electrical conductors. (CMP-8)

Raceway, Underfloor. (Underfloor Raceway)

A raceway and associated components designed and intended for installation beneath or flush with the surface of a floor for the installation of cables and electrical conductors. (CMP-8)

Rail.

The structural support for the suspended ceiling system typically forming the ceiling grid supporting the ceiling tile and listed utilization equipment, such as sensors, actuators, A/V devices, and low-voltage luminaires and similar electrical equipment. (393) (CMP-18)

Rainproof.

Constructed, protected, or treated so as to prevent rain from interfering with the successful operation of the apparatus under specified test conditions. (CMP-1)

Raintight.

Constructed or protected so that exposure to a beating rain will not result in the entrance of water under specified test conditions. (CMP-1)

Rated-Load Current (RLC).

The current of a hermetic refrigerant motor-compressor resulting when it is operated at the rated load, rated voltage, and rated frequency of the equipment it serves. (440) (CMP-11)

Rated Output Power.

The amplifier manufacturer's stated or marked output power capability into its rated load. (640) (CMP-12)

Rated Power.

The output power of a wind turbine at its rated wind speed. (694) (CMP-4)

Informational Note: See IEC 61400-12-1, *Power Performance Measurements of Electricity Producing Wind Turbines* , for the method for measuring wind turbine power output.

Receptacle.

A contact device installed at the outlet for the connection of an attachment plug, or for the direct connection of electrical utilization equipment designed to mate with the corresponding contact device. A single receptacle is a single contact device with no other contact device on the same yoke or strap. A multiple receptacle is two or more contact devices on the same yoke or strap. (CMP-18)

Informational Note: A duplex receptacle is an example of a multiple receptacle that has two receptacles on the same yoke or strap.

Receptacle, Weather-Resistant (WR). (Weather-Resistant Receptacle)

A receptacle constructed to be resistant to the adverse effects of damp, wet, or outdoor locations. (CMP-18)

Receptacle, Weight-Supporting Ceiling (WSCR). (Weight-Supporting Ceiling Receptacle)

A contact device installed at an outlet box for the connection and support of luminaries or ceiling-suspended (paddle) fans using a weight-supporting attachment fitting (WSAF). (CMP-18)

Informational Note: See ANSI/NEMA WD 6, *American National Standard for Wiring Devices — Dimensional Specifications* , for the standard configuration of weight-supporting ceiling receptacles and related weight-supporting attachment fittings.

Receptacle Outlet.

An outlet where the branch-circuit conductors are connected to one or more receptacles. (CMP-18)

Reconditioned Equipment.

Electromechanical systems, equipment, apparatus, or components that are restored to operating conditions. This process differs from normal servicing of equipment that remains within a facility, or replacement of listed equipment on a one-to-one basis. (CMP-1)

Informational Note: The term *reconditioned* is frequently referred to as *rebuilt* , *refurbished* , or *remanufactured* .

Recreational Vehicle (RV) (Camping Trailer) (Motor Home) (Travel Trailer) (Truck Camper).

A vehicle or slide-in camper that is primarily designed as temporary living quarters for recreational, camping, or seasonal use; has its own motive power or is mounted on or towed by another vehicle; is regulated by the National Highway Traffic Safety Administration as a vehicle or vehicle equipment; does not require a special highway use permit for operation on the highways; and can be easily transported and set up on a daily basis by an individual. [**1192:** 3.3.52] (551) (CMP-7)

Informational Note: See NFPA 1192-2026, *Standard on Recreational Vehicles* , Informative Annex A, for product types and definitions for motor homes and towable recreational vehicles.

Recreational Vehicle Park.

Any parcel or tract of land under the control of any person, organization, or governmental entity wherein two or more recreational vehicle, recreational park trailer, and/or other camping sites are offered for use by the public or members of an organization for overnight stays. (551) (CMP-7)

Recreational Vehicle Site.

A specific area within a recreational vehicle park or campground that is set aside for use by a camping unit. (551) (CMP-7)

Recreational Vehicle Site Supply Equipment.

A power outlet assembly located near the point of entrance of supply conductors to a recreational vehicle site and intended to constitute the disconnecting means for connected recreational vehicles. (551) (CMP-7)

Recreational Vehicle Stand.

That area of a recreational vehicle site intended for the placement of a recreational vehicle. (551) (CMP-7)

Reference Grounding Point.

The ground bus of the panelboard or isolated power system panel supplying the patient care room. [**99:** 3.3.158] (517) (CMP-15)

Relative Analgesia.

A state of sedation and partial block of pain perception produced in a patient by the inhalation of concentrations of nitrous oxide insufficient to produce loss of consciousness (conscious sedation). (517) (CMP-15)

Relay, Automatic Load Control (ALCR). (Automatic Load Control Relay)

An emergency lighting control device used to set normally dimmed or normally-off switched emergency lighting equipment to full power illumination levels in the event of a loss of the normal supply by bypassing the dimming/switching controls, and to return the emergency lighting equipment to normal status when the device senses the normal supply has been restored. (700) (CMP-13)

Informational Note: See ANSI/UL 924, *Emergency Lighting and Power Equipment* , for the requirements covering automatic load control relays.

Remote-Control Circuit.

Any electrical circuit that controls any other circuit through a relay or an equivalent device. (CMP-3)

Remote Disconnect Control.

An electric device and circuit that controls a disconnecting means through a relay or equivalent device. (645) (CMP-12)

Resistance Heating Element.

A specific separate element to generate heat that is stand-alone, externally attached to, embedded in, integrated with, or internal to the object to be heated. (CMP-17)

Informational Note: Tubular heaters, strip heaters, heating cable, heating tape, heating blankets, immersion heaters, and heating panels are examples of resistance heaters.

Restricted Industrial Establishment [as applied to hazardous (classified) locations].

Establishment with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation. (CMP-14)

Retrofit Kit.

A complete subassembly of parts and devices for field conversion of utilization equipment. (CMP-18)

Retrofit Kit, General Use. (General Use Retrofit Kit)

A kit that includes some, but not all, of the necessary parts to replace the illumination system of a host sign and installation instructions that identify the parts required to complete the subassembly in the field. (600) (CMP-18)

Retrofit Kit, Sign Specific. (Sign Specific Retrofit Kit)

A kit that includes all of the necessary parts and hardware to allow for field installation in a host sign, based on the included installation instructions. (600) (CMP-18)

Reverse Polarity Protection (Backfeed Protection).

A system that prevents two interconnected power supplies, connected positive to negative, from passing current from one power source into a second power source. (393) (CMP-18)

Ride Device.

A device or combination of devices that carry, convey, or direct a person(s) over or through a fixed or restricted course within a defined area for the primary purpose of amusement or entertainment. (522) (CMP-15)

Riser Cable, Cable Routing Assemblies, and Raceways.

Cables, cable routing assemblies, and raceways that have fire-resistant characteristics capable of preventing the carrying of fire from floor to floor and are suitable for use in a vertical run in a shaft or from floor to floor. (722) (CMP-3)

Road Show Connection Panel.

A type of patch panel designed to allow for road show connection of portable stage switchboards to fixed lighting outlets by means of permanently installed supplementary circuits. (520) (CMP-15)

Safe Zone.

Low probability of damage other than a slight swelling of the capacitor case, as identified by the case rupture curve of the capacitor. (460) (CMP-11)

Safety Circuit.

The part of a control system containing one or more devices that perform a safety-related function. [**79:** 3.3.95] (CMP-12)

Informational Note: See NFPA 79-2024, *Electrical Standard for Industrial Machinery. Safety-related control system* and *safety interlock circuit* are common terms that can be used to refer to the safety circuit in other standards. The safety circuit can include hard-wired, communication, and software-related components.

Sealable Equipment.

Equipment enclosed in a case or cabinet that is provided with a means of sealing or locking so that live parts cannot be made accessible without opening the enclosure. (CMP-1)

Informational Note: The equipment may or may not be operable without opening the enclosure.

Sealed [as applied to hazardous (classified) locations].

Constructed such that equipment is sealed effectively against entry of an external atmosphere and is not opened during normal operation or for any maintenance activities. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Sealed, Hermetically. (Hermetically Sealed)

Sealed against the entrance of an external atmosphere, such that the seal is made by fusion of metal to metal, ceramic to metal, or glass to metal. (CMP-14)

Informational Note: See ANSI/UL 121201, *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations* , for additional information.

Section Sign.

A sign or outline lighting system, shipped as subassemblies, that requires field-installed wiring between the subassemblies to complete the overall sign. The subassemblies are either physically joined to form a single sign unit or are installed as separate remote parts of an overall sign. (600) (CMP-18)

Selected Receptacles.

A minimal number of receptacles selected by the health care facility's governing body as necessary to provide essential patient care and facility services during loss of normal power. [**99:** 3.3.164] (517) (CMP-15)

Self-Contained Therapeutic Tubs or Hydrotherapeutic Tanks.

A factory-fabricated unit consisting of a therapeutic tub or hydrotherapeutic tank with all water-circulating, heating, and control equipment integral to the unit. Equipment may include pumps, air blowers, heaters, light controls, sanitizer generators, and so forth. (680) (CMP-17)

Separable Power Supply Cable Assembly.

A flexible cord or cable, including ungrounded, grounded, and equipment grounding conductors, provided with a cord connector, an attachment plug, and all other fittings, grommets, or devices installed for the purpose of delivering energy from the source of electrical supply to the truck or transport refrigerated unit (TRU) flanged surface inlet. (626) (CMP-12)

Separately Derived System.

An electrical power supply output, other than a service, having no direct connection(s) to circuit conductors of any other electrical source other than those established by grounding and bonding connections. (CMP-5)

Service.

The conductors and equipment connecting the serving utility to the wiring system of the premises served. (CMP-10)

Service Conductors.

The conductors from the service point to the service disconnecting means. (CMP-10)

Service Conductors, Overhead. (Overhead Service Conductors)

The overhead conductors between the service point and the first point of connection to the service-entrance conductors at the building or other structure. (CMP-10)

Service Conductors, Underground. (Underground Service Conductors)

The underground conductors between the service point and the first point of connection to the service-entrance conductors in a terminal box, meter, or other enclosure, inside or outside the building wall. (CMP-10)

Informational Note: Where there is no terminal box, meter, or other enclosure, the point of connection is considered to be the point of entrance of the service conductors into the building.

Service Disconnect (Service Disconnecting Means).

A device that is connected to service conductors and disconnects the premises wiring system or equipment from the service conductors. (CMP-10)

Service Drop.

The overhead conductors between the serving utility and the service point. (CMP-10)

Service-Entrance Conductor Assembly.

Multiple single-insulated conductors twisted together without an overall covering, other than an optional binder intended only to keep the conductors together. (CMP-6)

Service-Entrance Conductors.

The service conductors between the terminals of the service equipment to the service drop, overhead service conductors, service lateral, or underground service conductors. (CMP-10)

Informational Note: Where service equipment is located outside the building walls, there could be no service-entrance conductors or they might be entirely outside the building.

Service Equipment.

The necessary equipment, consisting of a circuit breaker(s) or switch(es) and fuse(s) and their accessories, connected to the serving utility and intended to constitute the main control and disconnect of the serving utility. (CMP-10)

Service Equipment, Mobile Home. (Mobile Home Service Equipment)

The equipment containing the disconnecting means, overcurrent protective devices, and receptacles or other means for connecting a mobile home feeder assembly. (550) (CMP-7)

Service Lateral.

The underground conductors between the utility electric supply system and the service point. (CMP-10)

Service Point.

The point of connection between the facilities of the serving utility and the premises wiring. (CMP-10)

Informational Note: The service point can be described as the point of demarcation between where the serving utility ends and the premises wiring begins. The serving utility generally specifies the location of the service point based on the conditions of service.

Service Point, Communications. (Communications Service Point)

The point of connection between the communications service provider's network (outside plant) and the premises wiring (inside plant). (CMP-16)

Servicing.

The process of following a manufacturer's set of instructions or applicable industry standards to analyze, adjust, or perform prescribed actions upon equipment with the intention to preserve or restore the operational performance of the equipment. (CMP-1)

Informational Note: Servicing often encompasses maintenance and repair activities.

Shore Power.

The electrical equipment required to power a floating vessel including, but not limited to, the receptacle and cords. (555) (CMP-7)

Shoreline.

The farthest extent of standing water under the applicable conditions that determine the electrical datum plane for the specified body of water. (682) (CMP-7)

Short Circuit.

An abnormal connection (including an arc) of relatively low impedance, whether made accidentally or intentionally, between two or more points of different potential. (CMP-10)

Short-Circuit Current Rating.

The prospective symmetrical fault current at a nominal voltage to which equipment is able to be connected without sustaining damage exceeding defined acceptance criteria. (CMP-10)

Show Window.

Any window, including windows above doors, used or designed to be used for the display of goods or advertising material, whether it is fully or partly enclosed or entirely open at the rear and whether or not it has a platform raised higher than the street floor level. (CMP-2)

Sign, Electric. (Electric Sign)

Electrically operated utilization equipment with words, symbols, art, or advertising designed to convey information or attract attention. (CMP-18)

Sign, Host. (Host Sign)

A sign or outline lighting system already installed in the field that is designated by a retroft kit for field conversion of the illumination system. (600) (CMP-18)

Sign, Photovoltaic (PV) Powered (PV Powered Sign). [Photovoltaic (PV) Powered Sign]

A complete sign powered by solar energy consisting of all components and subassemblies for installation either as an off-grid stand-alone, on-grid interactive, or non-grid interactive system. (600) (CMP-18)

Sign Body.

A portion of a sign that can provide protection from the weather and can additionally serve as an electrical enclosure. (600) (CMP-18)

Signaling Circuit.

Any electrical circuit that energizes signaling equipment. (CMP-3)

Simple Apparatus.

An electrical component or combination of components of simple construction with well-defined electrical parameters that does not generate more than 1.5 volts, 100 mA, and 25 mW, or a passive component that does not dissipate more than 1.3 watts and is compatible with the intrinsic safety of the circuit in which it is used. (CMP-14)

Informational Note No. 1: The following are examples of simple apparatus:

(1) Passive components; for example, switches, instrument connectors, plugs and sockets, junction boxes, resistance temperature devices, and simple semiconductor devices such as LEDs

(2) Sources of stored energy consisting of single components in simple circuits with well-defined parameters; for example, capacitors or inductors, whose values are considered when determining the overall safety of the system

(3) Sources of generated energy; for example, thermocouples and photocells, that do not generate more than 1.5 volts, 100 mA, and 25 mW

Informational Note No. 2: See ANSI/UL 913, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* , and ANSI/UL 60079-11, *Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"* , for additional information.

Single-Pole Separable Connector.

A device that is installed at the ends of portable, flexible, single-conductor cable that is used to establish connection or disconnection between two cables or one cable and a single-pole, panel-mounted separable connector. (CMP-18)

Site-Isolating Device.

A pole-mounted disconnecting means installed at the distribution point for the purposes of isolation, system maintenance, emergency disconnection, or connection of optional standby systems. (547) (CMP-7)

Skeleton Tubing.

Neon tubing that is itself the sign or outline lighting and is not attached to an enclosure or sign body. (600) (CMP-18)

Slip.

A berthing space between or adjacent to piers, wharves, or docks; the water areas associated with boat occupation. [**303:** 3.3.21] (555) (CMP-7)

Informational Note: See the definition of *Berth* for additional information.

Solid-State Phase-Control Dimmer.

A solid-state dimmer where the wave shape of the steady-state current does not follow the wave shape of the applied voltage such that the wave shape is nonlinear. (CMP-15)

Solid-State Sine Wave Dimmer.

A solid-state dimmer where the wave shape of the steady-state current follows the wave shape of the applied voltage such that the wave shape is linear. (CMP-15)

Spa or Hot Tub.

A hydromassage pool, or tub for recreational or therapeutic use, not located in health care facilities, designed for immersion of users, and usually having a filter, heater, and motor-driven blower. It may be installed indoors or outdoors, on the ground or supporting structure, or in the ground or supporting structure. Generally, they are not designed or intended to have its contents drained or discharged after each use. (680) (CMP-17)

Spa or Hot Tub, Packaged Equipment Assembly. (Packaged Spa or Hot Tub Equipment Assembly)

A factory-fabricated unit consisting of water-circulating, heating, and control equipment mounted on a common base, intended to operate a spa or hot tub. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Spa or Hot Tub, Self-Contained. (Self-Contained Spa or Hot Tub)

Factory-fabricated unit consisting of a spa or hot tub vessel with all water-circulating, heating, and control equipment integral to the unit. Equipment can include pumps, air blowers, heaters, lights, controls, sanitizer generators, and so forth. (680) (CMP-17)

Spa or Hot Tub, Storable. (Storable Spa or Hot Tub)

Spas or hot tubs installed entirely on or above the ground that are intended to be stored when not in use and are designed for ease of relocation. (680) (CMP-17)

Space.

A portion of the health care facility designated by the health care facility's governing body that serves a specific purpose. [**99:** 3.3.171] (517) (CMP-15)

Special Permission.

The written consent of the authority having jurisdiction. (CMP-1)

Special Protection "s".

Type of protection that permits design, assessment, and testing of equipment that cannot be fully assessed within a recognized type of protection or combination of recognized types of protection because of functional or operational limitations, but that can be demonstrated to provide the necessary equipment protection level (EPL). (CMP-14)

Informational Note: See ANSI/UL 60079-33, *Explosive Atmospheres — Part 33: Equipment Protection by Special Protection "s"* , for additional information.

Special-Purpose Multi-Circuit Cable System.

A portable branch-circuit distribution system consisting of one or more trunk cables and optional breakout assemblies or multi-circuit outlet enclosures. (520) (CMP-15)

Spider (Cable Splicing Block).

A device that contains busbars that are insulated from each other for the purpose of splicing or distributing power to portable cables and cords that are terminated with single-pole busbar connectors. (530) (CMP-15)

Spin Down.

A shutdown condition of the FESS, where energy is being dissipated and the flywheel rotor is slowing down to a stop. (706) (CMP-13)

Informational Note: A complete stop of a flywheel rotor cannot occur instantaneously because of the high kinetic energy of the rotor, but rather occurs over time as a result of friction forces acting on the rotor.

Splash Pad.

A fountain intended for recreational use by pedestrians and designed to contain no more than 25 mm (1 in.) of water depth. This definition does not include showers intended for hygienic rinsing prior to use of a pool, spa, or other water feature. (680) (CMP-17)

Spray Area.

Any fully enclosed, partly enclosed, or unenclosed area in which flammable or combustible vapors, mists, residues, dusts, or deposits are present due to the operation of spray processes, including:

(1) any area in the direct path of a spray application process;

(2) the interior of a spray booth, spray room, or limited finishing workstation, as herein defined;

(3) the interior of any exhaust plenum, eliminator section, or scrubber section;

(4) the interior of any exhaust duct or exhaust stack leading from a spray application process;

(5) the interior of any air recirculation path up to and including recirculation particulate filters;

(6) any solvent concentrator (pollution abatement) unit or solvent recovery (distillation) unit; and

(7) the inside of a membrane enclosure.

The following are not part of the spray area:

(1) fresh air make-up units;

(2) air supply ducts and air supply plenums;

(3) recirculation air supply ducts downstream of recirculation particulate filters; and

(4) exhaust ducts from solvent concentrator (pollution abatement) units. [**33:** 3.3.2.3] (CMP-14)

Informational Note No. 1: Unenclosed spray areas are locations outside of buildings or are localized operations within a larger room or space. Such areas are normally provided with some local vapor extraction/ventilation system. In automated operations, the area limits are the maximum area in the direct path of spray operations. In manual operations, the area limits are the maximum area of spray when aimed at 90 degrees to the application surface.

Informational Note No. 2: See definitions for *limited finishing workstation* and *membrane enclosure* for additional information.

Spray Area, Outdoor. (Outdoor Spray Area)

A spray area that is outside the confines of a building or that has a canopy or roof that does not limit the dissipation of the heat of a fire or dispersion of flammable vapors and does not restrict fire-fighting access and control. For the purpose of this standard, an outdoor spray area can be treated as an unenclosed spray area as defined in this code. [**33:** 3.3.2.3.1] (CMP-14)

Spray Area, Unenclosed. (Unenclosed Spray Area)

Any spray area that is not confined by a limited finishing workstation, spray booth, or spray room, as herein defined. [**33:** 3.3.2.3.2] (CMP-14)

Spray Booth.

A power-ventilated enclosure for a spray application operation or process that confines and limits the escape of the material being sprayed, including vapors, mists, dusts, and residues that are produced by the spraying operation and conducts or directs these materials to an exhaust system. [**33:** 3.3.19] (CMP-14)

Informational Note: A spray booth is an enclosure or insert within a larger room used for spraying, coating, and/or dipping applications. A spray booth can be fully enclosed or have open front or face and can include a separate conveyor entrance and exit. The spray booth is provided with a dedicated ventilation exhaust with supply air from the larger room or from a dedicated air supply.

Spray Room.

A power-ventilated fully enclosed room with a specified fire resistance rating used exclusively for open spraying of flammable or combustible materials. [**33:** 3.3.20] (CMP-14)

Stage Effect (Special Effect).

An electrical or electromechanical piece of equipment used to simulate a distinctive visual or audible effect, such as a wind machine, lightning simulator, or sunset projector. (CMP-15)

Stage Equipment.

Equipment at any location on the premises integral to the stage production including, but not limited to, equipment for lighting, audio, special effects, rigging, motion control, projection, or video. (520) (CMP-15)

Stage Lighting Hoist.

A motorized lifting device that contains a mounting position for one or more luminaires, with wiring devices for connection of luminaires to branch circuits, and integral flexible cables to allow the luminaires to travel over the lifting range of the hoist while energized. (520) (CMP-15)

Stage Property.

An article or object used as a visual element in a motion picture or television production, except painted backgrounds (scenery) and costumes. (530) (CMP-15)

Stage Set.

A specific area set up with temporary scenery and properties designed and arranged for a particular scene in a motion picture or television production. (CMP-15)

Stage Switchboard, Fixed. (Fixed Stage Switchboard)

A permanently installed switchboard, panelboard, or rack containing dimmers or relays with associated overcurrent protective devices, or overcurrent protective devices alone, used primarily to feed stage equipment. (CMP-15)

Stage Switchboard, Portable. (Portable Stage Switchboard)

A portable rack or pack containing dimmers or relays with associated overcurrent protective devices, or overcurrent protective devices alone, used to feed stage equipment. (520) (CMP-15)

Stand Lamp.

A portable stand that contains a general-purpose luminaire or lampholder with guard for the purpose of providing general illumination on a stage, in an auditorium, or in a studio. (520) (CMP-15)

Stand-Alone System.

A system that is not connected to an electric power production and distribution network. (CMP-4)

Storage, Dry Stack. (Dry Stack Storage)

A facility, either covered or uncovered, constructed of horizontal and vertical structural members designed to allow placement of small boats in defined slots arranged both horizontally and vertically. [**303:** 3.3.24.2] (555) (CMP-7)

Stored-Energy Power Supply System (SEPSS).

A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)

Stranding, Compact. (Compact Stranding)

A conductor stranding method in which each layer of strands is pressed together to minimize the gaps between the strands so the overall diameter of the finished conductor is less than a concentric stranded conductor and less than a compressed stranded conductor. (CMP-6)

Stranding, Compressed. (Compressed Stranding)

A conductor stranding method in which the outer layer of strands is pressed together so the overall diameter of the finished conductor is less than a concentric stranded conductor but greater than a compact stranded conductor. (CMP-6)

Stranding, Concentric. (Concentric Stranding)

A conductor consisting of a straight central strand surrounded by one or more layers of strands, helically laid in a geometric pattern. (CMP-6)

Strip Light.

A luminaire with multiple lamps arranged in a row. (520) (CMP-15)

Structure.

That which is built or constructed, other than equipment. (CMP-1)

Structure, Relocatable. (Relocatable Structure)

A factory-assembled structure or structures transportable in one or more sections that are built on a permanent chassis and designed to be used as other than a dwelling unit without a permanent foundation. (545) (CMP-7)

> Informational Note: Examples of relocatable structures are those units that are equipped for sleeping purposes only, contractor's and other on-site offices, construction job dormitories, studio dressing rooms, banks, clinics, stores, shower facilities and restrooms, training centers, or for the display or demonstration of merchandise or machines.

Subassembly.

Component parts or a segment of a sign, retrofit kit, or outline lighting system that, when assembled, forms a complete unit or product. (600) (CMP-18)

Substation.

An assemblage of equipment (e.g., switches, interrupting devices, circuit breakers, buses, and transformers) through which electric energy is passed for the purpose of distribution, switching, or modifying its characteristics. (CMP-9)

Supervisory Control and Data Acquisition (SCADA).

An electronic system that provides monitoring and controls for the operation of the critical operations power system. (CMP-13)

> Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators.

Support Areas.

Areas, other than fixed production offices, intended to support production and where image capture will not take place. Such areas include, but are not limited to, mobile production offices, storage, and workspaces; vehicles and trailers for cast, makeup, hair, lighting, grip, wardrobe, props, catering, and craft services; and portable restrooms. (530) (CMP-15)

Surge Arrester.

A protective device for limiting surge voltages by discharging or bypassing surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions. (CMP-10)

Surge-Protective Device (SPD).

A protective device for limiting transient voltages by diverting or limiting surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions and is designated as follows:

(1) Type 1: Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service disconnect overcurrent device

(2) Type 2: Permanently connected SPDs intended for installation on the load side of the service disconnect overcurrent device, including SPDs located at the branch panel

(3) Type 3: Point of utilization SPDs

(4) Type 4: Component SPDs, including discrete components, as well as assemblies. (CMP-10)

> Informational Note: See UL 1449, *Standard for Surge Protective Devices* , for further information on SPDs.

Suspended Ceiling Grid.

A system that serves as a support for a finished ceiling surface and other utilization equipment. (393) (CMP-18)

Switch, Bypass Isolation. (Bypass Isolation Switch)

A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of bypass that directly connects the load conductors to a power source and allows the transfer switch to be isolated or disconnected. (CMP-13)

Switch, General-Use. (General-Use Switch)

A switch intended for use in general distribution and branch circuits. It is rated in amperes, and it is capable of interrupting its rated current at its rated voltage. (CMP-10)

Switch, General-Use Snap. (General-Use Snap Switch)

A form of general-use switch constructed so that it can be installed in device boxes or on box covers, or otherwise used in conjunction with wiring systems recognized by this code. (CMP-18)

Switch, Isolating. (Isolating Switch)

A switch intended for isolating an electrical circuit from the source of power. It has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means. (CMP-10)

Switch, Motor-Circuit. (Motor-Circuit Switch)

A switch rated in horsepower that is capable of interrupting the maximum operating overload current of a motor of the same horsepower rating as the switch at the rated voltage. (CMP-11)

Switchboard.

A large single panel, frame, or assembly of panels on which are mounted on the face, back, or both, switches, overcurrent and other protective devices, buses, and usually instruments.(CMP-10)

Informational Note: These assemblies can be accessible from the rear or side as well as from the front and are not intended to be installed in cabinets.

Switchgear.

An assembly completely enclosed on all sides and top with sheet metal (except for ventilating openings and inspection windows) and containing primary power circuit switching, interrupting devices, or both, with buses and connections. The assembly may include control and auxiliary devices. Access to the interior of the enclosure is provided by doors, removable covers, or both. (CMP-10)

Informational Note: All switchgear subject to *NEC* requirements is metal enclosed. Switchgear rated below 1000 V or less may be identified as "low-voltage power circuit breaker switchgear." Switchgear rated over 1000 V may be identified as "metal-enclosed switchgear" or "metal-clad switchgear." Switchgear is available in non–arc-resistant or arc-resistant constructions.

Switching Device (as applied to equipment rated over 1000 volts ac, 1500 volts dc, nominal).

A device designed to close, open, or both, one or more electrical circuits. (CMP-9)

Cutout.

An assembly of a fuse support with either a fuseholder, fuse carrier, or disconnecting blade. The fuseholder or fuse carrier may include a conducting element (fuse link) or may act as the disconnecting blade by the inclusion of a nonfusible member.

Disconnecting Switch (or Isolating Switch).

A mechanical switching device used for isolating a circuit or equipment from a source of power.

Interrupter Switch.

A switching device capable of making, carrying, and interrupting specified currents.

Oil-Filled Cutout.

A cutout in which all or part of the fuse support and its fuse link or disconnecting blade is mounted in oil with complete immersion of the contacts and the fusible portion of the conducting element (fuse link) so that arc interruption by severing of the fuse link or by opening of the contacts will occur under oil.

Oil Switch.

A switching device having contacts that operate under oil (or askarel or other suitable liquid).

Regulator Bypass Switch.

A switching device or combination of switching devices designed to bypass equipment used to control voltage levels or related circuit characteristics.

System Isolation Equipment.

A redundantly monitored, remotely operated contactor-isolating system, packaged to provide the disconnection/isolation function, capable of verifiable operation from multiple remote locations by means of lockout switches, each having the capability of being padlocked in the "off" (open) position. (430) (CMP-11)

Tap Conductor.

A conductor, other than a service conductor, that has overcurrent protection ahead of its point of supply that exceeds the value permitted for similar conductors that are protected as described elsewhere in 240.4 . (240) (CMP-10)

Task Illumination.

Provisions for the minimum lighting required to carry out necessary tasks in the areas described in 517.34(A) , including safe access to supplies and equipment and access to exits. [**99:** 3.3.177] (517) (CMP-15)

Technical Power System.

An electrical distribution system where the equipment grounding conductor is isolated from the premises grounded conductor and the premises equipment grounding conductor except at a single grounded termination point within a branch-circuit panelboard, at the originating (main breaker) branch-circuit panelboard or at the premises grounding electrode. (640) (CMP-12)

Temporary Equipment.

Portable wiring and equipment intended for use with events of a transient or temporary nature where all equipment is presumed to be removed at the conclusion of the event. (640) (CMP-12)

Terminal (as applied to batteries).

That part of a cell, container, or battery to which an external connection is made (commonly identified as post, pillar, pole, or terminal post). (CMP-13)

Thermal Protector (as applied to motors).

A protective device for assembly as an integral part of a motor or motor-compressor that, when properly applied, protects the motor against dangerous overheating due to overload and failure to start. (CMP-11)

Informational Note: The thermal protector may consist of one or more sensing elements integral with the motor or motor-compressor and an external control device.

Thermal Resistivity.

The heat transfer capability through a substance by conduction. (CMP-6)

Informational Note: Thermal resistivity is the reciprocal of thermal conductivity and is designated Rho, which is expressed in the units °C-cm/W.

Thermally Protected (as applied to motors).

A motor or motor-compressor that is provided with a thermal protector. (CMP-11)

Top Shield.

A grounded metal shield covering under-carpet components of the flat conductor cable (Type FCC) system for the purposes of providing protection against physical damage. (324) (CMP-6)

Tower.

A pole or other structure that supports a wind turbine. (694) (CMP-4)

Transfer Switch.

An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)

Transfer Switch, Branch-Circuit Emergency Lighting (BCELTS). (Branch-Circuit Emergency Lighting Transfer Switch)

A device connected on the load side of a branch-circuit overcurrent protective device that transfers only emergency lighting loads from the normal power source to an emergency power source. (700) (CMP-13)

Informational Note: See ANSI/UL 1008, *Transfer Switch Equipment* , for information covering branch-circuit emergency lighting transfer switches.

Transfer Switch, Bypass Isolation. (Bypass Isolation Transfer Switch)

A transfer switch that provides a means to isolate the transfer switch. (CMP-13)

Transfer Switch, Meter-Mounted. (Meter-Mounted Transfer Switch)

A transfer switch connected between the utility meter and the meter base. (CMP-13)

Informational Note: Meter-mounted transfer switches can plug into the meter base. Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.

Transformer.

Equipment, either single-phase or polyphase, that uses electromagnetic induction to convert current and voltage in a primary circuit into current and voltage in a secondary circuit. (CMP-9)

Transformer Secondary Conductor.

A conductor, other than a service conductor, that originates at the secondary winding terminals of a transformer. (CMP-10)

Transition Assembly.

An assembly to facilitate connection of the flat conductor cable (Type FCC) system to other wiring systems, incorporating (1) a means of electrical interconnection and (2) a suitable box or covering for providing electrical safety and protection against physical damage. (324) (CMP-6)

Transport Refrigerated Unit (TRU).

A trailer or container, with integrated cooling or heating, or both, used for the purpose of maintaining the desired environment of temperature-sensitive goods or products. (626) (CMP-12)

Transportable.

X-ray equipment that is to be installed in a vehicle or that may be readily disassembled for transport in a vehicle. (660) (CMP-12)

Truck.

A motor vehicle designed for the transportation of goods, services, and equipment. (626) (CMP-12)

Truck Coupler.

A truck flanged surface inlet and mating cord connector. (626) (CMP-12)

Truck Flanged Surface Inlet.

The device(s) on the truck into which the connector(s) is inserted to provide electric energy and other services. This device is part of the truck coupler. The truck flanged surface inlet is considered to be part of the truck and not part of the electrified truck parking space supply equipment. (626) (CMP-12)

Trunk Cable.

A portable extension cable containing six or more branch circuits, a male multipole plug, and a female multipole receptacle. (520) (CMP-15)

Tubing, Electrical Metallic (EMT). (Electrical Metallic Tubing)

An unthreaded thinwall raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed utilizing appropriate fittings. (CMP-8)

Tubing, Electrical Nonmetallic (ENT). (Electrical Nonmetallic Tubing)

A nonmetallic, pliable, corrugated raceway of circular cross section with integral or associated couplings, connectors, and fittings for the installation of electrical conductors. It is composed of a material that is resistant to moisture and chemical atmospheres and is flame retardant.

A pliable raceway is a raceway that can be bent by hand with a reasonable force but without other assistance. (CMP-8)

Tubing, Flexible Metallic (FMT). (Flexible Metallic Tubing)

A metal raceway that is circular in cross section, flexible, and liquidtight without a nonmetallic jacket. (CMP-8)

Twofer.

An assembly containing one male plug and two female cord connectors used to connect two loads to one branch circuit. (520) (CMP-15)

Type of Protection “n”.

Type of protection where electrical equipment, in normal operation, is not capable of igniting a surrounding explosive gas atmosphere and a fault capable of causing ignition is not likely to occur. (CMP-14)

Informational Note: See ANSI/UL 60079-15, *Explosive Atmospheres — Part 15: Equipment Protection by Type of Protection “n”* , for additional information.

Ungrounded.

Not connected to ground or to a conductive body that extends the ground connection. (CMP-5)

Uninterruptible Power Supply (UPS).

A device or system that provides quality and continuity of ac power through the use of a stored-energy device as the backup power source for a period of time when the normal power supply is incapable of performing acceptably. (CMP-13)

Unit Equipment.

A battery-equipped emergency luminaire that illuminates only as part of the emergency illumination system and is not illuminated when the normal supply is available. (CMP-13)

Utilization Equipment.

Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes. (CMP-1)

Valve Actuator Motor (VAM) Assemblies.

A manufactured assembly, used to operate a valve, consisting of an actuator motor and other components such as motor controllers, torque switches, limit switches, and overload protection. (430) (CMP-11)

Informational Note: VAMs typically have short-time duty and high-torque characteristics.

Ventilated.

Provided with a means to permit circulation of air sufficient to remove an excess of heat, fumes, or vapors. (CMP-14)

Vessel.

A container such as a barrel, drum, or tank for holding fluids or other material. (CMP-17)

Volatile Flammable Liquid.

A flammable liquid having a flash point below 38°C (100°F), or a flammable liquid whose temperature is above its flash point, or a Class II combustible liquid that has a vapor pressure not exceeding 276 kPa (40 psia) at 38°C (100°F) and whose temperature is above its flash point. (CMP-14)

Voltage (of a circuit).

The greatest root-mean-square (rms) (effective) difference of potential between any two conductors of the circuit concerned. (CMP-1)

Informational Note: Some systems, such as 3-phase 4-wire, single-phase 3-wire, and 3-wire direct current, may have various circuits of various voltages.

Voltage, High. (High Voltage)

A potential difference over 1000 volts ac, 1500 volts dc, nominal. (CMP-9)

Informational Note: Circuits and equipment rated at potential differences of more than 1000 volts ac, 1500 volts dc, and up to 52 kV, are also commonly referred to as medium voltage.

Voltage, Low. (Low Voltage)

An electromotive force rated 24 volts, nominal, or less. (552) (CMP-7)

Voltage, Nominal. (Nominal Voltage)

A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class (e.g., 120/240 volts, 480Y/277 volts, 600 volts). (CMP-1)

Informational Note No. 1: The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment.

Informational Note No. 2: See ANSI C84.1-2011, *Voltage Ratings for Electric Power Systems and Equipment (60 Hz).*

Voltage, Nominal (as applied to battery or cell).(Nominal Voltage)

The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13)

Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.

Voltage to Ground.

For grounded circuits, the voltage between the given conductor and that point or conductor of the circuit that is grounded; for ungrounded circuits, the greatest voltage between the given conductor and any other conductor of the circuit. (CMP-1)

Watertight.

Constructed so that moisture will not enter the enclosure under specified test conditions. (CMP-1)

Weatherproof.

Constructed or protected so that exposure to the weather will not interfere with successful operation. (CMP-1)

Informational Note: Rainproof, raintight, or watertight equipment can fulfill the requirements for weatherproof where varying weather conditions other than wetness, such as snow, ice, dust, or temperature extremes, are not a factor.

Wharf.

A structure at the shoreline that has a platform built along and parallel to a body of water with either an open deck or a superstructure. [**307:** 3.3.28] (555) (CMP-7)

Wind Turbine.

A mechanical device that converts wind energy to electrical energy. (CMP-4)

Wind Turbine Output Circuit. (Turbine Output Circuit)

The circuit conductors between the internal components of a wind turbine (which might include an alternator, integrated rectifier, controller, and/or inverter) and other equipment. (694) (CMP-4)

Wire.

A factory assembly of one or more insulated conductors without an overall covering. (805) (CMP-3)

Wireless Power Transfer (WPT).

The transfer of electrical energy from a power source to an electrical load via magnetic fields by a contactless means between a primary device and a secondary device. (625) (CMP-12)

Wireless Power Transfer Equipment (WPTE).

Equipment installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle without physical electrical contact. (625) (CMP-12)

Informational Note No. 1: The general form of WPTE consists of two physical packages: a control box and a primary pad.

Informational Note No. 2: Electric vehicle power export equipment and wireless power transfer equipment are sometimes contained in one set of equipment, sometimes referred to as a bidirectional WPTE.

Wireways, Metal. (Metal Wireways)

Sheet metal troughs with hinged or removable covers for housing and protecting electrical wires and cable and in which conductors are laid in place after the raceway has been installed as a complete system. (CMP-8)

Wireways, Nonmetallic. (Nonmetallic Wireways)

Flame-retardant, nonmetallic troughs with removable covers for housing and protecting electrical wires and cables in which conductors are laid in place after the raceway has been installed as a complete system. (CMP-8)

Wiring Device.

An electrical device that serves as either a connection point to facilitate the flow of current or as a control device in general distribution and branch circuits. (CMP-18)

Informational Note: Examples of wiring devices include attachment plugs, receptacles, general-use snap switches, pendant switches, surface switches, dimmers, and electronic control switches and lighting control switches.

Work Surface.

A fixed, stationary, or portable surface typically intended for dry use and for tasks other than food or beverage preparation, food or beverage serving, personal lavation, or laundering that presents an incidental risk of spillage of smaller quantities of beverages and other liquids upon outlets mounted directly on or recessed in the surface. (CMP-2)

Informational Note No. 1: See UL 111, *Outline of Investigation for Multioutlet Assemblies* , and UL 962A, *Furniture Power Distribution Units* , which establish the performance evaluation criteria and construction criteria.

Informational Note No. 2: See 406.14(F) , 406.14(G)(1) , and 406.14(H) for information on receptacles for work surfaces distinguished from receptacles for counters and countertops.

Yoke (Strap).

The structural frame of a wiring device, such as a receptacle or switch, that serves as the mounting means. (CMP-18)

Zone.

A physically identifiable area (such as barriers or separation by distance) within an information technology equipment room, with dedicated power and cooling systems for the information technology equipment or systems. (645) (CMP-12)

Statement of Problem and Substantiation for Public Comment

A panelboard is a defined term and is defined as follows: “A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet, enclosure, or cutout box placed in or against a wall, partition, or other support; and accessible only from the front.” Accordingly, what a panelboard is does not need to be restated within the definition of panelboard. Note that a key phrase in the definition of panelboard is “…designed to be placed in…” Accordingly, once the panelboard is actually “placed in” or “installed in” “a cabinet, enclosure, or cutout box” per this definition, it is no longer a panelboard which is, by definition, “…designed to be placed in a cabinet, enclosure, or cutout box…” – it is then something other than a panelboard. The phrase “an assembly” recognizes that this panelboard is actually assembled by installing the panelboard in a cabinet, enclosure, or cutout box. Notably, the panelboard is no longer stand-alone – it is now two distinct pieces of electrical equipment; a panelboard and either a cabinet, enclosure, or cutout box. Further, the defined term “approved” was used rather than the possibly unenforceable and vague term “suitable” per Table 3.2.1 in the NEC Style Manual. Importantly, this definition of “installed panelboard” differs significantly from, and is not in conflict with, the defined term “enclosed panelboard” in UL 67 for a number of reasons including, but not limited to, that “installed panelboard” rather than “enclosed panelboard” is being defined and that “suitable” is replaced with “approved” (a defined term) to comply with Table 3.2.1 of the NEC Style Manual to remove this possibly vague and unenforceable word.

Related Item

• FR-8903

Submitter Information Verification

Submitter Full Name: Palmer Hickman
Organization: Electrical Training Alliance
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 06 17:44:40 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The terms "panelboard" and "enclosure" are presently defined in the NEC and can be used to adequately describe either a panelboard or a panelboard inside an enclosure. The proposed definition would cause additional confusion. The correlating committee has purview over the assignment of definitions.

Public Comment No. 486-NFPA 70-2024 [Definition: Current-Limiting (as applied to overcurrent pro...]

Current-Limiting (as applied to overcurrent protection devices).

The ability to, when interrupting currents in its current-limiting range, reduce the current flowing in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit if the device were replaced with a solid conductor having comparable impedance. (CMP-10)

Additional Proposed Changes

File Name	Description	Approved
CN_133.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 133 appeared in the First Draft Report on First Revision No. 8857.

The Correlating Committee directs CMP 10 to review this definition regarding the use of the terms “substantially” and “comparable” as they are not in compliance with the NEC Style Manual 3.2.1

Related Item

- First Revision No. 8857

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:46:31 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8357-NFPA 70-2024
Statement: The definition of Current-Limiting is revised to “(as applied to overcurrent protective devices)”. The terms “substantially” and “comparable” have been retained as they are considered necessary for providing an accurate definition.

Correlating Committee Note No. 133-NFPA 70-2024 [Definition: Overcurrent Protective Device, Current-Limiting...]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 15:21:46 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review this definition regarding the use of the terms “substantially” and “comparable” as they are not in compliance with the NEC Style Manual 3.2.1

First Revision No. 8857-NFPA 70-2024 [Definition: Overcurrent Protective Device, Current-Limiting...]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 490-NFPA 70-2024 [Definition: Industrial Installation, Supervised. (Supervise...]

Industrial Installation, Supervised. (Supervised Industrial Installation)

The industrial portions of a facility where all of the following conditions are met:

(1) Conditions of maintenance and engineering supervision ensure that only qualified persons monitor and service the system.

(2) The premises wiring system has 2500 kVA or greater of load used in industrial processes, manufacturing activities, or both, as calculated in accordance with Article 120, Parts II, III, IV, or V.

(3) The premises has at least one service or feeder that is more than 150 volts to ground and more than 300 volts phase-to-phase.

This definition excludes installations in buildings used by the industrial facility for offices, warehouses, garages, machine shops, and recreational facilities that are not an integral part of the industrial plant, substation, or control center. (240) (CMP-10)

Additional Proposed Changes

File Name	Description	Approved
CN_137.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 137 appeared in the First Draft Report on First Revision No. 8853.

The Correlating Committee directs CMP-10 to review the definition “industrial installation, supervised” that contains requirements and does not comply with the NEC Style Manual 2.1.2.5.

Related Item

- First Revision No. 8853

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:53:34 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8571-NFPA 70-2024
Statement: For the definition of “supervised industrial installation,” the words “are met” have been replaced with the word “exist” to come into compliance with Section 2.1.2.5 of the NEC Style Manual.

Correlating Committee Note No. 137-NFPA 70-2024 [Definition: Industrial Installation, Supervised. (Supervise...]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 15:47:59 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-10 to review the definition “industrial installation, supervised” that contains requirements and does not comply with the NEC Style Manual 2.1.2.5.

First Revision No. 8853-NFPA 70-2024 [Definition: Industrial Installation, Supervised. (Supervise...]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 1220-NFPA 70-2024 [Definition: Overcurrent Protective Device, Branch-Circuit. ...]

Overcurrent ~~Protective Device, Branch-Circuit. (Branch-Circuit Overcurrent Protective Device)~~ Protection Device

A device capable of providing protection for ~~service,~~ feeder circuits , ~~and~~ branch circuits, and equipment over the full range of overcurrents between its rated current and its interrupting rating. (CMP-10)

Informational Note: These devices were previously referred to as branch circuit overcurrent protective devices.

Statement of Problem and Substantiation for Public Comment

I agree with the intent of the committee input, but recommend deleting the language about services. A device that is installed at the end of a circuit can only provide overload protection, not ground fault and short circuit protection.

Related Item

- CI 9263

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Sat Aug 17 18:24:04 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8359-NFPA 70-2024

Statement: The term “Branch-Circuit Overcurrent Protective Device” is revised to the term “Overcurrent Protective Device (OCPD)” to reduce the confusion over the use of the term branch-circuit. Information note 1 was added to assimilate the use of the new term as it relates to past definitions of the Code. Additionally, informational note 2 was added to reference the new 240.7 where those devices specifically suitable for protecting branch, feeder and service conductors and equipment are now identified.

Service overcurrent protective devices provide overload protection for service conductors and provide overcurrent protection downstream of the service OCPD.

Public Comment No. 1636-NFPA 70-2024 [Definition: Overcurrent Protective Device, Branch-Circuit. ...]

Overcurrent Protective Device ~~, Branch-Circuit. (Branch-Circuit Overcurrent Protective Device)~~ (OCPD).

A device capable of providing ~~protection for service, feeder, and branch circuits and equipment over~~ protection over the full range of ~~overcurrents between~~ overcurrent between its rated current and its interrupting rating. (CMP-10)

Informational Note 1: Prior editions of NFPA 70 included the defined term "branch circuit overcurrent protective device" for overcurrent protective devices suitable for providing protection for service, feeder and branch circuits. This term has been revised to a generalized term of "overcurrent protective device" (OCPD). The specific requirements using this term may include modifiers (such as branch OCPD, feeder OCPD, service OCPD) to specify location or application of the OCPD, or to specify variations (such as supplementary OCPD).

Informational Note 2: See 240.7 for a list of overcurrent protective devices suitable for providing protection for service, feeder, branch circuits and equipment.

Statement of Problem and Substantiation for Public Comment

This Public Comment is submitted on behalf of a Task Group formed under the purview of Code Making Panel 10 consisting of Randy Dollar, Thomas Domitrovich, Jason Doty, Diane Lynch, Alan Manche, Nathan Philips, David Williams, and Danish Zia. This Public Comment, along with other Public Comments, was developed with the goal of improving usability and accuracy on requirements associated with overcurrent protection devices.

The term "Branch-Circuit Overcurrent Protective Device" is revised to the term "Overcurrent Protective Device (OCPD)". With this new broader term, to ensure proper protection, there is now a need to identify those OCPDs which are suitable for providing protection to service, feeder, branch-circuit conductors and equipment among the wide ranging category of overcurrent protection devices. The proposed 240.7 lists those devices currently considered suitable for providing such protection. Additionally, the new proposal permits other devices to be used where specified elsewhere in the Code (such as Article 430 and Article 690), or where listed and labeled accordingly.

Related Item

• PI-4050 • PI 460 • PI 3036 • PC 1640 • PC 1641 - 1658

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 25 20:24:27 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8359-NFPA 70-2024

Statement: The term "Branch-Circuit Overcurrent Protective Device" is revised to the term "Overcurrent Protective Device (OCPD)" to reduce the confusion over the use of the term branch-circuit. Information note 1 was added to assimilate the use of the new term as it relates to past definitions of the Code. Additionally, informational note 2 was added to reference the new 240.7 where those devices specifically suitable for protecting branch, feeder and service conductors and equipment are now identified.

Service overcurrent protective devices provide overload protection for service conductors and provide overcurrent protection downstream of the service OCPD.

Public Comment No. 866-NFPA 70-2024 [Definition: Overcurrent Protective Device, Branch-Circuit. ...]

Overcurrent Protective Device, Branch-Circuit. (Branch-Circuit Overcurrent Protective Device)

A device capable of providing protection ~~for service, feeder, and branch~~ for branch circuits and equipment over the full range of overcurrents between its rated current and its interrupting rating. (CMP-10)

Statement of Problem and Substantiation for Public Comment

Branch circuit is a defined term. Accordingly, a branch circuit overcurrent protective device cannot protect more than what is included in that defined term including service and feeder circuits and equipment.

Related Item

- PI-2223

Submitter Information Verification

Submitter Full Name: Palmer Hickman
Organization: Electrical Training Alliance
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 06 17:52:28 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8359-NFPA 70-2024

Statement: The term “Branch-Circuit Overcurrent Protective Device” is revised to the term “Overcurrent Protective Device (OCPD)” to reduce the confusion over the use of the term branch-circuit. Information note 1 was added to assimilate the use of the new term as it relates to past definitions of the Code. Additionally, informational note 2 was added to reference the new 240.7 where those devices specifically suitable for protecting branch, feeder and service conductors and equipment are now identified.

Service overcurrent protective devices provide overload protection for service conductors and provide overcurrent protection downstream of the service OCPD.

Public Comment No. 1638-NFPA 70-2024 [Definition: Overcurrent Protective Device, Supplementary. (...]

Overcurrent Protective Device, Supplementary. (Supplementary Overcurrent Protective Device) (Supplementary OCPD)

A device intended to provide limited overcurrent protection for specific applications and utilization equipment such as luminaires and appliances. This limited protection is in addition to the protection provided in the required branch circuit by the branch-circuit overcurrent protective device. (CMP-10)

Informational Note: Supplementary Overcurrent Protective Devices provide limited protection and differs from Overcurrent Protective Device (OCPD) that provides protection over the full range of overcurrent.

Statement of Problem and Substantiation for Public Comment

This Public Comment is based on the work of CMP-10 Task Group that reviewed the Overcurrent definitions in the document. Adding an Alternate Term "(Supplementary OCPD)" will allow for electronic searching where the term is used in the document.
The addition of an Informational Note will provide clarity for users.

Related Item

• PI 4275 • PC 1636 • PC 1641 - 1658

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 25 20:50:37 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8361-NFPA 70-2024
Statement: The alternate term "(Supplementary OCPD)" is added for searchability in the document. The definition has been revised to align with the revised definitions related to overcurrent protection. The informational note was not accepted because it was determined it was redundant.

Public Comment No. 858-NFPA 70-2024 [Definition: Panelboard.]

Panelboard.

A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet, enclosure, or cutout box placed in or against a wall, partition, or other support; and accessible only from the front. (CMP-~~10~~ 1)

Statement of Problem and Substantiation for Public Comment

This definition, which includes the phrase "...designed to be placed in a cabinet, enclosure, or cutout box..." should be under the purview of CMP-1 as it has purview of the definition of enclosure and is where a panelboard is designed to be placed. CMP-8 has purview of the definitions of "cutout box" and "cabinet" which are are also where a panelboard is designed to be placed. CMP-8, rather than CMP-10, is also an acceptable panel to have jurisdiction for "panelboard" based on the fact that a panelboard is designed to be placed in a cabinet, enclosure, or cutout box. CMP-8 has purview over the majority of these definitions where a panelboard is designed to be placed.

Related Item

- FCR-163

Submitter Information Verification

Submitter Full Name: Palmer Hickman

Organization: Electrical Training Alliance

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 06 16:52:35 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: CMP-10 does not have the authority to change assigned purview of a definition. In addition, CMP-10 has purview over Article 408 which contains requirements for panelboards.

Public Comment No. 860-NFPA 70-2024 [Definition: Panelboard.]

Panelboard.

A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet, enclosure, or cutout box placed in or against a wall, partition, or other support; and accessible only from the front. (CMP-~~10~~ 8)

Statement of Problem and Substantiation for Public Comment

This definition, which includes the phrase "...designed to be placed in a cabinet, enclosure, or cutout box..." should be under the purview of CMP-8 as it has purview over most of the definitions where a panelboard is designed to be placed. CMP-8 has purview of the definitions of "cutout box" and "cabinet" which is where a panelboard is designed to be placed. CMP-1, rather than CMP-10, is also an acceptable panel to have jurisdiction for "panelboard" based on the fact that a panelboard is designed to be placed in a cabinet, enclosure, or cutout box. CMP-1 has purview of the definition of "enclosure" which the definition of panelboard includes in the phrase "...designed to be placed in a cabinet, enclosure, or cutout box..."

Related Item

- FCR-163

Submitter Information Verification

Submitter Full Name: Palmer Hickman

Organization: Electrical Training Alliance

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 06 17:06:57 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: CMP-10 does not have the authority to change assigned purview of a definition. In addition, CMP-10 has purview over Article 408 which contains requirements for panelboards.

Public Comment No. 111-NFPA 70-2024 [Definition: Service.]

Service.

The conductors and equipment connecting the serving utility or stand alone system to the wiring system of the premises served. (CMP-10)

Statement of Problem and Substantiation for Public Comment

The current definitions of "service" in article 100 and article 230 have been interpreted by AHJs to prohibit buildings and other structures from being served by a stand alone system in the code. For instance, article 230.79(C) states that one family dwellings shall have a service disconnecting means rated to not less than 100 amperes, which effectively means that a one family dwelling cannot be built without utility service. This change clarifies that one family dwellings (NEC230.79(C)) and other occupancies are allowed be served by a stand alone (i.e. fully off grid) renewable energy generation and energy storage system as an alternative to a standard electrical utility company provided service.

As an example, Manatee County Florida plans examiners have explicitly prohibited stand alone systems as being allowed as a sole electrical source based on this interpretation. A copy of their interpretation is below:

From: Plans review, Manatee County 7/8/2024:
No off grid. NEC Articles to follow
230.79(C) states a one-family dwelling shall have a service disconnecting means not less than 100amps
100 - Service - The conductors and equipment connecting the serving utility to the wiring system of the premises served .

Related Item

• definition of service

Submitter Information Verification

Submitter Full Name: Bill Johnson
Organization: Brilliant Harvest Llc
Street Address:
City:
State:
Zip:

Submittal Date: Thu Jul 18 09:04:08 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Sources other than the serving utility is not a service. The proposed language would not be accurate for the definition of a service. 230.79 has requirements specific for service disconnects if they exist. It does not prohibit a dwelling being supplied only by a standalone source

Public Comment No. 503-NFPA 70-2024 [Definition: Transformer Secondary Conductor.]

Transformer Secondary Conductor.

A conductor, other than a service conductor, that originates at the secondary winding terminals of a transformer. (CMP-10)

Additional Proposed Changes

File Name	Description	Approved
CN_156.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 156 appeared in the First Draft Report on First Revision No. 8885.

The Correlating Committee directs CMP 10 to review FR 8885 and ensure the new definition is appropriate for the places in the NEC where the term is used. Additionally, CMPs 7 and 9 (having purview for requirements where the proposed new term is used) are requested to review the new definition to ensure it is accurate with respect to the requirements under their purview.

Related Item

- First Revision No. 8885

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 30 22:27:10 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8613-NFPA 70-2024
Statement: These sections have been updated for appropriate use of the term “transformer secondary conductors.”

Correlating Committee Note No. 156-NFPA 70-2024 [Definition: Transformer Secondary Conductor.]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Thu May 09 08:40:17 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review FR 8885 and ensure the new definition is appropriate for the places in the NEC where the term is used. Additionally, CMPs 7 and 9 (having purview for requirements where the proposed new term is used) are requested to review the new definition to ensure it is accurate with respect to the requirements under their purview.

First Revision No. 8885-NFPA 70-2024 [New Definition after Definition: Transformer.]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James

Williams, David A.

Public Comment No. 1639-NFPA 70-2024 [New Definition after Definition: Overcurrent.]

Overcurrent Protection.

Automatic interruption of an overcurrent. (CMP-10)

Statement of Problem and Substantiation for Public Comment

This Public Comment is submitted on behalf of a Task Group formed under the purview of Code Making Panel 10 consisting of Randy Dollar, Thomas Domitrovich, Jason Doty, Diane Lynch, Alan Manche, Nathan Philips, David Williams, and Danish Zia. This Public Comment, along with other Public Comments, was developed with the goal of improving usability and accuracy on requirements associated with overcurrent protection devices.

The term "Overcurrent Protection" is used over 400 times in the document and this definition will provide clarity and correlation throughout the document.

Related Item

• Global PI 4050 • PC 1636 • PC 1641 - 1658

Submitter Information Verification

Submitter Full Name: David Williams

Organization: Delta Charter Township

Street Address:

City:

State:

Zip:

Submittal Date: Sun Aug 25 21:00:16 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8364-NFPA 70-2024

Statement: The term "overcurrent protection" is used over 400 times in the document. This new definition will provide clarity and correlation throughout the document

Public Comment No. 1930-NFPA 70-2024 [New Definition after Definition: Panelboard.]

Panelboard, Installed (Installed Panelboard)

A complete assembly comprised of a panelboard installed in any of the following: a cabinet, cutout box, enclosure, or other means approved for the application (CMP-1).

Statement of Problem and Substantiation for Public Comment

This public comment is submitted to replace the previously defined term “Enclosed Panelboard” that was deleted by FR-88903.
A panelboard is a defined term and is defined as follows: “A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet, enclosure, or cutout box placed in or against a wall, partition, or other support; and accessible only from the front.”
Accordingly, what a panelboard is does not need to be restated within the definition of panelboard. Note that a key phrase in the definition of panelboard is “… designed to be placed in…” Accordingly, once the panelboard is actually “placed in” or “installed in” “a cabinet, enclosure, or cutout box” per this definition, it is no longer a panelboard which is, by definition, “…designed to be placed in a cabinet, enclosure, or cutout box…” – it is then something other than a panelboard.
The phrase “an assembly” recognizes that this panelboard is actually assembled by installing the panelboard in a cabinet, enclosure, or cutout box. Notably, the panelboard is no longer stand-alone – it is now two distinct pieces of electrical equipment; a panelboard and either a cabinet, enclosure, or cutout box. Further, the defined term “approved” was used rather than the possibly unenforceable and vague term “suitable” per Table 3.2.1 in the NEC Style Manual. Importantly, this definition of “installed panelboard” differs significantly from, and is not in conflict with, the defined term “enclosed panelboard” in UL 67 for a number of reasons including, but not limited to, that “installed panelboard” rather than “enclosed panelboard” is being defined and that “suitable” is replaced with “approved” (a defined term) to comply with Table 3.2.1 of the NEC Style Manual to remove this possibly vague and unenforceable word.

Related Item

- FR-8903

Submitter Information Verification

Submitter Full Name: Jeff Noren
Organization: National Electrical Contractors Association
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 10:42:05 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The terms "panelboard" and "enclosure" are presently defined in the NEC and can be used to adequately describe either a panelboard or a panelboard inside an enclosure. The proposed definition would cause additional confusion. The correlating committee has purview over the assignment of definitions.

Public Comment No. 534-NFPA 70-2024 [Section No. 215.1]

215.1 Scope.

This article covers the installation requirements, overcurrent protection requirements, minimum size, and ampacity of conductors for feeders not over 1000 volts ac or 1500 volts dc, nominal.

Informational Note: See Article 265, Part III, for feeders over 1000 volts ac or 1500 volts dc.

Additional Proposed Changes

File Name	Description	Approved
CN_266.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 266 appeared in the First Draft Report on First Revision No. 9018.

The Correlating Committee directs CMP 10 to review the references to Article 235 in 215.1 and 225.1, as the requirements for feeders over 1000 volts ac, 1500 volts dc and for outside branch circuits and feeders over 1000 volts ac or 1500 volts dc, are now located in Articles 266 and 267, respectively.

Related Item

- First Revision No. 9018

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 30 23:22:40 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8380-NFPA 70-2024

Statement: Informational Note: See Article 265, Part III, for 266 for feeders over 1000 volts ac or 1500 volts dc

The reference in the Informational Note is corrected to reflect the appropriate Article. The NEC Style Manual in 4.1.4 identifies that the entire Article can be referenced when necessary. Here Article 266 is needed to be referenced in total referencing of every applicable requirement in Article 266 would be too extensive.

Correlating Committee Note No. 266-NFPA 70-2024 [Section No. 215.1]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Thu May 09 17:52:37 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review the references to Article 235 in 215.1 and 225.1, as the requirements for feeders over 1000 volts ac, 1500 volts dc and for outside branch circuits and feeders over 1000 volts ac or 1500 volts dc, are now located in Articles 266 and 267, respectively.

First Revision No. 9018-NFPA 70-2024 [Section No. 215.1]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 68-NFPA 70-2024 [Section No. 215.1]

215.1 Scope.

This article covers the installation requirements, overcurrent protection requirements, minimum size, and ampacity of conductors for feeders not over 1000 volts ac or 1500 volts dc, nominal.

Informational Note: See Article ~~265 , Part III, for~~ 266 for feeders over 1000 volts ac or 1500 volts dc.

Statement of Problem and Substantiation for Public Comment

This Public Comment is submitted on behalf of a Correlating Committee Medium Voltage Task Group consisting of Robert Osborne (Chair), Paul Barnhart, Lou Grahor, Donny Cook, Scott Higgins, Mike Querry, Roger McDaniel, Dave Burns, Rod Belisle, Kevin Rogers, Tony Ricciuti, Paul Knapp, Paul Sullivan, George Smith, Eric Simmon, Kevin Arnold, Larry Wildermuth, and Kyle Krueger.

This Public Comment was developed to address the change made by First Correlating Revision No. 32. In that revision, the Correlating Committee relocated Articles 235-238 to Articles 265-268. This Public Comment corrects the reference in the Informational Note to reflect the correct Article.

Related Item

• FCR 32

Submitter Information Verification

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Submittal Date: Mon Jul 15 14:51:52 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8380-NFPA 70-2024

Statement: Informational Note: See Article 265, Part III, for 266 for feeders over 1000 volts ac or 1500 volts dc

The reference in the Informational Note is corrected to reflect the appropriate Article. The NEC Style Manual in 4.1.4 identifies that the entire Article can be referenced when necessary. Here Article 266 is needed to be referenced in total referencing of every applicable requirement in Article 266 would be too extensive.

Public Comment No. 146-NFPA 70-2024 [Section No. 215.4(A)]

(A) General.

Feeder conductors shall have an ampacity not less than the larger of 215.4(A)(1) or 215.4(A)(2) and shall comply with 110.14(C).

(1) Continuous and Noncontinuous Loads.

Where a feeder supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum feeder conductor size shall have an ~~ampacity~~ ampacity without application of any adjustment or correction factors not less than the noncontinuous load plus 125 percent of the continuous load.

Exception No. 1: If the assembly, including the overcurrent devices protecting the feeder(s), is listed for operation at 100 percent of its rating, the ampacity of the feeder conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load.

Exception No. 2: Where a portion of a feeder is connected at both its supply and load ends to separately installed pressure connections as covered in 110.14(C)(2), it shall be permitted to have an ampacity not less than the sum of the continuous load plus the noncontinuous load. No portion of a feeder installed under this exception shall extend into an enclosure containing either the feeder supply or the feeder load terminations, as covered in 110.14(C)(1).

Exception No. 3: Grounded conductors that are not connected to an overcurrent device shall be permitted to be sized at 100 percent of the continuous and noncontinuous load.

(2) Ampacity Adjustment or Correction Factors.

The minimum feeder conductor size shall have an ampacity not less than the maximum load to be served after the application of any adjustment or correction factors in accordance with 310.~~14~~ 15 .

Informational Note No. 1: See Informative Annex D for Examples D1 through D11.

Informational Note No. 2: Conductors for feeders, as defined in Article 100, sized to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or combinations of such loads, and where the maximum total voltage drop on both feeders and branch circuits to the farthest outlet does not exceed 5 percent, will provide reasonable efficiency of operation.

Informational Note No. 3: See 210.19 Informational Note for voltage drop for branch circuits.

Statement of Problem and Substantiation for Public Comment

This section uses the word "ampacity" to mean two different things, which is confusing and is not in accordance with the Article 100 definition.

Subsection (1) uses "ampacity" to refer to a value directly from the relevant table in Article 310. Subsection (2) uses "ampacity" to refer to the final value after the application of any adjustment or correction factors to that table value.

The definition of "ampacity" specifies that it is a current that a conductor may carry "under the conditions of use," and as such, it already means a value after the application of any adjustment or correction factors. The usage of "ampacity" in subsection (2) is in accordance with the definition, and the modifiers "after the application of any adjustment or correction factors" are redundant.

In contrast, the usage of "ampacity" in subsection (1) is not in accordance with the definition. Divining the correct meaning of "ampacity" in subsection (1) currently requires reading it in contrast to subsection (2), noting the lack of the redundant modifiers that are in subsection (2), and inferring that "ampacity" is being used in a manner different from its Article 100 definition.

Obviously all defined terms should be used in accordance with their definitions. Therefore the term "ampacity" in subsection (1) requires modifiers or a change. I have suggested the modifier "without application of any adjustment or correction factors" for parallelism with subsection (2). This phrase could be added at the end of the sentence instead of immediately after the term "ampacity" if preferred.

Also, subsection (2) refers to "adjustment or correction factors in accordance with 310.14," but the adjustment and correction factors are in 310.15, not 310.14. The equivalent section for branch circuit, 210.19(A), refers to 310.14 for subsection (1) and 310.15 for subsection (2).

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 144-NFPA 70-2024 [Section No. 210.19(A)]	Identical change for branch circuits
Public Comment No. 150-NFPA 70-2024 [Section No. 230.42(A)]	Identical change for service entrance conductors
Public Comment No. 144-NFPA 70-2024 [Section No. 210.19(A)]	
Public Comment No. 150-NFPA 70-2024 [Section No. 230.42(A)]	

Related Item

- Public Input No. 472-NFPA 70-2023

Submitter Information Verification

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Submittal Date: Mon Jul 22 12:19:12 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution:	The language does not provide any further clarity. The reference to 310.14 is the correct reference to address all adjustments. NEC 310.14 also takes into account the requirements of NEC 310.15.

Public Comment No. 1961-NFPA 70-2024 [Section No. 215.4(A)(1)]

(1) Continuous and Noncontinuous Loads.

Where a feeder supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum feeder conductor size shall have an ampacity not less than the noncontinuous load plus 125 percent of the continuous load.

Exception No. 1: If the assembly, including the overcurrent devices protecting the feeder(s), is listed for operation at 100 percent of its rating, the ampacity of the feeder conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load.

Exception No. 2: Where a portion of a feeder is connected at both its supply and load ends to separately installed pressure connections as covered in 110.14(C)(2), it shall be permitted to have an ampacity not less than the sum of the continuous load plus the noncontinuous load. No portion of a feeder installed under this exception shall extend into an enclosure containing either the feeder supply or the feeder load terminations, as covered in 110.14(C)(1).

Exception No. 3: Grounded conductors that are not connected to an overcurrent device shall be permitted to be sized at 100 percent of the continuous and noncontinuous load.

Exception No. 4:

Where neither Exception No. 1 nor Exception No. 2 applies and a Power Control System is used to prevent overloading of feeder conductors supplying both continuous and noncontinuous loads per Section 120.7, the minimum feeder conductor size shall have an ampacity not less than 125 percent of the PCS current setpoint.

Where a Power Control System is used to prevent overloading of feeder conductors supplying only noncontinuous loads per Section 120.7, the minimum feeder conductor size shall have an ampacity not less than 100 percent of the PCS current setpoint.

Statement of Problem and Substantiation for Public Comment

This addition is necessitated by the First Draft's removal of continuous load considerations from the load calculation language (formerly Article 220, now Article 120). As continuous load factors are now addressed as part of conductor sizing, this language needs to be updated to reflect the use of EMS with PCS in lieu of traditional load calculation to determine conductor ampacity requirements. These changes explicitly enable EMS with PCS to be used to avoid upsizing conductors while also ensuring that service conductors controlled by a PCS and supplying continuous loads are properly sized. Without this revision, the existing rule (conductor ampacity must equal or exceed 100 of continuous loads plus 125% of noncontinuous loads) cannot be sensibly applied to situations where the PCS current setpoint is used in place of a traditional load calculation per 120.7. In cases where no continuous loads are being controlled or monitored by the PCS, there is no continuous load thermal concern and the conductor does not need an ampacity greater than the current setpoint of the PCS.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1950-NFPA 70-2024 [Section No. 120.7(B)]	
Public Comment No. 1957-NFPA 70-2024 [Section No. 210.19(A)]	
Public Comment No. 1970-NFPA 70-2024 [Section No. 230.42(A)(1)]	
Public Comment No. 1950-NFPA 70-2024 [Section No. 120.7(B)]	
Public Comment No. 1957-NFPA 70-2024 [Section No. 210.19(A)]	
Public Comment No. 1970-NFPA 70-2024 [Section No. 230.42(A)(1)]	
Public Comment No. 1999-NFPA 70-2024 [Section No. 230.31(A)]	

Related Item

- FR-8184

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Submittal Date: Wed Aug 28 13:04:30 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The calculation for the continuous and non continuous loads already takes into account the use of a PCS in Articles 120 and 130 and therefore it is unnecessary to provide exception 4.

Public Comment No. 1615-NFPA 70-2024 [Section No. 215.10]

215.10 Ground-Fault Protection of Equipment (GFPE).

(A) ac Systems.

Each feeder disconnect rated 1000 amperes or more and installed on solidly grounded wye electrical systems of more than 150 volts to ground, but not exceeding 1000 volts phase-to-phase, shall be provided with GFPE in accordance with 230.95.

(B) dc Systems.

Each feeder disconnect rated 1000 amperes or more and installed on solidly grounded dc electrical systems of more than 150 volts to ground, but not exceeding 1500 volts dc line-to-line, shall be provided with GFPE in accordance with 230.95.

Informational Note: See 517.17 for buildings that contain health care occupancies.

Exception No. 1: This section shall not apply to a disconnecting means for a continuous industrial process where a nonorderly shutdown will introduce additional or increased hazards.

Exception No. 2: This section shall not apply if GFPE is provided on the supply side of the feeder and on the load side of any transformer supplying the feeder.

Exception No. 3: If temporary feeder conductors are used to connect a generator to a facility for repair, maintenance, or emergencies, GFPE shall not be required. Temporary feeders without ground-fault protection shall be permitted for the time period necessary but not exceeding 90 days.
Exception No. 4: For fused disconnects in ac systems, where the available fault current, at the fused disconnect, is 10,000 amperes or greater, the ground-fault protection provisions of this section shall not apply if the fuses have a clearing time of 0.07 seconds or less at the lower of the calculated minimum available arcing current or 38% of the available fault current or if the disconnect switch complies with Section 240.67(B)(1), 240.67(B)(3), or 240.67(B)(4), and is set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.

Exception No. 5: For circuit breakers in ac systems , where the available fault current, at the circuit breaker, is 10,000 amperes or greater, the ground-fault protection provisions of this section shall not apply if the circuit breaker complies with Section 240.87(B)(2), 240.87(B)(4), 240.87(B)(5), or 240.87(B)(6), and is set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.

Additional Proposed Changes

File Name	Description	Approved
Figure_1_for_Public_Comment_on_PI_1641_215.10_.docx	Figure 1 for Public Comment on PI 1641 (215.10)	

Statement of Problem and Substantiation for Public Comment

Let's review the Panel Statement to resolve PI 1641.

The first two sentences read: "Even with the limitations proposed in the new exceptions, the arc energy reduction technologies may not operate above the pickup current levels specified in 230.95(A), but below the minimum arcing current. Ground-fault currents may exist in this range, and the arc energy reduction technology may not operate on this current unless the resulting damage to equipment leads to a higher current arcing fault."

The logic of these first two sentences fails to remember the historic reason for ground fault protection in solidly grounded 480/277 volt systems protected at 1000 amperes and greater. Ground fault protection is not needed for faults that are not high impedance arcing faults. If the fault is not arcing, it is a bolted fault, which is safely interrupted by the phase overcurrent device (fuse or circuit breaker). If it is arcing, the limitations in the new Exceptions No. 4 & 5 assure that the arc flash reduction technologies allow less damage than allowed by existing 230.95. Opening "at the lower of (1) the calculated minimum arcing current or (2) 38% of the available fault current" assures that the arc energy reduction technologies open when a potentially damaging arc is initiated. There's no need for the arc energy reduction technologies to operate unless the fault begins arcing.

The third sentence of the Panel Statement reads: "Additionally, differential relaying and energy-reducing active arc-flash mitigation system options would not protect any downstream conductors or equipment, and only provide protection within the equipment boundary." First, it should be remembered that this Public Comment does not prohibit Ground-Fault Protection. It simply provides an alternative method of protecting equipment from burndown. If ground fault protection is desired for burndown protection of downstream equipment it can be included with the phase overcurrent device that is protecting that equipment. (And because it is downstream, it can likely be set to open at lower arcing ground fault levels and at faster opening times.) A key point to remember is that if the downstream equipment is protected with a phase overcurrent protective device (fuse or circuit breaker) at less than 1000 amperes, extensive testing, and field experience, over decades, has shown that the downstream equipment is adequately protected from arcing ground faults by that fuse or circuit breaker.

The fourth and final sentence of the Panel Statement reads: "This may ultimately reduce the level of protection currently provided by GFPE, or by a combination of GFPE and arc energy reduction technology, as applicable." This sentence is addressed by the extensive BACKGROUND below. Arc energy reduction technology, in order to protect human flesh (as opposed to copper, aluminum, and steel), must operate much quicker than is allowed in existing 230.95.

BACKGROUND:

We can now accurately calculate the minimum three-phase arcing current, and the minimum sustainable line-to-ground arcing current, for a high impedance arcing fault. Knowing these currents, we can determine whether or not the arc energy reduction technologies in Exceptions 4 and 5 will operate at, or below, those calculated values. If they do operate at or below those levels, the equipment damage will be just a small percentage of that allowed by the GFPE requirements of 230.95. This applies to all available fault currents of 10,000 amperes or greater.

A requirement (230.95) for ground fault protection of equipment (GFPE) was added to the 1971 NEC® because 480/277 volt, solidly grounded wye services, protected by 1000 ampere and larger overcurrent protective devices, were burning down due to arcing ground faults. 208/120 volt services and those services protected by smaller overcurrent protective devices were not burning down, so they weren't included in the new GFPE requirement.

Over many Code cycles, GFPE requirements were also added for branch circuits (210.13), feeders (215.10), and equipment (240.13). In all cases, the intent was to limit, not eliminate, damage to the switchboard, switchgear, panelboard or equipment being supplied by the 1000 ampere and larger overcurrent protective device.

PRESENT DAY:

The electrical industry has evolved considerably since those early GFPE requirements were introduced. In those years, J. R. Dunki-Jacobs, Harris I. Stanback, and R. H. Kaufman authored numerous ground-breaking papers on arcing ground faults and the need for ground fault protection. They accomplished a great deal that has prevented multitudes of equipment burndowns. Their determination that the minimum sustainable line-to-ground arcing fault on a 480/277 volt system was 38% of the available bolted fault current is very close to the values predicted today by IEEE1584-2018.

In recent editions of the NEC®, Sections were added to require the protection of an employee that is exposed to dangerous levels of incident energy while working

on energized equipment. To avoid serious injuries, employees, working on or near energized equipment, can only withstand a small fraction of the incident energy to which equipment may be subjected by the allowances of 230.95(A). This substantiation compares the levels of equipment damage allowed by existing 230.95(A) with the levels allowed by the employee arc-flash protection requirements of 240.67 and 240.87. It shows that the equipment damage allowed by the employee arc-flash protection requirements of 240.67 and 240.87 is just a small fraction of that allowed by 230.95(A).

EXAMPLES:

The following example utilizes IEEE 1584-2018 for a 480 volt arcing fault with 32mm equipment spacing, in a 20”x20”x20” box and an HCB configuration (horizontal conductors in a metal enclosure). Equipment damage is described in terms of kW-cycles which is a product of arcing current (kA) X number of arcing cycles (cycles) X arc voltage (100 volts on a 480 system).

Worst Case Equipment Damage with 10 kA Available Fault Current As allowed by 230.95(A)

The IEEE 1584-2018 minimum arcing current is 6.09kA. Using the maximum 230.95(A) opening time of 60 cycles, the equipment damage is (6.09 kA X 60 cycles X 100 arcing volts) = 36,540 kW-cycles. See Figure 1.

Worst Case Equipment Damage with 10 kA Available Fault Current As allowed by Exception No. 4.

The IEEE 1584-2018 minimum arcing current is 6.09kA. Assuming the maximum opening time of 4.2 cycles (0.07 seconds) for 240.67(B), the equipment damage is 6.09 kA X 4.2 cycles X 100 arcing volts) = 2,558 kW-cycles. Assuming an opening time of 7 cycles for 240.67(B)(1) and (B)(3), the equipment damage is (6.09 kA X 7 cycles X 100 arcing volts = 4,263 kW-cycles. Assuming an opening time of 1/2 cycle for 240.67(B)(4), the equipment damage is (6.09 kA X 0.5 cycles X 100 arcing volts) = 305 kW-cycles. Worst-case damage for the minimum arcing current with this exception for fusible switches (4,263 kW-cycles) is less than 12% of the worst-case damage allowed by 230.95(A) (36,540 kW-cycles). See Figure 1.

Worst Case Equipment Damage with 10 kA Available Fault Current As allowed by Exception No. 5

The IEEE 1584-2018 minimum arcing current is 6.09kA. Assuming an opening time of 4 cycles for 240.87(B)(1), (B)(2), or (B)(4), the equipment damage is (6.09 kA X 4.0 cycles X 100 arcing volts) = 2,436 kW-cycles. Assuming an opening time of 3 cycles for 240.87(B)(5) or (B)(6), the equipment damage is (6.09 kA X 3 cycles X 100 arcing volts) = 1,827 kW-cycles. Worst-case damage for the minimum arcing current with this exception for circuit breakers (2,426 KW-Cycles) is less than 7% of the worst-case damage allowed by 230.95(A) (36,540 kW-cycles). See Figure 1.

Similar comparisons exist for available fault currents of 25 kA, 50 kA, and 100 kA. See Figure 1.

(Open Figure 1 in the attached file)

Figure 1 shows that equipment damage allowed by this Public Comment is always, from 10,000 amperes available through 100,000 amperes available, just a small fraction of the equipment damage allowed by 230.95(A).

One might ask whether it is possible that the alternate protective systems in this Public Comment could be set such that they might provide arc energy reduction, but not operate during a lower level arcing ground fault where traditional GFPE will provide protection. That question is answered by the very last lines of the new language for both fusible switches and circuit breakers, as both the fusible switches and circuit breakers must be “set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.” Since we know the minimum three phase arcing current from IEEE 1584-2018 and the minimum sustainable phase to ground arcing current of 38% of the available fault current, we know whether or not the fusible switch or circuit breaker is set to operate at those values. SO, THERE IS NO MINIMUM VALUE OF ARCING CURRENT THAT COULD BE SO SMALL AS TO BE PICKED UP BY 230.95(A) REQUIREMENTS THAT WOULD NOT ALSO BE SENSED BY THE REQUIREMENTS OF EXCEPTIONS 4 AND 5.

Let’s look at an example with 10,000 available short-circuit amperes (lowest available fault current for which Exceptions 4 and 5 could apply). In this case the minimum IEEE 1584-2018 three-phase arcing current is 6.09 kA and the minimum sustainable phase-to-ground arcing current is 38% of 10,000 amps = 3.8 kA. Per the requirements of the exceptions the fusible switch or circuit breaker must be set to operate at the lower of either 6.09 kA or 3.8 kA, so the fusible switch or circuit breaker must operate for all arcing currents of 3.8 kA or greater. If a three phase arcing fault occurs it is calculated to be 6.09 kA with the possibility that a single phase to ground arcing fault could be as low as 3.8 kA. In either case, the requirements of Exceptions 4 and 5 assure that the arcing fault is taken off-line in no more than 7 cycles for Exception 4 and no more than 4 cycles for Exception 5, while 230.95(A) would allow a full 60 cycles. What happens if the available fault current is less than or even significantly less than 10,000 amperes? Then Exceptions 4 and 5 do not apply and GFPE would be required.

Energy reducing maintenance switches (240.67(B)(2) and 240.87(B)(3)) are not included in the exceptions because energy-reducing maintenance switches are typically turned off when a worker is not working on energized equipment, whereas ground fault protection is constantly protecting the equipment, whether or not a worker is working on the energized equipment.

The Approved Equivalent Means, (240.67(B)(5) and 240.87(B)(7)), are excluded because the opening times for these methods are unclear.

KEY BENEFIT:

While GFPE can often be set as low as 200 amperes, because of numerous nuisance GFPE openings, in some cases even for ground faults in 277-volt lighting circuits, it has become common for plant electricians, plant engineers, consulting engineers, and electrical contractors to set GFPE at the maximum settings. That has solved a portion of the nuisance tripping problem, but even set at the maximum, it is often difficult to selectively coordinate feeder GFPE with subfeeder phase overcurrent protective devices of 400 amperes or greater. So, for example, even with a feeder GFPE set at the 230.95(A) maximum, a ground fault on a 500 kcmil subfeeder circuit can easily open the GFPE on the feeder, blacking out the entire feeder. If Exceptions 4 or 5 are met, GFPE becomes optional. With Exceptions 4 or 5, the feeder is still protected (even better protected) and the entire feeder is not subjected to a nuisance blackout because of a ground fault on a subfeeder. The key benefit of this Public Comment is that when these alternate methods are utilized, it provides the consulting engineer or design-build contractor with the ability to provide even better arcing fault protection for the equipment and the ability to much more easily meet the selective coordination requirements of 240.11, 700.32, 701.32, and 708.54.

CONCLUSION:

This Public Comment takes advantage of the arc-energy reduction technologies found in 240.67 and 240.87. It provides an exception for GFPE requirements whenever specific 240.67 and 240.87 methods to reduce clearing time are utilized. Arc energy reduction methods, as detailed in Exceptions 4 and 5, must open in a much faster time than allowed by 230.95(A). Reviewing Figure 1, it becomes obvious that Exceptions 4 and 5 will limit the arcing fault damage to the equipment to a level that is considerably less than that currently allowed by the requirements found in 230.95(A).

In closing, doesn’t it just make common sense that arc energy reduction technologies which protect an employee’s skin from third degree burns will also prevent copper, aluminum, and steel from melting?

Related Item

• PI 1641 • FR 7565 • PI 1645 • PC 1616 • PI 1655 • PC 1617 • PC 1722 • PC 1766

Submitter Information Verification

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Committee:	NEC-P10

Committee Statement

Committee Action:	Rejected
Resolution:	Ground faults can exist that are other than arcing or bolted faults, especially considering the additional impedance in the grounding path. Arc flash reduction technologies are required per 240.67 and 240.87 and may be employed in addition to the GFPE required by 215.10. Insufficient substantiation was provided to demonstrate that arc flash reduction technologies will provide the same level of protection at currents lower than the minimum arcing current, and for downstream equipment if replaced by GFPE.

Figure 1

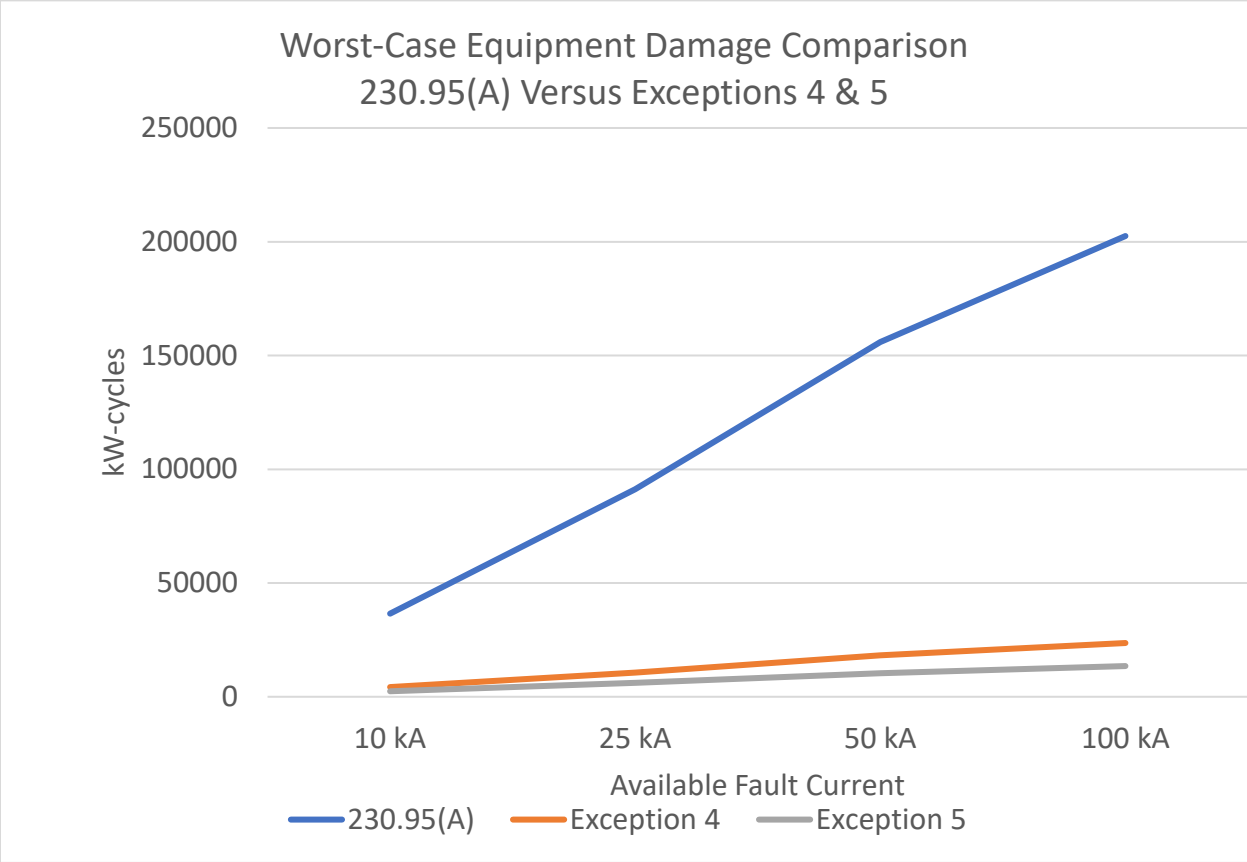

Figure 1 shows that equipment damage allowed by this Public Comment is always, from 10,000 amperes available through 100,000 amperes available, just a small fraction of the equipment damage allowed by 230.95(A).

Public Comment No. 1242-NFPA 70-2024 [Section No. 215.12(C)]

(C) Identification of Ungrounded Conductors.

Ungrounded conductors shall be identified in accordance with ~~215~~ the following . ~~12~~

(

~~C)(~~

1)

~~or 215.12(C)(2) , as applicable.~~

~~(1~~

Feeders Supplied from One Nominal Voltage System.

Where the premises wiring system has branch circuits supplied from one nominal voltage system, branch circuit ungrounded conductors shall be identified in accordance with 310.6(C).

(2) Feeders Supplied from More Than One Nominal Voltage System.

Where the premises wiring system has feeders supplied from more than one nominal voltage system, each ungrounded conductor of a feeder shall be identified by phase or line and nominal voltage system at all termination, connection, and splice points in compliance with 215.12(C)(1)(a) and 215.12(C)(1)(b).

(a) *Means of Identification.* The means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means.

(b) *Posting of Identification Means.* The method used for conductors originating from each panelboard or similar distribution equipment shall be documented in a manner that is readily available or be permanently posted at each panelboard or similar distribution equipment.

(~~2~~ 3) Feeders Supplied from Direct-Current Systems.

Where a feeder is supplied from a dc system operating at more than 60 volts, identification shall comply with the following:

(1) Each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means.

(2) Each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with 215.12(C)(2)(a) and 215.12(C)(2)(b).

(3) The identification methods used for conductors originating from each panelboard or similar distribution equipment shall be documented in a manner that is readily available or be permanently posted at each panelboard or similar distribution equipment.

(a) *Positive Polarity, Sizes 6 AWG or Smaller.* Where the positive polarity of a dc system does not serve as the connection for the grounded conductor, each positive ungrounded conductor shall be identified by one of the following means:

(2) A continuous red outer finish

(3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black

(4) Imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.8(B)

(5) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, with imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black

(f) *Negative Polarity, Sizes 6 AWG or Smaller.* Where the negative polarity of a dc system does not serve as the connection for the grounded conductor, each negative ungrounded conductor shall be identified by one of the following means:

(7) A continuous black outer finish

(8) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red

(9) Imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.8(B)

(10) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, with imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red

Statement of Problem and Substantiation for Public Comment

This comment seeks to provide consistency between 210.5 and 215.12. Refer to FR 7523 in 210.5(C) of the First Draft.

Related Item

- FR 7523

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Submittal Date: Sun Aug 18 13:58:04 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-8605-NFPA 70-2024
Statement:	Language has been added to align identification requirement with 210.5(C)(1). The section has been reordered to correct the numbering. List items (2) and (3) are reordered so the list item that refers to the third-level subdivisions (a) and (b) appears directly above those subdivisions.

Public Comment No. 325-NFPA 70-2024 [Section No. 215.12(C)(2)]

(2) Feeders Supplied from Direct-Current Systems.

Where a feeder is supplied from a dc system operating at more than 60 volts, identification shall comply with the following:

(1) Each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means.

(2) Each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with 215.12(C)(2)(a) and 215.12(C)(2)(b).

(3) The identification methods used for conductors originating from each panelboard or similar distribution equipment shall be documented in a manner that is readily available or be permanently posted at each panelboard or similar distribution equipment.

(a) *Positive Polarity, Sizes 6 AWG or Smaller.* Where the positive polarity of a dc system does not serve as the connection for the grounded conductor, each positive ungrounded conductor shall be identified by one of the following means:

(1) A continuous red outer finish

(2) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black

(3) Imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.8(B)

(4) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, with imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black

(b) *Negative Polarity, Sizes 6 AWG or Smaller.* Where the negative polarity of a dc system does not serve as the connection for the grounded conductor, each negative ungrounded conductor shall be identified by one of the following means:

(1) A continuous black outer finish

(2) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red

(3) Imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.8(B)

(4) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, with imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red

Additional Proposed Changes

File Name	Description	Approved
CN_24.pdf	NEC_CN24	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 24 appeared in the First Draft Report on First Revision No. 9013.

The Correlating Committee directs CMP 10 to review FR 9013 and consider reorganizing the list in (C)(2) for usability. Specifically, consider reordering list items (2)and (3), such that the list item that refers to the third-level subdivisions (a) and (b)appears directly above those subdivisions.

Related Item

• First Revision No. 9013

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Mon Jul 29 17:01:35 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8605-NFPA 70-2024

Statement: Language has been added to align identification requirement with 210.5(C)(1). The section has been reordered to correct the numbering. List items (2) and (3) are reordered so the list item that refers to the third-level subdivisions (a) and (b) appears directly above those subdivisions.

Correlating Committee Note No. 24-NFPA 70-2024 [Section No. 215.12(C)(2)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 12:04:03 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review FR 9013 and consider reorganizing the list in (C)(2) for usability. Specifically, consider reordering list items (2) and (3), such that the list item that refers to the third-level subdivisions (a) and (b) appears directly above those subdivisions.

First Revision No. 9013-NFPA 70-2024 [Section No. 215.12(C)(2)]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 249-NFPA 70-2024 [Section No. 215.18]

215.18 Surge Protection.

(A) Surge-Protective Device.

If feeders supply loads within any of the following, surge-protective devices (SPDs) shall be installed:

(1) Dwelling units

(2) Dormitories

(3) Guest rooms and guest suites of hotels, motels, and dormitories

(4) Areas of nursing homes and limited-care facilities used exclusively as patient sleeping rooms

(5) Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations

(B) Location.

The SPD shall be installed in or adjacent to ~~distribution equipment, connected to~~ the ~~load side of the feeder,~~ feeder-supplied panelboard that contains branch circuit overcurrent protective device(s) that supply the locations specified in 215.18(A).

Informational Note: Surge protection is most effective when closest to the branch circuit. Surges can be generated from multiple sources including, but not limited to, lightning, the electric utility, or utilization equipment.

(C) Type.

The SPD shall be a Type 1 or Type 2 SPD.

(D) Replacement.

Where the distribution equipment supplied by the feeder is replaced, all of the requirements of this section shall apply.

(E) Ratings.

SPDs shall have a nominal discharge current rating (In) of not less than 10kA.

Statement of Problem and Substantiation for Public Comment

There is considerable confusion about this section throughout the country. By adding the words "that supply loads within..." we clarify two things. First, that an SPD is not required for a fused disconnect supplying, for example, an air-conditioner. Second, it clarifies that the feeder need not supply the ENTIRE dwelling unit. As currently written, it can easily be argued that the feeder-supplied panelboard only requires SPD if the feeder supply a dwelling unit, which is to say that the feeder supplies all of the locations indicated in that definition. For example, if a feeder does not supply any bathrooms, does it really supply the dwelling unit? That argument could be a stretch, but it is being made in the field and causing problems between installers and inspectors.
Distribution equipment is not defined, but panelboard is. The equipment that contains the branch circuit overcurrent protective devices for these locations will be a panelboard, so why not just say it?

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 254-NFPA 70-2024 [Section No. 230.67]	

Related Item

• FR 9061

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Thu Jul 25 14:17:40 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The language is correct as written and the proposed revisions do not clarify the requirement. Feeders that supply the locations identified in their entirety or portions thereof are already required to have SPD protection with the existing language. Panelboards are not the only distribution equipment where branch circuit OCPDs supplying the location in 215.18(A) can be used.

Public Comment No. 1938-NFPA 70-2024 [Section No. 215.18(A)]

(A) Surge-Protective Device.

If feeders supply any of the following, surge-protective devices (SPDs) shall be installed:

(1) Dwelling units of a multifamily building

(2) Dormitories

(3) Guest rooms and guest suites of hotels, motels, and dormitories

(4) Areas of nursing homes and limited-care facilities used exclusively as patient sleeping rooms

(5) Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations

Statement of Problem and Substantiation for Public Comment

SPDs require active monitoring by a building manager. The Panel confirmed this in its statement on PI 75: “NEC users should follow manufacturers' maintenance guidelines in order to monitor SPD status.” And homeowners are generally not knowledgeable enough about the systems that are in their homes to do the necessary monitoring. They will not know to look for an indicator light that is off or that it indicates the end of life of the device.
The statements below are taken from a major SPD manufacturer’s website. They say more harm may be done with a disabled SPD than with no SPD at all.
Looking five to ten years down the road, this will be the case for many thousands of homes across the country.
This comment limits the scope of this section to those buildings which are more likely to have trained management that can identify disabled SPDs and have them replaced.
Note: The phrase “dwelling unit of a multifamily building” is taken from Chapter 2.

Once a surge protector has reached EOL, connected systems and devices are vulnerable to the same electrical surges and spikes the SPD was designed to protect. Since there is no average lifespan for a surge protector, it is important to inspect your SPDs regularly to verify they are still functional.
Many surge protectors for AC power products use LED diagnostics to visually indicate when an SPD is no longer functional. This type of indicator requires visual confirmation, meaning someone will have to visually inspect the SPD frequently for device failure.
A faulty SPD creates as many issues, if not more, as not having one installed. For example, a disabled surge protector can disseminate surges throughout the rest of your connected system, damaging other devices along the way.
Source: www.diteksurgeprotection.com/how-to-know-when-your-surge-protector-has-reached-end-of-life/

Related Item

• FR 9061

Submitter Information Verification

Submitter Full Name: Daniel Buuck
Organization: National Association of Home Builders
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 11:24:38 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Where a feeder supplies a single family dwelling an SPD is required which is common in rural construction when the service is located away from the dwelling. There has not been any substantiation provided to remove such protection. The occupant already has a responsibility to test their GFCI, reset circuit breakers and replace batteries in smoke alarms.

Public Comment No. 1926-NFPA 70-2024 [Section No. 215.18(E)]

~~(E) Ratings.~~

~~SPDs shall have a nominal discharge current rating (In) of not less than 10kA~~

Informational Note 1: For SPD selection guidance, see C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits .

Statement of Problem and Substantiation for Public Comment

CMP 10's stated purpose of requiring SPDs is to protect life-saving equipment from transient voltage. CMP-10 stated this purpose in PI 4103 with the following statement:

"The requirement for surge protection in the NEC is necessary to provide protection for sensitive electronics for safety devices in the home."

IEEE C62.41.2 outlines the established and comprehensive methods required to meet CMP-10's goal. Specifically, Section 1.3.2 defines the requirements to achieve "practical surge immunity," covering a broad range of factors:

"Section 1.3.2 Achieving Practical Surge Immunity
These considerations include:

- The desired level of protection
- Worst-case or typical-case scenarios
- Hardware integrity (no damage)
- Process immunity (no operational upset)
- Equipment sensitivities
- Power environment, including surge characteristics and other system parameters
- Interactions with communications or other systems
- SPD performance (protection, durability, and failure mode)
- The test environment
- Cost considerations (total and relative)"

By mandating a single metric within a single consideration - 230.67(E) - and omitting the majority of these required considerations, the NEC fails to align with IEEE C62.41.2. This oversight leaves essential life-saving equipment vulnerable to transient voltage failures as it does not provide NEC users with the necessary tools to "provide protection for sensitive electronics for safety devices in the home."

To ensure CMP-10 meets its objective of safeguarding sensitive life-saving equipment, strike 215.18(E) and instead referring users to IEEE C62.41.2 for a more complete and effective result.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1928-NFPA 70-2024 [Section No. 215.18(E)]	

Related Item

- PI-75

Submitter Information Verification

Submitter Full Name: James Moellmann
Organization: Maxivolt
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 10:23:30 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The provisions of 215.18(E) are adequate to meet the objective of protecting life-saving equipment from transient voltage events. Other parameters have been identified in the substantiation, but no changes were proposed and further substantiation would be necessary in order to consider. The informational note has not been added in this section because it has been added to NEC Article 242.

Public Comment No. 1928-NFPA 70-2024 [Section No. 215.18(E)]

~~(E) Ratings.~~

~~SPDs shall have a nominal discharge current rating (In) of not less than 10kA~~

Informational Note 1: For SPD selection guidance, see C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits .

Statement of Problem and Substantiation for Public Comment

CMP-10's stated purpose for requiring Surge Protective Devices (SPDs) in the NEC is to protect critical, life-saving equipment from transient voltage events. CMP-10 directly expressed this in their response to Public Input (PI) 4103, which stated:

> "The requirement for surge protection in the NEC is necessary to provide protection for sensitive electronics for safety devices in the home."

IEEE C62.41.2 outlines the established and comprehensive methods required to meet CMP-10's goal. Specifically, Section 1.3.2 defines the requirements to achieve "practical surge immunity," covering a broad range of critical issues:

"Section 1.3.2 Achieving Practical Surge Immunity
These considerations include:
- The desired level of protection
- Worst-case or typical-case scenarios
- Hardware integrity (no damage)
- Process immunity (no operational upset)
- Equipment sensitivities
- Power environment, including surge characteristics and other system parameters
- Interactions with communications or other systems
- SPD performance (protection, durability, and failure mode)
- The test environment
- Cost considerations (total and relative)"

By mandating a single metric within a single consideration - 230.67(E) - and omitting the majority of these required considerations, the NEC is ignoring IEEE C62.41.2. This oversight leaves essential life-saving equipment vulnerable to transient voltage failures as it does not provide NEC users with the necessary tools to "provide protection for sensitive electronics for safety devices in the home."

To ensure CMP-10 meets its objective of safeguarding sensitive life-saving equipment, it's recommended to strike 230.67(E) and instead refer users to IEEE C62.41.2 for a more complete and effective result.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1926-NFPA 70-2024 [Section No. 215.18(E)]	

Related Item

- PI-4103

Submitter Information Verification

Submitter Full Name: James Moellmann
Organization: Maxivolt
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 10:37:35 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The provisions of 215.18(E) are adequate to meet the objective of protecting life-saving equipment from transient voltage events. Other parameters have been identified in the substantiation, but no changes were proposed and further substantiation would be necessary in order to consider. The informational note has not been added in this section because it has been added to NEC Article 242.

Public Comment No. 535-NFPA 70-2024 [Section No. 225.1]

225.1 Scope.

This article covers requirements for outside branch circuits and feeders not over 1000 volts ac or 1500 volts dc, nominal, run on or between buildings, structures, or poles on the premises; and electrical equipment and wiring for the supply of utilization equipment that is located on or attached to the outside of buildings, structures, or poles.

Informational Note: See Article 265, Part IV, for outside branch circuits and feeders over 1000 volts ac or 1500 volts dc.

Additional Proposed Changes

File Name	Description	Approved
CN_267.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 267 appeared in the First Draft Report on First Revision No. 9066.

The Correlating Committee directs CMP 10 to review the references to Article 235 in 215.1 and 225.1, as the requirements for feeders over 1000 volts ac, 1500 volts dc and for outside branch circuits and feeders over 1000 volts ac or 1500 volts dc, are now located in Articles 266 and 267, respectively.

Related Item

- First Revision No. 9066

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 23:24:43 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8403-NFPA 70-2024
Statement: The reference in Informational Note No. 1 is corrected to reflect the appropriate Article. Informational Note NO. 2 is added to clarify the relationship with 210 and 215. The NEC Style Manual in 4.1.4 identifies that the entire Article can be referenced when necessary. Here Article 210, 215, 225, and 267 are needed to be referenced in total referencing of every applicable requirement in Article 210, 215, 225, and 267 would be too extensive.

Correlating Committee Note No. 267-NFPA 70-2024 [Section No. 225.1]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Thu May 09 17:55:09 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review the references to Article 235 in 215.1 and 225.1, as the requirements for feeders over 1000 volts ac, 1500 volts dc and for outside branch circuits and feeders over 1000 volts ac or 1500 volts dc, are now located in Articles 266 and 267, respectively.

First Revision No. 9066-NFPA 70-2024 [Section No. 225.1]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 69-NFPA 70-2024 [Section No. 225.1]

225.1 Scope.

This article covers requirements for outside branch circuits and feeders not over 1000 volts ac or 1500 volts dc, nominal, run on or between buildings, structures, or poles on the premises; and electrical equipment and wiring for the supply of utilization equipment that is located on or attached to the outside of buildings, structures, or poles.

Informational Note: See Article ~~265 , Part IV, for~~ 267 for outside branch circuits and feeders over 1000 volts ac or 1500 volts dc.

Statement of Problem and Substantiation for Public Comment

This Public Comment is submitted on behalf of a Correlating Committee Medium Voltage Task Group consisting of Robert Osborne (Chair), Paul Barnhart, Lou Grahor, Donny Cook, Scott Higgins, Mike Querry, Roger McDaniel, Dave Burns, Rod Belisle, Kevin Rogers, Tony Ricciuti, Paul Knapp, Paul Sullivan, George Smith, Eric Simmon, Kevin Arnold, Larry Wildermuth, and Kyle Krueger.

This Public Comment was developed to address the change made by First Correlating Revision No. 32. In that revision, the Correlating Committee relocated Articles 235-238 to Articles 265-268. This Public Comment corrects the reference in the Informational Note to reflect the correct Article.

Related Item

- FCR No. 32

Submitter Information Verification

Submitter Full Name: Robert Osborne
Organization: UL Solutions
Street Address:
City:
State:
Zip:

Submittal Date: Mon Jul 15 15:03:38 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8403-NFPA 70-2024

Statement: The reference in Informational Note No. 1 is corrected to reflect the appropriate Article. Informational Note NO. 2 is added to clarify the relationship with 210 and 215. The NEC Style Manual in 4.1.4 identifies that the entire Article can be referenced when necessary. Here Article 210, 215, 225, and 267 are needed to be referenced in total referencing of every applicable requirement in Article 210, 215, 225, and 267 would be too extensive.

Public Comment No. 1243-NFPA 70-2024 [Section No. 225.10]

225.10 Wiring on Buildings (or Other Structures).

The installation of outside wiring on surfaces of buildings (or other structures) shall only be permitted to be any of the following:

(1) Auxiliary gutters
(2) Busways
(3) Cable trays
(4) Cablebus
(5) Electrical metallic tubing (EMT)
(6) Flexible metal conduit (FMC)
(7) Intermediate metal conduit (IMC)
(8) Liquidtight flexible metal conduit (LFMC)
(9) Liquidtight flexible nonmetallic conduit (LFNC)
(10) Messenger-supported wiring
(11) Open wiring on insulators
(12) Reinforced thermosetting resin conduit (RTRC)
(13) Rigid metal conduit (RMC)
(14) Rigid polyvinyl chloride conduit (PVC)
(15) Type MC cable
(16) Type MI cable
(17) Type SE cable
(18) Type TC-ER cable
(19) Type UF cable
(20) Wireways

Statement of Problem and Substantiation for Public Comment

As indicated in 90.5(B), the term "shall be permitted" provides optional methods and does not provide requirements. In this instance, the optional methods would be alternatives to the general rule of 110.8, which allows and wiring method in any location, except as indicated elsewhere (such as this section). By adding the word "only" the text becomes enforceable.

Related Item

- FR 8927

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 18 14:01:59 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8404-NFPA 70-2024
Statement: The language is revised to clarify the wiring methods that are required to be used outside on the surfaces of buildings.

Public Comment No. 326-NFPA 70-2024 [Section No. 225.39]

225.39 Rating of Disconnect.

The disconnecting means specified in 225.31 shall have a rating of not less than the calculated load to be supplied, determined in accordance with Article 120, Parts I and II, for branch circuits; Article 120, Part III or IV, for feeders; or Article 120, Part V, for farm loads. If the branch circuit or feeder disconnecting means consists of more than one switch or circuit breaker, as permitted by 225.33, combining the ratings of all the switches or circuit breakers for determining the rating of the disconnecting means shall be permitted. In no case shall the rating be lower than specified in 225.39(A), 225.39(B), 225.39(C), or 225.39(D).

(A) One-Circuit Installation.

For installations to supply only limited loads of a single branch circuit, the branch circuit disconnecting means shall have a rating of not less than 15 amperes.

(B) Two-Circuit Installations.

For installations consisting of not more than two 2-wire branch circuits, the feeder or branch-circuit disconnecting means shall have a rating of not less than 30 amperes.

(C) One-Family Dwelling.

For a one-family dwelling, the feeder disconnecting means shall have a rating of not less than 100 amperes, 3-wire.

(D) All Others.

For all other installations, the feeder or branch-circuit disconnecting means shall have a rating of not less than 60 amperes.

Additional Proposed Changes

File Name	Description	Approved
CN_25.pdf	NEC_CN25	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 25 appeared in the First Draft Report on First Revision No. 9076.

The Correlating Committee directs that CMP 10 review FR 9076 and the last sentence in regard to the phrase “In no case shall the rating...”. Consider the following modification as a potential revision: “The rating of the disconnect shall not be less than specified in 225.39(A), 225.39(B), 225.39(C), or 225.39(D)”.

Related Item

• First Revision No. 9076

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Mon Jul 29 17:03:36 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8405-NFPA 70-2024

Statement: The language is revised to enhance usability and consistency across the NEC. The reference to Article 120 has been moved to an informational note to assist the user in knowing where to find the appropriate calculations.

Correlating Committee Note No. 25-NFPA 70-2024 [Section No. 225.39]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:21:15 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 9076 and the last sentence in regard to the phrase “In no case shall the rating...”. Consider the following modification as a potential revision: “The rating of the disconnect shall not be less than specified in 225.39(A), 225.39(B), 225.39(C), or 225.39(D)”.

First Revision No. 9076-NFPA 70-2024 [Section No. 225.39 [Excluding any Sub-Sections]]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 1490-NFPA 70-2024 [Section No. 225.41(A)(1)]

(1) Location.

The disconnecting means shall be installed in a readily accessible outdoor location on or ~~within sight of the~~ visible from the dwelling unit.

Exception: If the service disconnecting means complies with 230.70(A)(2) or the disconnecting means in accordance with 225.31 is in a readily accessible outdoor location, on or ~~within sight of~~ visible from the one- and two-family dwelling unit, an additional emergency disconnect shall not be required.

Statement of Problem and Substantiation for Public Comment

This comment is being submitted on behalf of the Minnesota Department of Labor and Industry. Currently, the Department's inspection staff includes 14-office/field staff, 50-state field inspectors, 4-virtual inspectors and 22 plus contract electrical inspectors that complete over 170,000 electrical inspections annually.

Continue to accept the proposed changes for the dwelling "emergency disconnect". The proposed language is enforceable, and is consistent with the other defined terms used throughout the NEC related to a service/feeder disconnect installations; however, the disconnect should be "visible" from the dwelling unit. In many cases, the debate in the field comes from the "in-sight of" rules. Many times, at a rural residence, the service disconnect could be visible and in the center of the yard, but not within 50'. The disconnect could be located 75' or 150' away and the first responders may drive directly by the service or feeder "emergency disconnect" when entering the yard, but it doesn't meet the 50' requirement. Instead of having a debate about the distance in the field, ensuring the disconnect is visible from the dwelling is more consistent for the installer, enforcer and first responder, plus, eliminates the need for possibly redundant or multiple disconnects being located at a dwelling.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1495-NFPA 70-2024 [Section No. 230.70(A)(2)]	

Related Item

- FR9187

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 23 15:13:54 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8606-NFPA 70-2024

Statement: The cross-reference to 110.29 has been added to align with the definition for "within sight" having been moved to a requirement in 110.29. This section has been revised to appear in listed form to align with the NEC Style Manual. The proposed revisions of the public comments have not been adopted due to concerns with the unlimited length that would be permitted. Further challenges exist over time with "visibility" being impacted by obstructions when the distance is unlimited and over 50ft. "Visible" is also undefined and unenforceable.

Public Comment No. 1501-NFPA 70-2024 [Section No. 225.41(A)(1)]

(1) Location.

The disconnecting means shall be installed in a readily accessible outdoor location on or ~~within sight of~~ visible of the dwelling unit.

Exception: If the service disconnecting means complies with 230.70(A)(2) or the disconnecting means in accordance with 225.31 is in a readily accessible outdoor location, on or within sight of the one- and two-family dwelling unit, an additional emergency disconnect shall not be required.

Statement of Problem and Substantiation for Public Comment

I ask that the committee review and consider the proposed wording. I fully understand using defined terms but, in this case, the 50' associated with "within sight" in 110.29 is too restrictive. "within sight" was removed from definitions in the 2023 NEC as it was in conflict with the style manual 2.1.2.5. I propose using the term visible in its place as this is an easily understood and enforceable term. Having the disconnect located on or within sight of the dwelling works just fine in most installations but does not relate itself well to rural situations where the premise is physically larger. Locating this disconnect further than 50' from the dwelling may be advantageous in many instances and assuming emergency personnel will not find it because it is more than 50' from the dwelling is just not accurate. There is no logic or common sense in requiring emergency personnel to approach a possibly burning dwelling to access the emergency disconnect. The end result should be an emergency disconnect that is readily accessible and easily identified for emergency personnel. Thanks for considering my PC.

Related Item

- Public Input No. 2024-NFPA 70-2023 [Section No. 225.41(A)(1)]

Submitter Information Verification

Submitter Full Name: Scott Higgins

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 23 15:50:21 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8606-NFPA 70-2024

Statement: The cross-reference to 110.29 has been added to align with the definition for “within sight” having been moved to a requirement in 110.29. This section has been revised to appear in listed form to align with the NEC Style Manual. The proposed revisions of the public comments have not been adopted due to concerns with the unlimited length that would be permitted. Further challenges exist over time with “visibility” being impacted by obstructions when the distance is unlimited and over 50ft. “Visible” is also undefined and unenforceable.

Public Comment No. 1168-NFPA 70-2024 [Section No. 225.42]

~~**225.42** Surge Protection.~~

~~**(A)** Surge-Protective Device.~~

~~If feeders supply any of the following, surge-protective devices (SPDs) shall be installed:~~

(1) ~~Dwelling units~~

(2) ~~Dormitories~~

(3) ~~Guest rooms and guest suites of hotels, motels, and dormitories~~

(4) ~~Areas of nursing homes and limited-care facilities used exclusively as patient sleeping rooms~~

(5) ~~Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations~~

~~**(B)** Location.~~

~~The SPD shall be installed in or adjacent to the distribution equipment that is connected to the load side of the feeder and contains branch circuit overcurrent protective device(s) that supply the location specified in 225.42(A).~~

~~Informational Note: Surge protection is most effective when closest to the branch circuit. Surges can be generated from multiple sources including, but not limited to, lightning, the electric utility, or utilization equipment.~~

~~**(C)** Type.~~

~~The SPD shall be a Type 1 or Type 2 SPD.~~

~~**(D)** Replacement.~~

~~Where the distribution equipment supplied by the feeder is replaced, all of the requirements of this section shall apply.~~

~~**(E)** Ratings.~~

~~SPDs shall have a nominal discharge current rating (I_n) of not less than 10kA.~~

~~Informational Note: See 242.24 for routing of conductors for SPDs.~~

Statement of Problem and Substantiation for Public Comment

The statement used by the Panel, say that 215 does not apply to Article 225. In Article 100 there is only one definition for Feeder. It does not distinguish between an indoor or outdoor feeder. As feeder is a feeder. The Wording is exactly the same in the two articles of 215.18 and 225.42. IF Surge protection is needed according to Article 215.18 then it should be required for outdoor feeders as well.

Related Item

• PI-1288, 2382, 744 and 84

Submitter Information Verification

Submitter Full Name: David Hittinger
Organization: Independent Electrical Contractors
Affiliation: IEC Codes and Standards
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 16 11:23:50 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8412-NFPA 70-2024

Statement: The committee has reviewed the scope of NEC Article 215 and NEC Article 225. NEC 225.42 has been deleted.. These provisions are addressed in NEC Article 215, which applies to all feeders. and it is not necessary to repeat those provisions in NEC Article 225.

Public Comment No. 1244-NFPA 70-2024 [Section No. 225.42]

~~**225.42** Surge Protection.~~

~~**(A)** Surge-Protective Device.~~

~~If feeders supply any of the following, surge-protective devices (SPDs) shall be installed:~~

(1) ~~Dwelling units~~

(2) ~~Dormitories~~

(3) ~~Guest rooms and guest suites of hotels, motels, and dormitories~~

(4) ~~Areas of nursing homes and limited-care facilities used exclusively as patient sleeping rooms~~

(5) ~~Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations~~

~~**(B)** Location.~~

~~The SPD shall be installed in or adjacent to the distribution equipment that is connected to the load side of the feeder and contains branch circuit overcurrent protective device(s) that supply the location specified in 225.42(A).~~

~~Informational Note: Surge protection is most effective when closest to the branch circuit. Surges can be generated from multiple sources including, but not limited to, lightning, the electric utility, or utilization equipment.~~

~~**(C)** Type.~~

~~The SPD shall be a Type 1 or Type 2 SPD.~~

~~**(D)** Replacement.~~

~~Where the distribution equipment supplied by the feeder is replaced, all of the requirements of this section shall apply.~~

~~**(E)** Ratings.~~

~~SPDs shall have a nominal discharge current rating (I_n) of not less than 10kA.~~

~~Informational Note: See 242.24 for routing of conductors for SPDs.~~

Statement of Problem and Substantiation for Public Comment

The committee rejected multiple Pubic Inputs to delete this section and stated that "The information located in Article 215 is not applied to Article 225, therefore it is necessary to retain this language in Article 225."
That statement is false, as can be shown by multiple revisions over the last two code cycles that deleted material from Article 225 that is already covered by Article 215. If the committee's statement was true, the code would would have no requirements for sizing outdoor feeder circuits and no rules for protecting them from overcurrent. Nor would it have rules for identifying the conductors or providing ground-fault protection of equipment, among other issues. If the committee wishes to stand by its statement, Article 225 needs to be increased by a couple of pages.

Related Item

• PI 84

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 18 14:12:48 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8412-NFPA 70-2024

Statement: The committee has reviewed the scope of NEC Article 215 and NEC Article 225. NEC 225.42 has been deleted.. These provisions are addressed in NEC Article 215, which applies to all feeders. and it is not necessary to repeat those provisions in NEC Article 225.

Public Comment No. 1931-NFPA 70-2024 [Section No. 225.42(E)]

~~(E) Ratings.~~

~~SPDs shall have a nominal discharge current rating (I_n) of not less than 10kA.~~

~~Informational Note~~

Informational Note1 : See 242.24 for routing of conductors for SPDs.

Informational Note 2: For SPD selection guidance, see C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.

Statement of Problem and Substantiation for Public Comment

FR 8910 is a helpful clarification. The committee needs to take this opportunity to address the NEC's omission of required considerations to achieve "practical surge immunity."

CMP-10's has stated the purpose for requiring Surge Protective Devices (SPDs) in the NEC is to protect critical, life-saving equipment from transient voltage events. CMP-10 directly expressed this in their response to Public Input (PI) 4103, which stated:

> "The requirement for surge protection in the NEC is necessary to provide protection for sensitive electronics for safety devices in the home."

IEEE C62.41.2 outlines the established and comprehensive methods required to meet CMP-10's goal. Specifically, Section 1.3.2 defines the requirements to achieve "practical surge immunity," covering a broad range of factors:

"Section 1.3.2 Achieving Practical Surge Immunity
These considerations include:
- The desired level of protection
- Worst-case or typical-case scenarios
- Hardware integrity (no damage)
- Process immunity (no operational upset)
- Equipment sensitivities
- Power environment, including surge characteristics and other system parameters
- Interactions with communications or other systems
- SPD performance (protection, durability, and failure mode)
- The test environment
- Cost considerations (total and relative)"

By mandating a single metric within a single consideration - 225.42(E) - and omitting the majority of these required considerations, the NEC is ignoring IEEE C62.41.2. This oversight leaves essential life-saving equipment vulnerable to transient voltage failures as it does not provide NEC users with the necessary tools to "provide protection for sensitive electronics for safety devices in the home."

To ensure CMP-10 meets its objective of safeguarding sensitive life-saving equipment, strike 225.42(E) and refer users to IEEE C62.41.2 for a more complete and effective result.

Related Item

- FR-8910

Submitter Information Verification

Submitter Full Name: James Moellmann
Organization: Maxivolt
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 10:51:40 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8412-NFPA 70-2024

Statement: The committee has reviewed the scope of NEC Article 215 and NEC Article 225. NEC 225.42 has been deleted.. These provisions are addressed in NEC Article 215, which applies to all feeders. and it is not necessary to repeat those provisions in NEC Article 225.

Public Comment No. 1933-NFPA 70-2024 [Section No. 225.42(E)]

~~(E) Ratings.~~

~~SPDs shall have a nominal discharge current rating (I_n) of not less than 10kA.~~

Informational Note 1 : See 242.24 for routing of conductors for SPDs.

Informational Note 2: For SPD selection guidance, see C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.

Statement of Problem and Substantiation for Public Comment

FR 8910 is a helpful clarification. The committee needs to take this opportunity to address the NEC's omission of required considerations to achieve "practical surge immunity."

CMP-10's has stated the purpose for requiring Surge Protective Devices (SPDs) in the NEC is to protect critical, life-saving equipment from transient voltage events. CMP-10 directly expressed this in their response to Public Input (PI) 4103, which stated:

> "The requirement for surge protection in the NEC is necessary to provide protection for sensitive electronics for safety devices in the home."

IEEE C62.41.2 outlines the established and comprehensive methods required to meet CMP-10's goal. Specifically, Section 1.3.2 defines the requirements to achieve "practical surge immunity," covering a broad range of factors:

"Section 1.3.2 Achieving Practical Surge Immunity
These considerations include:
- The desired level of protection
- Worst-case or typical-case scenarios
- Hardware integrity (no damage)
- Process immunity (no operational upset)
- Equipment sensitivities
- Power environment, including surge characteristics and other system parameters
- Interactions with communications or other systems
- SPD performance (protection, durability, and failure mode)
- The test environment
- Cost considerations (total and relative)"

By mandating a single metric within a single consideration - 225.42(E) - and omitting the majority of these required considerations, the NEC is ignoring IEEE C62.41.2. This oversight leaves essential life-saving equipment vulnerable to transient voltage failures as it does not provide NEC users with the necessary tools to "provide protection for sensitive electronics for safety devices in the home."

To ensure CMP-10 meets its objective of safeguarding sensitive life-saving equipment, strike 225.42(E) and refer users to IEEE C62.41.2 for a more complete and effective result.

Related Item

- PI-4103

Submitter Information Verification

Submitter Full Name: James Moellmann
Organization: Maxivolt
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 10:55:40 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8412-NFPA 70-2024

Statement: The committee has reviewed the scope of NEC Article 215 and NEC Article 225. NEC 225.42 has been deleted.. These provisions are addressed in NEC Article 215, which applies to all feeders. and it is not necessary to repeat those provisions in NEC Article 225.

Public Comment No. 324-NFPA 70-2024 [Section No. 230.2]

230.2 Listing Requirements.

All service equipment shall be listed or field evaluated.

Additional Proposed Changes

File Name	Description	Approved
CN_23.pdf	NEC_CN23	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 23 appeared in the First Draft Report on First Revision No. 9102.

The Correlating Committee directs CMP 10 to review Article 230 regarding equipment required to be listed that is not identified in 230.2. Consideration should be given to expanding 230.2 to identify all equipment in Article 230 required to be listed. Refer to comments included with ballots.

Related Item

- First Revision No. 9102

Submitter Information Verification

Submitter Full Name: CC Notes

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jul 29 16:59:52 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8414-NFPA 70-2024

Statement: The language is revised to pull all listing requirements from 230.46, 230.66, and 230.82 into the listing requirements in 230.2. Requirement for listing of permanently mounted absence of voltage testers has been added to correlate to 230.82.

Correlating Committee Note No. 23-NFPA 70-2024 [Section No. 230.2]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 11:53:10 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review Article 230 regarding equipment required to be listed that is not identified in 230.2. Consideration should be given to expanding 230.2 to identify all equipment in Article 230 required to be listed. Refer to comments included with ballots.

First Revision No. 9102-NFPA 70-2024 [Detail]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 637-NFPA 70-2024 [Section No. 230.2]

230.2 Listing Requirements.

~~All service~~ The following equipment shall be listed or field evaluated~~.~~ :

(1) All service equipment

(2) Meter sockets, unless supplied by and under the exclusive control of an electric utility

(3) Power distribution blocks

(4) Pressure connectors

(5) Devices for splices and taps

Statement of Problem and Substantiation for Public Comment

CMP 10 created Section 230.2 to comply with 2.2.1 of the NEC Style Manual but neglected to identify all the equipment required in Article 230 to be listed. This Public Comment identifies listing requirements that exist in 230.46 and 230.66. Companion Public Comments are submitted to remove those statements from 230.46 and 230.66.

Related Item

• CC Note No. 23 • PC 638 • PC 639

Submitter Information Verification

Submitter Full Name: Robert Osborne

Organization: UL Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 02 07:42:12 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8414-NFPA 70-2024

Statement: The language is revised to pull all listing requirements from 230.46, 230.66, and 230.82 into the listing requirements in 230.2. Requirement for listing of permanently mounted absence of voltage testers has been added to correlate to 230.82.

Public Comment No. 414-NFPA 70-2024 [Section No. 230.4(A)]

(A) Special Conditions.

Additional services shall be permitted to supply the following:

(1) Fire pumps

(2) Emergency systems

(3) Legally required standby systems

(4) ~~Optional standby systems~~

(5) Interconnected electric power production sources

(6) Systems designed for connection to multiple sources of supply for the purpose of enhanced reliability

Statement of Problem and Substantiation for Public Comment

230.2(A)(4) is being removed from the list as an optional standby system, per Article 702 with the same title, is not permitted to be supplied from a separate service. The Scope of Article 702 states “The systems covered by this article consist of those that are permanently installed in their entirety, including prime movers, and those that are arranged for a connection to a premises wiring system from a portable alternate power supply.” In addition the definition of optional standby system states that the generation must be onsite. "Optional Standby Systems. Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13)".

The inclusion of this reference in 230.2 is not necessary to permit the installation of an Article 702 system. Adding a generator or equivalent is not adding a service to a structure hence language in 230.2 is not necessary.

Previous list items should be renumbered to accommodate the removal of (4).

Related Item

• FR 9097

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich

Organization: Eaton Corporation

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jul 30 15:50:06 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Additional services may be owned by the utility and be a service with a prime mover on site, meeting the scope of Article 702

Public Comment No. 970-NFPA 70-2024 [Section No. 230.4(E)]

(E) Identification.

Where a building or structure is supplied by more than one service ~~, or any combination of branch circuits, feeders, and services,~~ a permanent plaque or directory shall be installed at each service disconnect location denoting all other services ~~, feeders, and branch circuits~~ supplying that building or structure and the area served by each.~~ See 225.37~~ .

Statement of Problem and Substantiation for Public Comment

PI 3275 should have been accepted as anything to do with feeders and branch circuits is outside of the scope of Article 230.

Related Item

- Public Input No. 3725-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: none
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 08 14:00:35 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The identification is a plaque that is located at the service to communicate the other sources of power supplying the premises, and is therefore under the scope of Article 230.

Public Comment No. 323-NFPA 70-2024 [Section No. 230.9(C)]

(C) Building Openings.

Overhead service conductors shall not be installed beneath openings through which materials may be moved, such as openings in farm and commercial buildings, and shall not be installed where they obstruct entrance to these building openings.

Additional Proposed Changes

File Name	Description	Approved
CN_22.pdf	NEC_CN22	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 22 appeared in the First Draft Report on First Revision No. 9070.

The Correlating Committee directs CMP 10 to review 230.9(C) and consider rewording these similar requirements to align with the revised text in 225.19(D)(3) (refer to FR9070). The NEC Style Manual, clause 3.5.5, states that requirements that are the same or similar shall use parallel construction for consistency.

Related Item

- First Revision No. 9070

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Mon Jul 29 16:58:11 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8493-NFPA 70-2024
Statement: The language has been revised to align with 225.19(D)(3).

Correlating Committee Note No. 22-NFPA 70-2024 [Section No. 230.9(C)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 11:49:53 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review 230.9(C) and consider rewording these similar requirements to align with the revised text in 225.19(D)(3) (refer to FR 9070). The NEC Style Manual, clause 3.5.5, states that requirements that are the same or similar shall use parallel construction for consistency.

First Revision No. 9070-NFPA 70-2024 [Detail]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 2000-NFPA 70-2024 [Section No. 230.23(A)]

(A) General.

Conductors shall have sufficient ampacity to carry the current for the load as calculated in accordance with Article 120, Parts ~~II~~ I through V, and have adequate mechanical strength.

Statement of Problem and Substantiation for Public Comment

Part I should be added as 120.7 is what enables a PCS to be utilized for load calculations.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1999-NFPA 70-2024 [Section No. 230.31(A)]	
Public Comment No. 1967-NFPA 70-2024 [Section No. 230.42(A) [Excluding any Sub-Sections]]	
Public Comment No. 1967-NFPA 70-2024 [Section No. 230.42(A) [Excluding any Sub-Sections]]	
Public Comment No. 1999-NFPA 70-2024 [Section No. 230.31(A)]	

Related Item

- FR-8184

Submitter Information Verification

Submitter Full Name: Jeff Nicholson
Organization: Lumin
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 14:54:02 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8421-NFPA 70-2024

Statement: The terms “sufficient” and “adequate” have been removed to comply with the NEC Style Manual 3.2.1. ”Mechanical strength” has been removed since it is not correct to address it in a section on s

Public Comment No. 328-NFPA 70-2024 [Section No. 230.23(A)]

(A) General.

Conductors shall have sufficient ampacity to carry the current for the load as calculated in accordance with Article 120, Parts II through V, and have adequate mechanical strength.

Additional Proposed Changes

File Name	Description	Approved
CN_27.pdf	NEC_CN27	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 27 appeared in the First Draft Report on First Revision No. 9111.

The Correlating Committee directs that CMP 10 review FR 9111 with respect to “sufficient” and “adequate” as these terms are possibly vague. Refer to NEC Style Manual Section 3.2.1.

Related Item

- First Revision No. 9111

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Mon Jul 29 17:07:51 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8421-NFPA 70-2024

Statement: The terms “sufficient” and “adequate” have been removed to comply with the NEC Style Manual 3.2.1. ”Mechanical strength” has been removed since it is not correct to address it in a section on s

Correlating Committee Note No. 27-NFPA 70-2024 [Section No. 230.23(A)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:25:18 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 9111 with respect to "sufficient" and "adequate" as these terms are possibly vague. Refer to NEC Style Manual Section 3.2.1.

First Revision No. 9111-NFPA 70-2024 [Section No. 230.23(A)]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 329-NFPA 70-2024 [Section No. 230.23(B)]

(B) Minimum Size.

The conductors shall not be smaller than 8 AWG copper or 6 AWG aluminum or copper-clad aluminum.

Exception: Service conductors supplying only a single branch circuit shall not be smaller than 12 AWG hard-drawn copper or equivalent.

Additional Proposed Changes

File Name	Description	Approved
CN_28.pdf	NEC_CN28	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 28 appeared in the First Draft Report on First Revision No. 9113.

The Correlating Committee directs that CMP 10 review FR 9113 with respect to “equivalent” that is not in compliance with the NEC Style Manual Section 3.2.1.

Related Item

- First Revision No. 9113

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 29 17:09:37 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected
Resolution: The committee is keeping the word “equivalent” that enables alternate materials to be demonstrated as being acceptable.

Correlating Committee Note No. 28-NFPA 70-2024 [Section No. 230.23(B)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:26:50 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 9113 with respect to "equivalent" that is not in compliance with the NEC Style Manual Section 3.2.1.

First Revision No. 9113-NFPA 70-2024 [Section No. 230.23(B)]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 1999-NFPA 70-2024 [Section No. 230.31(A)]

(A) General.

Underground service conductors shall have sufficient ampacity to carry the current for the load as calculated in accordance with Article 120, Parts ~~II~~ I through V.

Statement of Problem and Substantiation for Public Comment

Part I should be added as 120.7 is what enables a PCS to be utilized for load calculations.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1961-NFPA 70-2024 [Section No. 215.4(A)(1)]	
Public Comment No. 2000-NFPA 70-2024 [Section No. 230.23(A)]	
Public Comment No. 1967-NFPA 70-2024 [Section No. 230.42(A) [Excluding any Sub-Sections]]	
Public Comment No. 2000-NFPA 70-2024 [Section No. 230.23(A)]	

Related Item

- FR-8184

Submitter Information Verification

Submitter Full Name: Jeff Nicholson
Organization: Lumin
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 14:52:45 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8426-NFPA 70-2024

Statement: The word “sufficient” is removed because it is unnecessary and to comply with the NEC Style manual 3.2.1. The reference to Article 120 has been moved to an informational note to assist the user in knowing where to find the appropriate calculations.

Public Comment No. 330-NFPA 70-2024 [Section No. 230.31(A)]

(A) General.

Underground service conductors shall have sufficient ampacity to carry the current for the load as calculated in accordance with Article 120, Parts II through V.

Additional Proposed Changes

File Name	Description	Approved
CN_29.pdf	NEC_CN29	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 29 appeared in the First Draft Report on First Revision No. 9116.

The Correlating Committee directs that CMP 10 review FR 9116 with respect to “sufficient” as this term is vague. Refer to NEC Style Manual Section 3.2.1.

Related Item

• First Revision No. 9116

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 29 17:11:04 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8426-NFPA 70-2024
Statement: The word “sufficient” is removed because it is unnecessary and to comply with the NEC Style manual 3.2.1. The reference to Article 120 has been moved to an informational note to assist the user in knowing where to find the appropriate calculations.

Correlating Committee Note No. 29-NFPA 70-2024 [Section No. 230.31(A)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:28:32 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 9116 with respect to "sufficient" as this term is vague. Refer to NEC Style Manual Section 3.2.1.

First Revision No. 9116-NFPA 70-2024 [Section No. 230.31(A)]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 150-NFPA 70-2024 [Section No. 230.42(A)]

(A) General.

Service-entrance conductors shall have an ampacity of not less than the maximum load to be served. Conductors shall be sized not less than the larger conductor of 230.42(A)(1) or 230.42(A)(2). Loads shall be determined in accordance with Article 120, Part III, IV, or V, as applicable. Ampacity shall be determined in accordance with 310.14 and comply with 110.14(C). The maximum current of busways shall be that value for which the busways have been listed or labeled.

Informational Note: See UL 857-2021, *Standard for Safety for Busways*, for information on busways.

(1) Continuous and Noncontinuous Loads.

Where the service-entrance conductors supply continuous loads or any combination of noncontinuous and continuous loads, the minimum service-entrance conductor size shall have an ~~ampacity~~ ampacity without application of any adjustment or correction factors not less than the sum of the noncontinuous loads plus 125 percent of continuous loads.

Exception No. 1: Grounded conductors that are not connected to an overcurrent device shall be permitted to be sized at 100 percent of the sum of the continuous and noncontinuous load.

Exception No. 2: Conductors shall be permitted to be sized at 100 percent of the sum of the continuous and noncontinuous load if they terminate to an overcurrent device where both the overcurrent device and its assembly are listed for operation at 100 percent of their rating.

(2) Application of Adjustment or Correction Factors.

The minimum service-entrance conductor size shall have an ampacity not less than the maximum load to be served after the application of any adjustment or correction factors.

Statement of Problem and Substantiation for Public Comment

This section uses the word "ampacity" to mean two different things, which is confusing and is not in accordance with the Article 100 definition.

Subsection (1) uses "ampacity" to refer to a value directly from the relevant table in Article 310. Subsection (2) uses "ampacity" to refer to the final value after the application of any adjustment or correction factors to that table value.

The definition of "ampacity" specifies that it is a current that a conductor may carry "under the conditions of use," and as such, it already means a value after the application of any adjustment or correction factors. The usage of "ampacity" in subsection (2) is in accordance with the definition, and the modifiers "after the application of any adjustment or correction factors" are redundant.

In contrast, the usage of "ampacity" in subsection (1) is not in accordance with the definition. Divining the correct meaning of "ampacity" in subsection (1) currently requires reading it in contrast to subsection (2), noting the lack of the redundant modifiers that are in subsection (2), and inferring that "ampacity" is being used in a manner different from its Article 100 definition.

Obviously all defined terms should be used in accordance with their definitions. Therefore the term "ampacity" in subsection (1) requires modifiers or a change. I have suggested the modifier "without application of any adjustment or correction factors" for parallelism with subsection (2). This phrase could be added at the end of the sentence instead of immediately after the term "ampacity" if preferred.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 144-NFPA 70-2024 [Section No. 210.19(A)]	Identical change for branch circuits
Public Comment No. 146-NFPA 70-2024 [Section No. 215.4(A)]	Identical change for feeders
Public Comment No. 144-NFPA 70-2024 [Section No. 210.19(A)]	
Public Comment No. 146-NFPA 70-2024 [Section No. 215.4(A)]	

Related Item

- Public Input No. 473-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Wayne Whitney
Organization: Whitney
Street Address:
City:
State:
Zip:

Submittal Date: Mon Jul 22 12:55:38 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The existing language is clear and requires you to add the noncontinuous loads to 125 percent of the continuous loads without adjustment or correction factors.

Public Comment No. 1970-NFPA 70-2024 [Section No. 230.42(A)(1)]

(1) Continuous and Noncontinuous Loads.

Where the service-entrance conductors supply continuous loads or any combination of noncontinuous and continuous loads, the minimum service-entrance conductor size shall have an ampacity not less than the sum of the noncontinuous loads plus 125 percent of continuous loads.

Exception No. 1: Grounded conductors that are not connected to an overcurrent device shall be permitted to be sized at 100 percent of the sum of the continuous and noncontinuous load.

Exception No. 2: Conductors shall be permitted to be sized at 100 percent of the sum of the continuous and noncontinuous load if they terminate to an overcurrent device where both the overcurrent device and its assembly are listed for operation at 100 percent of their rating.

Exception No. 3:

Where Exception No. 2 does not apply and a Power Control System is used to prevent overloading of service-entrance conductors supplying both continuous and noncontinuous loads per Section 120.7, the minimum service-entrance conductor size shall have an ampacity not less than 125 percent of the PCS current setpoint.

Where a Power Control System is used to prevent overloading of service-entrance conductors supplying only noncontinuous loads per Section 120.7, the minimum service-entrance conductor size shall have an ampacity not less than 100 percent of the PCS current setpoint.

Statement of Problem and Substantiation for Public Comment

This addition is necessitated by the First Draft's removal of continuous load considerations from the load calculation language (formerly Article 220, now Article 120). As continuous load factors are now addressed as part of conductor sizing, this language needs to be updated to reflect the use of EMS with PCS in lieu of traditional load calculation to determine conductor ampacity requirements. These changes explicitly enable EMS with PCS to be used to avoid upsizing conductors while also ensuring that service conductors controlled by a PCS and supplying continuous loads are properly sized. Without this revision, the existing rule (conductor ampacity must equal or exceed 100 of continuous loads plus 125% of noncontinuous loads) cannot be sensibly applied to situations where the PCS current setpoint is used in place of a traditional load calculation per 120.7. In cases where no continuous loads are being controlled or monitored by the PCS, there is no continuous load thermal concern and the conductor does not need an ampacity greater than the current setpoint of the PCS.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1950-NFPA 70-2024 [Section No. 120.7(B)]	
Public Comment No. 1957-NFPA 70-2024 [Section No. 210.19(A)]	
Public Comment No. 1961-NFPA 70-2024 [Section No. 215.4(A)(1)]	
Public Comment No. 1950-NFPA 70-2024 [Section No. 120.7(B)]	
Public Comment No. 1957-NFPA 70-2024 [Section No. 210.19(A)]	
Public Comment No. 1961-NFPA 70-2024 [Section No. 215.4(A)(1)]	

Related Item

- FR-8184

Submitter Information Verification

Submitter Full Name: Jeff Nicholson
Organization: Lumin
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 13:33:55 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The calculations for the continuous and noncontinuous loads have already taken into account the use of a PCS in Articles 120 and 130 and therefore it is unnecessary to provide exception 3.

Public Comment No. 1967-NFPA 70-2024 [Section No. 230.42(A) [Excluding any Sub-Sections]]

Service-entrance conductors shall have an ampacity of not less than the maximum load to be served. Conductors shall be sized not less than the larger conductor of 230.42(A)(1) or 230.42(A)(2). Loads shall be determined in accordance with Article 120, ~~Part III~~ Part I , III, IV, or V, as applicable. Ampacity shall be determined in accordance with 310.14 and comply with 110.14(C). The maximum current of busways shall be that value for which the busways have been listed or labeled.

Informational Note: See UL 857-2021, *Standard for Safety for Busways*, for information on busways.

Statement of Problem and Substantiation for Public Comment

Part I should be added as 120.7 is what enables a PCS to be utilized for load calculations.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1999-NFPA 70-2024 [Section No. 230.31(A)]	
Public Comment No. 2000-NFPA 70-2024 [Section No. 230.23(A)]	
Public Comment No. 1950-NFPA 70-2024 [Section No. 120.7(B)]	
Public Comment No. 2000-NFPA 70-2024 [Section No. 230.23(A)]	

Related Item

- FR-8184

Submitter Information Verification

Submitter Full Name: Jeff Nicholson
Organization: Lumin
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 13:27:44 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8428-NFPA 70-2024
Statement: The reference to Article 120 has been moved to an informational note to assist the user in knowing where to find the appropriate calculations

Public Comment No. 2081-NFPA 70-2024 [Section No. 230.46]

230.46 Spliced and Tapped Conductors.

Service-entrance conductors shall be permitted to be spliced or tapped in accordance with 110.14, 300.7(E), 300.15, and 300.17.

The following equipment installed on service conductors shall be listed and be marked or identified as “suitable for use on the line side of the service equipment” or equivalent~~.~~ , and have a listed short-circuit current rating greater than or equal to the available fault current.

(1) Power distribution blocks

(2) Pressure connectors

(3) Devices for splices and taps

Informational Note: The marking “SVC” is an industry identification that is considered equivalent to “suitable for use on the line side of service equipment.”

Additional Proposed Changes

File Name	Description	Approved
230-46_splice_short_circuit_-_1.jpg		
230-46_picture.jpg		

Statement of Problem and Substantiation for Public Comment

The devices that are used for splices and taps are typically exposed to the highest values of available fault current when they are used on the lineside of service equipment as permitted by 230.46. Some of the devices permitted, such as power distribution blocks, are required to be short-circuit tested and rated for the application while other types of mechanical connections are not required to be short-circuit tested. As you can see in the picture provided the outcome of an actual field installation where there was a short circuit that occurred that had catastrophic results. These types of connections that are held in the palm of your hand when trying to achieve the required torque values and are left to "float" after installed in the raceway need to be evaluated for a short-circuit current rating to ensure they are being installed properly and safely. This will also help the AHJ to ensure a safe and code compliant installation. There are products on the market today for mechanical connectors that have been evaluated for short-circuit currents as it is an "optional" test for mechanical splices. Power distribution blocks have a mandatory requirement in their product standard to be tested and evaluated for a short-circuit current rating when used on the lineside of service equipment.

Related Item

• PI 1955, PI3026, PI3622

Submitter Information Verification

Submitter Full Name: Kevin Arnold

Organization: Eatons Bussmann Business

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 28 21:25:19 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The requirement for suitability of connectors on the line side of service equipment was addressed in the 2023 Code cycle. Insufficient substantiation was provided to additionally require short-circuit current ratings on all connectors used on the line side of the service equipment. Although the photo provided clearly indicates an arcing fault, it does not show that the wire connector had failed. As these connectors are “floating” they will move along with the conductor and are less prone to damage than power distribution blocks which are mounted in place and do not move with the conductors.

Public Comment No. 331-NFPA 70-2024 [Section No. 230.46]

230.46 Spliced and Tapped Conductors.

Service-entrance conductors shall be permitted to be spliced or tapped in accordance with 110.14, 300.7(E), 300.15, and 300.17.

The following equipment installed on service conductors shall be listed and be marked or identified as “suitable for use on the line side of the service equipment” or equivalent:

(1) Power distribution blocks

(2) Pressure connectors

(3) Devices for splices and taps

Informational Note: The marking “SVC” is an industry identification that is considered equivalent to “suitable for use on the line side of service equipment.”

Additional Proposed Changes

File Name	Description	Approved
CN_30.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 30 appeared in the First Draft Report on First Revision No. 9125.

The Correlating Committee directs that CMP 10 review FR 9125 with respect to the listing requirement. Listing requirements are to be located in XXX.2 of the article in accordance with Section 2.2.1 of the NEC Style Manual.

Related Item

• First Revision No. 9125

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 29 17:12:23 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8448-NFPA 70-2024
Statement: The listing requirement has moved to 230.2 to comply with the NEC Style Manual.

Correlating Committee Note No. 30-NFPA 70-2024 [Section No. 230.46]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:29:49 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 9125 with respect to the listing requirement. Listing requirements are to be located in XXX.2 of the article in accordance with Section 2.2.1 of the NEC Style Manual.

First Revision No. 9125-NFPA 70-2024 [Section No. 230.46]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 638-NFPA 70-2024 [Section No. 230.46]

230.46 Spliced and Tapped Conductors.

Service-entrance conductors shall be permitted to be spliced or tapped in accordance with 110.14, 300.7(E), 300.15, and 300.17.

The following equipment installed on service conductors ~~shall be listed and be~~ shall be marked or identified as “suitable for use on the line side of the service equipment” or equivalent:

(1) Power distribution blocks

(2) Pressure connectors

(3) Devices for splices and taps

Informational Note: The marking “SVC” is an industry identification that is considered equivalent to “suitable for use on the line side of service equipment.”

Statement of Problem and Substantiation for Public Comment

Listing requirements for equipment in Services are covered in 230.2. Public Comment No. 637 has been submitted to add "power distribution blocks", "pressure connectors", and "devices for splices and taps" to that section. With the acceptance of that Public Comment, the requirement for listing can be removed from 230.46.

Related Item

• CC Note No. 23 • PC 637

Submitter Information Verification

Submitter Full Name: Robert Osborne

Organization: UL Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 02 07:54:55 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8448-NFPA 70-2024

Statement: The listing requirement has moved to 230.2 to comply with the NEC Style Manual.

Public Comment No. 971-NFPA 70-2024 [Section No. 230.56]

~~**230.56** Service Conductor with the Higher Voltage to Ground.~~

~~On a 4-wire, delta-connected service where the midpoint of one phase winding is grounded, the service conductor having the higher phase voltage to ground shall be durably and permanently marked by an outer finish that is orange in color, or by other effective means, at each termination or junction point.~~

Statement of Problem and Substantiation for Public Comment

This is require by 110.15 and section 4.1.2 of the Style Manual says "General requirements contained in Chapter 1 shall not be repeated in other articles of the document."

Related Item

• Public Input No. 85-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: none
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 08 14:14:45 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Accepted
Resolution: SR-8450-NFPA 70-2024
Statement: This requirement is already addressed in110.15 and has been removed due avoid redundancy.

Public Comment No. 1739-NFPA 70-2024 [Section No. 230.62(C)]

(C) Barriers.

Barriers shall be placed in service equipment such that no energized, uninsulated, ungrounded service busbar or service terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing load terminations with the service disconnect in the open position.

*informational note Barriers mentioned in this section will comply with UL 67 standard

Statement of Problem and Substantiation for Public Comment

Nothing in 230.62(C) mentions that barriers are included and tested with the equipment an informational note will make this clear to installers.

Related Item

• 210.62(C)

Submitter Information Verification

Submitter Full Name: William Snyder
Organization: RCC Solutions
Affiliation: High Voltage Live Podcast
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 26 21:05:48 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8451-NFPA 70-2024

Statement: The proposed informational note is focused on a single product standards and barriers are addressed in other products and will be included or identified for use in listed products. The language has been revised to require identification of barriers that are placed in the service equipment.

Public Comment No. 640-NFPA 70-2024 [New Section after 230.66]

230.X Meter Sockets.

Meter sockets shall be rated for the voltage and current rating of the service.

Statement of Problem and Substantiation for Public Comment

The title to 230.66 is "Markings"; however, it includes requirements for ratings of meter sockets. This Public Comment, which is a companion to PC 639, relocates the requirement to a new section with a proper title.

Related Item

• FR 9137 • PC 639

Submitter Information Verification

Submitter Full Name: Robert Osborne

Organization: UL Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 02 08:06:30 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8455-NFPA 70-2024

Statement: The rating requirements for meter sockets are moved from the marking section to a new section after 230.66 and revised to structurally align with the NEC Style Manual.

Public Comment No. 639-NFPA 70-2024 [Section No. 230.66]

230.66 Marking.

~~**(A)** General.~~

Service equipment shall be marked to identify it as being suitable for use as service equipment.

~~**(B)** Meter Sockets.~~

~~Meter~~

~~Meter sockets shall not be considered service equipment~~

~~but shall be listed and rated for the voltage and current rating of the service~~

~~.~~

~~*Exception:* *Meter sockets supplied by and under the exclusive control of an electric utility shall not be required to be listed.*~~

Statement of Problem and Substantiation for Public Comment

Listing requirements for equipment in Services are covered in 230.2. Public Comment No. 637 has been submitted to add "meter sockets" to that section. The exception to (B) is also relocated (and put in positive text) into 230.2 and can be deleted. With the acceptance of that Public Comment, the requirement for listing can be removed from 230.66. Additionally, the remaining requirement for meter sockets is about 'ratings', not 'markings', so it is not consistent with the title of this section. Public Comment No. 640 has been submitted to relocate this requirement to a new section with a more appropriate title.

Related Item

• CC Note No. 23 • PC No. 637 • PC No. 640

Submitter Information Verification

Submitter Full Name: Robert Osborne
Organization: UL Solutions
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 02 07:59:21 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8452-NFPA 70-2024

Statement: The listing requirements have been relocated to 230.2 and the rating requirements for meter sockets have been moved to a new section after 230.66.

Public Comment No. 808-NFPA 70-2024 [Section No. 230.66]

230.66 Marking.

~~**(A)** General.~~

Service equipment shall be marked to identify it as being suitable for use as service equipment.

~~**(B)** Meter Sockets.~~

~~Meter sockets shall not be considered service equipment but shall be listed and rated for the voltage and current rating of the service.~~

~~*Exception:* *Meter sockets supplied by and under the exclusive control of an electric utility shall not be required to be listed.*~~

Statement of Problem and Substantiation for Public Comment

The meter socket requirements are being relocated to a proposed new Part V to Article 408. The existing language of 230.66 for meter sockets are not marking requirements. Reference new Part V to Article 408 for the requirements for meter sockets.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 805-NFPA 70-2024 [New Part after IV.]	
Public Comment No. 812-NFPA 70-2024 [Section No. 408.1]	
Public Comment No. 813-NFPA 70-2024 [Article 408]	

Related Item

• PI 3165

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 05 15:51:03 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8452-NFPA 70-2024

Statement: The listing requirements have been relocated to 230.2 and the rating requirements for meter sockets have been moved to a new section after 230.66.

Public Comment No. 254-NFPA 70-2024 [Section No. 230.67]

230.67 Surge Protection.

(A) Surge-Protective Device.

All services supplying the following occupancies shall be provided with a surge-protective device (SPD):

(1) Dwelling units

(2) Dormitories

(3) Guest rooms and guest suites of hotels, motels, and dormitories

(4) Areas of nursing homes and limited-care facilities used exclusively as patient sleeping rooms

(5) Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations

Ex: An SPD shall not be required for the service if surge protection complying with 215.18 is provided.

(B) Location.

The SPD shall be an integral part of the service equipment or shall be located immediately adjacent thereto.

~~Exception: The SPD shall not be required to be located at the service equipment as required in 230.67~~

(

~~B) if located at each next level distribution equipment downstream toward the load.~~

(C) Type.

The SPD shall be a Type 1 or Type 2 SPD.

(D) Replacement.

Where service equipment is replaced, all of the requirements of this section shall apply.

(E) Ratings.

SPDs shall have a nominal discharge current rating (In) of not less than 10kA.

Statement of Problem and Substantiation for Public Comment

The comment seeks to reloacte the exisitng exception and revise it for clarity. The current is not an exception for (B), it is an exception for (A). If the SPD is in each "next level distribution equipment" (whatever that means) then the service does not have surge protection. The exception excepts out the rul in (A), not (B).
The revision to the text is simply the issue. Because "next level distribution equipment" is not defined, there is much argument in the field. Is a fused disconnect switch for an air-conditioner really "distribution equipment," or is it just a box with fuses in it?
Please note my companion proposal for 215.18.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 249-NFPA 70-2024 [Section No. 215.18]	

Related Item

- FR 9142

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 25 15:20:47 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8486-NFPA 70-2024

Statement: Item (A) establishes the specific occupancies requiring SPDs. The location of the SPD is established in Item (B). The exception is properly located in Item(B). The exception language has been clarified.

Public Comment No. 365-NFPA 70-2024 [Section No. 230.67(A)]

(A) Surge-Protective Device.

All services supplying the following occupancies shall be provided with a surge-protective device (SPD):

(1) Dwelling units

(2) Dormitories

(3) Guest rooms and guest suites of hotels, motels, and dormitories

(4) Areas of nursing homes and limited-care facilities used exclusively as patient sleeping rooms

(5) Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations

Additional Proposed Changes

File Name	Description	Approved
CN_31.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 31 appeared in the First Draft Report on First Revision No. 9142.

The Correlating Committee directs that CMP 10 review FR 9142 and the redundant inclusion of “Dormitories” in both (A)(2) and (A)(3). Additionally, the statement that “the following occupancies” is inaccurate and consideration should be made to rephrasing the statement, as not all locations identified are “occupancies” (reference list item (5)).

Related Item

• First Revision No. 9142

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 30 11:46:01 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8609-NFPA 70-2024
Statement: The term "occupancy" has been deleted to address the list that includes occupancies and areas.

Correlating Committee Note No. 31-NFPA 70-2024 [Section No. 230.67(A)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:31:26 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 9142 and the redundant inclusion of “Dormitories” in both (A)(2) and (A)(3). Additionally, the statement that “the following occupancies” is inaccurate and consideration should be made to rephrasing the statement, as not all locations identified are “occupancies” (reference list item (5)).

First Revision No. 9142-NFPA 70-2024 [Section No. 230.67(A)]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 289-NFPA 70-2024 [Section No. 230.67(B)]

(B) Location.

The SPD shall be an integral part of the service equipment or shall be located immediately adjacent thereto.

Exception: The SPD shall not be required to be located at the service equipment as required in 230.67(B) if located at each next level distribution equipment downstream toward the load. This does not include service equipment that is in a panel board containing overcurrent protective devices other than the service disconnect.

Statement of Problem and Substantiation for Public Comment

In most areas the common installation for dwelling units is to mount a panel board outside to use as the service disconnect and overcurrent protective device with other OCPD's for 240volt and 120volt loads. This would allow, with the current language, to not have any OCPD's protected by surge protection in this outside panel if you are to use the exception in 230.67 (B). This is brought about by several factors the first is AHJ's being reluctant to require 2 surge protective devices. Secondly is the incorrect conclusion that a panel board that contains service equipment is only service equipment. Thirdly is the idea that downstream means it cannot be in the same panel board as the service equipment.

Related Item

• 215.67 (B) location of surge protection at services.

Submitter Information Verification

Submitter Full Name: Ronald Dalrymple
Organization: City of Converse
Street Address:
City:
State:
Zip:

Submittal Date: Sat Jul 27 15:12:58 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8486-NFPA 70-2024

Statement: Item (A) establishes the specific occupancies requiring SPDs. The location of the SPD is established in Item (B). The exception is properly located in Item(B). The exception language has been clarified.

Public Comment No. 1934-NFPA 70-2024 [Section No. 230.67(E)]

~~(E) Ratings.~~

~~SPDs shall have a nominal discharge current rating (In) of not less than 10kA~~

Informational Note 1: For SPD selection guidance, see C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits .

Statement of Problem and Substantiation for Public Comment

CMP-10's stated purpose for requiring Surge Protective Devices (SPDs) in the NEC is to protect critical, life-saving equipment from transient voltage events. CMP-10 directly expressed this in their response to Public Input (PI) 4103, which stated:

> "The requirement for surge protection in the NEC is necessary to provide protection for sensitive electronics for safety devices in the home."

IEEE C62.41.2 outlines the established and comprehensive methods required to meet CMP-10's goal. Specifically, Section 1.3.2 defines the requirements to achieve "practical surge immunity," covering a broad range of critical issues:

"Section 1.3.2 Achieving Practical Surge Immunity
These considerations include:
- The desired level of protection
- Worst-case or typical-case scenarios
- Hardware integrity (no damage)
- Process immunity (no operational upset)
- Equipment sensitivities
- Power environment, including surge characteristics and other system parameters
- Interactions with communications or other systems
- SPD performance (protection, durability, and failure mode)
- The test environment
- Cost considerations (total and relative)"

By mandating a single metric within a single consideration - 230.67(E) - and omitting the majority of these required considerations, the NEC is ignoring IEEE C62.41.2. This oversight leaves essential life-saving equipment vulnerable to transient voltage failures as it does not provide NEC users with the necessary tools to "provide protection for sensitive electronics for safety devices in the home."

To ensure CMP-10 meets its objective of safeguarding sensitive life-saving equipment, strike 230.67(E) and instead refer users to IEEE C62.41.2 for a more complete and effective result.

Related Item

- FR-9142

Submitter Information Verification

Submitter Full Name: James Moellmann
Organization: Maxivolt
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 11:00:16 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The provisions of 230.67(E) are adequate to meet the objective of protecting life-saving equipment from transient voltage events. Other parameters have been identified in the substantiation, but no changes were proposed and further substantiation would be necessary in order to consider. The informational note has not been added in this section because it has been added to NEC Article 242.

Public Comment No. 1936-NFPA 70-2024 [Section No. 230.67(E)]

~~(E) Ratings.~~

~~SPDs shall have a nominal discharge current rating (In) of not less than 10kA~~

Informational Note 1: For SPD selection guidance, see C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits .

Statement of Problem and Substantiation for Public Comment

CMP-10's stated purpose for requiring Surge Protective Devices (SPDs) in the NEC is to protect critical, life-saving equipment from transient voltage events. CMP-10 directly expressed this in their response to Public Input (PI) 4103, which stated:

> "The requirement for surge protection in the NEC is necessary to provide protection for sensitive electronics for safety devices in the home."

IEEE C62.41.2 outlines the established and comprehensive methods required to meet CMP-10's goal. Specifically, Section 1.3.2 defines the requirements to achieve "practical surge immunity," covering a broad range of critical issues:

"Section 1.3.2 Achieving Practical Surge Immunity
These considerations include:
- The desired level of protection
- Worst-case or typical-case scenarios
- Hardware integrity (no damage)
- Process immunity (no operational upset)
- Equipment sensitivities
- Power environment, including surge characteristics and other system parameters
- Interactions with communications or other systems
- SPD performance (protection, durability, and failure mode)
- The test environment
- Cost considerations (total and relative)"

By mandating a single metric within a single consideration - 230.67(E) - and omitting the majority of these required considerations, the NEC is ignoring IEEE C62.41.2. This oversight leaves essential life-saving equipment vulnerable to transient voltage failures as it does not provide NEC users with the necessary tools to "provide protection for sensitive electronics for safety devices in the home."

To ensure CMP-10 meets its objective of safeguarding sensitive life-saving equipment, strike 230.67(E) and instead refer users to IEEE C62.41.2 for a more complete and effective result.

Related Item

• PI-46

Submitter Information Verification

Submitter Full Name: James Moellmann
Organization: Maxivolt
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 11:06:26 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The provisions of 230.67(E) are adequate to meet the objective of protecting life-saving equipment from transient voltage events. Other parameters have been identified in the substantiation, but no changes were proposed and further substantiation would be necessary in order to consider. The informational note has not been added in this section because it has been added to NEC Article 242.

Public Comment No. 1110-NFPA 70-2024 [Section No. 230.70(A)]

(A) Service Disconnect Location.

Service disconnects shall be installed in accordance with 230.70(A)(1), 230.70(A)(2),230.70(A)(3), and 230.70(A)(4).

(1) – ~~Readily Accessible Location~~ . One- and Two-Family Dwellings .

Service disconnects shall be installed at a readily accessible outdoor location ~~either outside~~ . ~~of a building or structure or inside nearest the point of entrance of the service~~ - ~~conductors~~ . ~~conductors~~ on or within sight of the one- or two-family dwelling unit .

(2)– . Other than One- and Two-Family Dwellings.

Service disconnects shall be installed in a readily accessible ~~outdoor~~ location ~~on or within~~ . ~~sight of the one- or two-family dwelling~~ - ~~unit~~ . ~~unit~~ either outside of a building or structure or inside nearest the point of entrance of the service conductors .

(3) Bathrooms.

Service disconnecting means shall not be installed in bathrooms.

(4) Remote Control.

If a remote-control device(s) is used to actuate the service disconnect, the service disconnect shall be located in accordance with 230.70(A)(1). Remote-control devices shall not be used as a service disconnect for one- and two-family dwellings.

Statement of Problem and Substantiation for Public Comment

Proposed changes are intended to provide clarity to service disconnect location requirements. List item (1) Readily Accessible Location could have been interpreted that service disconnects for One- and Two-Family Dwellings may be permitted inside the building. The proposed wording removes that interpretation and reorders the list to a more logical sequence.

Related Item

• FR-9155

Submitter Information Verification

Submitter Full Name: David Hittinger
Organization: Independent Electrical Contractors
Affiliation: IEC Codes and Standards
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 15 08:12:53 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8496-NFPA 70-2024

Statement: The charging statement in 230.70(A) was clarified to remove a potential contradiction in meeting both 230.70(A)(1) and (2). 230.70(A)(1) and (2) were revised for additional clarification and consistency in language. A reference was added to 110.29 concerning “within sight of” as the defined term was deleted.

An exception was added for service disconnects for one and two family dwellings to not require installation on or within sight of the unit if an outdoor feeder emergency disconnect is provided in accordance with 225.41. This would reduce the need for redundant emergency disconnects and allow for service disconnects where the residence is significantly set back from the road and served by a feeder.

The language has been revised to clarify that the remote disconnecting control device actuating the service disconnect is not the service disconnect. Additionally, the term “remote control” was revised to “remote disconnect control” to clarify that it pertains to the disconnect device.

Public Comment No. 1349-NFPA 70-2024 [Section No. 230.70(A)(2)]

(2) One- and Two-Family Dwellings.

Service disconnects shall be installed in a readily accessible outdoor location on or within sight of the one- or two-family dwelling unit.

Exception: The service disconnect for one- and two-family dwellings is not required to be installed on or within sight of the one- or two-family dwelling unit when the requirements of 225.41 are met.

Statement of Problem and Substantiation for Public Comment

The suggested language change recognizes services that may be much further from the residence such as at the road when the residence is set back from the road served by a feeder. The exception points to the emergency disconnect requirements found in Article 225 which would meet the needs of first responders.

Related Item

• FR 9187 for 225.41 • FR 9155 for 230.70

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 21 08:15:03 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8496-NFPA 70-2024

Statement: The charging statement in 230.70(A) was clarified to remove a potential contradiction in meeting both 230.70(A)(1) and (2). 230.70(A)(1) and (2) were revised for additional clarification and consistency in language. A reference was added to 110.29 concerning “within sight of” as the defined term was deleted.

An exception was added for service disconnects for one and two family dwellings to not require installation on or within sight of the unit if an outdoor feeder emergency disconnect is provided in accordance with 225.41. This would reduce the need for redundant emergency disconnects and allow for service disconnects where the residence is significantly set back from the road and served by a feeder.

The language has been revised to clarify that the remote disconnecting control device actuating the service disconnect is not the service disconnect. Additionally, the term “remote control” was revised to “remote disconnect control” to clarify that it pertains to the disconnect device.

Public Comment No. 1495-NFPA 70-2024 [Section No. 230.70(A)(2)]

(2) One- and Two-Family Dwellings.

Service disconnects shall be installed in a readily accessible outdoor location on or ~~within sight of~~ visible from the one- or two-family dwelling unit.

Statement of Problem and Substantiation for Public Comment

This comment is being submitted on behalf of the Minnesota Department of Labor and Industry. Currently, the Department's inspection staff includes 14-office/field staff, 50-state field inspectors, 4-virtual inspectors and 22 plus contract electrical inspectors that complete over 170,000 electrical inspections annually.

Continue to accept the proposed changes for the dwelling "emergency disconnect". The proposed language is enforceable, and is consistent with the other defined terms used throughout the NEC related to a service/feeder disconnect installations; however, the disconnect should be "visible" from the dwelling unit. In many cases, the debate in the field comes from the "in-sight of" rules. Many times, at a rural residence, the service disconnect could be visible and in the center of the yard, but not within 50'. The disconnect could be located 75' or 150' away and the first responders may drive directly by the service or feeder "emergency disconnect" when entering the yard, but it doesn't meet the 50' requirement. Instead of having a debate about the distance in the field, ensuring the disconnect is visible from the dwelling is more consistent for the installer, enforcer and first responder, plus, eliminates the need for possibly redundant or multiple disconnects being located at a dwelling.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1490-NFPA 70-2024 [Section No. 225.41(A)(1)]	Correlates with 225.41 "visible from"

Related Item

- Public Input No. 2021-NFPA 70-2023 Section No. 230.70(A) • FR-9155-NFPA 70-2024

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 23 15:28:31 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected
Resolution: The term "visible" is not defined or enforceable.

Public Comment No. 1176-NFPA 70-2024 [Section No. 230.70(A)(4)]

(4) Remote Disconnect Control.

If a remote - disconnect control device(s) is used to actuate the service disconnect, the service disconnect shall be located in accordance with 230.70(A)(1). Remote - disconnect control devices shall not be used as a service disconnect for one- and two-family dwellings.

Statement of Problem and Substantiation for Public Comment

The purpose of this Public Input is to revise 230.70(A)(4) for clarity, useability, and correlation.

230.70(A)(4) was revised to change “Remote Control” to “Remote Disconnect Control” to utilize a defined term within the NEC. Remote Control is an undefined term in the NEC that can be misinterpreted. As digital control become more popular a user could misunderstand the term to believe they could remotely control the disconnect using a mobile app.

A companion Public Comment was submitted to CMP-12 to revise the definition to remove the designated Article number “(645)” so that the definition can be used throughout the code.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1155-NFPA 70-2024 [Definition: Remote Disconnect Control.]	
Public Comment No. 1155-NFPA 70-2024 [Definition: Remote Disconnect Control.]	

Related Item

- FR9155

Submitter Information Verification

Submitter Full Name: Megan Hayes
Organization: NEMA
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 16 12:05:27 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8496-NFPA 70-2024

Statement: The charging statement in 230.70(A) was clarified to remove a potential contradiction in meeting both 230.70(A)(1) and (2). 230.70(A)(1) and (2) were revised for additional clarification and consistency in language. A reference was added to 110.29 concerning “within sight of” as the defined term was deleted.

An exception was added for service disconnects for one and two family dwellings to not require installation on or within sight of the unit if an outdoor feeder emergency disconnect is provided in accordance with 225.41. This would reduce the need for redundant emergency disconnects and allow for service disconnects where the residence is significantly set back from the road and served by a feeder.

The language has been revised to clarify that the remote disconnecting control device actuating the service disconnect is not the service disconnect. Additionally, the term “remote control” was revised to “remote disconnect control” to clarify that it pertains to the disconnect device.

Public Comment No. 1245-NFPA 70-2024 [Section No. 230.70(A)(4)]

(4) Remote Control.

If a remote-control device(s) is used to actuate the service disconnect, the service disconnect shall be located in accordance with 230.70(A)(1). Remote-control devices that actuate the service disconnect shall not be ~~used as a service disconnect~~ permitted for one- and two-family dwellings.

Statement of Problem and Substantiation for Public Comment

This should be viewed as editorial only. In no case is a remote-control device permitted to be used AS the service disconnect, be it at dwelling units or anywhere else.

Related Item

- FR 9155

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 18 14:38:09 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The existing language does not permit remote control devices to be used as the service disconnect. Service disconnects may also be operated remotely as long as service disconnects are located in accordance with 230.70(A). No substantiation was provided to restrict remote operation of service disconnects for one and two family dwellings. Also see panel action on PC-1110.

Public Comment No. 1397-NFPA 70-2024 [Section No. 230.70(A)(4)]

(4) Remote Control.

If a remote-control device(s) is used to actuate the service disconnect, the service disconnect shall be located in accordance with 230.70(A)(1). Remote-control devices shall not be used as a service disconnect for one- and two-family dwellings.

Exception: One- and two-family dwellings supplied by a service lateral or by underground service conductors shall be permitted to be capable of disconnection from a readily accessible location outside on the one- or two- family dwelling by using a method providing remote control wiring of the service disconnect, and marked: EMERGENCY ELECTRICAL DISCONNECT - NOT SERVICE EQUIPMENT. The control wiring shall be enclosed in a raceway.

Statement of Problem and Substantiation for Public Comment

There are areas in cities where dwellings are connected row style along streets and the buildings have no side alleys and building frontage is right on the sidewalk. Services are fed by an "in street" utility owned underground manhole system with underground service to the dwelling and all service equipment located in the basement including the utility meter. In these cases remote control is necessary for emergency disconnect. The electrical industry has main breakers with integral shunt-trip devices available for this application. Control wiring installed in a raceway adds a level of physical protection.

Related Item

- FR-9155-NFPA 70-2024

Submitter Information Verification

Submitter Full Name: Peter Diamond
Organization: Diamond Seminars
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 22 05:38:54 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: While remote operation of a service disconnect is acceptable, the service must still be located in accordance with 230.70(A), so the exception is inappropriate. The reliance on only remote operation of service disconnects introduces additional failure modes and hazards, and should not be normalized. Also see panel action on PC-1110.

Public Comment No. 1040-NFPA 70-2024 [Section No. 230.70(A) [Excluding any Sub-Sections]]

Service disconnects shall be installed in accordance with 230.70(A)(1) ~~,~~ or 230.70(A)(2) ~~;~~ and 230.70(A)(3), and 230.70(A)(4).

Statement of Problem and Substantiation for Public Comment

The current wording appears to require compliance with items 1 and 2. You cannot comply with both items. It should be item or item 2 and the remaining items

Related Item

- FR-9155

Submitter Information Verification

Submitter Full Name: Dennis Querry
Organization: Trinity River Authority
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 12 16:03:53 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8496-NFPA 70-2024

Statement: The charging statement in 230.70(A) was clarified to remove a potential contradiction in meeting both 230.70(A)(1) and (2). 230.70(A)(1) and (2) were revised for additional clarification and consistency in language. A reference was added to 110.29 concerning “within sight of” as the defined term was deleted.

An exception was added for service disconnects for one and two family dwellings to not require installation on or within sight of the unit if an outdoor feeder emergency disconnect is provided in accordance with 225.41. This would reduce the need for redundant emergency disconnects and allow for service disconnects where the residence is significantly set back from the road and served by a feeder.

The language has been revised to clarify that the remote disconnecting control device actuating the service disconnect is not the service disconnect. Additionally, the term “remote control” was revised to “remote disconnect control” to clarify that it pertains to the disconnect device.

Public Comment No. 1879-NFPA 70-2024 [Section No. 230.70(B)]

(B) Service Disconnect Marking.

Service disconnects shall be marked in accordance with 230.70(B)(1) ~~and~~ through 230.70(B)(~~2~~ 3).

(1) Marking.

Service disconnects shall be marked ~~as "SERVICE DISCONNECT" and the marking shall comply~~ in accordance with 110.21(B) ~~.~~

~~(2) One-~~

and

~~Two-Family Dwellings.~~

~~Service disconnects for one- and two-family dwellings shall be marked as follows:~~

~~EMERGENCY DISCONNECT, SERVICE DISCONNECT~~

~~Markings shall comply~~ with ~~110.21(B)~~ ~~and~~ both of the following:

(1) The markings shall be located on the outside front of the disconnect enclosure with a red background and white text.

(2) The letters shall be at least ~~13mm~~ 13 mm (1/2 in.) high.

(2) One- and Two-Family Dwellings.

Service disconnects for one- and two-family dwellings shall be marked as follows:

EMERGENCY DISCONNECT, SERVICE DISCONNECT

(3) Other Service Disconnects

Service disconnects for other than one- and two-family dwellings shall be marked as follows:

SERVICE DISCONNECT

Additional Proposed Changes

File Name	Description	Approved
230.70_B_Service_Disconnect_Marking.pdf	230.70(B) Service Disconnect Marking	

Statement of Problem and Substantiation for Public Comment

The marking requirement for the Emergency Disconnect and the Service Disconnect should be the same. Currently the "SERVICE DISCONNECT" marking could be located outside on the back, bottom, top, or inside on the back wall of the disconnect. The letter size could be a small as the printer would allow.

There are two applications for marking service disconnects. One for One- and Two-Family Dwellings and one for other than one- and two-family dwellings. The revisions in this Public Comment will provide similar requirements for both types of service disconnects, other than the text of the marking.

Related Item

- FR 9155

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 27 19:36:05 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8610-NFPA 70-2024

Statement: Section 230.70(B) has been clarified that the emergency disconnect marking is on the front of the enclosure. The service disconnect marking is to be on or adjacent to the service disconnect, as there may be more than one disconnect in the service equipment enclosure or the switch may be inside the enclosure behind the door.

230.70(B) Service Disconnect Marking

(B) Service Disconnect Marking.

Service disconnects shall be marked in accordance with 230.70(B)(1) through 230.70(B)(3).

(1) Marking.

Service disconnects shall be marked in accordance with 110.21(B) and with both of the following:

(1) The markings shall be located on the outside front of the disconnect enclosure with a red background and white text.

(2) The letters shall be at least 13 mm (1/2 in.) high.

(2) One- and Two-Family Dwellings.

Service disconnects for one- and two-family dwellings shall be marked as follows:

EMERGENCY DISCONNECT, SERVICE DISCONNECT

(3) Other Service Disconnects

Service disconnects for other than one- and two-family dwellings shall be marked as follows:

SERVICE DISCONNECT

DRAFT

Public Comment No. 1831-NFPA 70-2024 [Section No. 230.70(B)(1)]

(1) Marking.

Service disconnects shall be marked as “SERVICE DISCONNECT” and the marking shall comply with 110.21(B) and both of the following:

(1) The markings shall be located on the outside front of the disconnect enclosure with a red background and white text .

(2) The letters shall be at least 13 mm (1/2 in.) high.

Statement of Problem and Substantiation for Public Comment

The marking requirement for the Emergency Disconnect and the Service Disconnect should be the same. Currently the "SERVICE DISCONNECT" marking could be located outside on the back, bottom, top, or inside on the back wall of the disconnect. The letter size could be a small as the printer would allow.

Related Item

- FR 9155

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 27 16:17:01 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8610-NFPA 70-2024

Statement: Section 230.70(B) has been clarified that the emergency disconnect marking is on the front of the enclosure. The service disconnect marking is to be on or adjacent to the service disconnect, as there may be more than one disconnect in the service equipment enclosure or the switch may be inside the enclosure behind the door.

Public Comment No. 1178-NFPA 70-2024 [Section No. 230.82]

230.82 Equipment Connected to the Supply Side of Service Disconnect.

Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:

(1) Cable limiters~~.~~

(2) Meters and meter sockets, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII, and bonded in accordance with Article 250, Part V.

(3) Meter disconnect switches that have a short-circuit current rating equal to or greater than the available fault current, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII and bonded in accordance with Article 250, Part V, as follows:

(4) The meter disconnect switch is capable of interrupting the load served.

(5) The meter disconnect is in equipment legibly field marked on its exterior in a manner suitable for the environment as follows:

METER DISCONNECT NOT SERVICE EQUIPMENT

(6) Instrument transformers (current and voltage)~~, impedance shunts, load~~

(7) Impedance shunts

(8) Load management devices~~, surge arresters, and~~

(9) Surge arresters

(10) Type 1 surge-protective devices.

(11) ~~Conductors used to supply energy management systems, circuits for standby power systems, fire pump equipment, and fire and sprinkler alarms, if provided with service equipment and installed in accordance with requirements for service-entrance conductors.~~

(12) ~~Solar photovoltaic systems, fuel cell systems, wind electric systems, energy storage systems, or interconnected electric power production sources, if provided with a disconnecting means in equipment listed as suitable for use as service equipment, and overcurrent protection as specified in Article 230 , Part VII.~~

(13) ~~Control circuits for power-operable service disconnecting means, if suitable overcurrent protection and disconnecting means are provided.~~

(14) ~~Ground-fault protection systems or Type 2 surge-protective devices, where installed as part of listed equipment, if suitable overcurrent protection and disconnecting means are provided.~~

(15) Connections used only to supply listed communications equipment under the exclusive control of the serving electric utility, if suitable overcurrent protection and disconnecting means are provided. For installations of equipment by the serving electric utility, a disconnecting means is not required if the supply is installed as part of a meter socket, such that access can only be gained with the meter removed.

(16) Meter-mounted transfer switches that have a short-circuit current rating equal to or greater than the available fault current, as follows:

(17) The meter-mounted transfer switch is listed and capable of transferring the load served.

(18) The meter-mounted transfer switch is marked on its exterior as follows:

METER-MOUNTED TRANSFER SWITCH

NOT SERVICE EQUIPMENT

(19) ~~Control power circuits for protective relays where installed as part of listed equipment, if overcurrent protection and disconnecting means are provided.~~ Power distribution blocks, pressure connectors, and devices for splices and taps when they meet the requirements of 230.46

Statement of Problem and Substantiation for Public Comment

This list should only include solutions that are applied on the line side of the service disconnecting means that are not afforded an overcurrent protective device because if they are afforded an overcurrent protective device, that device is a service disconnecting means and you cannot have a permission to place a service disconnecting means ahead of a service disconnecting means. A splice and power distribution block are good examples that are being added. Existing examples include a meter socket and a meter-mounted transfer switch. Another good example is a cable limiter. These devices do not have disconnects and are not afforded an overcurrent protective device. Those applications that are such that the service conductor is tapped and the serving service conductors land on an overcurrent protective deivce are provided with a service overcurrent protective device and so are not installed on the supply side of the service as they are service equipment. The conductor taps and associated equipment are addressed by the addition of the item that states “power distribution blocks, pressure connectors, and devices for splices and taps when they meet the requirements of 230.46.” The language of how many service disconnects you are permitted is already addressed elsewhere and what is not to be counted as a service disconnecting means is also already addressed elsewhere. The language being deleted as part of this section is not necessary and can cause confusion.

Related Item

• FR 9174 • FR 9148 Service Disconnect

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 16 13:03:02 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-8515-NFPA 70-2024
Statement:	The general requirements in items 230.82(2) and 230.82(3) concerning grounding and bonding are considered redundant with 250.25 and have been removed. Items 230.82(3) and 230.82(10) have been revised to list the requirements for clarity. Additionally, item 230.82(10) has been moved to item 230.82(4). Equipment previously grouped into a single item have been separated in accordance with the NEC Style Manual cl. 2.1.8. The list has been re-organized to place similar items (such as SPDs) adjacent to each other. Solar photovoltaic systems, fuel cell systems, wind electric systems and energy storage systems have been deleted from the list as they are considered interconnected electric power production sources. Other list items which may require service disconnects have not been removed from 230.82 as removal of these items at this time may cause confusion.

Public Comment No. 1881-NFPA 70-2024 [Section No. 230.82]

230.82 Equipment Connected to the Supply Side of Service Disconnect.

Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:

(1) Cable limiters.

(2) Meters and meter sockets, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII, and bonded in accordance with Article 250, Part V. Where bonding of the grounded conductor is present in the meter enclosure, or associated equipment, and the distance between this bonding point and the service disconnecting means is greater than 10 feet, conductors shall be installed in a nonconductive raceway, whether aboveground or underground, from this grounded conductor bonding point to the service disconnecting means.

(3) Meter disconnect switches that have a short-circuit current rating equal to or greater than the available fault current, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII and bonded in accordance with Article 250, Part V, as follows:

(4) The meter disconnect switch is capable of interrupting the load served.

(5) The meter disconnect is in equipment legibly field marked on its exterior in a manner suitable for the environment as follows:

METER DISCONNECT NOT SERVICE EQUIPMENT

(6) Instrument transformers (current and voltage), impedance shunts, load management devices, surge arresters, and Type 1 surge-protective devices.

(7) Conductors used to supply energy management systems, circuits for standby power systems, fire pump equipment, and fire and sprinkler alarms, if provided with service equipment and installed in accordance with requirements for service-entrance conductors.

(8) Solar photovoltaic systems, fuel cell systems, wind electric systems, energy storage systems, or interconnected electric power production sources, if provided with a disconnecting means in equipment listed as suitable for use as service equipment, and overcurrent protection as specified in Article 230, Part VII.

(9) Control circuits for power-operable service disconnecting means, if suitable overcurrent protection and disconnecting means are provided.

(10) Ground-fault protection systems or Type 2 surge-protective devices, where installed as part of listed equipment, if suitable overcurrent protection and disconnecting means are provided.

(11) Connections used only to supply listed communications equipment under the exclusive control of the serving electric utility, if suitable overcurrent protection and disconnecting means are provided. For installations of equipment by the serving electric utility, a disconnecting means is not required if the supply is installed as part of a meter socket, such that access can only be gained with the meter removed.

(12) Meter-mounted transfer switches that have a short-circuit current rating equal to or greater than the available fault current, as follows:

(13) The meter-mounted transfer switch is listed and capable of transferring the load served.

(14) The meter-mounted transfer switch is marked on its exterior as follows:

METER-MOUNTED TRANSFER SWITCH

NOT SERVICE EQUIPMENT

(15) Control power circuits for protective relays where installed as part of listed equipment, if overcurrent protection and disconnecting means are provided.

Additional Proposed Changes

File Name	Description	Approved
Pub._Comment_No._1881-NFPA_70-2024_Section_No._230.82_.pdf	Legislative Text View	

Statement of Problem and Substantiation for Public Comment

Where bonding of the grounded conductor(neutral) occurs in the meter can and metallic raceway is installed from the meter can to the service disconnecting means, a parallel path for neutral current is created via this metallic raceway. Whether aboveground or underground, such current could be considered objectionable, and, under the right conditions, a safety hazard.

NEC 250.6(A) specifically prohibits objectionable current.
Further, NEC sections 250.30(A), 250.30(A)(I)(b) Exception No.2,
250.30(A)(2)Exception, and 250.32(B)(I)Exception No.2, all recognize the hazard created by a parallel path for neutral current.

The proposed added text will bring typical service installations in line with the intent of the NEC, with regard to prohibition of parallel paths for grounded conductors, resulting in overall safer installations going forward.

Related Item

• FR No. 9174

Submitter Information Verification

Submitter Full Name: Peter Noval Jr
Organization: Noval Jr
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 27 19:39:49 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The proposed revisions are related to bonding and grounding which is under the scope of Article 250.

Public Comment No. 1881-NFPA 70-2024 [Section No. 230.82]

230.82 Equipment Connected to the Supply Side of Service Disconnect.

Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:

(1) Cable limiters.

(2) Meters and meter sockets, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII, and bonded in accordance with Article 250, Part V.

(3) Meter disconnect switches that have a short-circuit current rating equal to or greater than the available fault current, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII and bonded in accordance with Article 250, Part V, as follows:

a. The meter disconnect switch is capable of interrupting the load served.

b. The meter disconnect is in equipment legibly field marked on its exterior in a manner suitable for the environment as follows:

METER DISCONNECT NOT SERVICE EQUIPMENT

(4) Instrument transformers (current and voltage), impedance shunts, load management devices, surge arresters, and Type 1 surge-protective devices.

(5) Conductors used to supply energy management systems, circuits for standby power systems, fire pump equipment, and fire and sprinkler alarms, if provided with service equipment and installed in accordance with requirements for service-entrance conductors.

(6) Solar photovoltaic systems, fuel cell systems, wind electric systems, energy storage systems, or interconnected electric power production sources, if provided with a disconnecting means in equipment listed as suitable for use as service equipment, and overcurrent protection as specified in Article 230, Part VII.

(7) Control circuits for power-operable service disconnecting means, if suitable overcurrent protection and disconnecting means are provided.

(8) Ground-fault protection systems or Type 2 surge-protective devices, where installed as part of listed equipment, if suitable overcurrent protection and disconnecting means are provided.

(9) Connections used only to supply listed communications equipment under the exclusive control of the serving electric utility, if suitable overcurrent protection and disconnecting means are provided. For installations of equipment by the serving electric utility, a disconnecting means is not required if the supply is installed as part of a meter socket, such that access can only be gained with the meter removed.

(10) Meter-mounted transfer switches that have a short-circuit current rating equal to or greater than the available fault current, as follows:

a. The meter-mounted transfer switch is listed and capable of transferring the load served.

b. The meter-mounted transfer switch is marked on its exterior as follows:

METER-MOUNTED TRANSFER SWITCH

NOT SERVICE EQUIPMENT

(11) Control power circuits for protective relays where installed as part of listed equipment, if overcurrent protection and disconnecting means are provided.

Statement of Problem and Substantiation for Public Comment

PLEASE SEE ATTACHED

Submitter Information Verification

This PC has not been submitted yet

8/28/2024

Copyright Assignment

I, Peter Noval Jr, hereby irrevocably grant and assign to the National Fire Protection Association (NFPA) all and full rights in copyright in this Public Comment (including both the Proposed Change and the Statement of Problem and Substantiation). I understand and intend that I acquire no rights, including rights as a joint author, in any publication of the NFPA in which this Public Comment in this or another similar or derivative form is used. I hereby warrant that I am the author of this Public Comment and that I have full power and authority to enter into this copyright assignment.

✓ By checking this box I affirm that I am Peter Noval Jr, and I agree to be legally bound by the above Copyright Assignment and the terms and conditions contained therein. I understand and intend that, by checking this box, I am creating an electronic signature that will, upon my submission of this form, have the same legal force and effect as a handwritten signature

Public Comment No.1881-NFPA 70-2024(Section No.230.82)

Add text to read:

(2) Meters and meter sockets, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII, and bonded in accordance with Article 250, Part V. Where bonding of the grounded conductor is present in the meter enclosure, or associated equipment, and the distance between this bonding point and the service disconnecting means is greater than 10 feet, conductors shall be installed in a nonconductive raceway, whether aboveground or underground, from this grounded conductor bonding point to the service disconnecting means.

Statement of Problem and Substantiation for Public Comment:

Where bonding of the grounded conductor(neutral) occurs in the meter can and metallic raceway is installed from the meter can to the service disconnecting means, a parallel path for neutral current is created via this metallic raceway. Whether aboveground or underground, such current could be considered objectionable, and, under the right conditions, a safety hazard.

NEC 250.6(A) specifically prohibits objectionable current.
Further, NEC sections 250.30(A), 250.30(A)(1)(b) Exception No.2, 250.30(A)(2)Exception, and 250.32(B)(1)Exception No.2, all recognize the hazard created by a parallel path for neutral current.

The proposed added text will bring typical service installations in line with the intent of the NEC, with regard to prohibition of parallel paths for grounded conductors, resulting in overall safer installations going forward.

Public Comment No. 2024-NFPA 70-2024 [Section No. 230.82]

230.82 Equipment Connected to the Supply Side of Service Disconnect.

Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:

(1) Cable limiters.

(2) Meters and meter sockets, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII, and bonded in accordance with Article 250, Part V.

(3) Meter disconnect switches that have a short-circuit current rating equal to or greater than the available fault current, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII and bonded in accordance with Article 250, Part V, as follows:

(4) The meter disconnect switch is capable of interrupting the load served.

(5) The meter disconnect is in equipment legibly field marked on its exterior in a manner suitable for the environment as follows:

METER DISCONNECT NOT SERVICE EQUIPMENT

(6) Instrument transformers (current and voltage), impedance shunts, load management devices, surge arresters, and Type 1 surge-protective devices.

(7) Conductors used to supply energy management systems, circuits for standby power systems, fire pump equipment, and fire and sprinkler alarms, if provided with service equipment and installed in accordance with requirements for service-entrance conductors.

(8) Solar photovoltaic systems, fuel cell systems, wind electric systems, energy storage systems, or interconnected electric power production sources, if provided with a disconnecting means in equipment listed as suitable for use as service equipment, and overcurrent protection as specified in Article 230, Part VII.

(9) Control circuits for power-operable service disconnecting means, if suitable overcurrent protection and disconnecting means are provided.

(10) Ground-fault protection systems or Type 2 surge-protective devices, where installed as part of listed equipment, if suitable overcurrent protection and disconnecting means are provided.

(11) Connections used only to supply listed communications equipment under the exclusive control of the serving electric utility, if suitable overcurrent protection and disconnecting means are provided. For installations of equipment by the serving electric utility, a disconnecting means is not required if the supply is installed as part of a meter socket, such that access can only be gained with the meter removed.

(12) Meter-mounted transfer switches that have a short-circuit current rating equal to or greater than the available fault current, as follows:

(13) The meter-mounted transfer switch is listed and capable of transferring the load served.

(14) The meter-mounted transfer switch is marked on its exterior as follows:

METER-MOUNTED TRANSFER SWITCH

NOT SERVICE EQUIPMENT

(15) Control power circuits for protective relays where installed as part of listed equipment, if overcurrent protection and disconnecting means are provided.

(16) Listed high impedance-protected devices used in lock-out tagout applications, such as absence of voltage testers, impedance-protected test points, and voltage presence indicators. Overcurrent protection shall not be required if supply conductors are protected from damage.

Statement of Problem and Substantiation for Public Comment

Note: Only new list item 12 is proposed to be added. No other revisions are proposed.

An absence of voltage or presence of voltage detection device is a permanently-mounted device that is used to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors and circuit parts. An absence of voltage detection device is provided with voltage test points that allow for insertion of meter probes to perform absence of voltage tests from outside an electrical enclosure. An absence of voltage tester (AVT) is a permanently-mounted test device that is used to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors and circuit parts. An AVT is provided with a test circuit with active indications to verify the absence of phase-to-phase voltage and phase-to-ground voltage. AVTs are provided with a test circuit and visual indicators to confirm that the tester is functioning properly before and after the process of determining that voltage is absent.

Using an absence of voltage detection device or presence of voltage detection device in service equipment enclosures containing the service disconnect, would require connecting the device to the supply side of the service disconnecting means. This application should be recognized in 230.82.

Requiring the device to be listed, would ensure that it has been evaluated specifically for its ability to test for the absence or presence of voltage.

Related Item

• PI 1345

Submitter Information Verification

Submitter Full Name: John Kovacik
Organization: Trusted Safety Solutions LLC
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 16:06:41 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-8515-NFPA 70-2024
Statement:	The general requirements in items 230.82(2) and 230.82(3) concerning grounding and bonding are considered redundant with 250.25 and have been removed. Items 230.82(3) and 230.82(10) have been revised to list the requirements for clarity. Additionally, item 230.82(10) has been moved to item 230.82(4). Equipment previously grouped into a single item have been separated in accordance with the NEC Style Manual cl. 2.1.8. The list has been re-organized to place similar items (such as SPDs) adjacent to each other. Solar photovoltaic systems, fuel cell systems, wind electric systems and energy storage systems have been deleted from the list as they are considered interconnected electric power production sources. Other list items which may require service disconnects have not been removed from 230.82 as removal of these items at this time may cause confusion.

Public Comment No. 2059-NFPA 70-2024 [Section No. 230.82]

230.82 Equipment Connected to the Supply Side of Service Disconnect.

Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:

(1) Cable limiters.

(2) Meters and meter sockets, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII, and bonded in accordance with Article 250, Part V.

(3) Meter disconnect switches that have a short-circuit current rating equal to or greater than the available fault current, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII and bonded in accordance with Article 250, Part V, as follows:

(4) The meter disconnect switch is capable of interrupting the load served.

(5) The meter disconnect is in equipment legibly field marked on its exterior in a manner suitable for the environment as follows:

METER DISCONNECT NOT SERVICE EQUIPMENT

(6) Instrument transformers (current and voltage), impedance shunts, load management devices, surge arresters, and Type 1 surge-protective devices.

(7) Conductors used to supply energy management systems, circuits for standby power systems, fire pump equipment, and fire and sprinkler alarms, if provided with service equipment and installed in accordance with requirements for service-entrance conductors.

(8) Solar photovoltaic systems, fuel cell systems, wind electric systems, energy storage systems, or interconnected electric power production sources, if provided with a disconnecting means in equipment listed as suitable for use as service equipment, and overcurrent protection as specified in Article 230, Part VII.

(9) Control circuits for power-operable service disconnecting means, if suitable overcurrent protection and disconnecting means are provided.

(10) Ground-fault protection systems or Type 2 surge-protective devices, where installed as part of listed equipment, if suitable overcurrent protection and disconnecting means are provided.

(11) Connections used only to supply listed communications equipment under the exclusive control of the serving electric utility, if suitable overcurrent protection and disconnecting means are provided. For installations of equipment by the serving electric utility, a disconnecting means is not required if the supply is installed as part of a meter socket, such that access can only be gained with the meter removed.

(12) Meter-mounted transfer switches that have a short-circuit current rating equal to or greater than the available fault current, as follows:

(13) The meter-mounted transfer switch is listed and capable of transferring the load served.

(14) The meter-mounted transfer switch is marked on its exterior as follows:

METER-MOUNTED TRANSFER SWITCH

NOT SERVICE EQUIPMENT

(15) Control power circuits for protective relays where installed as part of listed equipment, if overcurrent protection and disconnecting means are provided.

(16) Absence of voltage detection devices and absence of voltage testers used for verifying absence of voltage if listed for use on the line side of the service disconnecting means and not mounted to a hinged door.

Statement of Problem and Substantiation for Public Comment

This public comment adds an item to be permitted on the line side of the service disconnecting means. These devices should be permitted on the line-side just like many other solutions listed here are. These devices can provide great value to electrical workers and if listed and applied per the NEC should be permitted in this location.

Related Item

• FR 9174

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich

Organization: Eaton Corporation

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 28 17:28:03 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8515-NFPA 70-2024

Statement: The general requirements in items 230.82(2) and 230.82(3) concerning grounding and bonding are considered redundant with 250.25 and have been removed. Items 230.82(3) and 230.82(10) have been revised to list the requirements for clarity. Additionally, item 230.82(10) has been moved to item 230.82(4).

Equipment previously grouped into a single item have been separated in accordance with the NEC Style Manual cl. 2.1.8. The list has been re-organized to place similar items (such as SPDs) adjacent to each other.

Solar photovoltaic systems, fuel cell systems, wind electric systems and energy storage systems have been deleted from the list as they are considered interconnected electric power production sources.

Other list items which may require service disconnects have not been removed from 230.82 as removal of these items at this time may cause confusion.

Public Comment No. 366-NFPA 70-2024 [Section No. 230.82]

230.82 Equipment Connected to the Supply Side of Service Disconnect.

Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:

(1) Cable limiters.

(2) Meters and meter sockets, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII, and bonded in accordance with Article 250, Part V.

(3) Meter disconnect switches that have a short-circuit current rating equal to or greater than the available fault current, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII and bonded in accordance with Article 250, Part V, as follows:

a. The meter disconnect switch is capable of interrupting the load served.

b. The meter disconnect is in equipment legibly field marked on its exterior in a manner suitable for the environment as follows:

METER DISCONNECT NOT SERVICE EQUIPMENT

(4) Instrument transformers (current and voltage), impedance shunts, load management devices, surge arresters, and Type 1 surge-protective devices.

(5) Conductors used to supply energy management systems, circuits for standby power systems, fire pump equipment, and fire and sprinkler alarms, if provided with service equipment and installed in accordance with requirements for service-entrance conductors.

(6) Solar photovoltaic systems, fuel cell systems, wind electric systems, energy storage systems, or interconnected electric power production sources, if provided with a disconnecting means in equipment listed as suitable for use as service equipment, and overcurrent protection as specified in Article 230, Part VII.

(7) Control circuits for power-operable service disconnecting means, if suitable overcurrent protection and disconnecting means are provided.

(8) Ground-fault protection systems or Type 2 surge-protective devices, where installed as part of listed equipment, if suitable overcurrent protection and disconnecting means are provided.

(9) Connections used only to supply listed communications equipment under the exclusive control of the serving electric utility, if suitable overcurrent protection and disconnecting means are provided. For installations of equipment by the serving electric utility, a disconnecting means is not required if the supply is installed as part of a meter socket, such that access can only be gained with the meter removed.

(10) Meter-mounted transfer switches that have a short-circuit current rating equal to or greater than the available fault current, as follows:

a. The meter-mounted transfer switch is listed and capable of transferring the load served.

b. The meter-mounted transfer switch is marked on its exterior as follows:

METER-MOUNTED TRANSFER SWITCH

NOT SERVICE EQUIPMENT

(11) Control power circuits for protective relays where installed as part of listed equipment, if overcurrent protection and disconnecting means are provided.

Additional Proposed Changes

File Name	Description	Approved
CN_33.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 33 appeared in the First Draft Report on First Revision No. 9174.

The Correlating Committee directs CMP 10 to review FR 9174 and the revised format for list items (3) and (10). The current format is confusing, as the list items in (a) and (b)in both cases are incomplete, as some attributes are in the main list item, while others are in this sub-list. Consideration should be made to including all required attributes in the sub-list. The Correlating Committee also directs CMP 10 to review all items in this list for correlation with the definition of equipment and to review whether attributes such as fault current rating may be repeating general requirements.

Related Item

• First Revision No. 9174

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 11:47:48 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8515-NFPA 70-2024

Statement: The general requirements in items 230.82(2) and 230.82(3) concerning grounding and bonding are considered redundant with 250.25 and have been removed. Items 230.82(3) and 230.82(10) have been revised to list the requirements for clarity. Additionally, item 230.82(10) has been moved to item 230.82(4).

Equipment previously grouped into a single item have been separated in accordance with the NEC Style Manual cl. 2.1.8. The list has been re-organized to place similar items (such as SPDs) adjacent to each other.

Solar photovoltaic systems, fuel cell systems, wind electric systems and energy storage systems have been deleted from the list as they are considered interconnected electric power production sources.

Other list items which may require service disconnects have not been removed from 230.82 as removal of these items at this time may cause confusion.

Correlating Committee Note No. 33-NFPA 70-2024 [Section No. 230.82]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:47:26 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review FR 9174 and the revised format for list items (3) and (10). The current format is confusing, as the list items in (a) and (b) in both cases are incomplete, as some attributes are in the main list item, while others are in this sub-list. Consideration should be made to including all required attributes in the sub-list. The Correlating Committee also directs CMP 10 to review all items in this list for correlation with the definition of equipment and to review whether attributes such as fault current rating may be repeating general requirements.

First Revision No. 9174-NFPA 70-2024 [Section No. 230.82]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James

Williams, David A.

Public Comment No. 964-NFPA 70-2024 [Section No. 230.82]

230.82 Equipment Connected to the Supply Side of Service Disconnect.

Only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means:

(1) Cable limiters.

(2) Meters and meter sockets, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII, and bonded in accordance with Article 250, Part V.

(3) Meter disconnect switches that have a short-circuit current rating equal to or greater than the available fault current, if all metal housings and service enclosures are grounded in accordance with Article 250, Part VII and bonded in accordance with Article 250, Part V, as follows:

(4) The meter disconnect switch is capable of interrupting the load served.

(5) The meter disconnect is in equipment legibly field marked on its exterior in a manner suitable for the environment as follows:

METER DISCONNECT NOT SERVICE EQUIPMENT

(6) Instrument transformers (current and voltage), impedance shunts, load management devices, surge arresters, and Type 1 surge-protective devices.

(7) Conductors used to supply energy management systems, circuits for standby power systems, fire pump equipment, and fire and sprinkler alarms, if provided with equipment listed as suitable for use as service equipment and installed in accordance with requirements for service-entrance conductors.

(8) Solar photovoltaic systems, fuel cell systems, wind electric systems, energy storage systems, or interconnected electric power production sources, if provided with a disconnecting means in equipment listed as suitable for use as service equipment, and overcurrent protection as specified in Article 230, Part VII.

(9) Control circuits for power-operable service disconnecting means, if suitable overcurrent protection and disconnecting means are provided.

(10) Ground-fault protection systems or Type 2 surge-protective devices, where installed as part of listed equipment, if suitable overcurrent protection and disconnecting means are provided.

(11) Connections used only to supply listed communications equipment under the exclusive control of the serving electric utility, if suitable overcurrent protection and disconnecting means are provided. For installations of equipment by the serving electric utility, a disconnecting means is not required if the supply is installed as part of a meter socket, such that access can only be gained with the meter removed.

(12) Meter-mounted transfer switches that have a short-circuit current rating equal to or greater than the available fault current, as follows:

(13) The meter-mounted transfer switch is listed and capable of transferring the load served.

(14) The meter-mounted transfer switch is marked on its exterior as follows:

METER-MOUNTED TRANSFER SWITCH

NOT SERVICE EQUIPMENT

(15) Control power circuits for protective relays where installed as part of listed equipment, if overcurrent protection and disconnecting means are provided.

Statement of Problem and Substantiation for Public Comment

The change made by this public comment is found in Item (5) of the list in this section. The existing language notes that the conductors connected to the line side of the service disconnect must land in service equipment. We can't have service equipment ahead of the service. The suggested change is the same language found in list item (6) for solar photovoltaic systems. the suggested change will bring this list item in alignment with other changes made in this section and will correct the existing error.

Related Item

• FR 9174

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich

Organization: Eaton Corporation

Street Address:

City:

State:

Zip:

Submittal Date: Thu Aug 08 06:56:57 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8515-NFPA 70-2024

Statement: The general requirements in items 230.82(2) and 230.82(3) concerning grounding and bonding are considered redundant with 250.25 and have been removed. Items 230.82(3) and 230.82(10) have been revised to list the requirements for clarity. Additionally, item 230.82(10) has been moved to item 230.82(4).

Equipment previously grouped into a single item have been separated in accordance with the NEC Style Manual cl. 2.1.8. The list has been re-organized to place similar items (such as SPDs) adjacent to each other.

Solar photovoltaic systems, fuel cell systems, wind electric systems and energy storage systems have been deleted from the list as they are considered interconnected electric power production sources.

Other list items which may require service disconnects have not been removed from 230.82 as removal of these items at this time may cause confusion.

Public Comment No. 1351-NFPA 70-2024 [New Section after 230.95]

Part VIII Service Conductors Serving Power Production Sources

230.100 Size and Ampacity.

Ampacity of service conductors connected to a power source service disconnecting means shall comply with the following:

(1) Ampacity shall be determined in accordance with 310.14 and comply with 110.14(C)

(2) The ampacity shall not be less than that determined in accordance with 705.28(B)

(3) Service conductors shall not be smaller than 6 AWG copper or 4 AWG aluminum or copper-clad aluminum

230.104 Overcurrent Protection.

Service conductors connected to a service disconnecting means for a power production source shall be protected from overcurrent in accordance with 705.30.

230.108 Service Connections in Buildings.

Power sources are permitted to be connected to existing service conductors located within buildings when all of the following requirements are met:

(1) Services are 1000 Vac and less

(2) Service conductors are protected from physical damage in accordance with 230.50(B)(1)

(3) Connection to service conductors are in accordance with 230.46

(4) Service conductors must terminate on a service disconnecting means connecting the power source

(5) Service conductors are limited to a length of 3 m (10 ft.) within the structure

Statement of Problem and Substantiation for Public Comment

This new Part VIII is being proposed to address the connection of power production sources to service equipment. The challenge for these applications is that details for this connection are addressed in Article 705 for the power source but services and service conductors are the purview of CMP 10 and Article 230.

this proposed language offers locating these details within Article 230.

Section 230.100 Size and Ampacity
This section aligns with 230.42 but recognizes that the current to compare is not determined by Article 220 but rather Section 705.28 of Article 705 because the current is dependent upon the source and not the load.

Section 230.104 Overcurrent protection.
This section recognizes that the service conductors must be protected and points to 705.30 because there are details in that section specific to the application of power sources. 705.30 addresses the rating of the OCPD which is not dependent upon a load calculation but rather the power source output capabilities. This section also includes marking requirements for all sources of power. it also addresses the fact that these OCPDs must be able to be able to back feed through the device.

Section 230.108 Service Connections in Buildings
This section addresses when a connection is made to an existing service where the service is located within the structure. The limitations for this are listed as follows:
1. Limit to low voltage applications below 1000 VAC. Medium voltage applications will require special attention and should be reviewed by CMP 9 and get public review as well.
2. Protection from damage. This item ensures that these conductors, especially because they are service conductors without short-circuit overcurrent protection at the source in the building, are protected from damage per 230.51(B)(1). The reference section requires physical protection for these conductors when subject to physical damage. This reference is needed because Article 230 doesn't address runs of service conductors within the structure as currently this is not permitted as being proposed. Specifically pointing to 230.51(B)(1) ensures physical protection is afforded for these service conductors.
3. Connections to service conductors must be made appropriately and for clarity a reference to 230.46 is made.
4. This addition ensures that the service conductors are terminated on a service disconnecting means that connects the power source to the service. it is not identified as being required to be located inside or outside of the structure.
5. This limits the amount of service conductor that is permitted within the structure. There is no specific justification for 10ft and can be debated by CMP 10 to establish an agreed upon length.
3.

Related Item

• FR 8564 • FR 8568 • FR 8812 • PI 248

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
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Street Address:
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Zip:

Submittal Date: Wed Aug 21 09:11:48 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8549-NFPA 70-2024

Statement: The requirements for conductor lengths tapped from service conductors is the purview of Panel 10 and is being relocated to this new Part in Article 230. The language for 230.108 is taken from similar language in Article 705. The allowance for 66 foot length of conductors with cable limiters is removed since technical substantiation has not been provided on the use of cable limiters to provide protection to service conductors. The 10 foot length of conductors aligns with “nearest the point of entrance” in 230.70 for one- and two- family dwellings. The greater length for other than one- and two- family dwellings was added to accommodate the needs of larger equipment. Requirements concerning GFPE have not been added as these are already addressed by 230.95.

Public Comment No. 1616-NFPA 70-2024 [Section No. 230.95(A)]

(A) ac Systems.

GFPE shall be provided for solidly grounded wye electric services of more than 150 volts to ground but not exceeding 1000 volts phase-to-phase for each service disconnect rated 1000 amperes or more. The grounded conductor for the solidly grounded wye system shall be connected directly to ground through a grounding electrode system, as specified in 250.50, without inserting any resistor or impedance device.

The rating of the service disconnect shall be considered the rating of the largest fuse that can be installed or the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted.

Exception No. 1 : The ground-fault protection requirements of this section shall not apply to a service disconnect for a continuous industrial process where a nonorderly shutdown will introduce additional or increased hazards.

Exception No. 2: For fused disconnects, where the available fault current is 10,000 amperes or greater, at the fused disconnect, the ground-fault protection provisions of this section shall not apply if the fuses have a clearing time of 0.07 seconds or less at the lower of the calculated minimum available arcing current or 38% of the available fault current , or if the disconnect switch complies with Section 240.67(B)(1), 240.67(B)(3), or 240.67(B)(4). and is set to operate at the lower of

(1) ***the calculated minimum arcing current or***

(2) ***38% of the available fault current.***

Exception No. 3: For circuit breakers, where the available fault current is 10,000 amperes or greater, at the circuit breaker, the ground-fault protection provisions of this section shall not apply if the circuit breaker complies with Section 240.87(B)(2), 240.87(B)(4), 240.87(B)(5), or 240.87(B)(6). and is set to operate at the lower of

(1) ***the calculated minimum arcing current or***

(2) ***38% of the available fault current.***

Additional Proposed Changes

File Name	Description	Approved
Figure_1_for_Public_Comment_on_PI_1645_230.95_.docx	Figure 1 for Public Comment on PI 1645 (230.95)	

Statement of Problem and Substantiation for Public Comment

Let's review the Panel Statement to resolve PI 1645.

The first two sentences read: "Even with the limitations proposed in the new exceptions, the arc energy reduction technologies may not operate above the pickup current levels specified in 230.95(A), but below the minimum arcing current. Ground-fault currents may exist in this range, and the arc energy reduction technology may not operate on this current unless the resulting damage to equipment leads to a higher current arcing fault."

The logic of these first two sentences fails to remember the historic reason for ground fault protection in solidly grounded 480/277 volt systems protected at 1000 amperes and greater. Ground fault protection is not needed for faults that are not high impedance arcing faults. If the fault is not arcing, it is a bolted fault, which is safely interrupted by the phase overcurrent device (fuse or circuit breaker). If it is arcing, the limitations in the new Exceptions No. 3 & 4 assure that the arc flash reduction allows less damage than allowed by existing 230.95. Opening "at the lower of (1) the calculated minimum arcing current or (2) 38% of the available fault current" assures that the arc energy reduction technologies open when a potentially damaging arc is initiated. There's no need for the arc energy reduction technologies to operate unless the fault begins arcing.

The third sentence of the Panel Statement reads: "Additionally, differential relaying and energy-reducing active arc-flash mitigation system options would not protect any downstream conductors or equipment, and only provide protection within the equipment boundary." First, it should be remembered that this Public Comment does not prohibit Ground-Fault Protection. It simply provides an alternative method of protecting equipment from burndown. If ground fault protection is desired for burndown protection of downstream equipment it can be included with the phase overcurrent device that is protecting that equipment. (And because it is downstream, it can likely be set to open at lower arcing ground fault levels and at faster opening times.) A key point to remember is that if the downstream equipment is protected with a phase overcurrent protective device (fuse or circuit breaker) at less than 1000 amperes, extensive testing, and field experience, over decades, has shown that the downstream equipment is adequately protected from arcing ground faults by that fuse or circuit breaker.

The fourth and final sentence of the Panel Statement reads: "This may ultimately reduce the level of protection currently provided by GFPE, or by a combination of GFPE and arc energy reduction technology, as applicable." This sentence is addressed by the extensive BACKGROUND below. Arc energy reduction technology, in order to protect human flesh (as opposed to copper, aluminum, and steel), must operate much quicker than is allowed in existing 230.95.

BACKGROUND:

We can now accurately calculate the minimum three-phase arcing current, and the minimum sustainable line-to-ground arcing current, for a high impedance arcing fault. Knowing these currents, we can determine whether or not the arc energy reduction technologies in Exceptions 2 and 3 will operate at, or below, those calculated values. If they do operate at or below those levels, the equipment damage will be just a small percentage of that allowed by the GFPE requirements of 230.95. This applies to all available fault currents of 10,000 amperes or greater.

A requirement (230.95) for ground fault protection of equipment (GFPE) was added to the 1971 NEC® because 480/277 volt, solidly grounded wye services, protected by 1000 ampere and larger overcurrent protective devices, were burning down due to arcing ground faults. 208/120 volt services and those services protected by smaller overcurrent protective devices were not burning down, so they weren't included in the new GFPE requirement.

Over many Code cycles, GFPE requirements were also added for branch circuits (210.13), feeders (215.10), and equipment (240.13). In all cases, the intent was to limit, not eliminate, damage to the switchboard, switchgear, panelboard or equipment being supplied by the 1000 ampere and larger overcurrent protective device.

PRESENT DAY:

The electrical industry has evolved considerably since those early GFPE requirements were introduced. In those years, J. R. Dunki-Jacobs, Harris I. Stanback, and R. H. Kaufman authored numerous ground-breaking papers on arcing ground faults and the need for ground fault protection. They accomplished a great deal that has prevented multitudes of equipment burndowns. Their determination that the minimum sustainable line-to-ground arcing fault on a 480/277 volt system was 38% of the available bolted fault current is very close to the values predicted today by IEEE1584-2018.

In recent editions of the NEC®, Sections were added to require the protection of an employee that is exposed to dangerous levels of incident energy while working on energized equipment. To avoid serious injuries, employees, working on or near energized equipment, can only withstand a small fraction of the incident energy to which equipment may be subjected by the allowances of 230.95(A). This substantiation compares the levels of equipment damage allowed by existing 230.95(A) with the levels allowed by the employee arc-flash protection requirements of 240.67 and 240.87. It shows that the equipment damage allowed by the employee arc-flash protection requirements of 240.67 and 240.87 is just a small fraction of that allowed by 230.95(A).

EXAMPLES:

The following example utilizes IEEE 1584-2018 for a 480 volt arcing fault with 32mm equipment spacing, in a 20”x20”x20” box and an HCB configuration (horizontal conductors in a metal enclosure). Equipment damage is described in terms of kW-cycles which is a product of arcing current (kA) X number of arcing cycles (cycles) X arc voltage (100 volts on a 480 system).

Worst Case Equipment Damage with 10 kA Available Fault Current As allowed by 230.95(A).

The IEEE 1584-2018 minimum arcing current is 6.09kA. Using the maximum 230.95(A) opening time of 60 cycles, the equipment damage is (6.09 kA X 60 cycles X 100 arcing volts) = 36,540 kW-cycles. See Figure 1.

Worst Case Equipment Damage with 10 kA Available Fault Current As allowed by Exception No. 2.

The IEEE 1584-2018 minimum arcing current is 6.09kA. Assuming the maximum opening time of 4.2 cycles (0.07 seconds) for 240.67(B), the equipment damage is 6.09 kA X 4.2 cycles X 100 arcing volts) = 2,558 kW-cycles. Assuming an opening time of 7 cycles for 240.67(B)(1) and (B)(3), the equipment damage is (6.09 kA X 7 cycles X 100 arcing volts = 4,263 kW-cycles. Assuming an opening time of 1/2 cycle for 240.67(B)(4), the equipment damage is (6.09 kA X 0.5 cycles X 100 arcing volts) = 305 kW-cycles. Worst-case damage for the minimum arcing current with this exception for fusible switches (4,263 kW-cycles) is less than 12% of the worst-case damage allowed by 230.95(A) (36,540 kW-cycles). See Figure 1.

Worst Case Equipment Damage with 10 kA Available Fault Current As allowed by Exception No. 3.

The IEEE 1584-2018 minimum arcing current is 6.09kA. Assuming an opening time of 4 cycles for 240.87(B)(1), (B)(2), or (B)(4), the equipment damage is (6.09 kA X 4.0 cycles X 100 arcing volts) = 2,436 kW-cycles. Assuming an opening time of 3 cycles for 240.87(B)(5) or (B)(6), the equipment damage is (6.09 kA X 3 cycles X 100 arcing volts) = 1,827 kW-cycles. Worst-case damage for the minimum arcing current with this exception for circuit breakers (2,426 KW-Cycles) is less than 7% of the worst-case damage allowed by 230.95(A) (36,540 kW-cycles). See Figure 1.

(Open the attached file "Figure 1")

Figure 1 shows that equipment damage allowed by this Public Comment is always, from 10,000 amperes available through 100,000 amperes available, just a small fraction of the equipment damage allowed by 230.95(A).

One might ask whether it is possible that the alternate protective systems in this Public Comment could be set such that they might provide arc energy reduction, but not operate during a lower level arcing ground fault where traditional GFPE will provide protection. That question is answered by the very last lines of the new language for both fusible switches and circuit breakers, as both the fusible switches and circuit breakers must be “set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.” Since we know the minimum three phase arcing current from IEEE 1584-2018 and the minimum sustainable phase to ground arcing current of 38% of the available fault current, we know whether or not the fusible switch or circuit breaker is set to operate at those values. SO, THERE IS NO MINIMUM VALUE OF ACTUAL ARCING CURRENT THAT COULD BE SO SMALL AS TO BE PICKED UP BY 230.95(A) REQUIREMENTS THAT WOULD NOT ALSO BE SENSED BY THE REQUIREMENTS OF EXCEPTIONS 2 AND 3.

Let’s look at an example with 10,000 available short-circuit amperes (lowest available fault current for which Exceptions 2 and 3 could apply). In this case the minimum IEEE 1584-2018 three-phase arcing current is 6.09 kA and the minimum sustainable phase-to-ground arcing current is 38% of 10,000 amps = 3.8 kA. Per the requirements of the exceptions the fusible switch or circuit breaker must be set to operate at the lower of either 6.09 kA or 3.8 kA, so the fusible switch or circuit breaker must operate for arcing currents of 3.8 kA or greater. If a three phase arcing fault occurs, it is calculated to be 6.09 kA with the possibility that a single phase to ground arcing fault could be as low as 3.8 kA. In either case, the requirements of Exceptions 2 and 3 assure that the arcing fault is taken off-line in no more than 7 cycles for Exception 2 and no more than 4 cycles for Exception 3, while 230.95(A) would allow a full 60 cycles. What happens if the available fault current is less than or even significantly less than 10,000 amperes? Then Exceptions 2 and 3 do not apply and GFPE would be required.

Energy reducing maintenance switches (240.67(B)(2) and 240.87(B)(3)) are not included in the exceptions because energy-reducing maintenance switches are typically turned off when a worker is not working on energized equipment, whereas ground fault protection is constantly protecting the equipment, whether or not a worker is working on the energized equipment.

The Approved Equivalent Means, (240.67(B)(5) and 240.87(B)(7)), are excluded because the opening times for these methods are unclear.

KEY BENEFIT:

While GFPE can often be set as low as 200 amperes, because of numerous nuisance GFPE openings, in some cases even for ground faults in 277-volt lighting circuits, it has become common for plant electricians, plant engineers, consulting engineers, and electrical contractors to set GFPE at the maximum settings. That has solved a portion of the nuisance tripping problem, but even set at the maximum, it is often difficult to selectively coordinate it (GFPE) with feeder phase overcurrent protective devices of 400 amperes or greater. So, for example, even with a service GFPE set at the 230.95(A) maximum, a ground fault on a 500 kcmil feeder circuit can easily take out the GFPE on the service, blacking out the entire service. With Exceptions 2 and 3, the GFPE becomes optional. With Exceptions 2 and 3 the equipment is still protected (even better protected) and the entire service is not subjected to a nuisance blackout because of a ground fault on a feeder. The key benefit of this Public Comment is that when these alternate methods are utilized, it provides the consulting engineer or design-build contractor with the ability to provide even better arcing fault protection for the equipment and the ability to much more easily meet the selective coordination requirements of 240.11, 700.32, 701.32, and 708.54.

CONCLUSION:

This Public Comment takes advantage of the arc-energy reduction requirements found in 240.67 and 240.87. It provides an exception for GFPE requirements whenever specific 240.67 and 240.87 methods to reduce clearing time are utilized. Arc energy reduction technologies, as detailed in Exceptions 2 and 3, must open in a much faster time than allowed by 230.95(A). Reviewing Figure 1, it becomes obvious that Exceptions 2 and 3 will limit the arcing fault damage to the equipment to a level that is considerably less than that currently allowed by the requirements found in 230.95(A).

In closing, doesn’t it just make common sense that arc energy reduction technologies which protect an employee’s skin from third degree burns will also prevent copper, aluminum, and steel from melting?

Related Item

• PI 1645 • FR 7565 • PC 1615 • PC 1617

Submitter Information Verification

Submitter Full Name: Vincent Saporita
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Street Address:

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Zip:
Submittal Date: Sat Aug 24 18:33:50 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Ground faults may exist that are other than arcing or bolted faults, especially considering the additional impedance in the grounding path. Arc flash reduction technologies are required per 240.67 and 240.87 and may be employed in addition to the GFPE required by 230.95. Insufficient substantiation was provided to demonstrate that arc flash reduction technologies will provide the same level of protection at currents lower than the minimum arcing current, and for downstream equipment if replaced by GFPE.

Figure 1

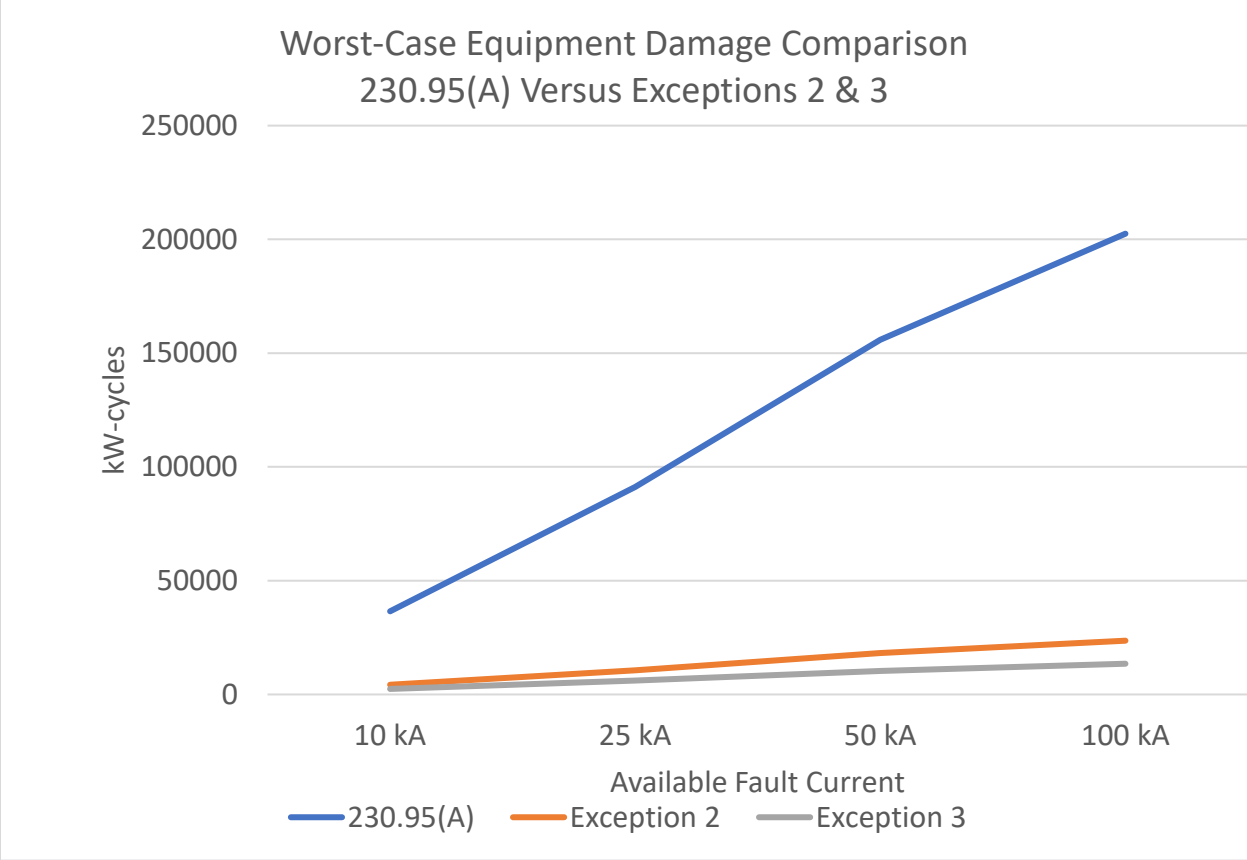

Figure 1 shows that equipment damage allowed by this Public Comment is always, from 10,000 amperes available through 100,000 amperes available, just a small fraction of the equipment damage allowed by 230.95(A).

Public Comment No. 2054-NFPA 70-2024 [Section No. 230.95(A)]

(A) ac Systems.

GFPE shall be provided for solidly grounded wye electric services of more than 150 volts to ground but not exceeding 1000 volts phase-to-phase for each service disconnect rated 1000 amperes or more. The grounded conductor for the solidly grounded wye system shall be connected directly to ground through a grounding electrode system, as specified in 250.50, without inserting any resistor or impedance device.

The rating of the service disconnect shall be considered the rating of the largest fuse that can be installed or the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted.

Exception Not. 1 : The ground-fault protection requirements of this section shall not apply to a service disconnect for a continuous industrial process where a nonorderly shutdown will introduce additional or increased hazards.

Exception No. 2: The ground-fault protection requirements of this section shall not apply to service equipment equipped with an active arc flash mitigation system.

Statement of Problem and Substantiation for Public Comment

Active arc flash mitigations systems look at light and current and provide a very fast clearing time for internal faults of service equipment. The existing requirements of this section permit a clearing time of 1 second which is an eternity for internal faults within this equipment. This section went into the Code as part of a requirement in 1971 to address arc flash events in service equipment due to the fact that the industry went from ungrounded to grounded systems, voltages from 208 to 480, and the size of the service moved from an average of 600A to upwards of 3000A. Permitting an active arc flash mitigation system as an alternative will increase the protection of the equipment providing a fast clearing time limiting damage to the equipment.

Related Item

• FR 9176

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
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Submittal Date: Wed Aug 28 17:17:03 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Ground faults may exist that are other than arcing or bolted faults, especially considering the additional impedance in the grounding path. Arc flash reduction technologies are required per 240.67 and 240.87 and may be employed in addition to the GFPE required by 230.95. Insufficient substantiation was provided to demonstrate that arc flash reduction technologies will provide the same level of protection at currents lower than the minimum arcing current, and for downstream equipment if replaced by GFPE.

Public Comment No. 367-NFPA 70-2024 [Section No. 240.2]

240.2 Listing Requirements.

The following shall be listed:

(1) Branch-circuit overcurrent protective devices

(2) Relays and circuit breakers providing ground-fault protection of equipment

(3) Ground-fault circuit interrupter devices

(4) Fuse reducers

Additional Proposed Changes

File Name	Description	Approved
CN_34.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 34 appeared in the First Draft Report on First Revision No. 9197.

The Correlating Committee directs that CMP 10 review FR 9197 and consider revising the text to align with recommended wording regarding reconditioning. The recommended wording for (A) would be “The installation of the following reconditioned equipment shall be permitted:”, and the recommended wording for (B) would be “The installation of the following reconditioned equipment shall not be permitted:”.

Related Item

- First Revision No. 9197

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 30 11:59:15 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8611-NFPA 70-2024

Statement: The language in 240.3(A) and 240.3(B) has been updated to align with the recommended wording regarding reconditioning. The reference to installation has been removed to address reconditioning in place.

Correlating Committee Note No. 34-NFPA 70-2024 [Section No. 240.2]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:49:25 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 9197 and consider revising the text to align with recommended wording regarding reconditioning. The recommended wording for (A) would be “The installation of the following reconditioned equipment shall be permitted:”, and the recommended wording for (B) would be “The installation of the following reconditioned equipment shall not be permitted:”.

First Revision No. 9197-NFPA 70-2024 [Section No. 240.2]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 1469-NFPA 70-2024 [Section No. 240.3]

240.3 Reconditioned Equipment.

(A) Permitted- ~~to be Installed~~ .

The following reconditioned equipment shall be permitted ~~to be~~ or installed:

(1) Low-voltage power circuit breakers

(2) Electromechanical protective relays and current transformers

(B) Not Permitted ~~to be Installed~~ or installed .

The following reconditioned equipment shall not be permitted or installed:

(1) Equipment providing ground-fault protection of equipment

(2) Ground-fault circuit interrupters

(3) Low-voltage fuseholders and low-voltage nonrenewable fuses

(4) Molded-case circuit breakers

(5) Low-voltage power circuit breaker electronic trip units

Statement of Problem and Substantiation for Public Comment

The suggested language change as part of this public comment addresses the generic fact that by focusing this requirement only on overcurrent protective devices that are "installed" is problematic. The existing language would permit an existing circuit breaker to be reconditioned and in regard to what is permitted to be reconditioned create a vague requirement on circuit breakers that are reconditioned in place. the suggested language as part of this change is enforceable and clear.

Related Item

• FR 9197

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich

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Submittal Date: Fri Aug 23 10:35:31 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8611-NFPA 70-2024

Statement: The language in 240.3(A) and 240.3(B) has been updated to align with the recommended wording regarding reconditioning. The reference to installation has been removed to address reconditioning in place.

Public Comment No. 1688-NFPA 70-2024 [Section No. 240.4(G)]

(G) Overcurrent Protection for Specific Conductor Applications.

Overcurrent protection for the specific conductors shall be permitted to be provided as referenced in Table 240.4(G).

Table 240.4(G) Specific Conductor Applications

Conductor	Article	Section
Air-conditioning and refrigeration equipment circuit conductors	440, Parts III, IV, VI	-
Capacitor circuit conductors	460	460.9 and 460.25
Control and instrumentation circuit conductors (Type ITC)	335	335.90
Electric welder circuit conductors	630	630.12 and 630.32
Fire alarm system circuit conductors	760	760.43, 760.45, 760.121, and Chapter 9, Tables 12(A) and 12(B)
Motor-operated appliance circuit conductors	422, Part II	-
Motor and motor-control circuit conductors	430, Parts II, III, IV, V, VI, VII	-
Phase converter supply conductors	455	455.7
Remote-control, signaling, and power-limited circuit conductors	724, 725, and 792	724.43, 724.45, 792.30, and Chapter 9, Tables 11(A) and 11(B)
Secondary tie conductors	450	450.8
Services	230	230.90(A)

Statement of Problem and Substantiation for Public Comment

The CMP responded to "Public Input No. 706-NFPA 70-2023" by stating "The provisions of 230.90 pertain to overload protection for service conductors, not full overcurrent protection. Complying with Exception No. 3 of 230.90(A) is a form of protecting the service conductors from overloads."

That is all true, but somewhat besides the point. At present there is a simple conflict between the requirements of 240.4 and the allowances of 230.90(A) Exception 3. When using 230.90(A) Exception 3, you have service conductors that are not "protected against overcurrent in accordance with their ampacities." Indeed, the sum of the service overcurrent device ratings may exceed the ampacity of the service conductors.

This directly conflicts with the base requirement in 240.4, so as the NEC currently stands, every use of 230.90(A) Exception 3 is a 240.4 violation. This is clearly not the intent. The conflict is easily resolved by adding 230.90(A) to the list of exceptions to 240.4 that occurs in 240.4(G).

Related Item

- Public Input No. 706-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Wayne Whitney
Organization: Whitney
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City:
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Submittal Date: Mon Aug 26 12:12:38 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: 230.90(A) Exception No. 3 clearly establishes the rule for overcurrent protection where two to six circuit breakers or sets of fuses are used as the overcurrent protective device. Revising the table as proposed is not needed.

Public Comment No. 1686-NFPA 70-2024 [Section No. 240.4 [Excluding any Sub-Sections]]

~~Conductors~~ Ungrounded conductors , other than flexible cords, flexible cables, and fixture wires, shall be protected against overcurrent in accordance with their ampacities specified in 310.14, unless otherwise permitted or required in 240.4(A) through 240.4(H).

Informational Note: See ICEA P-32-382-2018, *Short Circuit Characteristics of Insulated Cables*, for information on allowable short-circuit currents for insulated copper and aluminum conductors.

Statement of Problem and Substantiation for Public Comment

The word "conductors" in 240.4 is too broad and does not reflect standard practice. GECs and EGCs are "conductors" yet they are not protected against overcurrent.

Grounded conductors are "conductors" yet they are not always protected against overcurrent "in accordance with their ampacity." They are protected against overcurrent by the overcurrent devices in series with their associated ungrounded conductors, and the ampacity of the grounded conductor may be noticeably less than the rating of that overcurrent device. For example, a 120/240V 100A feeder with a calculated neutral load of 70A per 120.61 may have a grounded conductor with an ampacity of 70A, while the overcurrent devices in the ungrounded conductors are rated at 100A.

Therefore adding the modifier "ungrounded" will bring the literal meaning of the text in accordance with the intent of the section and actual practice.

Related Item

• Public Input No. 705-NFPA 70-2023 • Public Input No. 635-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Wayne Whitney
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Submittal Date: Mon Aug 26 12:00:51 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The proposed added language is unnecessary. The NEC already contains provisions for which types of conductors connect to overcurrent protection devices. For example, see 240.15 and 240.21.

Public Comment No. 368-NFPA 70-2024 [Section No. 240.5]

240.5 Protection of Flexible Cords, Flexible Cables, and Fixture Wires.

Flexible cord and flexible cable, including tinsel cord and cord sets, and fixture wires shall have overcurrent protection in accordance with 240.5(A).

(A) Ampacities.

Flexible cord and flexible cable shall be protected by an overcurrent device in accordance with their ampacity as specified in Table 400.5(A)(1) and Table 400.5(A)(2). Fixture wire shall be protected against overcurrent in accordance with its ampacity as specified in Table 402.5. Supplementary overcurrent protection, as covered in 240.10, shall be permitted to be an acceptable means for providing this protection.

(B) Branch-Circuit Overcurrent Device.

Flexible cord shall be protected, where supplied by a branch circuit, in accordance with one of the methods described in 240.5(B)(1), 240.5(B)(3), or 240.5(B)(4). Fixture wire shall be protected, where supplied by a branch circuit, in accordance with 240.5(B)(2).

(1) Supply Cord of Listed Appliance or Luminaire.

Where flexible cord or tinsel cord is approved for and used with a specific listed appliance or luminaire, it shall be considered to be protected when applied within the appliance or luminaire listing requirements. For the purposes of this section, a luminaire may be either portable or permanent.

(2) Fixture Wire.

Fixture wire shall be permitted to be tapped to the branch-circuit conductor of a branch circuit in accordance with the following:

(1) 15- or 20-ampere circuits — 18 AWG, up to 15 m (50 ft) of run length

(2) 15- or 20-ampere circuits — 16 AWG, up to 30 m (100 ft) of run length

(3) 20-ampere circuits — 14 AWG and larger

(4) 30-ampere circuits — 14 AWG and larger

(5) 40-ampere circuits — 12 AWG and larger

(6) 50-ampere circuits — 12 AWG and larger

(3) Extension Cord Sets.

Flexible cord used in listed extension cord sets shall be considered to be protected when applied within the extension cord listing requirements.

(4) Field Assembled Extension Cord Sets.

Flexible cord used in extension cords made with separately listed and installed components shall be permitted to be supplied by a branch circuit in accordance with the following:

20-ampere circuits — 16 AWG and larger

Additional Proposed Changes

File Name	Description	Approved
CN_35.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 35 appeared in the First Draft Report on First Revision No. 9208.

The Correlating Committee directs CMP 10 to review FR 9208 with respect to whether 240.5(B) was intended to be removed in the first paragraph.

Related Item

• First Revision No. 9208

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 30 12:01:12 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8556-NFPA 70-2024
Statement: The reference to 240.5(B) was inadvertently deleted at the first draft meeting and is now restored.

Correlating Committee Note No. 35-NFPA 70-2024 [Section No. 240.5]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:51:25 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review FR 9208 with respect to whether 240.5(B) was intended to be removed in the first paragraph.

First Revision No. 9208-NFPA 70-2024 [Section No. 240.5 [Excluding any Sub-Sections]]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 369-NFPA 70-2024 [Section No. 240.6]

240.6 Standard Ampere Ratings.

(A) Fuses and Fixed-Trip Circuit Breakers.

The standard ampere ratings for fuses and inverse time circuit breakers shall be considered as shown in Table 240.6(A). Additional standard ampere ratings for fuses shall be 1, 3, 6, and 601. The use of fuses and inverse time circuit breakers with nonstandard ampere ratings shall be permitted.

Table 240.6(A) Standard Ampere Ratings for Fuses and Inverse Time Circuit Breakers

Standard Ampere Ratings				
10	15	20	25	30
35	40	45	50	60
70	80	90	100	110
125	150	175	200	225
250	300	350	400	450
500	600	700	800	1000
1200	1600	2000	2500	3000
4000	5000	6000	—	—

(B) Adjustable-Trip Circuit Breakers.

The rating of adjustable-trip circuit breakers having external means for adjusting the current setting (long-time pickup setting) shall be the maximum setting possible unless otherwise permitted in 240.6(C) or 240.6(D).

(C) Local Restricted Access Adjustable-Trip Circuit Breakers.

A circuit breaker(s) that cannot be adjusted remotely to modify the current setting (long-time pickup setting) and has restricted access to the adjusting means shall be permitted to have an ampere rating(s) that is equal to the adjusted current setting (long-time pickup setting). Restricted access shall be achieved by one of the following methods:

(1) Located behind removable and sealable covers over the adjusting means

(2) Located behind bolted equipment enclosure doors

(3) Located behind locked doors accessible only to qualified personnel

(4) Password protected, with password accessible only to qualified personnel

Informational Note: See NFPA 730-2023, *Guide for Premises Security*, and ANSI/TIA-5017, *Telecommunications Physical Network Security Standard*, for information regarding physical security.

(D) Remotely Accessible Adjustable-Trip Circuit Breakers.

Circuit breakers that can be adjusted remotely to modify the current setting (long-time pickup setting) shall be permitted to have an ampere rating(s) that is equal to the adjusted current setting (long-time pickup setting) only when local restricted access to the circuit breaker is achieved by 240.6(C)(1), 240.6(C)(2), 240.6(C)(3) or 240.6(C)(4), and remote access is achieved by one of the following methods:

(1) Connected directly through a local nonnetworked interface.

(2) Connected through a networked interface complying with one of the following methods:

a. The circuit breaker and associated software for adjusting the settings are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment of the network is completed and documentation of the assessment and certification is available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards series*, UL 2900 *Cybersecurity Standard series*, or the NIST *Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1 for assessment requirements.

Informational Note No. 2: Examples used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities that could arise due to software defects, system configuration changes, or user interactions. Installation of devices that can be secured is an important first step but not sufficient to guarantee a secure system.

Informational Note No. 4: See NEMA CY70001-2023, *Cybersecurity Implementation Guidance for Connected Electrical Infrastructure*, for recommendations on how to meet this requirement.

Additional Proposed Changes

File Name	Description	Approved
CN_36.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 36 appeared in the First Draft Report on First Revision No. 9210.

The Correlating Committee directs CMP 10 to review FR 9210 with respect to the use of the parenthetical phrase “(long-time pick-up setting)” in (B)(C) and (D). Refer to NEC Style Manual section 3.5.1.1.

Related Item

• First Revision No. 9210

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 12:03:13 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected
Resolution: Deleting the parenthetical term “long-time pickup setting" will create confusion and misunderstanding.

Correlating Committee Note No. 36-NFPA 70-2024 [Section No. 240.6]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:53:37 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 10 to review FR 9210 with respect to the use of the parenthetical phrase “(long-time pick-up setting)” in (B)(C) and (D). Refer to NEC Style Manual section 3.5.1.1.

First Revision No. 9210-NFPA 70-2024 [Section No. 240.6]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 1464-NFPA 70-2024 [Section No. 240.6(D)]

(D) Remotely Accessible Adjustable-Trip Circuit Breakers.

Circuit breakers that can be adjusted remotely to modify the current setting (long-time pickup setting) shall be permitted to have an ampere rating(s) that is equal to the adjusted current setting (long-time pickup setting) only when local restricted access to the circuit breaker is achieved by 240.6(C)(1), 240.6(C)(2), 240.6(C)(3) or 240.6(C)(4), and remote access is achieved by one of the following methods:

(1) Connected directly through a local nonnetworked interface.

(2) Connected through a networked interface complying with one of the following methods:

(3) The circuit breaker and associated software for adjusting the settings are identified as being evaluated for cybersecurity.

(4) A cybersecurity risk assessment of the network is completed and documentation of the assessment and certification is available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards series*, UL 2900 *Cybersecurity Standard series*, or the NIST *Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1 for assessment requirements.

Informational Note No. 2: Examples used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities that could arise due to software defects, system configuration changes, or user interactions. Installation of devices that can be secured is an important first step but not sufficient to guarantee a secure system.

Informational Note No. 4: See NEMA CY70001-2023, *Cybersecurity Implementation Guidance for Connected Electrical Infrastructure*, for recommendations on how to meet this requirement.

Statement of Problem and Substantiation for Public Comment

This public comment is submitted on behalf of the NFPA Cybersecurity Advisory Committee.

This PC only adds the word "risk" in front of the word "assessment". Terra has marked several sentences as new which is incorrect.

A “cybersecurity assessment” is a vague requirement, where as a “cybersecurity risk assessment” is a defined, established, and recognized process in the cybersecurity industry. This PC seeks to add specificity, by using a term that aligns with industry standards and practices.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1465-NFPA 70-2024 [Section No. 708.7]	Similar Proposal
Public Comment No. 1465-NFPA 70-2024 [Section No. 708.7]	

Related Item

• PI-4060 • FR-2910 •

Submitter Information Verification

Submitter Full Name: Michael Pallett
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Submittal Date: Fri Aug 23 09:36:08 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8557-NFPA 70-2024
Statement: The term “cybersecurity assessment” has been revised to “cybersecurity risk assessment” to use a term that aligns with industry standards and practices.

Public Comment No. 1572-NFPA 70-2024 [Section No. 240.6(D)]

(D) Remotely Accessible Adjustable-Trip Circuit Breakers.

Circuit breakers that can be adjusted remotely to modify the current setting (long-time pickup setting) shall be permitted to have an ampere rating(s) that is equal to the adjusted current setting (long-time pickup setting) only when local restricted access to the circuit breaker is achieved by 240.6(C)(1), 240.6(C)(2), 240.6(C)(3) or 240.6(C)(4), and remote access is achieved by one of the following methods:

(1) Connected directly through a local nonnetworked interface.

(2) Connected through a networked interface complying with ~~one of~~ both of the following methods:

(3) The circuit breaker and associated software for adjusting the settings are identified as being evaluated for cybersecurity.

(4) A cybersecurity assessment of the network is completed and documentation of the assessment and certification is available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards series*, UL 2900 *Cybersecurity Standard series*, or the NIST *Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1 for assessment requirements.

Informational Note No. 2: Examples used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities that could arise due to software defects, system configuration changes, or user interactions. Installation of devices that can be secured is an important first step but not sufficient to guarantee a secure system.

Informational Note No. 4: See NEMA CY70001-2023, *Cybersecurity Implementation Guidance for Connected Electrical Infrastructure*, for recommendations on how to meet this requirement.

Statement of Problem and Substantiation for Public Comment

One can't argue with the Committee Statement to resolve Public Input 1231 that "Facility owners have the responsibility to ensure that their electrical system is protected against cyber-attacks". That seems obvious enough, but the circuit breaker/software must be hardened against cyber attack when first installed, and then the facility owner must maintain it that way. If the circuit breaker/software is vulnerable to cyber attack when installed, there's little the owner can do, short of replacing the equipment.

One can't argue either with the second sentence of the Committee Statement that "Complying with one of the methods in 240.6(D)(2) establishes a minimum baseline for cybersecurity protection", especially since a circuit breaker/software with zero cybersecurity protection, as could be determined in an assessment, would certainly be a "minimum baseline for cybersecurity protection". Can't get much less than zero!

Existing requirements have no teeth. They allow for the installation to be vulnerable to cyber hacking by simply performing an assessment. That assessment, unfortunately, could actually show the system to be vulnerable to cyber attack. The critical change by this Public Comment removes that possible vulnerability. It requires a networked circuit breaker and associated hardware to be both identified for cybersecurity and for an assessment to be completed.

Why is it so important to require actual cybersecurity protection? Because, if the system is not protected, a hacker could easily reduce the ampere rating of the circuit breaker, forcing it to trip under normal running conditions. Or, the hacker could increase the current setting of the circuit breaker and also increase loads by hacking into them, thereby causing equipment/systems to overload and fail. In short, a hacker could easily shut down any facility with network connected circuit breakers that are not cyber secure.

A CYBERSECURITY ASSESSMENT SHOWING AN UNPROTECTED CIRCUIT BREAKER THAT SITS IN THE PLANT ENGINEER'S DESK DRAWER WILL NOT PREVENT AN UNPLANNED FACILITY SHUTDOWN AND/OR EQUIPMENT DAMAGE.

This Public Comment simply requires that a network-connected circuit breaker and associated software be identified as being evaluated for cybersecurity and that an assessment be completed and made available.

Related Item

• PI 1231

Submitter Information Verification

Submitter Full Name: Vincent Saporita
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City:
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Submittal Date: Sat Aug 24 08:16:32 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Cybersecurity may be achieved at a system level without the use of individual components specifically evaluated at a component level. No specific requirements for an acceptable risk assessment were submitted.

Public Comment No. 1640-NFPA 70-2024 [New Section after 240.8]

240.7 Overcurrent Protective Devices.

Unless permitted elsewhere in the code, overcurrent protective devices for protecting branch-circuit, feeder and service conductors and equipment shall be one of the following:

1. Molded-case circuit breakers
2. Low-voltage power circuit breakers
3. Solid-state or solid-state hybrid circuit breakers
4. Class C, CA, CB, CC, CF, G, H, J, K, L, R, or T fuses
5. Edison base, Type C or Type S fuses
6. Other devices listed and label as suitable for the application.

Statement of Problem and Substantiation for Public Comment

This Public Comment is submitted on behalf of a Task Group formed under the purview of Code Making Panel 10 consisting of Randy Dollar, Thomas Domitrovich, Jason Doty, Diane Lynch, Alan Manche, Nathan Philips, David Williams, and Danish Zia. This Public Comment, along with other Public Comments, was developed with the goal of improving usability and accuracy on requirements associated with overcurrent protection devices.

As stated in the related Public Comment for Article 100, the definition of "Branch-Circuit Overcurrent Protective Device" is proposed to be revised to the term "Overcurrent Protective Device (OCPD)". With this new broader term, to ensure proper protection, there is now a need to identify those OCPDs which are suitable for providing protection to service, feeder, branch-circuit conductors and equipment among the wide-ranging category of overcurrent protection devices. The proposed 240.7 lists those devices currently considered suitable for providing such protection. Additionally, the new proposal permits other devices to be used where specified elsewhere in the Code (such as Article 430 and Article 690), or where listed and labeled accordingly.

Related Item

• Global PI 4050 • CI 9263 • PC 1636

Submitter Information Verification

Submitter Full Name: David Williams
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City:
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Submittal Date: Sun Aug 25 21:15:24 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8368-NFPA 70-2024

Statement: This revision clarifies what types of overcurrent protection devices are permitted for protecting branch-circuits, feeders, service conductors, and equipment.

Public Comment No. 1617-NFPA 70-2024 [Section No. 240.13(A)]

(A) ac Systems.

GFPE shall be provided in accordance with 230.95 for solidly grounded wye electrical systems of more than 150 volts to ground but not exceeding 1000 volts phase-to-phase for each individual device used as a building or structure main disconnecting means rated 1000 amperes or more.

This section shall not apply to the disconnecting means for the following:

(1) Continuous industrial processes where a nonorderly shutdown will introduce additional or increased hazards

(2) Installations where ground-fault protection is provided by other requirements for services or feeders

(3) Fire pumps

(4) **For fused disconnects, where the available fault current, at the fused disconnect, is 10,000 amperes or greater, if the fuses have a clearing time of 0.07 seconds or less at the lower of the calculated minimum available arcing current or 38% of the available fault current, or if the disconnect switch complies with Section 240.67(B)(1), 240.67(B)(3),or 240.67(B)(4), and is set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.**

(5) **For circuit breakers, where the available fault current, at the circuit breaker, is 10,000 amperes or greater, if the circuit breaker complies with Section 240.87(B)(2), 240.87(B)(4),240.87(B)(5), or 240.87(B)(6), and is set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.**

Additional Proposed Changes

File Name	Description	Approved
Figure_1_for_Public_Comment_on_PI_1655_240.13_.docx	Figure 1 for Public Comment on PI 1655 (240.13)	

Statement of Problem and Substantiation for Public Comment

Let's review the Panel Statement to resolve PI 1655.

The first two sentences read: "Even with the limitations proposed in the new exceptions, the arc energy reduction technologies may not operate above the pickup current levels specified in 230.95(A), but below the minimum arcing current. Ground-fault currents may exist in this range, and the arc energy reduction technology may not operate on this current unless the resulting damage to equipment leads to a higher current arcing fault."

The logic of these first two sentences fails to remember the historic reason for ground fault protection in solidly grounded 480/277 volt systems protected at 1000 amperes and greater. Ground fault protection is not needed for faults that are not high impedance arcing faults. If the fault is not arcing, it is a bolted fault, which is safely interrupted by the phase overcurrent device (fuse or circuit breaker). If it is arcing, the limitations in the new List Items 4 & 5 assure that the arc energy reduction technologies allow less damage than allowed by existing 230.95. Opening "at the lower of the calculated minimum arcing current or 38% of the available fault current" assures that the arc energy reduction technologies open when a potentially damaging arc is initiated. There's no need for the arc energy reduction technologies to operate unless the fault begins arcing.

The third sentence of the Panel Statement reads: "Additionally, differential relaying and energy-reducing active arc-flash mitigation system options would not protect any downstream conductors or equipment, and only provide protection within the equipment boundary." First, it should be remembered that this Public Comment does not prohibit Ground-Fault Protection. It simply provides an alternative method of protecting equipment from burndown. If ground fault protection is desired for burndown protection of downstream equipment it can be included with the phase overcurrent device that is protecting that equipment. A key point to remember is that if the downstream equipment is protected with a phase overcurrent protective device (fuse or circuit breaker) at less than 1000 amperes, extensive testing, and field experience, over decades, has shown that the downstream equipment is adequately protected from arcing ground faults by that fuse or circuit breaker.

The fourth and final sentence of the Panel Statement reads: "This may ultimately reduce the level of protection currently provided by GFPE, or by a combination of GFPE and arc energy reduction technology, as applicable." This sentence is addressed by the extensive BACKGROUND below. Arc energy reduction technology, in order to protect human flesh (as opposed to copper, aluminum, and steel), must operate much quicker than is allowed in existing 230.95.

BACKGROUND:

We can now accurately calculate the minimum three-phase arcing current, and the minimum sustainable line-to-ground arcing current, for a high impedance arcing fault. Knowing these currents, we can determine whether or not the arc energy reduction methods in List Items 4 and 5 will operate at, or below, those calculated values. When they do operate at or below those levels, the equipment damage will be just a small percentage of that allowed by the GFPE requirements of 230.95. This applies to all available fault currents of 10,000 amperes or greater.

A requirement (230.95) for ground fault protection of equipment (GFPE) was added to the 1971 NEC® because 480/277 volt, solidly grounded wye services, protected by 1000 ampere and larger overcurrent protective devices, were burning down due to arcing ground faults. 208/120 volt services and those services protected by smaller overcurrent protective devices were not burning down, so they weren't included in the new GFPE requirement.

Over many Code cycles, GFPE requirements were also added for branch circuits (210.13), feeders (215.10), and equipment (240.13). In all cases, the intent was to limit, not eliminate, damage to the switchboard, switchgear, panelboard or equipment being supplied by the 1000 ampere and larger overcurrent protective device.

PRESENT DAY:

The electrical industry has evolved considerably since those early GFPE requirements were introduced. In those years, J. R. Dunki-Jacobs, Harris I. Stanback, and R. H. Kaufman authored numerous ground-breaking papers on arcing ground faults and the need for ground fault protection. They accomplished a great deal that has prevented multitudes of equipment burndowns. Their determination that the minimum sustainable line-to-ground arcing fault on a 480/277 volt system was 38% of the available bolted fault current is very close to the values predicted today by IEEE1584-2018.

In recent editions of the NEC®, Sections were added to require the protection of an employee that is exposed to dangerous levels of incident energy while working on energized equipment. To avoid serious injuries, employees, working on or near energized equipment, can only withstand a small fraction of the incident energy to which equipment may be subjected by the allowances of 230.95(A). This substantiation compares the levels of equipment damage allowed by existing 230.95(A) with the levels allowed by the employee arc-flash protection requirements of 240.67 and 240.87. It shows that the equipment damage allowed by the employee arc-flash protection requirements of 240.67 and 240.87 is just a small fraction of that allowed by 230.95(A).

EXAMPLES:

The following example utilizes IEEE 1584-2018 for a 480 volt arcing fault with 32mm equipment spacing, in a 20”x20”x20” box and an HCB configuration (horizontal conductors in a metal enclosure). Equipment damage is described in terms of kW-cycles which is a product of arcing current (kA) X number of arcing cycles (cycles) X arc voltage (100 volts on a 480 system).

Worst Case Equipment Damage with 10 kA Available Fault Current As Allowed by 230.95(A)

The IEEE 1584-2018 minimum arcing current is 6.09kA. Using the maximum 230.95(A) opening time of 60 cycles, the equipment damage is (6.09 kA X 60 cycles X 100 arcing volts) = 36,540 kW-cycles. See Figure 1.

Worst Case Equipment Damage with 10 kA Available Fault Current As Allowed by List Item 4.

The IEEE 1584-2018 minimum arcing current is 6.09kA. Assuming the maximum opening time of 4.2 cycles (0.07 seconds) for 240.67(B), the equipment damage is 6.09 kA X 4.2 cycles X 100 arcing volts) = 2,558 kW-cycles. Assuming an opening time of 7 cycles for 240.67(B)(1) and (B)(3), the equipment damage is (6.09 kA X 7 cycles X 100 arcing volts = 4,263 kW-cycles. Assuming an opening time of 1/2 cycle for 240.67(B)(4), the equipment damage is (6.09 kA X 0.5 cycles X 100 arcing volts) = 305 kW-cycles. Worst-case damage for the minimum arcing current with this exception for fusible switches (4,263 kW-cycles) is less than 12% of the worst-case damage allowed by 230.95(A) (36,540 kW-cycles). See Figure 1.

Worst Case Equipment Damage with 10 kA Available Fault Current As Allowed by List Item 5.

The IEEE 1584-2018 minimum arcing current is 6.09kA. Assuming an opening time of 4 cycles for 240.87(B)(1), (B)(2), or (B)(4), the equipment damage is (6.09 kA X 4.0 cycles X 100 arcing volts) = 2,436 kW-cycles. Assuming an opening time of 3 cycles for 240.87(B)(5) or (B)(6), the equipment damage is (6.09 kA X 3 cycles X 100 arcing volts) = 1,827 kW-cycles. Worst-case damage for the minimum arcing current with this exception for circuit breakers (2,426 KW-Cycles) is less than 7% of the worst-case damage allowed by 230.95(A) (36,540 kW-cycles). See Figure 1.

(Open Figure 1 in attached file)

Figure 1 shows that equipment damage allowed by this Public Comment is always, from 10,000 amperes available through 100,000 amperes available, just a small fraction of the equipment damage allowed by 230.95(A).

One might ask whether it is possible that the alternate protective systems in this Public Comment could be set such that they might provide arc energy reduction, but not operate during a lower level arcing ground fault where traditional GFPE will provide protection. That question is answered by the very last lines of the new language for both fusible switches and circuit breakers, as both the fusible switches and circuit breakers must be “set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.” Since we know the minimum three phase arcing current from IEEE 1584-2018 and the minimum sustainable phase to ground arcing current of 38% of the available fault current, we know whether or not the fusible switch or circuit breaker is set to operate at those values. SO, THERE IS NO MINIMUM VALUE OF ACTUAL ARCING CURRENT THAT COULD BE SO SMALL AS TO BE PICKED UP BY 230.95(A) REQUIREMENTS THAT WOULD NOT ALSO BE SENSED BY THE REQUIREMENTS OF LIST ITEMS 4 AND 5.

Let’s look at an example with 10,000 available short-circuit amperes (lowest available fault current for which List Items 4 and 5 could apply). In this case the minimum IEEE 1584-2018 three-phase arcing current is 6.09 kA and the minimum sustainable phase-to-ground arcing current is 38% of 10,000 amps = 3.8 kA. Per the requirements of the list items the fusible switch or circuit breaker must be set to operate at the lower of either 6.09 kA or 3.8 kA, so the fusible switch or circuit breaker must operate for arcing currents of 3.8 kA or greater. If a three phase arcing fault occurs it is calculated to be 6.09 kA with the possibility that a single phase to ground arcing fault could be as low as 3.8 kA. In either case, the requirements of List Items 4 and 5 assure that the arcing fault is taken off-line in no more than 7 cycles for List Item 4 and no more than 4 cycles for List Item 5, while 230.95(A) would allow a full 60 cycles. What happens if the available fault current is less than or even significantly less than 10,000 amperes? Then the List Items 4 and 5 do not apply and GFPE would be required.

Energy reducing maintenance switches (240.67(B)(2) and 240.87(B)(3)) are not included in the exceptions because energy-reducing maintenance switches are typically turned off when a worker is not working on energized equipment, whereas ground fault protection is constantly protecting the equipment, whether or not a worker is working on the energized equipment.

The Approved Equivalent Means, (240.67(B)(5) and 240.87(B)(7)), are excluded because the opening times for these methods are unclear.

CONCLUSION:

This Public Comment takes advantage of the arc-energy reduction technologies found in 240.67 and 240.87. It provides an exception for GFPE requirements whenever specific 240.67 and 240.87 methods to reduce clearing time are utilized. Arc energy reduction technologies, as detailed in List Items 4 and 5, must open in a much faster time than allowed by 230.95(A). Reviewing Figure 1, it becomes obvious that List Items 4 and 5 will limit the equipment’s arcing fault damage to a level that is considerably less than that currently allowed by the requirements found in 230.95(A).

In closing, doesn’t it just make common sense that arc energy reduction technologies which protect an employee’s skin from third degree burns will also prevent copper, aluminum, and steel from melting?

Related Item

• PI 1655 • FR 7565 • PI 1641 • PC 1615 • PI 1645 • PC 1616 • PC 1722 • PC 1766

Submitter Information Verification

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Submittal Date: Sat Aug 24 18:54:21 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Ground faults may exist which are other than arcing or bolted faults, especially considering the additional impedance in the grounding path. Arc flash reduction technologies are required per 240.67 and 240.87 and may be employed in addition to the GFPE required by 230.95. Insufficient substantiation was provided to demonstrate that arc flash reduction technologies will provide the same level of protection at currents lower than the minimum arcing current, and for downstream equipment if replaced by GFPE.

Figure 1

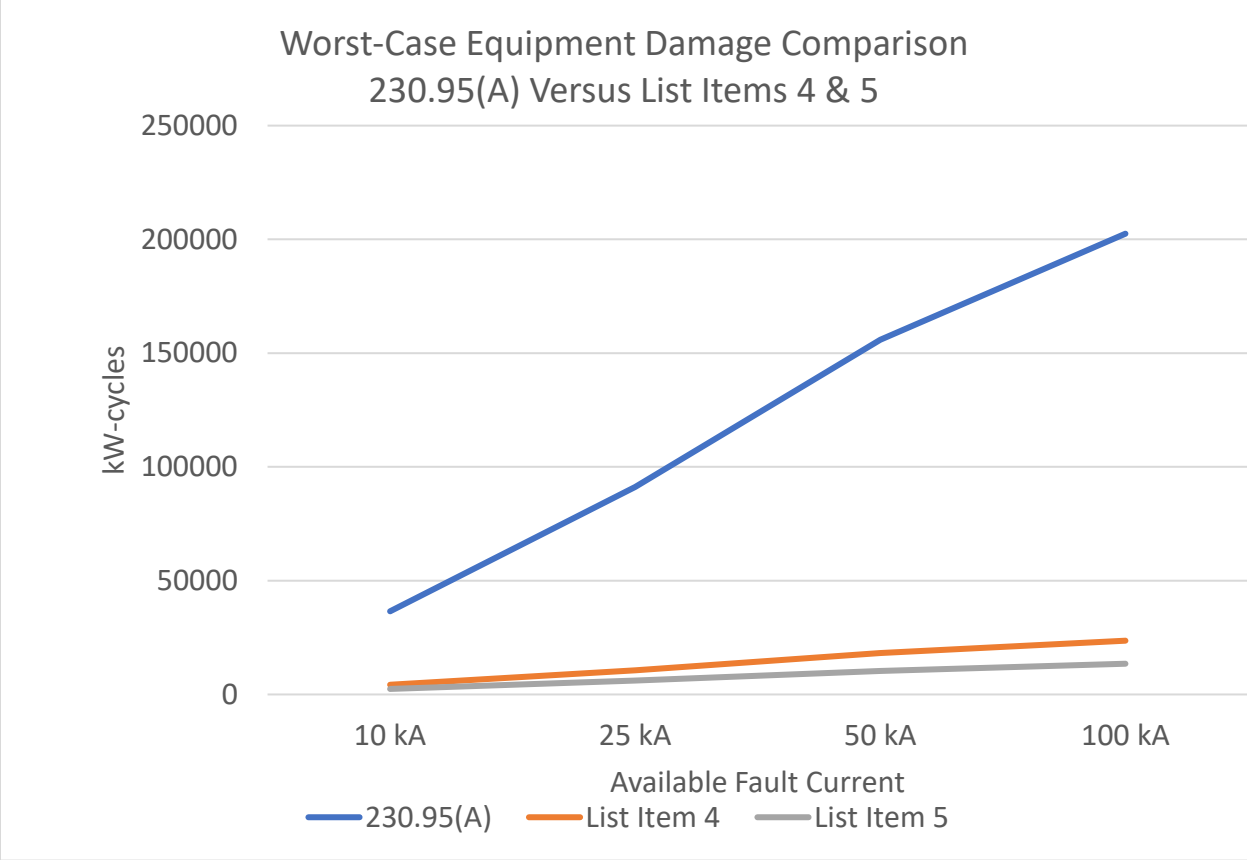

Figure 1 shows that equipment damage allowed by this Public Comment is always, from 10,000 amperes available through 100,000 amperes available, just a small fraction of the equipment damage allowed by 230.95(A).

Public Comment No. 1893-NFPA 70-2024 [Section No. 240.15(B)(1)]

(1) Multiwire Branch Circuits.

Individual single-pole circuit breakers, with identified handle ties, shall be permitted as the protection for each ungrounded conductor of multiwire branch circuits that serve only DC or single-phase AC line-to-neutral loads.

Statement of Problem and Substantiation for Public Comment

This Public Comment is submitted on behalf of a Correlating Committee DC Task Group consisting of Danish Zia, Jason Fisher, Randy Dollar, Larry Wildermuth, Scott Higgins, Scott Harding, Mark Earley, Jason Hopkins, Chris Vance, Chad Kennedy and Derrick Atkins. This Public Comment, along with other Public Comments, was developed with the goal of improving usability and accuracy on requirements associated with DC circuits.

Section 240.15(B)(1) is written as an AC-specific requirement due to the use of the term “single-phase”. However, this configuration could also be applicable to DC circuits, and there are DC rated circuit breakers listed for this application. The recommended language makes the requirement apply to both AC and DC circuits.

Related Item

- Public Input No. 4287-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Danish Zia
Organization: UL Solutions
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 27 21:31:07 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8558-NFPA 70-2024

Statement: The multiwire branch circuit configuration covered by 240.15(B)(1) could also be applicable to DC circuits serving DC line-to-neutral loads. The revised language makes the requirement apply to such DC circuits as well.

Public Comment No. 2023-NFPA 70-2024 [Section No. 240.67 [Excluding any Sub-Sections]]

Where fuses rated ~~1200~~ 1000 amperes or higher are installed, 240.67(A), 240.67(B), and 240.67(C) shall apply.

Statement of Problem and Substantiation for Public Comment

Johns Hopkins assessed electrical incident data from 2010 to 2020. It found that the U.S. Bureau of Labor Statistics recorded 26,480 occupational electrical incidents of all types, but only 1,386 cases with injuries were reported to the U.S. Occupational Safety and Health Administration (OSHA). Johns Hopkins applied the resulting 19:1 ratio to the OSHA injury number to estimate that 630 arc flash injuries occur annually. This key insight underscores an urgent need to implement additional measures to foster a working environment that focuses on further reducing risk for electrical workers.

Johns Hopkins University PhD candidate Qi Tong and Professor Thomas Gernay recently published an in-depth study. Their report, Arc Flash Incidents in Non-Residential Buildings: Data Analysis, offers a tangible understanding of the frequency and severity of arc flash incidents. The report details the variety of amperage where arc flash incidents occur. the data showed 88 incidents that were lower than 1200 with approximately twice the number of fatalities than the 37 incidents above 1200A.
https://jscholarship.library.jhu.edu/server/api/core/bitstreams/8a734ce7-4844-4eb6-a109-e9e1c9f6a8c5/content

The information detailed provides substantiation that additional work needs to be done to reduce arc flash incidents. Moving the threshold from 1200A to 1000A provides a small step in beginning this process.

Related Item

- PI 4176

Submitter Information Verification

Submitter Full Name: Keith Waters
Organization: Schneider Electric
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 16:05:09 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8560-NFPA 70-2024

Statement: The addition of 8cal/cm2 to this section of the code gets to the point of “Arc Energy Reduction” and is a logical and meaningful additional trigger event to incorporate the methods of achieving Arc Energy Reduction listed in 240.67. Many installations are being identified and marked in accordance with Article 110.16 and many of those installations are in excess of 8cal/cm2 .

Public Comment No. 1291-NFPA 70-2024 [Section No. 240.87(B)]

(B) Method to Reduce Clearing Time.

One of the following means shall be provided and shall be set to operate at less than the available arcing current:

(1) Zone-selective interlocking

(2) Differential relaying

(3) Energy-reducing maintenance switching with ~~local~~ instantenous overcurrent and ground settings ;and local status indicator

(4) Energy-reducing active arc flash mitigation system

(5) An instantaneous trip setting. Temporary adjustment of the instantaneous trip setting to achieve arc energy reduction shall not be permitted.

(6) An instantaneous override

(7) An approved equivalent means

Informational Note No. 1: An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to “no intentional delay” to reduce the clearing time while the worker is working within an arc-flash boundary as defined in *NFPA 70E*-2024, *Standard for Electrical Safety in the Workplace*, and then to set the trip unit back to a normal setting after the potentially hazardous work is complete.

Informational Note No. 2: An energy-reducing active arc-flash mitigation system helps in reducing arcing duration in the electrical distribution system. No change in the circuit breaker or the settings of other devices is required during maintenance when a worker is working within an arc-flash boundary as defined in *NFPA 70E*-2024, *Standard for Electrical Safety in the Workplace*.

Informational Note No. 3: An instantaneous trip is a function that causes a circuit breaker to trip with no intentional delay when currents exceed the instantaneous trip setting or current level. If arcing currents are above the instantaneous trip level, the circuit breaker will trip in the minimum possible time.

Informational Note No. 4: See IEEE 1584-2018, *IEEE Guide for Performing Arc Flash Hazard Calculations*, for guidance in determining arcing current.

Statement of Problem and Substantiation for Public Comment

The current Energy Reducing Maintenance Switch (ERMS) will mitigate the arc flash after occurrence but it can not prevent the arc flash from occurrence. This is because the ERMS is activating the instantaneous overcurrent only and not including the instantaneous ground fault protection. Most of the arc flash incidents start with ground fault for few seconds caused by many reasons such as human error then develops to three phase or two phase faults with arc flash.

If the ERMS will activate the instantaneous ground fault setting in addition to the instantaneous overcurrent fault protection, the instantaneous ground protection will prevent the further development of the heating leading to three or two phase faults causing the flashover (arc flash)

Related Item

- 1524

Submitter Information Verification

Submitter Full Name: Wasseem Alkhardawi

Organization: Saudi Aramco

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City:

State:

Zip:

Submittal Date: Tue Aug 20 03:49:16 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The ERMS function reduces the delay and pickup level of the instantaneous function. Not all circuit breakers are provided with a ground-fault protection function. Also see 240.13 for Ground-Fault Protection of Equipment requirements.

Public Comment No. 2028-NFPA 70-2024 [Section No. 240.87 [Excluding any Sub-Sections]]

Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is ~~1200~~ 1000 amperes or higher, 240.87(A), 240.87(B), and 240.87(C) shall apply.

Statement of Problem and Substantiation for Public Comment

Johns Hopkins assessed electrical incident data from 2010 to 2020. It found that the U.S. Bureau of Labor Statistics recorded 26,480 occupational electrical incidents of all types, but only 1,386 cases with injuries were reported to the U.S. Occupational Safety and Health Administration (OSHA). Johns Hopkins applied the resulting 19:1 ratio to the OSHA injury number to estimate that 630 arc flash injuries occur annually. This key insight underscores an urgent need to implement additional measures to foster a working environment that focuses on further reducing risk for electrical workers.

Johns Hopkins University PhD candidate Qi Tong and Professor Thomas Gernay recently published an in-depth study. Their report, Arc Flash Incidents in Non-Residential Buildings: Data Analysis, offers a tangible understanding of the frequency and severity of arc flash incidents. The report details the variety of amperage where arc flash incidents occur. the data showed 88 incidents that were lower than 1200 with approximately twice the number of fatalities than the 37 incidents above 1200A.
https://jscholarship.library.jhu.edu/server/api/core/bitstreams/8a734ce7-4844-4eb6-a109-e9e1c9f6a8c5/content

The information detailed provides substantiation that additional work needs to be done to reduce arc flash incidents. Moving the threshold from 1200A to 1000A provides a small step in beginning this process.

Related Item

• PI 4166

Submitter Information Verification

Submitter Full Name: Keith Waters
Organization: Schneider Electric
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 16:12:58 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8561-NFPA 70-2024

Statement: The addition of 8cal/cm2 to this section of the code gets to the point of “arc energy reduction” and is a logical and meaningful additional trigger event to incorporate the methods of achieving arc energy reduction listed in 240.87. Many installations are being identified and marked in accordance with Article 110.16 and many of those installations are in excess of 8cal/cm2 .

Public Comment No. 1357-NFPA 70-2024 [Article 242]

Article 242 ~~Overvoltage~~ Surge Protection

Part I. General

242.1 Scope.

This article provides the general requirements, installation requirements, and connection requirements for ~~overvoltage protection~~ surge protection and ~~overvoltage protective~~ surge protective devices. Part II covers surge-protective devices (SPDs) permanently installed on premises wiring systems of not over 1000 volts ac, 1500 volts dc, nominal, while Part III covers surge arresters permanently installed on premises wiring systems over 1000 volts, nominal.

242.3 Reconditioned Equipment.

Reconditioned SPDs and surge arresters shall not be installed.

Part II. Surge-Protective Devices (SPDs), not over 1000 Volts ac, 1500 Volts dc, Nominal

242.6 Listing.

An SPD shall be a listed device.

242.8 Short-Circuit Current Rating.

The SPD shall be marked with a short-circuit current rating and shall not be installed at a point on the system where the available fault current is in excess of that rating. This marking requirement shall not apply to receptacles.

242.9 Indicating.

An SPD shall provide indication that it is functioning properly.

242.12 Uses Not Permitted.

An SPD device shall not be installed in the following:

(1) Circuits over 1000 volts ac, 1500 volts dc, nominal

(2) On ungrounded systems, impedance grounded systems, or corner grounded delta systems unless listed specifically for use on these systems

(3) Where the rating of the SPD is less than the maximum continuous phase-to-ground voltage at the power frequency available at the point of application

242.13 Type 1 SPDs.

Type 1 SPDs shall be installed in accordance with 242.13(A) and 242.13(B) .

(A) Installation.

Type 1 SPDs shall be permitted to be installed in any location not prohibited by the SPD installation instructions.

(B) At the Service.

When installed at services, Type 1 SPDs shall be connected to one of the following:

(1) Grounded service conductor

(2) Grounding electrode conductor

(3) Grounding electrode for the service

(4) Equipment grounding terminal in the service equipment

242.14 Type 2 SPDs.

If a Type 2 SPD is installed, it shall be installed in accordance with 242.14(A) , 242.14(B) , or 242.14(C) .

(A) Service-Supplied Building or Structure.

Type 2 SPDs shall be connected anywhere on the load side of a service disconnect overcurrent device required in 230.91 unless installed in accordance with 230.82(8) .

(B) Feeder-Supplied Building or Structure.

Type 2 SPDs shall be connected at the building or structure anywhere on the load side of the first overcurrent device at the building or structure.

(C) Separately Derived System.

The SPD shall be connected on the load side of the first overcurrent device in a separately derived system.

242.16 Type 3 SPDs.

Type 3 SPDs shall be permitted to be installed on the load side of branch-circuit overcurrent protection up to the equipment served. If included in the manufacturer's instructions, the Type 3 SPD connection shall be a minimum 10 m (30 ft) of conductor distance from the service or separately derived system disconnect.

242.18 Type 4 and Other Component Type SPDs.

Type 4 component assemblies and other component type SPDs shall only be installed by the equipment manufacturer.

242.20 Number Required.

Where used at a point on a circuit, the SPD shall be connected to each ungrounded conductor.

242.22 Location.

SPDs shall be permitted to be located indoors or outdoors and shall be made inaccessible to unqualified persons unless listed for installation in accessible locations.

242.24 Routing of Conductors.

The conductors used to connect the SPD to the line or bus and to ground shall not be any longer than necessary and shall avoid unnecessary bends.

242.28 Conductor Size.

SPD line conductors and conductors to ground shall not be smaller than 14 AWG copper or 12 AWG aluminum.

242.30 Connection Between Conductors.

An SPD shall be permitted to be connected between any two conductors — ungrounded conductor(s), grounded conductor, equipment grounding conductor, or grounding electrode conductor. The grounded conductor and the equipment grounding conductor shall be interconnected only by the normal operation of the SPD during a surge.

242.32 Grounding Electrode Conductor Connections and Enclosures.

Except as indicated in this article, SPD grounding connections shall be made as specified in Article 250, Part III. Grounding electrode conductors installed in metal enclosures shall comply with 250.64(E) .

Part III. Surge Arresters, Over 1000 Volts

242.40 Uses Not Permitted.

A surge arrester shall not be installed where the rating of the surge arrester is less than the maximum continuous phase-to-ground voltage at the power frequency available at the point of application.

242.42 Surge Arrester Rating.

The duty cycle rating of a surge arrester shall be not less than 125 percent of the maximum continuous operating voltage available at the point of application.

For solidly grounded systems, the maximum continuous operating voltage shall be the phase-to-ground voltage of the system.

For impedance or ungrounded systems, the maximum continuous operating voltage shall be the phase-to-phase voltage of the system.

Informational Note No. 1: See IEEE C62.11-2020, *Standard for Metal-Oxide Surge Arresters for Alternating-Current Power Circuits (>1 kV)*, and IEEE C62.22-2009, *Guide for the Application of Metal-Oxide Surge Arresters for Alternating-Current Systems*, for further information on surge arresters.

Informational Note No. 2: The selection of a properly rated metal oxide arrester is based on considerations of maximum continuous operating voltage and the magnitude and duration of overvoltages at the arrester location as affected by phase-to-ground faults, system grounding techniques, switching surges, and other causes. See the manufacturer's application rules for selection of the specific arrester to be used at a particular location.

242.44 Number Required.

Where used at a point on a circuit, a surge arrester shall be connected to each ungrounded conductor. A single installation of such surge arresters shall be permitted to protect a number of interconnected circuits if no circuit is exposed to surges while disconnected from the surge arresters.

242.46 Location.

Surge arresters shall be permitted to be located indoors or outdoors. Surge arresters shall be made inaccessible to unqualified persons unless listed for installation in accessible locations.

242.48 Routing of Surge Arrester Equipment Grounding Conductors.

The conductor used to connect the surge arrester to line, bus, or equipment and to an equipment grounding conductor or grounding electrode connection point as provided in 242.50 shall not be any longer than necessary and shall avoid unnecessary bends.

242.50 Connection.

The arrester shall be connected to one of the following:

(1) Grounded service conductor

(2) Grounding electrode conductor

(3) Grounding electrode for the service

(4) Equipment grounding terminal in the service equipment

242.52 Surge-Arrester Conductors.

The conductor between the surge arrester and the line, and the surge arrester and the grounding connection, shall not be smaller than 6 AWG copper or aluminum.

242.54 Interconnections.

The surge arrester protecting a transformer that supplies a secondary distribution system shall be interconnected as specified in 242.54(A), 242.54(B), or 242.54(C).

(A) Metal Interconnections.

A metal interconnection shall be made to the secondary grounded circuit conductor or the secondary circuit grounding electrode conductor, if, in addition to the direct grounding connection at the surge arrester, the connection complies with 242.54(A)(1) or 242.54(A)(2).

(1) Additional Grounding Connection.

The grounded conductor of the secondary has a grounding connection elsewhere to a continuous metal underground water piping system. In urban water-pipe areas where there are at least four water-pipe connections on the neutral conductor and not fewer than four such connections in each mile of neutral conductor, the metal interconnection shall be permitted to be made to the secondary neutral conductor with omission of the direct grounding connection at the surge arrester.

(2) Multigrounded Neutral System Connection.

The grounded conductor of the secondary system is part of a multigrounded neutral system or static wire of which the primary neutral conductor or static wire has at least four grounding connections in each 1.6 km (1 mile) of line in addition to a grounding connection at each service.

(B) Through Spark Gap or Device.

Where the surge arrester grounding electrode conductor is not connected as in 242.54(A), or where the secondary is not grounded as in 242.54(A) but is otherwise grounded as in 250.52, an interconnection shall be made through a spark gap or listed device as required by 242.54(B)(1) or 242.54(B)(2).

(1) Ungrounded or Unigrounded Primary System.

For ungrounded or unigrounded primary systems, the spark gap or a listed device shall have a 60-Hz breakdown voltage of at least twice the primary circuit voltage but not necessarily more than 10 kV, and there shall be at least one other ground on the grounded conductor of the secondary that is not less than 6.0 m (20 ft) distant from the surge-arrester grounding electrode.

(2) Multigrounded Neutral Primary System.

For multigrounded neutral primary systems, the spark gap or listed device shall have a 60-Hz breakdown of not more than 3 kV, and there shall be at least one other ground on the grounded conductor of the secondary that is not less than 6.0 m (20 ft) distant from the surge-arrester grounding electrode.

(C) By Special Permission.

An interconnection of the surge-arrester ground and the secondary neutral conductor, other than as provided in 242.54(A) or 242.54(B), shall be permitted to be made only by special permission.

242.56 Grounding Electrode Conductor Connections and Enclosures.

Except as indicated in this article, surge-arrester grounding electrode conductor connections shall be made as specified in Article 250, Parts III and X. Grounding electrode conductors installed in metal enclosures shall comply with 250.64(E).

Statement of Problem and Substantiation for Public Comment

The only changes suggested changes to existing Code text by this Public Comment are (1) the change of the Article Title from "Overvoltage Protection" to "Surge Protection", and (2) the change in 242.1 from "overvoltage protection and overvoltage protective devices" to "surge protection and surge protective devices". Terra View began underlining 242.6 and the remaining parts of the Article without any changes being made. NO CHANGES ARE INTENDED EXCEPT FOR THE TITLE AND 242.1.

The original Substantiation for PI 1465 read: "This Public Input is provided with the understanding that the Scope falls under the jurisdiction of the Correlating

Committee. The title of Article 242 should be changed from Overvoltage Protection to Surge Protection. Surge Protective Devices, per UL 1449, protect against voltage surges, not against a "long" overvoltage, such as a "line cross" with a higher voltage circuit. It is misleading to describe the protection in Article 242 as overvoltage protection. It could incorrectly be compared to the overcurrent protection requirements of Article 240, which are of a "long" duration. Other suggested minor changes to the first paragraph of the scope and 242.3 follow this same logic."

The Panel Statement to resolve reads: "The proposed replacement of the term "overvoltage" with "surge" is too narrow. Doing so would potentially prevent other types of overvoltage devices from being allowed to be installed."

The Panel Statement fails to note that Article 242 covers only surge protective devices and surge arresters. YES, YOU READ THAT CORRECTLY, THE ONLY TYPES OF DEVICES COVERED BY ARTICLE 242 ARE SURGE PROTECTIVE DEVICES AND SURGE ARRESTERS. If text is added to cover requirements of other devices, such as overvoltage relays, the title of Article 242 can be changed, or a new Article can be developed covering actual over voltage protection.

Related Item

• PI 1465

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 21 12:33:16 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected
Resolution: The proposed text does not provide further clarity as surge protection falls under overvoltage protection.

Public Comment No. 1716-NFPA 70-2024 [Section No. 242.3]

242.3 Reconditioned Equipment.

Reconditioned SPDs and surge arresters shall not be permitted or installed.

Statement of Problem and Substantiation for Public Comment

The existing proposed language allows electrical equipment to be reconditioned in place, as it only pertains to the installation process. The National Electrical Code (NEC) can apply to existing installations during modifications, additions, or other changes. It would be incorrect to suggest that the NEC only applies when a product is initially 'installed' into the circuit. Existing installations are often affected by such changes. This new language uses the phrase "shall not be permitted" as all inclusive addressing when an overcurrent device is installed and reconditioned in place.

Related Item

- FR 9236

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich

Organization: Eaton Corporation

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 26 15:28:18 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8562-NFPA 70-2024

Statement: The titles of 242.3(A) and 242.3(B) are in accordance with the NEC Style Manual (cl. 2.2.1.1). The language in 242.3 has been updated to align with the recommended wording regarding reconditioning.

Public Comment No. 370-NFPA 70-2024 [Section No. 242.3]

242.3 Reconditioned Equipment.

Reconditioned SPDs and surge arresters shall not be installed.

Additional Proposed Changes

File Name	Description	Approved
CN_37.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 37 appeared in the First Draft Report on First Revision No. 9236.

The Correlating Committee directs that CMP 10 review FR 9236 and consider revising the text to align with recommended wording regarding reconditioning. The recommended wording for this section is: “The installation of reconditioned SPD’s and surge arresters shall not be permitted”.

Related Item

- First Revision No. 9236.

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 30 12:05:07 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8562-NFPA 70-2024

Statement: The titles of 242.3(A) and 242.3(B) are in accordance with the NEC Style Manual (cl. 2.2.1.1). The language in 242.3 has been updated to align with the recommended wording regarding reconditioning.

Correlating Committee Note No. 37-NFPA 70-2024 [Section No. 242.3]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:55:32 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 9236 and consider revising the text to align with recommended wording regarding reconditioning. The recommended wording for this section is: “The installation of reconditioned SPD’s and surge arresters shall not be permitted”.

First Revision No. 9236-NFPA 70-2024 [Section No. 242.2]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 2051-NFPA 70-2024 [Section No. 242.13]

242.13 Type 1 SPDs.

Type 1 SPDs shall be installed in accordance with 242.13(A) and 242.13(B).

(A) Installation.

Type 1 SPDs shall be permitted to be installed in any location not prohibited by the SPD installation instructions.

(B) At the Service.

When installed at services, Type 1 SPDs shall be connected to one of the following:

(1) Grounded service conductor

(2) Grounding electrode conductor

(3) Grounding electrode for the service

(4) Equipment grounding terminal in the service equipment

Informational Note 2: For SPD selection guidance, see C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.

Statement of Problem and Substantiation for Public Comment

How does section A address ungrounded Delta and Corner grounded Delta installations?

Related Item

• FR-9238

Submitter Information Verification

Submitter Full Name: James Moellmann
Organization: Maxivolt
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 17:04:07 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8399-NFPA 70-2024
Statement: An informational note referencing IEEE C62.41.2 is added in 242.1 to provide users with guidance on selection of SPDs.

Public Comment No. 1975-NFPA 70-2024 [Section No. 242.13(B)]

(B) At the Service.

When installed at services, Type 1 SPDs shall be connected to one of the following:

(1) Grounded service conductor

(2) Grounding electrode conductor

(3) Grounding electrode for the service

(4) Equipment grounding terminal in the service equipment

(C) Surge Protective Devices (SPDs) utilizing a grounding conductor.

For SPDs utilizing a grounding conductor a ground impedance of 25 ohms or less shall be required when attached to locations B.2, B.3 or B.4.

Ground impedance to be verified by fall of potential measurement or use of a clamp-on resistance tester.

Informational Note 1: See IEEE Std. 142 IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems for guidance.

Statement of Problem and Substantiation for Public Comment

CMP-10's response suggests there may have been a difference in interpreting the intent of the submission. The primary aim was to underscore the fact that all Surge Protective Devices (SPDs) utilizing a grounding conductor for its surge mitigation (common-mode) carry a risk of "arcing or insulation breach" if the ground impedance is not sufficiently minimized. This risk applies to all common-mode SPDs, regardless of whether they are part of a Lightning Protection System (LPS).

The safety concern being raised is that while the NEC mandates SPDs at the service entrance in certain locations, it does not currently address the specific grounding requirements necessary to mitigate the hazardous conditions of "arcing or insulation breach" or to verify the effectiveness of the SPD.

As outlined in the substantiation:
"A.4.20.8 The effectiveness of the SPD is based on the impedance of the path to ground. A lower impedance minimizes voltage differences between conductors attached to SPDs near the service entrance and reduces the likelihood of arcing or insulation breach. Therefore, it is crucial to minimize impedance in this circuit."
In other words, the safety and effectiveness of these devices cannot be guaranteed if the ground impedance is unknown.

To address these risks, CMP-10 should integrate grounding verification into the main text of the NEC. This would emphasize the importance of establishing a proper conductive path for the safe and reliable operation of common-mode SPDs, helping to ensure that these critical safety concerns are effectively addressed in the code.

Related Item

• PI-4540

Submitter Information Verification

Submitter Full Name: James Moellmann

Organization: Maxivolt

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 28 13:45:27 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The requirement for a 25 ohm or less ground impedance or allowing only specific methods of verifying the ground impedance has not been substantiated.

Public Comment No. 2047-NFPA 70-2024 [Section No. 242.13 [Excluding any Sub-Sections]]

Type 1 SPDs shall be installed in accordance with 242.13(A) and 242.13(B).

Informational Note 1: For SPD selection guidance, see C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.

Statement of Problem and Substantiation for Public Comment

Clarification is need on the installation method.
Where and how is the Type 1 SPD to be installed?
What considerations need to be taken into account?

IEEE C62 standard provide guidance and should be considered. This section only refers to grounded and grounding conductors.
There is no clarificaton for power systems or any other condiseration.

Related Item

• FR-9238

Submitter Information Verification

Submitter Full Name: James Moellmann
Organization: Maxivolt
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 16:50:51 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8399-NFPA 70-2024
Statement: An informational note referencing IEEE C62.41.2 is added in 242.1 to provide users with guidance on selection of SPDs.

Public Comment No. 312-NFPA 70-2024 [Article 404]

Article 404 Switches

Part I. General

404.1 Scope.

(A) Covered.

This article covers the installation of general-use switches, motor-circuit switches, isolating switches, circuit breakers used as switches, and molded case switches operating at voltages not over 1000 volts ac, 1500 volts dc, nominal.

(B) Not Covered.

This article does not cover the installation of the following:

(1) Wireless control equipment to which circuit conductors are not connected

(2) Wiring devices

Informational Note: See 406.1 for wiring devices.

404.2 Listing Requirements.

Switches shall be listed.

Informational Note No. 1: See 600.6 for switches for signs and outline lighting.

Informational Note No. 2: See 430.83, 430.109, and 430.110 for switches controlling motors.

404.3 Reconditioned Equipment.

(A) Permitted to be Installed.

Reconditioned knife switches, switches with butt contacts, and bolted pressure contact switches shall be permitted to be installed. If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(B) Not Permitted to be Installed.

The following reconditioned equipment shall not be installed:

(1) Lighting, dimmer, and electronics control switches

(2) Snap switches of any type

(3) Molded-case switches

404.5 Enclosures.

(A) General.

Switches and circuit breakers shall be of the externally operable type mounted in an enclosure listed for the intended use. The minimum wire-bending space at terminals and minimum gutter space provided in switch enclosures shall be as required in 312.9.

Exception No. 1: Pendant- and surface-type snap switches and knife switches mounted on an open-face switchboard or panelboard shall be permitted without enclosures.

Exception No. 2: Switches and circuit breakers installed in accordance with 110.27(A)(1), 110.27(A)(2), 110.27(A)(3), or 110.27(A)(4) shall be permitted without enclosures.

(B) Used as Raceways.

Enclosures shall not be used as junction boxes, auxiliary gutters, or raceways for conductors feeding through or tapping off to other switches or overcurrent devices, unless the enclosure complies with 312.11.

404.6 Damp or Wet Locations.

(A) Surface-Mounted Switches or Circuit Breakers.

Surface-mounted switches or circuit breakers shall be enclosed in weatherproof enclosure or cabinets that comply with 312.4.

(B) Flush-Mounted Switches or Circuit Breakers.

Flush-mounted switches or circuit breakers shall be equipped with weatherproof covers.

(C) Switches in Tub or Shower Spaces.

Switches shall not be installed within tub or shower spaces unless installed as part of a listed tub or shower assembly.

404.7 Adjustable Switches or Circuit Breakers.

Adjustable switches or circuit breakers shall be of the enclosed type or be mounted in cabinets or boxes or equipment enclosures. Energized parts shall be barriered to prevent operator exposure when making manual adjustments or switching.

Exception: Devices mounted so they are accessible only to qualified persons shall be permitted without barriers if they are located within an enclosure such that any energized parts within 152 mm (6.0 in.) of the manual adjustment or switch are covered by suitable barriers.

404.8 Position and Connection of Switches.

(A) Single-Throw Knife Switches.

Single-throw knife switches shall be placed so that gravity will not tend to close them. Single-throw knife switches, approved for use in the inverted position, shall be provided with an integral mechanical means that ensures that the blades remain in the open position when so set.

(B) Double-Throw Knife Switches.

Double-throw knife switches shall be permitted to be mounted so that the throw is either vertical or horizontal. Where the throw is vertical, integral mechanical means shall be provided to hold the blades in the open position when so set.

(C) Connection of Switches.

Single-throw knife switches and switches with butt contacts shall be connected such that their blades are de-energized when the switch is in the open position. Bolted pressure contact switches shall have barriers that prevent inadvertent contact with energized blades. Single-throw knife switches, bolted pressure contact switches, molded case switches, switches with butt contacts, and circuit breakers used as switches shall be connected so that the terminals supplying the loads are de-energized when the switches are in the open position.

Exception: The blades and terminals supplying the loads of switches shall be permitted to be energized when the switches are in the open position where the switches are connected to circuits or equipment inherently capable of providing a backfeed source of power. For such installations, permanent signs shall be installed on the switch enclosures or immediately adjacent to open switches with the following words or equivalent: WARNING — LOAD SIDE TERMINALS MAY BE ENERGIZED BY BACKFEED. The warning sign or label shall comply with 110.21(B).

404.9 Indicating.

General-use and motor-circuit switches, circuit breakers, and molded case switches, where mounted in an enclosure as described in 404.5, shall indicate, in a location that is visible when accessing the external operating means, whether they are in the open (off) or closed (on) position.

Where these switch or circuit breaker handles are operated vertically rather than rotationally or horizontally, the up position of the handle shall be the closed (on) position.

Exception No. 1: Vertically operated double-throw switches shall be permitted to be in the closed (on) position with the handle in either the up or down position.

Exception No. 2: On busway installations, tap switches employing a center-pivoting handle shall be permitted to be open or closed with either end of the handle in the up or down position. The switch position shall be clearly indicating and be visible from the floor or from the usual point of operation.

404.10 Accessibility and Grouping.

(A) Location.

(1) Readily Accessible.

All switches and circuit breakers used as switches shall be located so that they can be operated from a readily accessible place.

(2) Maximum Height.

They shall be installed such that the center of the grip of the operating handle of the switch or circuit breaker, when in its highest position, is not more than 2.0 m (6 ft 7 in.) above the floor, finished grade, or working platform, except as follows:

(1) On busway installations, fused switches and circuit breakers shall be permitted to be located at the same level as the busway. Suitable means shall be provided to operate the handle of the device from the floor.

(2) Switches and circuit breakers installed adjacent to motors, appliances, or other equipment that they supply shall be permitted to be located higher than 2.0 m (6 ft 7 in.) and to be accessible by portable means.

(3) Hookstick operable isolating switches shall be permitted at greater heights.

404.11 Circuit Breakers as Switches.

A hand-operable circuit breaker equipped with a lever or handle, or a power-operated circuit breaker capable of being opened by hand in the event of a power failure, shall be permitted to serve as a switch if it has the required number of poles.

Informational Note: See 240.81 and 240.83 for requirements for circuit breakers relative to indication of state and required markings.

404.12 Grounding of Enclosures.

Metal enclosures for switches or circuit breakers shall be connected to equipment grounding conductors as specified in Article 250, Part IV. Metal enclosures for switches or circuit breakers used as service equipment shall comply with the requirements of Article 250, Part V. Where nonmetallic enclosures are used with metal raceways or metal-armored cables, they shall comply with 314.5 Exception No. 1 or No. 2.

Nonmetallic boxes for switches shall be installed with a wiring method that provides or includes an equipment grounding conductor.

404.13 Knife Switches.

(A) Isolating Switches.

Knife switches rated at over 1200 amperes at 250 volts or less, and at over 1000 amperes at 251 to 1000 volts, shall be used only as isolating switches and shall not be opened under load.

(B) To Interrupt Currents.

To interrupt currents over 1200 amperes at 250 volts, nominal, or less, or over 600 amperes at 251 to 1000 volts ac, 1500 volts dc, nominal, circuit breakers or switches listed for the purpose shall be used.

(C) General-Use Switches.

Knife switches of ratings less than specified in 404.13(A) and 404.13(B) shall be considered general-use switches.

Informational Note: See Article 100 for the definition of *general-use switch*.

(D) Motor-Circuit Switches.

Motor-circuit switches shall be permitted to be of the knife-switch type.

Informational Note: See Article 100 for the definition of *motor-circuit switch*.

Part II. Construction Specifications

404.20 Marking.

(A) Ratings.

Switches shall be marked with the current, voltage, and, if horsepower rated, the maximum rating for which they are designed.

(B) Off Indication.

Where in the off position, a switching device with a marked OFF position shall completely disconnect all ungrounded conductors to the load it controls.

404.26 Knife Switches Rated 600 to 1000 Volts.

Auxiliary contacts of a renewable or quick-break type or the equivalent shall be provided on all knife switches rated 600 to 1000 volts and designed for use in breaking current over 200 amperes.

404.27 Fused Switches.

Fused switches shall not have fuses in parallel except as permitted in 240.8.

404.28 Wire-Bending Space.

The wire-bending space required by 404.5 shall comply with Table 312.9(B)(2) spacings to the enclosure wall opposite the line and load terminals.

404.30 Switch Enclosures with Doors.

Switch mechanisms mounted within enclosures with doors that, when opened, expose uninsulated live parts shall be constructed so that access to the switch interior is restricted when the switch is in the closed position. Access to the interior with the switch in the closed position shall require the use of a tool or an approved design that provides equivalent protection from access by unqualified persons.

Additional Proposed Changes

File Name	Description	Approved
CN_10.pdf	NEC_PC10	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 10 appeared in the First Draft Report on First Revision No. 7914 and First Revision No. 7835.

The Correlating Committee directs that a task group be formed between CMP 10 and CMP 18 to review FR 7835 (created by CMP 9) for correlation with the changes CMP 18 created in FR 7914 and to verify that all requirements are located within the correct articles. This task group shall submit Public Comments to ensure the reorganized Article 404 for switches and Article 406 for Wiring Devices are correlated.

Related Item

• First Revision No. 7914 • First Revision No. 7835 •

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 29 16:28:08 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8579-NFPA 70-2024

Statement: The language was updated to be in accordance with 2.2.1 of the Style Manual. Snap switches was removed from 404.3(B) as such devices are wiring devices and not within the scope of Article 404. In 404.3(B)(1), the words “that are not wiring devices” have been added as the scope of Article 404 states that wiring devices are not covered by this article.

The existing language regarding damage of equipment by fire, products of combustion, corrosive influences or water has been moved to after the list of reconditioned items that are permitted.

Correlating Committee Note No. 10-NFPA 70-2024 [Article 404]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 10:19:37 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that a task group be formed between CMP 10 and CMP 18 to review FR 7835 (created by CMP 9) for correlation with the changes CMP 18 created in FR 7914 and to verify that all requirements are located within the correct articles. This task group shall submit Public Comments to ensure the reorganized Article 404 for switches and Article 406 for Wiring Devices are correlated.

First Revision No. 7914-NFPA 70-2024 [Global Input]

First Revision No. 7835-NFPA 70-2024 [Global Input]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James

Williams, David A.

Public Comment No. 1790-NFPA 70-2024 [Section No. 404.1(A)]

(A) Covered.

This article covers the installation of general-use switches, motor-circuit switches, isolating switches, pullout switches, circuit breakers used as switches, and molded case switches operating at voltages not over 1000 volts ac, 1500 volts dc, nominal.

Statement of Problem and Substantiation for Public Comment

Pullout switches manufactured in accordance with UL 1429 are commonly used but lack installation requirements in the NEC. The newly configured Article 404 is the appropriate location for them so they are added to the scope for ease of use. This comment was developed by a task group reviewing CN 47 consisting of Nathan Philips, Jim Rogers, Dirk Meuller, Keith Waters and Seth Carlton.

Related Item

- FR 8025, CN 47

Submitter Information Verification

Submitter Full Name: Nathan Philips
Organization: Integrated Electronic Systems
Affiliation: NECA
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 27 11:45:48 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Accepted
Resolution: SR-8576-NFPA 70-2024
Statement: Pullout switches manufactured in accordance with UL 1429 are commonly used but lack installation requirements in the NEC. The newly configured Article 404 is the appropriate location for pullout switches, so they have been added to the scope for ease of use.

Public Comment No. 1190-NFPA 70-2024 [Section No. 404.3]

404.3 Reconditioned Equipment.

(A) Permitted to be Installed.

Reconditioned knife switches, switches with butt contacts, and bolted pressure contact switches shall be permitted to be installed. If equipment has been damaged such as by fire, products of combustion, corrosive influences, or water, ~~it~~ it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(B) Not Permitted to be Installed.

The following reconditioned equipment shall not be installed:

(1) Lighting, dimmer, and electronics control switches

(2) Snap switches of any type

(3) Molded-case switches

Statement of Problem and Substantiation for Public Comment

Equipment may be damaged by fire, products of combustion, corrosive influences, or water but these are not the only factors that should be considered for evaluation before returning equipment to service. Adding "such as" does not limit "damage" to only four factors. This revision will clarify that damaged equipment shall be evaluated prior to returning to service.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 555-NFPA 70-2024 [Section No. 495.3]	
Public Comment No. 1188-NFPA 70-2024 [Section No. 408.3]	
Public Comment No. 555-NFPA 70-2024 [Section No. 495.3]	
Public Comment No. 1188-NFPA 70-2024 [Section No. 408.3]	

Related Item

- FR-7868

Submitter Information Verification

Submitter Full Name: David Hittinger
Organization: Independent Electrical Contractors
Affiliation: IEC Codes and Standards
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 16 22:21:13 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The proposed revision has not been made since it is unenforceable. The existing language identifies the specific types of damage, while the proposed revision would open up the requirement to any type of damage.

Public Comment No. 1721-NFPA 70-2024 [Section No. 404.3]

404.3 Reconditioned Equipment.

(A) Permitted ~~to be~~ or Installed.

Reconditioned knife switches, switches with butt contacts, and bolted pressure contact switches shall be permitted~~ to be installed~~ . If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(B) Not ~~Permitted to be~~ Permitted or Installed.

The following reconditioned equipment shall not be permitted or installed:

(1) Lighting, dimmer, and electronics control switches

(2) Snap switches of any type

(3) Molded-case switches

Statement of Problem and Substantiation for Public Comment

the change in first sub level division (A) makes sure that a switch can be reconditioned in place. It does not have to be removed and then installed to be permitted. If the reconditioning is able to be completed on installed equipment is should not be prohibited.

The change in the second sub level division (B) recognizes that the equipment that is not permitted to be reconditioned is not permitted whether it is being installed or reconditioned in place.

Related Item

• FR 7868

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich

Organization: Eaton Corporation

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 26 16:18:52 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8579-NFPA 70-2024

Statement: The language was updated to be in accordance with 2.2.1 of the Style Manual. Snap switches was removed from 404.3(B) as such devices are wiring devices and not within the scope of Article 404. In 404.3(B)(1), the words “that are not wiring devices” have been added as the scope of Article 404 states that wiring devices are not covered by this article.

The existing language regarding damage of equipment by fire, products of combustion, corrosive influences or water has been moved to after the list of reconditioned items that are permitted.

Public Comment No. 696-NFPA 70-2024 [Section No. 404.3]

404.3 Reconditioned Equipment.

(A) Permitted to be Installed.

Reconditioned knife switches, switches with butt contacts, and bolted pressure contact switches shall be permitted to be installed. If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(B) Not Permitted to be Installed.

The following reconditioned equipment shall not be installed:

(1) Lighting, dimmer, and electronics control switches

(2) Snap switches of any type

(3) Molded-case switches

Additional Proposed Changes

File Name	Description	Approved
CN_9.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 9 appeared in the First Draft Report on First Revision No. 7868.

The Correlating Committee directs that CMP 10 review FR 7868 and consider revising the text to align with recommended wording regarding reconditioning. The recommended wording for the first sentence in (A) is “The installation of the following reconditioned equipment shall be permitted:
(1) Knife switches
(2) Switches with butt contacts
(3) Bolted pressure contact switches”
The recommended wording for the first sentence in (B) would be “The installation of the following reconditioned equipment shall not be permitted:” Additionally CMP 10 shall remove items in 404.3(B) that are no longer covered within the scope of Article 404.
Note to CMP 1: CMP 10 has included the text “If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service” in Articles 404 and 408. Consider whether this is a general requirement and should be included in 110.11.

Related Item

• First Revision No. 7868

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 02 12:23:26 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8579-NFPA 70-2024

Statement: The language was updated to be in accordance with 2.2.1 of the Style Manual. Snap switches was removed from 404.3(B) as such devices are wiring devices and not within the scope of Article 404. In 404.3(B)(1), the words “that are not wiring devices” have been added as the scope of Article 404 states that wiring devices are not covered by this article.

The existing language regarding damage of equipment by fire, products of combustion, corrosive influences or water has been moved to after the list of reconditioned items that are permitted.

Correlating Committee Note No. 9-NFPA 70-2024 [Section No. 404.16]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 10:16:34 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 7868 and consider revising the text to align with recommended wording regarding reconditioning. The recommended wording for the first sentence in (A) is “The installation of the following reconditioned equipment shall be permitted:

(1) Knife switches

(2) Switches with butt contacts

(3) Bolted pressure contact switches”

The recommended wording for the first sentence in (B) would be “The installation of the following reconditioned equipment shall not be permitted:” Additionally CMP 10 shall remove items in 404.3(B) that are no longer covered within the scope of Article 404.

Note to CMP 1: CMP 10 has included the text “If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service” in Articles 404 and 408. Consider whether this is a general requirement and should be included in 110.11.

First Revision No. 7868-NFPA 70-2024 [Section No. 404.16]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.

Bowmer, Trevor N.

Hickman, Palmer L.

Holub, Richard A.

Jackson, Peter D.

Kendall, David H.

Manche, Alan

Osborne, Robert D.

Porter, Christine T.

Schultheis, Timothy James

Williams, David A.

Public Comment No. 550-NFPA 70-2024 [Section No. 404.3(B)]

(B) Not Permitted to be Installed.

The following reconditioned equipment shall not be installed:

(1) Lighting, dimmer, and electronics control switches

(2) ~~Snap switches of any type~~

(3) that are not wiring Devices

(4)

(5) Molded-case switches

Additional Proposed Changes

File Name	Description	Approved
404.3_B_Revision_.docx	404.3 (B) Revision Terra issue	

Statement of Problem and Substantiation for Public Comment

On behalf of the Correlating Committee, a Task Group consisting of Panel Members from both Panels 10 and 18 (Chuck Kurten, Frank Tse, Rob Roettgers, Doug Smith, Bob Fahey and Nathan Philips) were asked to ensure the reorganized Article 404 for Switches and Article 406 for Wiring Devices are correlated.

404.3 (B) Not Permitted to be Installed Item (1) has been modified to include "that are not Wiring Devices" has been added for clarity. No. (2) "Snap switches of any type have been deleted as these are types of Wiring Devices covered by Article 406. "Molded-case switches" were retained and re-numbered to No. (2). Note: Terra Issue - See "Additional Proposed Changes" for details

Related Item

• cc note 10

Submitter Information Verification

Submitter Full Name: Charles Kurten
Organization: UL Solutions
Street Address:
City:
State:
Zip:

Submittal Date: Wed Jul 31 11:17:29 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8579-NFPA 70-2024

Statement: The language was updated to be in accordance with 2.2.1 of the Style Manual. Snap switches was removed from 404.3(B) as such devices are wiring devices and not within the scope of Article 404. In 404.3(B)(1), the words “that are not wiring devices” have been added as the scope of Article 404 states that wiring devices are not covered by this article.

The existing language regarding damage of equipment by fire, products of combustion, corrosive influences or water has been moved to after the list of reconditioned items that are permitted.

404.3 Reconditioned Equipment.

(A) Permitted to be Installed.

Reconditioned knife switches, switches with butt contacts, and bolted pressure contact switches shall be permitted to be installed. If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(B) Not Permitted to be Installed.

The following reconditioned equipment shall not be installed:

(1) Lighting, dimmer, and electronics control switches

(2) Snap switches of any type

(3) Molded-case switches

Revise (B) only, shown below:

(B) Not Permitted to be Installed.

The following reconditioned equipment shall not be installed:

~~(1)~~(1) Lighting, dimmer, and electronic control switches that are not Wiring Devices

~~(2)Snap switches of any type~~

~~(3)~~(2) Molded-case switches

Public Comment No. 551-NFPA 70-2024 [Section No. 404.5(A)]

(A) General.

Switches and circuit breakers shall be of the externally operable type mounted in an enclosure listed for the intended use. The minimum wire-bending space at terminals and minimum gutter space provided in switch enclosures shall be as required in 312.9.

Exception No. 1: ~~Pendant- and surface-type snap switches and knife switches~~ Knife switches mounted on an open-face switchboard or panelboard shall be permitted without enclosures.

Exception No. 2: Switches and circuit breakers installed in accordance with 110.27(A)(1), 110.27(A)(2), 110.27(A)(3), or 110.27(A)(4) shall be permitted without enclosures.

Statement of Problem and Substantiation for Public Comment

On behalf of the Correlating Committee, a Task Group consisting of Panel Members from both Panels 10 and 18 (Chuck Kurten, Frank Tse, Rob Roettgers, Doug Smith, Bob Fahey and Nathan Philips) were asked to ensure the reorganized Article 404 for Switches and Article 406 for Wiring Devices are correlated.

404.5 Exception No. 1 has been modified by removing “Pendant-and surface-type snap switches” as these are Wiring Devices covered by Article 406 Wiring Devices.
Knife switches are retained.

Related Item

• cc note 10

Submitter Information Verification

Submitter Full Name: Charles Kurten
Organization: UL Solutions
Street Address:
City:
State:
Zip:

Submittal Date: Wed Jul 31 11:29:13 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Accepted
Resolution: SR-8580-NFPA 70-2024
Statement: The language was removed since pendant and surface-type snap switches are wiring devices and are outside the scope of Article 404.

Public Comment No. 1127-NFPA 70-2024 [Section No. 404.30]

404.30 Switch Enclosures with Doors.

~~Switch mechanisms mounted within enclosures~~ Enclosed Switches with doors that, when opened, expose uninsulated live parts shall be constructed so that access to the switch interior is restricted when the switch is in the closed position. Access to the interior with the switch in the closed position shall require the use of a tool or an approved design that provides equivalent protection from access by unqualified persons.

Statement of Problem and Substantiation for Public Comment

The existing 404.30 language covers switch mechanisms which are sub-components of a finished product. The NEC, 90.2(C), covers the installation of finished products and does not cover sub-components such as mechanisms. Updating the language to “enclosed switches” ensures that 404.30 is referring to a finished product and provides further clarity.

In addition, Pull-out switches would not have been covered using the current language. I would not characterize a pull-out switch as a mechanism. Thus, updating the language to “Enclosed switches” would include pull-out switches as well as switches with an internal switch mechanism

Related Item

- FR-7835

Submitter Information Verification

Submitter Full Name: Steve Chutka
Organization: Siemens
Affiliation: Siemens
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 15 15:40:35 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8581-NFPA 70-2024
Statement: The revision increases the safety of switches by requiring a dead-front when the switch can be opened without the use of a tool.

Public Comment No. 1758-NFPA 70-2024 [Section No. 404.30]

404.30 Switch Enclosures with Doors or Hinged Covers .

Switch mechanisms mounted within enclosures with doors ~~that, when opened, expose uninsulated live parts shall be constructed so that~~ or hinged covers shall be dead-front, unless access to the ~~switch~~ interior ~~is restricted when the switch is in the closed position. Access to the interior with the switch in the closed position shall~~ requires the use of a tool.

Exception: Switches mounted within enclosures with doors or hinged covers that are accessible only to qualified persons shall not be required to be dead-front or require the use of a tool ~~or an approved design that provides equivalent protection from access by unqualified persons~~ .

Statement of Problem and Substantiation for Public Comment

Section 404.30 restricts access to live parts to unqualified persons only when the switching device is in the closed "on" position. It does not prohibit access to uninsulated live parts to unqualified persons with the switch in the open "off" position. Access to uninsulated live parts to unqualified persons should not be conditional on the switching device position since a shock hazard is present regardless of the switching device position. Revisions to 404.30 are necessary to address this hazard by requiring a dead-front design, or requiring the use of a tool to gain access to areas with uninsulated live parts. The proposed revisions aligns this Section with the similar requirements in 408.38, and includes an exception for locations "accessible only to qualified persons." Additionally, the ability to provide an "approved design that provides equivalent protection" is vague and difficult to enforce, and is therefore removed.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1763-NFPA 70-2024 [Section No. 440.11]	
Public Comment No. 1763-NFPA 70-2024 [Section No. 440.11]	

Related Item

- Correlating Committee Note No. 47-NFPA 70-2024

Submitter Information Verification

Submitter Full Name: Bryan Tatum
Organization: Underwraters Laboratories
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 27 08:21:32 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8581-NFPA 70-2024
Statement: The revision increases the safety of switches by requiring a dead-front when the switch can be opened without the use of a tool.

Public Comment No. 813-NFPA 70-2024 [Article 408]

Article 408 Switchboards, Switchgear, Meter Sockets and Panelboards

Part I. General

408.1 Scope.

This article covers switchboards, switchgear, and panelboards. It does not apply to equipment operating at over 1000 volts ac, 1500 volts dc, nominal, except as specifically referenced elsewhere in this code.

408.3 Reconditioned Equipment.

The use of reconditioned equipment within the scope of this article shall be limited as described in 408.3(A) and 408.3(B) . If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(A) Permitted to be Installed.

Reconditioned switchboards and switchgear, or sections of switchboards or switchgear, shall be permitted to be installed.

(B) Not Permitted to be Installed.

Reconditioned panelboards shall not be installed.

408.4 Descriptions Required.

(A) Circuit Directory or Circuit Description.

Every circuit and circuit modification shall be provided with a legible and permanent description that complies with all of the following conditions as applicable:

(1) Located at each switch or circuit breaker in a switchboard or switchgear

(2) Included in a circuit directory that is located on the face of, inside of, or in an approved location adjacent to the panel door in the case of a panelboard

(3) Clear, evident, and specific to the purpose or use of each circuit including spare positions with an unused overcurrent device

(4) Described with a degree of detail and clarity that is unlikely to result in confusion between circuits

(5) Not dependent on transient conditions of occupancy

(6) Clear in explaining abbreviations and symbols when used

(B) Source of Supply.

All switchboards, switchgear, and panelboards supplied by a feeder(s) in other than one- or two-family dwellings shall be permanently marked in accordance with the following:

(1) With the identification and physical location of where the power originates

(2) With a label that is permanently affixed and of sufficient durability to withstand the environment involved

(3) Using a method that is not handwritten

408.5 Clearance for Conductor Entering Bus Enclosures.

Where conduits or other raceways enter a switchboard, switchgear, floor-standing panelboard, or similar enclosure at the bottom, approved space shall be provided to permit installation of conductors in the enclosure. The wiring space shall not be less than shown in Table 408.5 where the conduit or raceways enter or leave the enclosure below the busbars, their supports, or other obstructions. The conduit or raceways, including their end fittings, shall not rise more than 75 mm (3 in.) above the bottom of the enclosure.

Table 408.5 Clearance for Conductors Entering Bus Enclosures

Conductor	Minimum Spacing Between Bottom of Enclosure and Busbars, Their Supports, or Other Obstructions	
	mm	in.
Insulated busbars, their supports, or other obstructions	200	8
Noninsulated busbars	250	10

408.6 Short-Circuit Current Rating.

Switchboards, switchgear, and panelboards shall have a short-circuit current rating not less than the available fault current. In other than one- and two-family dwellings, switchboards, switchgear and panelboards shall comply with the following, as applicable:

(1) The available fault current at the line terminals and the date the calculation was performed shall be field marked in a readily accessible location on the enclosure at the point of supply.

(2) The short-circuit current rating of switchboards and panelboards, at nominal circuit voltage, based on the overcurrent protection devices installed, shall be field marked in a readily accessible location on the enclosure.

(3) The marking required by 408.6(1) and 408.6(2) shall comply with 110.21(B) .

(4) The available fault current calculation shall be documented and made available to those authorized to inspect, install, or maintain the installation.

(5) When modifications to the electrical installation occur that affect the available fault current at the line terminals of the equipment, the following shall apply:

(6) The available fault current shall be verified or recalculated as necessary to ensure the equipment ratings are sufficient for the available fault current at the line terminals of the equipment.

(7) The required field markings in 408.6(1) shall be adjusted to reflect the new level of available fault current.

When overcurrent protection devices are added or replaced, the interrupting rating of the replacement devices shall be equal to or greater than the available fault current marked on the equipment in accordance with 408.6(1) .

Informational Note: See 110.22 for series combination systems.

408.7 Unused Openings.

Unused openings for circuit breakers and switches shall be closed using identified closures, or other approved means that provide protection substantially equivalent to the wall of the enclosure.

408.9 Replacement Panelboards.

Replacement panelboards shall be permitted to be installed in existing enclosures in accordance with 408.9(A) or 408.9(B) .

(A) Panelboards Listed for the Specific Enclosure.

If the replacement panelboard is listed for the specific enclosure identified by either catalog number or dimensional information, the panelboard shall be permitted to maintain its short-circuit current rating.

(B) Panelboards Not Listed for the Specific Enclosure.

If the available fault current is greater than 10,000 amperes, the completed work shall be field labeled. If the available fault current is 10,000 amperes or less, the replacement panelboard shall be identified for the application. Any previously applied listing marks on the cabinet that pertain to the panelboard shall be removed.

408.10 Support and Arrangement of Busbars and Conductors.

(A) Conductors and Busbars on a Switchboard, Switchgear, or Panelboard.

Conductors and busbars on a switchboard, switchgear, or panelboard shall comply with 408.10(A)(1) and 408.10(A)(2) as applicable.

(1) Location.

Conductors and busbars shall be located to be free from physical damage and be held firmly in place.

(2) Same Vertical Section.

Other than required interconnections and control wiring, only those conductors that are intended for termination in a vertical section of a switchboard or switchgear shall be located in that section.

Exception: Conductors shall be permitted to travel horizontally through vertical sections of switchboards and switchgear where such conductors are isolated from busbars by a barrier.

(B) Overheating and Inductive Effects.

The arrangement of busbars and conductors shall be such that overheating due to inductive effects is avoided.

(C) Used as Service Equipment.

Each switchboard, switchgear, or panelboard, if used as service equipment, shall be provided with a main bonding jumper sized in accordance with 250.28(D) or the equivalent placed within the panelboard or one of the sections of the switchboard or switchgear for connecting the grounded service conductor on its supply side to the switchboard, switchgear, or panelboard frame. All sections of a switchboard or switchgear shall be bonded together using an equipment bonding jumper or a supply-side bonding jumper sized in accordance with 250.122 or 250.102(C)(1) as applicable.

Exception: Switchboards, switchgear, and panelboards used as service equipment on high-impedance grounded neutral systems in accordance with 250.36 shall not be required to be provided with a main bonding jumper.

(D) Terminals.

In switchboards and switchgear, load terminals for field wiring shall comply with 408.18(C).

(E) Bus Arrangement.

(1) ac Phase Arrangement.

Alternating-current phase arrangement on 3-phase buses shall be A, B, C from front to back, top to bottom, or left to right, as viewed from the front of the switchboard, switchgear, or panelboard. The B phase shall be that phase having the higher voltage to ground on 3-phase, 4-wire, delta-connected systems. Other busbar arrangements shall be permitted for additions to existing installations and shall be marked.

Exception: Equipment within the same single section or multisection switchboard, switchgear, or panelboard as the meter on 3-phase, 4-wire, delta-connected systems shall be permitted to have the same phase configuration as the metering equipment.

Informational Note: See 110.15 for requirements on marking the busbar or phase conductor having the higher voltage to ground where supplied from a 4-wire, delta-connected system.

(2) dc Bus Arrangement.

Direct-current ungrounded buses shall be permitted to be in any order. Arrangement of dc buses shall be field marked as to polarity, grounding system, and nominal voltage.

(F) Switchboard, Switchgear, or Panelboard Identification.

Caution signs or labels provided in accordance with 408.10(F)(1) through 408.10(F)(5) shall comply with 110.21(B).

(1) High-Leg Identification.

A switchboard, switchgear, or panelboard containing a 4-wire, delta-connected system where the midpoint of one phase winding is grounded shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION _____ PHASE HAS _____ VOLTS TO GROUND

(2) Ungrounded ac Systems.

A switchboard, switchgear, or panelboard containing an ungrounded ac electrical system as permitted in 250.21 shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION UNGROUNDED SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(3) High-Impedance Grounded Neutral ac Systems.

A switchboard, switchgear, or panelboard containing a high-impedance grounded neutral ac system in accordance with 250.36 shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION: HIGH-IMPEDANCE GROUNDED NEUTRAL AC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

(4) Ungrounded dc Systems.

A switchboard, switchgear, or panelboard containing an ungrounded dc electrical system in accordance with 250.169 shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION: UNGROUNDED DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(5) Resistively Grounded dc Systems.

A switchboard, switchgear, or panelboard containing a resistive connection between current-carrying conductors and the grounding system to stabilize voltage to ground shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION: DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

(G) Minimum Wire-Bending Space.

The minimum wire-bending space at terminals and minimum gutter space provided in switchboards, switchgear, and panelboards shall be as required in 312.9 .

408.14 Equipment Ratings.

All switchgear, switchboards, and panelboards shall have a current rating not less than the minimum load calculated in accordance with Article 120 , Part III, IV, or V, as applicable.

Part II. Switchboards and Switchgear

408.16 Switchboards and Switchgear in Damp or Wet Locations.

Switchboards and switchgear in damp or wet locations shall be installed in accordance with 312.4 .

408.17 Location Relative to Easily Ignitible Material.

Switchboards and switchgear shall be placed so as to reduce to a minimum the probability of communicating fire to adjacent combustible materials. Where installed over a combustible floor, suitable protection thereto shall be provided.

408.18 Clearances.

(A) From Ceiling.

For other than a totally enclosed switchboard or switchgear, a space not less than 900 mm (3 ft) shall be provided between the top of the switchboard or switchgear and any combustible ceiling, unless a noncombustible shield is provided between the switchboard or switchgear and the ceiling.

(B) Around Switchboards and Switchgear.

Clearances around switchboards and switchgear shall comply with the provisions of 110.26 .

(C) Connections.

Each section of equipment that requires rear or side access to make field connections shall be so marked by the manufacturer on the front. Section openings requiring rear or side access shall comply with 110.26 . Load terminals for field wiring shall comply with 408.18(C)(1) , 408.18(C)(2) , or 408.18(C)(3) as applicable.

(1) Equipment Grounding Conductors.

Load terminals for field wiring shall be so located that it is not necessary to reach across uninsulated ungrounded bus in order to make connections.

(2) Grounded Circuit Conductors.

Where multiple branch or feeder grounded circuit conductor load terminals for field wiring are grouped together in one location, they shall be so located that it is not necessary to reach across uninsulated ungrounded bus, whether or not energized, in order to make connections.

Where only one branch or feeder set of load terminals for field wiring are grouped with its associated ungrounded load terminals, they shall be so located that it is not necessary to reach across energized uninsulated bus including other branch or feeder bus in order to make connections. Bus on the line side of service, branch, or feeder disconnects is considered energized with respect to its associated load side circuits.

(3) Ungrounded Conductors.

Load terminals for ungrounded conductors shall be so located that it is not necessary to reach across energized uninsulated bus in order to make connections. Bus on the line side of service, branch, or feeder disconnects is considered energized with respect to its associated load side circuits.

408.19 Conductor Insulation.

An insulated conductor used within a switchboard or switchgear shall be listed, shall be flame retardant, and shall be rated not less than the voltage applied to it and not less than the voltage applied to other conductors or busbars with which it may come into contact.

408.20 Location of Switchboards and Switchgear.

Switchboards and switchgear that have any exposed live parts shall be located in permanently dry locations and then only where under competent supervision and accessible only to qualified persons. Switchboards and switchgear shall be located such that the probability of damage from equipment or processes is reduced to a minimum.

408.22 Grounding of Instruments, Relays, Meters, and Instrument Transformers on Switchboards and Switchgear.

Instruments, relays, meters, and instrument transformers located on switchboards and switchgear shall be grounded as specified in 250.170 through 250.178 .

408.23 Power Monitoring and Energy Management Equipment.

The requirements of 312.11(B) shall apply.

Part III. Panelboards

408.36 Overcurrent Protection.

In addition to the requirement of 408.14 , a panelboard shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard.

Exception No. 1: Individual protection shall not be required for a panelboard protected by two main circuit breakers or two sets of fuses in other than service equipment, having a combined rating not greater than that of the panelboard. A panelboard constructed or wired under this exception shall not contain more than 42 overcurrent devices. For the purposes of determining the maximum of 42 overcurrent devices, a 2-pole or a 3-pole circuit breaker shall be considered as two or three overcurrent devices, respectively.

Exception No. 2: For existing panelboards, individual protection shall not be required for a panelboard used as service equipment for an individual residential occupancy.

(A) Snap Switches Rated at 30 Amperes or Less.

Panelboards equipped with snap switches rated at 30 amperes or less shall have overcurrent protection of 200 amperes or less.

(B) Supplied Through a Transformer.

Where a panelboard is supplied through a transformer, the overcurrent protection required by 408.36 shall be located on the secondary side of the transformer.

Exception: A panelboard supplied by the secondary side of a transformer shall be considered as protected by the overcurrent protection provided on the primary side of the transformer where that protection is in accordance with 240.21(C)(1) .

(C) Delta Breakers.

A 3-phase disconnect or overcurrent device shall not be connected to the bus of any panelboard that has less than 3-phase buses. Delta breakers shall not be installed in panelboards.

(D) Back-Fed Devices.

Plug-in-type overcurrent protection devices or plug-in type main lug assemblies that are backfed and used to terminate field-installed ungrounded supply conductors shall be secured in place by an additional fastener that requires other than a pull to release the device from the mounting means on the panelboard.

408.37 Panelboards in Damp or Wet Locations.

Panelboards in damp or wet locations shall be installed to comply with 312.4 .

408.38 Enclosure.

Panelboards shall be mounted in cabinets, cutout boxes, or identified enclosures and shall be dead-front. Where the available fault current is greater than 10,000 amperes, the panelboard and enclosure combination shall be evaluated for the application.

Exception: Panelboards other than of the dead-front, externally operable type shall be permitted where accessible only to qualified persons.

408.39 Relative Arrangement of Switches and Fuses.

In panelboards, fuses of any type shall be installed on the load side of any switches.

Exception: Fuses installed as part of service equipment in accordance with the provisions of 230.94 shall be permitted on the line side of the service switch.

408.40 Grounding of Panelboards.

Panelboard cabinets and panelboard frames, if of metal, shall be in physical contact with each other and be connected to an equipment grounding conductor. Where the panelboard is used with nonmetallic raceway or cable or where separate equipment grounding conductors are provided, a terminal bar for the equipment grounding conductors shall be secured inside the cabinet. The terminal bar shall be bonded to the cabinet and panelboard frame, if of metal; otherwise it shall be connected to the equipment grounding conductor that is run with the conductors feeding the panelboard.

Exception: Where an isolated equipment grounding conductor for a branch circuit or a feeder is provided as permitted by 250.146(D) , the insulated equipment grounding conductor that is run with the circuit conductors shall be permitted to pass through the panelboard without being connected to the panelboard's equipment grounding terminal bar.

Equipment grounding conductors shall not be connected to a terminal bar provided for grounded conductors or neutral conductors unless the bar is identified for the purpose and is located where interconnection between equipment grounding conductors and grounded circuit conductors is permitted or required by Article 250 , Part II and Part VII.

408.41 Grounded Conductor Terminations.

Each grounded conductor shall terminate within the panelboard in an individual terminal that is not also used for another conductor.

Exception: Grounded conductors of circuits with parallel conductors shall be permitted to terminate in a single terminal if the terminal is identified for connection of more than one conductor.

408.43 Panelboard Orientation.

Panelboards shall not be installed in the face-up or face-down position.

Part IV. Construction Specifications

408.50 Panels.

The panels of switchboards and switchgear shall be made of moisture-resistant, noncombustible material.

408.51 Busbars.

Insulated or bare busbars shall be rigidly mounted.

408.52 Protection of Instrument Circuits.

Instruments, pilot lights, voltage (potential) transformers, and other switchboard or switchgear devices with potential coils shall be supplied by a circuit that is protected by standard overcurrent devices rated 15 amperes or less.

Exception No. 1: Overcurrent devices rated more than 15 amperes shall be permitted where the interruption of the circuit could create a hazard. Short-circuit protection shall be provided.

Exception No. 2: For ratings of 2 amperes or less, special types of enclosed fuses shall be permitted.

408.54 Maximum Number of Overcurrent Devices.

A panelboard shall be provided with physical means to prevent the installation of more overcurrent devices than that number for which the panelboard was designed, rated, and listed.

For the purposes of this section, a 2-pole circuit breaker or fusible switch shall be considered two overcurrent devices; a 3-pole circuit breaker or fusible switch shall be considered three overcurrent devices.

408.55 Wire-Bending Space Within an Enclosure Containing a Panelboard.

(A) Top and Bottom Wire-Bending Space.

The enclosure for a panelboard shall have the top and bottom wire-bending space sized in accordance with Table 312.9(B)(2) for the largest conductor entering or leaving the enclosure.

Exception No. 1: Either the top or bottom wire-bending space shall be permitted to be sized in accordance with Table 312.9(A) for a panelboard rated 225 amperes or less and designed to contain not over 42 overcurrent devices. For the purposes of this exception, a 2-pole or a 3-pole circuit breaker shall be considered as two or three overcurrent devices, respectively.

Exception No. 2: Either the top or bottom wire-bending space for any panelboard shall be permitted to be sized in accordance with Table 312.9(A) where at least one side wire-bending space is sized in accordance with Table 312.9(B)(2) for the largest conductor to be terminated in any side wire-bending space.

Exception No. 3: The top and bottom wire-bending space shall be permitted to be sized in accordance with Table 312.9(A) spacings if the panelboard is designed and constructed for wiring using only a single 90-degree bend for each conductor, including the grounded circuit conductor, and the wiring diagram shows and specifies the method of wiring that shall be used.

Exception No. 4: Either the top or the bottom wire-bending space, but not both, shall be permitted to be sized in accordance with Table 312.9(A) where there are no conductors terminated in that space.

(B) Side Wire-Bending Space.

Side wire-bending space shall be in accordance with Table 312.9(A) for the largest conductor to be terminated in that space.

(C) Back Wire-Bending Space.

Where a raceway or cable entry is in the wall of the enclosure opposite a removable cover, the distance from that wall to the cover shall be permitted to comply with the distance required for one wire per terminal in Table 312.9(A) . The distance between the center of the rear entry and the nearest termination for the entering conductors shall not be less than the distance given in Table 312.9(B)(2) .

408.56 Minimum Spacings.

The distance between uninsulated metal parts, busbars, and other uninsulated live parts shall not be less than specified in Table 408.56 .

Where close proximity does not cause excessive heating, parts of the same polarity at switches, enclosed fuses, and so forth shall be permitted to be placed as close together as convenience in handling will allow.

Exception: The distance shall be permitted to be less than that specified in Table 408.56 at circuit breakers and switches and in listed components installed in switchboards, switchgear, and panelboards.

Table 408.56 Minimum Spacings Between Bare Metal Parts

AC or DC Voltage	Opposite Polarity Where Mounted on the Same Surface		Opposite Polarity Where Held Free in Air		Live Parts to Ground*	
	mm	in.	mm	in.	mm	in.
Not over 125 volts, nominal	19.1	3/4	12.7	1/2	12.7	1/2
Not over 250 volts, nominal	31.8	1 1/4	19.1	3/4	12.7	1/2
Not over 1000 volts ac, 1500 volts dc, nominal	50.8	2	25.4	1	25.4	1

*For spacing between live parts and doors of cabinets, the dimensions in 312.101(A) shall apply.

408.58 Panelboard Marking.

Panelboards shall be durably marked by the manufacturer with the voltage and the current rating and the number of ac phases or dc buses for which they are designed and with the manufacturer's name or trademark in such a manner so as to be visible after installation, without disturbing the interior parts or wiring.

Statement of Problem and Substantiation for Public Comment

This is a title change for this Article related to the creation of a new Part V focusing on meter sockets and a change to the scope expanding to meter sockets.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 812-NFPA 70-2024 [Section No. 408.1]	
Public Comment No. 808-NFPA 70-2024 [Section No. 230.66]	
Public Comment No. 805-NFPA 70-2024 [New Part after IV.]	

Related Item

- PI 3165

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
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City:
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Submittal Date: Mon Aug 05 16:43:49 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but held

Resolution: More review is needed to appropriately add meter sockets to Article 408. The proposed revisions will be considered during the next revision cycle, since the revisions are new material.

Public Comment No. 812-NFPA 70-2024 [Section No. 408.1]

408.1 Scope.

This article covers switchboards, switchgear, meter sockets, and panelboards. It does not apply to equipment operating at over 1000 volts ac, 1500 volts dc, nominal, except as specifically referenced elsewhere in this code.

Statement of Problem and Substantiation for Public Comment

This change supports a new Part V that was added as part of public comment that relocates requirements found in Article 230 focusing on meter sockets.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 808-NFPA 70-2024 [Section No. 230.66]	
Public Comment No. 805-NFPA 70-2024 [New Part after IV.]	
Public Comment No. 813-NFPA 70-2024 [Article 408]	

Related Item

- PI 3165

Submitter Information Verification

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Submittal Date: Mon Aug 05 16:41:09 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but held

Resolution: More review is needed to appropriately add meter sockets to Article 408. The proposed revisions will be considered during the next revision cycle, since the revisions are new material.

Public Comment No. 1188-NFPA 70-2024 [Section No. 408.3]

408.3 Reconditioned Equipment.

The use of reconditioned equipment within the scope of this article shall be limited as described in 408.3(A) and 408.3(B). If equipment has been damaged such as by fire, products of combustion, corrosive influences, or ~~water, it~~ water it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(A) Permitted to be Installed.

Reconditioned switchboards and switchgear, or sections of switchboards or switchgear, shall be permitted to be installed.

(B) Not Permitted to be Installed.

Reconditioned panelboards shall not be installed.

Statement of Problem and Substantiation for Public Comment

Equipment may be damaged by fire, products of combustion, corrosive influences, or water but these are not the only factors that should be considered for evaluation before returning equipment to service. Adding "such as" does not limit "damage" to only four factors. This revision will clarify that damaged equipment shall be evaluated prior to returning to service.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 555-NFPA 70-2024 [Section No. 495.3]	
Public Comment No. 1190-NFPA 70-2024 [Section No. 404.3]	
Public Comment No. 555-NFPA 70-2024 [Section No. 495.3]	
Public Comment No. 1190-NFPA 70-2024 [Section No. 404.3]	

Related Item

- FR-8938

Submitter Information Verification

Submitter Full Name: David Hittinger
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Submittal Date: Fri Aug 16 22:08:23 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The proposed revision has not been made since it is unenforceable. The existing language identifies the specific types of damage, while the proposed revision would open up the requirement to any type of damage.

Public Comment No. 1447-NFPA 70-2024 [Section No. 408.3]

408.3 Reconditioned Equipment.

The use of reconditioned equipment within the scope of this article shall be limited as described in 408.3(A) and 408.3(B). If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service.

(A) Shall be Permitted- ~~to be Installed~~ .

Reconditioned switchboards and switchgear, or sections of switchboards or switchgear, shall be permitted- ~~to be installed~~ .

(B) – Shall Not be Permitted- ~~to be Installed~~ .

Reconditioned panelboards shall not be ~~installed~~ permitted .

Statement of Problem and Substantiation for Public Comment

This change seeks to ensure the integrity of equipment when reconditioned and add clarity for that equipment that is not permitted to be reconditioned.

the language change during the first draft focused on whether or not reconditioned equipment can be installed. The suggested language change in this public comment brings the text back to a shall or shall not be permitted and removes installed to address the fact that when equipment is not permitted to be reconditioned is not hinged on whether it is being installed or being reconditioned in place. A panelbaord, for example, that is currently installed and damaged to a point that would require reconditioning to bring it back into working condition, with the first draft could be reconditioned in place as it is not being installed. This activity should not be permitted.

In first-level subdivision (A) where reconditioning of equipment is permitted, the language now says it is permitted to be installed but is silent on whether or not you can recondition equipment that is in place. Larger equipment such as this which is rarely if ever removed, reconditioned, and then reinstalled leaves the inspector and others wondering about the requirements because it is not clear and could be interpreted that you are not permitted to recondition in place.

the suggested language adds clarity for reconditioned of equipment covered as part of Article 408.

Related Item

• FR 8938

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
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Submittal Date: Fri Aug 23 08:29:02 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8585-NFPA 70-2024
Statement: The language was updated to be in accordance with 2.2.1 of the Style Manual.

Public Comment No. 1965-NFPA 70-2024 [Section No. 408.6]

408.6 Short-Circuit Current Rating.

Switchboards, switchgear, and panelboards shall have a short-circuit current rating not less than the available fault current.~~ In other than one- and two-family dwellings, switchboards,~~ Switchboards, switchgear and panelboards shall comply with the following, as applicable:

(1) The available fault current at the line terminals and the date the calculation was performed shall be field marked in a readily accessible location on the enclosure at the point of supply.

(2) The short-circuit current rating of switchboards and panelboards, at nominal circuit voltage, based on the overcurrent protection devices installed, shall be field marked in a readily accessible location on the enclosure.

(3) The marking required by 408.6(1) and 408.6(2) shall comply with 110.21(B).

(4) The available fault current calculation shall be documented and made available to those authorized to inspect, install, or maintain the installation.

(5) When modifications to the electrical installation occur that affect the available fault current at the line terminals of the equipment, the following shall apply:

a. The available fault current shall be verified or recalculated as necessary to ensure the equipment ratings are sufficient for the available fault current at the line terminals of the equipment.

b. The required field markings in 408.6(1) shall be adjusted to reflect the new level of available fault current.

When overcurrent protection devices are added or replaced, the interrupting rating of the replacement devices shall be equal to or greater than the available fault current marked on the equipment in accordance with 408.6(1).

Informational Note: See 110.22 for series combination systems.

Statement of Problem and Substantiation for Public Comment

This comment requests the committee to reconsider the decision to resolve PI 955. As noted in PI 955, 400A residential panelboards are becoming more popular due to electrification initiatives. These panels are typically factory-configured with a standard 200A main breaker rated 22kAIC, with an open position for an optional secondary main breaker. The choices of secondary main breakers typically include ones that are rated 10kAIC. The optional secondary main breaker are most likely not be installed during the initial inspection. Without the benefit of field marked available short circuit current on the panelboard, there exists an unacceptable risk that a 10kAIC secondary main breaker, being installed months or years after the initial inspection, being installed into a panelboard subjected to a much higher available short circuit current.

Related Item

• Public Input 955

Submitter Information Verification

Submitter Full Name: Frank Tse
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Zip:

Submittal Date: Wed Aug 28 13:11:58 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Section 408.6 and 110.10 require panelboards in dwelling units to have a short-circuit current rating not less than the calculated fault current. The justification provided regarding a second main breaker for a panelboard is not clear.

Public Comment No. 2003-NFPA 70-2024 [Section No. 408.6]

408.6 Short-Circuit Current Rating.

Switchboards, switchgear, and panelboards shall have a short-circuit current rating not less than the available fault current. In other than one- and two-family dwellings, switchboards, switchgear and panelboards shall comply with the following, as applicable:

(1) The ~~available fault current at the line terminals and the date the calculation was performed shall be field marked in a readily accessible location on the enclosure at the point of supply.~~

(2) ~~The~~ short-circuit current rating of switchboards and panelboards, at nominal circuit voltage, based on the overcurrent protection devices installed, shall be field marked in a readily accessible location on the enclosure.

(3) The marking required by 408.6(1) and 408.6(2) shall comply with 110.21(B).

(4) The available fault current calculation shall be documented and made available to those authorized to inspect, install, or maintain the installation.

(5) When modifications to the electrical installation occur that affect the available fault current at the line terminals of the equipment, the following shall apply:

(6) ~~The available fault current shall be verified or recalculated as necessary to ensure the equipment ratings are sufficient for the available fault current at the line terminals of the equipment.~~

(7) ~~The required field markings in 408.6(1) shall be adjusted to reflect the new level of available fault current.~~

When overcurrent protection devices are added or replaced, the interrupting rating of the replacement devices shall be equal to or greater than the available fault current marked on the equipment in accordance with 408.6(1).

a. The available fault current shall be verified or recalculated as necessary to ensure the equipment ratings are sufficient for the available fault current at the line terminals of the equipment.

Informational Note: See 110.22 for series combination systems.

Statement of Problem and Substantiation for Public Comment

This comment looks much worse than it is. I'm attempting to delete item (1) and item 5(b) from the first draft. The available fault current does not need to be marked on the equipment. Calculations like this are done in software, typically, and are used to confirm equipment specified (and supplied) have the proper short circuit current rating for the available fault current. Field marking of this information isn't necessary, though. We already have field marking requirements for the arc-flash energy that's present so it can be safely operated, and that calculation is being updated on a cycle not to exceed 5 years, so this available fault current vs. SCCR is being checked - let's avoid the additional labeling, though, and the relabeling that would result. You could imagine that the available fault current could change some but still be well below the SCCR, yet by this language we'd be required to relabel the equipment in the field. This is just not necessary.

Related Item

• FR-8961

Submitter Information Verification

Submitter Full Name: Richard Holub

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Submittal Date: Wed Aug 28 15:06:42 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: Field marking of the available fault current is required to ensure that a breaker installed has an adequate AIC rating and the SCCR of the equipment is adequate.

Public Comment No. 371-NFPA 70-2024 [Section No. 408.6]

408.6 Short-Circuit Current Rating.

Switchboards, switchgear, and panelboards shall have a short-circuit current rating not less than the available fault current. In other than one- and two-family dwellings, switchboards, switchgear and panelboards shall comply with the following, as applicable:

(1) The available fault current at the line terminals and the date the calculation was performed shall be field marked in a readily accessible location on the enclosure at the point of supply.

(2) The short-circuit current rating of switchboards and panelboards, at nominal circuit voltage, based on the overcurrent protection devices installed, shall be field marked in a readily accessible location on the enclosure.

(3) The marking required by 408.6(1) and 408.6(2) shall comply with 110.21(B).

(4) The available fault current calculation shall be documented and made available to those authorized to inspect, install, or maintain the installation.

(5) When modifications to the electrical installation occur that affect the available fault current at the line terminals of the equipment, the following shall apply:

a. The available fault current shall be verified or recalculated as necessary to ensure the equipment ratings are sufficient for the available fault current at the line terminals of the equipment.

b. The required field markings in 408.6(1) shall be adjusted to reflect the new level of available fault current.

When overcurrent protection devices are added or replaced, the interrupting rating of the replacement devices shall be equal to or greater than the available fault current marked on the equipment in accordance with 408.6(1).

Informational Note: See 110.22 for series combination systems.

Additional Proposed Changes

File Name	Description	Approved
CN_38.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 38 appeared in the First Draft Report on First Revision No. 8961.

The Correlating Committee directs that CMP 10 review FR 8961 with respect to the use of the term “sufficient” in (5), as it is a vague term. Refer to NEC Style Manual Section 3.2.3.

Related Item

• First Revision No. 8961

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 12:07:05 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8588-NFPA 70-2024
Statement: The term “sufficient” has been replaced with “not less than” to avoid the use of unenforceable terms.

Correlating Committee Note No. 38-NFPA 70-2024 [Section No. 408.6]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Tue May 07 14:56:56 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs that CMP 10 review FR 8961 with respect to the use of the term “sufficient” in (5), as it is a vague term. Refer to NEC Style Manual Section 3.2.3.

First Revision No. 8961-NFPA 70-2024 [Section No. 408.6]

Ballot Results

✔ **This item has passed ballot**

12 Eligible Voters
1 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.
Bowmer, Trevor N.
Hickman, Palmer L.
Holub, Richard A.
Jackson, Peter D.
Kendall, David H.
Manche, Alan
Osborne, Robert D.
Porter, Christine T.
Schultheis, Timothy James
Williams, David A.

Public Comment No. 748-NFPA 70-2024 [Section No. 408.6]

408.6 Short-Circuit Current Rating.

Switchboards, switchgear, and panelboards shall have a short-circuit current rating not less than the available fault current. In other than one- and two-family dwellings, switchboards, switchgear and panelboards shall comply with the following, as applicable:

(1) The available fault current at the line terminals and the date the calculation was performed shall be field marked in a readily accessible location on the enclosure at the point of supply.

(2) The short-circuit current rating of switchboards and panelboards, at nominal circuit voltage, based on the overcurrent protection devices installed, shall be ~~field~~ marked in a readily accessible location on the enclosure.

(3) The marking required by 408.6(1) and 408.6(2) shall comply with 110.21(B).

(4) The available fault current calculation shall be documented and made available to those authorized to inspect, install, or maintain the installation.

(5) When modifications to the electrical installation occur that affect the available fault current at the line terminals of the equipment, the following shall apply:

a. The available fault current shall be verified or recalculated as necessary to ensure the equipment ratings are sufficient for the available fault current at the line terminals of the equipment.

b. The required field markings in 408.6(1) shall be adjusted to reflect the new level of available fault current.

~~When overcurrent protection devices are added or replaced, the interrupting rating of the replacement devices shall be equal to or greater than the available fault current marked on the equipment in accordance with 408.6(1)~~ :

Informational Note: See 110.22 for series combination systems.

Statement of Problem and Substantiation for Public Comment

There is no reason to require the short-circuit current rating to be field marked if it is already factory marked. That requirement makes good sense for item (1), it makes no sense for item (2).
The language regarding overcurrent deive installation is outside the scope of Article 408 and should be addressed in Article 240 (if anywhere). It could also be easily argued that 110.9 already covers the issue well enough it does not need repeating here.

Related Item

• FR 8961

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 04 15:24:56 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The factory installed marking typically provides guidance for determining the SCCR of the equipment based on the types of overcurrent protection devices installed within the equipment. Field marking is necessary to determine what the final SCCR is for the installation. The language of the last sentence is retained for completeness of the requirements.

Public Comment No. 1573-NFPA 70-2024 [New Section after 408.7]

TITLE OF NEW CONTENT

Type your content here ...

408.10. Cybersecurity

Switchboards, switchgear, and panelboards, located in life safety-related infrastructures, that are connected to a communication network and have the capability to be controlled or permit control of any portion of the premises shall comply with either of the following:

(1) The ability to control the switchboard, switchgear, and panelboard is limited to a direct connection through a local nonnetworked interface.

(2) The switchboard, switchgear, and panelboard is connected through a networked interface complying with both of the following methods:

a. The switchboard, switchgear, and panelboard are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment of the switchboard, switchgear, and panelboard is completed and documentation of the assessment and certification is available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards series* , UL 2900 *Cybersecurity Standard series* , or the NIST *Framework for Improving Critical Infrastructure Cybersecurity* , Version 1.1 for assessment requirements.

Informational Note No. 2: Examples used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities that could arise due to software defects, system configuration changes, or user interactions. Installation of devices that can be secured is an important first step but not sufficient to guarantee a secure system.

Informational Note No. 4: See NEMA CY70001-2023, *Cybersecurity Implementation Guidance for Connected Electrical Infrastructure* , for recommendations on how to meet this requirement.

Informational Note No. 5: Examples of life safety-related infrastructures include, but are not limited to, waste water treatment facilities, water supply facilities, police stations, call centers, financial centers, data centers, and military bases.

Statement of Problem and Substantiation for Public Comment

Let's examine each part of the Panel Statement to resolve PI 1244.

The Panel Statement "The submitter did not provide specific information on the history of switchboard, switchgear and panelboards equipment covered by article 408 and Cybersecurity events", can be addressed by an example of just how common cyber attacks on life safety related infrastructure have become. Let's look at just the water supply and waste water treatment industry. The DNI (Director of National Intelligence), through the CTIIC (Cyber Threat Intelligence Integration Center) recently released a report of 12 cyber attacks on the industrial control systems of water utilities, water systems, and waste water treatment systems, for the six-month period from November 2023 through April 2024. This report can be found at

https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.dni.gov/files/CTIIC/documents/products/Recent_Cyber_Attacks_on_US_Infrastructure_Underscore_Vulnerability_of_Crit June2024.pdf&ved=2ahUKEwi5gP7-m4eIAxUakYkEHasyIRQQFnoECB8QAQ&usg=AOvVaw3hJL2DMIRs-CECfmewcXVP

While this example covered attacks on industrial control systems, successful attacks can occur on all electrical equipment that is continuously connected to the internet and even equipment that is only connected to the internet during system updates. (Cyber attacks can lay quiet for years, waiting for an update, and then do their intended damage during the update.)

The Panel Statement "This PI is overly broad in scope, and would affect a very wide variety of equipment with unknown cost and complexity impact", has been addressed by the addition of the application-limiting phrase "located in life safety-related infrastructures". Informational Note No. 5 is added to give examples of life safety-related infrastructures.

EXAMPLE:

Let's look at an example of a waste water treatment facility. 110.3(A)(8) currently requires that the fire alarm system, because it is life safety equipment, be evaluated in light of cybersecurity. However, there is no requirement for other non-life safety systems within the waste water treatment plant, such as switchboards, which, if they were connected to the internet, could easily be compromised by a cyber attack. The proposed text in this Public Comment addresses the vulnerability of switchboards, switchgear, and panelboards located only in life safety-related infrastructure, adding examples of life safety-related infrastructure provided in Informational Note No. 5.

The Panel Statement "this PI, even with a five-year interval, would be woefully inadequate in guaranteeing Cybersecurity for this type of equipment and system" has been addressed by the deletion of the 5-year assessment intervals.

In addressing the Panel Statement "Such a guarantee of Cybersecurity can only result from ongoing persistent expert activity that is outside the scope of article 408 and outside the expertise of an AHJ to evaluate", it should be noted that it is the responsibility of the owner to maintain the level of cybersecurity that is provided when the equipment is installed. However, if the equipment is installed with inadequate cyber protection, there is little that the owner can do short of replacing the equipment. It should also be noted that, with the removal of the 5-year assessment interval, the electrical inspector is "out of the picture" after the initial installation.

As for the Panel Statement "is outside the scope of article 408", let's look at the actual text of the scope. It reads "This article covers switchboards, switchgear, and panelboards. It does not apply to equipment operating at over 1000 volts, except as specifically referenced elsewhere in the Code". After reviewing the actual text,

there is nothing in this Public Comment that is “outside the scope” of Article 408.

Finally, the Panel Statement “outside the expertise of an AHJ to evaluate” is addressed by the requirement in 2(a) that “The switchboard, switchgear, and panelboard and associated software are identified as being evaluated for cybersecurity”. "Identified" as applied to equipment, is defined in Article 100 as "Recognizable as suitable for the specific purpose, function, use, environment, application, and so forth, where described in a particular Code requirement. Informational Note: Some examples of ways to determine suitability of equipment for a specific purpose, environment, or application include investigations by a qualified testing laboratory (listing and labeling), an inspection agency, or other organization concerned with product evaluation." It is perfectly within the expertise of the electrical inspector if, per the requirement, the switchboard, switchgear, and panelboard is “identified” per the definition in Article 100.

Hackers can easily destroy unprotected equipment and shut down entire unprotected facilities. Our adversaries are continuously mounting cyber attacks on our life safety-related infrastructure. We have the ability, and obligation, to prevent this type of damage to our infrastructure from malicious cyber attacks. Informational Note No. 4 was added to correlate with FR 9040 (110.3(A)(8)), FR 9210 (240.6(D)), and FR 8219 (708.7).

THIS PUBLIC COMMENT SIMPLY REQUIRES THAT SWITCHBOARDS, SWITCHGEAR, AND PANELBOARDS, LOCATED ONLY IN LIFE SAFETY-RELATED INFRASTRUCTURES, EITHER NOT BE CONNECTED TO THE INTERNET, OR IF THEY ARE CONNECTED TO THE INTERNET, THAT THEY BE IDENTIFIED FOR CYBERSECURITY AND THAT AN ASSESSMENT IS PROVIDED.

Related Item

• PI 1244

Submitter Information Verification

Submitter Full Name: Vincent Saporita
Organization: Saporita Consulting
Street Address:
City:
State:
Zip:

Submittal Date: Sat Aug 24 08:23:26 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected

Resolution: The term “life-safety related infrastructure” is undefined and would be difficult to enforce. Appropriate requirements for such infrastructure should be proposed in Chapters 5-7 where such equipment may be installed for safety related functionality. Cybersecurity concerns for circuits breakers located within the identified equipment, that have the functionality identified by the public comment, are addressed as part of 240.6(D). Substantiation was not provided to expand this cybersecurity requirement to other devices including those that have the same vulnerability. Switchgear, switchboards and panelboards in and of themselves do not control loads. The language is not clear and could cause confusion.

Public Comment No. 322-NFPA 70-2024 [Section No. 408.10]

408.10 Support and Arrangement of Busbars and Conductors.

(A) Conductors and Busbars on a Switchboard, Switchgear, or Panelboard.

Conductors and busbars on a switchboard, switchgear, or panelboard shall comply with 408.10(A)(1) and 408.10(A)(2) as applicable.

(1) Location.

Conductors and busbars shall be located to be free from physical damage and be held firmly in place.

(2) Same Vertical Section.

Other than required interconnections and control wiring, only those conductors that are intended for termination in a vertical section of a switchboard or switchgear shall be located in that section.

Exception: Conductors shall be permitted to travel horizontally through vertical sections of switchboards and switchgear where such conductors are isolated from busbars by a barrier.

(B) Overheating and Inductive Effects.

The arrangement of busbars and conductors shall be such that overheating due to inductive effects is avoided.

(C) Used as Service Equipment.

Each switchboard, switchgear, or panelboard, if used as service equipment, shall be provided with a main bonding jumper sized in accordance with 250.28(D) or the equivalent placed within the panelboard or one of the sections of the switchboard or switchgear for connecting the grounded service conductor on its supply side to the switchboard, switchgear, or panelboard frame. All sections of a switchboard or switchgear shall be bonded together using an equipment bonding jumper or a supply-side bonding jumper sized in accordance with 250.122 or 250.102(C)(1) as applicable.

Exception: Switchboards, switchgear, and panelboards used as service equipment on high-impedance grounded neutral systems in accordance with 250.36 shall not be required to be provided with a main bonding jumper.

(D) Terminals.

In switchboards and switchgear, load terminals for field wiring shall comply with 408.18(C).

(E) Bus Arrangement.

(1) ac Phase Arrangement.

Alternating-current phase arrangement on 3-phase buses shall be A, B, C from front to back, top to bottom, or left to right, as viewed from the front of the switchboard, switchgear, or panelboard. The B phase shall be that phase having the higher voltage to ground on 3-phase, 4-wire, delta-connected systems. Other busbar arrangements shall be permitted for additions to existing installations and shall be marked.

Exception: Equipment within the same single section or multisection switchboard, switchgear, or panelboard as the meter on 3-phase, 4-wire, delta-connected systems shall be permitted to have the same phase configuration as the metering equipment.

Informational Note: See 110.15 for requirements on marking the busbar or phase conductor having the higher voltage to ground where supplied from a 4-wire, delta-connected system.

(2) dc Bus Arrangement.

Direct-current ungrounded buses shall be permitted to be in any order. Arrangement of dc buses shall be field marked as to polarity, grounding system, and nominal voltage.

(F) Switchboard, Switchgear, or Panelboard Identification.

Caution signs or labels provided in accordance with 408.10(F)(1) through 408.10(F)(5) shall comply with 110.21(B).

(1) High-Leg Identification.

A switchboard, switchgear, or panelboard containing a 4-wire, delta-connected system where the midpoint of one phase winding is grounded shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION _____ PHASE HAS _____ VOLTS TO GROUND

(2) Ungrounded ac Systems.

A switchboard, switchgear, or panelboard containing an ungrounded ac electrical system as permitted in 250.21 shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION UNGROUNDED SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(3) High-Impedance Grounded Neutral ac Systems.

A switchboard, switchgear, or panelboard containing a high-impedance grounded neutral ac system in accordance with 250.36 shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION: HIGH-IMPEDANCE GROUNDED NEUTRAL AC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

(4) Ungrounded dc Systems.

A switchboard, switchgear, or panelboard containing an ungrounded dc electrical system in accordance with 250.169 shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION: UNGROUNDED DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(5) Resistively Grounded dc Systems.

A switchboard, switchgear, or panelboard containing a resistive connection between current-carrying conductors and the grounding system to stabilize voltage to ground shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION: DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

(G) Minimum Wire-Bending Space.

The minimum wire-bending space at terminals and minimum gutter space provided in switchboards, switchgear, and panelboards shall be as required in 312.9.

Additional Proposed Changes

File Name	Description	Approved
CN_21.pdf	NEC_CN21	

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 21 appeared in the First Draft Report on First Revision No. 8952.

The Correlating Committee directs that a task group be formed with members from CMP 1 and CMP 10 to review the requirements covering the location of equipment markings for consistency and if general requirements should be located in 110.21(B).

Related Item

• First Revision No. 8952

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 29 16:55:43 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected
Resolution: The provisions of marking under 408.10 are not general marking requirements and are not relocated to 110.21(B).

Public Comment No. 1988-NFPA 70-2024 [Section No. 408.10(F)]

(F) Switchboard, Switchgear, or Panelboard Identification.

Caution signs or labels provided in accordance with 408.10(F)(1) through 408.10(F)(5) shall comply with 110.21(B).

(1) High-Leg Identification.

A switchboard, switchgear, or panelboard containing a 4-wire, delta-connected system where the midpoint of one phase winding is grounded shall be legibly and permanently field marked in a readily accessible location visible ~~while~~ prior to servicing the equipment as follows:

CAUTION _____ PHASE HAS _____ VOLTS TO GROUND

(2) Ungrounded ac Systems.

A switchboard, switchgear, or panelboard containing an ungrounded ac electrical system as permitted in 250.21 shall be legibly and permanently field marked in a readily accessible location visible ~~while~~ prior to servicing the equipment as follows:

CAUTION UNGROUNDED SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(3) High-Impedance Grounded Neutral ac Systems.

A switchboard, switchgear, or panelboard containing a high-impedance grounded neutral ac system in accordance with 250.36 shall be legibly and permanently field marked in a readily accessible location visible ~~while~~ prior to servicing the equipment as follows:

CAUTION: HIGH-IMPEDANCE GROUNDED NEUTRAL AC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

(4) Ungrounded dc Systems.

A switchboard, switchgear, or panelboard containing an ungrounded dc electrical system in accordance with 250.169 shall be legibly and permanently field marked in ~~a~~ a readily accessible location visible ~~while~~ prior to servicing the equipment as follows:

CAUTION: UNGROUNDED DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(5) Resistively Grounded dc Systems.

A switchboard, switchgear, or panelboard containing a resistive connection between current-carrying conductors and the grounding system to stabilize voltage to ground shall be legibly and permanently field marked in a readily accessible location visible ~~while~~ prior to servicing the equipment as follows:

CAUTION: DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

Statement of Problem and Substantiation for Public Comment

The use of warning or caution labels is to inform persons of the hazard before interacting with equipment, certainly not during or while servicing. Nor should it take the use of tools (other than keys) to access the warning label (Readily Accessible) This phrasing can also be viewed as a violation of OSH Act General Duty Clause. Persons have to be made aware of the hazard prior to interacting with, in, or around said hazard so that mitigation techniques can be employed for the hazard. That is hard to do if the warning label is only visible while servicing equipment.

Related Item

• FR-8952

Submitter Information Verification

Submitter Full Name: Jason Doty

Organization: International Brotherhood of Electrical Workers

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 28 14:10:49 EDT 2024

Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8589-NFPA 70-2024

Statement: The language is revised to clarify requirements concerning locations of markings. Deletions are also made to improve useability and avoid redundant language. Also, 408.10(F)(3) was updated to reflect proper reference to impedance grounded systems.

Public Comment No. 750-NFPA 70-2024 [Section No. 408.10(F)]

(F) Switchboard, Switchgear, or Panelboard Identification.

Caution signs or labels provided in accordance with 408.10(F)(1) through 408.10(F)(5) shall comply with 110.21(B). Labels shall be legible and permanently field-marked in a location that is visible while servicing the equipment

(1) High-Leg Identification.

A switchboard, switchgear, or panelboard containing a 4-wire, delta-connected system where the midpoint of one phase winding is grounded shall be ~~legibly and permanently field-~~ marked~~- in a location visible while servicing the equipment as follows~~ :

CAUTION _____ PHASE HAS _____ VOLTS TO GROUND

(2) Ungrounded ac Systems.

A switchboard, switchgear, or panelboard containing an ungrounded ac electrical system as permitted in 250.21 shall be ~~legibly and permanently field~~ marked~~- in a location visible while servicing the equipment as follows~~ :

CAUTION UNGROUNDED SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(3) High-Impedance Grounded Neutral ac Systems.

A switchboard, switchgear, or panelboard containing a high-impedance grounded neutral ac system in accordance with 250.36 shall be ~~legibly and permanently field-~~ marked~~- in a location visible while servicing the equipment as follows~~ :

CAUTION: HIGH-IMPEDANCE GROUNDED NEUTRAL AC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

(4) Ungrounded dc Systems.

A switchboard, switchgear, or panelboard containing an ungrounded dc electrical system in accordance with 250.169 shall be ~~legibly and permanently field-~~ marked~~- in a location visible while servicing the equipment as follows~~ :

CAUTION: UNGROUNDED DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(5) Resistively Grounded dc Systems.

A switchboard, switchgear, or panelboard containing a resistive connection between current-carrying conductors and the grounding system to stabilize voltage to ground shall be ~~legibly and permanently field-~~ marked~~- in a location visible while servicing the equipment as follows~~ :

CAUTION: DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

Statement of Problem and Substantiation for Public Comment

This suggested edit simply removes repetitive language.

Related Item

- FR 8952

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 04 15:31:07 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8589-NFPA 70-2024

Statement: The language is revised to clarify requirements concerning locations of markings. Deletions are also made to improve useability and avoid redundant language. Also, 408.10(F)(3) was updated to reflect proper reference to impedance grounded systems.

Public Comment No. 845-NFPA 70-2024 [Section No. 408.10(F)]

(F) Switchboard, Switchgear, or Panelboard Identification.

Caution signs or labels provided in accordance with 408.10(F)(1) through 408.10(F)(5) shall comply with 110.21(B).

(1) High-Leg Identification.

A switchboard, switchgear, or panelboard containing a 4-wire, delta-connected system where the midpoint of one phase winding is grounded shall be legibly and permanently field marked in a readily accessible location ~~visible while servicing the equipment as follows~~ on the enclosure :

CAUTION _____ PHASE HAS _____ VOLTS TO GROUND

(2) Ungrounded ac Systems.

A switchboard, switchgear, or panelboard containing an ungrounded ac electrical system as permitted in 250.21 shall be legibly and permanently field ~~marked~~ marked in a readily accessible location ~~visible while servicing the equipment as follows~~ on the enclosure :

CAUTION UNGROUNDED SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(3) High-Impedance Grounded Neutral ac Systems.

A switchboard, switchgear, or panelboard containing a high-impedance grounded neutral ac system in accordance with 250.36 shall be legibly and permanently field marked in a readily accessible location ~~visible while servicing the equipment as follows~~ on the enclosure :

CAUTION: HIGH-IMPEDANCE GROUNDED NEUTRAL AC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

(4) Ungrounded dc Systems.

A switchboard, switchgear, or panelboard containing an ungrounded dc electrical system in accordance with 250.169 shall be legibly and permanently field marked in a readily accessible location ~~visible while servicing the equipment as follows~~ on the enclosure :

CAUTION: UNGROUNDED DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS

(5) Resistively Grounded dc Systems.

A switchboard, switchgear, or panelboard containing a resistive connection between current-carrying conductors and the grounding system to stabilize voltage to ground shall be legibly and permanently field marked in a readily accessible location ~~visible while servicing the equipment as follows~~ on the enclosure :

CAUTION: DC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

Statement of Problem and Substantiation for Public Comment

The label needs to be located to "warn" before servicing servicing equipment to mitigate potential hazards. "Field marked in a readily accessible location on the enclosure" is similar language that is used in 408.6.

Related Item

• FR-8952

Submitter Information Verification

Submitter Full Name: David Hittinger
Organization: Independent Electrical Contractors
Affiliation: IEC Codes and Standards
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 06 14:35:55 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8589-NFPA 70-2024

Statement: The language is revised to clarify requirements concerning locations of markings. Deletions are also made to improve useability and avoid redundant language. Also, 408.10(F)(3) was updated to reflect proper reference to impedance grounded systems.

Public Comment No. 1359-NFPA 70-2024 [Section No. 408.10(F)(3)]

(3) High-Impedance Grounded Neutral ac Systems.

A switchboard, switchgear, or panelboard containing a ~~high-~~ impedance grounded neutral ac system in accordance with 250.36 shall be legibly and permanently field marked in a location visible while servicing the equipment as follows:

CAUTION: ~~HIGH-~~ IMPEDANCE GROUNDED NEUTRAL AC SYSTEM OPERATING — _____ VOLTS BETWEEN CONDUCTORS AND MAY OPERATE — _____ VOLTS TO GROUND FOR INDEFINITE PERIODS UNDER FAULT CONDITIONS

Statement of Problem and Substantiation for Public Comment

During the 2023 cycle, the term "high-impedance grounded" in 250.36 was changed to "impedance grounded."

Related Item

- FR 8952

Submitter Information Verification

Submitter Full Name: Mark Earley
Organization: Alumni Code Consulting
Affiliation: Self
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 21 13:22:03 EDT 2024
Committee: NEC-P10

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-8589-NFPA 70-2024

Statement: The language is revised to clarify requirements concerning locations of markings. Deletions are also made to improve useability and avoid redundant language. Also, 408.10(F)(3) was updated to reflect proper reference to impedance grounded systems.

Public Comment No. 805-NFPA 70-2024 [New Part after IV.]

Part V Meter Sockets

408.65 Ratings

Meter sockets shall be listed and marked with their ratings.

(A) Service Applications

Meter sockets used in service applications shall be rated for the voltage and current rating of the service equipment. The meter socket shall be protected by an overcurrent protective device having a rating not greater than that of the meter socket. Overcurrent protection is permitted on the line side or load side of the meter socket.

Exception: Meter sockets supplied by and under the exclusive control of an electric utility shall not be required to be listed

(B) Non Service Applications

Meter sockets shall be protected by an overcurrent protective device having a rating not greater than that of the meter socket.

(C) Fire Pump Applications

Meter sockets applied on fire pump circuits shall have a rating at least that of the branch circuit or feeder ampacity.

(D) Short-Circuit Current Rating

Meter sockets shall have a short-circuit current rating not less than the available fault current. In other than one- and two-family dwelling units, the available fault current and the date the calculation was performed shall be field marked on the enclosure at the point of supply. The marking shall be of sufficient durability to withstand the environment involved.

Statement of Problem and Substantiation for Public Comment

Meter socket application code requirements are missing in a large part from the National Electrical Code. This addition does a few things.
1. The existing requirements found in Section 230.66(B) titled Meter sockets is being relocated to this section. The requirements found there are in Section 230.66 which is titled Marking but the requirements in 230.66(B) are not marking related.
2. This new part introduces general requirements for meter sockets addressing SCCR requirements and proper sizing of the meter socket. Meter socket applications addressed include when used in a service application, fire pump application, and when not either of those applications. The NEC is silent on these topics.

Related Item

• PI 3165

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Committee: NEC-P10

Committee Statement

Committee Action: Rejected but held

Resolution: More review is needed to appropriately add meter sockets to Article 408. The proposed revisions will be considered during the next revision cycle, since the revisions are new material.