Public Comment No. 1642-NFPA 70-2024 [Global Input]

This Global Public Comment is for CMP-2 to review the use of the terms "overcurrent", "overcurrent protective devices" and "overcurrent protection".

Additional Proposed Changes

File Name	Description	Approved
CMP-2_OCPD_TG-4_CMP-10.pdf	CMP-2_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 21:35:26 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7532-NFPA 70-2024
Statement: The modifications made align with the new defined term "overcurrent protective device (OCDP)" Aligns with defined terms.

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-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. 527-NFPA 70-2024 [Global Input]

The CMPs are directed to review references to Article 220 in the articles under their purview and make necessary revisions based on Article 220 being relocated to Article120.

Additional Proposed Changes

File Name	Description	Approved
CN_212.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 212 appeared in the First Draft Report.

The CMPs are directed to review references to Article 220 in the articles under their purview and make necessary revisions based on Article 220 being relocated to Article 120.

Related Item

• Correlating Committee Note No. 212

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 23:08:41 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: All references under the purview of CMP-2 were correct in the First Draft Report. No additional changes needed.

Correlating Committee Note No. 212-NFPA 70-2024 [Global Input]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Thu May 09 11:53:08 EDT 2024

Committee Statement and Meeting Notes

Committee Statement: The CMPs are directed to review references to Article 220 in the articles under their purview and make necessary revisions based on Article 220 being relocated to Article 120.

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. 556-NFPA 70-2024 [Global Input]

220.5C took out the wording for the garage which is now included in the square footage for general lighting. However 220.82B1 still includes the wording that garages shall not be included in the square footage for general lighting. Is this an oversight?

Statement of Problem and Substantiation for Public Comment

Make the square footage calculation the same for both standard and optional methods.

Related Item

• Chapter 2

Submitter Information Verification

Submitter Full Name: Robert McChesney

Organization: Perry Technical Institute

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jul 31 16:35:28 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: First Revision 8082 modified 120.82(B)(1) (formerly 220.82(B)(1)) to address inconsistencies that have emerged between 120.5(C) and 220.82(B)(1). Rather than repeat the text from 120.5(C), a reference to that sub-section is now provided in 120.82(B)(1).

Public Comment No. 2066-NFPA 70-2024 [Definition: Branch Circuit, Individual. (Individual Branch ...]

Branch Circuit, Individual. (Individual Branch Circuit)

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

Statement of Problem and Substantiation for Public Comment

The proposed revision clarifies that an outlet is always present.

Related Item

- PI #1344

Submitter Information Verification

Submitter Full Name:	James Stallcup
Organization:	Stallcup Electrical Education
Affiliation:	Stallcup Electrical Education
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Aug 28 17:45:51 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	The suggested language would introduce unintended consequences for an individual branch circuit. An example of an unintended consequence is as follows: A 6-gang box with six duplex receptacles is one receptacle outlet that could serve multiple pieces of utilization equipment. This 6-gang box with six duplex receptacles, should this change be made, would then meet the definition of an individual branch circuit.

Public Comment No. 1020-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter (GFCI).]

Ground-Fault Circuit Interrupter (GFCI), Class A .

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.

Statement of Problem and Substantiation for Public Comment

This PC is editorial and will only be needed if CMP-2 acts favorably on PCs 1018 and 1019, that proposed the addition of new individual definitions for GFCI Classes C, D, and E to improve code clarity and usability.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1018-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]	Complementary
Public Comment No. 1019-NFPA 70-2024 [New Definition after Definition: Ground-Fault Circuit Inter...]	Complementary
Public Comment No. 1018-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]	
Public Comment No. 1019-NFPA 70-2024 [New Definition after Definition: Ground-Fault Circuit Inter...]	

Related Item

- FR-7606

Submitter Information Verification

Submitter Full Name: Nehad El-Sherif
Organization: MNKYBR Technologies Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 11 05:26:53 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7516-NFPA 70-2024
Statement: Adding “(Class A GFCI)” to the definition of a GFCI adds clarity and is consistent with changes made to other types of GFCIs being introduced to the NEC.

Public Comment No. 1018-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]

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~~ term used by UL to refer to GFCI Classes C, D, and E . (CMP-2)

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

Statement of Problem and Substantiation for Public Comment

The term SPGFCI is the title of UL 943C and not a defined term and is used in UL 943C to collectively refer to GFCI Classes C, D, and E. This PC is submitted along with other PCs to add definitions for GFCI Classes C, D, and E.

Adding individual definitions for GFCI classes will allow code making panels to specify the appropriate GFCI class to be used. Therefore, improving code clarity and usability by avoiding any confusion/uncertainty that may arise when deciding which GFCI class to install.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1019-NFPA 70-2024 [New Definition after Definition: Ground-Fault Circuit Inter...]	Complementary
Public Comment No. 1020-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter (GFCI).]	Complementary
Public Comment No. 1019-NFPA 70-2024 [New Definition after Definition: Ground-Fault Circuit Inter...]	
Public Comment No. 1020-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter (GFCI).]	

Related Item

- FR-7606

Submitter Information Verification

Submitter Full Name: Nehad El-Sherif

Organization: MNKYBR Technologies Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Sun Aug 11 04:43:36 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7518-NFPA 70-2024

Statement: The definition is being modified to recognize that new defined terms have been added for SPGFCI Classes C, D, and E. The SPGFCI definition provides a general overview and identifies that a SPGFCI can be any one of these classes of devices.

Public Comment No. 1972-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]

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

A device intended for the ~~detection of ground-fault currents~~ protection of personnel that functions to de-energize a circuit or portion of a circuit within an established period of time when ground-fault current exceeds the values 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.

Statement of Problem and Substantiation for Public Comment

The Class C, D, and E Special-Purpose Ground-Fault Circuit-Interrupters are based on the same time/current protection curve outlined in UL 943 for Class A devices. While Class C, D, and E devices utilize a higher pickup level of 15-20 mA, they must also employ a ground monitor/interrupter circuit. SPGFIs rely on equipment grounding, in combination with the 15-20 mA ground-fault protection, to provide let-go protection. FR7606 for the SPGFCI definition was a good change to correct the issue with the voltage rating in the 2023 edition. This addition proposed here helps to clarify the protection offered by SPGFCI devices.

As a reference, this concept is also used for EV chargers with AC supply, as outlined in the UL 2231-1 and UL 2231-2 standards talking about personnel protection for EV supply circuits. In this application, charger manufacturers can choose to either utilize CCID5 standalone ground-fault protection (5 +/-1 MIU), or CCID20 ground-fault protection (15-20 MIU) with ground monitoring.

Related Item

- PI 4523

Submitter Information Verification

Submitter Full Name: Mark Pollock

Organization: Littelfuse

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 28 13:36:57 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The definition of SPGFCI has been modified and the language being commented on no longer exists. The intent of the public comment is captured through the new definitions for SPGFCI Classes C, D, and E.

Public Comment No. 967-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]

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~~ a 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.

Statement of Problem and Substantiation for Public Comment

This PI proposes to remove the redundantly stated word "established" to improve clarity of the definition.

Related Item

- FR 7606

Submitter Information Verification

Submitter Full Name: Vincent Della Croce
Organization: Siemens
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 08 10:44:36 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The definition of SPGFCI has been modified and the language being commented on no longer exists. The intent of the public comment is captured through the new definitions for SPGFCI Classes C, D, and E.

Public Comment No. 1019-NFPA 70-2024 [New Definition after Definition: Ground-Fault Circuit Inter...]

Ground-Fault Circuit Interrupter (GFCI), Class C.

A ground-fault circuit-interrupter that is intended to be used in circuits with no conductor over 300 V AC to ground where reliable equipment grounding or double insulation is provided.

Informational Note 1: See UL 943C, Outline of Investigation for Special-Purpose Ground-Fault Circuit Innterrupters. Class C ground-fault circuit interrupters trip when the ground-fault current is 20 mA or higher and do not trip when the ground-fault current is less than 15 mA.

Informational Note 2: To provide limited-let-go protection, Class C ground-fault circuit interrupters are permitted to have a trip threshold greater than 6 mA but less than 15 mA.

Ground-Fault Circuit Interrupter (GFCI), Class D.

A ground-fault circuit-interrupter that is intended to be used in circuits with one or more conductors over 300 volts to ground, and with specially sized, reliable grounding, to provide a low impedance path so that the voltage across the body during a fault does not exceed 150 volts.

Informational Note: See UL 943C, Outline of Investigation for Special-Purpose Ground-Fault Circuit Innterrupters. Class D ground-fault circuit interrupters trip when the ground-fault current is 20 mA or higher and do not trip when the ground-fault current is less than 15 mA.

Ground-Fault Circuit Interrupter (GFCI), Class E.

A ground-fault circuit-interrupter that is intended to be used in circuits with one or more conductors over 300 volts to ground but with conventional equipment grounding provided for the protected equipment in the system or double insulation. These ground-fault circuit-interrupters respond rapidly to open the circuit before the magnitude and duration of the current flowing through the person's body exceeds the limits for ventricular fibrillation.

Informational Note: See UL 943C, Outline of Investigation for Special-Purpose Ground-Fault Circuit Innterrupters. Class E ground-fault circuit interrupters trip when the ground-fault current is 20 mA or higher and do not trip when the ground-fault current is less than 15 mA.

Additional Proposed Changes

File Name	Description	Approved
UL_definitions_of_GFCI_Classes_C_D_E.png	GFCI Classes C, D, and E definitions in UL 943C	
Tripping_Range_of_Classes_C_D_E.png	GFCI Classes C, D, and E tripping range in UL 943C	

Statement of Problem and Substantiation for Public Comment

This PC adds individual definitions for GFCI Classes C, D, and E. These new definitions are adopted from UL 943C, the UL document that specifies the requirements for these GFCI classes.

Adding individual definitions for GFCI classes will allow code making panels to specify the appropriate GFCI class to be used. Therefore, improving code clarity and usability by avoiding any confusion/uncertainty that may arise when deciding which GFCI class to install.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1018-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]	Complementary
Public Comment No. 1020-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter (GFCI).]	Complementary
Public Comment No. 1018-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]	
Public Comment No. 1020-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter (GFCI).]	

Related Item

- FR-7606

Submitter Information Verification

Submitter Full Name: Nehad El-Sherif

Organization: MNKYBR Technologies Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Sun Aug 11 05:05:53 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7511-NFPA 70-2024

Statement: This second revision includes one of three new defined terms which include Class C, D, and E special purpose GFCIs. Each term is used in the definition of a special purpose GFCI. Providing a clear definition for these terms is important for clarity in the proper application of these solutions.

The following second revisions are related to PC-1019, SR 7511, SR 7513 and SR 7514.

Public Comment No. 1902-NFPA 70-2024 [New Definition after Definition: Ground-Fault Circuit Inter...]

Ground-Fault Circuit Interrupter, High Frequency (HF).

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 the frequency weighted differential current exceeds the values established for a Class A device listed as High Frequency.

Informational Note: See UL 943, *Standard for Ground-Fault Circuit Interrupters*, for further information. High Frequency ground-fault circuit interrupters do not trip when the frequency weighted differential current is less than 4 mA.

Statement of Problem and Substantiation for Public Comment

The UL 943 standard for GFCIs is being updated to reduce nuisance tripping on loads which contain modernized electrical components such as LED drivers, switched-mode power supplies, and variable frequency drives.

In the UL 943 preliminary review draft (April 2024), this modernized GFCI was referred to as Class A-HF. The next version of the UL 943 draft (expected Q3/Q4 2024) will change Class A-HF to a High Frequency (HF) rating. Although the name is changing, the underlying technical specifications are not.

This change to the First Draft will better align language in the NEC with the latest language in UL standards work.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1900-NFPA 70-2024 [Section No. 422.5]	

Related Item

- FR 7788

Submitter Information Verification

Submitter Full Name:	Greg Woyczynski
Organization:	Association of Home Appliance
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 27 22:25:04 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	Information regarding the performance of these devices was added as part of an informational note to 210.8 instead of adding a new defined term.

Public Comment No. 710-NFPA 70-2024 [Section No. 120.1]

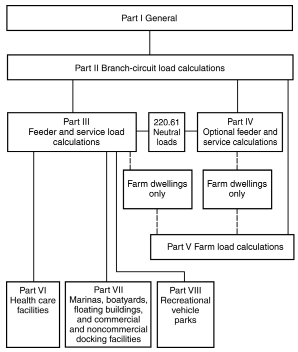
120.1 Scope.

This article provides requirements for calculating branch-circuit, feeder, and service loads. Part I provides general requirements for calculation methods. Part II provides calculation methods for branch-circuit loads. Part III and Part IV provide calculation methods for feeder and service loads. Part V provides calculation methods for farm loads. Part VI provides calculation methods for health care facilities. Part VII provides calculation methods for marinas, boatyards, floating buildings, and commercial and noncommercial docking facilities.

Informational Note No. 1: See Informative Annex D for examples.

Informational Note No. 2: See Figure Informational Note 120.1 for information on the organization of this article.

Figure Informational Note 120.1 Branch-Circuit, Feeder, and Service Load Calculation Methods.



Additional Proposed Changes

File Name	Description	Approved
CN_213.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 213 appeared in the First Draft Report.

The Correlating Committee directs CMP 2 to revise the scope as it relates to the addition of Article 220, Part VIII, Recreational Vehicle Parks. Additionally the phrase "commercial and noncommercial" needs to be revised in the scope and informational note figure for correlation with the title of Article 555.

Related Item

• Correlating Committee Note No. 213

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 02 14:11:25 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7777-NFPA 70-2024
Statement: The Scope of Article 120 and Figure 120.1 are revised to reflect the correct title for Part VII and the addition of Part VIII.

Correlating Committee Note No. 213-NFPA 70-2024 [Section No. 220.1]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Thu May 09 11:59:26 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to revise the scope as it relates to the addition of Article 220, Part VIII, Recreational Vehicle Parks. Additionally the phrase "commercial and noncommercial" needs to be revised in the scope and informational note figure for correlation with the title of Article 555.

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. 712-NFPA 70-2024 [Section No. 120.3]

120.3 Other Articles for Specific-Purpose Calculations.

Table 120.3 shall provide references for specific-purpose calculation requirements not located in Chapters 5, 6, or 7 that amend or supplement the requirements of this article.

Table 120.3 Specific-Purpose Calculation References

Calculation	Article	Section (or Part)
Air-conditioning and refrigerating equipment, branch-circuit conductor sizing	440	Part IV
Capacitors	460	460.8
Fixed electric heating equipment for pipelines and vessels, branch-circuit sizing	427	427.4
Fixed electric space-heating equipment, branch-circuit sizing	424	424.4
Fixed outdoor electric deicing and snow-melting equipment, branch-circuit sizing	426	426.4
Fixed resistance and electrode industrial process heating equipment	425	425.4
Motors, feeder demand factor	430	430.26
Motors, multimotor and combination-load equipment	430	430.25
Motors, several motors or a motor(s) and other load(s)	430	430.24
Over 1000-volt ac and 1500-volt dc branch-circuit calculations	235	235.19
Over 1000-volt feeder calculations	215	236.4
Phase converters, conductors	455	455.6
Storage-type water heaters	422	422.13

Additional Proposed Changes

File Name	Description	Approved
CN_216.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 216 appeared in the First Draft Report.

The Correlating Committee directs CMP-2 to review 220.3 and relocate this material to comply with Section 2.2.1 of the NEC Style Manual covering parallel numbering.

Related Item

- Correlating Committee Note No. 216

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 02 14:16:04 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7779-NFPA 70-2024

Statement: Section 120.3 is relocated to 120.4 to comply with Section 2.2.1 of the NEC Style Manual. Section 120.3 is reserved for “Reconditioned Equipment”.

Correlating Committee Note No. 216-NFPA 70-2024 [Section No. 220.3]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Thu May 09 12:09:48 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to review 220.3 and relocate this material to comply with Section 2.2.1 of the NEC Style Manual covering parallel numbering.

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. 1889-NFPA 70-2024 [Section No. 120.5(A)]

(A) Voltages.

Unless other voltages are specified, for purposes of calculating branch-circuit and feeder loads, nominal system voltages of 120, 120/240, 208Y/120, 240, 347, 416Y/240, 480Y/277, 480, 600Y/347, and 600 volts shall be used.

Informational Note: DC electrical systems are often described with a nominal voltage and a wide voltage band. For DC electrical systems with a wide voltage band, both the upper and lower limits of the bands are important considerations for load calculations.

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.

DC electrical systems may have a wide range of upper and lower voltage limits due to variable power generation, and the system may operate indefinitely under these conditions. Additionally, the load current drawn by the utilization equipment may be significantly different between the nominal, maximum or minimum voltages. Furthermore, the maximum current drawn by the utilization equipment may not occur at the maximum voltage. The proposed informational note provides the user with clarity that both the maximum and minimum voltage limits are important considerations when conducting load calculations for such DC electrical systems.

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 21:11:57 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7782-NFPA 70-2024

Statement: DC electrical systems may have a wide range of upper and lower nominal voltage limits due to variable power generation, and the system may operate indefinitely under these conditions. Additionally, the load current drawn by the utilization equipment may be significantly different between the nominal, maximum or minimum voltages. Furthermore, the maximum current drawn by the utilization equipment may not occur at the maximum voltage. The informational note provides the user with clarity that both the maximum and minimum voltage limits are important considerations when conducting load calculations for such DC electrical systems.

Public Comment No. 1754-NFPA 70-2024 [Section No. 120.7]

120.7 Power Control System (PCS).

PCS compliant with Article 130 shall be permitted to be ~~used for~~ considered in branch-circuit, feeder, or service load calculations~~. When used in load calculations, the installation shall comply with 120.7(A) through 120.7(D) .~~

~~**(A)** PCS Requirements.~~

~~The PCS shall comply with Article 130, Part II.~~

~~**(B)** PCS Current Setpoint.~~

~~The PCS current setpoint shall be determined by qualified personnel and shall be set to no greater than 80 percent of the rating of the overcurrent protective device for the circuit for which the PCS is providing overload control.~~

~~**(C)** Load Calculations Using PCS.~~

~~Load calculations that use PCS shall be based on the monitoring and control configuration of the PCS and shall comply with one or both of the following:~~

(1) ~~Monitoring only controlled loads: When the PCS monitors only controlled loads, the current setpoint of the PCS shall be used in place of the controlled loads in load calculations.~~

(2) ~~Monitoring controlled and noncontrolled loads: When the PCS monitors both controlled and noncontrolled loads, the minimum operating current of the controlled loads shall be used in load calculations.~~

~~Informational Note: Minimum operating current is a value greater than or equal to zero representing the minimum current allowed for each load by the PCS.~~

~~**(D)** Noncontrolled Loads.~~

~~The load calculations for loads that are not controlled by the PCS shall meet the requirements in Article 120, Parts II through VII~~

, provided that the PCS current setpoints were determined by qualified personnel and suitably labeled on the PCS equipment via a durable method. Loads controlled by the PCS the load shall be treated as 0 watts (volt-amperes) unless a higher minimum is described on the durable labeling. All non-controlled loads must be calculated per their usual methods .

Informational Note: See Informative Annex D, Examples ~~D14(a) through D14(d) for examples of load calculations with~~ D15 for loads managed by PCS.

Statement of Problem and Substantiation for Public Comment

As written, this seemed longer than needed to clearly state the intent.

The entire point of a PCS is to control loads. The 80% derating for continuous loads should be handled in Article 130, not here.
Not all PCS switched loads are continuous, and anyway the PCS is in the right place to switch loads on and off to ensure the intent of the 125%/80% rule for the upstream wiring is maintained regardless of conditions.

The real purpose of a PCS from a load calculation point of view is to ramp switched loads down to zero, which is what this rewrite intends to make clear with as little text as possible.

The full text without change bars is :

120.7 Power Control System (PCS).
PCS compliant with Article 130 shall be permitted to be considered in branch-circuit, feeder, or service load calculations, provided that the PCS current setpoint was determined by qualified personnel and suitably labeled on the PCS equipment via a durable method. Loads controlled by the PCS shall be treated as 0 watts (volt-amperes) unless a higher minimum is described on the durable labeling. All non-controlled loads must be calculated per their usual methods.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1753-NFPA 70-2024 [Section No. 120.57]	

Related Item

- Public Input No. 4238-NFPA 70-2023 [Section No. 220.57] (for zeroing out loads)
- Public Input No. 3025-NFPA 70-2023 [Section No. 220.70] (for unmanaged loads)

Submitter Information Verification

Submitter Full Name:	Bryce Nesbitt
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Submittal Date:	Tue Aug 27 03:16:30 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7785-NFPA 70-2024

Statement: Revisions were made to align terminology with the product standard for Power Control Systems, UL 3141 - changing “current setpoint” to “control setting”. “Minimum operating current” is necessary to allow for use of PCS in scenarios where both controlled and non-controlled loads are monitored.

Revisions were made in the language of 120.7(C) and 120.7(D) to further clarify how PCS are used in load calculations.

The term “qualified personnel” was changed to “qualified persons” to align with a defined term in Article 100.

The 80% limit for the control setting of the PCS is not modified. The PCS may or may not be a continuous load. Sizing at 80% is a conservative approach that allows the use of PCS technology without resulting in overloading of OCPDs.

Additionally, it is clarified that the 80% value is for the rating of the OCPD being monitored by the PCS, which is provided for overload control of the system. This is consistent with the examples provided in Annex D.

Public Comment No. 2001-NFPA 70-2024 [Section No. 120.7]

120.7 Power Control System (PCS).

PCS shall be permitted to be used for branch-circuit, feeder, or service load calculations. When used in load calculations, the installation shall comply with 120.7(A) through 120.7(D).

(A) PCS Requirements.

The PCS shall comply with Article 130, Part II.

(B) PCS ~~Current Setpoint.~~ Control Setting

The PCS ~~current setpoint~~ control setting shall be determined by qualified personnel and shall be set to no greater than 80 percent of the rating of the overcurrent protective device for the circuit for which the PCS is providing overload control.

(C) Load Calculations Using PCS.

Load calculations that use PCS shall be based on the monitoring and control configuration of the PCS and shall comply with one or both of the following:

(1) Monitoring only controlled loads: When the PCS monitors only controlled loads, the ~~current setpoint~~ control setting of the PCS shall be used in place of the controlled loads in load calculations.

(2) Monitoring controlled and noncontrolled loads: When the PCS monitors both controlled and noncontrolled loads, the ~~minimum operating current of~~ PCS control setting of the controlled loads shall be used in load calculations.

~~Informational Note: Minimum operating current is a value greater than or equal to zero representing the minimum current allowed for each load by the PCS.~~

(D) Noncontrolled Loads.

The load calculations for loads that are not controlled by the PCS shall meet the requirements in Article 120, Parts II through VII.

Informational Note: See Informative Annex D, Examples D14(a) through D14(d) for examples of load calculations with loads managed by PCS.

Statement of Problem and Substantiation for Public Comment

120.7(B) was revised to use UL 3141 terminology of "PCS control setting" rather than " PCS current setpoint" and "minimum operating current". Since "minimum operating current" is not a term used, the information note is not necessary.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1096-NFPA 70-2024 [Sections Part II., 130.50, 130.60, 130.70, 130.80]	

Related Item

- FR 8184

Submitter Information Verification

Submitter Full Name: Scott Picco
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Zip:

Submittal Date: Wed Aug 28 14:54:24 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7785-NFPA 70-2024

Statement: Revisions were made to align terminology with the product standard for Power Control Systems, UL 3141 - changing “current setpoint” to “control setting”. “Minimum operating current” is necessary to allow for use of PCS in scenarios where both controlled and non-controlled loads are monitored.

Revisions were made in the language of 120.7(C) and 120.7(D) to further clarify how PCS are used in load calculations.

The term “qualified personnel” was changed to “qualified persons” to align with a defined term in Article 100.

The 80% limit for the control setting of the PCS is not modified. The PCS may or may not be a continuous load. Sizing at 80% is a conservative approach that allows the use of PCS technology without resulting in overloading of OCPDs.

Additionally, it is clarified that the 80% value is for the rating of the OCPD being monitored by the PCS, which is provided for overload control of the system. This is consistent with the examples provided in Annex D.

Public Comment No. 706-NFPA 70-2024 [Section No. 120.7]

120.7 Power Control System (PCS).

PCS shall be permitted to be used for branch-circuit, feeder, or service load calculations. When used in load calculations, the installation shall comply with 120.7(A) through 120.7(D).

(A) PCS Requirements.

The PCS shall comply with Article 130, Part II.

(B) PCS Current Setpoint.

The PCS current setpoint shall be determined by qualified personnel and shall be set to no greater than 80 percent of the rating of the overcurrent protective device for the circuit for which the PCS is providing overload control.

(C) Load Calculations Using PCS.

Load calculations that use PCS shall be based on the monitoring and control configuration of the PCS and shall comply with one or both of the following:

(1) Monitoring only controlled loads: When the PCS monitors only controlled loads, the current setpoint of the PCS shall be used in place of the controlled loads in load calculations.

(2) Monitoring controlled and noncontrolled loads: When the PCS monitors both controlled and noncontrolled loads, the minimum operating current of the controlled loads shall be used in load calculations.

Informational Note: Minimum operating current is a value greater than or equal to zero representing the minimum current allowed for each load by the PCS.

(D) Noncontrolled Loads.

The load calculations for loads that are not controlled by the PCS shall meet the requirements in Article 120, Parts II through VII.

Informational Note: See Informative Annex D, Examples D14(a) through D14(d) for examples of load calculations with loads managed by PCS.

Additional Proposed Changes

File Name	Description	Approved
CN_206.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 206 appeared in the First Draft Report on First Revision No. 8184.

The requirements in this section should be revised to provide correct references and align the terminology with Article 750, Part II, “EMS with PCS”, as determined by CMP 13 in FR 8095. References to Article 750 should be adjusted based on the relocation to Chapter 1, Article 130.

Related Item

• First Revision No. 8184

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 02 14:05:41 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: No action was necessary as the terminology in Article 120.7 aligns correctly with the terminology in Article 130.

Correlating Committee Note No. 206-NFPA 70-2024 [Section No. 220.7]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Thu May 09 11:29:12 EDT 2024

Committee Statement

Committee Statement: The requirements in this section should be revised to provide correct references and align the terminology with Article 750, Part II, “EMS with PCS”, as determined by CMP 13 in FR 8095. References to Article 750 should be adjusted based on the relocation to Chapter 1, Article 130.

First Revision No. 8184-NFPA 70-2024 [Section No. 220.70]

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. 1950-NFPA 70-2024 [Section No. 120.7(B)]

(B) PCS Current Setpoint.

The PCS current setpoint shall be determined by qualified personnel and shall be set to no greater than ~~80~~ 100 percent of the rating of the overcurrent protective device for the circuit for which the PCS is providing overload control.

Statement of Problem and Substantiation for Public Comment

Subsection 120.5(D) states that load calculations do not require a 125% continuous load multiplier. This means that the 125% (inverse of 80%) multiplier in the PCS load calculation language of 120.7 cannot be due to concerns about conductors heating while the PCS manages continuous loads. It appears that the 80% limitation may instead be due to a concern that the PCS will fail to control the load adequately and needs a margin of safety to ensure that an overload does not occur. This is arbitrary, encroaches on the responsibility of the relevant product listings, and is not reflective of the reliable characteristics of PCS technologies.

Limiting the current setpoint to 80% of the OCPD rating would not ensure a safer or more functional installation than a 100% setpoint. Any overload over the setpoint of the PCS due to a malfunctioning PCS would simply trip the circuit breaker, protecting the conductor. PCS do not function more reliably if the setpoint is exceeded by 25% than if it is exceeded by 1%, so the proposed 80% limitation seems arbitrary and unrelated to the safety of the installation.

Article 90 makes it clear that the code is not intended to be a design specification for equipment and that examinations and determinations of equipment safety are made by a qualified electrical testing laboratory. It is not the role of the electrical code to introduce a margin of safety requirement for the use of equipment.

Lumin's product is just one that could be adversely affected by this limitation. The Lumin Smart Panel monitors a setpoint and can react within seconds to shed load to limit current when the setpoint is surpassed. The response rapidity of a PCS is far more aggressive than the trip behavior of a standard thermal circuit breaker that will allow overages many times greater than the breaker rating for several seconds, often allow twice the rated current for 50 seconds, and will not trip at the rated current for three hours.

As we move toward more digitally managed electrical systems, we should rely on product standards and rigorous testing to ensure that Power Control Systems function properly and reliably while avoiding arbitrary and unnecessary code limitations on this important technology.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1957-NFPA 70-2024 [Section No. 210.19(A)]	linked concept
Public Comment No. 1961-NFPA 70-2024 [Section No. 215.4(A)(1)]	linked concept
Public Comment No. 1967-NFPA 70-2024 [Section No. 230.42(A) [Excluding any Sub-Sections]]	linked concept
Public Comment No. 1970-NFPA 70-2024 [Section No. 230.42(A)(1)]	linked concept
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. 1970-NFPA 70-2024 [Section No. 230.42(A)(1)]	

Related Item

- FR-8184

Submitter Information Verification

Submitter Full Name: Jeff Nicholson
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City:
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Zip:
Submittal Date: Wed Aug 28 12:35:28 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The 80% limit for the control setting of the PCS is not modified. The PCS may or may not be a continuous load. Sizing at 80% is a conservative approach that allows the use of PCS technology without resulting in overloading of OCPDs.

Public Comment No. 1974-NFPA 70-2024 [Section No. 120.7(B)]

(B) PCS Current Setpoint.

The PCS current setpoint shall be determined by qualified ~~personnel~~ persons and shall be set to no greater than 80 percent of the rating of the overcurrent protective device for the circuit for which the PCS is providing overload control.

Statement of Problem and Substantiation for Public Comment

"Qualified personnel" is not a defined term in Article 100, but "qualified person" is. To avoid ambiguity and inconsistency, the term "qualified persons" should be used in this setting.

Related Item

- FR-8184

Submitter Information Verification

Submitter Full Name: Jeff Nicholson
Organization: Lumin
Street Address:
City:
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Zip:

Submittal Date: Wed Aug 28 13:45:11 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7785-NFPA 70-2024

Statement: Revisions were made to align terminology with the product standard for Power Control Systems, UL 3141 - changing “current setpoint” to “control setting”. “Minimum operating current” is necessary to allow for use of PCS in scenarios where both controlled and non-controlled loads are monitored.

Revisions were made in the language of 120.7(C) and 120.7(D) to further clarify how PCS are used in load calculations.

The term “qualified personnel” was changed to “qualified persons” to align with a defined term in Article 100.

The 80% limit for the control setting of the PCS is not modified. The PCS may or may not be a continuous load. Sizing at 80% is a conservative approach that allows the use of PCS technology without resulting in overloading of OCPDs.

Additionally, it is clarified that the 80% value is for the rating of the OCPD being monitored by the PCS, which is provided for overload control of the system. This is consistent with the examples provided in Annex D.

Public Comment No. 36-NFPA 70-2024 [Section No. 120.7(B)]

(B) PCS Current Setpoint.

The PCS current setpoint shall be determined by qualified personnel and shall be set to no greater than 80 percent of the rating of the overcurrent protective device for the circuit for which the PCS is providing overload control.

Exception: When all loads monitored or controlled by the PCS are noncontinuous, the PCS current setpoint shall be set to no greater than 100 percent of the rating of the overcurrent device for the circuit for which the PCS is providing overload control.

Statement of Problem and Substantiation for Public Comment

When all loads monitored or controlled by the PCS are noncontinuous, the PCS current setpoint shall be set to no greater than 100 percent of the rating of the overcurrent device for the circuit for which the PCS is providing overload control.

The intent of the 80% limitation on the PCS current setpoint relative to the OCPD rating is presumed to be that the various loads managed by a PCS would, in aggregate, effectively create a single PCS load that could at times behave like a continuous load. This is reasonable when the aggregate PCS load includes individual continuous loads, as PCS management does nothing to change their continuous nature. However, it is unduly restrictive when there are no continuous loads being monitored or managed by the PCS. A continuous load is defined in Article 100 as "a load where the maximum current is expected to continue for 3 hours or more." Noncontinuous loads are not defined but are clearly loads where maximum current is not expected to continue for 3 hours or more. A PCS managing only noncontinuous loads will never experience any managed load drawing maximum current for 3 hours; the demand from all loads in this scenario will by definition be variable over a 3-hour period. Thus, in aggregate these loads will never exhibit a steady-state current draw at the PCS current setpoint or any other value and the PCS load will not and cannot behave like a continuous load.

Adding this exception would bring the PCS load calculations in line with other aspects of load calculation and conductor sizing where an 80% derate/125% load multiplier is only required when loads are continuous. This proposal is more conservative than the existing feeder sizing rules found in 215(A)(1) as combinations of continuous and noncontinuous loads would not be permitted when utilizing 100% of the OCPD rating in the PCS current setpoint.

Related Item

- FR 8095

Submitter Information Verification

Submitter Full Name: David Kendall
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City:
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Submittal Date: Thu Jul 11 11:05:23 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The 80% limit for the control setting of the PCS is not modified. The PCS may or may not be a continuous load. Sizing at 80% is a conservative approach that allows the use of PCS technology without resulting in overloading of OCPDs.

Public Comment No. 1939-NFPA 70-2024 [Section No. 120.7(C)]

(C) Load Calculations Using PCS.

Load calculations for circuits that use PCS shall be based on the monitoring and control configuration of the PCS and shall comply with one or both of the following:

(1) ~~Monitoring only controlled loads: When the PCS monitors only controlled loads, the current setpoint of the PCS shall be used in place of the controlled loads in load calculations.~~

(2) ~~Monitoring controlled and noncontrolled loads: When the PCS monitors both controlled and noncontrolled loads, the minimum operating current of the controlled loads shall be used in load calculations.~~

~~Informational Note: Minimum operating current is a value greater than or equal to zero representing the minimum current allowed for each load by the PCS.~~

(1) Total circuit load managed by PCS: Where the PCS monitors a complete circuit supplying only controlled loads, or any combination of controlled and uncontrolled loads, the value used in load calculations shall be the larger of the following:

(2) The PCS control setpoint

(3) The load calculated in 120.7(D) for the uncontrolled load

(4) Partial circuit load managed by PCS: Where the PCS monitors a portion of the connected load to a circuit, the value used in load calculations shall be the sum of the load calculated in 120.7(C)(1) plus the load calculated in 120.7(D).

Statement of Problem and Substantiation for Public Comment

While well intentioned, the use of the term "minimum operating current" in this section would create confusion and prevent the uniform application of these requirements to all PCS. This is because not all PCS will have a minimum operating current rating and most importantly, the standard to evaluate a PCS (UL 3141) does not include this term, nor any testing requirements to verify such a rating. Because of this, listed PCS equipment could be installed and approved with a false sense of security that the equipment will default to a particular low current value under malfunction or other conditions where there is a lack of monitoring or control, when in fact, there would be no guarantee that the equipment has been independently verified to do this.

With the recent changes to this code and the UL 3141 standard, there is no need for such provisions in this code. There are requirements in UL 3141 sufficient to evaluate any PCS for its particular application, while ensuring all PCS meet the same level of reliability during faults and failures reasonable to expect over the system's lifetime.

This proposal seeks to reorient the requirement in 120.7(C) away from how loads are controlled within a PCS but instead, to focus on the circuit that the PCS is providing overload control for. This is accomplished by the following:
- If the PCS is providing overload control for an entire circuit (with no loads connected "outside" of the PCS), then the value used for load calculations should be the PCS setting. This aligns with the 2023 language and UL3141.
-- To prevent someone from connecting an excess of noncontrolled load to the circuit, a requirement is included in new 120.7(C)(1)(2) that that calculation be performed for the noncontrolled load and that value be used if larger than the PCS setting.
- If the PCS is only providing overload control for a portion of the load on the circuit (i.e. a feeder or busbar "upstream" of a PCS where there are both PCS managed circuits and non PCS circuits connected) the practical solution is to simply to sum the two together, both the PCS load (from 120.7(C)(1)) and the load not within the PCS "boundary" (using 120.7(D)).
Note that this is how similar PCS applications for power sources have been addressed since the 2023 edition (see 705.28(A)).

The informative Annex D examples will need to be changed, but the good news is that they should be simplified, not made more complex.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1942-NFPA 70-2024 [Definition: Example D.15 Load Calculations Using Power Cont...]	Suggested changes to Annex D Examples
Public Comment No. 1942-NFPA 70-2024 [Definition: Example D.15 Load Calculations Using Power Cont...]	

Related Item

• FR-8184

Submitter Information Verification

Submitter Full Name: Jason Fisher
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Zip:

Submittal Date: Wed Aug 28 11:24:53 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7785-NFPA 70-2024

Statement: Revisions were made to align terminology with the product standard for Power Control Systems, UL 3141 - changing “current setpoint” to “control setting”. “Minimum operating current” is necessary to allow for use of PCS in scenarios where both controlled and non-controlled loads are monitored.

Revisions were made in the language of 120.7(C) and 120.7(D) to further clarify how PCS are used in load calculations.

The term “qualified personnel” was changed to “qualified persons” to align with a defined term in Article 100.

The 80% limit for the control setting of the PCS is not modified. The PCS may or may not be a continuous load. Sizing at 80% is a conservative approach that allows the use of PCS technology without resulting in overloading of OCPDs.

Additionally, it is clarified that the 80% value is for the rating of the OCPD being monitored by the PCS, which is provided for overload control of the system. This is consistent with the examples provided in Annex D.

Public Comment No. 1854-NFPA 70-2024 [Section No. 120.13]

120.13 Dwelling Units – Branch Circuit Loads.

In dwelling units, the minimum unit load shall be not less than ~~33~~ 43 volt-amperes/m^2 (~~3~~ 4 volt-amperes/ft^2) for calculating minimum branch circuits required.

Additional Proposed Changes

File Name	Description	Approved
PC_1854_substantiation.docx		

Statement of Problem and Substantiation for Public Comment

The proposed bedroom branch circuits in PI 3406, received comments from CMP2 that there was no substantiation that the bedroom receptacle outlets were the only location causing the documented overloads. Further overload research was done to indicate that indeed there is a balance between bedrooms, living rooms, basements, and garages for overload tripping activity with a slight majority being living rooms. Therefore, this public comment is submitted to allow the necessary circuits to be utilized in the best way possible to prevent overloads. Circuit calculation scenarios were developed for the following size homes based on 3VA/ft², 3.5/ft², and 4VA/ft².

	@3VA	@3.5VA	@4VA
1000 ft²	25A (2-15A Circuits)	29A (2-15A Circuits)	34A (3-15A 0r 2-20A Circuits)
1200 ft²	30A (2-15A Circuits)	35A (1-15A and 1-20A)	40A (3-15A or 2-20A circuits)
1600 ft²	40A (2-20A or 3-15A Circuits)	47A (add 1 Circuit)	54A (add 1-15A circuit)
2400 ft²	60A	70A (add 1 Circuit)	80A (add 1-20A circuit)

The load demand on receptacle outlets have become even more critical as we have seen an expansion of remote / home office applications, home fitness equipment, and the trend to more in-home medical recovery and the use of Durable Medical Equipment (DME). Many homes are wired with 15A circuits in the various rooms. If the home requires a hospital type bed that could take 6-10A itself thereby not providing additional load capacity. While these are the largest loads there are smaller DME loads that could add up. A CPAP is 2A, Oxygenator is 3A, and infusion pump is 1A. Another example is if a treadmill is installed it is required to be on a dedicated 20A receptacle. The load data and requirements came from the various manufacturer's documentation.

ESFI conducted a survey of electrical contractors in the Commonwealth of Massachusetts during 2022 asking about any various circuit breaker technology tripping issues. A large majority of tripping issues found were related to overloads/short circuits. This corresponds to the Customer Service call data that circuit breaker manufacturers are seeing. This Data reviewed from the last three years indicates that over 40% of customer phone calls related to residential circuit protection are a result of an overloaded circuit. The overload calls were almost 2 ½ times greater than the nearest other reason. This proposal seeks to address our documented concerns of homeowners where overloads have left them without power. These situations are based on the loads an individual home-owner may utilize establishing perceived 'nuisance' tripping events when the circuit was appropriately protected from an overload hazard. Similar results were found in a 2023 survey of Colorado, Georgia, Kentucky, Minnesota, Ohio, Texas, and Washington. The survey was taken again in 2024 for the State of California with the similar results.

Related Item

- PI 3406

Submitter Information Verification

Submitter Full Name: Keith Waters
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 27 17:50:25 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: There were questions as to whether the report cited in public comment substantiation included homes that were wired to older editions of the Code. Older wiring methods might have been cause for the overloading issues. Information was not provided to the cause of the overload.

PC No. 1854

120.13 Dwelling Units – Branch Circuit Loads.

In dwelling units, the minimum unit load shall be not less than ~~33~~ 43 volt-amperes/m2 (~~3~~ 4 volt-amperes/ft2) for calculating minimum branch circuits required.

Substantiation:

The proposed bedroom branch circuits in PI 3406, received comments from CMP2 that there was no substantiation for just using the bedroom receptacle outlets. Further overload research was done to indicate that indeed there is a balance between bedrooms, living rooms, basements, and garages for overload tripping activity with a slight majority being living rooms. Therefore, this public comment is submitted to allow the necessary circuits to be utilized in the best way possible to prevent overloads. Circuit calculation scenarios were developed for the following size homes based on 3VA/ft², 3.5/ft², and 4VA/ft².

	@3VA	@3.5VA	@4VA
1000 ft²	25A (2-15A Circuits)	29A (2-15A Circuits)	34A (3-15A 0r 2-20A Circuits)
1200 ft²	30A (2-15A Circuits)	35A (1-15A and 1-20A)	40A (3-15A or 2-20A circuits)
1600 ft²	40A (2-20A or 3-15A Circuits)	47A (add 1 Circuit)	54A (add 1-15A circuit)
2400 ft²	60A	70A (add 1 Circuit)	80A (add 1-20A circuit)

The load demand on receptacle outlets have become even more critical as we have seen an expansion of remote / home office applications, home fitness equipment, and the trend to more in-home medical recovery and the use of Durable Medical Equipment (DME). Many homes are wired with 15A circuits in the various rooms. If the home requires a hospital type bed that could take 6-10A itself thereby not providing additional

load capacity. While these are the largest loads there are smaller DME loads that could add up. A CPAP is 2A, Oxygenator is 3A, and infusion pump is 1A. Another example is if a treadmill is installed it is required to be on a dedicated 20A receptacle. The load data and requirements came from the various manufacturer’s documentation.

ESFI conducted a survey of electrical contractors in the Commonwealth of Massachusetts during 2022 asking about any various circuit breaker technology tripping issues. A large majority of tripping issues found were related to overloads/short circuits. This corresponds to the Customer Service call data that circuit breaker manufacturers are seeing. This Data reviewed from the last three years indicates that over 40% of customer phone calls related to residential circuit protection are a result of an overloaded circuit. The overload calls were almost 2 ½ times greater than the nearest other reason. This proposal seeks to address our documented concerns of homeowners where overloads have left them without power. These situations are based on the loads an individual home-owner may utilize establishing perceived 'nuisance' tripping events when the circuit was appropriately protected from an overload hazard. Similar results were found in a 2023 survey of Colorado, Georgia, Kentucky, Minnesota, Ohio, Texas, and Washington. The survey was taken again in 2024 for the State of California with the similar results.

Public Comment No. 1038-NFPA 70-2024 [Section No. 120.14(H)]

(H) Fixed Multioutlet Assemblies.

Fixed multioutlet assemblies used in other than dwelling units or the guest rooms or guest suites of hotels or motels shall be calculated in accordance with the following:

(1) Where ~~appliances are~~ utilization equipment is unlikely to be used simultaneously, each 1.5 m (5 ft) or fraction thereof of each separate and continuous length shall be considered as one outlet of not less than 180 volt-amperes.

(2) Where ~~appliances are likely~~ utilization equipment is likely to be used simultaneously, each 300 mm (1 ft) or fraction thereof shall be considered as an outlet of not less than 180 volt-amperes.

For the purposes of this section, the calculation shall be permitted to be based on the portion that contains receptacles.

Statement of Problem and Substantiation for Public Comment

The defined term "utilization equipment would be a better term

Related Item

- PI2210

Submitter Information Verification

Submitter Full Name: Dennis Querry
Organization: Trinity River Authority
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 12 14:32:39 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7796-NFPA 70-2024

Statement: The term “utilization equipment” more accurately describes the electrical equipment that may be supplied by the receptacles in a multioutlet assembly. The term appliance was removed as it implies a more limited scope than intended.

Public Comment No. 1160-NFPA 70-2024 [Section No. 120.14(H)]

(H) Fixed Multioutlet Assemblies.

Fixed multioutlet assemblies used in other than dwelling units or the guest rooms or guest suites of hotels or motels shall be calculated in accordance with the following:

(1) Where ~~appliances are unlikely to~~ equipment is unlikely to be used simultaneously, each 1.5 m (5 ft) or fraction thereof of each separate and continuous length shall be considered as one outlet of not less than 180 volt-amperes.

(2) Where ~~appliances are likely to~~ equipment is unlikely to be used simultaneously, each 300 mm (1 ft) or fraction thereof shall be considered as an outlet of not less than 180 volt-amperes.

For the purposes of this section, the calculation shall be permitted to be based on the portion that contains receptacles.

Statement of Problem and Substantiation for Public Comment

The public input used the word "Load" which the panel states was not a defined term. The word "Equipment" could be used to replace the word appliance is the sentence. The term Equipment is a defined term in Article 100. "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." This covers any type of load that could be connected to a Multioutlet Assembly.

Related Item

- PI-2210

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 10:18:01 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7796-NFPA 70-2024

Statement: The term “utilization equipment” more accurately describes the electrical equipment that may be supplied by the receptacles in a multioutlet assembly. The term appliance was removed as it implies a more limited scope than intended.

Public Comment No. 38-NFPA 70-2024 [Section No. 120.42(A)]

(A) General.

A unit load of not less than that specified in Table 120.42(A) for non-dwelling occupancies and the floor area determined in 120.5(C) shall be used to calculate the minimum lighting load. Motors rated less than ⅛ HP and connected to a lighting circuit shall be considered general lighting load.

Informational Note: The unit values of Table 120.42(A) are based on minimum load conditions and 80 percent power factor and might not provide sufficient capacity for the installation contemplated.

Table 120.42(A) General Lighting Loads by Non-Dwelling Occupancy

Type of Occupancy	Unit Load	
	Volt-amperes/ m^2	Volt-amperes/ ft^2
Automotive facility	~~16~~ 13	1.~~5~~ 2
Convention center	~~15~~ 12	1.~~4~~ 1
Courthouse	~~15~~ 12	1.~~4~~ 1
Dormitory	~~16~~ 13	1.~~5~~ 2
Exercise center	~~15~~ 12	1.~~4~~ 1
Fire station	~~14~~ 11	1.~~3~~ 0
Gymnasium[1]	~~18~~ 14	1.~~7~~ 3
Health care clinic	~~17~~ 14	1.~~6~~ 3
Hospital	~~17~~ 14	1.~~6~~ 3
Hotel or motel, or apartment house without provisions for cooking by tenants[2]	~~18~~ 14	1.~~7~~ 3
Library	~~16~~ 13	1.~~5~~ 2
Manufacturing facility[3]	~~24~~ 19	~~2~~ 1 .~~2~~ 8
Motion picture theater	~~17~~ 14	1.~~6~~ 3
Museum	~~17~~ 14	1.~~6~~ 3
Office[4]	~~14~~ 11	1.~~3~~ 0
Parking garage[5]	~~3~~ 2	0.~~3~~ 2
Penitentiary	~~13~~ 10	~~1~~ 0 .~~2~~ 9
Performing arts theater	~~16~~ 13	1.~~5~~ 2
Police station	~~14~~ 11	1.~~3~~ 0
Post office	~~17~~ 14	1.~~6~~ 3
Religious facility	~~24~~ 19	~~2~~ 1 .~~2~~ 8
Restaurant[6]	~~16~~ 13	1.~~5~~ 2
Retail[7, 8]	~~20~~ 16	1.~~9~~ 5
School/university	~~16~~ 13	1.~~5~~ 2
Sports arena	~~16~~ 13	1.~~5~~ 2
Town hall	~~15~~ 12	1.~~4~~ 1
Transportation	~~13~~ 10	~~1~~ 0 .~~2~~ 9
Warehouse	~~13~~ 10	~~1~~ 0 .~~2~~ 9
Workshop	~~18~~ 14	1.~~7~~

~~Note: The 125 percent multiplier for a continuous load as specified in 210.20(A) is included, therefore no additional multiplier shall be required when using the unit loads in this table for calculating the minimum lighting load for a specified occupancy.~~

3

[1] Armories and auditoriums are considered gymnasium-type occupancies.

[2] Lodge rooms are similar to hotels and motels.

[3] Industrial commercial loft buildings are considered manufacturing-type occupancies.

[4] Banks are office-type occupancies.

[5] Commercial (storage) garages are considered parking garage occupancies.

[6] Clubs are considered restaurant occupancies.

[7] Barber shops and beauty parlors are considered retail occupancies.

[8] Stores are considered retail occupancies.

Statement of Problem and Substantiation for Public Comment

The table's inclusion of a 125% continuous load multiplier is in conflict with the new section 120.5(E). Therefore the table entries require adjustment to remove the 125% multiplier.

I have done this for the first column by taking the original value, multiplying by 0.8, and then rounding to the nearest integer. I then took the resulting values and divided by 3.28*3.28 to convert from VA/m^2 to VA/ft^2, and rounded the result to the nearest tenth to generate the new values for the second column.

Note that in a few cases, this resulted in a new second column value that is 0.1 less than the rounding of 0.8 times the original value. Such disparities are unavoidable when rounding. In these cases, if it is desired, the new values could be increased by 1 VA/m^2 and 0.1 VA/ft^2, which would result in the second column being the preferred data source, rather than the first column.

Related Item

• FR 8190-NFPA 70-2024

Submitter Information Verification

Submitter Full Name: Wayne Whitney
Organization: Whitney
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 11 13:52:49 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7797-NFPA 70-2024

Statement: Lighting loads were updated in the 2020 code and are appropriate based on the change approved. The note with the table is confusing and while it does identify the continuous nature of these loads, the fact that these are considered continuous should not be considered the sole reason for the 125-percent multiplier, refer to the Informational Note for 120.5(E). The note in table 120.42(A) is removed to clarify that the table values are not to be adjusted by 125-percent for continuous loading.

Public Comment No. 1693-NFPA 70-2024 [Section No. 120.54]

120.54 Electric Clothes Dryers — Dwelling Unit(s).

The load for household electric clothes dryers in a dwelling unit(s) shall be the nameplate rating when available or 5000 watts (volt-amperes), whichever is larger, for each dryer served. The use of the demand factors in Table 120.54 shall be permitted. Where two or more single-phase dryers are supplied by a 3-phase, 4-wire feeder or service, the total load shall be calculated on the basis of twice the maximum number connected between any two phases. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated in this section.

Table 120.54 Demand Factors for Household Electric Clothes Dryers

Number of Dryers	Demand Factor (%)
~~1–5~~ 1-2	~~80~~ 100
3- 5	~~85~~ 80
6	75
7	65
8	60
9	55
10	50
11	47
12–23	47% minus 1% for each dryer exceeding 11
24–42	35% minus 0.5% for each dryer exceeding 23
43 and over	25%

Statement of Problem and Substantiation for Public Comment

1. FR-8044 contains an error within the table regarding the dryer count:
- 1-5 dryers = 80%
- 5th dryer = 85%
- 5th dryer is referenced twice, and the demand factor percentages do not match.

2. Proposed Update to the below Demand factor % updates:
- 1-2 dryers = 100%.
- 3-5 dryers = 80%.
- Reason for proposed update: A Dwelling unit having 1-2 installed dryers is prevalent within the US. Many households may have 2 dryers that would be used simultaneously. Therefore, please consider updating 1-2 dryers to 100% Demand factor.

Related Item

• FR 8044

Submitter Information Verification

Submitter Full Name: Randy Dollar
Organization: Siemens Industry
Affiliation: American Circuit Breaker Manufacturers Association (ACBMA)
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 26 12:23:12 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7804-NFPA 70-2024

Statement: First Revision FR-8044 revised the dryer circuit demand factor to 80% for feeder/service load calculations.

Many households have two dryers that would be used simultaneously therefore the table has been updated for 1-2 dryers at 100% demand factor.

The request in PC-1708 to remove the statement “whichever is larger” is not supported, as user changes must be considered that allow the feeder or service calculation to be based on the nameplate rating of the equipment, or 5000 watts when a larger dryer may be installed in the future.

This Second Revision corrects the inadvertent inclusion of the second row, as it is inconsistent with the first row.

Public Comment No. 1708-NFPA 70-2024 [Section No. 120.54]

120.54 Electric Clothes Dryers — Dwelling Unit(s).

The load for household electric clothes dryers in a dwelling unit(s) shall be the nameplate rating when available or 5000 watts (volt-amperes), ~~whichever is larger,~~ for each dryer served. The use of the demand factors in Table 120.54 shall be permitted. Where two or more single-phase dryers are supplied by a 3-phase, 4-wire feeder or service, the total load shall be calculated on the basis of twice the maximum number connected between any two phases. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated in this section.

Table 120.54 Demand Factors for Household Electric Clothes Dryers

Number of Dryers	Demand Factor (%)
~~1–5~~ 1–4	80
5	85
6	75
7	65
8	60
9	55
10	50
11	47
12–23	47% minus 1% for each dryer exceeding 11
24–42	35% minus 0.5% for each dryer exceeding 23
43 and over	25%

Statement of Problem and Substantiation for Public Comment

Right now, this code section has been revised instructing the user to use the "nameplate rating when available". But this code section also still says to use 5 kVA when larger than the nameplate. Based on the changes approved by the CMP in the FR, it appears that the "whichever is larger" language should have been struck from the section but was not. Otherwise, why were the words "nameplate rating when available" added, if the result is still to use the larger of the two? Also, Table 120.54 listed 5 dryers at both 80 and 85%, revised so 80% applies to only 1-4 dryers.

Many electric clothes drying solutions exist whose nameplate ratings are less than 5 kW. These include resistance condensing clothes dryers, heat pump dryers and many combination washer/dryer units. These devices should be treated at their actual loads. If branch circuit wiring is desired to be made robust for future changes, the 5 kW could be maintained for branch circuit calculations, while nameplate ratings are allowed for service and feeder loads.

Related Item

- This PC is related to FR 8044.

Submitter Information Verification

Submitter Full Name: Brennan Less
Organization: LBNL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 26 14:27:39 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7804-NFPA 70-2024

Statement: First Revision FR-8044 revised the dryer circuit demand factor to 80% for feeder/service load calculations.

Many households have two dryers that would be used simultaneously therefore the table has been updated for 1-2 dryers at 100% demand factor.

The request in PC-1708 to remove the statement “whichever is larger” is not supported, as user changes must be considered that allow the feeder or service calculation to be based on the nameplate rating of the equipment, or 5000 watts when a larger dryer may be installed in the future.

This Second Revision corrects the inadvertent inclusion of the second row, as it is inconsistent with the first row.

Public Comment No. 307-NFPA 70-2024 [Section No. 120.54]

120.54 Electric Clothes Dryers — Dwelling Unit(s).

The load for household electric clothes dryers in a dwelling unit(s) shall be the nameplate rating when available or 5000 watts (volt-amperes), whichever is larger, for each dryer served. The use of the demand factors in Table 120.54 shall be permitted. Where two or more single-phase dryers are supplied by a 3-phase, 4-wire feeder or service, the total load shall be calculated on the basis of twice the maximum number connected between any two phases. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated in this section.

Table 120.54 Demand Factors for Household Electric Clothes Dryers

Number of Dryers	Demand Factor (%)
1–5	80
~~5~~	~~85~~
6	75
7	65
8	60
9	55
10	50
11	47
12–23	47% minus 1% for each dryer exceeding 11
24–42	35% minus 0.5% for each dryer exceeding 23
43 and over	25%

Statement of Problem and Substantiation for Public Comment

The first line was revised from 1-4 dryers to 1-5 dryers. The second line for 5 dryers should have been deleted.

Related Item

- Public Input No. 4151-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: none
Street Address:
City:
State:
Zip:

Submittal Date: Mon Jul 29 12:29:46 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7804-NFPA 70-2024

Statement: First Revision FR-8044 revised the dryer circuit demand factor to 80% for feeder/service load calculations.

Many households have two dryers that would be used simultaneously therefore the table has been updated for 1-2 dryers at 100% demand factor.

The request in PC-1708 to remove the statement “whichever is larger” is not supported, as user changes must be considered that allow the feeder or service calculation to be based on the nameplate rating of the equipment, or 5000 watts when a larger dryer may be installed in the future.

This Second Revision corrects the inadvertent inclusion of the second row, as it is inconsistent with the first row.

Public Comment No. 37-NFPA 70-2024 [Section No. 120.54]

120.54 Electric Clothes Dryers — Dwelling Unit(s).

The load for household electric clothes dryers in a dwelling unit(s) shall be the nameplate rating when available or 5000 watts (volt-amperes), whichever is larger, for each dryer served. The use of the demand factors in Table 120.54 shall be permitted. Where two or more single-phase dryers are supplied by a 3-phase, 4-wire feeder or service, the total load shall be calculated on the basis of twice the maximum number connected between any two phases. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated in this section.

Table 120.54 Demand Factors for Household Electric Clothes Dryers

Number of Dryers	Demand Factor (%)
1–5	80
~~5~~	~~85~~
6	75
7	65
8	60
9	55
10	50
11	47
12–23	47% minus 1% for each dryer exceeding 11
24–42	35% minus 0.5% for each dryer exceeding 23
43 and over	25%

Statement of Problem and Substantiation for Public Comment

The first draft version of the table is clearly self-contradictory. Given the revisions that were made to the first row, I infer the intention is to delete the second row.

Related Item

- FR 8044-NFPA 70-2024

Submitter Information Verification

Submitter Full Name: Wayne Whitney
Organization: Whitney
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 11 13:46:54 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7804-NFPA 70-2024

Statement: First Revision FR-8044 revised the dryer circuit demand factor to 80% for feeder/service load calculations.

Many households have two dryers that would be used simultaneously therefore the table has been updated for 1-2 dryers at 100% demand factor.

The request in PC-1708 to remove the statement “whichever is larger” is not supported, as user changes must be considered that allow the feeder or service calculation to be based on the nameplate rating of the equipment, or 5000 watts when a larger dryer may be installed in the future.

This Second Revision corrects the inadvertent inclusion of the second row, as it is inconsistent with the first row.

Public Comment No. 704-NFPA 70-2024 [Section No. 120.54]

120.54 Electric Clothes Dryers — Dwelling Unit(s).

The load for household electric clothes dryers in a dwelling unit(s) shall be the nameplate rating when available or 5000 watts (volt-amperes), whichever is larger, for each dryer served. The use of the demand factors in Table 120.54 shall be permitted. Where two or more single-phase dryers are supplied by a 3-phase, 4-wire feeder or service, the total load shall be calculated on the basis of twice the maximum number connected between any two phases. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated in this section.

Table 120.54 Demand Factors for Household Electric Clothes Dryers

Number of Dryers	Demand Factor (%)
1–5	80
5	85
6	75
7	65
8	60
9	55
10	50
11	47
12–23	47% minus 1% for each dryer exceeding 11
24–42	35% minus 0.5% for each dryer exceeding 23
43 and over	25%

Additional Proposed Changes

File Name	Description	Approved
CN_204.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 204 appeared in the First Draft Report on First Revision No. 8044.

The requirements in 220.54 and Table 220.54 do not align and should be reviewed and revised for installations with a single electric clothes dryer. Additionally, 220.54 should be reviewed for compliance with 3.5.4 of the NEC Style Manual. The use of “when” is limited to the expression of time and should be replaced with “if” for condition- based statements. CMP 2 should review the table based on ballot comments regarding two table rows covering 5 dryers.

Related Item

- First Revision No. 8044

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 02 14:01:59 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7804-NFPA 70-2024
Statement: First Revision FR-8044 revised the dryer circuit demand factor to 80% for feeder/service load calculations.

Many households have two dryers that would be used simultaneously therefore the table has been updated for 1-2 dryers at 100% demand factor.

The request in PC-1708 to remove the statement “whichever is larger” is not supported, as user changes must be considered that allow the feeder or service calculation to be based on the nameplate rating of the equipment, or 5000 watts when a larger dryer may be installed in the future.

This Second Revision corrects the inadvertent inclusion of the second row, as it is inconsistent with the first row.

Correlating Committee Note No. 204-NFPA 70-2024 [Section No. 220.54]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Thu May 09 11:19:52 EDT 2024

Committee Statement

Committee Statement: The requirements in 220.54 and Table 220.54 do not align and should be reviewed and revised for installations with a single electric clothes dryer. Additionally, 220.54 should be reviewed for compliance with 3.5.4 of the NEC Style Manual. The use of “when” is limited to the expression of time and should be replaced with “if” for condition- based statements. CMP 2 should review the table based on ballot comments regarding two table rows covering 5 dryers.

First Revision No. 8044-NFPA 70-2024 [Section No. 220.54]

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. 1713-NFPA 70-2024 [Section No. 120.57]

120.57 Electric Vehicle Supply Equipment (EVSE) Load.

~~The EVSE~~ For each EVSE served, the EVSE loads shall be calculated at ~~either 7200 watts (volt-amperes) or~~ the nameplate rating of the equipment, ~~whichever is larger, for each EVSE served, unless~~ including ratings modified by 625.42 . If the nameplate rating is unavailable, 240V EVSE shall be treated at 7200 watts (volt-amperes) and 120V EVSE on a dedicated branch circuit shall be treated at 1800 watts (volt-amperes).

Statement of Problem and Substantiation for Public Comment

In FR-8060, the CMP added language pointing to Section 625.42, which allows for EVSE ratings to be modified by EMS and by Adjustable Settings. This approach is appropriate and logical, as many EVSE will use managed charging and other features that reduce their impacts on service loads and on the distribution grid.

Unfortunately, this change leads to inconsistent treatment of managed and unmanaged EVSE loads.

As written, a low-cost, low-power EVSE with an unmanaged nameplate rating of 4 kW must be treated as 7.2 kW in service and feeder load calculations.

In contrast, a managed EVSE with current settings adjusted to 4 kW in accordance with 625.42(B) appears to be permitted to use 4 kW in service and feeder load calculations.

Similarly, an EVSE managed by an EMS to a current limit of 4 kW in accordance with 625.42(A) appears to be permitted to use 4 kW in service and feeder load calculations.

It does not make sense to permit these adjustments per 625.42, while also not permitting simple, low-power and low-cost EVSE to use their nameplate ratings in load calculations. And if these values from section 625.42 cannot be used in load calculations, then why do they exist in the first place? And why are they referenced here by the CMP? The current first draft language unnecessarily discourages and excludes use of low power level 2 charging solutions that do not leverage more expensive EMS or adjustable setting features.

The proposed language in this public comment provides equal treatment of unmanaged nameplate ratings and ratings adjusted by 625.42. The default kW value is then used only when the other values are unavailable/unknown. The proposed language also differentiates between 240V and 120V EVSE installations, with defaults of 7.2 and 1.8 kW, respectively.

Related Item

- FR 8060

Submitter Information Verification

Submitter Full Name: Brennan Less
Organization: LBNL
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 26 14:44:33 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7809-NFPA 70-2024

Statement: The statement “unless modified by 625.42” is removed to avoid unnecessary forward references in the standard.

The revision allows the use of nameplate ratings, in lieu of the 7200 VA value. This is consistent with how the Code already allows EVSE loads to be reduced below a minimum rating using controls (EMS, adjustable settings or PCS).

Finally, treating EVSE loads based on amperage and not volt-amperes (as requested in PCs 1753, 2038) is inconsistent with the purpose of load calculations and with the approach used throughout Article 120.

Public Comment No. 1753-NFPA 70-2024 [Section No. 120.57]

120.57 Electric Vehicle Supply Equipment (EVSE) Load.

~~The~~ For each EVSE served, loads shall be calculated at ~~either 7200 watts~~ the 80% of the capacity of the attached receptacle, the nameplate rating for fixed equipment, or 6,240 VA (volt-amperes) ~~or~~ if the nameplate ~~rating of the equipment, whichever is larger, for each EVSE served, unless modified by 625.42 .~~ is unknown or the circuit is reserved for future use.

Statement of Problem and Substantiation for Public Comment

Rewritten to clarify how multiple chargers, such as for apartments, would be calculated:

For large numbers of low power chargers, using a 7200VA default leads to the wrong value: a vast overstatement of the needed circuit capacity.

Like the author of 750-NFPA 70-2023 Wayne Whitney, I would prefer this section be based on Amps, not VA or Watts. Vehicle charging is current controlled independent of voltage. 208Y or 240V or 277V charging heads will all pull the same amps but a different number of volt-amperes. With the introduction of the new NACS connector 208V and 277V charging are likely to become reality, thus a standard based on 240V seems outdated. But for consistency with the existing approach, I have adopted Wayne's 6,240 VA value to at least accommodate 208V circuits.

Please consider that cost is an important element in housing. My area has high building costs and a dearth of affordable units. Every bit we can do to right size electrical helps. Removal of the 7200VA minimum is important for large low power L2 installations in apartments.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1754-NFPA 70-2024 [Section No. 120.7]	Same topic, same author.

Related Item

- First Revision No. 8060-NFPA 70-2024 [Section No. 220.57]
- Public Input No. 1439-NFPA 70-2023 [Section No. 220.57] (7200W minimum)
- Public Input No. 3145-NFPA 70-2023 [Section No. 220.57] (Brennan Less LBNL)
- Public Input No. 4238-NFPA 70-2023 [Section No. 220.57] (0 VA for Energy Management)
- Public Input No. 750-NFPA 70-2023 [Section No. 220.57] (Use Amps not VA, Wayne)

Submitter Information Verification

Submitter Full Name:	Bryce Nesbitt
Organization:	Obviously Inspects
Affiliation:	Based in part on comments and discussions with the NEC POWER ⚡ group "Panel Optimization Work and Electrical Reassessments"
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 27 02:25:20 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7809-NFPA 70-2024

Statement: The statement “unless modified by 625.42” is removed to avoid unnecessary forward references in the standard.

The revision allows the use of nameplate ratings, in lieu of the 7200 VA value. This is consistent with how the Code already allows EVSE loads to be reduced below a minimum rating using controls (EMS, adjustable settings or PCS).

Finally, treating EVSE loads based on amperage and not volt-amperes (as requested in PCs 1753, 2038) is inconsistent with the purpose of load calculations and with the approach used throughout Article 120.

Public Comment No. 2038-NFPA 70-2024 [Section No. 120.57]

120.57 Electric Vehicle Supply Equipment (EVSE) Load.

The EVSE loads shall be calculated ~~at either 7200 watts (volt-amperes) or~~ **per** **the nameplate rating of the equipment** ~~, whichever is larger,~~ **for each EVSE served,** ~~unless modified~~ **or as** **by** **625.42** **(A)** **.** **New construction reserved circuits for future EVSE shall be calculated at 30A or larger, regardless of voltage.**

Statement of Problem and Substantiation for Public Comment

Installation of large numbers of level 1 and or level 2 EVSEs should not be penalized with unfavorable load calculations.
Even this rewritten section is overly conservative. For parking lots over eight or so spaces, a load factor could apply as not all vehicles in a large installation will be plugged in, actually charging, charging at full rate, or even capable of charging.

Related Item

• First Revision No. 8060-NFPA 70-2024 [Section No. 220.57] • Public Input No. 3145-NFPA 70-2023 [Section No. 220.57]

Submitter Information Verification

Submitter Full Name: Sven Thesen
Organization: EVCAC
Affiliation: Electric Vehicle Charging for All Coalition, Co-Lead
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 16:33:02 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7809-NFPA 70-2024

Statement: The statement “unless modified by 625.42” is removed to avoid unnecessary forward references in the standard.

The revision allows the use of nameplate ratings, in lieu of the 7200 VA value. This is consistent with how the Code already allows EVSE loads to be reduced below a minimum rating using controls (EMS, adjustable settings or PCS).

Finally, treating EVSE loads based on amperage and not volt-amperes (as requested in PCs 1753, 2038) is inconsistent with the purpose of load calculations and with the approach used throughout Article 120.

Public Comment No. 399-NFPA 70-2024 [Section No. 120.57]

120.57 Electric Vehicle Supply Equipment (EVSE) Load.

The EVSE loads shall be calculated at either 7200 watts (volt-amperes) or the nameplate rating of the equipment, whichever is larger, for each EVSE served~~, unless modified by 625 . 42.~~

Statement of Problem and Substantiation for Public Comment

Section 90.3 allows for chapter 6 to modify chapter 2. Therefore, a forward reference in the code is not required and should not be made. If a reference to 625.42 is deemed useful, in accordance with 2.1.10 of the NEC Style Manual, a reference to this requirement could be made in an Informational Note.

Related Item

- FR8060

Submitter Information Verification

Submitter Full Name: Joseph Bablo

Organization: UL Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jul 30 14:58:05 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7809-NFPA 70-2024

Statement: The statement “unless modified by 625.42” is removed to avoid unnecessary forward references in the standard.

The revision allows the use of nameplate ratings, in lieu of the 7200 VA value. This is consistent with how the Code already allows EVSE loads to be reduced below a minimum rating using controls (EMS, adjustable settings or PCS).

Finally, treating EVSE loads based on amperage and not volt-amperes (as requested in PCs 1753, 2038) is inconsistent with the purpose of load calculations and with the approach used throughout Article 120.

Public Comment No. 705-NFPA 70-2024 [Section No. 120.57]

120.57 Electric Vehicle Supply Equipment (EVSE) Load.

The EVSE loads shall be calculated at either 7200 watts (volt-amperes) or the nameplate rating of the equipment, whichever is larger, for each EVSE served, unless modified by 625.42.

Additional Proposed Changes

File Name	Description	Approved
CN_205.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 205 appeared in the First Draft Report on First Revision No. 8060.

The forward reference to 625.42 should be removed as the code arrangement in 90.3 permits Chapters 5 through 8 to modify the requirements of Chapters 1 through 4. The Correlating Committee directs that a task group consisting of members from CMP 2, CMP 12, and CMP 13 be formed to coordinate the requirements covering EVSE load calculations and their location in the code.

Related Item

- First Revision No. 8060

Submitter Information Verification

Submitter Full Name:	CC Notes
Organization:	NEC Correlating Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Aug 02 14:04:04 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7809-NFPA 70-2024
Statement:	The statement “unless modified by 625.42” is removed to avoid unnecessary forward references in the standard. The revision allows the use of nameplate ratings, in lieu of the 7200 VA value. This is consistent with how the Code already allows EVSE loads to be reduced below a minimum rating using controls (EMS, adjustable settings or PCS). Finally, treating EVSE loads based on amperage and not volt-amperes (as requested in PCs 1753, 2038) is inconsistent with the purpose of load calculations and with the approach used throughout Article 120.

Correlating Committee Note No. 205-NFPA 70-2024 [Section No. 220.57]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Thu May 09 11:26:49 EDT 2024

Committee Statement

Committee Statement: The forward reference to 625.42 should be removed as the code arrangement in 90.3 permits Chapters 5 through 8 to modify the requirements of Chapters 1 through 4. The Correlating Committee directs that a task group consisting of members from CMP 2, CMP 12, and CMP 13 be formed to coordinate the requirements covering EVSE load calculations and their location in the code.

First Revision No. 8060-NFPA 70-2024 [Section No. 220.57]

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. 1566-NFPA 70-2024 [Section No. 120.61(B)(1)]

(1) Household Electric Ranges, Wall-Mounted Ovens, Counter-Mounted Cooking Units, and Dryers.

A demand factor of 70 percent shall be permitted to be applied to the portion of the feeder or service supplying household electric ranges, wall-mounted ovens, counter-mounted cooking units, and electric dryers, where the maximum unbalanced load has been determined in accordance with Table 120.55 for ranges and Table 120.54 for dryers.

Statement of Problem and Substantiation for Public Comment

As currently written, 220.61(B)(1) states that if there are ranges or dryers on a service or feeder, that a 70% demand factor is applied to the neutral of the entire feeder. This addition makes it more clear that the demand factor only applies to the part of the neutral load associated with the ranges and dryers.

Related Item

- PI 1540

Submitter Information Verification

Submitter Full Name: John McCamish
Organization: Eaton
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 23 20:31:36 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Accepted
Resolution: SR-7812-NFPA 70-2024
Statement: The additional text clarifies that the 70% demand factor in 120.61(B)(1) applies only to the portion of the neutral load that is attributed to the appliances identified in this sub-section. Without this clarification, this allowance would apply to the entire neutral load of the feeder or service.

Public Comment No. 729-NFPA 70-2024 [Section No. 120.82(A)]

(A) Feeder and Service Load.

This section applies to a dwelling unit having the total connected load served by a single 120/240-volt or 208Y/120-volt set of 3-wire service or feeder conductors with an ampacity of 100 or greater. It shall be permissible to calculate the feeder and service loads in accordance with this section instead of the method specified in Article 120, Part III. The calculated load shall be the result of adding the loads from 120.82(B), 120.82(C), and 120.82(D) <u>for each dwelling unit individually</u> . Feeder and service-entrance conductors whose calculated load is determined by this optional calculation shall be permitted to have the neutral load determined by 120.61.

Statement of Problem and Substantiation for Public Comment

Consider a duplex with a single service that supplies two sets of service entrance conductors to two service disconnects, one for each dwelling unit. The service entrance conductors supplying just one dwelling unit can have their load computed using 120.82.

There is, however, some uncertainty as to whether the service conductors supplying both dwelling units may have their load calculated as the sum of those two 120.82 calculations. The current wording of 120.82 leads some AHJs to the interpretation that 120.82 only applies to conductors carrying the load of exactly one dwelling unit, and that the results of that computation can not be used for determining the load on any upstream conductors that supply more than one dwelling unit. This point of view is supported by the observation that 120.84 is available for conductors supplying 3 or more dwelling units, and that 120.85 is available for conductors supplying exactly 2 dwelling units.

However, it makes no sense to limit the calculation results from 120.82 to conductors that supply exactly one dwelling unit. Where a set of conductors supplies multiple other sets of conductors, it is is physically impossible for the load on those conductors to exceed the sum of the loads on the multiple other conductors supplied. Summing those individual loads is always a conservative overestimate of the load on the common supply conductors.

Therefore this change clarifies that conductors that supply multiple dwelling units may have their load determined by calculating the 120.82 load of each dwelling unit separately, and then adding those results.

<u>Related Item</u>

- Public Input No. 457-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Wayne Whitney
Organization: Whitney
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 04 12:34:38 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: This section already applies to a single dwelling unit and further clarification is not required.

Public Comment No. 1480-NFPA 70-2024 [Section No. 120.83]

120.83 Existing Dwelling Unit.

This section shall be permitted to be used to determine if the existing service or feeder is of sufficient capacity to serve additional loads where the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service or feeder. The percentages listed in Table 120.83 shall be used for existing and additional new loads as indicated . The larger connected load of air-conditioning or space heating, but not both, shall be used in accordance with 120 .82(C).

Informational Note: When considering the installation of additional electrical loads to an existing dwelling unit, the respective age of the dwelling unit along with the condition and integrity of the electrical system must be taken into account. Also, due to the potential for coincidental operation of large electrical loads (such as EVSE, HVAC equipment, instantaneous water heaters, etc.), the implementation of EMS and PCS in accordance with article 130 and section 120.7 may be required.

Load calculations shall include the following:

(1) General lighting and general-use receptacles at 22 volt-amperes/m^2 or 2 volt-amperes/ft^2

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and 210.11(C)(2)

(3) The nameplate rating of the following:

(4) All appliances that are fastened in place, permanently connected, or located to be on a specific circuit

(5) Ranges, wall-mounted ovens, counter-mounted cooking units

(6) Clothes dryers that are not connected to the laundry branch circuit specified in 120.83(2)

(7) Water heaters

~~Electric~~

a. Existing electric vehicle supply equipment (EVSE) supplied by an individual branch circuit in accordance with 120.57.

Table 120.83 Existing Dwelling Unit Load Percentages

~~80~~

Load (kVA)	Percent of Load	
First 8 kVA of existing and new load	100	
Remainder of existing load	40	
New ~~EVSE~~	EVSE installed in accordance with 120.57	100
New central electric resistance space heating	80	
All other new loads	50	

Additional Proposed Changes

File Name	Description	Approved
CONCERNS_with_the_proposed_section_120.83_2026_NEC_8-22-24.docx	Concerns with the proposed First Draft of Section 120.83	

Statement of Problem and Substantiation for Public Comment

Several conflicts arise correlating the proposed (First Draft) language and structure for section 120.83 with many other proposed sections of the 2026 NEC [specifically 120.57; 625.41; 625.42; 120.53; 120.82(D)]. Essentially, the proposed (First Draft) language and structure of section 120.83 is – open to misapplication of the standard in the field, highly open to misinterpretation, imposes conflicts with other sections of the NEC which will make it very difficult for AHJ enforcement, and is simply unsafe to universally apply to existing dwelling units. These proposed 2nd Draft changes are intended to mitigate the above concerns.

A top concern in the substantiation of the proposed (First Draft) of 120.83 (stated in Public Input No. 3028-NFPA 70-2023 [Section No. 220.83]) relates to the argument by LBNL stating that… "Millions of existing US dwelling units are going to undergo the electrification of fuel-fired end-uses in coming decades".

Since, the NEC is a living document that is constantly being review and revised to reflect actual new technologies, real world conditions, and changes which are imminent – the changes to the (2026) NEC must be applicable to such conditions that will be in effect and enforced by AHJs when the 2026 NEC is adopted (Not apply to 'potential' changes over the course of future decades).

There are significant variables and factors that don't seem to be seriously considered in the First Draft recommendation for 120.83. It's critical that the overall electrical safety of an existing dwelling unit (home) does not become compromised due to the installation of new high demand electrical loads which are likely to operate coincidentally, and in addition to existing general lighting and other appliance loads.

Giving serious consideration to current, real world conditions within states that are early adopters of the NEC (Texas, Nebraska, Michigan, Ohio, Minnesota, North Dakota, Massachusetts, Maine, Washington, etc.)... each of these states contain highly populated areas, have diverse demographics, have an abundance of older homes, are areas which commonly experience extreme seasonal weather conditions (winter and/or summer) and do experience coincidental operation of high demand loads – such as environmental air / central space heating systems and EVSE, for extended periods and not simply for hours periodically, but, often, for consecutive days and weeks, extending through months (daytime and night time).

Also taking into account the US regions which annually experience severe temperatures for several months (such as: Central and Southern California; the greater Reno & Las Vegas, Nevada areas; the greater Phoenix & Tucson, Arizona areas; Santa Fee and Albuquerque, New Mexico; also throughout Texas and Florida) – highly populated areas that will have HVAC equipment (etc.) operating coincidentally with EVSE when the homeowner's EV is the prime mode of transportation.

Furthermore, it's imprudent to presume a homeowner will upgrade their environmental air / central space heating equipment at the same time they purchase a new

EV and install new EVSE – let alone presume a homeowner will readily implement EMS / PCS technologies to either their environmental air / central space heating or EVSE (especially when seriously considering the US regions identified earlier).

When considering the installation of additional electrical loads to an existing dwelling unit, the respective age of the dwelling unit along with the condition and integrity of the electrical system must be taken into account. Also, due to the potential for coincidental operation of large electrical loads (such as EVSE, HVAC equipment, instantaneous water heaters, etc.), the implementation of EMS and PCS in accordance with article 130 and section 120.7 may be required.

Related Item

• Public Input No. 3028-NFPA 70-2023 [Section No. 220.83]

Submitter Information Verification

Submitter Full Name: Edmund T Ned Johns
Organization: Generac Power Systems Inc
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 23 13:47:29 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: First Revision FR 8188 added the EVSE circuit demand factor of 80% for feeder/service load calculations. The value of 80% is double the previous demand factor of “remainder of all other loads” that would have applied to EVSE (as EVSE was not previously identified in Table 220.83(A) or 220.83(B)). The values published in the First Draft Report are based on analysis shared by Lawrence Berkely National Lab (LBNL) of sub-metering end-use data in existing dwellings. The proposed Informational Note in PC 1480 includes a requirement, and would be in violation of 2.1.10.2 of the NEC Style Manual. Additionally, Section 220.70 was moved to 120.7 to reflect the fact that it applies to the entire Article. Identifying this section in the Informational Note is unnecessary.

Several conflicts arise correlating this proposed language and structure for section 120.83 with many other proposed sections of the 2026 NEC [specifically 120.57; 625.41; 625.42; 120.53; 120.82(D)]. Also, the language proposed in 120.83 presents conflicts which can be misapplied or misinterpreted – creating difficulty with proper application of the standard in the field, as well as confusion at the level of jurisdictional enforcement.

Some of the concerns in context:

1. Section 120.57 essentially states EVSE load shall be 100% "… for each EVSE served, unless modified by 625.42."

2. The demand factor permitted in 120.53 does not apply to EVSE.

3. **Is** 120.83(3)(e) stating / implying that EVSE is existing (at 7200 Watts or Nameplate value @ 100%)?
    a. Then, is proposed Table 120.83 stating that installing an additional ("New") EVSE is permitted at 80%?
        i. ***OR***
    b. **Is** the proposed Table 120.83 stating that ***regardless*** if the EVSE is "New" to the existing dwelling, or the EVSE is an additional ("New") EVSE to the existing dwelling = 80% is permitted?

4. **Is** the proposed 120.83 (and Table) then permitting the following on an existing dwelling unit @ 50%? :
    a. An existing 35 year old dwelling unit (home) in Wisconsin (in the outskirts of Milwaukee)
    b. Work is being done to convert an unfinished basement into a habitable / home office space, plus a bathroom
        i. Plans to install (2) each – 240V, 1350 Watt baseboard heaters (for the office) = NOT central heat
        ii. Plans to install (1) each – 240V, 1130 Watt heater (for the bathroom) = NOT central heat
        iii. Plans to install (1) each – Instant water heater (for the bathroom)

5. The proposed section 120.83 does not reference, nor does it provide informational notes which correspond to, sections 120.7; 130.30; and/or part II of article 130.

6. Impending difficulty correlating the application and enforcement of the proposed 120.83 with the sizing and installation of optional standby systems per 702.4(A).

A top concern in the substantiation of the proposed 120.83 relates to the argument by LBNL stating that… "Millions of existing US dwelling units are going to undergo the electrification of fuel-fired end-uses in coming decades".

Since, the NEC is a living document that is constantly being review and revised to reflect actual new technologies, real world conditions, and changes which are imminent – the changes to the (2026) NEC must be applicable to such conditions that will be in effect and enforced by AHJs when the 2026 NEC is adopted (Not apply to 'potential' changes over the course of future decades).

There are significant variables and factors that don't seem to be seriously considered in this recommendation for 120.83. It's critical that the overall electrical safety of an existing dwelling unit (home) does not become compromised due to the installation of new high demand electrical loads which are likely to operate coincidentally, and in addition to existing general lighting and other appliance loads.

Giving serious consideration to current, real world conditions within states that are early adopters of the NEC (Texas, Nebraska, Michigan, Ohio, Minnesota, North Dakota, Massachusetts, Maine, Washington, etc.)... each of these states contain highly populated areas, have diverse demographics, have an abundance of older homes, are areas which commonly experience extreme seasonal weather conditions (winter and/or summer) and do experience coincidental operation of high demand loads – such as environmental air / central space heating systems and EVSE, for extended periods and not simply for hours periodically, but, often, for consecutive days and weeks, extending through months (daytime and night time).

Also taking into account the US regions which annually experience severe temperatures for several months (such as: Central and Southern California; the greater Reno & Las Vegas, Nevada areas; the greater Phoenix & Tucson, Arizona areas; Santa Fee and Albuquerque, New Mexico; also throughout Texas and Florida) – highly populated areas that will have HVAC equipment (etc.) operating coincidentally with EVSE when the homeowner's EV is the prime mode of transportation.

Furthermore, it's imprudent to presume a homeowner will upgrade their environmental air / central space heating equipment at the same time they purchase a new EV and install new EVSE – let alone presume a homeowner will readily implement EMS / PCS technologies to either their environmental air / central space heating or EVSE (especially when seriously considering the US regions identified earlier).

SUMMARY: The proposed language and structure of section 120.83 is – open to misapplication in the field, highly open to misinterpretation, imposes conflicts with other sections of the NEC which will make it very difficult for AHJ enforcement, and is simply unsafe to universally apply to existing dwelling units.

Written by: Edmund T. (Ned) Johns – Technical Application Manager, Generac Power Systems, Inc. (8-22-2024)

Public Comment No. 1691-NFPA 70-2024 [Section No. 120.83]

120.83 Existing Dwelling Unit.

This section shall be permitted to be used to determine if the existing service or feeder is of sufficient capacity to serve additional loads where the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service or feeder. The percentages listed in Table 120.83 shall be used for existing and additional new loads. The larger connected load of air-conditioning or space heating, but not both, shall be used.

Load calculations shall include the following:

(1) General lighting and general-use receptacles at 22 volt-amperes/m^2 or 2 volt-amperes/ft^2

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and 210.11(C)(2)

(3) The nameplate rating of the following:

- (4) All appliances that are fastened in place, permanently connected, or located to be on a specific circuit
- (5) Ranges, wall-mounted ovens, counter-mounted cooking units
- (6) Clothes dryers that are not connected to the laundry branch circuit specified in 120.83(2)
- (7) Water heaters
- (8) Electric vehicle supply equipment (EVSE) supplied by an individual branch circuit

Table 120.83 Existing Dwelling Unit Load Percentages

Load (kVA)	Percent of Load
First 8 kVA of existing and new load	100
Remainder of existing load	40
New EVSE	~~80~~ 100
New central electric resistance space heating	80
All other new loads	50

Statement of Problem and Substantiation for Public Comment

An EVSE load is the same whether the dwelling is new or existing. Section 120.82(D) states “The total load of an EVSE shall be calculated at 100 percent in accordance with 120.57.” The load percentage in 120.83 should align with 120.82.

Related Item

• FR 8188

Submitter Information Verification

Submitter Full Name: Randy Dollar
Organization: Siemens Industry
Affiliation: American Circuit Breaker Manufacturers Association (ACBMA)
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 26 12:16:52 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: First Revision FR 8188 added the EVSE circuit demand factor of 80% for feeder/service load calculations. The value of 80% is double the previous demand factor of “remainder of all other loads” that would have applied to EVSE (as EVSE was not previously identified in Table 220.83(A) or 220.83(B)). The values published in the First Draft Report are based on analysis shared by Lawrence Berkely National Lab (LBNL) of sub-metering end-use data in existing dwellings. The proposed Informational Note in PC 1480 includes a requirement, and would be in violation of 2.1.10.2 of the NEC Style Manual. Additionally, Section 220.70 was moved to 120.7 to reflect the fact that it applies to the entire Article. Identifying this section in the Informational Note is unnecessary.

Public Comment No. 707-NFPA 70-2024 [Section No. 120.83]

120.83 Existing Dwelling Unit.

This section shall be permitted to be used to determine if the existing service or feeder is of sufficient capacity to serve additional loads where the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service or feeder. The percentages listed in Table 120.83 shall be used for existing and additional new loads. The larger connected load of air-conditioning or space heating, but not both, shall be used.

Load calculations shall include the following:

(1) General lighting and general-use receptacles at 22 volt-amperes/m^2 or 2 volt-amperes/ft^2

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and 210.11(C)(2)

(3) The nameplate rating of the following:

a. All appliances that are fastened in place, permanently connected, or located to be on a specific circuit

b. Ranges, wall-mounted ovens, counter-mounted cooking units

c. Clothes dryers that are not connected to the laundry branch circuit specified in 120.83(2)

d. Water heaters

e. Electric vehicle supply equipment (EVSE) supplied by an individual branch circuit

Table 120.83 Existing Dwelling Unit Load Percentages

Load (kVA)	Percent of Load
First 8 kVA of existing and new load	100
Remainder of existing load	40
New EVSE	80
New central electric resistance space heating	80
All other new loads	50

Additional Proposed Changes

File Name	Description	Approved
CN_207.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 207 appeared in the First Draft Report on First Revision No. 8186.

This section should be reviewed for compliance with 3.5.4 of the NEC Style Manual. The use of “where” is limited to the expression of location and should be replaced with “if” for condition based statements.

Related Item

• First Revision No. 8186

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 02 14:07:11 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7832-NFPA 70-2024

Statement: In accordance with 3.5.4 of the NEC Style Manual, the word “where“ is limited to the expression of location. The term is replaced with “if”, as the usage is for a conditioned based statement.

Additionally, the relocation of the statement in 120.83(3)(c), ensures that loads connected to branch circuits already treated with default values are not to be double-counted in the 120.83 calculations. This provision only applied to clothes dryers, but there is no technical reason why it should not apply to other loads specified in 120.83(3).

Correlating Committee Note No. 207-NFPA 70-2024 [Section No. 220.83]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Thu May 09 11:30:46 EDT 2024

Committee Statement

Committee Statement: This section should be reviewed for compliance with 3.5.4 of the NEC Style Manual. The use of “where” is limited to the expression of location and should be replaced with “if” for condition based statements.

First Revision No. 8186-NFPA 70-2024 [Section No. 396.10(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. 84-NFPA 70-2024 [Section No. 120.83]

120.83 Existing Dwelling Unit.

This section shall be permitted to be used to determine if the existing service or feeder is of sufficient capacity to serve additional loads where the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service or feeder. The percentages listed in Table 120.83 shall be used for existing and additional new loads. The larger connected load of air-conditioning or space heating, but not both, shall be used.

Load calculations shall include the following:

(1) General lighting and general-use receptacles at 22 volt-amperes/m^2 or 2 volt-amperes/ft^2

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and 210.11(C)(2)

(3) The nameplate rating of the following equipment that are not connected to the branch circuits addressed in 120.83(1) or 120.83(2) :

(4) All appliances that are fastened in place, permanently connected, or located to be on a specific circuit

(5) Ranges, wall-mounted ovens, counter-mounted cooking units

(6) Clothes dryers

~~that are not connected to the laundry branch circuit specified in 120.83(2)~~

a.

b. Water heaters

c. Electric vehicle supply equipment (EVSE) supplied by an individual branch circuit

Table 120.83 Existing Dwelling Unit Load Percentages

Load (kVA)	Percent of Load
First 8 kVA of existing and new load	100
Remainder of existing load	40
New EVSE	80
New central electric resistance space heating	80
All other new loads	50

Additional Proposed Changes

File Name	Description	Approved
120.83_pc84_tracked_changes_text.docx	Terraview shows revision to the entire list in 120.83(3). The attached document more clearly shows the tracked changes for this public comment.	

Statement of Problem and Substantiation for Public Comment

For some loads, section 120.83 currently appears to require double-counting. This occurs when a load is treated using default values (in 120.83(1) and (2)) and is also required to use its nameplate value in 120.83(3). The load is added once using its default treatment and then added a second time using its nameplate rating. Currently, only clothes dryers have specific language to avoid this double-counting (see 120.83(3)(c)). The proposed language clarifies that loads connected to branch circuits already treated with default values are not to be double-counted in 120.83 calculations. It generalizes the clarity currently provided for clothes dryers.

	Related Item
• This relates to PI 3319 and FR 8188, which are directed towards improving clarity and usability of 120.83 for existing dwellings, and which directly revised the list in 120.83(3).	

Submitter Information Verification

Submitter Full Name: Brennan Less
Organization: LBNL
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 16 10:42:32 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7832-NFPA 70-2024

Statement: In accordance with 3.5.4 of the NEC Style Manual, the word “where“ is limited to the expression of location. The term is replaced with “if”, as the usage is for a conditioned based statement.

Additionally, the relocation of the statement in 120.83(3)(c), ensures that loads connected to branch circuits already treated with default values are not to be double-counted in the 120.83 calculations. This provision only applied to clothes dryers, but there is no technical reason why it should not apply to other loads specified in 120.83(3).

120.83 Existing Dwelling Unit.

This section shall be permitted to be used to determine if the existing service or feeder is of sufficient capacity to serve additional loads where the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service or feeder. The percentages listed in Table 120.83 shall be used for existing and additional new loads. The larger connected load of air-conditioning or space heating, but not both, shall be used.

Load calculations shall include the following:

1) General lighting and general-use receptacles at 22 volt-amperes/m^2 or 2 volt-amperes/ft^2
2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and 210.11(C)(2)
3) The nameplate rating of the following equipment that are not connected to the branch circuits addressed in 120.83(1) or 120.83(2):
    a. All appliances that are fastened in place, permanently connected, or located to be on a specific circuit
    b. Ranges, wall-mounted ovens, counter-mounted cooking units
    c. Clothes dryers ~~that are not connected to the laundry branch circuit specified in 120.83(2)~~
    d. Water heaters
    e. Electric vehicle supply equipment (EVSE) supplied by an individual branch circuit

Public Comment No. 87-NFPA 70-2024 [Section No. 120.84]

120.84 Multifamily Dwelling.

(A) Feeder or Service Load.

It shall be permissible to calculate the load of a feeder or service that supplies three or more dwelling units of a multifamily dwelling in accordance with Table 120.84(~~B~~ C) instead of Article 120, Part III if all the following conditions are met:

(1) No dwelling unit is supplied by more than one feeder.

(2) Each dwelling unit is equipped with electric cooking equipment.

Exception: When the calculated load for multifamily dwellings without electric cooking in Article 120, Part III exceeds that calculated under Article 120, Part IV for the identical load plus electric cooking (based on 8 kW per unit), the lesser of the two loads shall be permitted to be used.

(3) Each dwelling unit is equipped with either electric space heating or air conditioning, or both. Feeders and service conductors whose calculated load is determined by this optional calculation shall be permitted to have the neutral load determined by 120.61.

(B) House Loads.

House loads shall be calculated in accordance with Article 120, Part III and shall be in addition to the dwelling unit loads calculated in accordance with Table 120.84(~~B~~ C).

~~Table 120.84~~

~~(~~

~~B) Optional Calculations — Demand Factors for Three or More Multifamily Dwelling Units Number of~~

~~Dwelling Units Demand Factor~~

~~(%) 3–5 45 6–7 44 8–10 43 11 42 12–13 41 14–15 40 16–17 39 18–20 38 21 37 22–23 36 24–25 35 26–27 34 28–30 33 31 32 32–33 31 34–36 30 37–38 29 39–42 28 43–45 27 46–50 26 51–55 25 56–61 24 62 and over 23~~

~~(~~ C) Calculated Loads.

The calculated load to which the demand factors of Table 120.84(~~B~~ C) apply shall include the following:

(1) 22 volt-amperes/m^2 or 2 volt-amperes/ft^2 for general lighting and general-use receptacles

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and 210.11(C)(2)

(3) The nameplate rating of the following:

- (4) All appliances that are fastened in place, permanently connected, or located to be on a specific circuit
- (5) Ranges, wall-mounted ovens, counter-mounted cooking units
- (6) Clothes dryers that are not connected to the laundry branch circuit specified in 120.84(C)(2)
- (7) Water heaters

(8) The nameplate ampere or kVA rating of all permanently connected motors not included in 120.84(C)(3)

(9) The larger of the air-conditioning load or the fixed electric space-heating load

Table 120.84(C) Optional Calculations — Demand Factors for Three or More Multifamily Dwelling Units

Number of Dwelling Units	**Demand Factor (%)**
3–5	45
6–7	44
8–10	43
11	42
12–13	41
14–15	40
16–17	39
18–20	38
21	37
22–23	36
24–25	35
26–27	34
28–30	33
31	32
32–33	31
34–36	30
37–38	29
39–42	28
43–45	27
46–50	26
51–55	25
56–61	24
62 and over	23

Statement of Problem and Substantiation for Public Comment

Apologies for the format of the tracked changes proposed here. This public comment addresses the fact that current Table 120.84(B) is located in the House Loads section where it is not used. The table is used for the Calculated Loads in 120.84(C). I believe the table should be re-located to the section that it applies to.

Related Item

• PIs # 3073 and 438

Submitter Information Verification

Submitter Full Name: Brennan Less
Organization: LBNL
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 16 13:34:07 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-8044-NFPA 70-2024
Statement: Table 120.84(B) is located in the sub-section titled “House Loads”, but is used for “Calculated Loads” in sub-section 120.84(C). The requirements for how to apply the table are in 120.84(C). In accordance with clause 2.1.7.2 of the NEC Style Manual, the table shall be designated by the section number in which it is referenced. Additionally, 120.84(B) should refer to all of 120.84(C), rather than just the table, as the requirements in 120.84(C) also apply.

Public Comment No. 90-NFPA 70-2024 [Section No. 120.84(A)]

(A) Feeder or Service Load.

It shall be permissible to calculate the load of a feeder or service that supplies three or more dwelling units of a multifamily dwelling in accordance with Table 120.84(B) instead of Article 120, Part III if all the following conditions are met:

(1) No dwelling unit is supplied by more than one feeder.

(2) Each dwelling unit is equipped with electric cooking equipment.

Exception: When the calculated load for multifamily dwellings without electric cooking in Article 120, Part III exceeds that calculated under Article 120, Part IV for the identical load plus electric cooking (based on 8 kW per unit), the lesser of the two loads shall be permitted to be used.

(3) Each dwelling unit is equipped with either electric space heating or air conditioning, or both. Feeders and service conductors whose calculated load is determined by this optional calculation shall be permitted to have the neutral load determined by 120.61.

(4) Where two or more single-phase 120/208V dwelling units are supplied by a 3-phase, 4-wire feeder or service, the total demand load shall be calculated on the basis of twice the maximum number dwelling units connected between any two phases.

Statement of Problem and Substantiation for Public Comment

The current language results in an undersized service for multifamily dwellings supplied by a three-phase service.
Current NEC Text
Example 1: A twenty-unit multifamily dwelling [each dwelling 20 kVA, 120/240V] on a 120/240V single-phase service will have a service demand load of 633A.
Service VA Load = 20,000 VA x 20 units x 38%
Service VA Load = 152,000 VA for two phases (76 VA per phase)
Service Size = 152,000 VA/240V
Service Size = 633A CORRECT

Example 2: A thirty-unit multifamily dwelling [each dwelling 20 kVA, 120/208V] on a 208Y/120V three-phase service will have a service demand load of 550A.
Note: There are 20 units on each of the three phases, not 30 units.
Service VA Load = 20,000 VA x 30 units x 33%
Service VA Load = 198,000 VA for three phases (66 VA per phase)
Service Size = 198,000 VA/(208V x 1.732)
Service Size = 550A, WRONG

Proposed NEC
Example: A thirty-unit multifamily dwelling [each dwelling 20 kVA, 120/208V] on a 208Y/120V three-phase service will have a service demand load of 633A. Based on 20 units per phase demand factor, not a 30-unit demand factor.
Service VA Load = 20,000 VA x 20 units x 38%
Service VA Load = 152,000 VA for two phases (76 VA per phase)
Service Size = 76,000 VA x 3 phases)/(208V x 1.732)
Service Size = 228,000 VA/(208V x 1.732)
Service Size = 633A CORRECT
Note: This concept is contained in 220.54 for Dryers and 220.55 for Ranges.

Related Item

• 3073

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 16 17:49:42 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7835-NFPA 70-2024
Statement: Section 120.84(A) has been revised to properly address single phase 120/208 multifamily dwelling units. 120.84 applies where there are 3 or more dwelling units supplied by a feeder or service. Two family dwelling units are still addressed in 120.85. Two family dwelling units may be calculated per 120.85 as three identical units using the revised text of 120.84.

Public Comment No. 1121-NFPA 70-2024 [Section No. 120.87]

120.87 Determining Existing Loads.

The calculation of a feeder or service load for existing installations shall be permitted to use actual maximum demand to determine the existing load under all of the following conditions:

(1) The maximum demand data is available for a 1-year period.

Exception: If the maximum demand data for a 1-year period is not available, the calculated load shall be permitted to be based on the maximum demand (the highest average kilowatts reached and maintained for a 15-minute interval) continuously recorded over a minimum 30-day period using a recording ammeter or power meter connected to the highest loaded phase of the feeder or service, based on the initial loading at the start of the recording. The recording shall reflect the maximum demand of the feeder or service by being taken when the building or space is occupied and shall include by measurement or calculation the larger of the heating or cooling equipment load, and other loads that might be periodic in nature due to seasonal or similar conditions.~~This exception shall not be permitted if the feeder or service has a~~ The maximum power production source output contribution from each interconnected renewable energy system (i.e., ~~solar photovoltaic~~ PV system, or wind electric system) shall be added to the maximum demand data. This exception shall not be permitted if the feeder or service employs any form of peak load shaving.

(2) The maximum demand at 125 percent plus the new load does not exceed the ampacity of the feeder or rating of the service.

(3) The feeder has overcurrent protection in accordance with 240.4, and the service has overload protection in accordance with 230.90.

Statement of Problem and Substantiation for Public Comment

Renewable energy system(s) connected to a feeder or service should not eliminate the ability to utilize this exception, provided the maximum power production source contribution of each renewable energy system is added to the feeder or service maximum demand data.

If a facility owner has existing electrical capacity in their power system, they should not be penalized for having or adding a renewable energy system.

The change in text does not alter the original exception's intent; however, it provides more flexibility when selecting an interconnection location for a renewable energy system.

Related Item

- PI-2855

Submitter Information Verification

Submitter Full Name: Duke Schamel
Organization: Electrical Service Solutions, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 15 12:35:10 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The exception that allows for less than 1 year of data excludes services and feeders with renewable energy systems. Addressing the additions being proposed would require more detail that what has been proposed, as the location/configuration of renewable energy systems impacts the load calculations in a variety of ways, not all of which have been addressed in the proposals.

Public Comment No. 1611-NFPA 70-2024 [Section No. 120.87]

120.87 Determining Existing Loads.

The calculation of a feeder or service load for existing installations shall be permitted to use actual maximum demand to determine the existing load under all of the following conditions:

(1) The maximum demand data is available for a 1-year period.

Exception: If the maximum demand data for a 1-year period is not available, the calculated load shall be permitted to be based on the maximum demand ~~(the highest average kilowatts reached and maintained for a 15-minute interval)~~ continuously recorded over a minimum 30-day period using a recording ammeter or power meter connected to the highest loaded phase of the feeder or service, based on the initial loading at the start of the recording, provided that the data is recorded using a maximum 15-minute sampling interval . The recording shall reflect the maximum demand of the feeder or service by being taken when the building or space is occupied and shall include by measurement or calculation the larger of the heating or cooling equipment load, and other loads that might be periodic in nature due to seasonal or similar conditions. This exception shall not be permitted if the feeder or service has a renewable energy system (i.e., solar photovoltaic or wind electric) or employs any form of peak load shaving.

(2) The maximum demand at 125 percent plus the new load does not exceed the ampacity of the feeder or rating of the service.

(3) The feeder has overcurrent protection in accordance with 240.4, and the service has overload protection in accordance with 230.90.

Statement of Problem and Substantiation for Public Comment

The parenthetical "definition" of "maximum demand" in the Exception is confusing as currently written because it is unclear how that relates to the meaning of "maximum demand" in item (1) above. Moving the requirement to the main text of the sentence in the Exception increases clarity, in particular that the 15-minute requirement has nothing to do with the "maximum demand" in item (1). Indeed, by providing the 15 minute maximum in the Exception, but not in item (1), it becomes implicit that the sampling interval in item (1) may be longer than 15 minutes.

Related Item

- 349-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Wayne Whitney
Organization: Whitney
Street Address:
City:
State:
Zip:

Submittal Date: Sat Aug 24 15:18:22 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7849-NFPA 70-2024

Statement: Item (2) currently references “new load” without specifying how that is determined. This may lead to different interpretations by users and AHJs. Revised text clarifies that the new or removed “loads” are permitted to be determined in accordance with Parts I, III, and IV of this article.

The data provided in the substantiation was specific to dwelling units. The impact to industrial establishments who have metering equipment that does not capture data at 15 minute intervals would be an unintended consequence of this change.

Public Comment No. 1613-NFPA 70-2024 [Section No. 120.87]

120.87 Determining Existing Loads.

The calculation of a feeder or service load for existing installations shall be permitted to use actual maximum demand to determine the existing load under all of the following conditions:

(1) The maximum demand data is available for a 1-year period.

Exception: If the maximum demand data for a 1-year period is not available, the calculated load shall be permitted to be based on the maximum demand (the highest average kilowatts reached and maintained for a 15-minute interval) continuously recorded over a minimum 30-day period using a recording ammeter or power meter connected to the highest loaded phase of the feeder or service, based on the initial loading at the start of the recording. The recording shall reflect the maximum demand of the feeder or service by being taken when the building or space is occupied and shall include by measurement or calculation the larger of the heating or cooling equipment load, and other loads that might be periodic in nature due to seasonal or similar conditions. This exception shall not be permitted if the feeder or service has ~~a renewable energy system (i.e., solar photovoltaic or wind electric) or~~ an interconnected power source or employs any form of peak load shaving.

(2) The maximum demand at 125 percent plus the new load does not exceed the ampacity of the feeder or rating of the service.

(3) The feeder has overcurrent protection in accordance with 240.4, and the service has overload protection in accordance with 230.90.

Statement of Problem and Substantiation for Public Comment

The current language in the exception is clearly discriminatory against renewable power sources without any technical justification. Whatever confounding problems an interconnected solar or wind power source could cause in the use of the exception clearly would occur for any interconnected power source. E.g. a coil fired, steam powered rotary generator.

Further it seems to me that any such problems would be solved by requiring the metering and summation of all input power sources as proposed in Public Input 2855-NFPA 70-2023. So unless there is a technical issue that such a procedure would not overcome, I suggest the adoption of the language in that Public Input.

Related Item

• Public Input 2855-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Wayne Whitney
Organization: Whitney
Street Address:
City:
State:
Zip:
Submittal Date: Sat Aug 24 15:42:23 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The exception that allows for less than 1 year of data excludes services and feeders with renewable energy systems. Addressing the additions being proposed would require more detail that what has been proposed, as the location/configuration of renewable energy systems impacts the load calculations in a variety of ways, not all of which have been addressed in the proposals.

Public Comment No. 86-NFPA 70-2024 [Section No. 120.87]

120.87 Determining Existing Loads.

The calculation of a feeder or service load for existing installations shall be permitted to use actual maximum demand to determine the existing load under all of the following conditions:

(1) The maximum demand data is available for a 1-year period at a time interval no greater than 15-minutes .

Exception 1 : If the maximum demand data for a 1-year period is not available, the calculated load shall be permitted to be based on the maximum demand (the highest average kilowatts reached and maintained for a 15-minute interval) continuously recorded over a minimum 30-day period using a recording ammeter or power meter connected to the highest loaded phase or all phases of the feeder or service, based on the initial loading at the start of the recording. The recording shall reflect the maximum demand of the feeder or service by being taken when the building or space is occupied and shall include by measurement or calculation the larger of the heating or cooling equipment load, and other loads that might be periodic in nature due to seasonal or similar conditions. ~~This exception shall not be permitted if~~ When the feeder or service ~~has a renewable energy system (i.e.~~ is supplied by more than one electric power source (e.g. , solar photovoltaic ~~or~~ , wind electric or energy storage system), or ~~employs any form of~~ when peak load shaving not treated in accordance with 120 .7 is present on the service or feeder, the maximum demand shall include by measurement or calculation the total demand of connected loads.

Exception 2: In dwelling units, a demand data time interval up to 60-minutes shall be permitted with the following adjustments. 60-minute maximum values less than or equal to 7.5 kW shall be multiplied by 140 percent plus 2.2 kW. All other 60-minute maximum values shall have 5.2 kW added.

(2) The maximum demand at 125 percent plus the ~~new load~~ sum of the new loads being added minus the sum of any existing loads being removed does not exceed the ampacity of the feeder or rating of the service. Loads being added or removed shall be permitted to be treated using values and percentages used for service and feeder load calculations in Parts III-IV of this article. The larger connected load of any air-conditioning or space heating equipment that is added or removed shall be used.

(3) The feeder has overcurrent protection in accordance with 240.4, and the service has overload protection in accordance with 230.90.

Additional Proposed Changes

File Name	Description	Approved
Panels_15min_vs_60min_scatterplot_proposedPiecewiseFunction.jpeg	Plot shows the proposed adjustment for hourly data from dwelling units (red line), overlaid on top of metered maximum demand data from 11,940 existing US dwellings.	

Statement of Problem and Substantiation for Public Comment

Change # 1: Addition of a 15-minute maximum time interval for demand data, plus an exception allowing adjusted 60-minute data for dwelling units.

As currently written, 120.87 does not specify an acceptable time interval for demand data recordings. This leads to inconsistent application and use of this code section. As currently written, one could use hourly, daily or even monthly demand data for this calculation. These values are not appropriate for a load calculation, and their use may lead to overload conditions. A maximum interval of 15 minutes is appropriate. It is the time period currently specified in the exception in this section It is commonly available from utility meter readings. It allows use of shorter time intervals if desired and available. And it aligns with the time-duration over which circuit breakers trip when in overload conditions of 100-150% of their rating.

The added second exception is needed for dwelling units, because utility meters in dwellings usually report only hourly demand data. This data can be safely used for load calculations if conservative adjustments are included. The proposed adjustments for hourly interval data were derived by comparing 15- and 60-minute maximum demand in 11,940 US dwellings. The adjustments provide a conservative estimate of 15-minute maximum demand in 99% of dwellings.

Change # 2: Allow metering of all phases, not just highest loaded phase in Exception 1.

The exception currently specifies metering the highest loaded phase, presumably so that only one CT device is required. Proposed language clarifies that metering all phases is also acceptable.

Change # 3: For exception 1, require users to account for parallel power sources and allow peak shaving that is part of 120.7 PCS control.

Exception 1 unnecessarily excludes millions of services and feeders with renewables and other power sources. Rather than exclude them, the proposed language requires users to account for parallel power sources (e.g., batteries, renewables, etc.), just as they are required to account for other large seasonal loads when using the exception. The proposed language allows for several compliance paths, such as calculation of gross demand based on net-metering data, or adding inverter output to the observed demand. Also, added clarifying language that permits use of the exception in cases where PCS are used for peak load shaving consistent with new section 120.7.

Change # 4: Loads being removed can be deducted from the metered demand data.

Currently, item (2) does not explicitly permit deductions for loads being removed. This is inconsistent with all other load calculation methods, where loads not present on the service are not included in the calculation. For example, when an HVAC heat pump replaces an existing air conditioner, section 120.83 would exclude the air conditioner from the load calculation. This is also the case when using Part III or Part IV optional calculations. Some users of this code section report deducting loads that are removed, while others interpret this as prohibited. The proposed language allows users to deduct loads being removed, making this section consistent with the rest of the code and avoiding different user interpretations.

Change # 5: Users can reference and use values and percentages from Parts III and IV of Section 120 for loads added or removed.

Currently, item (2) is unclear as to how new loads are accounted for, which leads to inconsistent interpretation and use. Some users report that new loads must be treated at 100% of nameplate for this calculation, while others report using values from throughout Parts III-IV of Section 120. For example, when adding a new cooking range, does the user apply 8 kW from Table 120.55 or the nameplate rating of 11 kW? Or when adding an electric dryer, is the user permitted to treat it at 80%, as specified in Table 120.54? To align 120.87 with the rest of the code and to clarify implementation, the proposed language permits users to use values and percentages from Parts III-IV.

Related Item

• This comment relates to my public input # 3320 and to inputs by others, including # 1234, 2855 and # 349.

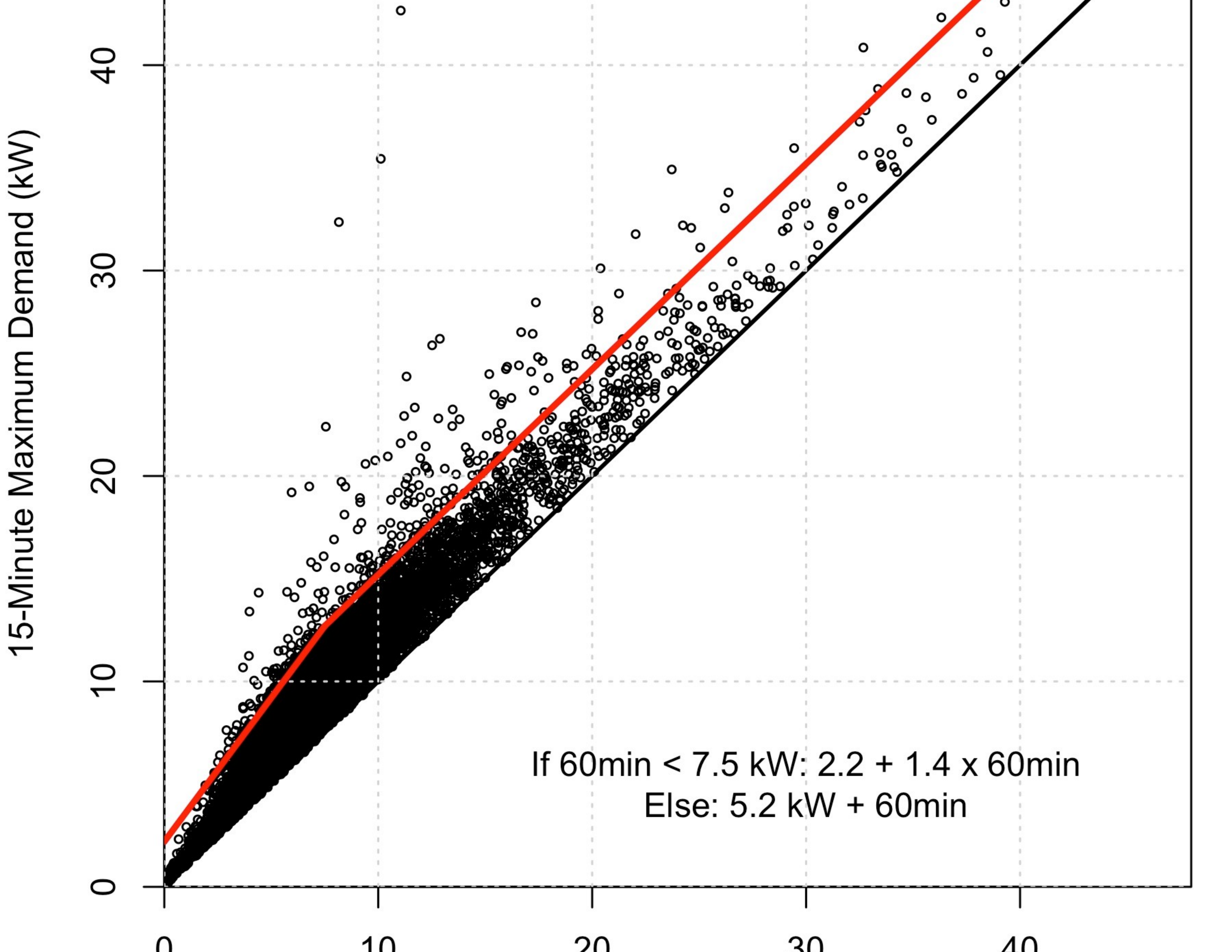
Submitter Information Verification

Submitter Full Name: Brennan Less

Organization:	LBNL
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jul 16 11:50:50 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7849-NFPA 70-2024
Statement:	Item (2) currently references “new load” without specifying how that is determined. This may lead to different interpretations by users and AHJs. Revised text clarifies that the new or removed “loads” are permitted to be determined in accordance with Parts I, III, and IV of this article. The data provided in the substantiation was specific to dwelling units. The impact to industrial establishments who have metering equipment that does not capture data at 15 minute intervals would be an unintended consequence of this change.


15-Minute Maximum Demand (kW)
0
10
20
30
40
0
10
20
30
40
If 60min < 7.5 kW: 2.2 + 1.4 x 60min
Else: 5.2 kW + 60min

Public Comment No. 533-NFPA 70-2024 [Section No. 210.1]

210.1 Scope.

This article provides the general requirements for branch circuits not over 1000 volts ac, 1500 volts dc, nominal.

Informational Note: See Article 265, Part II for requirements for branch circuits over 1000 volts ac, 1500 volts dc, nominal.

Additional Proposed Changes

File Name	Description	Approved
CN_265.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 265 appeared in the First Draft Report on First Revision No. 7515.

The Correlating Committee directs CMP 2 to review the reference to Part II of Article 235 to revise the reference as the branch circuit requirements for branch circuits over 1000 volts ac, 1500 volts dc, nominal, are now located in Article 265.

Related Item

- First Revision No. 7515

Submitter Information Verification

Submitter Full Name:	CC Notes
Organization:	NEC Correlating Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jul 30 23:20:59 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7528-NFPA 70-2024
Statement:	The change to the informational note was made to remove the reference to Part II of the Article as the entire article focuses Branch Circuit requirements for over 1000 volts AC, 1500 volts DC.

Correlating Committee Note No. 265-NFPA 70-2024 [Section No. 210.1]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Thu May 09 17:50:47 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to review the reference to Part II of Article 235 to revise the reference as the branch circuit requirements for branch circuits over 1000 volts ac, 1500 volts dc, nominal, are now located in Article 265.

First Revision No. 7515-NFPA 70-2024 [Section No. 210.1]

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. 136-NFPA 70-2024 [Section No. 210.3]

210.3 Reconditioned Equipment.

The following reconditioned equipment shall not be permitted or installed:

(1) Equipment that provides ground-fault circuit-interrupter protection for personnel

(2) Equipment that provides arc-fault circuit-interrupter protection

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 7517 • PI 1317

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 22 07:07:00 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7530-NFPA 70-2024

Statement: The changes make now uses the phrase "shall not be permitted" as it is all inclusive addressing installation of reconditioned equipment and the reconditioning of equipment that is already installed.

Public Comment No. 460-NFPA 70-2024 [Section No. 210.3]

210.3 Reconditioned Equipment.

The following reconditioned equipment shall not be installed:

(1) Equipment that provides ground-fault circuit-interrupter protection for personnel

(2) Equipment that provides arc-fault circuit-interrupter protection

Additional Proposed Changes

File Name	Description	Approved
CN_108.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 108 appeared in the First Draft Report on First Revision No. 7517.

The Correlating Committee directs CMP 2 to reconsider the language in the requirement and consider the following: "The installation of the following reconditioned equipment shall not be permitted."

Related Item

• First Revision No. 7517

Submitter Information Verification

Submitter Full Name: CC Notes

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jul 30 18:54:49 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7530-NFPA 70-2024

Statement: The changes make now uses the phrase "shall not be permitted" as it is all inclusive addressing installation of reconditioned equipment and the reconditioning of equipment that is already installed.

Correlating Committee Note No. 108-NFPA 70-2024 [Section No. 210.3]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 13:50:12 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to reconsider the language in the requirement and consider the following: "The installation of the following reconditioned equipment shall not be permitted."

First Revision No. 7517-NFPA 70-2024 [Section No. 210.2]

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. 1052-NFPA 70-2024 [Section No. 210.5(C)(1)]

(1) Branch Circuits 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) .~~ by methods other than described by 200.7 for grounded conductors and 250.119 for equipment grounding conductors.

Statement of Problem and Substantiation for Public Comment

Code section 210.5(C)(1) refers to 310.6(C)(2) which refers right back to 210.5(C)(1). Neither location provides how to identify ungrounded conductors. Any color used to identify an ungrounded conductor shall not be the what is used for the grounded or equipment grounding conductor.

Related Item

- FR-7523

Submitter Information Verification

Submitter Full Name: David Hittinger
Organization: Independent Electrical Contractors
Affiliation: IEC Codes and Standards
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 12 22:29:41 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The changes in the first draft of 310.6(C) address the intent of the public comment. The existing language of 210.5(C)(1) does not point to 310.6(C)(2) but rather points to 310.6(C). Because it points to 310.6(C), 310.6(C)(1) general requirements apply and must be followed for the identification of these conductors.

Public Comment No. 1890-NFPA 70-2024 [Section No. 210.8]

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel.

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F) for ac circuits . The GFCI shall be installed in a readily accessible location._ For dc circuits, equivalent protection shall be provided in accordance with 210.8(G) in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

(B) Other Than Dwelling Units.

All 125-volt through 250-volt receptacles supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less, installed in the following locations shall be provided with GFCI protection:

(1) Bathrooms

(2) Kitchens

(3) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(4) Buffet serving areas with permanent provisions for food serving, beverage serving, or cooking

(5) Rooftops

(6) Outdoors

(7) Sinks where receptacles or cord-and plug-connected fixed or stationary appliances are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(8) Indoor damp locations

(9) Indoor wet locations

(10) Locker rooms with associated showering facilities

(11) Garages, accessory buildings, service bays, and similar areas other than vehicle exhibition halls and showrooms

(12) Crawl spaces at or below grade level

(13) Unfinished areas of basements

(14) Aquariums, bait wells, and similar open aquatic vessels or containers, such as tanks or bowls, where receptacles are installed within 1.8 m (6 ft.) from the top inside edge or rim or from the conductive support framing of the vessel or container

(15) Laundry areas

(16) Bathtubs and shower stalls where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: At industrial establishments where conditions of maintenance and supervision ensure that only qualified personnel are involved, if a greater hazard is created by power interruption to outdoor fixed and stationary cord- and plug-connected equipment or that has a design that is not compatible with GFCI protection, an assured equipment grounding conductor program in accordance with 590.7(B)(2) shall be implemented and enforced in lieu of GFCI protection provided at the receptacle outlet.

Exception No. 3: Receptacles or cord- and plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial laboratories where the receptacles are used to supply equipment if removal of power would introduce a greater hazard.

Exception No. 4: Receptacles located in patient bed locations of Category 2 (general care) or Category 1 (critical care) spaces of health care facilities shall be permitted to comply with 517.21.

Exception No. 5: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of serving a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

(C) Crawl Space Lighting Outlets.

GFCI protection shall be provided for lighting outlets not exceeding 120 volts, nominal installed in crawl spaces.

(D) Specific Appliances.

GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single-phase or 100 amperes or less, 3-phase:

(1) Automotive vacuum machines

(2) Drinking water coolers and bottle fill stations

(3) High-pressure spray washing machines

(4) Tire inflation machines

(5) Vending machines

(6) Sump pumps

(7) Dishwashers

(8) Electric ranges

(9) Wall-mounted ovens

(10) Counter-mounted cooking units

(11) Clothes dryers

(12) Microwave ovens

(E) Equipment Requiring Servicing.

GFCI protection shall be provided for the receptacles required by 210.63.

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

(G) DC circuits.

A listed device providing ground-fault protection for personnel equivalent to a Class A GFCI shall be provided for the following dc circuits greater than 30 V dc:

(1) Receptacles rated installed in dwelling units in locations as specified in 210.8(A)(1) through (A)(14)

(2) Receptacles rated 100 amperes or less installed in other than dwelling units in locations as specified in 210.8(B)(1) through (B)(16)

(3) Crawl space lighting outlets

(4) Branch circuits and outlets for appliances, rated 60 amperes or less, installed in locations as specified in 210.8(D)(1) through (D)(12)

(5) Receptacles required by 210.63

(6) All outdoor outlets rated 50 amperes or less

Exception: Protection is not required for a Class 2, Class 3, Class 4 or communications circuit.

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.

The proposed updates to Section 210.8 are intended to provide lifesaving protection for personnel from electrical shock hazards originating from DC circuits. Although DC distribution circuits may not be prevalent at this time in the locations identified in 210.8(A) through (F), they are expected to be a growing alternative to AC circuits. This proposal closes a gap in the Code for DC circuits where similar hazards exist, but ground-fault protection may not be provided.

The committee statement by CMP2 for Public Input No. 4269 requested additional information concerning dc ground faults and let-go thresholds. According to the definition in UL 943, the Standard for Ground-Fault Circuit Interrupters, Class A GFCI for 60Hz AC circuits interrupt the circuit to the load when the ground-fault current is 6mA or more but not when the ground-fault current is 4mA or less. This provides the user with a level of protection against “let-go” (an effect of muscular tetanization in which there is an inability to let go of a gripped conductive part while current flows from the part into the hand) and more severe physiological effects.

Similar “let-go” effects occur with DC current above 30mA as referenced in IEC 60479-1:2018 “Effects of current on human beings and livestock – Part 1: General aspects”. This 30 mA current threshold is also the ground fault threshold presently required for DC rated CCID5 (Charging Circuit-Interrupting Device) covered in UL 2231-1 and UL 2231-2, the Standards for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits, and provide a similar level of protection. Ground fault threshold limits for DC and AC+DC waveforms are also specified in UL 1400-1, the Outline of Investigation for Fault-Managed Power Systems – Part 1: Safety, and utilized for Class 4 products on the market. These existing requirements may be used as a basis for equivalent criteria for providing Class A GFCI protection for DC circuits.

Related Item

• Public Input No. 4269-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Danish Zia
Organization: UL Solutions
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 27 21:14:15 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: During this revision cycle there is not currently a product standard nor listed products available in the industry capable of meeting this requirement. The phrase “equivalent to a class A GFCI” is vague and unenforceable.

Public Comment No. 461-NFPA 70-2024 [Section No. 210.8]

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel.

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

(B) Other Than Dwelling Units.

All 125-volt through 250-volt receptacles supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less, installed in the following locations shall be provided with GFCI protection:

(1) Bathrooms

(2) Kitchens

(3) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(4) Buffet serving areas with permanent provisions for food serving, beverage serving, or cooking

(5) Rooftops

(6) Outdoors

(7) Sinks where receptacles or cord-and plug-connected fixed or stationary appliances are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(8) Indoor damp locations

(9) Indoor wet locations

(10) Locker rooms with associated showering facilities

(11) Garages, accessory buildings, service bays, and similar areas other than vehicle exhibition halls and showrooms

(12) Crawl spaces at or below grade level

(13) Unfinished areas of basements

(14) Aquariums, bait wells, and similar open aquatic vessels or containers, such as tanks or bowls, where receptacles are installed within 1.8 m (6 ft.) from the top inside edge or rim or from the conductive support framing of the vessel or container

(15) Laundry areas

(16) Bathtubs and shower stalls where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: At industrial establishments where conditions of maintenance and supervision ensure that only qualified personnel are involved, if a greater hazard is created by power interruption to outdoor fixed and stationary cord- and plug-connected equipment or that has a design that is not compatible with GFCI protection, an assured equipment grounding conductor program in accordance with 590.7(B)(2) shall be implemented and enforced in lieu of GFCI protection provided at the receptacle outlet.

Exception No. 3: Receptacles or cord- and plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial laboratories where the receptacles are used to supply equipment if removal of power would introduce a greater hazard.

Exception No. 4: Receptacles located in patient bed locations of Category 2 (general care) or Category 1 (critical care) spaces of health care facilities shall be permitted to comply with 517.21.

Exception No. 5: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of serving a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

(C) Crawl Space Lighting Outlets.

GFCI protection shall be provided for lighting outlets not exceeding 120 volts, nominal installed in crawl spaces.

(D) Specific Appliances.

GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single-phase or 100 amperes or less, 3-phase:

(1) Automotive vacuum machines

(2) Drinking water coolers and bottle fill stations

(3) High-pressure spray washing machines

(4) Tire inflation machines

(5) Vending machines

(6) Sump pumps

(7) Dishwashers

(8) Electric ranges

(9) Wall-mounted ovens

(10) Counter-mounted cooking units

(11) Clothes dryers

(12) Microwave ovens

(E) Equipment Requiring Servicing.

GFCI protection shall be provided for the receptacles required by 210.63.

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Additional Proposed Changes

File Name	Description	Approved
CN_109.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 109 appeared in the First Draft Report on First Revision No. 7788.

The Correlating Committee directs CMP-2 to consider including an informational note to this section or to the defined term GFCI, regarding Class A-HF, High Frequency.

Related Item

- First Revision No. 7788

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 18:57:02 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7539-NFPA 70-2024

Statement: Removing “or class A HF” and adding a new Informational Note recognizes that the class A GFCI can be marked “HF” or “HF+”. This change maintains the fact that these are Class A GFCIs but offer a technology that can provide shock protection yet provide for a solution that is evaluated for use with loads that have high frequency leakage currents. Creating a Class A HF designation may deviate from OSHA reference for “Class A” GFCI. This marking requirement as shown in the new Informational Note will allow the user to select a Class A GFCI that has been evaluated and listed for specific GFCI requirements at high frequency if determined to be required for the application. This approach is consistent with other common ratings such as Tamper resistant (TR), Hospital Grade, Weather Resistant (WR), Switching Duty (SWD), and High Intensity Discharge (HID). Because this language is in the parent text of 210.8, this solution is available for first level subdivisions (A) through (F).

Correlating Committee Note No. 109-NFPA 70-2024 [Section No. 210.8]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Wed May 08 13:56:04 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to consider including an informational note to this section or to the defined term GFCI, regarding Class A-HF, High Frequency.

First Revision No. 7788-NFPA 70-2024 [Section No. 210.8 [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. 1080-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp locations

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

Added "locations" to list item 13. Thanks

Related Item

- FR-7908

Submitter Information Verification

Submitter Full Name: Daniel Naughton
Organization: JATC of Greater Boston
Affiliation: IBEW
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 14 07:09:06 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7550-NFPA 70-2024

Statement: Item (3) modification: (PC 1237): List item 3 has been modified to specify areas of accessory buildings instead of accessory buildings. Changing "Accessory buildings" to Areas of accessory" adds clarity to the requirement.

Item (13) modification: (PC 137, 462, 1080)

List item 13 is modified Adding "Locations" for clarity. Corrected the language from "Indoor damp" to "Indoor damp locations". This was inadvertently left off in the first revision language. This change brings 210.8(A) consistent with language in 210.8(B).

Public Comment No. 1237-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) ~~Accessory~~ Areas of accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

This comment should be viewed as editorial only. As written in the first draft, it appears that the entire accessory building must be GFCI protected if the entirety of the building is not intended as nonhabitable. For example, a two-story detached building will often have a garage on the main floor (GFCI should be required) and a living room above (GFCI should not be required). In such a building, the the draft language should be more clear on whether GFCI is required throughout, or in some locations, or not at all.

Related Item

• FR 7704

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Self-employed

Street Address:

City:

State:

Zip:

Submittal Date: Sun Aug 18 12:45:15 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7550-NFPA 70-2024

Statement: Item (3) modification: (PC 1237): List item 3 has been modified to specify areas of accessory buildings instead of accessory buildings. Changing “Accessory buildings” to Areas of accessory” adds clarity to the requirement.

Item (13) modification: (PC 137, 462, 1080)

List item 13 is modified Adding “Locations” for clarity. Corrected the language from “Indoor damp” to “Indoor damp locations”. This was inadvertently left off in the first revision language. This change brings 210.8(A) consistent with language in 210.8(B).

Public Comment No. 1344-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250~~-volt receptacles installed~~ volt outlets or devices installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for ~~listed weight~~ listed weight -supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Additional Proposed Changes

File Name	Description	Approved
.1724236124096	210.8 A revised 08 21 2024	

Statement of Problem and Substantiation for Public Comment

With the added language, it will provide GFCI protection to all 125-volt through 250-volt outlets and devices in locations specified in 210.8A to include USB ports in the following locations.

Related Item

• FR-7704

Submitter Information Verification

Submitter Full Name: Larry Wildermuth

Organization: Orange County Division Buildin

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 21 06:22:09 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Although the public comment has merit, adding “outlets or devices” to replace “receptacles” in parent text has not been substantiated. Outlets are all inclusive and could result in unintended consequences.

Public Comment No. 137-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp locations

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

This comment adds the word "Locations" where it is needed to make this item make sense.

Related Item

- FR 7908

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich

Organization: Eaton Corporation

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jul 22 07:20:59 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7550-NFPA 70-2024

Statement: Item (3) modification: (PC 1237): List item 3 has been modified to specify areas of accessory buildings instead of accessory buildings. Changing “Accessory buildings” to Areas of accessory” adds clarity to the requirement.

Item (13) modification: (PC 137, 462, 1080)

List item 13 is modified Adding “Locations” for clarity. Corrected the language from “Indoor damp” to “Indoor damp locations”. This was inadvertently left off in the first revision language. This change brings 210.8(A) consistent with language in 210.8(B).

Public Comment No. 1398-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations (protection provided for the supply conductors of floor receptacle outlets)

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

All underground installations are considered wet locations per NEC 300.5 (B). This would require all ground level floor receptacle outlets to have GFCI protection for the portion of the branch circuit that is installed underground. The GFCI protection is needed for the portion of the line side of the branch circuit to the floor receptacle to insure no contact with energized conductors would occur. The potential hazard of floor receptacle outlets becoming wet (due to spillage) exists in all installations in floors of any and all locations. It seems as if the current code is intended for this protection to occur, however it has not been clearly written, understood, or enforced.

Related Item

• clarification of :GFCI Protection for Floor Outlet Receptacles (13) Floor outlet receptacles (protection provided for the circuit of the conductors feeding outlet) Aslo adding to 210.8(B) (16) Floor outlet receptacles (protection provided for the circuit of the conductors feeding outlet)

Submitter Information Verification

Submitter Full Name: Jason Scott

Organization: IES Residential

Affiliation: IEC

Street Address:

City:

State:

Zip:

Submittal Date: Thu Aug 22 08:59:35 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The proposed language is vague and unenforceable. The proposed language could add confusion for installers and enforcement.

Public Comment No. 1817-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Exception No. 5: GFCI protection shall not be required for a single receptacle dedicated to serving an HVAC condensate pump. The receptacle shall be labeled "not GFCI protected" and another GFCI receptacle shall be located within three feet from the unprotected dedicated outlet. Any receptacles installed under this exception shall not be considered as meeting the requirements of 210.52(C) and (G).

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

GFCI receptacle nuisance trips interrupting power to indoor HVAC condensate pumps create three major life safety issues because the loss of pump function is required to shut down the HVAC system by building code. The three hazards are (1) occupant health due to exposure to extreme heat or cold, (2) occupant injury in attempts to find the issue by persons with agility issues, and (3) defeating the new flammability safety feature by interfering with the control systems which need blowers to operate in response to increasing A2L refrigerant concentrations to prevent potentially flammable A2L room concentrations. All residential split systems manufactured after 2025 will utilize A2L ("mildly flammable") refrigerants to meet recently enacted federal low-Global Warming Potential (GWP) refrigerant limits.

CMP-2 rejected ACCA's proposal last January because the suggested language could result in an unprotected receptacle located in the basement that can be used for other equipment or devices. ACCA's comment proposes the addition of Exception No. 5, which allows for a single dedicated non-GFCI receptacle, as opposed to a duplex receptacle, and also requires it to be labeled. It also requires a GFCI receptacle to be within three feet so the occupant has no motive to remove the condensate pump cord and use the unprotected dedicated outlet. This addresses the concern of the receptacle being used as another outlet.

An HVAC condensate pump is a device installed and dedicated for the normal operation of a condensing furnace or air handler located in the basement. Building codes require that it shut down the HVAC system if the condensate reservoir reaches high level as occurs when a GFCI nuisance trips.

In addition, there were concerns noted that an HVAC condensate pump could be confused with a sump pump. ACCA does not believe an HVAC condensate pump can be mistaken for a sump pump.

The proposed language is also based on the State of Oregon's broader exception allowing for non-GFCI receptacles for dedicated equipment and so labeled. At least five states (NC, ND, OH, OR and WI) have amended the NEC to include GFCI exemptions for sewer, sump and/or condensate pumps. The states took this action even before the A2L refrigerants were mandated and blower operation became part of a safety system.

There were comments made that ACCA's condensate pump survey may have included GFCI tripping in response to a grounding situation. During its presentation last January, ACCA reported that its member survey involved only reports of nuisance tripping of condensate pumps that were connected to GFCI receptacles in basements per the NEC. The survey was ONLY focused on incidents within the past 12 months where the GFCI receptacle tripped and no defect or grounding condition was found.

Related Item

• Public Input No. 4381-NFPA 70-2023 [Section No. 210.8(A)]

Submitter Information Verification

Submitter Full Name: David Bixby

Organization: ACCA

Affiliation: ACCA

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 27 14:54:57 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The proposed language would result in an unprotected receptacle in areas requiring GFCI protection that can be used for other equipment. Condensate pumps reflect a potential shock hazard due to the presence of water and GFCI are required.

Public Comment No. 1867-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Exception No. 5: GFCI protection shall not be required for a refrigerator or HVAC appliance if all the following conditions are met:

a. The appliance is not portable

b. The appliance is on an individual branch-circuit

c. The receptacle is not installed within 1.8m (6 ft) of the top inside edge of the bowl of a sink

d. The receptacle is installed within 1.2m (4 ft) of the appliance enclosure

e. The receptacle is a single receptacle

This exception shall expire January 1, 2028

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

The First Draft allows the use of modernized GFCIs, termed Class A-HF. These modernized GFCIs are not required in the First Draft which means the higher risk of GFCI nuisance tripping remains if the appliance is connected to a non-modernized Class A GFCI.

The code should allow a proactive approach in preventing GFCI nuisance tripping by making an exception for appliances which present a lower risk of shock. Electrical risks of higher voltage loads will never be completely mitigated, even if such loads are connected to a GFCI. These conditions of acceptability mitigate risk until adequate solutions to the proven nuisance tripping problem have been addressed. Lower risk is achieved through five conditions of acceptability listed in (a.) through (e.) A number of these conditions were added and edited in response to comments provided during the First Draft meetings.

--The defined term “portable” has been added to address concerns regarding vague conditions of acceptability,
--A new condition of acceptability has been added regarding proximity to a sink to mitigate risk of splashing water,
--An expiration date has been added to motivate manufacturers of home appliances and GFCIs to work on effective UL standards which address nuisance tripping. AHAM hopes that, by 2028, modernization will be required in the UL 943 standard for all Class A GFCIs, not just GFCIs which meet an optional rating.

Resources on GFCI nuisance tripping can be seen at

UL:
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwif_5iL8fSGAxWgP2IAHZ21CaIQFnoECBMQAQ&url=https%3A%2F%2Fcrc.ul.com%2Fapp%2Fasset_files%2F54854%2

CPSC:
https://www.cpsc.gov/s3fs-public/CPSC-staff-comment-UL-101-Leakage-Current-0223.pdf?VersionId=zUbconvHu8Us1hLETgS3xztZRYhRcWhz

Related Item

• PI 4070 • FR 7788

Submitter Information Verification

Submitter Full Name: Greg Woyczynski
Organization: Association of Home Appliance
Street Address:
City:

State:	
Zip:	
Submittal Date:	Tue Aug 27 18:56:27 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	The suggested language would result in an unprotected receptacle in areas requiring GFCI protection that can be used for other equipment. The addition of a type HF GFCI will help installers address these compatibility concerns. Placing an appliance on an individual branch circuit or on a single receptacle does not remove the electrical hazard.

Public Comment No. 1876-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Exception No. 5: GFCI protection shall not be required for an electric range, wall-mounted oven, or counter-mounted cooking unit if all the following conditions are met:

a. The appliance is not portable

b. The receptacle is not installed within 1.8m (6 ft) of the top inside edge of the bowl of a sink

c. The receptacle is installed within 1.2m (4 ft) of the appliance enclosure

d. The receptacle is a single receptacle

This exception shall expire January 1, 2028

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

The First Draft allows the use of modernized GFCIs, termed Class A-HF. These modernized GFCIs are not required in the First Draft which means the higher risk of GFCI nuisance tripping remains if the appliance is connected to a non-modernized Class A GFCI.

The code should allow a proactive approach in preventing GFCI nuisance tripping by making an exception for appliances which present a lower risk of shock. This lower risk is achieved through four conditions of acceptability listed in (a.) through (d.) A number of these conditions were added and edited in response to comments provided during the First Draft meetings:

--The defined term “portable” has been added to address concerns regarding vague conditions of acceptability,
--A new condition of acceptability has been added regarding proximity to a sink to mitigate risk of splashing water,
--An expiration date has been added to motivate manufacturers of home appliances and GFCIs to work on effective UL standards which address nuisance tripping. AHAM hopes that, by 2028, modernization will be required in the UL 943 standard for all Class A GFCIs, not just GFCIs which meet an optional rating.

Resources on GFCI nuisance tripping can be seen at

UL:
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwif_5iL8fSGAxWgP2IAHZ21CaIQFnoECBMQAQ&url=https%3A%2F%2Fcrc.ul.com%2Fapp%2Fasset_files%2F54854%2

CPSC:
https://www.cpsc.gov/s3fs-public/CPSC-staff-comment-UL-101-Leakage-Current-0223.pdf?VersionId=zUbconvHu8Us1hLETgS3xztZRYhRcWhz

Related Item

• FR 7788 • PI 4107

Submitter Information Verification

Submitter Full Name: Greg Woyczynski
Organization: Association of Home Appliance
Street Address:
City:
State:

Zip:
Submittal Date: Tue Aug 27 19:31:04 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	The proposed language would result in an unprotected receptacle in areas requiring GFCI protection that can be used for other equipment. The addition of a type HF GFCI will help installers address these compatibility concerns.

Public Comment No. 1907-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

<u>Exception No. 5: GFCI protection shall not be required for permanently connected appliances protected by a Class C SPGFCI.</u>

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

The First Draft allows the use of modernized GFCIs, termed Class A-HF. These modernized GFCIs are not required in the First Draft which means the higher risk of GFCI nuisance tripping remains if the appliance is connected to a non-modernized Class A GFCI.

The code should allow a proactive approach to prevent GFCI nuisance tripping by allowing a GFCI which is less sensitive but requires ground monitoring ensuring hazardous current has a safe path of least resistance.

Resources on Class A GFCI nuisance tripping can be seen at

UL:
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwif_5iL8fSGAxWgP2IAHZ21CaIQFnoECBMQAQ&url=https%3A%2F%2Fcrc.ul.com%2Fapp%2Fasset_files%2F54854%2

CPSC:
https://www.cpsc.gov/s3fs-public/CPSC-staff-comment-UL-101-Leakage-Current-0223.pdf?VersionId=zUbconvHu8Us1hLETgS3xztZRYhRcWhz

<u>Related Item</u>

• FR 7788

Submitter Information Verification

Submitter Full Name:	Greg Woyczynski
Organization:	Association of Home Appliance
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 27 22:58:36 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	Section 210.8(A) applies to 125-volt through 250-volt receptacles installed in the identified locations. This section does not apply to hard wired permanently connected appliances. The suggested language is not appropriately placed. The addition of a type HF GFCI will help installers address these compatibility concerns.

Public Comment No. 462-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Garages

(3) Accessory buildings not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(4) Outdoors

(5) Crawl spaces — at or below grade level

(6) Basements

(7) Kitchens

(8) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(9) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(10) Boathouses

(11) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(12) Laundry areas

(13) Indoor damp

(14) Indoor wet locations

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system.

Exception No. 3: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Additional Proposed Changes

File Name	Description	Approved
CN_110.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 110 appeared in the First Draft Report on First Revision No. 7908.

The Correlating Committee directs CMP-2 to reconsider the revised text to comply with the NEC Style Manual 3.5.4 for clarity and for parallel construction 3.5.5.
Consider adding the word “location” after “Indoor damp” for clarity.

The Correlating Committee also directs CMP-2 to reconsider the revised text to comply with the NEC Style Manual 3.5.3 for plural references of “receptacles” and “systems”.

Related Item

• First Revision No. 7908

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 18:58:31 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7550-NFPA 70-2024

Statement: Item (3) modification: (PC 1237): List item 3 has been modified to specify areas of accessory buildings instead of accessory buildings. Changing “Accessory buildings” to Areas of accessory” adds clarity to the requirement.

Item (13) modification: (PC 137, 462, 1080)

List item 13 is modified Adding “Locations” for clarity. Corrected the language from “Indoor damp” to “Indoor damp locations”. This was inadvertently left off in the first revision language. This change brings 210.8(A) consistent with language in 210.8(B).

Correlating Committee Note No. 110-NFPA 70-2024 [Section No. 210.8(A)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 13:57:30 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to reconsider the revised text to comply with the NEC Style Manual 3.5.4 for clarity and for parallel construction 3.5.5. Consider adding the word “location” after “Indoor damp” for clarity.

The Correlating Committee also directs CMP-2 to reconsider the revised text to comply with the NEC Style Manual 3.5.3 for plural references of “receptacles” and “systems”.

First Revision No. 7908-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. 1297-NFPA 70-2024 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All 125-volt through 250-volt receptacles supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ~~ground~~ ground on any one phase , 100 amperes or less, installed in the following locations shall be provided with GFCI protection:

(1) Bathrooms

(2) Kitchens

(3) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(4) Buffet serving areas with permanent provisions for food serving, beverage serving, or cooking

(5) Rooftops

(6) Outdoors

(7) Sinks where receptacles or cord-and plug-connected fixed or stationary appliances are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(8) Indoor damp locations

(9) Indoor wet locations

(10) Locker rooms with associated showering facilities

(11) Garages, accessory buildings, service bays, and similar areas other than vehicle exhibition halls and showrooms

(12) Crawl spaces at or below grade level

(13) Unfinished areas of basements

(14) Aquariums, bait wells, and similar open aquatic vessels or containers, such as tanks or bowls, where receptacles are installed within 1.8 m (6 ft.) from the top inside edge or rim or from the conductive support framing of the vessel or container

(15) Laundry areas

(16) Bathtubs and shower stalls where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: At industrial establishments where conditions of maintenance and supervision ensure that only qualified personnel are involved, if a greater hazard is created by power interruption to outdoor fixed and stationary cord- and plug-connected equipment or that has a design that is not compatible with GFCI protection, an assured equipment grounding conductor program in accordance with 590.7(B)(2) shall be implemented and enforced in lieu of GFCI protection provided at the receptacle outlet.

Exception No. 3: Receptacles or cord- and plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial laboratories where the receptacles are used to supply equipment if removal of power would introduce a greater hazard.

Exception No. 4: Receptacles located in patient bed locations of Category 2 (general care) or Category 1 (critical care) spaces of health care facilities shall be permitted to comply with 517.21.

Exception No. 5: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of serving a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

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.

Please revisit the resolution on PI 1897. For enforcement reasons, clarifying the “any one phase” will clarify that GFCI protection is required for those delta system high-leg receptacle installations where the voltage is over 150-volts to ground. We have encountered installations where it could be argued that with a high leg voltage, that the GFCI protection would not be required. Also, we are not understanding what the unintended consequences would be.

Clarification would help the enforcement community.

Related Item

• Public Input No. 1897-NFPA 70-2023 Section No. 210.8(B)

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 20 12:43:05 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: This public comment proposes to add language to require a “stinger leg” “wild leg” Delta to have GFCI protection. GFCI Class A protection interrupting time relationship for let go is based on a maximum potential of 150V to ground. References within the code when applying GFCIs are for circuits rated 150V or less to ground which correlate with the standard for these solutions. A special case includes high-leg deltas where the potential may exceed 150V resulting in GFCI protection is not being required. UL 943 would not be applicable for the potential involved on the high-leg circuit. This is where SPGFCI UL 943C such as a Class D would then be more appropriate for voltage potential of under 300V to ground. PC 1297 is being rejected because the Class A GFCI according to UL 943 is only suitable for branch circuits that have a maximum operating potential of 150V respects to ground.

Public Comment No. 1346-NFPA 70-2024 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All 125-volt through 250-volt ~~receptacles~~ outlets or devices supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less, installed in the following locations shall be provided with GFCI protection:

(1) Bathrooms

(2) Kitchens

(3) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(4) Buffet serving areas with permanent provisions for food serving, beverage serving, or cooking

(5) Rooftops

(6) Outdoors

(7) Sinks where receptacles or cord-and plug-connected fixed or stationary appliances are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(8) Indoor damp locations

(9) Indoor wet locations

(10) Locker rooms with associated showering facilities

(11) Garages, accessory buildings, service bays, and similar areas other than vehicle exhibition halls and showrooms

(12) Crawl spaces at or below grade level

(13) Unfinished areas of basements

(14) Aquariums, bait wells, and similar open aquatic vessels or containers, such as tanks or bowls, where receptacles are installed within 1.8 m (6 ft.) from the top inside edge or rim or from the conductive support framing of the vessel or container

(15) Laundry areas

(16) Bathtubs and shower stalls where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: At industrial establishments where conditions of maintenance and supervision ensure that only qualified personnel are involved, if a greater hazard is created by power interruption to outdoor fixed and stationary cord- and plug-connected equipment or that has a design that is not compatible with GFCI protection, an assured equipment grounding conductor program in accordance with 590.7(B)(2) shall be implemented and enforced in lieu of GFCI protection provided at the receptacle outlet.

Exception No. 3: Receptacles or cord- and plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial laboratories where the receptacles are used to supply equipment if removal of power would introduce a greater hazard.

Exception No. 4: Receptacles located in patient bed locations of Category 2 (general care) or Category 1 (critical care) spaces of health care facilities shall be permitted to comply with 517.21.

Exception No. 5: GFCI protection shall not be required for ~~listed weight~~ listed weight -supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of serving a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Additional Proposed Changes

File Name	Description	Approved
.1724236404707	210.8 B	

Statement of Problem and Substantiation for Public Comment

With the added language, it will provide GFCI protection to all 125-volt through 250-volt outlets and devices in locations specified in 210.8A to include USB ports in the following locations.

Related Item

• FR-7911

Submitter Information Verification

Submitter Full Name: Larry Wildermuth
Organization: Orange County Division Buildin
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 21 06:31:49 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Although the public comment has merit, adding “outlets or devices” to replace “receptacles” in parent text has not been substantiated. Outlets are all inclusive and could result in unintended consequences.

Public Comment No. 726-NFPA 70-2024 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All 125-volt through 250-volt receptacles supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less, installed in the following locations shall be provided with GFCI protection:

(1) Bathrooms

(2) Kitchens

(3) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(4) Buffet serving areas with permanent provisions for food serving, beverage serving, or cooking

(5) Rooftops

(6) Outdoors

(7) Sinks where receptacles or cord-and plug-connected fixed or stationary appliances are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(8) Indoor damp locations

(9) Indoor wet locations

(10) Locker rooms with associated showering facilities

(11) Garages, accessory buildings, service bays, and similar areas other than vehicle exhibition halls and showrooms

(12) Crawl spaces at or below grade level

(13) Unfinished areas of basements

(14) ~~Aquariums, bait wells, and similar open~~ Open aquatic vessels or containers, such as aquariums, bait wells, and similar tanks or bowls, where receptacles are installed within 1.8 m (6 ft.) from the top inside edge or rim or from the conductive support framing of the vessel or container

(15) Laundry areas

(16) Bathtubs and shower stalls where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

Exception No. 1: Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2: At industrial establishments where conditions of maintenance and supervision ensure that only qualified personnel are involved, if a greater hazard is created by power interruption to outdoor fixed and stationary cord- and plug-connected equipment or that has a design that is not compatible with GFCI protection, an assured equipment grounding conductor program in accordance with 590.7(B)(2) shall be implemented and enforced in lieu of GFCI protection provided at the receptacle outlet.

Exception No. 3: Receptacles or cord- and plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial laboratories where the receptacles are used to supply equipment if removal of power would introduce a greater hazard.

Exception No. 4: Receptacles located in patient bed locations of Category 2 (general care) or Category 1 (critical care) spaces of health care facilities shall be permitted to comply with 517.21.

Exception No. 5: GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of serving a ceiling luminaire or ceiling-suspended fan. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Statement of Problem and Substantiation for Public Comment

This revised language would make it clear when the code rule is to be applied to "open aquatic vessels or containers" not within 6 feet of aquariums or bait wells with a closed top or lid.

Related Item

• FR7911

Submitter Information Verification

Submitter Full Name: David Johnson

Organization: CenTex IEC

Affiliation: Independent Electrical Contractors

Street Address:

City:

State:

Zip:

Submittal Date: Sun Aug 04 12:19:42 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7560-NFPA 70-2024

Statement: List item 14 has been modified to make it clear when the code rule is to be applied. The existing language has been reorganized to "open aquatic vessels or containers" not within 6 feet of aquariums or bait wells not with a closed top or lid.

Public Comment No. 1081-NFPA 70-2024 [Section No. 210.8(D)]

(D) Specific Appliances.

GFCI protection shall be provided for ~~the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single-phase or 100 amperes or less, 3-phase:~~

(1) ~~Automotive vacuum machines~~

(2) ~~Drinking water coolers and bottle fill stations~~

(3) ~~High-pressure spray washing machines~~

(4) ~~Tire inflation machines~~

(5) ~~Vending machines~~

(6) ~~Sump pumps~~

(7) ~~Dishwashers~~

(8) ~~Electric ranges~~

(9) ~~Wall-mounted ovens~~

(10) ~~Counter-mounted cooking units~~

(11) ~~Clothes dryers~~

(12) ~~Microwave ovens~~

specific appliances in accordance with 422.5(B), of a type and location in accordance with 422.5(C).

Statement of Problem and Substantiation for Public Comment

This public comment is a response to First Draft PI No. 195-NFPA 70-2023 [Section No. 210.8(D) which was resolved by CMP-2 and Public Input No. 1548-NFPA 70-2023 [Section No. 422.5(A)]which was resolved by CMP 17.

The logic behind both of these public inputs was to harmonize the requirements of 210.8(D) and 422.5(B). The list of appliances requiring GFCI protection and the specific requirements for GFCI protection should not be in two places in the Code, and the requirements should not differ.

Having two appliance lists requiring GFCI protection that don't match in Articles 210 and 422 is confusing and difficult for users of this Code to reconcile. This PC updates the language to harmonize the requirements of 210.8(D) and the requirements of 422(5). This public comment has a related PC #1082 to update the list of appliances in 422.5(C) to match the current list in 210.8(D). In addition, the allowance for type and location of GFCI protection in 422.2(C) is not currently the same as the requirements of 210.8(D). If there are indeed different location requirements for the list of appliances in 422 versus the list in 210, please make this clear to users of this Code by listing the appliances in 210 that should follow the requirements in 210 and a different (non-overlapping) list in 422 (if they actually do have different requirements or allowances). The overlapping but slightly different list and requirements is not currently clear or logical and will cause confusion with both users and enforcement.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1082-NFPA 70-2024 [Section No. 422.5(B)]	
Public Comment No. 1082-NFPA 70-2024 [Section No. 422.5(B)]	

Related Item

- PI 195, PI 1548

Submitter Information Verification

Submitter Full Name: Rebekah Hren
Organization: IPPNC LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 14 09:47:01 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7617-NFPA 70-2024

Statement: This second revision ensures that the requirements found in 210.8(D) only apply to the protection of branch circuits or outlets and not the appliance. The list of appliances is driven off of those found in Article 422, section 422.5. CMP-2 reaffirms that it would like to maintain the GFCI protection of the branch circuit and the outlet for the appliances listed in 210.8(D)(1)-(12) as a shock hazard can exist in these installations as documented in CPSC data that was used when CMP-2 generated the items in this list.

Public Comment No. 1162-NFPA 70-2024 [Section No. 210.8(D)]

(D) Specific Appliances.

GFCI protection ~~shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single-phase or 100 amperes or less, 3-phase:~~

(1) ~~Automotive vacuum machines~~

(2) ~~Drinking water coolers and bottle fill stations~~

(3) ~~High-pressure spray washing machines~~

(4) ~~Tire inflation machines~~

(5) ~~Vending machines~~

(6) ~~Sump pumps~~

(7) ~~Dishwashers~~

(8) ~~Electric ranges~~

(9) ~~Wall-mounted ovens~~

(10) ~~Counter-mounted cooking units~~

(11) ~~Clothes dryers~~

(12) ~~Microwave ovens~~

<u>for specific appliances shall be provided in accordance with 422.5.</u>

Statement of Problem and Substantiation for Public Comment

Appliances requiring GFCI protection is already covered in 422.5
It is better to point people to the proper article rather than adding redundancies to the code. A companion PC 1164 will add list Items to 422.5(B).
FR7736 for 210.8(D) changed the circuit requirements to match FR8871 422.5 basically making the articles identical.
Dishwashers was moved from 210.8 to 422.5 recently and I think we should be consistent.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1164-NFPA 70-2024 [Section No. 422.5(B)]	
Public Comment No. 1164-NFPA 70-2024 [Section No. 422.5(B)]	

Related Item

- FR-7736, FR-8871

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 10:26:39 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7617-NFPA 70-2024
Statement:	This second revision ensures that the requirements found in 210.8(D) only apply to the protection of branch circuits or outlets and not the appliance. The list of appliances is driven off of those found in Article 422, section 422.5. CMP-2 reaffirms that it would like to maintain the GFCI protection of the branch circuit and the outlet for the appliances listed in 210.8(D)(1)-(12) as a shock hazard can exist in these installations as documented in CPSC data that was used when CMP-2 generated the items in this list.

Public Comment No. 1273-NFPA 70-2024 [Section No. 210.8(D)]

(D) Specific Appliances.

GFCI protection ~~shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single-phase or 100 amperes or less, 3-phase:~~

(1) ~~Automotive vacuum machines~~

(2) ~~Drinking water coolers and bottle fill stations~~

(3) ~~High-pressure spray washing machines~~

(4) ~~Tire inflation machines~~

(5) ~~Vending machines~~

(6) ~~Sump pumps~~

(7) ~~Dishwashers~~

(8) ~~Electric ranges~~

(9) ~~Wall-mounted ovens~~

(10) ~~Counter-mounted cooking units~~

(11) ~~Clothes dryers~~

(12) ~~Microwave ovens~~

for specific appliances shall be provided in accordance with 422.5.

Statement of Problem and Substantiation for Public Comment

As requested by the Correlating Committee, a task group was created to address the correct location of the technical material currently found in both 210.8(D) and 422.5, with the aim of limiting that content to one location or the other. Unlike the GFCI requirements set forth in 210.8(A), (B), (C), (E), and (F), the requirements in (D) are not driven by physical location. They are specific to appliances, and therefore should reside in the appliance article.

The task group consisted of the following members of Code-Making Panel 2 and Code-Making Panel 17: David Johnson (Chair), Ryan Jackson, Robert DellaValle, Greg Woyczynski, and Larry Wildermuth. The chair appreciates the time and efforts put forth by these individuals.

A companion PC will add list items to 422.5(B).

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1275-NFPA 70-2024 [Section No. 422.5(B)]	PC #1275
Public Comment No. 1275-NFPA 70-2024 [Section No. 422.5(B)]	

Related Item

- FR7736, FR8871

Submitter Information Verification

Submitter Full Name: David Johnson
Organization: CenTex IEC
Affiliation: Tack Group for correlation of 210.8(D) and 422.5.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 19 14:26:23 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7617-NFPA 70-2024

Statement: This second revision ensures that the requirements found in 210.8(D) only apply to the protection of branch circuits or outlets and not the appliance. The list of appliances is driven off of those found in Article 422, section 422.5. CMP-2 reaffirms that it would like to maintain the GFCI protection of the branch circuit and the outlet for the appliances listed in 210.8(D)(1)-(12) as a shock hazard can exist in these installations as documented in CPSC data that was used when CMP-2 generated the items in this list.

Public Comment No. 1737-NFPA 70-2024 [Section No. 210.8(D)]

(D) Specific Appliances.

GFCI protection shall be provided for the ~~branch circuit or~~ outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single-phase or 100 amperes or less, 3-phase:

(1) Automotive vacuum machines

(2) Drinking water coolers and bottle fill stations

(3) High-pressure spray washing machines

(4) Tire inflation machines

(5) Vending machines

(6) Sump pumps

(7) Dishwashers

(8) Electric ranges

(9) Wall-mounted ovens

(10) Counter-mounted cooking units

(11) Clothes dryers

(12) Microwave ovens

Statement of Problem and Substantiation for Public Comment

There is no reason to say branch circuit or outlets since GFCI protection would provide personnel protection anywhere in the circuit to the outlet or utilization equipment.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 275-NFPA 70-2024 [Section No. 625.54]	625.54 doesn't need to have the word outlet added

Related Item

• PI #3158

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 20:44:28 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The existing language provides options for GFCI protection in the OCPD or the device for protection of the outlet. The removal of this language could cause confusion.

Public Comment No. 1882-NFPA 70-2024 [Section No. 210.8(D)]

(D) Specific Appliances.

GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single-phase or 100 amperes or less, 3-phase:

(1) Automotive vacuum machines

(2) Drinking water coolers and bottle fill stations

(3) High-pressure spray washing machines

(4) Tire inflation machines

(5) Vending machines

(6) Sump pumps

(7) Dishwashers

(8) Electric ranges

(9) Wall-mounted ovens

(10) Counter-mounted cooking units

(11) Clothes dryers

(12) Microwave ovens

<u>Exception No. 1: GFCI protection shall not be required for an electric range, wall-mounted oven, or counter-mounted cooking unit if all the following conditions are met:</u>

<u>a. The appliance is not portable</u>

<u>b. The receptacle is not installed within 1.8m (6 ft) of the top inside edge of the bowl of a sink</u>

<u>c. The receptacle is installed within 1.2m (4 ft) of the appliance enclosure</u>

<u>d. The receptacle is a single receptacle</u>

<u>This exception shall expire January 1, 2028</u>

Statement of Problem and Substantiation for Public Comment

AHAM is against the presence of this list in Chapter 2 and supports PC 1273. If PC 1273 is accepted by CMP2, this PC should be withdrawn. However, if PC 1273 is rejected by CMP2, consumers must be protected from GFCI nuisance tripping on critical appliances.

The First Draft allows the use of modernized GFCIs, termed Class A-HF. These modernized GFCIs are not required in the First Draft which means the higher risk of GFCI nuisance tripping remains if the appliance is connected to a non-modernized Class A GFCI.

The code should allow a proactive approach in preventing GFCI nuisance tripping by making an exception for appliances which present a lower risk of shock. This lower risk is achieved through four conditions of acceptability listed in (a.) through (d.) A number of these conditions were added and edited in response to comments provided during the First Draft meetings.

An expiration date was also added in response to comments provided during the First Draft meeting. AHAM hopes that, by 2028, modernization will be required in the UL 943 standard for all Class A GFCIs, not just GFCIs which meet an optional rating.

<u>Related Item</u>

• FR 7788 • PI 4107

Submitter Information Verification

Submitter Full Name: Greg Woyczynski
Organization: Association of Home Appliance
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 27 19:53:18 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The proposed language would result in an unprotected receptacle in areas requiring GFCI protection that can be used for other equipment. The addition of a type HF GFCI will help installers address these compatibility concerns.

Public Comment No. 45-NFPA 70-2024 [Section No. 210.8(D)]

(D) Specific Appliances.

~~GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances rated~~ For branch circuits rated rated 150 volts or less to ground and 60 amperes or less, single-phase ~~or~~ , or 100 amperes or less, 3-phase~~.~~ , GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances.

(1) Automotive vacuum machines

(2) Drinking water coolers and bottle fill stations

(3) High-pressure spray washing machines

(4) Tire inflation machines

(5) Vending machines

(6) Sump pumps

(7) Dishwashers

(8) Electric ranges

(9) Wall-mounted ovens

(10) Counter-mounted cooking units

(11) Clothes dryers

(12) Microwave ovens

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow up to Public Input 29 which I believe should have been accepted.
I respectfully disagree with the Panel's statement "The suggested language does not add clarity. The existing language ensures protection and is sufficient"

In fact, I believe the existing language inadvertently excludes appliances that the the CMP intended to be GFCI protected. Based on the present wording 240V appliances are excluded. 250V appliances are excluded. 208V appliances are excluded too. I do not believe the intent is to exclude these appliances. However, with the present wording the branch circuit voltage is completely irrelevant as it is never mentioned in this rule. Presently only the rating of the appliance matters. A 208V or 250V rated appliance installed on a branch circuit operating at 120V to ground is presently excluded based on the literal wording since the branch circuit operating voltage is not part of this requirement. The revisions proposed by PI 29 and this Public Comment with clarify the intent and include 208V appliances, 240V appliances, 250V appliances and other appliances that are presently not included in this requirement.

Related Item

• PI 29

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: LeBlanc Consulting Services
Street Address:
City:
State:
Zip:

Submittal Date: Fri Jul 12 07:03:02 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: 240 volt appliances are less than 150 volts to ground and therefore are covered under this section.

Public Comment No. 1811-NFPA 70-2024 [New Section after 210.8(F)]

(G) Listed Equipment with Integral Personnel Protection

Listed equipment that provides listed personnel protection may be installed on branch circuits with regular breakers, provided the listed protection cannot be readily disabled, removed, substituted or otherwise rendered inactive. Such listed equipment may include a retry feature to re-establish the load after a delay compatible with the listing. Such equipment must include an alert, alarm, log or other indicator that the protection feature was engaged since last checked. The protection must be integral to the device, and not subject to simple swap to remove the listed protection. The equipment must be suitably and durably labeled and listed as to the protection provided.

As of September 1st 2028, installed control equipment for the following categories of equipment must be so listed:

(A) Electric Vehicle Service Equipment (EVSE)

(B) Sump pumps

As of September 1st 2029, installed control equipment for the following categories of equipment must be so listed:

(A) All electrical equipment for water features, spa and pool equipment.

(B) Line powered equipment containing water or hooked to domestic water pipes, such as water heating equipment.

Note: the listed personnel protection system may or may not include ground-fault detection, depending on the voltages and currents involved. For example a low voltage pool lighting system may achieve the safety goals via listed isolation means, not ground-fault detection.

Additional Proposed Changes

File Name	Description	Approved
Edison_Base_Fuses_30A_Screw_-_Like_a_GFCI_Breaker.pdf	Obsolete Edison base fuse, which like a modern GFCI can be swapped out by untrained persons	

Statement of Problem and Substantiation for Public Comment

We've had too many tragedies where innocent persons are electrocuted by touching a water feature or dipping in a pool, where the required upstream GFCI device was either never installed or was removed after it tripped.

"Five swimmers in Indiana were electrocuted in what police described as a 'freak accident' in a swimming pool Sunday afternoon." is the headline in my inbox from August 25th 2024.

It's not a freak accident, it's a result of an unsafe situation with GFCI protection in the NEC. It's exactly the same problem that circuit breakers originally solved, back when Edison base fuses could be readily swapped for different values, or for a penny ¢.

See also other tragedies such as the October 2023 Harbourside Place electrocution, where a report was prepared by the Jupiter FL police department.

This proposed section 210.8(G) recognizes devices with integral listed personnel protection devices. These can be tailored to the specific equipment and need. Most importantly such integral protection will be very hard to bypass. For example, EVSE has such protection where the device's relay is completely off until a signal is received from a vehicle. A sump pump with integral protection can balance electrical safety with environmental safety: automatically retrying after a fault event and remaining powered up enough in a fault condition to alert maintenance personnel. Equipment could shut down if tilted. A refrigerator with integral residual current detection or GFCI allows a service technician who has contacted the internal wiring to "release", yet a few minutes later return to cooling food. Listed systems could isolate a fault to a part of the equipment, and keep logs, in a way that becomes impossible with an upstream "non-integral" GFCI. High voltage and high leakage current systems such as high-power AC to DC systems can have thresholds appropriate to the equipment, and testable by the vendor in the factory rather than out in the field.

Importantly, this will allow the listed equipment to test the integrity of the equipment ground and case bonding without worry of tripping an upstream "non-integral" GFCI.

And finally, this proposal, if integrated well with vampire load standards, could save megawatts of power every year. Equipment that is "off" will draw no power to maintain a GFCI or AFCI equivalent function 24/7/365 ⚡ .

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1740-NFPA 70-2024 [Section No. 625.2]	On listing
Public Comment No. 1730-NFPA 70-2024 [Section No. 625.54]	On GFCI for hardwired EVSE

Related Item

• 3619-NFPA 70-2023 Section No. 210.8(F) (GFCI incompatibility & timeline) LBA	• TIA 1748 Proposed	• Public Input No. 1802-NFPA 70-2023 [Section No. 625.54]	• Nuisance Tripping of Ground-Fault Circuit Interrupters (GFCIs) for Appliances - February 5, 2024 Association of Home Appliance Manufacturers AHAM

Submitter Information Verification

Submitter Full Name:	Bryce Nesbitt
Organization:	Obviously Inspects / Expert Witness / Electrical Designer
Affiliation:	Based in part on comments and discussions with the NEC POWER ⚡ group "Panel Optimization Work and Electrical Reassessments"
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 27 13:57:58 EDT 2024

Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	The suggested language is vague and unenforceable. The proposed language states that “Listed equipment that provides listed personnel protection may be installed on branch circuits with regular breakers . . .” It is not clear what listed personnel protection is and what a regular breaker is. In addition, the suggested language states “Such listed equipment may include a retry feature to re-establish the load after a delay compatible with the listing.” This “retry feature” could energize a circuit that is faulted exposing personnel to an electrical shock hazard. The proposed language also provides product requirements that would be better suited for the appropriate article in Chapter 4.

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LOOK FOR THE BUSS LABEL
BEFORE BUYING FUSES
All labeled fuses are not equally good but
unlabeled fuses are dangerous. They may start
fires or cause injury. Be safe. The BUSS Trade
Mark means the fuse will operate as intended with
safety and accuracy under any service condition.

Public Comment No. 120-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI ~~or SPGFCI~~ protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Statement of Problem and Substantiation for Public Comment

There are 3 fundamental issues with this proposal to allow an SPGFCI as an alternative to a traditional Class A GFCI.
1. As indicated in the informational note after the definition of SPGFCI in Chapter 1, the requirements used to certify a SPGFCI are contained in an Outline of Investigation. An Outline of Investigation (OOI) is not and ANSI standard which has gone through the ANSI consensus process for standards development. It is the requirements created by one certification company to certify the product. Other certification companies are NOT bound to follow the same criteria. The OOI will NOT be found on the list of standards a OSHA NRTL is permitted to certify products against. The OOI identified was originally written in 2012 and has not be worked on since. I spoke to the original author of the OOI and learned that the class of SPGFCI was created to address special needs to protect special equipment not accessible by the general public. Examples would include; decorative light/fountain shows such as those seen in Las Vegas, and lighting stanchions such as those found in sports stadiums.
2. The OOI lists three classes of SPGFCI (C,D,E) while the proposed change to the NEC simply states that a SPGFCI is acceptable without mention of class. Reading the OOI one will find that there are additional requirements for the installation and use of the different classes of SPGFCI. These additional requirements deal with size of grounding conductor and the use of ground monitors.
3. Will a SPGFCI actually protect the three major segments of people (Adult Male, Adult Female and Child). The values associated with a traditional Class A GFCI were selected so that the largest percentile of these segments would be protected against Let-go and fibrillation. Not a single line of data demonstrating that the most susceptible segment, children, would be protected against fibrillation should the threshold current be increase to 20mA. This is a major concern and is one which cannot be "fluffed" over. The original values were selected for a reason. If the panel takes the step to include a SPGFCI as equivalent to a Class A GFCI here, how long before it replaces Class A GFCIs in other applications? This is a very dangerous precedent the panel is suggesting.

Related Item

• First Revision 7913

Submitter Information Verification

Submitter Full Name: Donald Talka

Organization: DJT Advisory Services LLC

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jul 18 18:14:47 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The SPGFCI provides additional safety by monitoring the equipment ground. If the EGC to the equipment is jeopardized or lost the SPGFCI must open based on the UL standards.

Public Comment No. 1738-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

~~If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.~~

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Statement of Problem and Substantiation for Public Comment

This is completely unenforceable it is not ok to shove this false narrative of safety down everyone's throat when the units being replaced have no technical merit to require class A protection. The deletion of this will ensure safe installations on multi-family with in some cases 300-400 units to replace and incompatibility will still exist 1/26 when this code is set to be adopted in some places.

Related Item

• PI #3158

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 20:55:50 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The electrical hazard is the same whether new or being replaced. The suggested removal of language was not substantiated and would remove the requirement that existing applications be afforded electrical shock protection through the application of GFCI.

Public Comment No. 1761-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

~~Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.~~

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1,

~~*2026*~~

2029.

Statement of Problem and Substantiation for Public Comment

The TIA that originally proposed an exception to the requirement for GFCI protection for listed HVAC equipment for a limited period of time included the following language in the substantiation.

"With respect to the extension of the date, the Task Group understands that there may not be a resolution to the incompatibility associated with listed Class A GFCIs and the leakage current permitted for listed HVAC equipment. However, the Task Group has included the date so that the exemption is not continued for an undefined period of time and to encourage the affected parties to continue to work together to resolve the incompatibility issue. The Task Group acknowledges that the date may need to be re-evaluated in the future if the incompatibility issues are not resolved."

Our original Public Input (PI 3619) proposed an extension to January 1, 2028, which was chosen to be consistent with a TIA that was submitted by AHMA. However, that TIA was not issued so there is no need to correlate the dates. The GFCI standard, UL 943, must be updated to ensure that devices only trip when presented with a dangerous differential current. Once the UL standard is revised and issued, equipment will still need to be listed to the new standard. We are not convinced that this will occur by September 2026.

CMP2 resolved our PI saying that the date was being retained to "drive urgency in resolving the problem of incompatibility." This is not a valid technical reason. CMP2 offers no assurance or evidence that the issue of incompatibility, including revising the UL Standard, can be accomplished in this timeframe. In fact, UL has presented timelines that indicate that the standard will not be revised in a time period to allow equipment to be listed and for the equipment to be tested for compatibility with HVAC equipment by September 2026.

PI 4203 introduced the concept of using SPGFCI, but also extended the date to January 1, 2029. CMP2 accepted the concept of using SPGFCI but not the extension of the date. This is critical because PI 4203 submitted no testing or research to document that the SPGFCI would address the incompatibility issue. By extending the date, as proposed by the submitted of PI 4203 (a manufacturer of GFCIs) would provide time to verify that this is an acceptable solution. As it stands, it is unknown as to whether using a SPGFCI might also represent an incompatibility issue with an inadequate time to change the effective date. If the SPGFCI option is retained by CMP2, they should also include the extension of the exception as proposed in PI 4203.

Lastly, PI4203 made no reference to the substantial cost difference between a Class A GFCI and an SPGFCI. Our research has indicated that the devices themselves may cost in excess of $3000, a significant increase in construction cost, including the cost associated with replacing existing HVAC equipment, as compared to a Class A GFCI.

The lack of documentation that a SPGFCI will be compatible with listed HVAC equipment and the significant increase in cost associated with a SPGFCI warrants the need for a Second Revision by CMP2.

Related Item

• PI3619 • FR7748

Submitter Information Verification

Submitter Full Name: William Koffel

Organization: Koffel Associates, Inc.

Affiliation: Leading Builders of America

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 27 08:29:36 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Substantiation was not provided to remove the options of GFCI or SPGFCI effective September 1, 2026. The SPGFCI is a listed solution that also provides equipment grounding conductor monitoring such that if the EGC is compromised it will open the protective device. Substantiation was not provided to remove this option.

Public Comment No. 1820-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, ~~2026~~ 2029 .

Statement of Problem and Substantiation for Public Comment

ACCA's reasons for extending Exception No. 2 to September 1, 2029, are the same as those presented to the CMP-2 at its January 2024 meeting in Charleston, SC. We urge extension of the deadline because the GFCI manufacturers have still not provided testing data showing the incompatibility of GFCI with HVAC units experienced frequently when 2020 NEC was initially adopted has been solved. There were no test results supporting the adoption in 2020 and there are none now. Municipalities and states experienced many cases of nuisance trips where the 2020 code was adopted, especially Texas. Some states deleted this section, such as Massachusetts. Some were modified to extend the effective date to September 1, 2026. The integrity of the NFPA process will be more suspect if the code panel again lacks proof of reliable operation but mandates the same application again

In addition, Phase 2 of the AHRI GFCI research project has been delayed for several reasons and has not been started yet, although funding is available. It is anticipated that the work statement will be available sometime in October 2024. In addition, the CMP-2's "solution" to the situation is to install either a Class A GFCI device or a Special Purpose GFCI (SPGFCI). Again, there was no testing data presented to prove that an SPGFCI will reduce the frequency of tripping let alone how it will interact with variable speed motors utilized on high efficiency heat pumps and air conditioners. Moreover, the HVACR industry has not had an opportunity to test such a device on their equipment to determine how it will interact. For these reasons one more extension is needed to give the related GFCI and HVACR industries more time to finish their development work and testing to support a permanent code solution. Pending such solutions, the market will need ample time to become familiar with the technology and devices needed to protect consumers and allow the equipment to operate safely. Again, allowing nuisance tripping to continue past September 1, 2026, without a proven solution will threaten the health of elderly and sensitive populations who will lose their heating and cooling as a result of constant tripping.

Related Item

- Public Input No. 4392-NFPA 70-2023 [Section No. 210.8(F)]

Submitter Information Verification

Submitter Full Name: David Bixby

Organization: ACCA

Affiliation: ACCA

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 27 15:13:55 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7584-NFPA 70-2024

Statement: There are currently incompatibility issues between GFCI devices and HVAC equipment. The industry needs additional time to develop compatible products. Based upon new information brought up during panel discussion, loss of power to new HVAC equipment utilizing flammable refrigerants could present other hazards.

Public Comment No. 2007-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, ~~60~~ 50 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Statement of Problem and Substantiation for Public Comment

No rationale was provided for making the change from 50 to 60 amperes.

Related Item

• FR 7909

Submitter Information Verification

Submitter Full Name: Thomas Deary
Organization: AHRI
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 15:18:53 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Section 210.8(F) was introduced due to fatalities on equipment served by outdoor outlets. The electrical shock hazard does not change due to the amperage of the circuit. This aligns with other sections of the Code.

Public Comment No. 2030-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

~~Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.~~

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI or SPGFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1,

~~*2026.*~~

2029.

Exception No. 3: Outdoor outlets shall not require field - supplied GFCI protection for equipment that is integrally equipped with a Class A or Class C GFCI circuit breaker.

Exception No. 4: Listed HVAC equipment with an integral ground monitoring system shall not require the use of other fault protection devices. The ground monitoring system shall be capable of disabling equipment operation when a fault is detected.

Statement of Problem and Substantiation for Public Comment

Extending Exception No. 2 until 2029 will allow time for SPGFCI to become available on the market and be tested with HVAC equipment. "Driving urgency," as was previously cited by CMP-2 in its responses that accompanied the rejection of Public Inputs 3619, 4026, and 4392, does not constitute technical justification. These issues of incompatibility cannot be resolved when these GFCI products are not available to be tested with HVAC equipment. If manufacturers include GFCI integral to their products, the identification and certification of these products will take time, thus further emphasizing the need for the 2029 date. Additionally, Class C GFCIs currently available on the market are approximately 10 to 20 times more expensive than Class A GFCIs. This is further justification for why the extension to 2029 is critical – to allow for Class C GFCIs that are more cost effective to come to the market. Additionally, AHRI urges NFPA to require that installed cost information is included with all public comments. For example, ICC requires installed cost information for evaluating potential solutions during the code adoption process.

Related Item

- FR-7913

Submitter Information Verification

Submitter Full Name: Thomas Deary

Organization: AHRI

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 28 16:17:47 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: There are three changes proposed that are addressed as part of the rejection of this public comment. Statements for each rejection are provided here: Change 1: Remove the permission of SPGFCI or GFCI for listed HVAC equipment beyond 9/1/2026. Substantiation was not provided to remove the options of GFCI or SPGFCI effective September 1, 2026. The SPGFCI is a listed solution that also provides equipment grounding conductor monitoring such that if the EGC is compromised it will open the protective device. Substantiation was not provided to remove this option. Change 2: See action taken on PC-1820. Change 3: Add new exception for outdoor outlets to not require a field supplied GFCI protection for equipment that has integral Class A or Class C GFCI protection. The suggested exception would leave an outdoor outlet without GFCI protection and for the conductor connecting the equipment to the outlet. Substantiation was not provided to remove the currently afforded protection for this portion of the circuit. Language such as "Field-supplied" is confusing and non-enforceable. Change 4: Addition of new exception for listed HVAC equipment with integral ground monitoring system. The proposed exception would bypass GFCI protection without substantiation. Monitoring the EGC only has not been substantiated to provide protection for the data that shows deaths of those who were working on this equipment. Monitoring of the EGC does not remove the electrical shock hazard in all cases.

Public Comment No. 2035-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment. <u>When SPGFCI is provided, the disconnect serving the HVAC equipment shall be marked "Warning: SPGFCI Protection Provided for HVAC Unit."</u>

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Statement of Problem and Substantiation for Public Comment

In support of permitting SPGFCI as an alternative to Class A GFCI, a warning marking is necessary for the installer and maintenance person to understand the protection provided on the circuit when it is not Class A GFCI protection. Without this marking it could be assumed that Class A GFCI protection is provided. It is critical for the installer to understand the protection being provided for appropriate installation requirements on the HVAC equipment and for the maintenance person to fully understand how he is being protected during trouble shooting activities.

<u>Related Item</u>

• FR7748

Submitter Information Verification

Submitter Full Name: Keith Waters
Organization: Schneider Electric
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 28 16:28:03 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: <u>SR-7590-NFPA 70-2024</u>

Statement: PC 464: The existing language for permission of using the SPGFCI was written into an exception. In addition, it was clarified that the SPGFCI for this application that is permitted is the Class C SPGFCI. The date was removed to permit the use of this technology when the code is adopted and not prohibit its use before 9/1/2026.

PC 2035: A new marking requirement is added for the disconnect that serves HVAC equipment protected by a Class C SPGFCI. This will provide information for the electrical worker noting that there is protection but it is not a class A GFCI. This information could provide additional information for possible troubleshooting. It will not cause the electrical worker to do anything different while work is performed but will raise awareness on the level of protection provided.

See also SR-7539.

Public Comment No. 264-NFPA 70-2024 [Section No. 210.8(F)]

~~(F) Outdoor Outlets.~~

~~For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:~~

(1) ~~Garages that have floors located at or below grade level~~

(2) ~~Accessory buildings~~

(3) ~~Boathouses~~

~~If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.~~

~~Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.~~

~~*Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C) .*~~

~~*Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.*~~

Additional Proposed Changes

File Name	Description	Approved
315553148_462641395978985_8355311864724243370_n.jpg		

Statement of Problem and Substantiation for Public Comment

#1 The example(s) of death by electrocution that were given in the substantiation was due to abnormal use of equipment in the tragic death used to add this reference the equipment was jumped on causing it to lose the EGC. #2 The example(s) of death by electrocution that were given in the substantiation was on an installation that was not compliant with the 2005 NEC which was the current code cycle at the time of the event.
#3. This reference was added to the 2020 NEC to include any utilization equipment installed on the exterior of a dwelling unit proper testing of compatibility was not done and even with the current proposed change to add SPGFCI there has not been testing on this either. Not all equipment will be compatible on 1/26 when the 2026 NEC will be adopted in some places and they will choose to not adopt this language as a whole.

Related Item

- 210.8(A)-(F) Exception #6 PI #3158

Submitter Information Verification

Submitter Full Name: William Snyder
Organization: RCC Solutions
Affiliation: High Voltage Live Podcast
Street Address:
City:
State:
Zip:

Submittal Date: Fri Jul 26 13:40:22 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Substantiation was not provided to reduce the level of protection currently provided in 210.8(F). Abnormal use of equipment and non-code compliance are not reasons to omit GFCI protection. The loss data provided in the substantiation is not complete.

210.8(F) Ground-Fault Circuit-Interrupter Protection for Personnel: Outdoor Outlets

GFCI protection is required on dwelling unit outdoor outlets* supplied by single-phase branch circuits rated 150-volts or less to ground, and 50-amperes or less. NEC 210.8(F) is only applicable to readily accessible outdoor equipment outlets. The intent of the requirement is to protect individuals who may come into contact with outdoor equipment that is likely to become energized.

210.8(F) is ***not applicable*** to:

- Outdoor outlets that are not readily accessible such as a submersible well pumps, sewer lift pumps, load management controllers, surge protection devices, or similar equipment.
- Outdoor single-stage, two-stage, or power conversion HVAC equipment
- Outdoor lighting outlets
- Existing outdoor outlets and the supplied equipment:
    - Replacement or repair of existing outdoor readily accessible electrical equipment utilizing the same feeder or branch circuit conductors.

Public Comment No. 438-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

<u>*Exception No. 3: GFCI protection shall not be required for outlets intended for permanently connected electric vehicle power transfer system in accordance with 625.2.*</u>

Statement of Problem and Substantiation for Public Comment

Recognizing the introduction of GFCI protection to 210.8(F) was to address an incident related to an outdoor HVAC condenser unit. Unfortunately, the introduction of GFCI outlet protection has resulted in unforeseen consequences as it does not only specifically apply to HVAC applications. The requirement is broad, applicable to all outdoor outlet branch circuits. The following is an unintended consequence of outlet GFCI protection requirements.

Per Article 625.6 (2023), EVSEs shall be listed according to UL 2594, UL Standard for Electric Vehicle Supply Equipment. As part of the listing certification requirement, EVSEs are tested in accordance to UL 2231-1, -2, the UL standard for Personnel Protection Systems for Electric Vehicle Supply Circuits, as referenced per UL 2594 clause 9.2 and also according to article 625.22 (2023). This requires all EVSEs to have an integrated ground fault personnel protection called a charging current interrupting device (CCID) to detect and interrupt in case of ground fault for personnel. The requirement to require GFCI protection for outlets supplying dedicated permanently connected EVSEs with integral personnel protection (CCID) is unnecessary, equivalent, and redundant.

Furthermore, an outlet for hardwired, or permanently connected EVSE does not pose the same risk a receptacle. The output socket (terminals) of the vehicle connector are not energized until they are fully mated to the EV inlet. Once mated, the terminals are no longer accessible and energization will only occur after the EVSE successfully performs a series of checks required by the standards used to obtain the listing.

<u>**Related Item**</u>

- FR-7748

Submitter Information Verification

Submitter Full Name: Indra Wiryadinata

Organization: Tesla

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jul 30 17:02:27 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The proposed exception would reduce the existing level of GFCI protection afforded by 210.8(F) without adequate substantiation. The CCID does not provide GFCI protection to the outlet.

Public Comment No. 464-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Additional Proposed Changes

File Name	Description	Approved
CN_111.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 111 appeared in the First Draft Report on First Revision No. 7909 and First Revision No. 7913.

The Correlating Committee directs CMP-2 to reconsider the action for correlation with existing Exception No. 2. Based on the charging statement for 210.8, CMP 2 should consider creating an exception for the permission to use SPGFCI protection in 210.8(F).

Related Item

• First Revision No. 7909 • First Revision No. 7913

Submitter Information Verification

Submitter Full Name: CC Notes

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jul 30 19:06:13 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7590-NFPA 70-2024

Statement: PC 464: The existing language for permission of using the SPGFCI was written into an exception. In addition, it was clarified that the SPGFCI for this application that is permitted is the Class C SPGFCI. The date was removed to permit the use of this technology when the code is adopted and not prohibit its use before 9/1/2026.

PC 2035: A new marking requirement is added for the disconnect that serves HVAC equipment protected by a Class C SPGFCI. This will provide information for the electrical worker noting that there is protection but it is not a class A GFCI. This information could provide additional information for possible troubleshooting. It will not cause the electrical worker to do anything different while work is performed but will raise awareness on the level of protection provided.

See also SR-7539.

Correlating Committee Note No. 111-NFPA 70-2024 [Section No. 210.8(F)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 14:13:20 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to reconsider the action for correlation with existing Exception No. 2. Based on the charging statement for 210.8, CMP 2 should consider creating an exception for the permission to use SPGFCI protection in 210.8(F).

First Revision No. 7909-NFPA 70-2024 [Detail]

First Revision No. 7913-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. 969-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A) Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 60 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

~~*Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.*~~

Statement of Problem and Substantiation for Public Comment

The new text requiring either GFCI or SPGFCI for listed HVAC equipment eliminates the need for Exception #2.

Related Item

• First Revision No. 7748-NFPA 70-2024

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: none
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 08 13:29:20 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The existing exception is being retained to provide the time agreed upon to provide time to address compatibility concerns with HVAC equipment.

Public Comment No. 112-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A ~~or Class A-HF GFCI~~ GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Statement of Problem and Substantiation for Public Comment

A Class A GFCI is intended to mitigate the effects of electric shock should the insulation system of connected equipment be compromised and an unsuspecting person comes in contact with exposed live parts. The sole purpose of the type HF GFCI is to deal with the unwanted tripping of a classical Class A GFCI when used with equipment producing and operating at frequencies other than pure 60Hz sine wave. The instructions of products operating at other than pure 60 Hz will inform the owner of the product to install on a circuit protected by a HF GFCI. The introduction of a second class of GFCI will lead to confusion in the field. When do you install a traditional class A device and when do you install an HF device? This becomes increasingly confusing when it is not known what will be plugged into the GFCI receptacle. Also we must also consider that as appliances and devices change, those not having a nuisance tripping problem now might have one in the future. Dual Class A GFCI devices having different performance characteristics will only lead to confusion.

The problem with this is that the ability of an HF GFCI to provide protection against the effects of electric shock at the frequencies/waveforms these products operate at is unknown. All that will be known is that the HF GFCI will not "nuisance" trip.

Traditionally when the external environment affects the ability of a safety device to function, the Safety Standard for that device is updated to take into account and address the changes. It does not create a second set of requirements only to address some of the changed environment. A recent examples of this is Smoke Alarms. When false tripping due to cooking smoke became an issue the standard for these products was revised though the ANSI consensus process and the requirements for product performance were increased across the board. Similar actions have been taken in other safety standards such as UL489 and UL1699.

It is also a concern that while it is recognized that a Class HF+ also needs to be developed , the motivation for actually developing this will be greatly reduced once the problem of nuisance tripping has been taken care of. In reality what needs to happen is the requirements for the basic Class A GFCI need to be updated so that will provide the anticipated protection across the spectrum of frequencies and waveforms in today's environment. The UL Researchers who produced the report showing the trip levels of present day GFCIs at different frequencies have also worked on defining the performance characteristics a GFCI should have, to provide protection, across these same frequencies. NFPA and this committee need to reach out to ULS&E (not ULS) to fast track the revision of UL943.

Related Item

- FR7910

Submitter Information Verification

Submitter Full Name: Donald Talka
Organization: DJT Advisory Services LLC
Street Address:
City:
State:
Zip:

Submittal Date: Thu Jul 18 12:22:11 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7539-NFPA 70-2024

Statement: Removing “or class A HF” and adding a new Informational Note recognizes that the class A GFCI can be marked “HF” or “HF+”. This change maintains the fact that these are Class A GFCIs but offer a technology that can provide shock protection yet provide for a solution that is evaluated for use with loads that have high frequency leakage currents. Creating a Class A HF designation may deviate from OSHA reference for “Class A” GFCI. This marking requirement as shown in the new Informational Note will allow the user to select a Class A GFCI that has been evaluated and listed for specific GFCI requirements at high frequency if determined to be required for the application. This approach is consistent with other common ratings such as Tamper resistant (TR), Hospital Grade, Weather Resistant (WR), Switching Duty (SWD), and High Intensity Discharge (HID). Because this language is in the parent text of 210.8, this solution is available for first level subdivisions (A) through (F).

Public Comment No. 1470-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed ~~Class A or Class A-HF~~ Class A GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Informational Note No. 2: Class A GFCI's marked "HF" or "HF+" are evaluated for use with loads having high frequency leakage currents from power conversion components, such as variable speed drives and inverters.

Additional Proposed Changes

File Name	Description	Approved
FR_7788_Class_A-HF_FINAL.docx		

Statement of Problem and Substantiation for Public Comment

A 'Class A HF/HF+' designation may deviate from OSHA reference for 'Class A'. To avoid confusion, the UL 943 proposals for HF have been revised to maintain the long-standing "Class A" designation as-is, and includes "HF" and "HF+" as a marked rating. This approach is consistent with other common ratings such as Tamper Resistant (TR), Hospital Grade, Weather Resistant (WR), Lamp Control Switching Duty (SWD), High Intensity Discharge (HID), Current Limiting Rating, Heating Air-Conditioning Refrigeration (HACR), and 25C or 40C rating. As a marked rating that is permitted to be used, there is no need to modify the requirement in 210.8. An Informational Note is added to explain the application for a Class A GFCI marked "HF" or "HF+".

Related Item

- FR 7788

Submitter Information Verification

Submitter Full Name: Frederick Reyes
Organization: UL Solutions
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 23 10:59:05 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7539-NFPA 70-2024

Statement: Removing "or class A HF" and adding a new Informational Note recognizes that the class A GFCI can be marked "HF" or "HF+". This change maintains the fact that these are Class A GFCIs but offer a technology that can provide shock protection yet provide for a solution that is evaluated for use with loads that have high frequency leakage currents. Creating a Class A HF designation may deviate from OSHA reference for "Class A" GFCI. This marking requirement as shown in the new Informational Note will allow the user to select a Class A GFCI that has been evaluated and listed for specific GFCI requirements at high frequency if determined to be required for the application. This approach is consistent with other common ratings such as Tamper resistant (TR), Hospital Grade, Weather Resistant (WR), Switching Duty (SWD), and High Intensity Discharge (HID). Because this language is in the parent text of 210.8, this solution is available for first level subdivisions (A) through (F).

First Revision No. 7788-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Jan 17 09:21:51 EST 2024

Committee Statement

Committee Statement: The exception for receptacles on rooftops was moved to the parent text of 210.8 as this exception applies regardless of what type of occupancy. Type of occupancy doesn't dictate the accessible nature of the receptacle.

Response Message: FR-7788-NFPA 70-2024. The following items from PI 264 were not accepted: 210.8(F): Section 210.8(F) suggested changes were not accepted as clarity is not added and the existing language is sufficient. The existing language does not indicate that GFCI protection must be provided as a wiring device only. The language uses the word "protection" which indicates protection is provided either at the device or upstream of the device. 210.8(A) and 210.8(B): The removal of Kitchens from list item (6) in 210.8(A) and list item (2) in 210.8(B) is not accepted as it could create confusion. Identifying "kitchens" clearly in 210.8 adds clarity and increases usablity of the Code. A kitchen is well defined and not in all cases does 210.8(A)(7) cover a kitchen. Not all of the criteria in 210.8(A)(7) are included for kitchens. 210.8(A)(7) says "or cooking" and the definition of a kitchen says "and cooking".

Public Input No. 264-NFPA 70-2023 [Section No. 210.8]

Ballot Results

This item has passed ballot

x

21 Eligible Voters

1 Not Returned

17 Affirmative All

2 Affirmative with Comments

1 Negative with Comments

0 Abstention

X

Not Returned

Velasquez, Oscar

X

Affirmative All

Ambrosino, John J.

Boynton, Charles L.

Buuck, Daniel

Doering, Tyler James

Domitrovich, Thomas A.

El-Sherif, Nehad

Humphrey, David G.

Johnson, David W.

Johnson, Brian H.

Kasznay, Andrew John

Libby, Arthur

Naughton, Daniel J.

Neubauer, Fred

Reyes, Frederick P.

Rhodes, Johnny

Tidd, Jeremy Mark

Woyczynski, Greg

X

Affirmative with Comment

Campolo, Steve

The UL-101 leakage standard has not been adopted (or proposed) for all utilization equipment standards including power tools which may be used on rooftops.

Cook, Mark Daniel

agree

X

Negative with Comment

Manche, Alan

We support adding the exception "Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop." We do not support adding the Class A-HF language. This needs to remain a Class A requirement to align with OSHA compliance. The recognition of high frequency performance should be designated through an HF rating. The committee could then require GFCIs with the HF rating on specific circuits.

Draft by FReyes 8.12.2024
FR-7788

Public Comment:

A ‘Class A HF/HF+’ designation may deviate from OSHA reference for ‘Class A’. To avoid confusion, the UL 943 proposals for HF have been revised to maintain the long-standing “Class A” designation as-is, and includes “HF” and “HF+” as a marked rating. This approach is consistent with other common ratings such as Tamper Resistant (TR), Hospital Grade, Weather Resistant (WR), Lamp Control Switching Duty (SWD), High Intensity Discharge (HID), Current Limiting Rating, Heating Air-Conditioning Refrigeration (HACR), and 25C or 40C rating. As a marked rating that is permitted to be used, there is no need to modify the requirement in 210.8. An Informational Note is added to explain the application for a Class A GFCI marked “HF” or “HF+”.

Proposed Revision:

210.8 A listed Class A ~~or Class A-HF~~ GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note No. 1: See 215.9 for GFCI protection on feeders.
Informational Note No. 2: Class A GFCI’s marked “HF” or “HF+” are evaluated for use with loads having high frequency leakage currents from power conversion components, such as variable speed drives and inverters.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

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Public Comment No. 1679-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be <u>listed, marked and rated for bidirectional use and</u> installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Statement of Problem and Substantiation for Public Comment

It appears that GFCI requirements for bidirectional use were overlooked in the past. To assure the necessary shock protection and functionality for cord connected, bidirectional equipment like EV-Chargers, plug-In solar & battery based power appliances, it is necessary that GFCI breakers can perform with the current flowing in either direction.

<u>Related Item</u>

- FR-7788

Submitter Information Verification

Submitter Full Name: Achim Ginsberg-Klemmt
Organization: GismoPower LLC
Affiliation: GismoPower LLC
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 26 10:09:30 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Substantiation was not provided to support the proposed language which would require all GFCIs to be bidirectional. The UL standard for GFCIs, UL 943, does not currently include requirements for bidirectional GFCIs, requiring all GFCIs to be bidirectional at this time without proper standards in place is premature and problematic.

Public Comment No. 1703-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A GFCI or ~~Class A-HF GFCI~~ a listed Class A GFCI marked as HF shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Statement of Problem and Substantiation for Public Comment

Since the January CMP meetings, there has been more discussion regarding the way in which high frequency leakage currents would be addressed in UL 943. In order to better align with OSHA requirements for a Class A GFCI, there is a push to use a rating to indicate a GFCI designed to have reduced sensitivity to high frequency leakage currents instead of creating an entirely new class of GFCI. The language in 210.8 has been modified to reflect that new direction. The "marked as HF" language is consistent with SWD and HID language in 240.83(D).

Related Item

- FR 7910

Submitter Information Verification

Submitter Full Name: Randy Dollar
Organization: Siemens Industry
Affiliation: American Circuit Breaker Manufacturers Association (ACBMA)
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 26 13:15:52 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7539-NFPA 70-2024

Statement: Removing "or class A HF" and adding a new Informational Note recognizes that the class A GFCI can be marked "HF" or "HF+". This change maintains the fact that these are Class A GFCIs but offer a technology that can provide shock protection yet provide for a solution that is evaluated for use with loads that have high frequency leakage currents. Creating a Class A HF designation may deviate from OSHA reference for "Class A" GFCI. This marking requirement as shown in the new Informational Note will allow the user to select a Class A GFCI that has been evaluated and listed for specific GFCI requirements at high frequency if determined to be required for the application. This approach is consistent with other common ratings such as Tamper resistant (TR), Hospital Grade, Weather Resistant (WR), Switching Duty (SWD), and High Intensity Discharge (HID). Because this language is in the parent text of 210.8, this solution is available for first level subdivisions (A) through (F).

Public Comment No. 1804-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Additional Proposed Changes

File Name	Description	Approved
Doc1.docx	210.8 Comment	

Statement of Problem and Substantiation for Public Comment

Today, most GFCIs can function for bidirectional use, despite their labeling. However, UL testing has shown some to get damaged and cease to protect when subject to bidirectional power. Many emerging products such as balcony PV and V2G EV chargers will backfeed power into the home. People will purchase and use these regardless of UL listing or compliance; this is not something we can easily regulate. Nonetheless, with required bidirectional GFCI breakers and outlets, we will still protect the current and future occupants from shock due to damaged GFCIs.

Related Item

- FR-7788

Submitter Information Verification

Submitter Full Name: Daniel Gerber
Organization:
Affiliation: Lawrence Berkeley National Laboratory
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 27 13:28:00 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Substantiation was not provided to support the proposed language which would require all GFCIs to be bidirectional. The UL standard for GFCIs, UL 943, does not currently include requirements for bidirectional GFCIs, requiring all GFCIs to be bidirectional at this time without proper standards in place is premature and problematic.

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be rated and marked for bidirectional use and installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Public Comment No. 1857-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A ~~or Class A-HF~~ GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location. The GFCI may be listed and identified as High Frequency (HF).

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Statement of Problem and Substantiation for Public Comment

The UL 943 standard for GFCIs is being updated to reduce nuisance tripping on loads which contain modernized electrical components such as LED drivers, switched-mode power supplies, and variable frequency drives.

In the UL 943 preliminary review draft (April 2024), this modernized GFCI was referred to as Class A-HF. The next version of the UL 943 draft (expected Q3/Q4 2024) will change Class A-HF to a High Frequency (HF) rating. Although the name is changing, the underlying technical specifications are not.

This change to the First Draft will better align language in the NEC with the latest language in UL standards work.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1865-NFPA 70-2024 [Section No. 422.5 [Excluding any Sub-Sections]]	

Related Item

- FR 7788

Submitter Information Verification

Submitter Full Name: Greg Woyczynski
Organization: Association of Home Appliance
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 27 18:10:00 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7539-NFPA 70-2024

Statement: Removing “or class A HF” and adding a new Informational Note recognizes that the class A GFCI can be marked “HF” or “HF+”. This change maintains the fact that these are Class A GFCIs but offer a technology that can provide shock protection yet provide for a solution that is evaluated for use with loads that have high frequency leakage currents. Creating a Class A HF designation may deviate from OSHA reference for “Class A” GFCI. This marking requirement as shown in the new Informational Note will allow the user to select a Class A GFCI that has been evaluated and listed for specific GFCI requirements at high frequency if determined to be required for the application. This approach is consistent with other common ratings such as Tamper resistant (TR), Hospital Grade, Weather Resistant (WR), Switching Duty (SWD), and High Intensity Discharge (HID). Because this language is in the parent text of 210.8, this solution is available for first level subdivisions (A) through (F).

Public Comment No. 1976-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops <u>or for compliance with 210.63(A)</u> shall not be required to be readily accessible other than from the ~~rooftop~~ <u>level on which they are installed</u> .

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Statement of Problem and Substantiation for Public Comment

In dwelling units, furnaces are often installed in attics, and 210.63 requires a service receptacle on the same level as the furnace. If the attic is accessed via a portable ladder, a GFCI receptacle in that location does not comply with the definition of being readily accessible, whereas the identical situation is considered readily accessible if there is a permanent (pull-down) ladder. In either case, the safety objective is met by using a GFCI receptacle, rather than one at the source of the circuit. The proposed language would still allow a circuit breaker type GFCI, but would not require it.

<u>Related Item</u>

• PI #264 correctly moved this exception to 210.8 and out of 210.8(B)

Submitter Information Verification

Submitter Full Name: Douglas Hansen
Organization: Code Check
Affiliation: Self
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 13:46:53 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The phrase “Level on which they are installed” is vague and unenforceable. Equipment could be at a different level than the receptacles. The proposed language could cause confusion in the proper application of the exception.

Public Comment No. 2010-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

[Comment: GFCI (Class A-HF) may be a solution, but the requirements for Class A-HF have not been adopted in UL 943 and thus manufacturers do not have the ability to identify a compatible Class A-HF device nor to perform testing.]

Statement of Problem and Substantiation for Public Comment

See comment.

Related Item

- FR-7910

Submitter Information Verification

Submitter Full Name: Thomas Deary
Organization: AHRI
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 28 15:22:13 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The proposed language of the public comment is in violation of Section 4.4.4.3 of the regulations governing the development of standards. Section 4.4.4.3(c) requires the text of the PC include the wording to be added or revised or deleted. The changes are required to be indicated using underlines for new text and strikethrough for deleted text. The technical committee for UL 943 is in the process of reviewing a revision to the standard to address Class A GFCI marked HF. These revisions are anticipated to be published prior to the next edition of this Code.

Public Comment No. 274-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through 210.8(F). The GFCI shall be installed in a readily accessible location.

Exception 1 : Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

Exception 6: Any equipment with integral personnel protection and documented compatibility issues with class A devices shall not be required to be installed on a GFCI device.

Informational Note: See 215.9 for GFCI protection on feeders.

For the purposes of this section, the distance from receptacles shall be measured as the shortest path the power supply cord connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier.

Additional Proposed Changes

File Name	Description	Approved
315522135_562375592318221_2186616584159142738_n.1688922631723_1_.jpg	Tesla manufacturer's instructions indicate personnel protection provided integral and not compatible with Class A devices.	

Statement of Problem and Substantiation for Public Comment

Many types of modern equipment has been developed with safety in mind outside of the realm of GFCI protection. The statistics in the last decade and a half don't support the expansion of Class A protection. Compatibility has became a major concern with the expansion of GFCI protection. What is the solution from the Code Making Panel for equipment that is not compatible with Class A devices? It seems energy efficiency, innovations in lighting, and better testing from the manufacturers supports an overall exception for equipment that will not function on Class A devices.

Related Item

- Exception #6 PI #3158

Submitter Information Verification

Submitter Full Name: William Snyder
Organization: RCC Solutions
Affiliation: High Voltage Live Podcast
Street Address:
City:
State:
Zip:

Submittal Date: Fri Jul 26 19:28:46 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The proposed language could leave a receptacle unprotected in an area where it is needed. The GFCI protection provided by 210.8 is for protection of the receptacle outlet and is not dependent on the utilization equipment installed. The proposed language may reduce the level of protection currently afforded by the NEC without proper substantiation.

Public Comment No. 465-NFPA 70-2024 [Section No. 210.11(A)]

(A) Number of Branch Circuits.

The minimum number of branch circuits shall be determined from the total calculated load and the size or rating of the circuits used. In all installations, the number of circuits shall be sufficient to supply the load served. In no case shall the load on any circuit exceed the maximum specified by 120.11.

Additional Proposed Changes

File Name	Description	Approved
CN_112.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 112 appeared in the First Draft Report.

The Correlating Committee directs CMP 2 to revise the language “In no case shall the load on any circuit exceed the maximum specified by 220.11” to: "the calculated load on any circuit shall not exceed the maximum specified by 220.11", for compliance with the NEC Style Manual requirement covering the use of mandatory text.

Related Item

• Correlating Committee Note No. 112

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:08:57 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7627-NFPA 70-2024
Statement: The language is revised to comply with NEC Style Manual 3.1.1.

Correlating Committee Note No. 112-NFPA 70-2024 [Section No. 210.11(A)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 14:16:32 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to revise the language “In no case shall the load on any circuit exceed the maximum specified by 220.11” to: "the calculated load on any circuit shall not exceed the maximum specified by 220.11", for compliance with the NEC Style Manual requirement covering the use of mandatory text.

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. 109-NFPA 70-2024 [Section No. 210.12]

~~**210.12** Arc-Fault Circuit-Interrupter Protection.~~

~~Arc-fault circuit-interrupter (AFCI) protection shall be installed in accordance with 210.12(B) through 210.12(E) by any of the means described in 210.12(A) . The AFCI shall be listed and installed in a readily accessible location.~~

~~**(A)** Means of Protection.~~

~~AFCI protection shall be provided by any of the following means:~~

(1) ~~A listed combination-type AFCI installed at the origin of the branch circuit to protect the entire branch circuit~~

(2) ~~A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which is marked to indicate that it is the first outlet of the branch circuit~~

(3) ~~A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:~~

  (4) ~~The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.~~

  (5) ~~The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.~~

  (6) ~~The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.~~

(7) ~~A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit OCPD if all of the following conditions are met:~~

  (8) ~~The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.~~

  (9) ~~The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.~~

  (10) ~~The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.~~

  (11) ~~The combination of the branch-circuit OCPD and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.~~

(12) ~~If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118 , with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit~~

(13) ~~Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit~~

~~Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit-Interrupters* , for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters* , for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters* , for information on system combination AFCIs.~~

~~**(B)** Dwelling Units.~~

~~All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A) .~~

(1) ~~Kitchens~~

(2) ~~Family rooms~~

(3) ~~Dining rooms~~

(4) ~~Living rooms~~

(5) ~~Parlors~~

(6) ~~Libraries~~

(7) ~~Dens~~

(8) ~~Bedrooms~~

(9) ~~Sunrooms~~

(10) ~~Recreation rooms~~

(11) ~~Closets~~

(12) ~~Hallways~~

(13) ~~Laundry areas~~

(14) ~~Similar areas~~

~~*Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B) . The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118 , with metal boxes, conduit bodies, and enclosures.*~~

~~*Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.*~~

~~Informational Note No. 1: See *NFPA 72* -2025, *National Fire Alarm and Signaling Code* , 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.~~

~~Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.~~

~~**(C)** Dormitories.~~

~~All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A) .~~

(1) ~~Bedrooms~~

(2) ~~Living rooms~~

(3) ~~Hallways~~

(4) ~~Closets~~

(5) ~~Bathrooms~~

(6) ~~Similar rooms~~

~~**(D)** Other Occupancies.~~

~~All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A) .~~

(1) ~~Guest rooms and guest suites of hotels and motels~~

(2) ~~Areas used exclusively as patient sleeping rooms in nursing homes and limited-care facilities~~

(3) ~~Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations~~

~~**(E)** Branch Circuit Wiring Extensions, Modifications, or Replacements.~~

~~If branch-circuit wiring for any of the areas specified in 210.12(B) , 210.12(C) , or 210.12(D) is modified, replaced, or extended, the branch circuit shall be protected by one of the following:~~

(1) ~~By any of the means described in 210.12(A)~~

(2) ~~A listed outlet branch-circuit-type AFCI located at the first receptacle outlet or switch of the existing branch circuit~~

~~*Exception: AFCI protection shall not be required where the extension of the existing branch-circuit conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices, other than splicing devices. This measurement shall not include the conductors inside an enclosure, cabinet, or junction box.*~~

Statement of Problem and Substantiation for Public Comment

The data submitted with Public Input No. 3155 which became FR 8195 after the First-Draft meeting provides clear data to show that AFCI devices are not providing the protection with which they're said to provide. This data was convincing enough that 50% of the voting members of this panel agreed that at the very least an exception should be added for kitchens and laundry areas.

The data clearly shows that AFCI's have not helped with fire prevention, and they along with everything else have gotten very expensive. If they don't work, which the data with the above mentioned PI and FR clearly show that they don't, then it is this panels responsibility to get them out of the code and to quit forcing consumers to pay for a defective product.

Related Item

• Public Input 3155 • First Revison 8195

Submitter Information Verification

Submitter Full Name: Jesse Duvuvei

Organization:	North Strabane Township
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Jul 17 18:29:45 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	Insufficient substantiation was provided to delete 210.12 in its entirety, which will have the effect of removing AFCI protection requirements from the code. Electrical fire statistics demonstrate that electrical fires exist in dwelling units that might have been prevented by AFCI protection.

Public Comment No. 1892-NFPA 70-2024 [Section No. 210.12]

210.12 Arc-Fault Circuit-Interrupter Protection.

Arc-fault circuit-interrupter (AFCI) protection shall be installed in accordance with 210.12(B) through 210.12(~~E~~ F) by any of the means described in 210.12(A). The AFCI shall be listed and installed in a readily accessible location.

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed at the origin of the branch circuit to protect the entire branch circuit

(2) A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which is marked to indicate that it is the first outlet of the branch circuit

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

- (4) The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.
- (5) The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
- (6) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

(7) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit OCPD if all of the following conditions are met:

- (8) The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.
- (9) The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
- (10) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.
- (11) The combination of the branch-circuit OCPD and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.

(12) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

(13) Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit-Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

(C) Dormitories.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Bedrooms

(2) Living rooms

(3) Hallways

(4) Closets

(5) Bathrooms

(6) Similar rooms

(D) Other Occupancies.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Guest rooms and guest suites of hotels and motels

(2) Areas used exclusively as patient sleeping rooms in nursing homes and limited-care facilities

(3) Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations

(E) DC circuits.

Effective January 1, 2029: All dc branch circuits greater than 30 V dc supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1), (A)(2), (A)(5) and (A)(6) or a listed device providing arc-fault protection equivalent to an AFCI:

(1) Branch circuits supplying dwelling units installed in locations as specified in 210.12(B)(1) through (B)(14)

(2) Branch circuits supplying dormitory units installed in locations as specified in 210.12(C)(1) through (C)(6)

(3) Branch circuits supplying other occupancies installed in locations as specified in 210.12(D)(1) through (D)(3)

Exception: AFCI protection shall not be required for a Class 2, Class 3, Class 4 or communications circuit.

(F) Branch Circuit Wiring Extensions, Modifications, or Replacements.

If branch-circuit wiring for any of the areas specified in 210.12(B), 210.12(C), ~~or~~ 210.12(D) ~~is~~ , or 210.12(E) is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

(1) By any of the means described in 210.12(A)

(2) Effective January 1, 2029: By any of the means described in 210.12(A)(1), (A)(2), (A)(5) and (A)(6) for dc circuits

(3) A listed outlet branch-circuit-type AFCI located at the first receptacle outlet or switch of the existing branch circuit

Exception: AFCI protection shall not be required where the extension of the existing branch-circuit conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices, other than splicing devices. This measurement shall not include the conductors inside an enclosure, cabinet, or junction box.

Additional Proposed Changes

File Name	Description	Approved
PC_210.12_Proposed_Changes.docx	Proposed Text	

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.

The requirements of Section 210.12 are intended to provide protection from arcing faults which can result in fires in areas occupied by personnel. The requirements are currently applied to AC circuits only, even though the potential for arcing faults also exist in DC circuits and the hazards may be more significant due to the lack of a zero crossing in DC waveforms. As there is continued expansion of DC throughout the electrical infrastructure it is necessary to ensure the same level of protection is provided from arcing faults occurring in these locations. This proposal closes a gap in the Code for DC circuits where similar hazards exist but arc fault circuit interrupter protection may not be provided for the same locations currently addressed in 210.12.

Although as mentioned in the committee statement to Public Input No. 4276 there are presently no listed products commercially available for this purpose, there are several listed DC rated arc-fault circuit protection devices for PV applications available on the market. These have been evaluated to UL 1699B, the Standard for Photovoltaic (PV) DC Arc-Fault Circuit Protection and the protection requirements are based on limiting the total arcing energy in the fault. Similarly, UL 1400-1, the Outline of Investigation for Fault-Managed Power Systems – Part 1: Safety, includes protection requirements for DC and AC+DC arc-faults based on limiting total arcing energy. The same protection concept could be utilized for the development of new requirements for DC arc-fault protection for the circuits and locations referenced in the proposal. An effective date of January 1, 2029 could be considered to allow the industry to develop devices for this specific purpose.

Additional note - No changes are being made to 210.12(A)(3) or 210.12(A)(4) and any changes shown are due to TerraView formatting issues. See attached document for changes proposed.

Related Item

• Public Input No. 4276-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Danish Zia

Organization: UL Solutions

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 27 21:18:22 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: CMP-2 recognizes the need for addressing arcing hazards in DC branch circuits as they are currently addressed in AC branch circuits. CMP-2 also recognizes that DC arcs are more challenging than AC arcs because unlike AC currents, DC currents do not have a zero crossing, which is an opportunity for the arc to self-extinguish. Yet, additional information is needed to warrant adding new requirements for AFCI protection in DC branch circuits including: 1. Science related to how DC arc initiate ignition as compared to AC arcs 2. Product standard and Listing requirements 3. Standardized requirements for when DC AFCI devices shall and shall not trip 4. DC AFCI product availability 5. DC branch circuit current rating that will required AFCI protection (only AC branch circuits rated 10 A, 15 A, and 20 A require AFCI protection)

210.12 Arc-Fault Circuit-Interrupter Protection.

Arc-fault circuit-interrupter (AFCI) protection shall be installed in accordance with 210.12(B) through 210.12(~~E~~F) by any of the means described in 210.12(A). The AFCI shall be listed and installed in a readily accessible location.

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

1. A listed combination-type AFCI installed at the origin of the branch circuit to protect the entire branch circuit
2. A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which is marked to indicate that it is the first outlet of the branch circuit
3. A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:
    1. The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.
    2. The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
    3. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.
4. A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit OCPD if all of the following conditions are met:
    1. The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.
    2. The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
    3. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.
    4. The combination of the branch-circuit OCPD and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.
5. If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit
6. Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit-Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

1. Kitchens
2. Family rooms
3. Dining rooms
4. Living rooms
5. Parlors
6. Libraries
7. Dens
8. Bedrooms
9. Sunrooms
10. Recreation rooms
11. Closets
12. Hallways
13. Laundry areas
14. Similar areas

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

(C) Dormitories.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

1. Bedrooms
2. Living rooms
3. Hallways
4. Closets
5. Bathrooms
6. Similar rooms

(D) Other Occupancies.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

1. Guest rooms and guest suites of hotels and motels
2. Areas used exclusively as patient sleeping rooms in nursing homes and limited-care facilities
3. Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations

(E) DC circuits.

Effective January 1, 2029: All dc branch circuits greater than 30 V dc supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1), (A)(2), (A)(5) and (A)(6) or a listed device providing arc-fault protection equivalent to an AFCI:

1. Branch circuits supplying dwelling units installed in locations as specified in 210.12(B)(1) through (B)(14)
2. Branch circuits supplying dormitory units installed in locations as specified in 210.12(C)(1) through (C)(6)
3. Branch circuits supplying other occupancies installed in locations as specified in 210.12(D)(1) through (D)(3)

Exception: AFCI protection shall not be required for a Class 2, Class 3, Class 4 or communications circuit.

(~~E~~F) Branch Circuit Wiring Extensions, Modifications, or Replacements.
If branch-circuit wiring for any of the areas specified in 210.12(B), 210.12(C), ~~or~~ 210.12(D), or 210.12(E) is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

1. By any of the means described in 210.12(A) for ac circuits

~~1.~~2. Effective January 1, 2029: By any of the means described in 210.12(A)(1), (A)(2), (A)(5) and (A)(6) for dc circuits

~~2.~~3. A listed outlet branch-circuit-type AFCI located at the first receptacle outlet or switch of the existing branch circuit

Exception: AFCI protection shall not be required where the extension of the existing branch-circuit conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices, other than splicing devices. This measurement shall not include the conductors inside an enclosure, cabinet, or junction box.

Public Comment No. 1433-NFPA 70-2024 [Section No. 210.12(A)]

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed at the origin of the branch circuit to protect the entire branch circuit

(2) A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which is marked to indicate that it is the first outlet of the branch circuit

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

(4) The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.

(5) The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

(6) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

(7) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit overcurrent protective device if all of the following conditions are met :

(8) The branch-circuit wiring shall be unspliced and untapped from the branch-circuit overcurrent device to the outlet branch-circuit AFCI .

(9) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 13.7 m (45 ft) for a 14 AWG copper conductor or 18.3 m (60 ft) for a 12 AWG copper conductor .

(10) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit .

(11) The branch-circuit circuit breaker shall be a listed single pole thermal-magnetic circuit breaker .

(12) The branch-circuit circuit breaker shall not be of the high-magnetic trip-type.

(13) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit OCPD if all of the following conditions are met:

(14) The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.

(15) The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

(16) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

(17) The combination of the branch-circuit OCPD and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.

(18) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

(19) Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit-Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

Additional Proposed Changes

File Name	Description	Approved
LegrandPC1433OBCAFCI.docx	Legrand Public Comment 1433 OBC AFCI	

Statement of Problem and Substantiation for Public Comment

Public Comment No. 1433-NFPA 70-2024
STATEMENT OF PROBLEM AND SUBSTANTIATION FOR PUBLIC INPUT.

Additional and readily available outlet based AFCI protection options for installers and homeowners are necessary to ensure that confidence in the electrical industry is not undermined. AFCI devices continue to experience nuisance tripping problems, although expansion is not recommended, this Public Comment seeks to mitigate issues by providing an immediate remedy and mitigation option.

Resetting an AFCI/GFCI breaker is the first response to nuisance tripping Ref1, typically sending residents to the basement or outside and creating risk of a trip and fall, especially for the over 335 million US residents over age 65 Ref2. The CDC reports that there about 3 million emergency room visits annually by older people due to falls Ref3. After multiple nuisance tripping events, the next typical solution involves replacing an AFCI/GFCI breaker with a standard breaker resulting in the elimination of both AFCI and proven lifesaving GFCI protection.

Allowing a practical, outlet-based solution to be installed without the unneeded and overconservative requirements previously considered will spur adoption and provide end users an easily accessible, yet safe alternative to circuit breaker-based solutions. Studies by Parks Ref4 and UL Ref5&Ref6 have demonstrated that only the installation guidelines stated within this proposal are required to ensure protection equivalent to current options.

Note that the only changes proposed are the addition of new 210.12(A)(4) and associated editorial numbering changes. There are no technical changes proposed to 210.12(A)(1) through (3) and (5) through (7). Any unintended underlining and renumbering were caused by issues with Terra. A clean copy of the proposed changes is provided in the attachment.

210.12 Arc-Fault Circuit-Interrupter Protection. Arc-fault circuit-interrupter (AFCI) protection shall be installed in accordance with 210.12(B) through (E) by any of

the means described in 210.12(A). The AFCI shall be listed and installed in a readily accessible location.
(A) Means of Protection. AFCI protection shall be provided by any of the following means:
(1) A listed combination-type AFCI installed to provide protection of the entire branch circuit.

(2) A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which shall be marked to indicate that it is the first outlet of the branch circuit.

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:
a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.
b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

(4) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit overcurrent protective device if all of the following conditions are met:
a. The branch-circuit wiring shall be unspliced and untapped from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.
b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 13.7 m (45 ft) for a 14 AWG copper conductor or 18.3 m (60 ft) for a 12 AWG copper conductor.
c. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.
d. The branch-circuit circuit breaker shall be a listed single pole thermal-magnetic circuit breaker.
e. The branch-circuit circuit breaker shall not be of the high-magnetic trip-type.

(5) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch- circuit overcurrent protective device if all of the following conditions are met:
a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.
b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
c. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.
d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.

(6) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

(7) Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.
Informational Note: See UL 1699-2011, Standard for Arc-Fault Circuit Interrupters, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, Outline of Investigation for System Combination Arc-Fault Circuit Interrupters, for information on system combination AFCIs.

References:

Ref1 AFCI and Nuisance Tripping Research study, Dr. Steven W. Schmidt, Dr. Xi Lin, East Carolina University, August 15, 2023

Ref2 US Census Bureau 4/8/2024, 8/23/2024,
https://www.census.gov/quickfacts/fact/table/US/AGE775223

Ref3 Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web–based Injury Statistics Query and Reporting System (WISQARS) [online]. Accessed March 11, 2024. https://www.cdc.gov/falls/data-research/facts-stats/index.html

Ref4 Short Circuit Fault Current Study, Parks Associates, August 2012

Ref5 Evaluation of Run Length and Available Current on Breaker Ability to Mitigate Parallel Arcing Faults, UL, Paul W. Brazis Jr., PhD and David A. Dini, PE

Ref6 Effectiveness of Circuit Breakers in Mitigating Parallel Arcing Faults in the Home Run, UL, Paul W. Brazis Jr., PhD and Fan He, PhD

Related Item

- PI2794

Submitter Information Verification

Submitter Full Name: Jonathan Potter
Organization: Legrand Pass & Seymour
Affiliation: Legrand Pass & Seymour
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City:
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Submittal Date: Thu Aug 22 15:55:22 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: AFCIs are designed and listed to UL 1699 tests with 500 amperes available at the source of the circuit. Absence of a marking that is not controlled nor required to be on the circuit breaker inherently leads to a possible misapplication. A circuit breaker that is not marked as high magnetic could have a high instantaneous and not be adequate yet still meet the requirement as written. In addition, the use of the term “high magnetic” is unenforceable and vague. There is no product or industry standard for the term “high magnetic”.

Public Comment No. 1433-NFPA 70-2024

STATEMENT OF PROBLEM AND SUBSTANTIATION FOR PUBLIC INPUT.

Additional and readily available outlet based AFCI protection options for installers and homeowners are necessary to ensure that confidence in the electrical industry is not undermined. AFCI devices continue to experience nuisance tripping problems, although expansion is not recommended, this Public Comment seeks to mitigate issues by providing an immediate remedy and mitigation option.

Resetting an AFCI/GFCI breaker is the first response to nuisance tripping[1], typically sending residents to the basement or outside and creating risk of a trip and fall, especially for the over 335 million US residents over age 65[2]. The CDC reports that there about 3 million emergency room visits annually by older people due to falls[3]. After multiple nuisance tripping events, the next typical solution involves replacing an AFCI/GFCI breaker with a standard breaker resulting in the elimination of both AFCI and proven lifesaving GFCI protection.

Allowing a practical, outlet-based solution to be installed without the unneeded and overconservative requirements previously considered will spur adoption and provide end users an easily accessible, yet safe alternative to circuit breaker-based solutions. Studies by Parks[4] and UL[5,6] have demonstrated that only the installation guidelines stated within this proposal are required to ensure protection equivalent to current options.

Note that the only changes proposed are the addition of new 210.12(A)(4) and associated editorial numbering changes. There are no technical changes proposed to 210.12(A)(1) through (3) and (5) through (7). Any unintended underlining and renumbering were caused by issues with Terra. A clean copy of the proposed changes is provided in the attachment.

210.12 Arc-Fault Circuit-Interrupter Protection. Arc-fault circuit-interrupter (AFCI) protection shall be installed in accordance with 210.12(B) through (E) by any of the means described in 210.12(A). The AFCI shall be listed and installed in a readily accessible location.

(A) Means of Protection. AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed to provide protection of the entire branch circuit.

(2) A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which shall be marked to indicate that it is the first outlet of the branch circuit.

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.
b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

(4) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit overcurrent protective device if all of the following conditions are met:

a. The branch-circuit wiring shall be unspliced and untapped from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.

b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 13.7 m (45 ft) for a 14 AWG copper conductor or 18.3 m (60 ft) for a 12 AWG copper conductor.

c. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

d. The branch-circuit circuit breaker shall be a listed single pole thermal-magnetic circuit breaker.

e. The branch-circuit circuit breaker shall not be of the high-magnetic trip-type.

(5) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch- circuit overcurrent protective device if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.
b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
c. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.
d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.

(6)~~(5)~~ If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

(7) ~~(6)~~ Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

References

[1] AFCI and Nuisance Tripping Research study, Dr. Steven W. Schmidt, Dr. Xi Lin, East Carolina University, August 15, 2023

AFCI 2023 Final 08-15-23.pdf

[2] US Census Bureau 4/8/2024, 8/23/2024,

https://www.census.gov/quickfacts/fact/table/US/AGE775223

[3] Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web–based Injury Statistics Query and Reporting System (WISQARS) [online]. Accessed March 11, 2024. https://www.cdc.gov/falls/data-research/facts-stats/index.html

[4] Short Circuit Fault Current Study, Parks Associates, August 2012

PARKS_Short Circuit Fault Current Study

[5] Evaluation of Run Length and Available Current on Breaker Ability to Mitigate Parallel Arcing Faults, UL, Paul W. Brazis Jr., PhD and David A. Dini, PE

Breaker_Mitigation_Run_Length.pdf

[6] Effectiveness of Circuit Breakers in Mitigating Parallel Arcing Faults in the Home Run, UL, Paul W. Brazis Jr., PhD and Fan He, PhD

BreakerMitigationofArcFaults.pdf

Public Comment No. 188-NFPA 70-2024 [Section No. 210.12(A)]

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed at the origin of the branch circuit to protect the entire branch circuit

(2) A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which is marked to indicate that it is the first outlet of the branch circuit

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

(4) The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.

(5) The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

(6) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

(7) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit OCPD if all of the following conditions are met:

(8) The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.

(9) The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

(10) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

(11) The combination of the branch-circuit OCPD and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.

(12)

A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit overcurrent protective device if all of the following conditions are met:

a. The branch-circuit wiring shall be unspliced and untapped from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.

b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 13.7 m (45 ft) for a 14 AWG copper conductor or 18.3 m (60 ft) for a 12 AWG copper conductor.

c. The available short circuit current at the line side of the branch circuit panelboard where the branch circuit overcurrent device is installed shall be a minimum of 3000 amps.

d. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

e. The branch-circuit circuit breaker shall be a listed single pole thermal-magnetic circuit breaker.

f. The branch-circuit circuit breaker shall not be of the high-magnetic trip-type.

(13) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

(14) Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit-Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

Additional Proposed Changes

File Name	Description	Approved
NEC_PC_188_John_Kovacik_Submission.docx		
Attachment_No._1_-_Bentley_Systems_Report_8_18_2023.pdf		
Attachment_No._2_-_Expanded_tables_from_Bentley_Report.pdf		

Statement of Problem and Substantiation for Public Comment

The only changes proposed are the addition of new 210.12(A)(5) and associated editorial numbering changes. There are no technical changes proposed to 210.12(A)(1) through (4) and existing (5) and (6). Any spurious underlining and renumbering were caused by a problematic Terra. A clean copy of the proposed changes is provided in the attachments.

Based on Panel input and a review of data with UL, this PC has improvements from the original PI which are detailed below. Unchanged supporting data and test results for the original PI 2794 are identified in the reference section at the end of the substantiation and available in the public domain. This includes several 3rd party test reports, including UL test reports, the Parks report and the Bentley report. The Bentley report is attached to this Public Comment for convenience.

It is important to have multiple options available to installers for providing arc-fault protection. This Public Comment provides a real, and immediately available, alternative for arc-fault protection with many years of proven service.

In the following substantiation, the term “home run” is defined as the conductor from the overcurrent device to the first outlet in the branch circuit, and the term “OBC” refers to the outlet branch circuit AFCI.

PC OVERVIEW
Feedback from the Panel during the First Draft meeting was used to resolve questions raised for this new additional method of AFCI protection. Several

requirements were rolled into a simple, measurable requirement for available fault current that replaces utility transformer characteristics, length of service conductors, and other factors ultimately affecting available fault current.

Additional substantiation has been provided to address the questions of the high-magnetic trip-type circuit breaker as well as a more conservative allowable conductor length of the home run.

TRANSFORMER CHARACTERISTICS AND SERVICE CONDUCTORS
Requirements for transformer characteristics and the length of service entrance conductors are no longer addressed as they were in the PI. These requirements are now unnecessary as there is a blanket requirement in the PC conditions for a minimum of 3000 amps of available fault current at the line side of the branch circuit panelboard. Equipment and conductors installed ahead of the branch circuit panelboard are no longer a factor. The new requirement states "The available short circuit current at the line side of the branch circuit panelboard where the branch circuit overcurrent device is installed shall be a minimum of 3000 amps". Including this condition eliminates the need to rely on transformer characteristics or the service entrance conductors that were included in the PI.

Although the transformer may be replaced, due to electrification trends, the expectation is that higher capacity and higher efficiency transformers will be used as replacements. This assumption is based on the 2008 Parks Study and the 2005 US Department of Energy mandates that were cited in the original PI 2794. It is important when drafting code requirements to not consider potential future temporary supply chain issues in a long-standing requirement.

CIRCUIT BREAKER TRIPPING CHARACTERISTICS:
HIGH MAG HAS A "DE FACTO" INDUSTRY DEFINITION
Concerns were raised about only allowing standard circuit breakers; it is noted that anywhere in the code, where circuit breakers are permitted for branch circuit protection, they are assumed to be standard trip-type breakers, but "high mag" trip-type breakers are not specifically prohibited. This PC specifically prohibits the use of high mag breakers to provide protection from parallel arc faults in the home run. The likelihood of using high-mag breakers with the OBC is no different than the likelihood of using high mag breakers to satisfy requirements in other parts of the code.

Breakers are used as established practice for validating acceptable performance of products, including GFCIs, receptacles, surge protectors, etc. The consistent low trip characteristics are relied upon to protect the downstream equipment. The product standards are silent about what circuit breaker trip characteristics are used. There is no additional risk for using the same methodology with the OBC option.

The following table shows a sampling of manufacturers' published data demonstrating that circuit breaker manufacturers already closely control their magnetic trip levels. Although not a "formal" definition, the industry has already created their own "de-facto" standard shown in the table as follows:

Manufacturer	Amperage	Trip Max (amps)	Mag Trip
A	15	225	Standard
A	15	525	High
B	15	255	Standard
B	15	600	High
C	15	225	Standard
C	15	600	High

In every case a high magnetic trip breaker has additional nomenclature in the catalog number to clearly differentiate it from the standard breaker. Additionally, high magnetic trip breakers are generally quite a bit more expensive (up to 10x more expensive), so these breakers would not be used in residential panelboards in lieu of standard breakers.

LENGTH OF THE HOME RUN CONDUCTOR MADE MORE CONSERVATIVE
This PC includes a revision to the lengths of the home run based on input and calculations from UL. Although the original lengths of 50' for 14 AWG, and 70' for 12 AWG were quite conservative, consideration has been given for the conductors to be exposed to higher temperatures which would affect conductor resistance. Taking this into account, the lengths of the home run have been recalculated assuming a maximum operating temperature of 90 C and added a 1.25 multiplier to the conductor resistance which would increase with a corresponding rise in the operating temperature. The maximum length of the home run has been changed from 50' to 45' for 14 AWG, and 70' to 60' for 12 AWG.

OVERALL IMPACT OF CHANGES FROM THE FIRST DRAFT
The changes outlined (shortening the home run length and specifying 3000-amps) result in a more conservative approach to ensure protection from a parallel arc fault in the home run. The requirement of the 3000 amps of available fault current is now specified in the PC to improve code usability and simplify the inspection process. These revisions are supported by the Parks Study, statements from the Edison Electric Institute (EEI) and a UL study.

1) The Parks Study shows the average available fault current for new construction is over 6000 amps
2) Written statements from EEI noted that available fault currents in new residential housing developments provide typically over 3000 amperes of fault current which is more than the minimum needed to cause the thermal magnetic breaker to trip with the home run wire lengths specified in the proposed text
3) The home run lengths were derived from the equations found in the UL study, "Effectiveness of Circuit Breakers in Mitigating Parallel Arcing"

EFFECT OF FIRST REVISION 9155
As a result of the CMP 10 First Revision 9155, the term "service equipment" was changed to "branch circuit panelboard".

CMP 10 has approved FR 9155, which will require the service disconnect for a one- and two-family dwelling to be located in a readily accessible outdoor location, so that it may additionally serve as an "Emergency Disconnect". The result is that it might be less common that the branch breakers will be located in the service equipment. PI 2794 required the branch-circuit overcurrent device to be located in the service equipment. In lieu of referring to service equipment, the term "branch circuit panelboard" is used in condition (5)c. and the reference to the location of the branch circuit breaker in condition (5)f has been removed.

OVERVIEW OF CURRENT INSTALLATION OPTIONS.
Reviewing the existing installation options in 210.12(A) we see that a viable option would be advantageous to installers and homeowners to provide a choice in how to provide AFCI protection in their electrical systems:
210.12(A) (1) - This option is predominantly used
210.12(A) (2) - This option is commercially unavailable
210.12(A) (3) - This option addresses technology that was never brought to the market
210.12(A) (4) – This option is continually debated about its commercial availability and viability
210.12(A) (5) – This option is a viable option only for locations where Type NM wiring is prohibited
210.12(A) (6) – This option is to encase the home run in concrete and is impractical for most residential installations

SUMMARY
This Public Comment supports the use of AFCI protection to protect both property and people. This issue has been well researched by UL, concluding that OBC AFCIs provide reliable AFCI protection when used in combination with a common thermal-magnetic circuit breaker within the specified limited home run lengths.

The acceptance of the proposed text will result in increased safety through increased adoption by offering installers a reasonable alternative to AFCI breakers. This option offers equivalent protection and provides homeowners more ready access to AFCI TEST and RESET functionality. As has been noted by Panel 2 members, there is more innovation in products developed by having alternatives, and acceptance of this PC adds another safe alternative. This is presented as an additional alternative installation method and does not change any existing methods; if for any reason the AHJ cannot verify any of the required conditions, then the AHJ shall not approve that installation.

REFERENCES
Brazis, P.W., Dini, D.A., He, Fan (2012). Evaluation of Run Length and Available Current on Breaker Ability to Mitigate Parallel Arcing Faults, Part II: Effect of Run

Length with 500A Available at the Panelboard. UL, Northbrook, IL, USA.
Brazis, P.W., He, Fan (2012). Effectiveness of Circuit Breakers in Mitigating Parallel Arcing Faults in the Home Run. UL, Northbrook, IL, USA.
Brazis, P.W., He Fan (2012). Effectiveness of Circuit Breakers in Mitigating Parallel Arcing Faults in the Home Run, Revised 11 January 2012
Campbell, R. (2017). Electrical Fires. NFPA, Quincy, MA, USA, Tech Rep. USS12A.
Campbell, R. (2019). Home Electrical Fires. NFPA, Quincy, MA, USA, NFPA No. USS37.
Kerber, T. (2012). Short Circuit Fault Current Study, Parks Associates, Dallas, TX.
Bentley Systems Report, August 18, 2023. Bentley Systems is the provider of the EasyPower™ power system analysis software and provides engineering services using the EasyPower™ software.

Related Item

- PI 2794

Submitter Information Verification

Submitter Full Name:	John Kovacik
Organization:	Trusted Safety Solutions LLC
Affiliation:	Arc Fault Circuit Interrupter Wiring Device Joint Research and Development Consortium
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jul 23 17:43:45 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	Information regarding the utilities equipment on the available short circuit current is the variable making the information not always available to AHJs and enforcers. The protections afforded by this section could be lost if the utility service changed during the life of the installation, changing the available short circuit current. AFCIs are designed and listed to UL 1699 tests with 500 amperes available at the source of the circuit. Absence of a marking that is not controlled nor required to be on the circuit breaker inherently leads to a possible misapplication. A circuit breaker that is not marked as high magnetic could have a high instantaneous and not be adequate yet still meet the requirement as written. In addition, the use of the term “high magnetic” is unenforceable and vague. There is no product or industry standard for the term “high magnetic”.

PC 188 - NFPA 70-2026 [Section 210.12(A)]

210.12 Arc-Fault Circuit-Interrupter Protection. Arc-fault circuit-interrupter (AFCI) protection shall be installed in accordance with 210.12(B) through (E) by any of the means described in 210.12(A). The AFCI shall be listed and installed in a readily accessible location.

(A) Means of Protection. AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed to provide protection of the entire branch circuit.

(2) A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which shall be marked to indicate that it is the first outlet of the branch circuit.

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.
b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

(4) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch- circuit overcurrent protective device if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.
b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
c. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.
d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.

<u>(5) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit overcurrent protective device if all of the following conditions are met:</u>

<u>a. The branch-circuit wiring shall be unspliced and untapped from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.</u>

<u>b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 13.7 m (45 ft) for a 14 AWG copper conductor or 18.3 m (60 ft) for a 12 AWG copper conductor.</u>

<u>c. The available short circuit current at the line side of the branch circuit panelboard where the branch circuit overcurrent device is installed shall be a minimum of 3000 amps.</u>

<u>d. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.</u>

<u>e. The branch-circuit circuit breaker shall be a listed single pole thermal-magnetic circuit breaker.</u>

<u>f. The branch-circuit circuit breaker shall not be of the high-magnetic trip-type.</u>

(6)~~(5)~~ If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

(7) ~~(6)~~ Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

STATEMENT OF PROBLEM AND SUBSTANTIATION FOR PUBLIC INPUT.

The only changes proposed are the addition of new 210.12(A)(5) and associated editorial numbering changes. There are no technical changes proposed to 210.12(A)(1) through (4) and existing (5) and (6). Any spurious underlining and renumbering were caused by a problematic Terra. A clean copy of the proposed changes is provided in the attachment.

Based on Panel input and a review of data with UL, this PC has improvements from the original PI which are detailed below. Unchanged supporting data and test results for the original PI 2794 are identified in the reference section at the end of the substantiation and available in the public domain.. This includes several 3rd party test reports, including UL test reports, the Parks report and the Bentley report. The Bentley report is attached to this Public Comment for convenience.

It is important to have multiple options available to installers for providing arc-fault protection. This Public Comment provides a real, and immediately available, alternative for arc-fault protection with many years of proven service.

In the following substantiation, the term “home run” is defined as the conductor from the overcurrent device to the first outlet in the branch circuit, and the term “OBC” refers to the outlet branch circuit AFCI.

PC OVERVIEW

Feedback from the Panel during the First Draft meeting was used to resolve questions raised for this new additional method of AFCI protection. Several requirements were rolled into a simple, measurable requirement for available fault current that replaces utility transformer characteristics, length of service conductors, and other factors ultimately affecting available fault current.

Additional substantiation has been provided to address the questions of the high-magnetic trip-type circuit breaker as well as a more conservative allowable conductor length of the home run.

TRANSFORMER CHARACTERISTICS AND SERVICE CONDUCTORS

Requirements for transformer characteristics and the length of service entrance conductors are no longer addressed as they were in the PI. These requirements are now unnecessary as there is a blanket requirement in the PC conditions for a minimum of 3000 amps of available fault current at the line side of the branch circuit panelboard. Equipment and conductors installed ahead of the branch circuit panelboard are no longer a factor. The new requirement states "The available short circuit current at the line side of the branch circuit panelboard where the branch circuit overcurrent device is installed shall be a minimum of 3000 amps". Including this condition eliminates the need to rely on transformer characteristics or the service entrance conductors that were included in the PI.

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REFERENCES

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Campbell, R. (2017). Electrical Fires. NFPA, Quincy, MA, USA, Tech Rep. USS12A.

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Kerber, T. (2012). Short Circuit Fault Current Study, Parks Associates, Dallas, TX.

Bentley Systems Report, August 18, 2023. Bentley Systems is the provider of the EasyPower™ power system analysis software and provides engineering services using the EasyPower™ software.

EasyPower®

A Memo for:

The Arc Fault Circuit Interrupter Wiring Device Joint Research and Development Consortium

» » » *Single-phase Short Circuit Calculations*

Bentley®

August 18, 2023

Mr. Eric J. Munoz
The Arc Fault Circuit Interrupter Wiring Device Joint Research and Development Consortium (“AFCI Consortium”)
55 E. Monroe Street, Suite 3440
Chicago, IL 60603

Dear Eric,

INTRODUCTION

Bentley Systems (Bentley) was asked to perform single-phase short calculations to aid the AFCI Consortium in their comment process for the latest revision to NFPA 70 National Electrical Code (NEC). Specifically, AFCI Consortium is interested in comparing single-phase short circuit calculations performed using the EasyPower® software on the secondary sides of service entrance transformers of varying impedances and secondary cable lengths/sizes with results obtained using the point-point short circuit calculation procedure. Figure 1 shows an example of the EasyPower® software one-line diagram used for single-phase short circuit calculations.

CRITICAL NOTES AND ASSUMPTIONS

The following apply to the analytical study results included with this memo:

- Infinite bus utility source impedance assumed (100,000 MVA with X/R = 150).
- Pre-fault bus voltages were 1.0 p.u. for all short circuit calculations.
- All service entrance transformer secondary cables were modeled as aluminum conductor installed in PVC conduit, except for selected steel conduit short circuit cases contained in Table 1.

ANALYSIS AND RESULTS

Attached to this memo is an Excel printout containing the results of single-phase short circuit calculations performed using the EasyPower® software compared against similar values obtained using the point-point short circuit calculation procedure. A native copy of the Excel file will be provided as an addendum to this memo. Additionally, Table 1 below compares single-phase short circuit calculations performed at the service conductor end for one (1) utility service entrance transformer configuration, with the service conductor raceway material changed from PVC conduit to steel conduit. The intent of Table 1 is to illustrate the impact of raceway material on single-phase short circuit calculations performed at the end of the service entrance cables due to inductive coupling between the cable and raceway material.

TABLE 1: COMPARISON OF SERVICE ENTRANCE SINGLE-PHASE SHORT CIRCUIT CALCULATIONS - PVC VS STEEL CONDUIT

Configuration	PVC Conduit – LL	Steel Conduit – LL	PVC Conduit – LN	Steel Conduit - LN
Z=1.0% @ 75 kVA 200 ft. 3/0 AWG	4,471 amps	4,373 amps	2,404 amps	2,357 amps

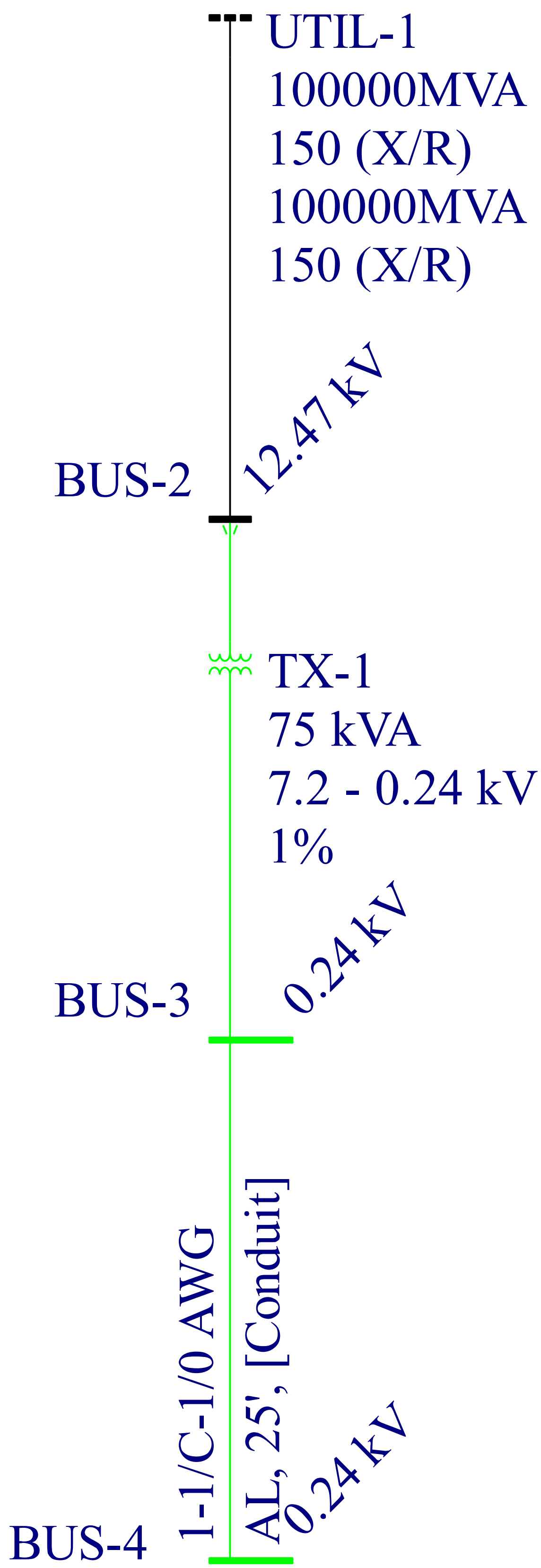

FIGURE 1: EASYPOWER® SOFTWARE ONE-LINE DIAGRAM EXAMPLE

Figure 1 shows an example of the EasyPower® software one-line diagram used for single-phase short circuit calculations. To produce the various short circuit calculation results, transformer impedances and secondary service entrance cable values were adjusted in the EasyPower® software prior to each calculation, as required.

CONCLUSION
Thank you for collaborating with Bentley. If you have questions or require additional information, please do not hesitate to get in touch.

Regards,

Ian Higginson

Ian Higginson, P.E.
Manager of Consulting, Grid Infrastructure
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Email: ian.higginson@bentley.com

Residential Service Fault Currents w/1/0 AWG

Transformer KVA - Single Phase 240/120 Volts	Transformer Impedance	Full Load Current @ 240 Volts Single Phase	Available Fault Current Phase to Phase		Available Fault Current Phase to Neutral		Available Fault Current Phase to Phase, 200 Amp Service, 1/0 Aluminum Service Conductor length (feet)								Available Fault Current Phase to Neutral, 200 Amp Service, 1/0 Aluminum Service Conductor length (feet)								240 Volt Line to Line Service: Maximum Length 1/0 Aluminum Service Conductor for 3000 Amps (feet)	120 Volt Line to Neutral Service: Maximum Length 1/0 Aluminum Service Conductor for 3000 Amps (feet)
							25		50		100		200		25		50		100		200		(Isca-Iscb)*C*n*Ell/(2*Isca*Iscb)	(Isca-Iscb)*C*n*Eln/(2*Isca*Iscb)
25	1.00	104	10,420	10,416	15,630	16,116	7,596	7,963	5,976	6,279	4,189	4,317	2,622	2,611	7,388	7,637	4,837	4,846	2,862	2,774	1,576	1,490	166	94
	1.25		8,336	8,333	12,504	12,893	6,425	6,709	5,227	5,500	3,806	3,957	2,467	2,485	6,607	6,881	4,490	4,547	2,736	2,679	1,537	1,463	149	89
	1.5		6,947	6,944	10,421	10,744	5,567	5,792	4,644	4,884	3,488	3,646	2,329	2,368	5,976	6,254	4,189	4,279	2,622	2,589	1,500	1,437	133	83
	1.75		5,954	5,952	8,931	9,209	4,910	5,093	4,179	4,389	3,219	3,375	2,205	2,259	5,454	5,726	3,926	4,037	2,516	2,504	1,465	1,402	116	78
	2.00		5,210	5,208	7,815	8,058	4,393	4,543	3,798	3,982	2,988	3,140	2,094	2,159	5,016	5,276	3,694	3,818	2,419	2,423	1,431	1,387	99	72
	2.25		4,631	4,629	6,947	7,163	3,974	4,099	3,481	3,642	2,788	2,933	1,994	2,065	4,644	4,890	3,488	3,621	2,329	2,346	1,398	1,363	82	66
37.5	1.00	156	15,630	15,623	23,445	24,243	10,033	10,586	7,388	7,718	4,837	4,902	2,862	2,798	8,771	8,939	5,395	5,309	3,048	2,913	1,629	1,528	189	102
	1.25		12,504	12,499	18,756	19,395	8,647	9,108	6,607	6,943	4,490	4,601	2,736	2,705	8,020	8,260	5,100	5,077	2,952	2,845	1,602	1,510	177	98
	1.5		10,420	10,416	15,630	16,163	7,596	7,982	5,976	6,298	4,189	4,329	2,622	2,616	7,388	7,667	4,837	4,860	2,862	2,779	1,576	1,492	166	94
	1.75		8,931	8,928	13,397	13,854	6,772	7,097	5,454	5,755	3,926	4,083	2,516	2,532	6,849	7,147	4,601	4,658	2,777	2,716	1,549	1,474	155	91
	2.00		7,815	7,812	11,723	12,122	6,111	6,386	5,016	5,293	3,694	3,859	2,419	2,451	6,383	6,688	4,386	4,470	2,697	2,655	1,524	1,457	144	87
	2.25		6,947	6,944	10,421	10,775	5,567	5,803	4,644	4,897	3,488	3,656	2,329	2,374	5,976	6,281	4,189	4,294	2,622	2,595	1,500	1,439	133	83
50	1.00	208	20,830	20,831	31,245	32,410	11,948	12,630	8,376	8,681	5,243	5,243	3,000	2,898	9,673	9,747	5,724	5,568	3,149	2,986	1,659	1,547	200	106
	1.25		16,664	16,665	24,996	25,929	10,450	11,059	7,612	7,958	4,933	4,992	2,895	2,826	8,979	9,153	5,472	5,381	3,072	2,934	1,637	1,534	191	103
	1.5		13,887	13,888	20,831	21,608	9,285	9,819	6,974	7,333	4,656	4,759	2,797	2,755	8,376	8,617	5,243	5,203	2,998	2,883	1,616	1,520	183	100
	1.75		11,903	11,904	17,855	18,521	8,355	8,820	6,436	6,790	4,410	4,542	2,707	2,687	7,851	8,134	5,032	5,034	2,928	2,833	1,594	1,506	175	97
	2.00		10,415	10,416	15,623	16,206	7,593	7,999	5,974	6,315	4,188	4,340	2,621	2,621	7,387	7,696	4,837	4,873	2,861	2,784	1,575	1,493	166	94
	2.25		9,258	9,259	13,887	14,405	6,959	7,315	5,574	5,898	3,988	4,153	2,541	2,558	6,974	7,299	4,656	4,721	2,797	2,737	1,555	1,480	158	92
75	1.00	313	31,250	31,244	46,875	48,831	14,775	15,554	9,675	9,863	5,722	5,618	3,150	3,002	10,786	10,681	6,094	5,846	3,258	3,061	1,687	1,567	211	109
	1.25		25,000	24,996	37,500	39,066	13,213	13,993	8,980	9,264	5,473	5,435	3,073	2,953	10,200	10,222	5,903	5,714	3,203	3,026	1,673	1,558	205	107
	1.5		20,833	20,831	31,250	32,556	11,950	12,691	8,377	8,720	5,242	5,260	2,998	2,904	9,675	9,763	5,722	5,585	3,150	2,991	1,659	1,549	200	106
	1.75		17,857	17,855	26,786	27,905	10,907	11,594	7,852	8,226	5,032	5,092	2,929	2,856	9,198	9,392	5,553	5,461	3,096	2,957	1,645	1,540	194	104
	2.00		15,625	15,623	23,438	24,417	10,031	10,662	7,388	7,777	4,838	4,932	2,861	2,809	8,768	9,018	5,393	5,340	3,047	2,923	1,629	1,531	189	102
	2.25		13,889	13,888	20,834	21,705	9,286	9,862	6,975	7,369	4,657	4,778	2,797	2,763	8,377	8,668	5,242	5,224	2,998	2,890	1,615	1,522	183	100

Calculations using client's point to point method

Calculations using EasyPower software

Isca = Line to Line Fault Current at transformer	
Iscb = final line to line fault current at service fixed at	3000
n = number of conductors per phase, fixed at 1	
Ell = Line to line voltage fixed at 240	
C = impedance constant for Aluminum 1/0 =	5838

Isca = Line to neutral Fault Current at transformer	
Iscb = final line to neutral fault current at service fixed at	3000
n = number of conductors per phase, fixed at 1	
Eln = Line to neutral voltage fixed at 120	
C = impedance constant for Aluminum 1/0 =	5838

Residential Service Fault Currents w/3/0 AWG

Transformer KVA - Single Phase 240/120 Volts	Transformer Impedance	Full Load Current @ 240 Volts Single Phase	Available Fault Current Phase to Phase		Available Fault Current Phase to Neutral		Available Fault Current Phase to Phase, 200 Amp Service, 3/0 Aluminum Service Conductor length (feet)								Available Fault Current Phase to Neutral, 200 Amp Service, 3/0 Aluminum Service Conductor length (feet)								240 Volt Line to Line Service: Maximum Length 3/0 Aluminum Service Conductor for 3000 Amps (feet)	120 Volt Line to Neutral Service: Maximum Length 3/0 Aluminum Service Conductor for 3000 Amps (feet)
							25		50		100		200		25		50		100		200		(Isca-Iscb)*C*n*Ell/(2*Isca*Iscb)	(Isca-Iscb)*C*n*Eln/(2*Isca*Iscb)
25	1.00	104	10,420	10,416	15,630	16,116	8,415	8,647	7,056	7,296	5,335	5,476	3,586	3,593	9,114	9,394	6,433	6,480	4,050	3,960	2,326	2,216	259	147
	1.25		8,336	8,333	12,504	12,893	7,643	7,172	6,506	6,234	5,014	4,876	3,437	3,338	8,496	8,236	6,118	5,927	3,923	3,755	2,284	2,153	233	138
	1.5		6,947	6,944	10,421	10,744	5,995	6,124	5,272	5,436	4,247	4,388	3,059	3,114	7,097	7,325	5,336	5,455	3,586	3,568	2,165	2,092	207	130
	1.75		5,954	5,952	8,931	9,209	5,240	5,343	4,680	4,817	3,855	3,985	2,850	2,915	6,341	6,592	4,916	5,049	3,391	3,397	2,093	2,035	181	121
	2.00		5,210	5,208	7,815	8,058	4,656	4,737	4,208	4,323	3,528	3,648	2,668	2,738	5,757	5,991	4,557	4,697	3,217	3,240	2,025	1,980	155	112
	2.25		4,631	4,629	6,947	7,163	4,187	4,255	3,822	3,921	3,253	3,362	2,507	2,580	5,272	5,488	4,247	4,389	3,059	3,096	1,961	1,928	128	104
37.5	1.00	156	15,630	15,623	23,445	24,243	11,515	11,911	9,114	9,428	6,433	6,537	4,050	3,993	11,315	11,564	7,456	7,402	4,433	4,272	2,448	2,307	294	159
	1.25		12,504	12,499	18,756	19,395	9,724	10,033	7,955	8,243	5,833	5,973	3,804	3,789	10,096	10,395	6,906	6,926	4,233	4,116	2,386	2,262	277	153
	1.5		10,420	10,416	15,630	16,163	8,415	8,661	7,056	7,313	5,335	5,490	3,586	3,601	9,114	9,431	6,433	6,502	4,050	3,969	2,326	2,219	259	147
	1.75		8,931	8,928	13,397	13,854	7,416	7,616	6,341	6,567	4,916	5,075	3,391	3,428	8,307	8,625	6,019	6,123	3,882	3,831	2,269	2,177	242	141
	2.00		7,815	7,812	11,723	12,122	6,630	6,794	5,757	5,956	4,557	4,714	3,217	3,268	7,632	7,941	5,656	5,782	3,728	3,701	2,217	2,136	225	136
	2.25		6,947	6,944	10,421	10,775	5,995	6,132	5,272	5,447	4,247	4,399	3,059	3,122	7,057	7,355	5,336	5,475	3,586	3,578	2,165	2,096	207	130
50	1.00	208	20,830	20,831	31,245	32,410	14,108	14,658	10,667	11,007	7,170	7,217	4,331	4,222	12,864	13,044	8,099	7,955	4,652	4,443	2,512	2,355	312	165
	1.25		16,664	16,665	24,996	25,929	12,066	12,518	9,457	9,800	6,601	6,708	4,116	4,054	11,663	11,936	7,606	7,549	4,484	4,319	2,465	2,320	299	160
	1.5		13,887	13,888	20,831	21,608	10,540	10,913	8,492	8,819	6,117	6,258	3,922	3,896	10,668	10,990	7,170	7,176	4,331	4,200	2,416	2,287	286	156
	1.75		11,903	11,904	17,855	18,521	9,356	9,667	7,707	8,008	5,698	5,859	3,746	3,748	9,829	10,175	6,781	6,835	4,185	4,086	2,369	2,254	273	152
	2.00		10,415	10,416	15,623	16,206	8,411	8,674	7,054	7,329	5,334	5,504	3,585	3,608	9,111	9,467	6,432	6,522	4,049	3,978	2,326	2,222	259	147
	2.25		9,258	9,259	13,887	14,405	7,641	7,864	6,504	6,753	5,012	5,186	3,437	3,477	8,492	8,847	6,117	6,234	3,922	3,874	2,283	2,190	246	143
75	1.00	313	31,250	31,244	46,875	48,831	18,225	18,981	12,863	13,157	8,100	8,025	4,653	4,471	14,911	14,908	8,864	8,582	4,894	4,626	2,583	2,404	329	171
	1.25		25,000	24,996	37,500	39,066	15,908	16,590	11,663	12,025	7,605	7,618	4,485	4,350	13,811	13,961	8,464	8,275	4,770	4,538	2,546	2,381	321	168
	1.5		20,833	20,831	31,250	32,556	14,110	14,714	10,669	11,055	7,171	7,243	4,329	4,233	12,863	13,115	8,100	7,985	4,653	4,453	2,513	2,358	312	165
	1.75		17,857	17,855	26,786	27,905	12,678	13,208	9,828	10,218	6,780	6,898	4,186	4,120	12,038	12,357	7,763	7,712	4,540	4,371	2,480	2,335	303	162
	2.00		15,625	15,623	23,438	24,417	11,513	11,974	9,113	9,491	6,431	6,579	4,050	4,012	11,311	11,674	7,456	7,454	4,432	4,291	2,447	2,313	294	159
	2.25		13,889	13,888	20,834	21,705	10,542	10,948	8,493	8,855	6,117	6,285	3,922	3,909	10,669	11,058	7,169	7,211	4,329	4,213	2,417	2,291	286	156

Calculations using client's point to point method

Calculations using EasyPower software

Isca = Line to Line Fault Current at transformer	
Iscb = final line to line fault current at service fixed at	3000
n = number of conductors per phase, fixed at 1	
Ell = Line to line voltage fixed at 240	
C = impedance constant for Aluminum 3/0 =	9110

Isca = Line to neutral Fault Current at transformer	
Iscb = final line to neutral fault current at service fixed at	3000
n = number of conductors per phase, fixed at 1	
Eln = Line to neutral voltage fixed at 120	
C = impedance constant for Aluminum 3/0 =	9110

Residential Service Fault Currents w/3/0 AWG

Transformer KVA - Single Phase 240/120 Volts	Transformer Impedance	Full Load Current @ 240 Volts Single Phase	Available Fault Current Phase to Phase		Available Fault Current Phase to Neutral		Available Fault Current Phase to Phase, 200 Amp Service, 3/0 Aluminum Service Conductor length (feet)							
							25		50		100		200	
25	1.00	104	10,420	10,416	15,630	16,116	8,415	8,647	7,056	7,296	5,335	5,476	3,586	3,593
	1.25		8,336	8,333	12,504	12,893	7,643	7,172	6,506	6,234	5,014	4,876	3,437	3,338
	1.5		6,947	6,944	10,421	10,744	5,995	6,124	5,272	5,436	4,247	4,388	3,059	3,114
	1.75		5,954	5,952	8,931	9,209	5,240	5,343	4,680	4,817	3,855	3,985	2,850	2,915
	2.00		5,210	5,208	7,815	8,058	4,656	4,737	4,208	4,323	3,528	3,648	2,668	2,738
	2.25		4,631	4,629	6,947	7,163	4,187	4,255	3,822	3,921	3,253	3,362	2,507	2,580
37.5	1.00	156	15,630	15,623	23,445	24,243	11,515	11,911	9,114	9,428	6,433	6,537	4,050	3,993
	1.25		12,504	12,499	18,756	19,395	9,724	10,033	7,955	8,243	5,833	5,973	3,804	3,789
	1.5		10,420	10,416	15,630	16,163	8,415	8,661	7,056	7,313	5,335	5,490	3,586	3,601
	1.75		8,931	8,928	13,397	13,854	7,416	7,616	6,341	6,567	4,916	5,075	3,391	3,428
	2.00		7,815	7,812	11,723	12,122	6,630	6,794	5,757	5,956	4,557	4,714	3,217	3,268
	2.25		6,947	6,944	10,421	10,775	5,995	6,132	5,272	5,447	4,247	4,399	3,059	3,122
50	1.00	208	20,830	20,831	31,245	32,410	14,108	14,658	10,667	11,007	7,170	7,217	4,331	4,222
	1.25		16,664	16,665	24,996	25,929	12,066	12,518	9,457	9,800	6,601	6,708	4,116	4,054
	1.5		13,887	13,888	20,831	21,608	10,540	10,913	8,492	8,819	6,117	6,258	3,922	3,896
	1.75		11,903	11,904	17,855	18,521	9,356	9,667	7,707	8,008	5,698	5,859	3,746	3,748
	2.00		10,415	10,416	15,623	16,206	8,411	8,674	7,054	7,329	5,334	5,504	3,585	3,608
	2.25		9,258	9,259	13,887	14,405	7,641	7,864	6,504	6,753	5,012	5,186	3,437	3,477
75	1.00	313	31,250	31,244	46,875	48,831	18,225	18,981	12,863	13,157	8,100	8,025	4,653	4,471
	1.25		25,000	24,996	37,500	39,066	15,908	16,590	11,663	12,025	7,605	7,618	4,485	4,350
	1.5		20,833	20,831	31,250	32,556	14,110	14,714	10,669	11,055	7,171	7,243	4,329	4,233
	1.75		17,857	17,855	26,786	27,905	12,678	13,208	9,828	10,218	6,780	6,898	4,186	4,120
	2.00		15,625	15,623	23,438	24,417	11,513	11,974	9,113	9,491	6,431	6,579	4,050	4,012
	2.25		13,889	13,888	20,834	21,705	10,542	10,948	8,493	8,855	6,117	6,285	3,922	3,909

Transformer KVA - Single Phase 240/120 Volts	Transformer Impedance	Available Fault Current Phase to Neutral, 200 Amp Service, 3/0 Aluminum Service Conductor length (feet)								240 Volt Line to Line Service: Maximum Length 3/0 Aluminum Service Conductor for 3000 Amps (feet)	120 Volt Line to Neutral Service: Maximum Length 3/0 Aluminum Service Conductor for 3000 Amps (feet)
		25		50		100		200		(Isca-Iscb)*C*n*Ell/(2*Isca*Iscb)	(Isca-Iscb)*C*n*Eln/(2*Isca*Iscb)
25	1.00	9,114	9,394	6,433	6,480	4,050	3,960	2,326	2,216	259	147
	1.25	8,496	8,236	6,118	5,927	3,923	3,755	2,284	2,153	233	138
	1.5	7,097	7,325	5,336	5,455	3,586	3,568	2,165	2,092	207	130
	1.75	6,341	6,592	4,916	5,049	3,391	3,397	2,093	2,035	181	121
	2.00	5,757	5,991	4,557	4,697	3,217	3,240	2,025	1,980	155	112
	2.25	5,272	5,488	4,247	4,389	3,059	3,096	1,961	1,928	128	104
37.5	1.00	11,315	11,564	7,456	7,402	4,433	4,272	2,448	2,307	294	159
	1.25	10,096	10,395	6,906	6,926	4,233	4,116	2,386	2,262	277	153
	1.5	9,114	9,431	6,433	6,502	4,050	3,969	2,326	2,219	259	147
	1.75	8,307	8,625	6,019	6,123	3,882	3,831	2,269	2,177	242	141
	2.00	7,632	7,941	5,656	5,782	3,728	3,701	2,217	2,136	225	136
	2.25	7,057	7,355	5,336	5,475	3,586	3,578	2,165	2,096	207	130
50	1.00	12,864	13,044	8,099	7,955	4,652	4,443	2,512	2,355	312	165
	1.25	11,663	11,936	7,606	7,549	4,484	4,319	2,465	2,320	299	160
	1.5	10,668	10,990	7,170	7,176	4,331	4,200	2,416	2,287	286	156
	1.75	9,829	10,175	6,781	6,835	4,185	4,086	2,369	2,254	273	152
	2.00	9,111	9,467	6,432	6,522	4,049	3,978	2,326	2,222	259	147
	2.25	8,492	8,847	6,117	6,234	3,922	3,874	2,283	2,190	246	143
75	1.00	14,911	14,908	8,864	8,582	4,894	4,626	2,583	2,404	329	171
	1.25	13,811	13,961	8,464	8,275	4,770	4,538	2,546	2,381	321	168
	1.5	12,863	13,115	8,100	7,985	4,653	4,453	2,513	2,358	312	165
	1.75	12,038	12,357	7,763	7,712	4,540	4,371	2,480	2,335	303	162
	2.00	11,311	11,674	7,456	7,454	4,432	4,291	2,447	2,313	294	159
	2.25	10,669	11,058	7,169	7,211	4,329	4,213	2,417	2,291	286	156

Calculations using client's point to point method

Calculations using EasyPower software

Isca = Line to Line Fault Current at transformer		Isca = Line to neutral Fault Current at	Isca = Line to neutral Fault Current at transformer	
Iscb = final line to line fault current at service fixed at	3000	Iscb = final line to neutral fault curre	Iscb = final line to neutral fault curre	3000
n = number of conductors per phase, fixed at 1		n = number of conductors per phase,	n = number of conductors per phase, fixed at 1	
Ell = Line to line voltage fixed at 240		Eln = Line to neutral voltage fixed at	Eln = Line to neutral voltage fixed at 120	
C = impedance constant for Aluminum 3/0 =	9110	C = impedance constant for Aluminu	C = impedance constant for Aluminu	9110

Residential Service Fault Currents w/3/0 AWG

Transformer KVA - Single Phase 240/120 Volts	Transformer Impedance	Full Load Current @ 240 Volts Single Phase	Available Fault Current Phase to Phase		Available Fault Current Phase to Neutral		Available Fault Current Phase to Phase, 200 Amp Service, 3/0 Aluminum Service Conductor length (feet)								Available Fault Current Phase to Neutral, 200 Amp Service, 3/0 Aluminum Service Conductor length (feet)							
							25		50		100		200		25		50		100		200	
25	1.00	104	10,420	10,416	15,630	16,116	8,415	8,647	7,056	7,296	5,335	5,476	3,586	3,593	9,114	9,394	6,433	6,480	4,050	3,960	2,326	2,216
	1.25		8,336	8,333	12,504	12,893	7,643	7,172	6,506	6,234	5,014	4,876	3,437	3,338	8,496	8,236	6,118	5,927	3,923	3,755	2,284	2,153
	1.5		6,947	6,944	10,421	10,744	5,995	6,124	5,272	5,436	4,247	4,388	3,059	3,114	7,097	7,325	5,336	5,455	3,586	3,568	2,165	2,092
	1.75		5,954	5,952	8,931	9,209	5,240	5,343	4,680	4,817	3,855	3,985	2,850	2,915	6,341	6,592	4,916	5,049	3,391	3,397	2,093	2,035
	2.00		5,210	5,208	7,815	8,058	4,656	4,737	4,208	4,323	3,528	3,648	2,668	2,738	5,757	5,991	4,557	4,697	3,217	3,240	2,025	1,980
	2.25		4,631	4,629	6,947	7,163	4,187	4,255	3,822	3,921	3,253	3,362	2,507	2,580	5,272	5,488	4,247	4,389	3,059	3,096	1,961	1,928
37.5	1.00	156	15,630	15,623	23,445	24,243	11,515	11,911	9,114	9,428	6,433	6,537	4,050	3,993	11,315	11,564	7,456	7,402	4,433	4,272	2,448	2,307
	1.25		12,504	12,499	18,756	19,395	9,724	10,033	7,955	8,243	5,833	5,973	3,804	3,789	10,096	10,395	6,906	6,926	4,233	4,116	2,386	2,262
	1.5		10,420	10,416	15,630	16,163	8,415	8,661	7,056	7,313	5,335	5,490	3,586	3,601	9,114	9,431	6,433	6,502	4,050	3,969	2,326	2,219
	1.75		8,931	8,928	13,397	13,854	7,416	7,616	6,341	6,567	4,916	5,075	3,391	3,428	8,307	8,625	6,019	6,123	3,882	3,831	2,269	2,177
	2.00		7,815	7,812	11,723	12,122	6,630	6,794	5,757	5,956	4,557	4,714	3,217	3,268	7,632	7,941	5,656	5,782	3,728	3,701	2,217	2,136
	2.25		6,947	6,944	10,421	10,775	5,995	6,132	5,272	5,447	4,247	4,399	3,059	3,122	7,057	7,355	5,336	5,475	3,586	3,578	2,165	2,096
50	1.00	208	20,830	20,831	31,245	32,410	14,108	14,658	10,667	11,007	7,170	7,217	4,331	4,222	12,864	13,044	8,099	7,955	4,652	4,443	2,512	2,355
	1.25		16,664	16,665	24,996	25,929	12,066	12,518	9,457	9,800	6,601	6,708	4,116	4,054	11,663	11,936	7,606	7,549	4,484	4,319	2,465	2,320
	1.5		13,887	13,888	20,831	21,608	10,540	10,913	8,492	8,819	6,117	6,258	3,922	3,896	10,668	10,990	7,170	7,176	4,331	4,200	2,416	2,287
	1.75		11,903	11,904	17,855	18,521	9,356	9,667	7,707	8,008	5,698	5,859	3,746	3,748	9,829	10,175	6,781	6,835	4,185	4,086	2,369	2,254
	2.00		10,415	10,416	15,623	16,206	8,411	8,674	7,054	7,329	5,334	5,504	3,585	3,608	9,111	9,467	6,432	6,522	4,049	3,978	2,326	2,222
	2.25		9,258	9,259	13,887	14,405	7,641	7,864	6,504	6,753	5,012	5,186	3,437	3,477	8,492	8,847	6,117	6,234	3,922	3,874	2,283	2,190
75	1.00	313	31,250	31,244	46,875	48,831	18,225	18,981	12,863	13,157	8,100	8,025	4,653	4,471	14,911	14,908	8,864	8,582	4,894	4,626	2,583	2,404
	1.25		25,000	24,996	37,500	39,066	15,908	16,590	11,663	12,025	7,605	7,618	4,485	4,350	13,811	13,961	8,464	8,275	4,770	4,538	2,546	2,381
	1.5		20,833	20,831	31,250	32,556	14,110	14,714	10,669	11,055	7,171	7,243	4,329	4,233	12,863	13,115	8,100	7,985	4,653	4,453	2,513	2,358
	1.75		17,857	17,855	26,786	27,905	12,678	13,208	9,828	10,218	6,780	6,898	4,186	4,120	12,038	12,357	7,763	7,712	4,540	4,371	2,480	2,335
	2.00		15,625	15,623	23,438	24,417	11,513	11,974	9,113	9,491	6,431	6,579	4,050	4,012	11,311	11,674	7,456	7,454	4,432	4,291	2,447	2,313
	2.25		13,889	13,888	20,834	21,705	10,542	10,948	8,493	8,855	6,117	6,285	3,922	3,909	10,669	11,058	7,169	7,211	4,329	4,213	2,417	2,291

Calculations using client's point to point method

Calculations using EasyPower software

Residential Service Fault Currents w/1/0 AWG

Transformer KVA - Single Phase 240/120 Volts	Transformer Impedance	Full Load Current @ 240 Volts Single Phase	Available Fault Current Phase to Phase		Available Fault Current Phase to Neutral		Available Fault Current Phase to Phase, 200 Amp Service, 1/0 Aluminum Service Conductor length (feet)								Available Fault Current Phase to Neutral, 200 Amp Service, 1/0 Aluminum Service Conductor length (feet)								240 Volt Line to Line Service Maximum Length 1/0 Aluminum Service Conductor for 3000 Amps (feet)	120 Volt Line to Neutral Service Maximum Length 1/0 Aluminum Service Conductor for 3000 Amps (feet)
							25		50		100		200		25		50		100		200		(Isca-Iscb)*C*n*Ell/(2*Isca*Iscb)	(Isca-Iscb)*C*n*Eln/(2*Isca*Iscb)
25	1.00	104	10,420	10,416	15,630	16,116	7,596	7,963	5,976	6,279	4,189	4,317	2,622	2,611	7,388	7,637	4,837	4,846	2,862	2,774	1,576	1,490	166	94
	1.25		8,336	8,333	12,504	12,893	6,425	6,709	5,227	5,500	3,806	3,957	2,467	2,485	6,607	6,881	4,490	4,547	2,736	2,679	1,537	1,463	149	89
	1.5		6,947	6,944	10,421	10,744	5,567	5,792	4,644	4,884	3,488	3,646	2,329	2,368	5,976	6,254	4,189	4,279	2,622	2,589	1,500	1,437	133	83
	1.75		5,954	5,952	8,931	9,209	4,910	5,093	4,179	4,389	3,219	3,375	2,205	2,259	5,454	5,726	3,926	4,037	2,516	2,504	1,465	1,402	116	78
	2.00		5,210	5,208	7,815	8,058	4,393	4,543	3,798	3,982	2,988	3,140	2,094	2,159	5,016	5,276	3,694	3,818	2,419	2,423	1,431	1,387	99	72
	2.25		4,631	4,629	6,947	7,163	3,974	4,099	3,481	3,642	2,788	2,933	1,994	2,065	4,644	4,890	3,488	3,621	2,329	2,346	1,398	1,363	82	66
37.5	1.00	156	15,630	15,623	23,445	24,243	10,033	10,586	7,388	7,718	4,837	4,902	2,862	2,798	8,771	8,939	5,395	5,309	3,048	2,913	1,629	1,528	189	102
	1.25		12,504	12,499	18,756	19,395	8,647	9,108	6,607	6,943	4,490	4,601	2,736	2,705	8,020	8,260	5,100	5,077	2,952	2,845	1,602	1,510	177	98
	1.5		10,420	10,416	15,630	16,163	7,596	7,982	5,976	6,298	4,189	4,329	2,622	2,616	7,388	7,667	4,837	4,860	2,862	2,779	1,576	1,492	166	94
	1.75		8,931	8,928	13,397	13,854	6,772	7,097	5,454	5,755	3,926	4,083	2,516	2,532	6,849	7,147	4,601	4,658	2,777	2,716	1,549	1,474	155	91
	2.00		7,815	7,812	11,723	12,122	6,111	6,386	5,016	5,293	3,694	3,859	2,419	2,451	6,383	6,688	4,386	4,470	2,697	2,655	1,524	1,457	144	87
	2.25		6,947	6,944	10,421	10,775	5,567	5,803	4,644	4,897	3,488	3,656	2,329	2,374	5,976	6,281	4,189	4,294	2,622	2,595	1,500	1,439	133	83
50	1.00	208	20,830	20,831	31,245	32,410	11,948	12,630	8,376	8,681	5,243	5,243	3,000	2,898	9,673	9,747	5,724	5,568	3,149	2,986	1,659	1,547	200	106
	1.25		16,664	16,665	24,996	25,929	10,450	11,059	7,612	7,958	4,933	4,992	2,895	2,826	8,979	9,153	5,472	5,381	3,072	2,934	1,637	1,534	191	103
	1.5		13,887	13,888	20,831	21,608	9,285	9,819	6,974	7,333	4,656	4,759	2,797	2,755	8,376	8,617	5,243	5,203	2,998	2,883	1,616	1,520	183	100
	1.75		11,903	11,904	17,855	18,521	8,355	8,820	6,436	6,790	4,410	4,542	2,707	2,687	7,851	8,134	5,032	5,034	2,928	2,833	1,594	1,506	175	97
	2.00		10,415	10,416	15,623	16,206	7,593	7,999	5,974	6,315	4,188	4,340	2,621	2,621	7,387	7,696	4,837	4,873	2,861	2,784	1,575	1,493	166	94
	2.25		9,258	9,259	13,887	14,405	6,959	7,315	5,574	5,898	3,988	4,153	2,541	2,558	6,974	7,299	4,656	4,721	2,797	2,737	1,555	1,480	158	92
75	1.00	313	31,250	31,244	46,875	48,831	14,775	15,554	9,675	9,863	5,722	5,618	3,150	3,002	10,786	10,681	6,094	5,846	3,258	3,061	1,687	1,567	211	109
	1.25		25,000	24,996	37,500	39,066	13,213	13,993	8,980	9,264	5,473	5,435	3,073	2,953	10,200	10,222	5,903	5,714	3,203	3,026	1,673	1,558	205	107
	1.5		20,833	20,831	31,250	32,556	11,950	12,691	8,377	8,720	5,242	5,260	2,998	2,904	9,675	9,763	5,722	5,585	3,150	2,991	1,659	1,549	200	106
	1.75		17,857	17,855	26,786	27,905	10,907	11,594	7,852	8,226	5,032	5,092	2,929	2,856	9,198	9,392	5,553	5,461	3,096	2,957	1,645	1,540	194	104
	2.00		15,625	15,623	23,438	24,417	10,031	10,662	7,388	7,777	4,838	4,932	2,861	2,809	8,768	9,018	5,393	5,340	3,047	2,923	1,629	1,531	189	102
	2.25		13,889	13,888	20,834	21,705	9,286	9,862	6,975	7,369	4,657	4,778	2,797	2,763	8,377	8,668	5,242	5,224	2,998	2,890	1,615	1,522	183	100

Calculations using client's point to point methoc

Calculations using EasyPower software

Isca = Line to Line Fault Current at transformer		Isca = Line to neutral Fault Current	Isca = Line to neutral Fault Current at transforme
Iscb = final line to line fault current at service fixed at	3000	Iscb = final line to neutral fault curre	Iscb = final line to neutral fault curre 3000
n = number of conductors per phase, fixed at 1		n = number of conductors per phas	n = number of conductors per phase, fixed at 1
Ell = Line to line voltage fixed at 240		Eln = Line to neutral voltage fixed a	Eln = Line to neutral voltage fixed at 120
C = impedance constant for Aluminum 1/0 =	5838	C = impedance constant for Alumin	C = impedance constant for Alumin 5838

Residential Service Fault Currents w/1/0 AWG

Transformer KVA - Single Phase 240/120 Volts	Transformer Impedance	Full Load Current @ 240 Volts Single Phase	Available Fault Current Phase to Phase		Available Fault Current Phase to Neutral		Available Fault Current Phase to Phase, 200 Amp Service, 1/0 Aluminum Service Conductor length (feet)								Available Fault Current Phase to Neutral, 200 Amp Service, 1/0 Aluminum Service Conductor length (feet)							
							25		50		100		200		25		50		100		200	
25	1.00	104	10,420	10,416	15,630	16,116	7,596	7,963	5,976	6,279	4,189	4,317	2,622	2,611	7,388	7,637	4,837	4,846	2,862	2,774	1,576	1,490
	1.25		8,336	8,333	12,504	12,893	6,425	6,709	5,227	5,500	3,806	3,957	2,467	2,485	6,607	6,881	4,490	4,547	2,736	2,679	1,537	1,463
	1.5		6,947	6,944	10,421	10,744	5,567	5,792	4,644	4,884	3,488	3,646	2,329	2,368	5,976	6,254	4,189	4,279	2,622	2,589	1,500	1,437
	1.75		5,954	5,952	8,931	9,209	4,910	5,093	4,179	4,389	3,219	3,375	2,205	2,259	5,454	5,726	3,926	4,037	2,516	2,504	1,465	1,402
	2.00		5,210	5,208	7,815	8,058	4,393	4,543	3,798	3,982	2,988	3,140	2,094	2,159	5,016	5,276	3,694	3,818	2,419	2,423	1,431	1,387
	2.25		4,631	4,629	6,947	7,163	3,974	4,099	3,481	3,642	2,788	2,933	1,994	2,065	4,644	4,890	3,488	3,621	2,329	2,346	1,398	1,363
37.5	1.00	156	15,630	15,623	23,445	24,243	10,033	10,586	7,388	7,718	4,837	4,902	2,862	2,798	8,771	8,939	5,395	5,309	3,048	2,913	1,629	1,528
	1.25		12,504	12,499	18,756	19,395	8,647	9,108	6,607	6,943	4,490	4,601	2,736	2,705	8,020	8,260	5,100	5,077	2,952	2,845	1,602	1,510
	1.5		10,420	10,416	15,630	16,163	7,596	7,982	5,976	6,298	4,189	4,329	2,622	2,616	7,388	7,667	4,837	4,860	2,862	2,779	1,576	1,492
	1.75		8,931	8,928	13,397	13,854	6,772	7,097	5,454	5,755	3,926	4,083	2,516	2,532	6,849	7,147	4,601	4,658	2,777	2,716	1,549	1,474
	2.00		7,815	7,812	11,723	12,122	6,111	6,386	5,016	5,293	3,694	3,859	2,419	2,451	6,383	6,688	4,386	4,470	2,697	2,655	1,524	1,457
	2.25		6,947	6,944	10,421	10,775	5,567	5,803	4,644	4,897	3,488	3,656	2,329	2,374	5,976	6,281	4,189	4,294	2,622	2,595	1,500	1,439
50	1.00	208	20,830	20,831	31,245	32,410	11,948	12,630	8,376	8,681	5,243	5,243	3,000	2,898	9,673	9,747	5,724	5,568	3,149	2,986	1,659	1,547
	1.25		16,664	16,665	24,996	25,929	10,450	11,059	7,612	7,958	4,933	4,992	2,895	2,826	8,979	9,153	5,472	5,381	3,072	2,934	1,637	1,534
	1.5		13,887	13,888	20,831	21,608	9,285	9,819	6,974	7,333	4,656	4,759	2,797	2,755	8,376	8,617	5,243	5,203	2,998	2,883	1,616	1,520
	1.75		11,903	11,904	17,855	18,521	8,355	8,820	6,436	6,790	4,410	4,542	2,707	2,687	7,851	8,134	5,032	5,034	2,928	2,833	1,594	1,506
	2.00		10,415	10,416	15,623	16,206	7,593	7,999	5,974	6,315	4,188	4,340	2,621	2,621	7,387	7,696	4,837	4,873	2,861	2,784	1,575	1,493
	2.25		9,258	9,259	13,887	14,405	6,959	7,315	5,574	5,898	3,988	4,153	2,541	2,558	6,974	7,299	4,656	4,721	2,797	2,737	1,555	1,480
75	1.00	313	31,250	31,244	46,875	48,831	14,775	15,554	9,675	9,863	5,722	5,618	3,150	3,002	10,786	10,681	6,094	5,846	3,258	3,061	1,687	1,567
	1.25		25,000	24,996	37,500	39,066	13,213	13,993	8,980	9,264	5,473	5,435	3,073	2,953	10,200	10,222	5,903	5,714	3,203	3,026	1,673	1,558
	1.5		20,833	20,831	31,250	32,556	11,950	12,691	8,377	8,720	5,242	5,260	2,998	2,904	9,675	9,763	5,722	5,585	3,150	2,991	1,659	1,549
	1.75		17,857	17,855	26,786	27,905	10,907	11,594	7,852	8,226	5,032	5,092	2,929	2,856	9,198	9,392	5,553	5,461	3,096	2,957	1,645	1,540
	2.00		15,625	15,623	23,438	24,417	10,031	10,662	7,388	7,777	4,838	4,932	2,861	2,809	8,768	9,018	5,393	5,340	3,047	2,923	1,629	1,531
	2.25		13,889	13,888	20,834	21,705	9,286	9,862	6,975	7,369	4,657	4,778	2,797	2,763	8,377	8,668	5,242	5,224	2,998	2,890	1,615	1,522

Calculations using client's point to point method

Calculations using EasyPower software

Public Comment No. 466-NFPA 70-2024 [Section No. 210.12(A)]

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed at the origin of the branch circuit to protect the entire branch circuit

(2) A listed branch/feeder-type AFCI installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box, which is marked to indicate that it is the first outlet of the branch circuit

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.

b. The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

c. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

(4) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit OCPD if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit OCPD to the outlet branch-circuit AFCI.

b. The maximum length of the branch-circuit wiring from the branch-circuit OCPD to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

c. The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

d. The combination of the branch-circuit OCPD and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and listed as such.

(5) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

(6) Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect the remaining portion of the branch circuit

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit-Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

Additional Proposed Changes

File Name	Description	Approved
CN_113.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 113 appeared in the First Draft Report on First Revision No. 8032.

The Correlating Committee directs CMP-2 to revise the phrase “meeting the applicable requirements of” with “in accordance with” to comply with the NEC Style Manual 4.1.3.

Related Item

• First Revision No. 8032

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:11:39 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7640-NFPA 70-2024
Statement: The language is revised to comply with NEC Style Manual 4.1.3.

Correlating Committee Note No. 113-NFPA 70-2024 [Section No. 210.12(A)]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Wed May 08 14:20:37 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to revise the phrase “meeting the applicable requirements of” with “in accordance with” to comply with the NEC Style Manual 4.1.3.

First Revision No. 8032-NFPA 70-2024 [Section No. 210.12(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. 1066-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices ~~installed in the following locations~~ shall be protected by any of the means described in 210.12(A).

- ~~Kitchens~~
- ~~Family rooms~~
- ~~Dining rooms~~
- ~~Living rooms~~
- ~~Parlors~~
- ~~Libraries~~
- ~~Dens~~
- ~~Bedrooms~~
- ~~Sunrooms~~
- ~~Recreation rooms~~
- ~~Closets~~
- ~~Hallways~~
- ~~Laundry areas~~
- ~~Similar areas~~

~~Exception No. 1~~ <u>Exception No. 1: AFCI protection shall not be required in garages, detached buildings, and outdoors.</u>

<u>Exception No. 2</u> : AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. ~~2~~ <u>3</u> : AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

The changes that where proposed did requires AFCI protection in the entire dwelling but without a long ever growing list. The new proposed exception1 - exempts the garage, detached buildings and outdoors which weren't on the original list. I believe this simplifies the goal for AFCI protection in the entire house. After reading the Committee statement I think they misunderstood the intention of the change. This Change will increase coverage and protection.

Committee StatementResolution: CI-8195-NFPA 70-2024
Statement: The section has been revised to make the NEC more user-friendly. Expansion to the remaining circuits of dwelling units, except for garages, continues the incremental steps to protect the entire dwelling as electrical fires can occur on these 10-A, 15-A, and 20-A circuits regardless of the area or room they serve. The entire length of conductors presents opportunities for causing an electrical fire. This Arc-fault protection expansion to all dwelling unit 10-A, 15-A, and 20-A branch circuits increases safety by reducing the likelihood of electrical fires.
Electrical fire statistics demonstrate that electrical fires exist in dwelling units that might have been prevented by AFCI protection.
Kitchens, Laundry areas, and Listed HVAC equipment have been excepted from AFCI protection due to incompatibility concerns.

<u>**Related Item**</u>

• PI 1438

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 13 12:42:59 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: CMP2 seeks to maintain a list of areas where AFCIs are required. The existing language has been in place for multiple code cycles.

Public Comment No. 1157-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

(15) <u>Bathrooms</u>

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

CMP 2 accepted the addition of bathrooms when reorganizing 210.12 in FR 8195. However, with the failure of the FR, this PC is needed to bring bathrooms into 210.12 (B). A presentation was provided detailing the interoperability testing without any negative feedback from CMP2 members.

Electrical malfunction (Per NFPA, home fires due to electrical failure or malfunction primarily involve some form of arcing, which results from an unintentional discharge of electrical current between conductors.) caused bathroom fires at an annual average of 2300/yr. and 10 deaths, 50 injuries, & $48M per NFPA 2021 Home Electrical Fires Table 8. A reduction of these fires, deaths, injuries, and financial impact is the focus of this public input. There have been significant AFCI testing done on bathroom cord/plug appliances as well as the major manufacturers of bathroom fans including humidity level testing in order to prevent unwanted tripping. This testing covers over 100,000 test cases, over 1,000 use cases, and over 300 appliance brands.

Example of some fires that started in bathrooms:

https://www.khq.com/news/bathroom-ceiling-fan-causing-electrical-fire-at-spokane-valley-home/article_4f2baa5e-add7-11eb-90b0-ff1f3e70dfea.html

https://www.theoaklandpress.com/news/two-fires-start-from-faulty-bathroom-exhaust-fans/article_35d3003c-ef71-11e9-aea7-63cc0011aca1.html

https://fox59.com/news/family-loses-everything-after-fire-started-by-bathroom-exhaust-fan/

The Commonwealth of Massachusetts has required AFCI protection on all circuits since their adoption of the 2020 NEC with this amendment on January 1, 2020. There has not been any reports of unwanted tripping or other issues related to the use of AFCI's across all 15-20A circuits. ESFI conducted a survey of electrical contractors during 2022 and found that there were no specified issues related to AFCI's causing tripping issues. The vast majority of tripping issues found were related to overloads/short circuits.

Additionally, concerns related to interoperability lead to additional testing of bathroom fans in a humidity chamber as presented to CMP-2 during the First Draft Meeting. Their testing covered 11 different fans from 6 different manufacturers utilizing Conditions of 120Vac, +32C (+90F), and Relative Humidity 20% - 93%. Three different manufacturers of current dual function circuit breakers were used and none of the devices tripped. Similar tests were run on 5 Radon Fans without any tripping of the dual function circuit breakers.

<u>Related Item</u>

• PI3408 • FR8195

Submitter Information Verification

Submitter Full Name: Megan Hayes

Organization: NEMA

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 16 09:47:11 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7738-NFPA 70-2024
Statement:	Technical substantiation has been provided to support the addition of bathroom lighting outlets to be included in the list of areas with AFCI protection. Bathrooms have been included for several cycles in dormitories. The circuits are the same as other lighting outlets in the dwelling.

Public Comment No. 1158-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

(15) Attics

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

CMP 2 accepted the addition of attics when reorganizing 210.12 in FR 8195. However, with the failure of the FR, this PC is needed to bring attics into 210.12 (B).

Electrical malfunction (Per NFPA, home fires due to electrical failure or malfunction primarily involve some form of arcing, which results from an unintentional discharge of electrical current between conductors.) is a major contributor to fires starting in attics with an annual average of 4600/yr. with 10 deaths, 70 injuries, & $194M in damage per NFPA 2021 Home Electrical Fires Table 8. While some of these fires are caused by circuits running through the attic, the branch circuits feeding the attic are subject to the same damage and other causes of arcing. The dangers that these unprotected circuits could create should not be ignored. The following recent attic fires are what this PI will prevent.

https://5280fire.com/2023-incidents/lakewood-west-5th-ave-attic-fire/

https://www.nbc15.com/2023/02/10/attic-fire-causes-estimated-50k-damage-monona-home/

https://roscoenews.com/g/rockton-il/n/127798/attic-fire-rockton-was-put-out-quickly

https://www.recordcourier.com/news/2022/may/13/firefighters-douse-main-street-attic-blaze/

While these fires caused damage with few injuries, that is not always the case as the NFPA Report indicates. In February of 2020, an attic fire in Clinton, MS took the lives of 7 people mostly children. The Mississippi fire marshals reported that the house fire that killed seven people was accidental, and it started with an electrical issue in the attic. It is understood that this report doesn't say that an arcing event started the fire in the attic, but there are limited electrical fire ignition options in an attic. Expanding this fire reducing technology will help save lives.

The Commonwealth of Massachusetts has required AFCI protection on all circuits since their adoption of the 2020 NEC with this amendment on January 1, 2020. There has not been any reports of unwanted tripping or other issues related to the use of AFCI's
across all 15-20A circuits. ESFI conducted a survey of electrical contractors during 2022 and found that there were no specified issues related to AFCI's causing tripping issues.

The vast majority of tripping issues found were related to overloads/short circuits.
Concerns related to interoperability lead to additional testing of attic fans in a humidity chamber. Their testing covered 5 different fans from 5 different manufacturers utilizing Conditions of 120Vac, and +54C (+130F). Three different manufacturers of current dual
function circuit breakers were used and none of the devices tripped.

Related Item

• PI3407 • FR8195

Submitter Information Verification

Submitter Full Name: Megan Hayes

Organization: NEMA

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 16 09:53:20 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7743-NFPA 70-2024

Statement: Data concerning the number of electrical fires was provided in a presentation to CMP-2 (see meeting minutes) which demonstrated the need for AFCI protection in attics. Some circuits in the attics are not individual circuits are already protected by an AFCI.

Public Comment No. 1677-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) ~~Kitchens~~

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) ~~Laundry areas~~

(14) Similar areas

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Additional Proposed Changes

File Name	Description	Approved
PI_8195_AFCI_Public_Comment_-_Buuck-v.1.0.pdf		

Statement of Problem and Substantiation for Public Comment

The First Draft panel meeting resulted in multiple changes to 210.12(B). Some changes added areas of the home where AFCIs would be required, and some removed areas. It would help to get a clearer picture of where the Panel stands if each change were balloted separately. This PC is an attempt to ballot one item from the failed FR.
This PC removes kitchens and laundry areas from the list of areas where AFCIs are required. As stated in my presentation to CMP-2 in January, national fire data does not support the continued expansion of AFCIs. Tens of millions of AFCI devices have been installed, and we are still seeing upticks in electrical fires (see attachment). This is very different from the clear reduction in electrocutions that were recorded over the first decades where GFCIs were introduced.
Note that TerraView incorrectly shows “family rooms” and “similar areas” as underlined. They were not added, and the underlining should be ignored.

Related Item

- CI 8195

Submitter Information Verification

Submitter Full Name: Daniel Buuck
Organization: National Association of Home Builders
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 26 10:00:03 EDT 2024
Committee: NEC-P02

Committee Statement

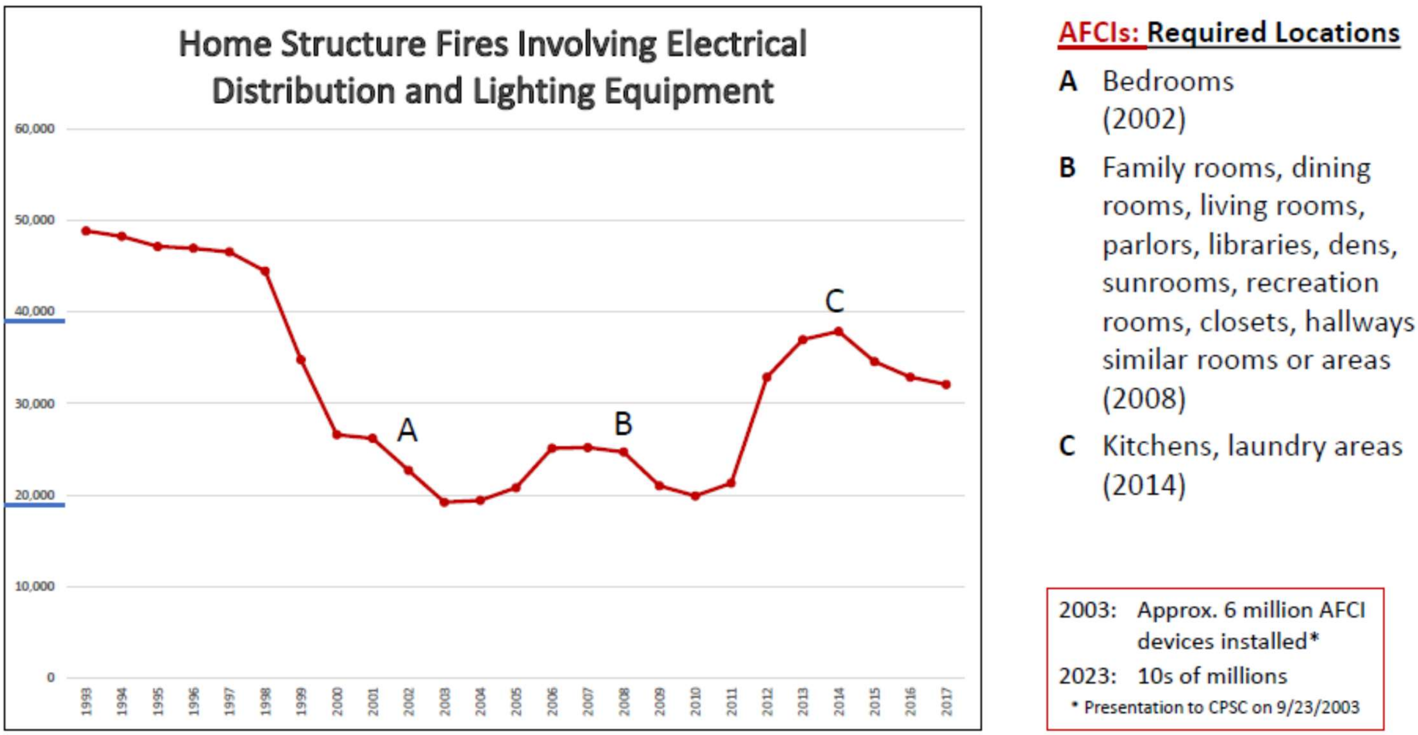
Committee Action: Rejected

Resolution: Insufficient substantiation was provided to remove kitchens and laundry areas from the list of dwelling units protected areas in Section 210.12(B). Removal of kitchens and laundry areas from the list would reduce safety in dwelling units. Fire data in the US does not include comprehensive information if electrical fires have occurred in homes or circuits with AFCI protection.

The First Draft panel meeting resulted in multiple changes to 210.12(B). Some changes added areas of the home where AFCIs would be required, and some removed areas. It would help to get a clearer picture of where the Panel stands if each change were balloted separately. This PC is an attempt to ballot one item from the failed FR.

This PC removes kitchens and laundry areas from the list of areas where AFCIs are required. As stated in my presentation to CMP-2 in January, national fire data does not support the continued expansion of AFCIs. Tens of millions of AFCI devices have been installed, and we are still seeing upticks in electrical fires (see below). This is very different from the clear reduction in electrocutions that were recorded over the first decades where GFCIs were introduced.

Note that TerraView incorrectly shows “family rooms” and “similar areas” as underlined. They were not added, and the underlining should be ignored.



Source: Home Fires Caused by Electrical Distribution and Lighting Equipment: Supporting Tables, Feb. 2022, NFPA
Note: Because of low participation in NFIRS Version 5.0 during 1999-2001, data from these years is not considered reliable.

Public Comment No. 1681-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

(15) Attics

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

CMP 2 accepted the addition of attics when reorganizing 210.12 in FR 8195. However, with the failure of the FR, this PC is needed to bring attics into 210.12 (B).

Electrical malfunction is a major contributor to fires starting in attics with an annual average of 4600/yr. with 10 deaths and 70 injuries per NFPA 2021 Home Electrical Fires Table 8. While some of these fires are caused by circuits running through the attic, the branch circuits feeding the attic are subject to the same damage and other causes of arcing. The dangers that these unprotected circuits could create should not be ignored. The following recent attic fires are what this PI will prevent.

https://roscoenews.com/g/rockton-il/n/127798/attic-fire-rockton-was-put-out-quickly

https://www.khon2.com/local-news/electrical-short-possible-cause-of-pahoa-attic-fire/

https://www.recordcourier.com/news/2022/may/13/firefighters-douse-main-street-attic-blaze/

While these fires caused damage with few injuries, that is not always the case as the NFPA Report indicates. In February of 2020, an attic fire in Clinton, MS took the lives of 7 people mostly children. The Mississippi fire marshal's reported that the house fire that killed seven people was accidental and it started with an electrical issue in the attic. The forensic report stated that the only ignition source in the attic was the electrical wiring. What caused the electrical wiring to ignite fire was undetermined as the wiring had been melted away. However, electrical wiring failure is usually caused by overloads or arcing faults. The overcurrent protective device would normally trip under and overload condition, so it is extremely likely the fault was an arcing type. Expanding the use of AFCI's as a fire reducing technology will help save lives.

The Commonwealth of Massachusetts has required AFCI protection on all circuits since their adoption of the 2020 NEC with this amendment on January 1, 2020. There has not been any reports of unwanted tripping or other issues related to the use of AFCI's across all 15-20A circuits. ESFI conducted a survey of electrical contractors during 2022 and found that there were no specified issues related to AFCI's causing tripping issues. The vast majority of tripping issues found were related to overloads/short circuits.

There are some who say unwanted tripping of appliances is a major issue, but when you calculate the number of homes and multi-family units built between 2014 and 2021 you find that over 60,000,000 appliances are loads on AFCI protected branch circuits. Based on data ACBMA has on unwanted tripping calls we have found .0078% of AFCI's shipped are reported as tripped. When investigations are conducted it is found that a lot of things cause these trips, wiring issues, installation issues, short circuit/overload trips, inoperable AFCI's, and the smallest percentage being interoperability issues.

AFCI's work to protect branch circuits from arcing faults that can create fires.

Related Item

• FR 8195

Submitter Information Verification

Submitter Full Name: Randy Dollar

Organization: Siemens Industry

Affiliation:	American Circuit Breaker Manufacturers Association (ACBMA)
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Aug 26 10:57:50 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7743-NFPA 70-2024
Statement:	Data concerning the number of electrical fires was provided in a presentation to CMP-2 (see meeting minutes) which demonstrated the need for AFCI protection in attics. Some circuits in the attics are not individual circuits are already protected by an AFCI.

Public Comment No. 1683-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

(15) Bathrooms

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Additional Proposed Changes

File Name	Description	Approved
Photo_1.docx	Photo 1	

Statement of Problem and Substantiation for Public Comment

CMP 2 accepted the addition of bathrooms when reorganizing 210.12 in FR 8195. However, with the failure of the FR, this PC is needed to bring bathrooms into 210.12 (B). A presentation was provided detailing the interoperability testing without any negative feedback from CMP2 members.

Electrical malfunction (Per NFPA, home fires due to electrical failure or malfunction primarily involve some form of arcing, which results from an unintentional discharge of electrical current between conductors.) caused bathroom fires at an annual average of 2300/yr. and 10 deaths along with 50 injuries per NFPA 2021 Home Electrical Fires Table 8. There have been significant AFCI testing done on bathroom cord/plug appliances as well as the major manufacturers of bathroom fans including humidity level testing in order to prevent unwanted tripping. This testing covers over 100,000 test cases, over 1,000 use cases, and over 300 appliance brands.

Example: See Photo 1

Here are some fires that started in bathrooms:

https://www.khq.com/news/bathroom-ceiling-fan-causing-electrical-fire-at-spokane-valley-home/article_4f2baa5e-add7-11eb-90b0-ff1f3e70dfea.html

https://www.theoaklandpress.com/news/two-fires-start-from-faulty-bathroom-exhaust-fans/article_35d3003c-ef71-11e9-aea7-63cc0011aca1.html

https://fox59.com/news/family-loses-everything-after-fire-started-by-bathroom-exhaust-fan/

The Commonwealth of Massachusetts has required AFCI protection on all circuits since their adoption of the 2020 NEC with this amendment on January 1, 2020. There has not been any reports of unwanted tripping or other issues related to the use of AFCI's across all 15-20A circuits. ESFI conducted a survey of electrical contractors during 2022 and found that there were no specified issues related to AFCI's causing tripping issues. A large majority of tripping issues found were related to overloads/short circuits.

There are some who say unwanted tripping of appliances is a major issue, but when you calculate the number of homes and multi-family units built between 2014 and 2021 you find that over 60,000,000 appliances are loads on AFCI protected branch circuits. Based on data ACBMA has on unwanted tripping calls we have found .0078% of AFCI's shipped are reported as tripped. When investigations are conducted it is found that a lot of things cause these trips, wiring issues, installation issues, short circuit/overload trips, inoperable AFCI's, and the smallest percentage actually being interoperability issues.

AFCI's work to protect branch circuits from arcing faults that can create fires.

CPSC data shows that many bathroom fires are ignited from the bathroom fan.

Additionally, concerns related to interoperability lead to additional testing of bathroom fans in a humidity chamber as presented to CMP-2 during the First Draft

Meeting. There testing covered 11 different fans from 6 different manufacturers utilizing Conditions of 120Vac, +32C (+90F), and Relative Humidity 20% - 93%. Three of the fans utilized ECMs in their design. Three different manufacturers of current dual function circuit breakers were used and none of the devices tripped. Similar tests were run on 5 Radon Fans without any tripping of the dual function circuit breakers.

Related Item

- FR 8195

Submitter Information Verification

Submitter Full Name:	Randy Dollar
Organization:	Siemens Industry
Affiliation:	American Circuit Breaker Manufacturers Association (ACBMA)
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Aug 26 11:05:32 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7738-NFPA 70-2024
Statement:	Technical substantiation has been provided to support the addition of bathroom lighting outlets to be included in the list of areas with AFCI protection. Bathrooms have been included for several cycles in dormitories. The circuits are the same as other lighting outlets in the dwelling.

Bathroom fans tested at cycling humidity and temp

No nuisance tripping registered

[redacted]

The test included fan samples with and without Humidity sensors.

Test setup is was done using 1P AFCI CB and 1P DF (AFCI/GFCI) CB.

Humidity was cycled 90/40 RH

Public Comment No. 1741-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

(15) Attics

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

CMP 2 accepted the addition of attics when reorganizing 210.12 in FR 8195. However, with the failure of the FR, this PC is needed to bring attics into 210.12 (B).

While Attic fires mostly caused damage with few injuries, that is not always the case as the NFPA Report listed below indicates. In February of 2020, an attic fire in Clinton, MS took the lives of 7 people mostly children. The Mississippi fire marshal's reported that the house fire that killed seven people was accidental and it started with an electrical issue in the attic. The forensic report stated that the only ignition source in the attic was the electrical wiring. While the damage didn't allow for determining why the wiring caused the fire, there are two options arcing or overload. The OCPD would most likely clear any overload leaving arcing as the most likely cause of the fire. Expanding this fire reducing technology will help save lives.

The Commonwealth of Massachusetts has required AFCI protection on all circuits since their adoption of the 2020 NEC w/ this amendment on January 1, 2020. There has not been any reports of unwanted tripping or other issues related to the use of AFCI's across all 15-20A circuits. ESFI conducted a survey of electrical contractors during 2022 and found that there were no specified issues related to AFCI's causing tripping issues. The vast majority of tripping issues found were related to overloads/short circuits.

Concerns related to interoperability lead to additional testing of attic fans in a humidity chamber. There testing covered 5 different fans from 5 different manufacturers utilizing Conditions of 120Vac, and +54C (+130F). Three different manufacturers of current dual function circuit breakers were used and none of the devices tripped. See ECM article "A Deep Dive into Interoperability Testing for Residential Fans with Advanced Function Circuit Breakers" detailing residential fan testing and the results. https://www.ecmweb.com/safety/article/55130752/a-deep-dive-into-interoperability-testing-for-residential-fans-with-advanced-function-circuit-breakers

Electrical malfunction (Per NFPA, home fires due to electrical failure or malfunction primarily involve some form of arcing, which results from an unintentional discharge of electrical current between conductors.) is a major contributor to fires starting in attics with an annual average of 4600/yr. with 10 deaths, 70 injuries, & $194M in damage per NFPA 2021 Home Electrical Fires Table 8. While some of these fires are caused by circuits running through the attic, the branch circuits feeding the attic are subject to the same damage and other causes of arcing. The dangers that these unprotected circuits could create should not be ignored.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1742-NFPA 70-2024 [Section No. 210.12(B)]	

Related Item

• FR-9195 • PI No. 3407

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:

State:

Zip:

Submittal Date:	Mon Aug 26 21:43:49 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7743-NFPA 70-2024
Statement:	Data concerning the number of electrical fires was provided in a presentation to CMP-2 (see meeting minutes) which demonstrated the need for AFCI protection in attics. Some circuits in the attics are not individual circuits are already protected by an AFCI.

Public Comment No. 1742-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

(15) <u>Bathrooms</u>

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Additional Proposed Changes

File Name	Description	Approved
Bathroom_Fan_June_2023.jpg	Bathroom Fan Testing Set up	

Statement of Problem and Substantiation for Public Comment

CMP 2 accepted the addition of bathrooms when reorganizing 210.12 in FR 8195. However, with the failure of the FR, this PC is needed to bring bathrooms into 210.12 (B). A presentation was provided detailing the interoperability testing without any negative feed back from CMP2 members during the first draft meeting.

The Commonwealth of Massachusetts has required AFCI protection on all circuits since their adoption of the 2020 NEC w/ this amendment on January 1, 2020. There has not been any reports of unwanted tripping or other issues related to the use of AFCI's feeding any 15-20A bathroom circuits. ESFI conducted a survey of electrical contractors during 2022 and found that there were no specified issues related to AFCI's causing tripping issues. The vast majority of tripping issues found were related to overloads/short circuits.

Concerns related to interoperability led to additional testing of bathroom fans in a humidity chamber as presented to CMP-2 during the First Draft Meeting. There testing covered 11 different fans from 6 different manufacturers utilizing Conditions of 120Vac, +32C (+90F), and Relative Humidity 20% - 93%. Three different manufacturers of current dual function circuit breakers were used and none of the devices tripped. Similar tests were run on 5 Radon Fans without any tripping of the dual function circuit breakers. See EC&M Article "A Deep Dive into Interoperability Testing for Residential Fans with Advanced Function Circuit Breakers" for more details on the testing. https://www.ecmweb.com/safety/article/55130752/a-deep-dive-into-interoperability-testing-for-residential-fans-with-advanced-function-circuit-breakers

Electrical malfunction (Per NFPA, home fires due to electrical failure or malfunction primarily involve some form of arcing, which results from an unintentional discharge of electrical current between conductors.) caused bathroom fires at an annual average of 2300/yr. and 10 deaths, 50 injuries, & $48M per NFPA 2021 Home Electrical Fires Table 8. A reduction of these fires, deaths, injuries, and financial impact is the focus of this public input. Per Ciba insurance services, The three most common causes of bathroom exhaust fan fires are faulty wiring, running it for extended periods of time, and failing to clean and maintain the fan. Accumulated dust, lint, and debris in exhaust fans can lead to overheating and pose a serious fire risk. There have been significant AFCI testing done on bathroom cord/plug appliances as well as the major manufacturers of bathroom fans including humidity level testing in order to prevent unwanted tripping. This testing covers over 100,000 test cases, over 1,000 use cases, and over 300 appliance brands.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1741-NFPA 70-2024 [Section No. 210.12(B)]	

Related Item

• FR 8195 • PI 3408 • P I3380

Submitter Information Verification

Submitter Full Name: Keith Waters

Organization: Schneider Electric

Street Address:

City:
State:
Zip:
Submittal Date: Mon Aug 26 21:54:28 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7738-NFPA 70-2024

Statement: Technical substantiation has been provided to support the addition of bathroom lighting outlets to be included in the list of areas with AFCI protection. Bathrooms have been included for several cycles in dormitories. The circuits are the same as other lighting outlets in the dwelling.

Public Comment No. 1913-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Exception No. 3: AFCI protection shall not be required for listed HVAC equipment.

Statement of Problem and Substantiation for Public Comment

The First Draft panel meeting resulted in multiple changes to 210.12(B). Some changes added areas of the home where AFCIs would be required, and some removed areas. It would help to get a clearer picture of where the Panel stands if each change were balloted separately. This PC is an attempt to ballot one item from the failed FR.
HVAC equipment can be located in areas where AFCIs are required, such as closets. And there is a concern about the compatibility between AFCI devices and HVAC equipment.

Related Item

- CI 8195

Submitter Information Verification

Submitter Full Name: Daniel Buuck

Organization: National Association of Home Builders

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 28 08:34:08 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7658-NFPA 70-2024

Statement: HVAC equipment can be located in areas where AFCIs are required, such as closets. And there is a concern about the compatibility between AFCI devices and HVAC equipment.

Public Comment No. 467-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A).

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Additional Proposed Changes

File Name	Description	Approved
CN_114.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 114 appeared in the First Draft Report on First Revision No. 8197.

The Correlating Committee directs CMP-2 to revise the phrase in Exception No.1 “meeting the applicable requirements of” with “in accordance with” to comply with the NEC Style Manual 4.1.3.

The Correlating Committee also directs CMP-2 to revise Exception 2 to remove the word “its” in two places.

Related Item

• First Revision No. 8197

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:13:59 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7752-NFPA 70-2024
Statement: The language is revised to comply with NEC Style Manual 4.1.3. The redundant “its” were removed as directed by the Correlating Committee.

Correlating Committee Note No. 114-NFPA 70-2024 [Section No. 210.12(B)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 14:25:42 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to revise the phrase in Exception No.1 “meeting the applicable requirements of” with “in accordance with” to comply with the NEC Style Manual 4.1.3.

The Correlating Committee also directs CMP-2 to revise Exception 2 to remove the word “its” in two places.

First Revision No. 8197-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. 730-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, nominal, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or ~~devices installed in the following locations shall~~ devices shall be protected by any of the means described in 210.12(A).

- ~~Kitchens~~
- ~~Family rooms~~
- ~~Dining rooms~~
- ~~Living rooms~~
- ~~Parlors~~
- ~~Libraries~~
- ~~Dens~~
- ~~Bedrooms~~
- ~~Sunrooms~~
- ~~Recreation rooms~~
- ~~Closets~~
- ~~Hallways~~
- ~~Laundry areas~~
- ~~Similar areas~~

Exception No. 1: AFCI protection shall not be required in garages, detached buildings or outdoors.

Exception No. 2: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. ~~2~~ 3 : AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2025, *National Fire Alarm and Signaling Code*, 29.9.4(5) for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Statement of Problem and Substantiation for Public Comment

This revised language was essentially agreed upon by the code panel to include AFCI protection of all areas of a dwelling unit except garages, detached buildings and outdoors however Exception No. 1 was amended to remove AFCI protection for the Kitchen and Laundry areas of the dwelling which have been in the code for several cycles. This revised language will simplify the requirements for AFCI protection within the dwelling unit without a long ever growing list of rooms and areas. Lets stop the area name game, is this a master "bedroom" or "owner suite" which is not on the list.

Related Item

• PI 1438 • CI 8195

Submitter Information Verification

Submitter Full Name: David Johnson
Organization: CenTex IEC
Affiliation: Independent Electrical Contractors
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 04 12:36:02 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: CMP2 seeks to maintain a list of areas where AFCIs are required. The existing language has been in place for multiple code cycles.

Public Comment No. 1182-NFPA 70-2024 [Section No. 210.13]

210.13 Ground-Fault Protection of Equipment.

Each branch-circuit disconnecting means 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 ground-fault protection of equipment in accordance with 230.95.

Informational Note: See 517.17 for requirements on 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 ground-fault protection of equipment is provided on the supply side of the branch circuit and on the load side of any transformer supplying the branch circuit.

~~*Exception No. 3: For fused disconnects, 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 percent of the available fault current , or if the disconnect switch complies with 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 percent of the available fault current.*~~

~~*Exception No. 4: For circuit breakers, 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 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 percent of the available fault current.*~~

Statement of Problem and Substantiation for Public Comment

Exceptions No. 3 and 4, added by FR 7565, were in reference to PI 1633. The CMP 2 statement for FR 7565 is “This FR revision correlates with changes to 215.10(PI#1641) and 230.95(PI#1645)…”. However, CMP10 did not accept these changes to 215.10 and 230.95 and instead resolved PI’s 1641 & 1645. The CMP10 Resolve statement is as follows: “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. 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. 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.”

Based on the resolve action taken by CMP 10, and to achieve correlation, this PC proposes to delete Exception No.3 and 4.

Related Item

- FR-7565

Submitter Information Verification

Submitter Full Name: Steve Chutka
Organization: Siemens
Affiliation: Siemens
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 16 14:32:03 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7666-NFPA 70-2024

Statement: The public inputs proposing the addition of these two exceptions were rejected by CMP-10. Deleting these exceptions will prevent correlation issues.

Public Comment No. 1894-NFPA 70-2024 [Section No. 210.13]

210.13 Ground-Fault Protection of Equipment.

(A) Each branch-circuit disconnecting means 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 ground-fault protection of equipment in accordance with 230.95.

(B) Each branch-circuit disconnecting means 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 line-to-line, shall be provided with ground-fault protection of equipment in accordance with 230.95.

Informational Note: See 517.17 for requirements on 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 ground-fault protection of equipment is provided on the supply side of the branch circuit and on the load side of any transformer supplying the branch circuit.

Exception No. 3: For fused disconnects, 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 percent of the available fault current , or if the disconnect switch complies with 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 percent of the available fault current.

Exception No. 4: For circuit breakers, 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 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 percent of the available fault current.

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.

DC residential and commercial installations are emerging in the electrical infrastructure and are expected to be a growing alternative to the traditional AC only utility fed building. Examples include the US DOE Grid-interactive Efficient Buildings project1, the Purdue University RENEWW house2, and a DC Microgrid community in Vermont3. These installations may involve buildings that are distributed entirely with DC, or with an AC/DC hybrid distribution.

The requirements of Section 210.13 address ground-faults on equipment which could propagate into a larger arcing fault, potentially causing significant loss of property and life. However, the requirements of Section 210.13 are currently limited to solidly grounded wye AC circuits only. The hazards addressed by this type of protection also exist in grounded DC circuits, and a resulting arcing fault may be more severe due to a lack of zero cross-over in DC waveforms. As there is continued expansion of DC throughout the infrastructure it is necessary to ensure that the same level of protection is provided.

This proposal aligns 210.13 with the first draft action CMP10 took on 215.10, 230.95 and 240.13, and closes a gap in the Code for DC circuits where similar hazards exist but ground-fault protection of equipment may not be provided.

Note 1 - https://www.energy.gov/sites/default/files/2020/09/f79/bto-geb-project-summary-093020.pdf
Note 2 - https://engineering.purdue.edu/ME/News/2022/purdue-house-runs-entirely-on-dc-power
Note 3 - https://www.efficiencyvermont.com/Media/Default/docs/white-papers/Energy_Resilience.pdf

Related Item

• Public Input No. 4287-NFPA 70-2023 • First Revision No. 9007-NFPA 70-2024 • First Revision No. 9176-NFPA 70-2024

Submitter Information Verification

Submitter Full Name: Danish Zia
Organization: UL Solutions
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 27 21:31:21 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7671-NFPA 70-2024

Statement: This proposal aligns 210.13 with the first draft action that CMP10 took on 215.10, 230.95 and 240.13, and closes a gap in the Code for DC circuits where similar hazards exist but ground-fault protection of equipment may not be provided.

Public Comment No. 459-NFPA 70-2024 [Section No. 210.13]

210.13 Ground-Fault Protection of Equipment.

Each branch-circuit disconnecting means 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 ground-fault protection of equipment in accordance with 230.95.

Informational Note: See 517.17 for requirements on 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 ground-fault protection of equipment is provided on the supply side of the branch circuit and on the load side of any transformer supplying the branch circuit.

Exception No. 3: For fused disconnects, 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 percent of the available fault current , or if the disconnect switch complies with 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 percent of the available fault current.

Exception No. 4: For circuit breakers, 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 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 percent of the available fault current.

Additional Proposed Changes

File Name	Description	Approved
CN_107.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 107 appeared in the First Draft Report on First Revision No. 7565.

The Correlating Committee directs CMP 2 to consider the comments expressed in the negative votes and also the actions taken by CMP 10 on PIs 1641 and 1645 for similar requirements in 215.10 and 230.95.

Related Item

- First Revision No. 7565

Submitter Information Verification

Submitter Full Name: CC Notes

Organization: NEC Correlating Committee

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jul 30 18:53:33 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7666-NFPA 70-2024

Statement: The public inputs proposing the addition of these two exceptions were rejected by CMP-10. Deleting these exceptions will prevent correlation issues.

Correlating Committee Note No. 107-NFPA 70-2024 [Section No. 210.13]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 13:45:07 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to consider the comments expressed in the negative votes and also the actions taken by CMP 10 on PIs 1641 and 1645 for similar requirements in 215.10 and 230.95.

First Revision No. 7565-NFPA 70-2024 [Section No. 210.13]

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. 468-NFPA 70-2024 [Section No. 210.14]

210.14 Other Articles for Specific-Purpose Branch Circuits.

Table 210.14 lists references for specific equipment and applications not located in Chapters 5, 6, and 7 that amend or supplement the requirements of this article.

Table 210.14 Specific-Purpose Branch Circuits

Equipment	Article	Section
Air-conditioning and refrigerating equipment		440.6, 440.31, and 440.32
Busways		368.17
Central heating equipment other than fixed electric space-heating equipment		422.12
Fixed electric heating equipment for pipelines and vessels		427.4
Fixed electric space-heating equipment		424.4
Fixed outdoor electrical deicing and snow-melting equipment		426.4
Infrared lamp industrial heating equipment		422.48 and 424.4
Motors, motor circuits, and controllers	430	Parts III and IV
Switchboards and panelboards		408.52

Additional Proposed Changes

File Name	Description	Approved
CN_115.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 115 appeared in the First Draft Report on First Revision No. 7520.

The Correlating Committee directs CMP-2 to consider the title of the section to comply with the NEC Style Manual 4.1.5, "Other Requirements" instead of "other articles".

Related Item

• First Revision No. 7520

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:16:42 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7672-NFPA 70-2024
Statement: The language is revised to comply with NEC Style Manual 4.1.5.

Editorial correction made by NFPA staff to provide mandatory text in accordance with Section 2.1.7.2 of the NEC Style Manual.

Correlating Committee Note No. 115-NFPA 70-2024 [Section No. 210.14]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 14:27:41 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to consider the title of the section to comply with the NEC Style Manual 4.1.5, “Other Requirements” instead of “other articles”.

First Revision No. 7520-NFPA 70-2024 [Section No. 210.3]

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. 469-NFPA 70-2024 [Section No. 210.17]

210.17 Guest Rooms and Guest Suites.

Guest rooms and guest suites in the following occupancies that are provided with permanent provisions for cooking shall have branch circuits installed to meet the rules for dwelling units:

(1) Hotels

(2) Motels

(3) Assisted living facilities

(4) Dormitories

Informational Note No. 1: See 210.11(C)(2) and 210.52(F) Exception No. 2 for information on laundry branch circuits and receptacle outlets.

Informational Note No. 2: See NFPA 101-2024, *Life Safety Code*, 3.3.205.12 and A.3.3.205.12(5) for the definition of *assisted living facilities*.

Additional Proposed Changes

File Name	Description	Approved
CN_116.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 116 appeared in the First Draft Report on First Revision No. 7568.

The Correlating Committee directs CMP 2 to consider revising the word “rules” to “requirements” in the first sentence for consistency of terminology.

Related Item

• First Revision No. 7568

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:18:24 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7673-NFPA 70-2024
Statement: The language is revised to comply with NEC Style Manual 3.5.1.4.

Correlating Committee Note No. 116-NFPA 70-2024 [Section No. 210.17]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Wed May 08 14:28:47 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to consider revising the word “rules” to “requirements” in the first sentence for consistency of terminology.

First Revision No. 7568-NFPA 70-2024 [Section No. 210.17]

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. 144-NFPA 70-2024 [Section No. 210.19(A)]

(A) General.

Branch-circuit conductors shall have an ampacity not less than the larger of the following and comply with 110.14(C) for equipment terminations:

(1) Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum branch-circuit 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 in accordance with 310.14.

Exception to (1): If the assembly, including the branch-circuit OCPDs, is listed for operation at 100 percent of its rating, the ampacity of the branch-circuit conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load in accordance with 110.14(C).

(2) The minimum branch-circuit 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 310.15.

Exception to (1) and (2): Where a portion of a branch circuit is connected at both its supply and load ends to separately installed pressure connections as covered in 110.14(C)(2), an allowable ampacity in accordance with 310.15 not less than the sum of the continuous load plus the noncontinuous load shall be permitted. No portion of a branch circuit installed under this exception shall extend into an enclosure containing either the branch-circuit supply or the branch-circuit load terminations.

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 as determined by section 310.15" 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), noting that the phrase "in accordance with 310.14" could implicitly mean "and not in accordance with 310.15," 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. 146-NFPA 70-2024 [Section No. 215.4(A)]	Identical change for feeders
Public Comment No. 150-NFPA 70-2024 [Section No. 230.42(A)]	Identical change for service entrance conductors
Public Comment No. 146-NFPA 70-2024 [Section No. 215.4(A)]	
Public Comment No. 150-NFPA 70-2024 [Section No. 230.42(A)]	

Related Item

• Public Input No. 471-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Wayne Whitney
Organization: Whitney
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 22 11:49:21 EDT 2024
Committee: NEC-P02

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. 1957-NFPA 70-2024 [Section No. 210.19(A)]

(A) General.

Branch-circuit conductors shall have an ampacity not less than the larger of the following and comply with 110.14(C) for equipment terminations:

(1) Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum branch-circuit conductor size shall have an ampacity not less than the noncontinuous load plus 125 percent of the continuous load in accordance with 310.14.

~~Exception to~~ Exception No. 1 to (1): If the assembly, including the branch-circuit OCPDs, is listed for operation at 100 percent of its rating, the ampacity of the branch-circuit conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load in accordance with 110.14(C).

Exception No. 2 to (1):

Where Exception No. 1 does not apply and a Power Control System is used to prevent overloading of branch-circuit conductors supplying both continuous and noncontinuous loads per Section 120.7, the minimum branch-circuit 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 branch-circuit conductors supplying only noncontinuous loads per Section 120.7, the minimum branch-circuit conductor size shall have an ampacity not less than 100 percent of the PCS current setpoint.

(2) The minimum branch-circuit 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 310.15.

Exception to (1) and (2): Where a portion of a branch circuit is connected at both its supply and load ends to separately installed pressure connections as covered in 110.14(C)(2), an allowable ampacity in accordance with 310.15 not less than the sum of the continuous load plus the noncontinuous load shall be permitted. No portion of a branch circuit installed under this exception shall extend into an enclosure containing either the branch-circuit supply or the branch-circuit load terminations.

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)]	linked concept
Public Comment No. 1961-NFPA 70-2024 [Section No. 215.4(A)(1)]	linked concept
Public Comment No. 1970-NFPA 70-2024 [Section No. 230.42(A)(1)]	linked concept
Public Comment No. 1950-NFPA 70-2024 [Section No. 120.7(B)]	
Public Comment No. 1961-NFPA 70-2024 [Section No. 215.4(A)(1)]	
Public Comment No. 1970-NFPA 70-2024 [Section No. 230.42(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 12:49:00 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The calculations for the continuous load already take into account the use of a PCS in Articles 120 and 130. Therefore it is unnecessary to provide a new Exception.

Public Comment No. 470-NFPA 70-2024 [Section No. 210.20(C)]

(C) Equipment.

The rating or setting of the branch-circuit OCPD shall not exceed that specified in the applicable articles for equipment.

Additional Proposed Changes

File Name	Description	Approved
CN_117.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 117 appeared in the First Draft Report on First Revision No. 8024.

The Correlating Committee directs CMP-2 to reconsider 210.20(C) because the previous section and Table 240.3 were deleted by CMP-10.

Related Item

• First Revision No. 8024

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:20:12 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: The panel has reviewed the languages and affirms that the reference to Table 240.3 was deleted at first draft.

Correlating Committee Note No. 117-NFPA 70-2024 [Section No. 210.20(C)]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 14:30:32 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to reconsider 210.20(C) because the previous section and Table 240.3 were deleted by CMP-10.

First Revision No. 8024-NFPA 70-2024 [Section No. 210.20 [Excluding any Sub-Sections]]

Ballot Results

✔ **This item has passed ballot**

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

Not Returned

McDaniel, Roger D.

Affirmative All

Ayer, Lawrence S.

Hickman, Palmer L.

Holub, Richard A.

Jackson, Peter D.

Kendall, David H.

Manche, Alan

Porter, Christine T.

Schultheis, Timothy James

Williams, David A.

Negative with Comment

Bowmer, Trevor N.

The correction has already been made in Terra. The reference to Table 240.3 has already been removed.

Osborne, Robert D.

It appears that the reference to Table 240.3 has already been removed; therefore, the CC Note is unnecessary.

Public Comment No. 134-NFPA 70-2024 [Section No. 210.21(B)(1)]

(1) Single Receptacle on an Individual Branch Circuit.

A single receptacle installed on an individual branch circuit shall have an ampere rating ~~not less than~~ equal to that of the branch circuit.

Exception No. 1: A receptacle installed in accordance with 430.81(B).

Exception No. 2: A receptacle installed exclusively for the use of a cord-and-plug-connected arc welder shall be permitted to have an ampere rating not less than the minimum branch-circuit conductor ampacity determined by 630.11(A) for arc welders.

Informational Note: See Article 100 for the definition of *receptacle*.

Statement of Problem and Substantiation for Public Comment

There is belief that higher ampacity rated receptacles equate to a safer or more "industrial" version. The current code language permits larger receptacles than the branch circuit over protection device. For instance, you can install a 14-50 receptacle on a 20-amp branch circuit with 12 AWG wiring. The 14-50R creates the apperance of a 50-amp circuit and leads to the end user thinking it is safe to connect a load that takes a 14-50P cord to the receptacle.

On a single receptacle circuit, this is simply unnecessary and creates a safety issue of repeately overloading the wiring or worse (overcurrent protection device fails to trip or the end user swaps out the breaker for a larger size one - thinking they have a larger circuit).

The code should match the receptacle rating to that of the branch circuit so that the receptacle itself is physically incapable of accepting a plug larger than the rating of the circuit.

Related Item

- Safety

Submitter Information Verification

Submitter Full Name:	James Kerins
Organization:	James Kerins
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Sun Jul 21 19:33:37 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but held
Resolution:	This is new material. While not mentioned in the public comment, CMP-2 has concerns over EV charging and considerations to revisions to this section may be warranted next cycle to address safety issues.

Public Comment No. 2026-NFPA 70-2024 [Section No. 210.21(B)(3)]

(3) Receptacle Ratings.

Where connected to a branch circuit supplying two or more receptacles or outlets, receptacle ratings shall ~~not be less than~~ conform to the values listed in Table 210.21(B)(3), or, where rated higher than 50 amperes, the receptacle rating shall not be less than the branch-circuit rating.

Exception No. 1: Receptacles installed exclusively for the use of cord-and-plug-connected arc welders shall be permitted to have ampere ratings not less than the minimum branch-circuit conductor ampacity determined by 630.11(A) or 630.11(B) for arc welders.

Exception No. 2: The ampere rating of a receptacle installed for electric discharge lighting shall be permitted to be based on 410.62(C).

Table 210.21(B)(3) Receptacle Ratings for Circuits Serving More Than One Receptacle or Receptacle Outlet

Circuit Rating (Amperes)	Receptacle Rating (Amperes)
15	15
20	15 or 20
30	30
40	40 or 50
50	50

Statement of Problem and Substantiation for Public Comment

This section was revised in the 2023 edition. It now allows the possibility of installing 20-amp rated receptacles on 15-amp circuits. The purpose of the configuration of 20-amp receptacles is to restrict their use to circuits capable of supplying the load that necessitated the use of a 20-amp attachment plug, such as some portable air conditioners.

Related Item

- PI 2459

Submitter Information Verification

Submitter Full Name: Douglas Hansen
Organization: Code Check
Affiliation: Self
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 16:11:54 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Insufficient substantiation was provided to required receptacle ratings to conform to Table 210.21(B)(3). The branch circuit should be protected by the proper sized OCPD.

Public Comment No. 184-NFPA 70-2024 [Section No. 210.22]

210.22 Permissible Loads, Individual Branch Circuits.

An individual branch circuit shall be permitted to supply any load for which it is rated, but in no case shall the load exceed the branch-circuit ampere rating.

Exception: A 10-ampere individual branch circuit shall not be permitted to supply a <u>*125-Volt through 250-Volt*</u> *receptacle outlet* <u>*rated 15-Ampere and larger*</u> *.*

Statement of Problem and Substantiation for Public Comment

This change recognizes that there are some receptacles that could be applied on a 10-Ampere rated branch circuit but yet are prohibited by the existing language. A wiring device that is limited to only supply class 2 power through a USB type interface is a "receptacle." This suggested language change will ensure the prohibition only applies to those types of receptacles that CMP-2 discussed. The concern that was expressed by the CMP was placing a 15-Ampere or 20-Ampere 125-Volt receptacle on a 10-Ampere circuit leading to overload and finally tripping of the overcurrent protective device at the origin of the branch circuit. This proposed language would not impact the concern yet permit a valid technology to be applied.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 232-NFPA 70-2024 [Section No. 210.24]	

Related Item

- FR 7635

Submitter Information Verification

Submitter Full Name:	Thomas Domitrovich
Organization:	Eaton Corporation
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jul 23 15:12:52 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	Although the proposal has merits, the proposed language can have unintended consequences. 10-amp branch circuits are only allowed to supply lighting outlets and exhaust fans.

Public Comment No. 471-NFPA 70-2024 [Section No. 210.22]

210.22 Permissible Loads, Individual Branch Circuits.

An individual branch circuit shall be permitted to supply any load for which it is rated, but in no case shall the load exceed the branch-circuit ampere rating.

Exception: A 10-ampere individual branch circuit shall not be permitted to supply a receptacle outlet.

Additional Proposed Changes

File Name	Description	Approved
CN_118.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 118 appeared in the First Draft Report on First Revision No. 7635.

The Correlating Committee directs CMP 2 to consider the following revision for clarity: "An individual branch circuit shall be permitted to supply any load for which itis rated".

The Correlating Committee also directs CMP 2 to reconsider the wording in the exception to be concise and to comply with the NEC Style Manual 3.5.3 for the use of plural terms.

Related Item

- First Revision No. 7635

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:22:16 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7677-NFPA 70-2024
Statement: The sentence "but in no case shall the load exceed the branch circuit ampere rating" was deleted for clarity. The exception was revised to comply with the NEC Style Manual 3.5.3 for the use of plural terms.

Correlating Committee Note No. 118-NFPA 70-2024 [Section No. 210.22]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Wed May 08 14:32:08 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to consider the following revision for clarity: “An individual branch circuit shall be permitted to supply any load for which it is rated”.

The Correlating Committee also directs CMP 2 to reconsider the wording in the exception to be concise and to comply with the NEC Style Manual 3.5.3 for the use of plural terms.

First Revision No. 7635-NFPA 70-2024 [Section No. 210.22]

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. 472-NFPA 70-2024 [Section No. 210.23]

210.23 Permissible Loads, Multiple-Outlet Branch Circuits.

In no case shall the load exceed the branch-circuit ampere rating. A branch circuit supplying two or more outlets or receptacles shall supply only the loads specified according to its size in accordance with 210.23(A) through 210.23(E) and as summarized in 210.24.

(A) 10-Ampere Branch Circuits.

10-ampere branch circuits shall be limited to supply any of the following:

(1) Lighting outlets

(2) Dwelling unit exhaust fans on bathroom and laundry room lighting circuits

(B) 15- and 20-Ampere Branch Circuits.

A 15- or 20-ampere branch circuit shall be permitted to supply lighting outlets, lighting units, or other utilization equipment, or any combination of them, and shall comply with 210.23(B)(1) and 210.23(B)(2).

Exception: The small-appliance branch circuits, laundry branch circuits, and bathroom branch circuits required in a dwelling unit(s) by 210.11(C)(1), 210.11(C)(2), and 210.11(C)(3) shall supply only the receptacle outlets specified in that section.

(1) Cord-and-Plug-Connected Equipment Not Fastened in Place.

The rating of any one cord-and-plug-connected utilization equipment not fastened in place shall not exceed 80 percent of the branch-circuit ampere rating.

(2) Utilization Equipment Fastened in Place.

The total rating of utilization equipment fastened in place, other than luminaires, shall not exceed 50 percent of the branch-circuit ampere rating where lighting units, cord-and-plug-connected utilization equipment not fastened in place, or both, are also supplied.

(C) 30-Ampere Branch Circuits.

A 30-ampere branch circuit shall be permitted to supply fixed lighting units with heavy-duty lampholders in other than a dwelling unit(s) or utilization equipment in any occupancy. The rating of any one cord-and-plug-connected utilization equipment shall not exceed 80 percent of the branch-circuit ampere rating.

(D) 40- and 50-Ampere Branch Circuits.

A 40- or 50-ampere branch circuit shall be permitted to supply cooking appliances that are fastened in place in any occupancy. In other than dwelling units, such circuits shall be permitted to supply fixed lighting units with heavy-duty lampholders, infrared heating units, or other utilization equipment.

(E) Branch Circuits Larger Than 50 Amperes.

Branch circuits larger than 50 amperes shall supply only nonlighting outlet loads.

Additional Proposed Changes

File Name	Description	Approved
CN_119.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 119 appeared in the First Draft Report on First Revision No. 7637.

The Correlating Committee directs CMP-2 to reconsider the wording of “In no case shall” and consider the following text: “Branch circuit loads shall not exceed the branch-circuit ampere rating.”

Related Item

• First Revision No. 7637

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 30 19:24:17 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7678-NFPA 70-2024
Statement: The language was revised for clarity and to align the language with other code sections.

Correlating Committee Note No. 119-NFPA 70-2024 [Section No. 210.23]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Wed May 08 14:34:06 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to reconsider the wording of “In no case shall” and consider the following text: “Branch circuit loads shall not exceed the branch-circuit ampere rating.”

FR-7637-NFPA 70-2024

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. 185-NFPA 70-2024 [Section No. 210.23(A)]

(A) 10-Ampere Branch Circuits.

10-ampere branch circuits shall be limited to supply any of the following:

(1) Lighting outlets

(2) Dwelling unit exhaust fans on bathroom and laundry room lighting circuits

(3) Receptacles that exclusively supply Class-2 power

Statement of Problem and Substantiation for Public Comment

This change recognizes that there are some receptacles that could be applied on a 10-Ampere rated branch circuit but yet are prohibited by the existing language. A wiring device that is limited to only supply class 2 power through a USB type interface is a "receptacle." This suggested language change will ensure the prohibition only applies to those types of receptacles that CMP-2 discussed. The concern that was expressed by the CMP was placing a 15-Ampere or 20-Ampere 125-Volt receptacle on a 10-Ampere circuit leading to overload and finally tripping of the overcurrent protective device at the origin of the branch circuit. This proposed language would not impact the concern yet permit a valid technology to be applied.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 232-NFPA 70-2024 [Section No. 210.24]	

Related Item

- FR 7637

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 23 15:15:05 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Although the proposal has merits, the proposed language can have unintended consequences. 10-amp branch circuits are only allowed to supply lighting outlets and exhaust fans.

Public Comment No. 232-NFPA 70-2024 [Section No. 210.24]

210.24 Branch-Circuit Requirements — Summary.

The requirements for circuits that have two or more outlets or receptacles, other than the receptacle circuits of 210.11(C)(1), 210.11(C)(2), and 210.11(C)(3), are summarized in Table 210.24(1) for copper conductors and Table 210.24(2) for aluminum and copper-clad aluminum conductors. Table 210.24(1) and Table 210.24(2) provide only a summary of minimum requirements. See 210.19, 210.20, and 210.21 for the specific requirements applying to branch circuits.

Table 210.24(1) Summary of Branch-Circuit Requirements — Copper Conductors

Circuit Rating	10 A	15 A	20 A	30 A	40 A	50 A
Conductors (min. size):	-	-	-	-	-	-
Circuit wires	14	14	12	10	8	6
Taps	14	14	14	14	12	12
Fixture wires and cords			See 240.5.	-	-	-
Overcurrent Protection	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**
Outlet devices:	-	-	-	-	-	-
Lampholders permitted	Any type	Any type	Any type	Heavy duty	Heavy duty	Heavy duty
Receptacle rating[1]	Not applicable[2]	15 max. A	15 A or 20 A	30 A	40 A or 50 A	50 A
Maximum Load	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**
Permissible load	See 210.23(A).	See 210.23(B).	See 210.23(B).	See 210.23(C).	See 210.23(D).	See 210.23(D).

[1]For receptacle rating of cord-connected electric-discharge luminaires, see 410.62(C).

[2]Branch circuits rated 10-amperes shall not supply 125-Volt through 250-Volt receptacle outlets rated 15-Amperes and larger .

Table 210.24(2) Summary of Branch-Circuit Requirements — Aluminum and Copper-Clad Aluminum Conductors

Circuit Rating	10 A	15 A	20 A	30 A	40 A	50 A	
Conductors (min. size):	-	-	-	-	-	-	
Circuit wires	12	12	10	8	6	4	
Taps	12	12	12	12	10	10	
Fixture wires and cords	-	-	-				See 240.5. - -
Overcurrent Protection	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**	
Outlet devices:	-	-	-	-	-	-	
Lampholders permitted	Any type	Any type	Any type	Heavy duty	Heavy duty	Heavy duty	
Receptacle rating[1]	Not applicable[2]	15 max. A	15 A or 20 A	30 A	40 A or 50 A	50 A	
Maximum Load	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**	
Permissible load	See 210.23(A).	See 210.23(B).	See 210.23(B).	See 210.23(C).	See 210.23(D).	See 210.23(D).	

[1]For receptacle rating of cord-connected electric-discharge luminaires, see 410.62(C).

[2]Branch circuits rated 10-amperes shall not supply 125-Volt through 250-Volt receptacle outlets rated 15-Amperes and larger .

Statement of Problem and Substantiation for Public Comment

This change recognizes that there are some receptacles that could be applied on a 10-Ampere rated branch circuit but yet are prohibited by the existing language. A wiring device that is limited to only supply class 2 power through a USB type interface is a "receptacle." This suggested language change will ensure the prohibition only applies to those types of receptacles that CMP-2 discussed. The concern that was expressed by the CMP was placing a 15-Ampere or 20-Ampere 125-Volt receptacle on a 10-Ampere circuit leading to overload and finally tripping of the overcurrent protective device at the origin of the branch circuit. This proposed language would not impact the concern yet permit a valid technology to be applied.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 184-NFPA 70-2024 [Section No. 210.22]	
Public Comment No. 185-NFPA 70-2024 [Section No. 210.23(A)]	
Public Comment No. 135-NFPA 70-2024 [Section No. 210.52(A)(2)]	

Related Item

- FR 8192

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 24 14:12:20 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	Although the proposal has merits, the proposed language can have unintended consequences. 10-amp branch circuits are only allowed to supply lighting outlets and exhaust fans.

Public Comment No. 473-NFPA 70-2024 [Section No. 210.24]

210.24 Branch-Circuit Requirements — Summary.

The requirements for circuits that have two or more outlets or receptacles, other than the receptacle circuits of 210.11(C)(1), 210.11(C)(2), and 210.11(C)(3), are summarized in Table 210.24(1) for copper conductors and Table 210.24(2) for aluminum and copper-clad aluminum conductors. Table 210.24(1) and Table 210.24(2) provide only a summary of minimum requirements. See 210.19, 210.20, and 210.21 for the specific requirements applying to branch circuits.

Table 210.24(1) Summary of Branch-Circuit Requirements — Copper Conductors

Circuit Rating	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**
Conductors (min. size):						
Circuit wires	14	14	12	10	8	6
Taps	14	14	14	14	12	12
Fixture wires and cords			See 240.5.			
Overcurrent Protection	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**
Outlet devices:						
Lampholders permitted	Any type	Any type	Any type	Heavy duty	Heavy duty	Heavy duty
Receptacle rating[1]	Not applicable[2]	15 max. A	15 A or 20 A	30 A	40 A or 50 A	50 A
Maximum Load	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**
Permissible load	See 210.23(A).	See 210.23(B).	See 210.23(B).	See 210.23(C).	See 210.23(D).	See 210.23(D).

[1]For receptacle rating of cord-connected electric-discharge luminaires, see 410.62(C).

[2]Branch circuits rated 10-amperes shall not supply receptacle outlets.

Table 210.24(2) Summary of Branch-Circuit Requirements — Aluminum and Copper-Clad Aluminum Conductors

Circuit Rating	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**
Conductors (min. size):						
Circuit wires	12	12	10	8	6	4
Taps	12	12	12	12	10	10
Fixture wires and cords				See 240.5.		
Overcurrent Protection	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**
Outlet devices:						
Lampholders permitted	Any type	Any type	Any type	Heavy duty	Heavy duty	Heavy duty
Receptacle rating[1]	Not applicable[2]	15 max. A	15 A or 20 A	30 A	40 A or 50 A	50 A
Maximum Load	**10 A**	**15 A**	**20 A**	**30 A**	**40 A**	**50 A**
Permissible load	See 210.23(A).	See 210.23(B).	See 210.23(B).	See 210.23(C).	See 210.23(D).	See 210.23(D).

[1]For receptacle rating of cord-connected electric-discharge luminaires, see 410.62(C).

[2]Branch circuits rated 10-amperes shall not supply receptacle outlets.

Additional Proposed Changes

File Name	Description	Approved
CN_120.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 120 appeared in the First Draft Report on First Revision No. 8257.

The Correlating Committee directs CMP 2 to correlate the minimum wire size for 10 ampere branch circuits in Tables 210.24(1) and (2) based on the CMP 6 revisions to Table 310.16.

Related Item

- First Revision No. 8257

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 30 19:25:53 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7682-NFPA 70-2024
Statement: The language was revised to correlate with the CMP-6 revisions to Table 310.16

Correlating Committee Note No. 120-NFPA 70-2024 [Section No. 210.24]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 14:38:25 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to correlate the minimum wire size for 10 ampere branch circuits in Tables 210.24(1) and (2) based on the CMP 6 revisions to Table 310.16.

First Revision No. 8257-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. 474-NFPA 70-2024 [Section No. 210.50]

210.50 Receptacle Outlets.

Receptacle outlets shall be installed as specified in 210.52 through 210.65.

Informational Note: See Informative Annex J for information regarding ADA accessibility design.

(A) Cord Pendants.

A cord connector that is supplied by a permanently connected cord pendant shall be considered a receptacle outlet.

(B) Cord Connections.

A receptacle outlet shall be installed wherever flexible cords with attachment plugs are used. Where flexible cords are permitted to be permanently connected, receptacles shall be permitted to be omitted for such cords.

(C) Appliance Receptacle Outlets.

Appliance receptacle outlets installed in a dwelling unit for specific appliances, such as laundry equipment, shall be installed within 1.8 m (6 ft) of the intended location of the appliance.

Additional Proposed Changes

File Name	Description	Approved
CN_121.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 121 appeared in the First Draft Report on First Revision No. 8898.

The Correlating Committee directs CMP-2 to review the action for correlation with the Informational Note in 210.50 on Informative Annex J, because the annex text was deleted by CMP-1.

Related Item

- First Revision No. 8898

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:27:17 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7687-NFPA 70-2024
Statement: The contents of Annex J has been deleted, therefore this Informational note has been revised to point readers to up-to-date guidance and information regarding accessible design.

Correlating Committee Note No. 121-NFPA 70-2024 [Section No. 210.50]

Submitter Information Verification

Committee: NEC-AAC
Submittal Date: Wed May 08 14:40:23 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP-2 to review the action for correlation with the Informational Note in 210.50 on Informative Annex J, because the annex text was deleted by CMP-1.

First Revision No. 8898-NFPA 70-2024 [Annex J]

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. 16-NFPA 70-2024 [Section No. 210.50 [Excluding any Sub-Sections]]

Receptacle outlets shall be installed as specified in 210.52 through 210.65.

~~Informational Note:~~ ~~See Informative Annex J~~ See ICC A117.1-2017, Accessible and Usable Buildings and Facilities, for information regarding ~~ADA~~ accessibility ~~design~~ for people with disabilities .

Statement of Problem and Substantiation for Public Comment

The NFPA Disability Access Review and Advisory Committee (DARAC) requests an update to this section. Annex J is proposed to be removed (See FR 8898 for explanation).

This Informational note points readers to up-to-date guidance and information regarding accessible design. Omitting direct reference to "ADA" will clarify that the code official enforces the accessibility requirements of the applicable code, not the Americans with Disabilities Act (ADA). The ADA is a federal civil rights law enforced at the federal level and is not a state or local code.

Related Item

- FR8898, FR8909, PC9, PC12

Submitter Information Verification

Submitter Full Name: Jessica Hubert

Organization: Guardian Services Inc.

Affiliation: Disability Access Review Advisory Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jul 10 10:52:44 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7687-NFPA 70-2024

Statement: The contents of Annex J has been deleted, therefore this Informational note has been revised to point readers to up-to-date guidance and information regarding accessible design.

Public Comment No. 178-NFPA 70-2024 [New Section after 210.52]

210.53 USB Receptacle

A receptacle that provides class 2 power shall be installed to serve island and peninsular countertops and work surfaces in kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units and shall meet the requirements of 210.53(A) and (B). This section shall be required as of January 1, 2029.

Informational Note: A USB receptacle is an example of a receptacle that provides class 2 power.

(A) Location

Receptacles required per 210.53 installed within 610 mm (24 in.) of the countertop or work surface shall be considered as serving the countertop or work surface and shall be permitted to be installed below the countertop or work surface.

(B) Branch Circuit Rating

Where the receptacle required by 210.53 is located below the countertop or work surface, the branch circuit supplying the receptacle shall be a 10 Ampere branch circuit.

Statement of Problem and Substantiation for Public Comment

1.Addresses the desire to put a receptacle on an island / peninsular
2.Fills the need to charge equipment and possibly power computers etc that do not have the same safety hazard as a cooking appliance that is cord/plug connected draping over the edge.
3.Recognizes that 210.52 does not apply to a USB receptacle so it is already permitted to be installed below the countertop. This adds clarity and will restrict that circuit to a 10A circuit when the receptacle is installed below the countertop to reduce the likelihood of future modifications.
4.If the installation uses a receptacle and meets the requirments of 210.52(C), a 15A / 20A 120V receptacle that additionally provides Class 2 power would meet the requirements found in 210.53.
5.Explain that a single yoke with 2 15A receptacles and 2 USB receptacles is a multi-receptacle, a total of 4 receptacles on the same yoke. You would not be permitted ot place a device like this below the countertop because of the requirements in 210.52(C).

Related Item

- FR 8192

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 23 14:48:16 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Unintended hazards could occur by allowing class 2 devices to be installed in areas where 125/250V receptacles are not allowed. Class 2 devices require a 125 volt power source and once installed could easily be changed out with a device that supplies a 125 volt power source.

Public Comment No. 1239-NFPA 70-2024 [Section No. 210.52(A)(2)]

(2) Wall Space.

As used in this section, a wall space shall include the following:

(1) Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, fireplaces, stationary appliances, and fixed cabinets that do not have countertops or similar work surfaces

(2) The space occupied by fixed panels in walls, excluding sliding panels

(3) The space afforded by fixed room dividers, such as freestanding bar-type counters or railings. Receptacle outlets beneath countertops shall not be located within 610 mm (24 in.) of the countertop or worksurface.

Statement of Problem and Substantiation for Public Comment

This is a companion comment to relocate the (First Draft) exception to 210.52(C)(1) to this location, where it makes more sense. As I indicated in the comment to that section, this text does not except out any requirements found in 210.52(C)(1) and therefore cann;t be an exception to that section because it is excepting out a rule that doesn't exist.
Also note that this comment not only moves the exception, but also revises it slightly. As it appears in the first draft, and as alluded to by the Correlating Committee, the text seems to prohibit receptacles above the countertop unless they are at least 24" above it. My revised text clarifies that only receptacles underneath the countertop should be limited by that vertical dimension.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1238-NFPA 70-2024 [Section No. 210.52(C)(1)]	
Public Comment No. 1238-NFPA 70-2024 [Section No. 210.52(C)(1)]	
Public Comment No. 1241-NFPA 70-2024 [Section No. 210.52(C)(4)]	

Related Item

• FR 8192 •

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 18 13:14:10 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7758-NFPA 70-2024

Statement: The language is relocated to new subsection 210.52(A)(5) to permit receptacle outlets to be installed on walls of cabinets supporting a countertop or worksurface provided the receptacle outlets are not installed less than 24 inches beneath the countertop. Locating this provision in a new subsection (5) results in the requirement applying to all locations where a countertop or worksurface is supported by a cabinet or fixed room divider. The reference in 210.52(A) was updated to include the new section.

Public Comment No. 135-NFPA 70-2024 [Section No. 210.52(A)(2)]

(2) Wall Space.

As used in this section, a wall space shall include the following:

(1) Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, fireplaces, ~~stationary appliances, and~~ and fixed cabinets ~~that do not have countertops or similar work surfaces~~

(2) The space occupied by fixed panels in walls, excluding sliding panels

(3) The space afforded by fixed room dividers, such as freestanding bar-type counters or railings

Statement of Problem and Substantiation for Public Comment

This public input proposes the removal of the term "stationary appliances" due to its problematic nature. Retaining "stationary appliances" in this context could exempt locations designated for appliances like refrigerators from requiring receptacles because these spaces would not be counted as part of the required wall space. Historically, previous editions of the NEC mandated receptacles in such locations. However, no substantiation has been provided to justify the removal of this requirement.

Furthermore, this proposal also seeks to eliminate the last sentence of (1) to address unintended consequences. This sentence, when introduced, could require receptacles in areas such as kitchens, contrary to the provisions of 210.52(A)(4) which specify that receptacles for countertop and similar work surfaces under 210.52(C) do not fulfill the receptacle requirements of 210.52(A). There is insufficient substantiation to necessitate additional receptacles beyond those required by 210.52(C) for locations such as kitchens, family rooms, dining rooms, living rooms, parlors, librarys, dens, sunrooms, bedrooms, recreation rooms, or similar rooms or areas of dwelling units.

This public input might be regarded as new material. My intention is to introduce this language for discussion, as it may necessitate a Temporary Interim Amendment (TIA). At the very least, this public input will ensure the topic is considered in the next revision cycle.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 232-NFPA 70-2024 [Section No. 210.24]	

Related Item

- FR 7607

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 22 06:42:52 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7759-NFPA 70-2024

Statement: This second revision addresses unintended consequences of requiring receptacle outlets in areas such as kitchens where cabinets have countertops or similar worksurfaces where receptacles are already required as part of 210.52(C). Stationary appliance is being retained as this would be new material.

Public Comment No. 48-NFPA 70-2024 [Section No. 210.52(A)(4)]

~~(4) Countertop and Similar Work Surface Receptacle Outlets.~~

~~Receptacles installed for countertop and similar work surfaces as specified in 210.52(C) shall not be considered as the receptacle outlets required by 210.52(A) .~~

Additional Proposed Changes

File Name	Description	Approved
210.52_A_and_C_.pdf	wall space receptacles	

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow up to PI 322 and 321

I respectfully disagree with the Panel's statement for PI 322 "Cabinets with countertops are not considered wall space as found in 210.52(A)(4)"

210.52(A)(2) clearly states "As used in this section, a wall space SHALL INCLUDE the following:
(1) Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, fireplaces, stationary appliances, and fixed cabinets that DO NOT HAVE countertops or similar work surfaces'

This means that wall spaces having cabinets that DO HAVE countertops or similar work surfaces are INCLUDED in the requirements to have wall receptacles installed.

But, according to 210.52(A)(4) and 210.52(C), Receptacles installed for countertop and similar work surfaces SHALL NOT be considered as the wall space receptacle outlets required by 210.52(A).

So, on a wall having cabinets WITH countertops or similar work surfaces where do we install the wall receptacles required by 210.52(A)? On the floor as permitted by 210.52(A)(3)? This would not work because most cabinets are 24" deep and would mean floor receptacles would be too far from wall to satisfy 210.52(A)(3). Cord drops as permitted by 210.50(A)? This would be impractical because cords would interfere with opening the upper cabinet doors! How about below the countertops on the face of the cabinets? Is this even permitted? Where is the wording that permits these wall spaces to be omitted from the 210.52(A) requirements? The fact is, there isn't any wording that permits these wall spaces to be omitted from this requirement!
This literally means receptacle outlets must be installed for the WALL SPACES at cabinets having countertops or work surfaces BUT the receptacle outlets installed to serve the countertops or work surfaces cannot be used to satisfy this requirements!!!!!! That is quite the conundrum!

Here is a very simple solution to this conundrum. If 210.52(A)(4) is deleted and 210.52(C) revised as proposed, then the countertop receptacle outlets can also be used to satisfy the requirement for wall space receptacle outlets. Problem solved!

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 46-NFPA 70-2024 [Section No. 210.52(C) [Excluding any Sub-Sections]]	wall spaces at cabinets with work surfaces or countertops
Public Comment No. 46-NFPA 70-2024 [Section No. 210.52(C) [Excluding any Sub-Sections]]	

Related Item

- PI 321

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: LeBlanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 12 07:47:12 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Deleting this section would permit a receptacle serving the countertop to also serve an adjacent wall space. The receptacles located to serve the countertop are necessary to serve countertop appliance loads.

Public Comment No. 1348-NFPA 70-2024 [Section No. 210.52(C)]

(C) Countertops and Work Surfaces.

In kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units, receptacle outlets for countertop and work surfaces that are 300 mm (12 in.) or wider shall be installed in accordance with 210.52(C)(1) through 210.52(C)(3) and shall not be considered as the receptacle outlets required by 210.52(A).

For the purposes of this section, where using multioutlet assemblies, each 300 mm (12 in.) of multioutlet assembly containing two or more receptacles installed in individual or continuous lengths shall be considered to be one receptacle outlet.

(1) Wall Spaces.

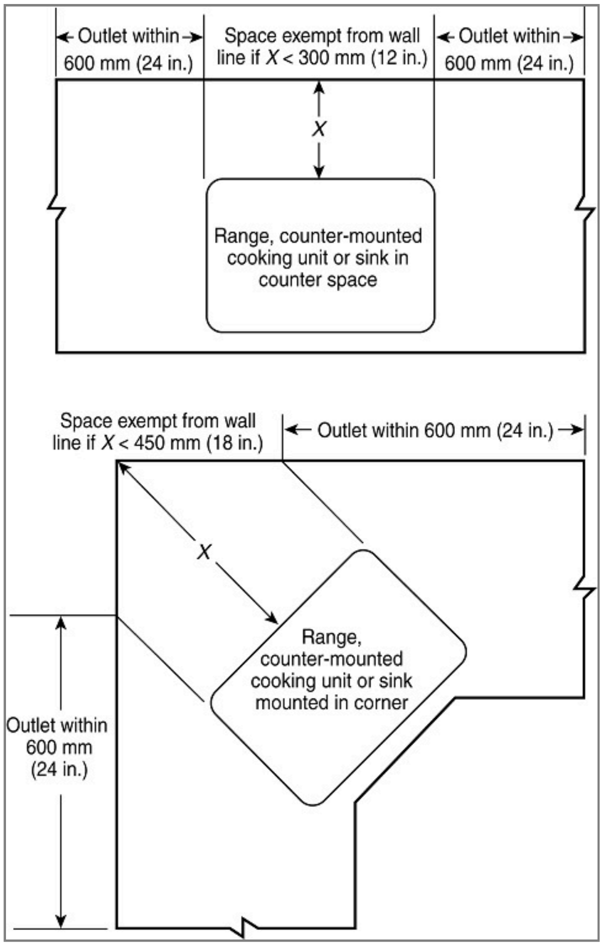
Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space. The location of the receptacles shall be in accordance with 210.52(C)(3) and (4) .

Exception No. 1: Receptacle outlets shall not be required directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(1).

Exception No. 2: Where a required receptacle outlet cannot be installed in the wall areas shown in Figure 210.52(C)(1), the receptacle outlet shall be permitted to be installed as close as practicable to the countertop area to be served. The total number of receptacle outlets serving the countertop shall not be less than the number needed to satisfy 210.52(C)(1). These outlets shall be located in accordance with 210.52(C)(3).

~~*Exception No. 3: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.*~~

Figure 210.52(C)(1) Determination of Area Behind a Range, Counter-Mounted Cooking Unit, or Sink.



(2) Island and Peninsular Countertops and Work Surfaces.

If provided to serve an island or peninsular countertop or work surface, receptacle outlets shall be installed in accordance with 210.52(C)(3) and 210.52(C)(4) . If a receptacle outlet is not provided to serve an island or peninsular countertop or work surface, electrical provisions shall be provided at the island or peninsula for future addition of a receptacle outlet to serve the island or peninsular countertop or work surface.

(3) Receptacle Outlet Location.

Receptacle outlets shall be located in one or more of the following:

(1) On or above, but not more than 500 mm (20 in.) above, a countertop or work surface

(2) In a countertop using receptacle outlet assemblies listed for use in countertops

(3) In a work surface using receptacle outlet assemblies listed for use in work surfaces or listed for use in countertops

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1) Exception No. 1 or appliances occupying assigned spaces shall not be considered as these required outlets.

Informational Note No. 1: See 406.14(E) for installation of receptacles in countertops and 406.14(F) for installation of receptacles in work surfaces. See 380.10 for installation of multioutlet assemblies.

Informational Note No. 2: See

~~Informative Annex J and ANSI/~~

ICC A117.1-2017,

~~Standard on~~

Accessible and Usable Buildings and Facilities , for

~~additional~~

information regarding accessibility for people with disabilities .

(4) Receptacle Outlet Locations Prohibited.

Required and permitted receptacle outlets

~~shall not be~~

installed on cabinet sides or wall surfaces that are below countertops and work surfaces

~~. Required and permitted receptacle outlets~~

shall comply with the following.

(1) Outlets shall not be installed on adjacent walls extending from the base cabinets within 610 mm (24 in.) horizontally

~~and downward from the countertop and work surface edge within 610 mm (24 in.) vertically~~

(1) .

(2) Outlets shall not be installed more than 500 mm (20 in.) above the floor .

Exception No. 1: Receptacle outlets installed in a drawer shall be permitted to be installed below countertops and work surfaces.

Exception No. 2: Receptacle outlets located in the specified location in 210.52(A)(2) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

Additional Proposed Changes

File Name	Description	Approved
FR_8192_Public_Comment_-_Buuck-v1.1.docx		

Statement of Problem and Substantiation for Public Comment

See the attachment for a clean version of the change and for the reason statement.

Related Item

• FR 8192 • FR 8898

Submitter Information Verification

Submitter Full Name:	Daniel Buuck
Organization:	National Association of Home Builders
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Aug 21 08:13:41 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7762-NFPA 70-2024
Statement:	The language is revised to clarify the restricted locations for receptacle outlets extending beyond and below the countertop surface. The language is moved to 210.52(A)(5) to permit a receptacle on a wall located on the back side of a cabinet but not within 24 inches of the countertop.

210.52(C) Countertops and Work Surfaces.

For the purposes of this section, where using multioutlet assemblies, each 300 mm (12 in.) of multioutlet assembly containing two or more receptacles installed in individual or continuous lengths shall be considered to be one receptacle outlet.

(1) Wall Spaces.

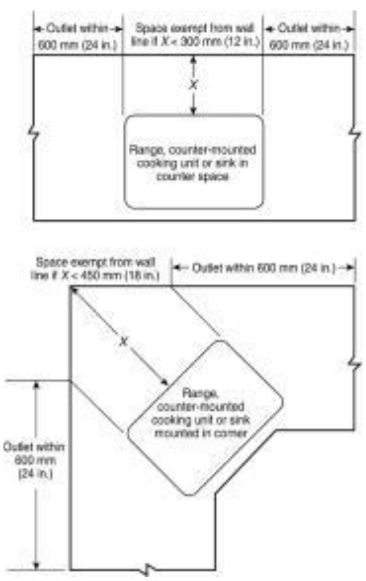
Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space. The location of the receptacles shall be in accordance with 210.52(C)(3) and (4).

Exception No. 1: Receptacle outlets shall not be required directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(1).

Exception No. 2: Where a required receptacle outlet cannot be installed in the wall areas shown in Figure 210.52(C)(1), the receptacle outlet shall be permitted to be installed as close as practicable to the countertop area to be served. The total number of receptacle outlets serving the countertop shall not be less than the number needed to satisfy 210.52(C)(1). These outlets shall be located in accordance with 210.52(C)(3).

~~*Exception No. 3: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.*~~

Figure 210.52(C)(1) Determination of Area Behind a Range, Counter-Mounted Cooking Unit, or Sink.



(2) Island and Peninsular Countertops and Work Surfaces.

If provided to serve an island or peninsular countertop or work surface, receptacle outlets shall be installed in accordance with 210.52(C)(3) and (4). If a receptacle outlet is not provided to serve an island or peninsular countertop or work surface, electrical provisions shall be provided at the island or peninsula for future addition of a receptacle outlet to serve the island or peninsular countertop or work surface.

(3) Receptacle Outlet Location.

Receptacle outlets shall be located in one or more of the following:

(1) On or above, but not more than 500 mm (20 in.) above, a countertop or work surface

(2) In a countertop using receptacle outlet assemblies listed for use in countertops
(3) In a work surface using receptacle outlet assemblies listed for use in work surfaces or listed for use in countertops

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception No. 1, or appliances occupying assigned spaces shall not be considered as these required outlets.

> Informational Note No. 1: See 406.5(E) for installation of receptacles in countertops and 406.5(F) for installation of receptacles in work surfaces. See 380.10 for installation of multioutlet assemblies.
>
> Informational Note No. 2: See ~~Informative Annex J and ANSI/~~ICC A117.1-2017, ~~*Standard on*~~ *Accessible and Usable Buildings and Facilities*, for ~~additional~~ information regarding accessibility for people with disabilities.

(4) Receptacle Outlet Locations Prohibited.

Required and permitted receptacle outlets ~~shall not be~~ installed on cabinet sides or wall surfaces that are below countertops and work surfaces shall comply with the following.

(1) ~~Required and permitted receptacle outlets~~ Outlets ~~-~~shall not be installed on adjacent walls extending from the base cabinets within 610 mm (24 in.) horizontally. ~~and downward from the countertop and work surface edge within 610 mm (24 in.) vertically~~
(2) Outlets shall not be installed more than 500 mm (20 in.) above the floor.

Exception No. 1: Receptacle outlets installed in a drawer shall be permitted to be installed below countertops and work surfaces.

Exception No. 2: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

Reason:

The language in Exception No. 3 under 210.52(C)(1) and 210.52(C)(4) conflict with accessibility requirements in ICC A117.1 as well as federal accessibility standards. Requiring receptacle outlets to be at least 24 in. below the countertop or work surface places them outside the reach range for accessibility for a standard 36-inch counter height. (See the figures below from A117.1.) Since receptacles are required under a counter that creates wall space (see 210.52(A)(2), Item (3)), this will cause irreconcilable conflicts in the field between this code and federal law if not changed.

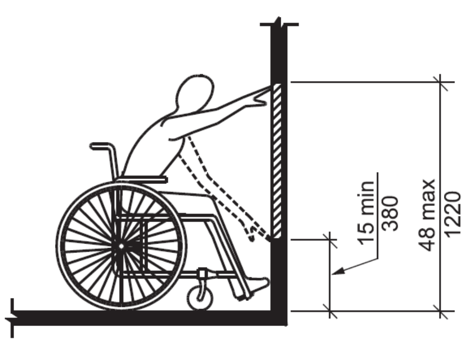


FIGURE 308.2.1
UNOBSTRUCTED FORWARD REACH

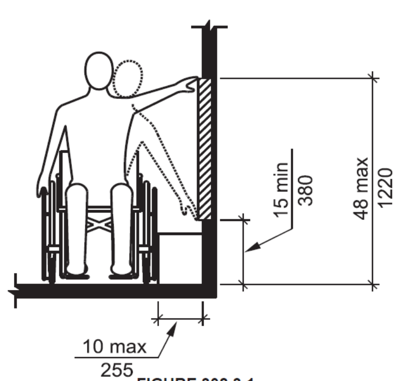


FIGURE 308.3.1
UNOBSTRUCTED SIDE REACH

The height of 20 inches above the floor was chosen to allow for a 5-inch dimension where a duplex receptacle can be installed. This is a small area for compliant installation considering construction tolerances and possible material changes.

A pointer to (4) was added under 210.52(C)(1) which eliminates the need for Exception No. 3 under that section.

210.52(C)(4) was modified to fix the apparent conflict between the first and second sentences. The format of the section was changed for ease of use.

Informational Note No. 2 under 210.52(C)(3) was changed to match the draft PC from the NFPA Disability Access Review and Advisory Committee (DARAC). Annex J was deleted by CMP-1 (See FR 8898), so this language needs to be updated.

The NFPA Disability Access Review Advisory Committee (DARAC: www.nfpa.org/darac) has reviewed this proposal, and by letter ballot, concurs with the technical changes and the substantiation provided.

Public Comment No. 475-NFPA 70-2024 [Section No. 210.52(C)]

(C) Countertops and Work Surfaces.

In kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units, receptacle outlets for countertop and work surfaces that are 300 mm (12 in.) or wider shall be installed in accordance with 210.52(C)(1) through 210.52(C)(3) and shall not be considered as the receptacle outlets required by 210.52(A).

For the purposes of this section, where using multioutlet assemblies, each 300 mm (12 in.) of multioutlet assembly containing two or more receptacles installed in individual or continuous lengths shall be considered to be one receptacle outlet.

(1) Wall Spaces.

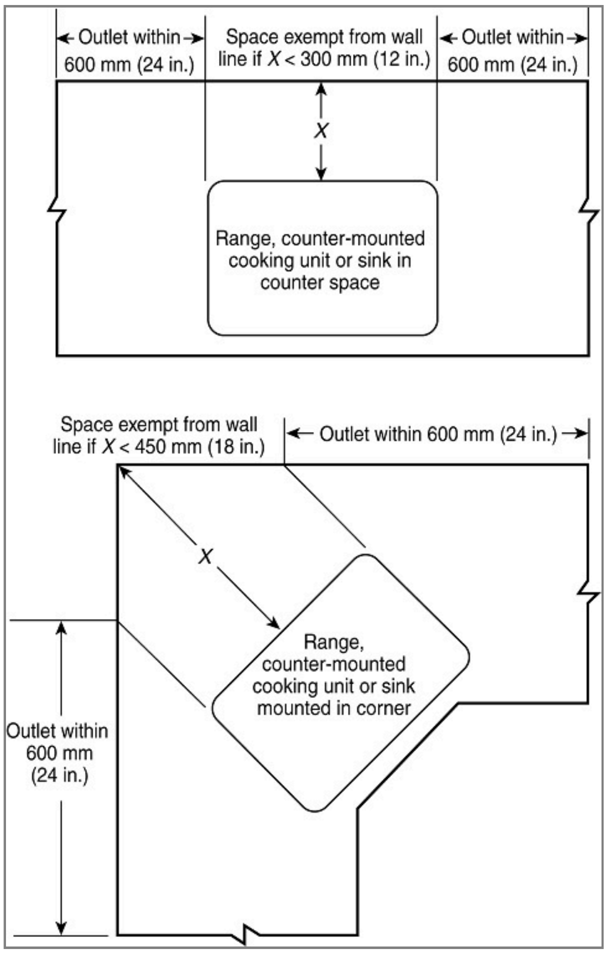
Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space. The location of the receptacles shall be in accordance with 210.52(C)(3).

Exception No. 1: Receptacle outlets shall not be required directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(1).

Exception No. 2: Where a required receptacle outlet cannot be installed in the wall areas shown in Figure 210.52(C)(1), the receptacle outlet shall be permitted to be installed as close as practicable to the countertop area to be served. The total number of receptacle outlets serving the countertop shall not be less than the number needed to satisfy 210.52(C)(1). These outlets shall be located in accordance with 210.52(C)(3).

Exception No. 3: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

Figure 210.52(C)(1) Determination of Area Behind a Range, Counter-Mounted Cooking Unit, or Sink.



(2) Island and Peninsular Countertops and Work Surfaces.

If provided to serve an island or peninsular countertop or work surface, receptacle outlets shall be installed in accordance with 210.52(C)(3) and 210.52(C)(4). If a receptacle outlet is not provided to serve an island or peninsular countertop or work surface, electrical provisions shall be provided at the island or peninsula for future addition of a receptacle outlet to serve the island or peninsular countertop or work surface.

(3) Receptacle Outlet Location.

Receptacle outlets shall be located in one or more of the following:

(1) On or above, but not more than 500 mm (20 in.) above, a countertop or work surface

(2) In a countertop using receptacle outlet assemblies listed for use in countertops

(3) In a work surface using receptacle outlet assemblies listed for use in work surfaces or listed for use in countertops

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1) Exception No. 1 or appliances occupying assigned spaces shall not be considered as these required outlets.

Informational Note No. 1: See 406.14(E) for installation of receptacles in countertops and 406.14(F) for installation of receptacles in work surfaces. See 380.10 for installation of multioutlet assemblies.

Informational Note No. 2: See Informative Annex J and ANSI/ICC A117.1-2017, *Standard on Accessible and Usable Buildings and Facilities*, for additional information.

(4) Receptacle Outlet Locations Prohibited.

Required and permitted receptacle outlets shall not be installed on cabinet sides or wall surfaces that are below countertops and work surfaces. Required and permitted receptacle outlets shall not be installed on adjacent walls extending from the base cabinets within 610 mm (24 in.) horizontally and downward from the countertop and work surface edge within 610 mm (24 in.) vertically.

Exception No. 1: Receptacle outlets installed in a drawer shall be permitted to be installed below countertops and work surfaces.

Exception No. 2: Receptacle outlets located in the specified location in 210.52(A)(2) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

Additional Proposed Changes

File Name	Description	Approved
CN_122.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 122 appeared in the First Draft Report on First Revision No. 8192 and First Revision No. 8898.

The Correlating Committee directs CMP 2 to review the action for correlation with the Informational Note 2 in 210.52(C)(3) on Informative Annex J as the annex text was deleted by CMP-1.
The Correlating Committee also directs CMP 2 to reconsider the wording of Exception No. 2 for clarity. This exception could be interpreted to specify that a receptacle cannot be installed on the counter if it is within 24” of the counter.

Related Item

• First Revision No. 8192 • First Revision No. 8898

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:28:39 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7701-NFPA 70-2024
Statement: The Informational Note is revised to address the removal of content in Annex J. This action aligns with the requested action by PC 1348.

Correlating Committee Note No. 122-NFPA 70-2024 [Section No. 210.52(C)]

Submitter Information Verification

Committee: NEC-AAC

Submittal Date: Wed May 08 14:42:09 EDT 2024

Committee Statement

Committee Statement: The Correlating Committee directs CMP 2 to review the action for correlation with the Informational Note 2 in 210.52(C)(3) on Informative Annex J as the annex text was deleted by CMP-1.

The Correlating Committee also directs CMP 2 to reconsider the wording of Exception No. 2 for clarity. This exception could be interpreted to specify that a receptacle cannot be installed on the counter if it is within 24” of the counter.

First Revision No. 8192-NFPA 70-2024 [Section No. 210.52(C)]

First Revision No. 8898-NFPA 70-2024 [Annex J]

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. 1238-NFPA 70-2024 [Section No. 210.52(C)(1)]

(1) Wall Spaces.

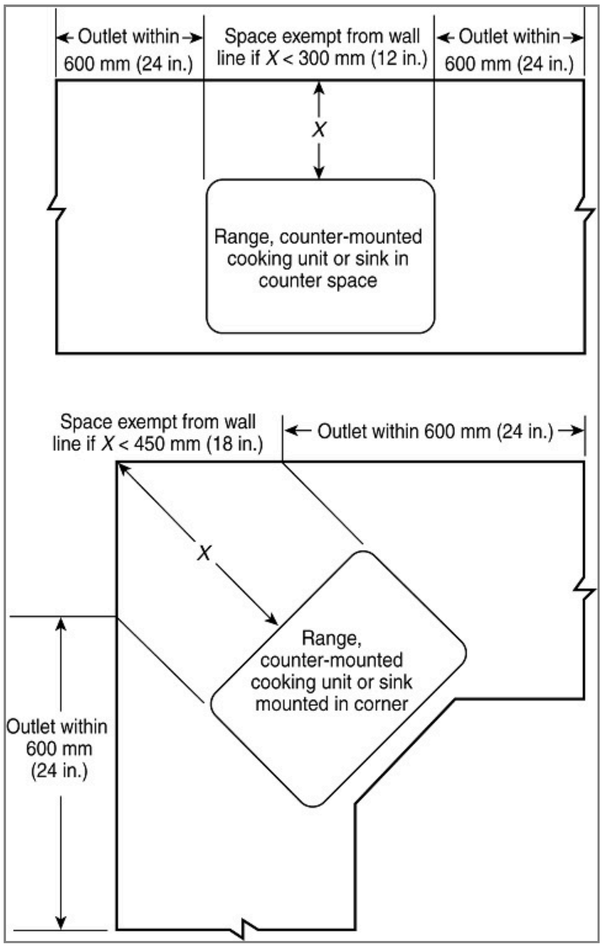
Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space. The location of the receptacles shall be in accordance with 210.52(C)(3).

Exception No. 1: Receptacle outlets shall not be required directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(1).

Exception No. 2: Where a required receptacle outlet cannot be installed in the wall areas shown in Figure 210.52(C)(1), the receptacle outlet shall be permitted to be installed as close as practicable to the countertop area to be served. The total number of receptacle outlets serving the countertop shall not be less than the number needed to satisfy 210.52(C)(1). These outlets shall be located in accordance with 210.52(C)(3).

~~*Exception No. 3: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.*~~

Figure 210.52(C)(1) Determination of Area Behind a Range, Counter-Mounted Cooking Unit, or Sink.



Statement of Problem and Substantiation for Public Comment

This public comment seeks to relocate the exception to 210.52(A)(2)(3). The exception does not remove any requirements to section 210.52(C)(1), it specifies location requirements for 210.52(A)(2)(3). See my companion comment to that section.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1239-NFPA 70-2024 [Section No. 210.52(A)(2)]	
Public Comment No. 1239-NFPA 70-2024 [Section No. 210.52(A)(2)]	
Public Comment No. 1241-NFPA 70-2024 [Section No. 210.52(C)(4)]	

Related Item

- FR 8192

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization:	Self-employed
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Sun Aug 18 13:11:20 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7761-NFPA 70-2024
Statement:	The requirement is moved to 210.52(A)(5) to permit a receptacle on a wall located on the back side of a cabinet but not within 24 inches of the countertop. This action aligns with the requested action by PC 1348.

Public Comment No. 1992-NFPA 70-2024 [Section No. 210.52(C)(1)]

(1) Wall Spaces.

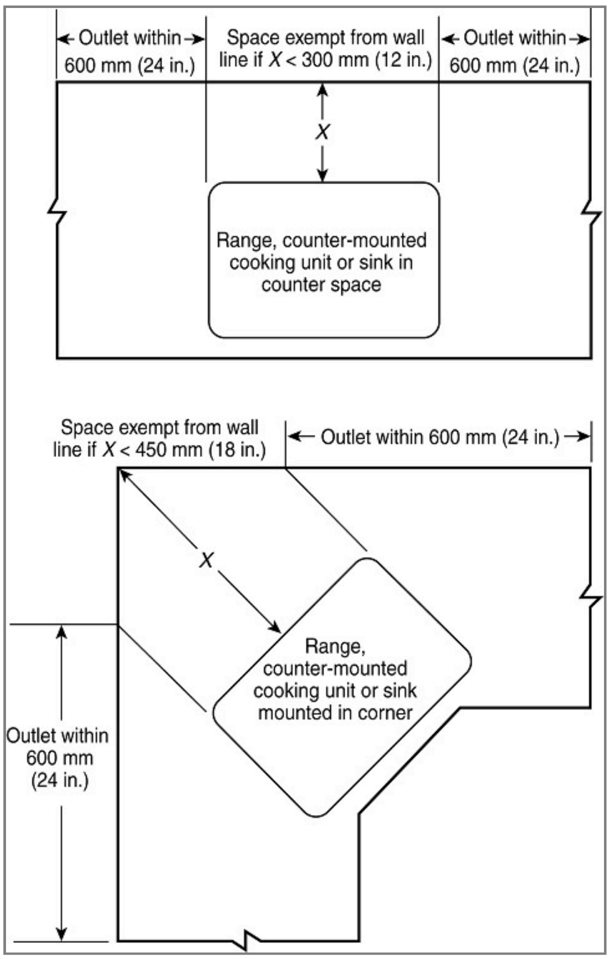
Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space. The location of the receptacles shall be in accordance with 210.52(C)(3).

Exception No. 1: Receptacle outlets shall not be ~~required~~ allowed directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(1).

Exception No. 2: Where a required receptacle outlet cannot be installed in the wall areas shown in Figure 210.52(C)(1), the receptacle outlet shall be permitted to be installed as close as practicable to the countertop area to be served. The total number of receptacle outlets serving the countertop shall not be less than the number needed to satisfy 210.52(C)(1). These outlets shall be located in accordance with 210.52(C)(3).

Exception No. 3: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

Figure 210.52(C)(1) Determination of Area Behind a Range, Counter-Mounted Cooking Unit, or Sink.



Statement of Problem and Substantiation for Public Comment

Receptacle outlets are very commonly installed directly behind counter-mounted cooktops, especially in remodels. The reason that a wall receptacle outlet is not required when the space behind the range is less than 12 inches is because the appliance cord would of necessity travel across a burner. For this same reason, such installations should be prohibited. The addition of 210.52(C)(4) expands the scope of 210.52(C) to include areas where receptacles are prohibited.

Related Item

- PI 318 and the committee response

Submitter Information Verification

Submitter Full Name: Douglas Hansen
Organization: Code Check
Affiliation: Self
Street Address:
City:
State:
Zip:

Submittal Date:	Wed Aug 28 14:31:02 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	Substantiation has not been provided that necessitates prohibiting receptacles located in the exempted wall space requirement. There may be a need for a receptacle to be located in that wall space for a specific application and prohibiting it would them drive the use of a cord over the cooktop or sink.

Public Comment No. 1912-NFPA 70-2024 [Section No. 210.52(C)(2)]

(2) Island and Peninsular Countertops and Work Surfaces.

~~If provided to~~ At least one receptacle outlet shall be installed to serve an island or peninsular countertop or work surface, receptacle outlets shall be installed in accordance with 210.52(C)(3) and 210.52(C)(4). ~~If a receptacle outlet is not provided to serve an island or peninsular countertop or work surface, electrical provisions shall be provided at the island or peninsula for future addition of a receptacle outlet to serve the island or peninsular countertop or work surface.~~

Statement of Problem and Substantiation for Public Comment

The current wording referencing “if provided” and “electrical provisions shall be provided” are an enforcement nightmare. The panel did not provide clarity on what the “provision of” would. need to include and leaves installers and AHJ’s trying to figure how to apply and enforce this provision.
Requiring at least one receptacle will provide clarity and enforceability.

Related Item

- FR 8192 • PI 1155 • PI 4408

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 28 08:29:14 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: CMP 2 reaffirms receptacle outlets are not required to be installed at island and peninsular countertops and work surfaces. Such locations may be designed where the requirements in 210.52(C)(3) and (4) cannot be met. The requirement for “future provisions” is also retained as certain construction methods may not allow receptacle outlet that meet the requirements of 210.52(C)(3) and (4) to be added at a later date. 210.52(C)(4) has been added to clarify as to where receptacle outlets can and cannot be installed, at new construction or a future date.

Public Comment No. 18-NFPA 70-2024 [Section No. 210.52(C)(3)]

(3) Receptacle Outlet Location.

Receptacle outlets shall be located in one or more of the following:

(1) On or above, but not more than 500 mm (20 in.) above, a countertop or work surface

(2) In a countertop using receptacle outlet assemblies listed for use in countertops

(3) In a work surface using receptacle outlet assemblies listed for use in work surfaces or listed for use in countertops

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1) Exception No. 1 or appliances occupying assigned spaces shall not be considered as these required outlets.

Informational Note No. 1: See 406.14(E) for installation of receptacles in countertops and 406.14(F) for installation of receptacles in work surfaces. See 380.10 for installation of multioutlet assemblies.

Informational Note No. 2: ~~See Informative Annex J and~~ See ANSI/ICC A117.1-2017, *Standard on Accessible and Usable Buildings and Facilities*, for ~~additional~~ information regarding accessibility for people with disabilities .

Statement of Problem and Substantiation for Public Comment

The NFPA Disability Access Review and Advisory Committee (DARAC) requests an update to this section. Annex J is proposed to be removed (See FR 8898 for explanation). This Informational note points readers to up-to-date guidance and information regarding accessible design. Omitting direct reference to “ADA” will clarify that the code official enforces the accessibility requirements of the applicable code, not the Americans with Disabilities Act (ADA). The ADA is a federal civil rights law enforced at the federal level and is not a state or local code. Also, the edition of ICC A117 has been updated for consistency throughout the document.

Related Item

- FR8909, FR8898

Submitter Information Verification

Submitter Full Name: Jessica Hubert

Organization: Guardian Services Inc.

Affiliation: Disability Access Review Advisory Committee

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jul 10 10:57:44 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7701-NFPA 70-2024

Statement: The Informational Note is revised to address the removal of content in Annex J. This action aligns with the requested action by PC 1348.

Public Comment No. 50-NFPA 70-2024 [Sections 210.52(C)(3), 210.52(C)(4)]

Sections 210.52(C)(3), 210.52(C)(4)

(3) Receptacle Outlet Location.

Receptacle outlets shall be located in one or more of the following:

(1) On or above, but not more than 500 mm (20 in.) above, a countertop or work surface

(2) In a countertop using receptacle outlet assemblies listed for use in countertops

(3) In a work surface using receptacle outlet assemblies listed for use in work surfaces or listed for use in countertops

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1) Exception No. 1 or appliances occupying assigned spaces shall not be considered as these required outlets.

Informational Note No. 1: See 406.14(E) for installation of receptacles in countertops and 406.14(F) for installation of receptacles in work surfaces. See 380.10 for installation of multioutlet assemblies.

Informational Note No. 2: See Informative Annex J and ANSI/ICC A117.1-2017, *Standard on Accessible and Usable Buildings and Facilities*, for additional information.

(4) Receptacle Outlet Locations Prohibited.

Required and permitted receptacle outlets shall not be installed on cabinet sides or wall surfaces that are below countertops and work surfaces. Required and permitted receptacle outlets shall not be installed on adjacent walls extending from the base cabinets within 610 mm (24 in.) horizontally and downward from the countertop and work surface edge within 610 mm (24 in.) vertically.

Exception No. 1: Receptacle outlets installed in a drawer shall be permitted to be installed below countertops and work surfaces.

Exception No. 2: Receptacle outlets located in the specified location in 210.52(A)(2) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

<u>It is my belief that this change was extremely shortsighted. You have now created a situation where occupants are using extension cords draped across walkways because they still want that island/peninsula countertop space to be usable. Not only are they using extension cords, but logic would tell you that they are using vastly undersized cords (most likely the standard brown/white 16ga ungrounded style) and using them for things like toasters, roasters, and crock pots which all have a high wattage draw. This is just asking for more accidents, fires, and who knows what else. I strongly urge to to reconsider this change as the bad and inevitable vastly outweigh the good.</u>

Statement of Problem and Substantiation for Public Comment

Not requiring accessible receptacles on islands and peninsulas leads to increased use of what is very likely undersized extension cords draped across walkways. Not only is this a fire/overheating hazard, but it has done nothing to solve the original intent and has actually increased the hazard of someone pulling the appliance off the countertop.

<u>Related Item</u>

• Island and Peninsular Receptacles

Submitter Information Verification

Submitter Full Name: Shannon Gatewood

Organization: Gatewood Superior Inspections

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jul 12 10:00:22 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The public comment does not contain proposed text in accordance with NFPA Regulations Governing the Development of NFPA Standards paragraph 4.4.4.3.

Public Comment No. 1241-NFPA 70-2024 [Section No. 210.52(C)(4)]

(4) Receptacle Outlet Locations Prohibited.- ~~Required and permitted receptacle outlets shall not be installed on cabinet sides or wall surfaces that are below countertops and work surfaces. Required and permitted receptacle outlets shall not be installed on adjacent~~ walls extending from the base cabinets within 610 mm (24 in.) horizontally and downward from the countertop and work surface edge within 610 mm (24 in.) vertically.

Exception No. 1: Receptacle outlets installed in a drawer shall be permitted to be installed below countertops and work surfaces.

~~Exception No. 2: Receptacle outlets located in the specified location in 210.52(A)(2) shall not be located within 610 mm (24 in.) of the countertop or worksurface.~~

Additional Proposed Changes

File Name	Description	Approved
210.52_C_Work_Surfaace.jpg	Receptacles in the knee hole space should be permitted.	
210.52_A_cabinets.JPG	This is a violation of the first draft (if in a kitchen). It should not be.	

Statement of Problem and Substantiation for Public Comment

As written in the first draft, a receptacle under a sink for a disposer is a violation. So is a receptacle in the kneehole space (the space typically consumed by a chair) beneath a work surface, such as those commonly found for built-in desks. See attached photos
The concern is receptacles within 24" beneath the countertop. There is no reason to prohibit receptacles below the countertop if they are more than 24" below the top of it.
The second exception is marked for deletion because the revised language in this comment removes the need for it, and a companion comment seeks to relocte the 210.52(C)(1) exception to 210.52(A)(2).

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1238-NFPA 70-2024 [Section No. 210.52(C)(1)]	
Public Comment No. 1239-NFPA 70-2024 [Section No. 210.52(A)(2)]	
Public Comment No. 1240-NFPA 70-2024 [Part III.]	

Related Item

- FR 8192

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 18 13:34:54 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7762-NFPA 70-2024

Statement: The language is revised to clarify the restricted locations for receptacle outlets extending beyond and below the countertop surface. The language is moved to 210.52(A)(5) to permit a receptacle on a wall located on the back side of a cabinet but not within 24 inches of the countertop.

Public Comment No. 1986-NFPA 70-2024 [Section No. 210.52(C)(4)]

~~**(4)** Receptacle Outlet Locations Prohibited.~~

~~Required and permitted receptacle outlets shall not be installed on cabinet sides or wall surfaces that are below countertops and work surfaces. Required and permitted receptacle outlets shall not be installed on adjacent walls extending from the base cabinets within 610 mm (24 in.) horizontally and downward from the countertop and work surface edge within 610 mm (24 in.) vertically.~~

~~*Exception No. 1: Receptacle outlets installed in a drawer shall be permitted to be installed below countertops and work surfaces.*~~

~~*Exception No. 2: Receptacle outlets located in the specified location in 210.52(A)(2) shall not be located within 610 mm (24 in.) of the countertop or worksurface.*~~

Statement of Problem and Substantiation for Public Comment

The proposed text contradicts the scoping provision of part III of article 210. A more appropriate location for this language would be in article 406, which has restrictions on locations of receptacle outlets.

Related Item

- PI 3995

Submitter Information Verification

Submitter Full Name: Douglas Hansen
Organization: Code Check
Affiliation: Self
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 28 14:07:34 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: NEC 210.52(C)(4) addresses the location and restriction of receptacles outlets serving countertops, therefore this section is appropriately located in the NEC 210.52(C)(4).

Public Comment No. 173-NFPA 70-2024 [Section No. 210.52(C) [Excluding any Sub-Sections]]

In ~~kitchens, pantries, breakfast rooms, dining rooms, and similar areas of~~ dwelling units, receptacle outlets for countertop and work surfaces that are 300 mm (12 in.) or wider shall be installed in accordance with 210.52(C)(1) through 210.52(C)(3) and shall not be considered as the receptacle outlets required by 210.52(A).

For the purposes of this section, where using multioutlet assemblies, each 300 mm (12 in.) of multioutlet assembly containing two or more receptacles installed in individual or continuous lengths shall be considered to be one receptacle outlet.

Statement of Problem and Substantiation for Public Comment

There is no reason to limit this requirement to just kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units. If it is a work surface our countertop a receptacle should be required for all of the same reasons we have it required in the stated locations of dwelling units. This could very well be considered new material but I am placing this on the table for discussion and to be held for next revision cycle.

Related Item

- FR 8192

Submitter Information Verification

Submitter Full Name: Thomas Domitrovich
Organization: Eaton Corporation
Street Address:
City:
State:
Zip:

Submittal Date: Tue Jul 23 14:21:28 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but held
Resolution: The material is identified as being new material and is therefore held for consideration in the development of the 2029 NEC.

Public Comment No. 46-NFPA 70-2024 [Section No. 210.52(C) [Excluding any Sub-Sections]]

In kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units, receptacle outlets for countertop and work surfaces that are 300 mm (12 in.) or wider shall be installed in accordance with 210.52(C)(1) through 210.52(C)(3)~~ and shall not be considered as the receptacle outlets required by 210 .52(A) .~~

For the purposes of this section, where using multioutlet assemblies, each 300 mm (12 in.) of multioutlet assembly containing two or more receptacles installed in individual or continuous lengths shall be considered to be one receptacle outlet.

Additional Proposed Changes

File Name	Description	Approved
210.52_A_and_C_.pdf	Wall Receptcales	

Statement of Problem and Substantiation for Public Comment

This Public Comment is a follow up to PI 322.

I respectfully disagree with the Panel's statement "Cabinets with countertops are not considered wall space as found in 210.52(A)(4)"

210.52(A)(2) clearly states "As used in this section, a wall space SHALL INCLUDE the following:
(1) Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, fireplaces, stationary appliances, and fixed cabinets that DO NOT HAVE countertops or similar work surfaces'

This means that wall spaces having cabinets that DO HAVE countertops or similar work surfaces are INCLUDED in the requirements to have wall receptacles installed!

But, according to 210.52(A)(4) and 210.52(C), Receptacles installed for countertop and similar work surfaces SHALL NOT be considered as the wall space receptacle outlets required by 210.52(A).

So, on a wall having cabinets WITH countertops or similar work surfaces where do we install the wall receptacles required by 210.52(A)? On the floor as permitted by 210.52(A)(3)? This would not work because most cabinets are 24" deep and would mean floor receptacles would be too far from wall to satisfy 210.52(A)(3). Cord drops as permitted by 210.50(A)? This would be impractical because cords would interfere with opening the upper cabinet doors! How about below the countertops on the face of the cabinets? Is this even permitted? Where is the wording that permits these wall spaces to be omitted from the 210.52(A) requirements? The fact is, there isn't any wording that permits these wall spaces to be omitted from this requirement!
This literally means receptacle outlets must be installed for the WALL SPACES at cabinets having countertops or work surfaces BUT the receptacle outlets installed to serve the countertops or work surfaces cannot be used to satisfy this requirements!!!!!! That is quite the conundrum!

Here is a very simple solution to this conundrum. If 210.52(A)(4) is deleted and 210.52(C) revised as proposed, then the countertop receptacle outlets can also be used to satisfy the requirement for wall space receptacle outlets. Problem solved!

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 48-NFPA 70-2024 [Section No. 210.52(A)(4)]	wall spaces at cabinets with work surfaces or countertops
Public Comment No. 48-NFPA 70-2024 [Section No. 210.52(A)(4)]	

Related Item

- PI 322

Submitter Information Verification

Submitter Full Name:	Russ Leblanc
Organization:	LeBlanc Consulting Services
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Jul 12 07:28:02 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	NEC 210.52(C) addressed the location of receptacles for countertops and work surfaces and NEC 210.52(A) addresses the location of receptacle outlets for wall space, therefore the language is correct as written.

Public Comment No. 476-NFPA 70-2024 [Section No. 210.52(D)]

(D) Bathrooms.

Receptacle outlets shall be installed in accordance with 210.52(D)(1) through 210.52(D)(3).

(1) Receptacle Outlet Requirement.

At least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each sink.

(2) Receptacle Outlet Location.

The receptacle outlet shall be located on a wall or partition that is adjacent to the sink or sink countertop, located on the countertop, or installed on the side or face of the sink cabinet. In no case shall the receptacle be located more than 300 mm (12 in.) below the top of the sink or sink countertop.

(3) Countertops.

Receptacle outlet assemblies listed for use in countertops shall be permitted to be installed in the countertop.

Informational Note: See 406.14(E) and 406.14(G) for requirements on installation of receptacles in countertops.

Additional Proposed Changes

File Name	Description	Approved
CN_123.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 123 appeared in the First Draft Report on First Revision No. 8037.

The Correlating Committee directs CMP-2 to reconsider the wording of “In no case shall” and consider the following language, “Receptacles shall not be located more than 300 mm (12 in.) below the top of the sink or sink countertop”.

Related Item

- First Revision No. 8037

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:30:10 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7704-NFPA 70-2024
Statement: The language is revised per the NEC Style Manual.

Public Comment No. 477-NFPA 70-2024 [Section No. 210.60]

210.60 Guest Rooms and Guest Suites of Hotels, Motels, and Dormitories.

(A) General.

Guest rooms or guest suites in hotels, motels, and dormitories shall have receptacle outlets installed in accordance with 210.52(A) and 210.52(D). Guest rooms or guest suites provided with permanent provisions for cooking shall have receptacle outlets installed in accordance with all of the applicable rules in 210.52.

(B) Receptacle Placement.

The total number of receptacle outlets shall not be less than required in 210.52(A). These receptacle outlets shall be permitted to be located conveniently for permanent furniture layout. At least two receptacle outlets shall be readily accessible. Where receptacles are installed behind the bed, the receptacle shall be located to prevent the bed from contacting any attachment plug that may be installed or the receptacle shall be provided with a suitable guard.

Additional Proposed Changes

File Name	Description	Approved
CN_124.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 124 appeared in the First Draft Report on First Revision No. 7982.

The Correlating Committee directs CMP 2 to revise the phrase “in accordance with all of the applicable rules in” to “in accordance with” to comply with the NEC Style Manual 4.1.3 as follows:
Guest rooms or guest suites in hotels, motels and dormitories shall have receptacle outlets installed in accordance with 210.52(A) and 210.52(D).
Guest rooms or guest suites provided with permanent provisions for cooking shall have receptacle outlets installed in accordance with 210.52.
The Correlating Committee also directs CMP 2 to review FR 7982 with respect to “suitable guard” that is not in compliance with the NEC Style Manual 3.2.1.regarding vague and unenforceable language.

Related Item

- First Revision No. 7982

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:31:27 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7709-NFPA 70-2024

Statement: The language has been revised to comply with the NEC Style Manual 4.1.3. The term “suitable guard” was modified as the language was vague and unenforceable per the NEC Style Manual 3.2.1.

Public Comment No. 1864-NFPA 70-2024 [Sections 210.60(A), 210.60(B)]

Sections 210.60(A), 210.60(B)

(A) General.

Guest rooms or guest suites in hotels, motels, and dormitories shall have receptacle outlets installed in accordance with 210.52(A) and 210.52(D).

(B) Cooking Provisions.

Guest rooms or guest suites provided with permanent provisions for cooking shall have receptacle outlets installed in accordance with all of the applicable rules in 210.52.

~~(B) Receptacle Placement.~~

~~The total number of receptacle outlets shall not be less than required in~~

C) Permanent Furniture

Permanent furniture that is fixed in place shall be considered a break along the floor line for the purpose of determining wall space in accordance with 210.52(A) ~~. These receptacle outlets shall be permitted to be located conveniently for permanent furniture layout. At least two receptacle outlets shall be readily accessible. Where receptacles are installed behind the bed, the receptacle shall be located to prevent the bed from contacting any attachment plug that may be installed or the receptacle shall be provided with a suitable guard~~ (2)(a) .

Statement of Problem and Substantiation for Public Comment

This public comment is submitted in response to the committee statement and resolution of PI-1600 and PI-1602. The purpose of these PIs/PCs is to correlate and simplify the application of receptacle requirements in habitable type occupancies. Currently Section 210.60 references 210.52 with slight modifications. The language proposed in the PC makes the requirement for hotel rooms, dormitories, etc. the same as a dwelling unit sleeping room, living room, or in the applicable case with permanent cooking provisions a dwelling unit kitchen. This would not result in less receptacles in these 210.60 spaces as cited in the committee statement. Additionally, the term "conveniently" can be subjective and potentially cause confusion for the enforcer. By aligning the requirements for a wall spacing in hotels, dormitories, etc., the language for receptacle spacing in all habitable type occupancies is consistent. Adding the language to address the furniture fixed in place in 210.52 would make it clear that when determining wall space in rooms where the furniture is fixed to the structure, the receptacle spacing would be treated like any other break in the wall requiring a receptacle within 6ft of that break (similar to a fireplace or built-in hutch or china cabinet).

Related Item

• PI-1600 • PI-1602

Submitter Information Verification

Submitter Full Name: Jeff Noren
Organization: National Electrical Contractors Association
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 27 18:41:19 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: CMP-2 reaffirms that the language in 210.60(A) is clear. The substantiation indicated receptacles should be provided to address furniture fixed in place however it would impact receptacle placement that could reduce the number of receptacles along the wall space.

Public Comment No. 1805-NFPA 70-2024 [Section No. 210.63(A)]

(A) Heating, Air-Conditioning, and Refrigeration Equipment.

The required receptacle outlet shall be located on the same level as the heating, air-conditioning, and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the equipment's branch-circuit disconnecting means.

Exception: A receptacle outlet shall not be required at one~~-~~ , two and ~~two~~ three -family dwellings~~- for the service of evaporative coolers~~ .

Statement of Problem and Substantiation for Public Comment

In California we have accessory dwelling rules that can result in three units at an otherwise single-family residence. This change moves the threshold to four-unit apartments and up, to avoid impacting too many non-commercial occupancies.

Note that over time this required receptacle may become less relevant as battery operated tools or power sources continue to improve.

Related Item

- Public Input No. 1498-NFPA 70-2023 [Section No. 210.63(A)]

Submitter Information Verification

Submitter Full Name:	Bryce Nesbitt
Organization:	Obviously Inspects / Expert Witness
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 27 13:29:00 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	The NEC is enforced in many jurisdictions and requirements that apply only to a specific region should not be included in the Code. One- and two-family dwellings and multifamily dwellings are defined terms in the NEC, this would be introducing a new non-defined term.

Public Comment No. 478-NFPA 70-2024 [Section No. 210.63(B)]

(B) Other Electrical Equipment.

In other than within a dwelling unit, a receptacle outlet shall be required for premises wiring systems that include a solidly grounded system operating at less than 150 volts to ground. The receptacle outlet shall be located within the same room or area as indoor switchboards, switchgear, panelboards, motor control centers, and service equipment.

Additional Proposed Changes

File Name	Description	Approved
CN_125.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 125 appeared in the First Draft Report on First Revision No. 8191.

The Correlating Committee directs CMP-2 to review FR 8191 with respect to providing clarity and usability for voltage levels, outlet locations and the use of "premises wiring systems".

Related Item

- First Revision No. 8191

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 19:32:51 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7716-NFPA 70-2024
Statement: The language has been revised to remove the "premises" as it does not add any further clarity to the sentence.

Public Comment No. 261-NFPA 70-2024 [Section No. 210.65(B)(2)]

(2) Floor Outlets.

A meeting room with any floor dimension that is 3.7 m (12 ft) or greater in any direction and that has a floor area of at least 20 m^2 (215 ft^2) shall have at least one floor receptacle outlet, or at least one floor outlet to serve a receptacle(s), located at a distance not less than 1.8 m (6 ft) from any fixed wall for each 20 m^2 (215 ft^2) or fraction thereof.

Informational Note No. 1: See 314.27(C) for requirements on floor boxes used for receptacles located in the floor.

Informational Note No. 2: See 518.1 for requirements on assembly occupancies designed for 100 or more persons.

Exception to (2): The installation of floor outlets shall not be required as a part of modifications or alterations within historical buildings. The quantity of outlets which would be required shall be added to the quantity required by 210.51(B)(1).

Statement of Problem and Substantiation for Public Comment

Installation of floor outlets during renovations causes significant damage to historic buildings, including cutting/drilling, damage to ceilings below, or the use of adhesives to install surface mounted products. The required quantity of receptacle outlets is added to part (1) to ensure sufficient availability of receptacles.

Related Item

- Public Input No. 1579-NFPA 70-2023

Submitter Information Verification

Submitter Full Name:	Edward Henderson
Organization:	[Not Specified]
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Jul 26 11:18:51 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected
Resolution:	CMP-2 recognizes the challenges related to addressing the electrical installations for registered historical buildings, however defining what constitutes a historical building has not been provided in the proposed language that would not impact a broader range of buildings.

Public Comment No. 262-NFPA 70-2024 [Section No. 210.65(B)(2)]

(2) Floor Outlets.

A meeting room with any floor dimension that is 3.7 m (12 ft) or greater in any ~~direction~~ plan dimension and that has a floor area of at least 20 m^2 (215 ft^2) shall have at least one floor receptacle outlet, or at least one floor outlet to serve a receptacle(s), located at a distance not less than 1.8 m (6 ft) from any fixed wall ~~for~~ , or as far from all fixed walls as practical where meeting room plan dimension does not exceed 3.7 m (12 ft), for each 20 m^2 (215 ft^2) or fraction thereof.

Informational Note No. 1: See 314.27(C) for requirements on floor boxes used for receptacles located in the floor.

Informational Note No. 2: See 518.1 for requirements on assembly occupancies designed for 100 or more persons.

Statement of Problem and Substantiation for Public Comment

1) Current language of "in any direction" invites unintended diagonal measurements. The term "Plan Dimension" is borrowed from the International Building Code.

2) Current language cannot be complied with in certain room geometries. For example, an 18'-0" x 12'-0" rectangular meeting room has no point at which a receptacle can be mounted not less than 6 feet from all walls. The use of the word "practical" is intended to allow minor leeway to coordinate the floor outlet location with the legs of planned large furniture, such as conference tables.

Related Item

• Public Input No. 1578-NFPA 70-2023

Submitter Information Verification

Submitter Full Name: Edward Henderson
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 26 11:28:55 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: The plan dimension may not be the actual dimension and does not clarify the language. When a receptacle is located in the center of a 12ft room, it complies with being located 6ft from the wall.

Public Comment No. 2082-NFPA 70-2024 [Section No. 210.70]

210.70 Lighting Outlets Required.

Lighting outlets shall be installed where specified in 210.70(A), 210.70(B), and 210.70(C).

(A) Dwelling Units.

In dwelling units, lighting outlets shall be installed in accordance with 210.70(A)(1) and 210.70(A)(2).

(1) Habitable Rooms, Kitchens, Laundry Areas, and Bathrooms.

At least one lighting outlet controlled by a wall switch or listed wall-mounted control device shall be installed in every habitable room, kitchen, laundry area, and bathroom. The wall switch or wall-mounted control device shall be located near an entrance to the room on a wall.

Exception No. 1: In other than kitchens, laundry areas, and bathrooms, one or more receptacles controlled by a wall switch or listed wall-mounted control device shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to wall switches or listed wall-mounted control devices or (2) located at a customary wall switch location and equipped with a manual override that will allow the sensor to function as a wall switch.

(2) Additional Locations.

Additional lighting outlets shall be installed in accordance with the following:

(1) At least one lighting outlet controlled by a wall switch or listed wall-mounted control device shall be installed in hallways, stairways, attached garages, detached garages, and accessory buildings with electric power.

(2) For dwelling units, attached garages, and detached garages with electric power, at least one exterior lighting outlet controlled by a wall switch or listed wall-mounted control device shall be installed to provide illumination on the exterior side of outdoor entrances or exits with grade-level access. A vehicle door in a garage shall not be considered as an outdoor entrance or exit.

Exception to (2): For an outdoor, grade-level bulkhead door with stairway access to a sub-grade-level basement, the required lighting outlet that provides illumination on the stairway steps shall be permitted to be located in the basement interior within 1.5 m (5 ft) horizontally of the bottommost stairway riser. This interior lighting outlet shall be permitted to be controlled by a wall switch or listed wall-mounted control device or by a unit switch of the interior luminaire or interior lampholder.

(3) Where lighting outlets are installed for an interior stairway with six or more risers between floor levels, there shall be a wall switch or listed wall-mounted control device at each floor level and at each landing level that includes a stairway entry to control the lighting outlets.

Exception to (1), (2), and (3): Remote, central, or automatic control of lighting shall be permitted in hallways, in stairways, and at outdoor entrances.

(4) Dimmer control of lighting outlets installed in accordance with 210.70(A)(2)(3) shall not be permitted unless the listed control devices can provide dimming control to maximum brightness at each control location for the interior stairway illumination.

(B) Guest Rooms or Guest Suites.

In hotels, motels, or similar occupancies, guest rooms or guest suites shall have at least one lighting outlet controlled by a wall switch or listed wall-mounted control device installed in every habitable room and bathroom.

Exception No. 1: In other than bathrooms and kitchens where provided, one or more receptacles controlled by a wall switch or listed wall-mounted control device shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to wall switch or listed wall-mounted control devices or (2) located at a customary wall switch location and equipped with a manual override that allows the sensor to function as a wall switch.

(C) All Occupancies.

For attics and underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch or listed wall-mounted control device shall be installed where these spaces are used for storage or contain equipment requiring servicing and shall comply with the following:.

(1) A point of control shall be at each entry that permits access to the attic and underfloor space, utility room, or basement.

(2) Where a lighting outlet is installed for equipment requiring service, the lighting outlet shall be installed at or near the equipment.

(3) Control by automatic means shall not be permitted to control all illumination in attics, underfloor spaces, or utility rooms unless a manual means to bypass the control is provided.

Additional Proposed Changes

File Name	Description	Approved
TIA_70_23_15.pdf	TIA 23-15 (Log No. 1753)	

Statement of Problem and Substantiation for Public Comment

NOTE: This public comment originates from Tentative Interim Amendment No. 23-15 (Log No. 1753) issued by the Standards Council on November 30, 2023 and per the NFPA Regs., needs to be reconsidered by the Code Making Panel for the next edition of the Document. This TIA was issued after the Public Input closing date and was emulated as a Public Comment.

Substantiation: Section 210.70 addresses the locations where lighting outlets are required. In the panel statement addressing the revision that would require a lighting outlet to automatically energize upon battery failure, CMP-2 states “The committee recognizing the need to support illumination upon failure of the control device powered exclusively by a battery that could impede safe egress. The failure mode of a battery powered device must ensure illumination.”. The proposed TIA text addresses this safety concern by prohibiting the lighting control in these locations from being an exclusively battery powered control device, unless the control device gives a positive indication when it is approaching battery exhaustion, much like a smoke or carbon monoxide alarm. If, for instance, a battery-operated wall-mounted control were to flash a LED when the battery was expiring, the occupants would be notified to change the battery before the control lost functionality. The proposed revision not only ensures illumination in critical locations, but it also eliminates the electric shock hazard created by a control device unexpectedly energizing a lighting outlet while being serviced.

Emergency Nature: The proposed TIA intends to correct a previously unknown existing hazard.

Related Item

• Issued TIA No. 23-15

Submitter Information Verification

Submitter Full Name: NFPA TIA
Organization: Code-Making Panel 2
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 29 09:32:00 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: CMP-2 reaffirms the action taken by FR-7966.

Public Comment No. 1304-NFPA 70-2024 [Section No. 210.70(A)(1)]

(1) Habitable Rooms, Kitchens, Laundry Areas, and Bathrooms.

At least one lighting outlet controlled by a wall switch or listed wall-mounted control device shall be installed in every habitable room, kitchen, laundry area, and bathroom. The wall switch or wall-mounted control device shall be located near an entrance to the room on a wall.

Exception No. 1: In other than kitchens, laundry areas, and bathrooms, one or more receptacles controlled by a wall switch or listed wall-mounted control device shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to wall switches or listed wall-mounted control devices or (2) located at a customary wall switch location and equipped with a manual override that will allow the sensor to function as a wall switch.

Exception No. 3: L ig hting outlets for closet ty pe laundry area shall be permitted to be outside the closet to provide adequate illumination.

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.

Please revisit PI 1902 for consideration. Without a definition for "laundry area", enforcement of what is considered the “laundry area” can be challenging. The exception allows the illumination outside the laundry area when a luminaire can't be mounted in the small area or closet space.

Related Item

- Public Input No. 1902-NFPA 70-2023 Section No. 210.70(A)(1)

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 20 13:12:38 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7766-NFPA 70-2024
Statement: Exception 3 is added to permit the lighting outlet and control switch to be located outside a small laundry area in order to adequately illuminate the area.

Public Comment No. 528-NFPA 70-2024 [Annex D]

Informative Annex D Examples

This informative annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

Selection of Conductors. In the following examples, the results are generally expressed in amperes (A). To select conductor sizes, refer to the 0 through 2000 volt (V) ampacity tables of Article 310 and the rules of 310.14 that pertain to these tables.

Voltage. For uniform application of Articles 210, 215, and 120, a nominal voltage of 120, 120/240, 240, and 208Y/120 V is used in calculating the ampere load on the conductor.

Fractions of an Ampere. Except where the calculations result in a major fraction of an ampere (0.5 or larger), such fractions are permitted to be dropped.

Power Factor. Calculations in the following examples are based, for convenience, on the assumption that all loads have the same power factor (PF).

Ranges. For the calculation of the range loads in these examples, Column C of Table 120.55 has been used. For optional methods, see Columns A and B of Table 120.55. Except where the calculations result in a major fraction of a kilowatt (0.5 or larger), such fractions are permitted to be dropped.

SI Units. For metric conversions, 0.093 m^2 = 1 ft^2 and 0.3048 m = 1 ft.

Example D1(a) One-Family Dwelling

The dwelling has a floor area of 1500 ft^2, exclusive of an unfinished cellar not adaptable for future use, unfinished attic, and open porches. Appliances are a 12-kW, 120/240 volt range and a 5.5-kW, 120/240 volt dryer. Assume range and dryer kW ratings equivalent to kVA ratings in accordance with 120.54 and 120.55.

Calculated Load

(see 120.40)

General Lighting Load

1500 ft^2 at 3 VA/ft^2 = 4500 VA

Minimum Number of Branch Circuits Required

[see 210.11(A)]

General Lighting Load:

4500 VA ÷ 120 V = 38 A

This requires three 15-A, 2-wire or two 20-A, 2-wire circuits.

Small-Appliance Load: Two 2-wire, 20-A circuits *[see 210.11(C)(1)]*

Laundry Load: One 2-wire, 20-A circuit *[see 210.11(C)(2)]*

Bathroom Branch Circuit: One 2-wire, 20-A circuit (no additional load calculation is required for this circuit) *[see 210.11(C)(3)]*

Minimum Size Feeder Required

[see 120.40]

General Lighting		4,500 VA
Small Appliance		3,000 VA
Laundry		1,500 VA
	Total	9,000 VA
3000 VA at 100%		3,000 VA
9000 VA – 3000 VA = 6000 VA at 35%		2,100 VA
	Net Load	5,100 VA
Range *(see Table 120.55)*		8,000 VA
Dryer Load *(see Table 120.54)*		5,500 VA
Net Calculated Load		18,600 VA

Net Calculated Load for 120/240-V, 3-wire, single-phase service or feeder

18,600 VA ÷ 240 V = 78 A

Sections 230.42(B) and 230.79 require service conductors and disconnecting means rated not less than 100 amperes.

Calculation for Neutral for Feeder and Service

Lighting and Small-Appliance Load		5,100 VA
Range: 8000 VA at 70% *(see 120.61)*		5,600 VA
Dryer: 5500 VA at 70% *(see 120.61)*		3,850 VA
	Total	14,550 VA

Calculated Load for Neutral

14,550 VA ÷ 240 V = 61 A

Example D1(b) One-Family Dwelling

Assume same conditions as Example No. D1(a), plus addition of one 6-A, 230-V, room air-conditioning unit and one 12-A, 115-V, room air-conditioning unit,* one 8-A, 115-V, rated waste disposer, and one 10-A, 120-V, rated dishwasher. See Article 430 for general motors and Article 440, Part VII, for air-conditioning equipment. Motors have nameplate ratings of 115 V and 230 V for use on 120-V and 240-V nominal voltage systems.

*(For feeder neutral, use larger of the two appliances for unbalance.)

From Example D1(a), feeder current is 78 A (3-wire, 240 V).

-	Line A	Neutral	Line B
Amperes from Example D1(a)	78	61	78
One 230-V air conditioner	6	—	6
One 115-V air conditioner and 120-V dishwasher	12	12	10
One 115-V disposer	—	8	8
25% of air-conditioner *(see 440.33)*	3	3	2
Total amperes per conductor	99	84	104

Therefore, the service would be rated 110 A.

Example D2(a) Optional Calculation for One-Family Dwelling, Heating Larger Than Air Conditioning

(see 120.82)

The dwelling has a floor area of 1500 ft^2, exclusive of an unfinished cellar not adaptable for future use, unfinished attic, and open porches. It has a 12-kW range, a 2.5-kW water heater, a 1.2-kW dishwasher, 9 kW of electric space heating installed in five rooms, a 5-kW clothes dryer, and a 6-A, 230-V, room air-conditioning unit. Assume range, water heater, dishwasher, space heating, and clothes dryer kW ratings equivalent to kVA.

Air Conditioner kVA Calculation

6 A × 230 V ÷ 1000 = 1.38 kVA

This 1.38 kVA [item 1 from 120.82(C)] is less than 40% of 9 kVA of separately controlled electric heat [item 6 from 120.82(C)], so the 1.38 kVA need not be included in the service calculation.

General Load

1500 ft^2 at 3 VA		4,500 VA
Two 20-A appliance outlet circuits at 1500 VA each		3,000 VA
Laundry circuit		1,500 VA
Range (at nameplate rating)		12,000 VA
Water heater		2,500 VA
Dishwasher		1,200 VA
Clothes dryer		5,000 VA
	Total	29,700 VA

Application of Demand Factor

[see 120.82(B)]

First 10 kVA of general load at 100%		10,000 VA
Remainder of general load at 40% (19.7 kVA × 0.4)		7,880 VA
	Total of general load	17,880 VA
9 kVA of heat at 40% (9000 VA × 0.4) =		3,600 VA
	Total	21,480 VA

Calculated Load for Service Size

21.48 kVA = 21,480 VA

21,480 VA ÷ 240 V = 90 A

Therefore, the minimum service rating would be 100 A in accordance with 230.42 and 230.79.

Feeder Neutral Load in Accordance with 120.61

1500 ft^2 at 3 VA		4,500 VA
Three 20-A circuits at 1500 VA		4,500 VA
	Total	9,000 VA
3000 VA at 100%		3,000 VA
9000 VA - 3000 VA = 6000 VA at 35%		2,100 VA
	Subtotal	5,100 VA
Range: 8 kVA at 70%		5,600 VA
Clothes dryer: 5 kVA at 70%		3,500 VA
Dishwasher		1,200 VA
	Total	15,400 VA

Calculated Load for Neutral

15,400 VA ÷ 240 V= 64 A

Example D2(b) Optional Calculation for One-Family Dwelling, Air Conditioning Larger Than Heating

[see 120.82(A) and 120.82(C)]

The dwelling has a floor area of 1500 ft^2, exclusive of an unfinished cellar not adaptable for future use, unfinished attic, and open porches. It has two 20-A small appliance circuits, one 20-A laundry circuit, two 4-kW wall-mounted ovens, one 5.1-kW counter-mounted cooking unit, a 4.5-kW water heater, a 1.2-kW dishwasher, a 5-kW combination clothes washer and dryer, six 7-A, 230-V room air-conditioning units, and a 1.5-kW permanently installed bathroom space heater. Assume wall-mounted ovens, counter-mounted cooking unit, water heater, dishwasher, and combination clothes washer and dryer kW ratings equivalent to kVA.

Air Conditioning kVA Calculation

Total amperes = 6 units × 7 A = 42 A

42 A × 240 V ÷ 1000 = 10.08 kVA (assume PF = 1.0)

Load Included at 100%

Air Conditioning: Included below *[see item 1 in 120.82(C)]*

Space Heater:

Omit *[see item 5 in 120.82(C)]*

General Load

1500 ft^2 at 3 VA		4,500 VA
Two 20-A small-appliance circuits at 1500 VA each		3,000 VA
Laundry circuit		1,500 VA
Two ovens		8,000 VA
One cooking unit		5,100 VA
Water heater		4,500 VA
Dishwasher		1,200 VA
Washer/dryer		5,000 VA
	Total general load	32,800 VA
First 10 kVA at 100%		10,000 VA
Remainder at 40% (22.8 kVA × 0.4 × 1000)		9,120 VA
	Subtotal general load	19,120 VA
Air conditioning		10,080 VA
	Total	29,200 VA

Calculated Load for Service

29,200 VA ÷ 240 V = 122 A (service rating)

Feeder Neutral Load, in accordance with 120.61

Assume that the two 4-kVA wall-mounted ovens are supplied by one branch circuit, the 5.1-kVA counter-mounted cooking unit by a separate circuit.

1500 ft^2 at 3 VA		4,500 VA
Three 20-A circuits at 1500 VA		4,500 VA
	Subtotal	9,000 VA
3000 VA at 100%		3,000 VA
9000 VA - 3000 VA = 6000 VA at 35%		2,100 VA
	Subtotal	5,100 VA

Two 4-kVA ovens plus one 5.1-kVA cooking unit = 13.1 kVA. Table 120.55 permits 55% demand factor or 13.1 kVA × 0.55 = 7.2 kVA feeder capacity.

	Subtotal from above	5,100 VA
Ovens and cooking unit: 7200 VA × 70% for neutral load		5,040 VA
Clothes washer/dryer: 5 kVA × 70% for neutral load		3,500 VA
Dishwasher		1,200 VA
	Total	14,840 VA

Calculated Load for Neutral

14,840 VA ÷ 240 V = 62

Example D2(c) Optional Calculation for One-Family Dwelling with Heat Pump (Single-Phase, 240/120-Volt Service)

(see 120.82)

The dwelling has a floor area of 2000 ft^2, exclusive of an unfinished cellar not adaptable for future use, unfinished attic, and open porches. It has a 12-kW range, a 4.5-kW water heater, a 1.2-kW dishwasher, a 5-kW clothes dryer, and a 2½-ton (24-A) heat pump with 15 kW of backup heat.

Heat Pump kVA Calculation

24 A × 240 V ÷ 1000 = 5.76 kVA
This 5.76 kVA is less than 15 kVA of the backup heat; therefore, the heat pump load need not be included in the service calculation *[see 120.82(C)]*.

General Load

2000 ft^2 at 3 VA		6,000 VA
Two 20-A appliance outlet circuits at 1500 VA each		3,000 VA
Laundry circuit		1,500 VA
Range (at nameplate rating)		12,000 VA
Water heater		4,500 VA
Dishwasher		1,200 VA
Clothes dryer		5,000 VA
	Subtotal general load	33,200 VA
First 10 kVA at 100%		10,000 VA
Remainder of general load at 40% (23,200 VA × 0.4)		9,280 VA
	Total net general load	19,280 VA

Heat Pump and Supplementary Heat*

240 V × 24 A = 5760 VA

15 kW Electric Heat:

5760 VA + (15,000 VA × 65%) = 5.76 kVA + 9.75 kVA = 15.51 kVA

***If supplementary heat is not on at same time as heat pump, heat pump kVA need not be added to total.**

Totals		
Net general load		19,280 VA
Heat pump and supplementary heat		15,510 VA
	Total	34,790 VA

Calculated Load for Service

34.79 kVA × 1000 ÷ 240 V= 145 A

Therefore, this dwelling unit would be permitted to be served by a 150-A service.

Example D3 Store Building

A store 80 ft by 60 ft, or 4,800 ft^2, has 30 ft of show window. There are a total of 80 duplex receptacles. The service is 120/240 V, single phase 3-wire service. Actual connected lighting load is 7,000 VA, all of which for this example is considered continuous. All calculations are rounded up or down as permitted in 120.5(B).

Calculated Load

(see 120.40)

Noncontinuous Loads		
Receptacle Load *(see 120.47)*		
80 receptacles at 180 VA		14,400 VA
10,000 VA at 100%		10,000 VA
14,400 VA - 10,000 VA = 4,400 VA at 50%		2,200 VA
	Subtotal	12,200 VA
Continuous Loads		
General Lighting*		
4,800 ft^2 at 1.9 VA/ft^2		9,120 VA
Show Window Lighting Load		
30 ft at 200 VA/ft *[see 120.14(G)]*		6,000 VA
Outside Sign Circuit *[see 120.14(F)]*		1,200 VA
	Subtotal	16,320 VA
	Subtotal from noncontinuous	12,200 VA
	Total noncontinuous loads + continuous loads =	28,520 VA

*In the example, the actual connected lighting load at 125% (7,000 VA × 1.25 VA) is less than the load from Table 120.42(A), so the required minimum lighting load from Table 120.42(A) is used in the calculation. Had the actual lighting load × 125% been greater than the value calculated from Table 120.42(A), the actual connected lighting load would have been used.

Minimum Number of Branch Circuits Required

General Lighting: Branch circuits need only be installed to supply the actual connected load *[see 210.11(B)]*.

7,000 VA × 1.25 = 8,750 VA

8,750 VA ÷ 240 V = 36.45 A for 3-wire, 120/240 V

8,750 VA ÷ 120 V = 72.92 A

The lighting load would be permitted to be served by 2-wire or 3-wire, 15- or 20-A circuits with combined capacity equal to 36 A or greater for 3-wire circuits or 73 A or greater for 2-wire circuits. The feeder capacity as well as the number of branch-circuit positions available for lighting circuits in the panelboard must reflect the full calculated load of 9,120 VA. Lighting loads from Table 120.42(A) already include 125% for continuous load. See note at bottom of Table 120.42(A).

Show Window

6,000 VA × 1.25 = 7,500 VA

7,500 VA ÷ 240 V = 31.25 A for 3-wire, 120/240 V

7,500 VA ÷ 120 V = 62.5 A for 2-wire, 120 V

The show window lighting is permitted to be served by 2-wire or 3-wire circuits with a capacity equal to 31 A or greater for 3-wire circuits or 63 A or greater for 2-wire circuits.

Receptacles required by 210.62 are assumed to be included in the receptacle load above if these receptacles do not supply the show window lighting load.

Receptacles

Receptacle Load:

14,400 VA ÷ 240 V = 60 A for 3-wire, 120/240 V

14,400 VA ÷ 120 V = 120 A for 2-wire, 120 V

The receptacle load would be permitted to be served by 2-wire or 3-wire circuits with a capacity equal to 60 A or greater for 3-wire circuits or 120 A or greater for 2-wire circuits.

Minimum Size Feeder (or Service) Overcurrent Protection

(see 215.5 or 230.90)

Subtotal noncontinuous loads		12,200 VA
Subtotal continuous loads not from Table 120.42(A) at 125% (7,200 VA × 1.25) (sign and show window)		9,000 VA
Subtotal of calculated continuous loads with 125% already included		9,120 VA
	Total	30,320 VA

30,320 VA ÷ 240 V = 126 A

The next higher standard size is 150 A *(see 240.6).*

Minimum Size Feeders (or Service Conductors) Required

[see 215.4, 230.42(A)]
For 120/240 V, 3-wire system,
30,320 VA ÷ 240 V = 126 A Service or feeder conductor is 1 AWG Cu in accordance with 215.5 and Table 310.16 (with 75°C terminations).

Example D3(a) Industrial Feeders in a Common Raceway

An industrial multi-building facility has its service at the rear of its main building, and then provides 480Y/277-volt feeders to additional buildings behind the main building in order to segregate certain processes. The facility supplies its remote buildings through a partially enclosed access corridor that extends from the main switchboard rearward along a path that provides convenient access to services within 15 m (50 ft) of each additional building supplied. Two building feeders share a common raceway for approximately 45 m (150 ft) and run in the access corridor along with process steam and control and communications cabling. The steam raises the ambient temperature around the power raceway to as much as 35°C. At a tee fitting, the individual building feeders then run to each of the two buildings involved. The feeder neutrals are not connected to the equipment grounding conductors in the remote buildings. All distribution equipment terminations are listed as being suitable for 75°C connections.

Each of the two buildings has the following loads:

Lighting, 11,600 VA, comprised of electric-discharge luminaires connected at 277 V

Receptacles, 22 125-volt, 20-ampere receptacles on general-purpose branch circuits, supplied by separately derived systems in each of the buildings

1 Air compressor, 460 volt, three phase, 5 hp

1 Grinder, 460 volt, three phase, 1.5 hp

3 Welders, AC transformer type (nameplate: 23 amperes, 480 volts, 60 percent duty cycle)

3 Industrial Process Dryers, 480 volt, three phase, 15 kW each (assume continuous use throughout certain shifts)

Determine the overcurrent protection and conductor size for the feeders in the common raceway, assuming the use of XHHW-2 insulation (90°C):

Calculated Load

{Note: For reasonable precision, volt-ampere calculations are carried to three significant figures only; where loads are converted to amperes, the results are rounded to the nearest ampere *[see 120.5(B)]*}.

Noncontinuous Loads		
Receptacle Load *(see 120.47)*		
22 receptacles at 180 VA		3,960 VA
Welder Load *[see 630.11(A),* *Table 630.11(A)]*		
Each welder: 480V × 23A × 0.78 = 8,610 VA		
All 3 welders *[see 630.11(B)]* (demand factors 100%, 100%, 85% respectively)		
8,610 VA + 8,610 VA + 7,320 VA =		24,500 VA
Subtotal, Noncontinuous Loads		**28,500 VA**
Motor Loads*(see 430.24,* *Table 430.250)*		
Air compressor: 7.6 A × 480 V × √3 =		6,310 VA
Grinder: 3 A × 480 V × √3 =		2,490 VA
Largest motor, additional 25%:		1,580 VA
Subtotal, Motor Loads		**10,400 VA**
By using 430.24, the motor loads and the noncontinuous loads can be combined for the remaining calculation.		
Subtotal for load calculations, Noncontinuous Loads		**38,900 VA**
Continuous Loads		
General Lighting		11,600 VA
3 Industrial Process Dryers	15 kW each	45,000 VA
Subtotal, Continuous Loads:		**56,600 VA**

Overcurrent protection

(see 215.5)
The branch-circuit OCPD must accommodate 125 percent of the continuous load, plus the noncontinuous load:

Continuous load	56,600 VA
Noncontinuous load	38,900 VA
Subtotal, actual load [actual load in amperes] [99,000 VA ÷ (480V × √3) = 119 A]	**95,500 VA**
(25% of 56,600 VA) (*See 215.5*)	**14,200 VA**
Total VA	**109,700 VA**

Conversion to amperes using three significant figures: 109,700 VA / (480V × √3) = 132 A

Minimum size branch-circuit OCPD: 132 A

Minimum standard size branch-circuit OCPD *(see 240.6)*: 150 amperes

Where the branch-circuit OCPD and its assembly are listed for operation at 100 percent of its rating, a 125 ampere branch-circuit OCPD would be permitted. However, branch-circuit OCPD assemblies listed for 100 percent of their rating are typically not available at the 125-ampere rating. *(See 215.5 Exception.)*

Ungrounded Feeder Conductors

The conductors must independently meet requirements for (1) terminations, and (2) conditions of use throughout the raceway run.

Minimum size conductor at the branch-circuit OCPD termination *[see 110.14(C) and 215.4(A), using 75°C ampacity column in Table 310.16]*: 1/0 AWG.

Minimum size conductors in the raceway based on actual load *[see Article 100 for the definition of ampacity, and 310.15(C)(1) and correction factors to Table 310.16]*:

95,500 VA ÷ 0.7 ÷ 0.96 = 142,000 VA

[70% = 310.15(C)(1)] and [0.96 = Correction factors to Table 310.16]

Conversion to amperes:

142,000 VA ÷ (480 V × √3) = 171 A

Note that the neutral conductors are counted as current-carrying conductors *[see 310.15(E)(1)(3)]* in this example because the discharge lighting has substantial nonlinear content. This requires a 2/0 AWG conductor based on the 90°C column of Table 310.16. Therefore, the worst case is given by the raceway conditions, and 2/0 AWG conductors must be used. If the utility corridor were at normal temperatures [(30°C (86°F)], and if the lighting at each building were supplied from the local separately derived system (thus requiring no neutrals in the supply feeders), the raceway result (95,500 VA ÷ 0.8 = 119,000 VA; 119,000 VA ÷ (480 V × √3) = 143 A, or a 1 AWG conductor @ 90°C) could not be used, because the termination result (1/0 AWG) based on the 75°C column of Table 310.16 would become the worst case, requiring the larger conductor.

In every case, the branch-circuit OCPD shall provide overcurrent protection for the feeder conductors in accordance with their ampacity as provided by this code *(see 240.4)*. A 90°C 2/0 AWG conductor has a Table 310.16 ampacity of 195 amperes. Adjusting for the conditions of use (35°C ambient temperature, 8 current-carrying conductors in the common raceway),

195 A × 0.96 × 0.7 = 131 A

The 150-ampere circuit breaker protects the 2/0 AWG feeder conductors, because 240.4(B) permits the use of the next higher standard size branch-circuit OCPD. Note that the feeder layout precludes the application of 310.14(A)(2) Exception.

Feeder Neutral Conductor

(see 120.61)

Because 210.11(B) does not apply to these buildings, the load cannot be assumed to be evenly distributed across phases. Therefore, the maximum imbalance must be assumed to be the full lighting load in this case, or 11,600 VA. (11,600 VA ÷ 277 V = 42 A.) The ability of the neutral-to-return fault current *[see 250.32(B) Exception No. 2]* is not a factor in this calculation.

Because the neutral runs between the main switchboard and the building panelboard, likely terminating on a busbar at both locations, and not on branch-circuit OCPD, the effects of continuous loading can be disregarded in evaluating its terminations *[see 215.4(A)(1) Exception No. 3]*. That calculation is (11,600 VA ÷ 277 V = 42 A), to be evaluated under the 75°C column of Table 310.16. The minimum size of the neutral might seem to be 8 AWG, but that size would not be sufficient to be depended upon in the event of a line-to-neutral fault *[see 215.4(B), second paragraph]*. Therefore, because the minimum size equipment grounding conductor for a 150 ampere circuit wired with 2/0 AWG conductors, as covered in Table 250.122(A), is 6 AWG, that is the minimum neutral size required for this feeder.

Example D4(a) Multifamily Dwelling

A multifamily dwelling has 40 dwelling units.

Meters are in two banks of 20 each with individual feeders to each dwelling unit.

One-half of the dwelling units are equipped with 120/240 volt electric ranges not exceeding 12 kW each. Assume range kW rating equivalent to kVA rating in accordance with 120.55. Other half of ranges are gas ranges.

Area of each dwelling unit is 840 ft^2.

Laundry facilities on premises are available to all tenants. Add no circuit to individual dwelling unit.

Calculated Load for Each Dwelling Unit

(see Article 120)

General Lighting: 840 ft^2 at 3 VA/ft^2 = 2520 VA

Special Appliance: Electric range *(see 120.55)* = 8000 VA

Minimum Number of Branch Circuits Required for Each Dwelling Unit

[see 210.11(A)]

General Lighting Load: 2520 VA ÷ 120 V = 21 A or two 15-A, 2-wire circuits; or two 20-A, 2-wire circuits

Small-Appliance Load: Two 2-wire circuits of 12 AWG wire *[see 210.11(C)(1)]*

Range Circuit: 8000 VA ÷ 240 V = 33 A or a circuit of two 8 AWG conductors and one 10 AWG conductor in accordance with 210.19(C)

Minimum Size Feeder Required for Each Dwelling Unit

(see 215.4)

Calculated Load *(see Article 120)*:		
General Lighting		2,520 VA
Small Appliance (two 20-ampere circuits)		3,000 VA
	Subtotal Calculated Load (without ranges)	5,520 VA

Application of Demand Factor

(see Table 120.45)

First 3000 VA at 100%		3,000 VA
5520 VA - 3000 VA = 2520 VA at 35%		882 VA
	Net Calculated Load (without ranges)	3,882 VA
Range Load		8,000 VA
	Net Calculated Load (with ranges)	11,882 VA

Size of Each Feeder

(see 215.4)

For 120/240-V, 3-wire system (without ranges)

Net calculated load of 3882 VA ÷ 240 V = 16 A

For 120/240-V, 3-wire system (with ranges)

Net calculated load, 11,882 VA ÷ 240 V = 50 A

Feeder Neutral

Lighting and Small-Appliance Load		3,882 VA
Range Load: 8000 VA at 70% *(see 120.61)*		5,600 VA
(only for apartments with electric range)		5,600 VA
	Net Calculated Load (neutral)	9,482 VA

Calculated Load for Neutral

9482 VA ÷ 240 V= 39.5 A

Minimum Size Feeders Required from Service Equipment to Meter Bank (For 20 Dwelling Units — 10 with Ranges)

Total Calculated Load:		
Lighting and Small Appliance		
20 units × 5520 V		110,400 VA
Application of Demand Factor		
First 3000 VA at 100%		3,000 VA
110,400 VA - 3000 VA = 107,400 VA at 35%		37,590 VA
	Net Calculated Load	40,590 VA
Range Load: 10 ranges (not over 12 kVA) *(see Col. C, Table 120.55,25 kW)*		25,000 VA
	Net Calculated Load (with ranges)	65,590 VA

Net calculated load for 120/240-V, 3-wire system,

65,590 VA ÷ 240 V = 273 A

Feeder Neutral

Lighting and Small-Appliance Load		40,590 VA
Range Load: 25,000 VA at 70% *[see 120.61(B)]*		17,500 VA
	Calculated Load (neutral)	58,090 VA

Calculated Load for Neutral

58,090 VA ÷ 240 V = 242 A

Further Demand Factor

[120.61(B)]

200 A at 100%		200 A
242 A - 200 A = 42 A at 70%		29 A
	Net Calculated Load (neutral)	229 A

Minimum Size Main Feeders (or Service Conductors) Required (Less House Load) (For 40 Dwelling Units — 20 with Ranges)

Total Calculated Load:		
Lighting and Small-Appliance Load		
40 units × 5520 V		220,800 VA

Application of Demand Factor

(from Table 120.45)

First 3000 VA at 100%		3,000 VA
Next 120,000 VA - 3000 VA = 117,000 VA at 35%		40,950 VA
Remainder 220,800 VA - 120,000 VA = 100,800 VA at 25%		25,200 VA
	Net Calculated Load	69,150 VA
Range Load: 20 ranges (less than 12 kVA)		
(see Col. C, Table 120.55)		35,000 VA
	Net Calculated Load	104,150 VA
For 120/240-V, 3-wire system		

Net calculated load of 104,150 VA ÷ 240 V = 434 A

Feeder Neutral

Lighting and Small-Appliance Load		69,150 VA
Range: 35,000 VA at 70% *[see 120.61(B)]*		24,500 VA
	Calculated Load (neutral)	93,650 VA

93,650 VA ÷ 240 V = 390 A

Further Demand Factor

[see 120.61(B)]

200 A at 100%		200 A
390 A − 200 A = 190 A at 70%		133 A
	Net Calculated Load (neutral)	333 A

[See Table 310.16 through Table 310.21, and 310.15(B), (C), and (E).]

Example D4(b) Optional Calculation for Multifamily Dwelling

A multifamily dwelling equipped with electric cooking and space heating or air conditioning has 40 dwelling units.

Meters are in two banks of 20 each plus house metering and individual feeders to each dwelling unit.

Each dwelling unit is equipped with an electric range of 8-kW, 120/240 volt nameplate rating, four 1.5-kW separately controlled 240 volt electric space heaters, and a 2.5-kW, 240 volt electric water heater. Assume range, space heater, and water heater kW ratings equivalent to kVA. Calculate the load for the individual dwelling unit by the standard calculation (Article 120, Part III).

A common laundry facility is available to all tenants *[see 210.52(F) Exception No. 1]*.

Area of each dwelling unit is 840 ft^2.

Calculated Load for Each Dwelling Unit

(see Part II and Part III of Article 120)

General Lighting Load:	
840 ft^2 at 3 VA/ft^2	2,520 VA
Electric range	8,000 VA
Electric heat: 6 kVA (or air conditioning if larger)	6,000 VA
Electric water heater	2,500 VA

Minimum Number of Branch Circuits Required for Each Dwelling Unit

General Lighting Load: 2520 VA ÷ 120 V = 21 A or two 15-A, 2-wire circuits, or two 20-A, 2-wire circuits
Small-Appliance Load: Two 2-wire circuits of 12 AWG *[see 210.11(C)(1)]*
Range Circuit *(See Table 120.55, Column B)*:

8000 VA × 80% ÷ 240 V = 27 A on a circuit of three

10 AWG conductors in accordance with 210.19(C)
Space Heating: 6000 VA ÷ 240 V = 25 A Number of circuits *(see 210.11)*

Minimum Size Feeder Required for Each Dwelling Unit

(see 215.4)

Calculated Load *(see Article 120):*		
General Lighting		2,520 VA
Small Appliance (two 20-A circuits)		3,000 VA
	Subtotal Calculated Load (without range and space heating)	5,520 VA

Application of Demand Factor

First 3000 VA at 100%		3,000 VA
5520 VA - 3000 VA = 2520 VA at 35%		882 VA
	Net Calculated Load (without range and space heating)	3,882 VA
Range		6,400 VA
Space Heating *(see 120.51)*		6,000 VA
Water Heater		2,500 VA
	Net Calculated Load (for individual dwelling unit)	18,782 VA

Size of Each Feeder

For 120/240-V, 3-wire system,

Net calculated load of 18,782 VA ÷ 240 V = 78 A

Feeder Neutral

(see 120.61)

Lighting and Small Appliance		3,882 VA
Range Load: 6400 VA at 70% *[see 120.61(B)]*		4,480 VA
Space and Water Heating (no neutral): 240 V		0 VA
	Net Calculated Load (neutral)	8,362 VA

Calculated Load for Neutral

8362 VA ÷ 240 V = 35 A

Minimum Size Feeder Required from Service Equipment to Meter Bank (For 20 Dwelling Units)

Total Calculated Load:		
Lighting and Small-Appliance Load		
20 units × 5520 V		110,400 VA
Water and Space Heating Load		
20 units × 8500 V		170,000 VA
Range Load: 20 × 8000 V		160,000 VA
	Net Calculated Load (20 dwelling units)	440,400 VA
Net Calculated Load Using Optional Calculation *(see Table 120.84(B))*		
440,400 VA × 0.38		167,352 VA

167,352 VA ÷ 240 V = 697 A

Minimum Size Main Feeder Required (Less House Load) (For 40 Dwelling Units)

Calculated Load:		
Lighting and Small-Appliance Load		
40 units × 5520 V		220,800 VA
Water and Space Heating Load 40 units × 8500 V		340,000 VA
Range: 40 ranges × 8000 V		320,000 VA
	Net Calculated Load (40 dwelling units)	880,800 VA

Net Calculated Load Using Optional Calculation *(see Table 120.84(B))*

880,800 VA × 0.28 = 246,624 VA

246,624 VA ÷ 240 V = 1028 A

Feeder Neutral Load for Feeder from Service Equipment to Meter Bank (For 20 Dwelling Units)

Lighting and Small-Appliance Load		
20 units × 5520 V		110,400 VA
First 3000 VA at 100%		3,000 VA
110,400 VA - 3000 VA = 107,400 VA at 35%		37,590 VA
	Net Calculated Load	40,590 VA
20 ranges: 35,000 VA at 70% *[see Table 120.55 and 120.61(B)]*		24,500 VA
	Total	65,090 VA

65,090 VA ÷ 240 V = 271 A

Further Demand Factor

[see 120.61(B)]

First 200 A at 100%		200 A
Balance: 271 A - 200 A = 71 A at 70%		50 A
	Total	250 A

Feeder Neutral Load of Main Feeder (Less House Load)(For 40 Dwelling Units)

Lighting and Small-Appliance Load		
40 units × 5520 V		220,800 VA
First 3000 VA at 100%		3,000 VA
Next 120,000 VA - 3000 VA = 117,000 VA at 35%		40,950 VA
Remainder 220,800 VA - 120,000 VA = 100,800 VA at 25%		25,200 VA
	Net Calculated Load	69,150 VA
40 ranges: 55,000 VA at 70% *[see Table 120.55 and 120.61(B)]*		38,500 VA
	Total	107,650 VA

107,650 VA ÷ 240 V = 449 A

Further Demand Factor

[see 120.61(B)]

First 200 A at 100%		200 A
Balance: 449 - 200 A = 249 A at 70%		174 A
	Total	374 A

Example D5(a) Multifamily Dwelling Served at208Y/120 Volts, Three Phase

All conditions and calculations are the same as for the multifamily dwelling [Example D4(a)] served at 120/240 V, single phase except as follows:

Service to each dwelling unit would be two phase legs and neutral.

Minimum Number of Branch Circuits Required for Each Dwelling Unit

(see 210.11)

Range Circuit: 8000 VA ÷ 208 V = 38 A or a circuit of two 8 AWG conductors and one 10 AWG conductor in accordance with 210.19(C)

Minimum Size Feeder Required for Each Dwelling Unit

(see 215.4)

For 120/208-V, 3-wire system (without ranges),

Net calculated load of 3882 VA ÷ 2 legs ÷ 120 V/leg = 16 A

For 120/208-V, 3-wire system (with ranges),

Net calculated load (range) of 8000 VA ÷ 208 V = 39 A

Total load (range + lighting) = 39 A + 16 A = 55 A

Reducing the neutral load on the feeder to each dwelling unit is not permitted *[see 120.61(C)(1)]*.

Minimum Size Feeders Required from Service Equipment to Meter Bank (For 20 Dwelling Units — 10 with Ranges)

For 208Y/120-V, 3-phase, 4-wire system,

Ranges: Maximum number between any two phase legs = 4

2 × 4 = 8.

Table 120.55 demand = 23,000 VA

Per phase demand = 23,000 VA ÷ 2 = 11,500 VA

Equivalent 3-phase load = 34,500 VA

Net Calculated Load (total):

40,590 VA + 34,500 VA = 75,090 VA

75,090 VA ÷ (208 V×1.732) = 208 A

Feeder Neutral Size

Net Calculated Lighting and Appliance Load & Equivalent Range Load:

40,590 VA + (34,500 VA at 70%) = 64,700 VA

Net Calculated Neutral Load:

64,700 VA ÷ (208 V×1.732) = 180 A

Minimum Size Main Feeder (Less House Load) (For 40 Dwelling Units — 20 with Ranges)

For 208Y/120-V, 3-phase, 4-wire system,

Ranges:

Maximum number between any two phase legs = 7

2 × 7 = 14.

Table 120.55 demand = 29,000 VA

Per phase demand = 29,000 VA ÷ 2 = 14,500 VA

Equivalent 3-phase load = 43,500 VA

Net Calculated Load (total):

69,150 VA + 43,500 VA = 112,650 VA

112,650 VA ÷ (208 V×1.732) = 313 A

Main Feeder Neutral Size:

69,150 VA + (43,500 VA at 70%) = 99,600 VA

99,600 VA ÷ (208 V×1.732) = 277 A

Further Demand Factor

(see 120.61)

200 A at 100%		200.0 A
277 A - 200 A = 77 A at 70%		54 A
	Net Calculated Load (neutral)	254 A

Example D5(b) Optional Calculation for Multifamily Dwelling Served at 208Y/120 Volts, Three Phase

All conditions and calculations are the same as for Optional Calculation for the Multifamily Dwelling [Example D4(b)] served at 120/240 V, single phase except as follows:

Service to each dwelling unit would be two phase legs and neutral.

Minimum Number of Branch Circuits Required for Each Dwelling Unit

(see 210.11)

Range Circuit *(see Table 120.55, Column B):* 8000 VA at 80%÷ 208 V = 31 A or a circuit of two 8 AWG conductors and one 10 AWG conductor in accordance with 210.19(C)

Space Heating: 6000 VA ÷ 208 V = 29 A

Two 20-ampere, 2-pole circuits required, 12 AWG conductors

Minimum Size Feeder Required for Each Dwelling Unit

120/208-V, 3-wire circuit

Net calculated load of 18,782 VA ÷ 208 V = 90 A

Net calculated load (lighting line to neutral):

3882 VA ÷ 2 legs ÷ 120 V per leg = 16.2 A

Line to line = 14,900 VA ÷ 208 V = 71.6 A

Total load = 16.2 A + 71.6 A = 88 A

Minimum Size Feeder Required for Service Equipment to Meter Bank (for 20 Dwelling Units)

Net Calculated Load

167,352 VA ÷ (208 V×1.732) = 465 A

Feeder Neutral

Load for Feeder from Service Equipment to Meter Bank (for 20 Dwelling Units)

Lighting and Small-Appliance Load

20 units × 5520 VA = 110,400 VA first 3000 VA at 100% = 3000 VA

110,400 VA − 3000 VA = 107,400 VA at 35% = 37,590 VA

Net Calculated Load: 40,590 VA

Minimum Size Main Feeder (Less House Load) (for 20 Dwelling Units – 20 Ranges) for 208Y/120-V, 3-Phase, 4-Wire System

Ranges:

Maximum number between any two phase legs = 7

2 × 7 = 14

Table 120.55 demand = 29,000 VA

Per phase demand = 29,000 VA ÷ 2 = 14,500 VA

Equivalent 3-phase load = 43,500 VA

Net Calculated Neutral Load (total): 40,590 VA + 43,500 VA = 84,090 VA

84,090 VA ÷ (208 V×1.732) = 234 A

Minimum Size Service Required (Less House Load) (for 40 Dwelling Units) (Assume Balanced Load)

Net Calculated Load:

246,624 VA ÷ (208 V×1.732) = 685 A

Feeder Neutral Load for Feeder from Service Equipment to Meter Bank (for 40 Dwelling Units)

Lighting and Small-Appliance Load

40 units × 5520 VA = 220,800 VA

First 3000 VA at 100% = 3000 VA

Next 120,000 VA − 3000 VA = 117,000 VA

117,000 VA at 35% = 40,950 VA

Remainder 220,800 VA − 120,000 VA = 100,800 VA at 25% = 25,200 VA

Net Calculated Load: 69,150 VA

Minimum Size Main Feeder (Less House Load) (for 40 Dwelling Units — 40 with Ranges) for 208Y/120-V, 3-Phase, 4-Wire System

Ranges:

Maximum number between any two phase legs = 14

2 × 14 = 28

Table 120.55 demand = 15,000 VA + (1000 VA × 28) = 43,000 VA per phase

Demand = 43,000 VA ÷ 2 = 21,500 VA

Equivalent 3-phase load = 21,500 VA × 3 = 64,500 VA

Neutral Load = 64,500 VA at 70% [See Table 120.55 and 120.61(B)] Neutral Load = 45,150 VA

Net Calculated Neutral Load (total): 69,150 VA + 45,150 VA = 114,300 VA

114,300 VA ÷ (208 V×1.732) = 317 A

Further Demand Factor

[see 120.61(B)]

200 A at 100%		200 A
317 A − 200 A = 117 A at 70%		82 A
	Net Calculated Load (neutral)	282 A

Example D6 Maximum Demand for Range Loads

Table 120.55, Column C, applies to ranges not over 12 kW. The application of Note 1 to ranges over 12 kW (and not over 27 kW) and Note 2 to ranges over 8¾ kW (and not over 27 kW) is illustrated in the following two examples.

A. Ranges All the Same Rating*(see Table 120.55, Note 1)*

Assume 24 ranges, each rated 16 kW.

From Table 120.55, Column C, the maximum demand for 24 ranges of 12-kW rating is 39 kW. 16 kW exceeds 12 kW by 4.

5% × 4 = 20% (5% increase for each kW in excess of 12)

39 kW × 20% = 7.8 kW increase

39 + 7.8 = 46.8 kW (value to be used in selection of feeders)

B. Ranges of Unequal Rating*(see Table 120.55, Note 2)*

Assume 5 ranges, each rated 11 kW; 2 ranges, each rated 12 kW; 20 ranges, each rated 13.5 kW; 3 ranges, each rated 18 kW.

5 ranges	× 12 kW =	60 kW (use 12 kW for range rated less than 12)
2 ranges	× 12 kW =	24 kW
20 ranges	× 13.5 kW =	270 kW
3 ranges	× 18 kW =	54 kW
30 ranges, Total kW =		408 kW

408 ÷ 30 ranges = 13.6 kW (average to be used for calculation)

From Table 120.55, Column C, the demand for 30 ranges of 12-kW rating is 15 kW + 30 (1 kW × 30 ranges) = 45 kW. 13.6 kW exceeds 12 kW by 1.6 kW (use 2 kW).

5% × 2 = 10% (5% increase for each kW in excess of 12 kW)

45 kW × 10% = 4.5 kW increase

45 kW + 4.5 kW = 49.5 kW (value to be used in selection of feeders)

Example D7 Sizing of Service Conductors for Dwelling(s)

Service conductors and feeders for certain dwellings are permitted to be sized in accordance with 310.12.

The terminal temperature rating is assumed to be 75°C (167°F) for the example.

With No Required Adjustment or Correction Factors. If a 175-ampere service rating is selected, a service conductor for a single-phase dwelling is then sized as follows per 310.12(A):

The single-phase dwelling service rating is calculated:

175 amperes × 0.83 = 145.25 amperes.

If no other adjustments or corrections are required for the installation, then, in accordance with Table 310.16, a 1/0 AWG Cu or a 3/0 AWG Al meets this rating at 75°C (167°F).

With Required Temperature Correction Factor.

If a 175-ampere service rating is selected, a service conductor for a single-phase dwelling is then sized as follows per 310.12(A):

First, the single phase dwelling service rating is calculated:

175 amperes × 0.83 = 145.25 amperes.

If the conductors are installed in an ambient temperature of 49°C (120°F), the conductor ampacity must be multiplied by the appropriate correction factor in Table 310.15(B)(1)(1). In this example, using an XHHW-2 conductor (Temperature Rating = 90°C (194°F)), will require a correction factor of 0.82 to obtain the corrected conductor ampacity for this installation:

Per 110.14(C) and 310.15(A), compare the corrected conductor ampacity based upon the conductor temperature rating with the conductor ampacity based upon the termination temperature rating and use the smaller of the two values. For the purposes of this calculation, no adjustment or correction factors are applied to the conductor ampacity that is based upon the termination temperature rating.

Starting with the sizes determined above, the corrected conductor ampacities are:

For 1/0 AWG Cu XHHW-2 at 90°C (194°F): 170 amperes x 0.82 = 139.4 amperes

For 3/0 AWG Al XHHW-2 at 90°C (194°F): 175 amperes x 0.82 = 143.5 amperes

The conductor ampacities for the termination temperature rating are:

For 1/0 AWG Cu XHHW-2 at 75°C (167°F): 150 amperes

For 3/0 AWG Al XHHW-2 at 75°C (167°F): 155 amperes

Choosing the smaller of these values:

For 1/0 AWG Cu: 139.4 amperes

For 3/0 AWG Al: 143.5 amperes

Since these results are below the single-phase dwelling service rating calculated above (145.25 amperes), try the next larger size:

For 2/0 AWG Cu XHHW-2 at 90°C (194°F): 195 amperes x 0.82 = 159.9 amperes

For 4/0 AWG Al XHHW-2 at 90°C (194°F): 205 amperes x 0.82 = 168.1 amperes

The conductor ampacities for the termination temperature rating are:

For 2/0 AWG Cu XHHW-2 at 75°C (167°F): 175 amperes

For 4/0 AWG Al XHHW-2 at 75°C (167°F): 180 amperes

Choosing the smaller of these values:

For 2/0 AWG Cu: 159.9 amperes

For 4/0 AWG Al: 168.1 amperes

These results are above the single-phase dwelling service rating calculated earlier (145.25 amperes), so the required conductor size is a 2/0 AWG Cu or a 4/0 AWG Al.

If no temperature correction or ampacity adjustment factors are required, the following table includes conductor sizes calculated using the requirements in 310.12. This table is based on 75°C terminations and without any adjustment or correction factors.

Table D.7 Single-Phase Dwelling Services and Feeders

Service or Feeder Rating (Amperes)	Conductor (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum
100	4	2
110	3	1
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	3/0	250
250	4/0	300
300	250	350
350	350	500
400	400	600

Example D8 Motor Circuit Conductors, Overload Protection, and Short-Circuit and Ground-Fault Protection

(see 240.6, 430.6, 430.22, 430.23, 430.24, 430.32, 430.52, and 430.62, Table 430.52(C)(1), and Table 430.250)

Determine the minimum required conductor ampacity, the motor overload protection, the branch-circuit short-circuit and ground-fault protection, and the feeder protection, for three induction-type motors on a 480-V, 3-phase feeder, as follows:

(a) One 25-hp, 460-V, 3-phase, squirrel-cage motor, nameplate full-load current 32 A, Design B, Service Factor 1.15

(b) Two 30-hp, 460-V, 3-phase, wound-rotor motors, nameplate primary full-load current 38 A, nameplate secondary full-load current 65 A, 40°C rise

Conductor Ampacity

The full-load current value used to determine the minimum required conductor ampacity is obtained from Table 430.250*[see 430.6(A)]* for the squirrel-cage motor and the primary of the wound-rotor motors. To obtain the minimum required conductor ampacity, the full-load current is multiplied by 1.25 *[see 430.22 and 430.23(A)].*

For the 25-hp motor,

34 A × 1.25 = 43 A

For the 30-horsepower motors,

40 A × 1.25 = 50 A

65 A × 1.25 = 81 A

Motor Overload Protection

Where protected by a separate overload device, the motors are required to have overload protection rated or set to trip at not more than 125% of the nameplate full-load current *[see 430.6(A) and 430.32(A)(1)].*

For the 25-hp motor,

32 A × 1.25 = 40.0 A

For the 30-hp motors,

38 A × 1.25 = 48 A

Where the separate overload device is an overload relay (not a fuse or circuit breaker), and the overload device selected at 125% is not sufficient to start the motor or carry the load, the trip setting is permitted to be increased in accordance with 430.32(C).

Branch-Circuit Short-Circuit and Ground-Fault Protection

The selection of the rating of the protective device depends on the type of motor and the protective device selected, in accordance with 430.52 and Table 430.52(C)(1). The following is for the 25-hp squirrel-cage motor:

(a) Nontime-Delay Fuse: The fuse rating is 300% × 34 A = 102 A. The next larger standard fuse is 110 A *[see 240.6 and 430.52(C)(1)(a)].* If the motor will not start with a 110-A nontime-delay fuse, the fuse rating is permitted to be increased to 125 A because this rating does not exceed 400% *[see 430.52(C)(1)(b)].*

(b) Time-Delay Fuse: The fuse rating is 175% × 34 A = 59.5 A. The next larger standard fuse is 60 A *[see 240.6 and 430.52(C)(1)(a)].* If the motor will not start with a 60-A time-delay fuse, the fuse rating is permitted to be increased to 70 A because this rating does not exceed 225% *[see 430.52(C)(1)(b)].*

The following is for the 30-hp wound-rotor motors:

(a) Nontime-Delay Fuse: The fuse rating is 150% × 40 A = 60 A. If the motor will not start with a 60-A nontime-delay fuse, the fuse rating is permitted to be increased to 150 A because this rating does not exceed 400% *[see 430.52(C)(1)(b)]*.

(b) Time-Delay Fuse: The fuse rating is 150% × 40 A = 60 A. If the motor will not start with a 60-A time-delay fuse, the fuse rating is permitted to be increased to 90 A because this rating does not exceed 225% *[see 430.52(C)(1)(b)].*

(c) Inverse Time Circuit Breaker: The breaker rating is 150% × 40 A = 60 A. If the motor will not start with a 60-A breaker, the breaker rating is permitted to be increased to 150 A because this rating does not exceed 400% *[see 430.52(C)(1)(b), for motor full-load currents of 100 A or less]*.

Feeder Short-Circuit and Ground-Fault Protection

(a) Example using nontime-delay fuse. The rating of the feeder protective device is based on the sum of the largest branch-circuit protective device for the specific type of device protecting the feeder. In the previous step above, the calculation for the 25 hp squirrel-cage motor results in the largest branch-circuit protective device: 300% × 34 A = 102 A (therefore the next largest standard size, 110 A, would be used) plus the sum of the full-load currents of the other motors, or 110 A + 40 A + 40 A = 190 A. The nearest standard fuse that does not exceed this value is 175 A *[see 240.6, Table 430.52(C)(1), and 430.62(A)]*.

(b) Example using inverse time circuit breaker. The largest branch-circuit protective device for the specific type of device protecting the feeder. The calculation for the 25-hp squirrel-cage motor results in the largest branch-circuit protective device, 250% × 34 A = 85. The next larger standard size is 90 A, plus the sum of the full-load currents of the other motors, or 90 A + 40 A + 40 A = 170 A. The nearest standard inverse time circuit breaker that does not exceed this value is 150 A *[see 240.6, Table 430.52(C)(1), and 430.62(A)]*.

Example D9 Feeder Ampacity Determination for Generator Field Control

[see 215.4, 430.24, 430.24 Exception No. 1, 620.13, 620.14, 620.61, and Table 430.22(E)]

Determine the conductor ampacity for a 460-V 3-phase, 60-Hz ac feeder supplying a group of six elevators. The 460-V ac drive motor nameplate rating of the largest MG set for one elevator is 40 hp and 52 A, and the remaining elevators each have a 30-hp, 40-A, ac drive motor rating for their MG sets. In addition to a motor controller, each elevator has a separate motion/operation controller rated 10 A continuous to operate microprocessors, relays, power supplies, and the elevator car door operator. The MG sets are rated continuous.

Conductor Ampacity

Conductor ampacity is determined as follows:

(a) In accordance with 620.13(D) and 620.61(B)(1), use Table 430.22(E), for intermittent duty (elevators). For intermittent duty using a continuous rated motor, the percentage of nameplate current rating to be used is 140%.

(b) For the 30-hp ac drive motor,

140% × 40 A = 56 A

(c) For the 40-hp ac drive motor,

140% × 52 A = 73 A(I)

(d) The total conductor ampacity is the sum of all the motor currents:

(1 motor × 73 A) + (5 motors × 56 A) = 353 A

(e) In accordance with 620.14 and Table 620.14, the conductor (feeder) ampacity would be permitted to be reduced by the use of a demand factor. Constant loads are not included *(see Table 620.14).* For six elevators, the demand factor is 0.79. The feeder diverse ampacity is, therefore, 0.79 × 353 A = 279 A.

(f) In accordance with 430.24 and 215.5, the controller continuous current is 125% × 10 A = 13 A

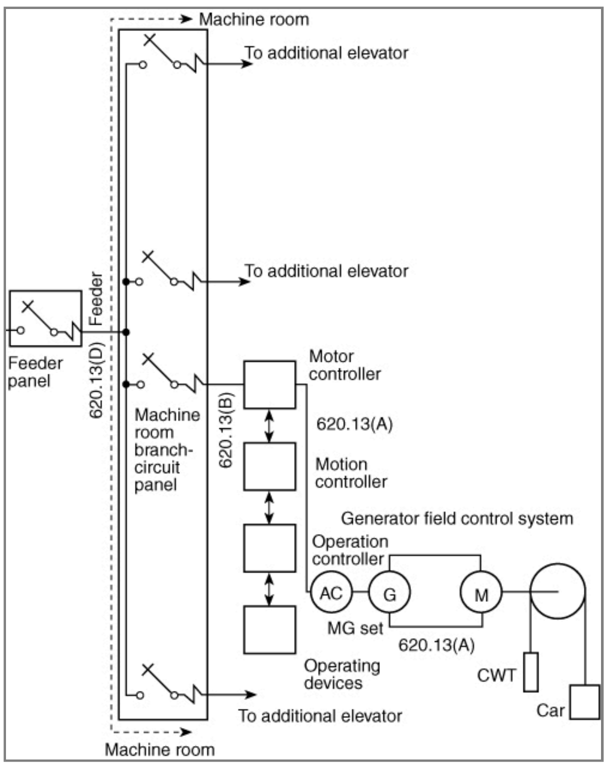
(g) The total feeder ampacity is the sum of the diverse current and all the controller continuous current.

I_{total} = 279 A + (6 elevators × 12.5 A) = 354 A

(h) This ampacity would be permitted to be used to select the wire size.

See Figure D9.

Figure D9 Generator Field Control.



Example D10 Feeder Ampacity Determination for Adjustable Speed Drive Control [see 215.4, 430.24, 620.13, 620.14, 620.61, and Table 430.22(E)]

Determine the conductor ampacity for a 460-V, 3-phase, 60-Hz ac feeder supplying a group of six identical elevators. The system is adjustable-speed SCR dc drive. The power transformers are external to the drive (motor controller) cabinet. Each elevator has a separate motion/operation controller connected to the load side of the main line disconnect switch rated 10 A continuous to operate microprocessors, relays, power supplies, and the elevator car door operator. Each transformer is rated 95 kVA with an efficiency of 90%.

Conductor Ampacity

Conductor ampacity is determined as follows:

(a) Calculate the nameplate rating of the transformer:

$$I = \frac{95 \text{ kVA} \times 1000}{\sqrt{3} \times 460 \text{ V} \times 0.90_{\text{eff.}}} = 133 \text{ A} \qquad \textbf{[D10]}$$

(b) In accordance with 620.13(D), for six elevators, the total conductor ampacity is the sum of all the currents.

6 elevators × 133 A = 798 A

(c) In accordance with 620.14 and Table 620.14, the conductor (feeder) ampacity would be permitted to be reduced by the use of a demand factor. Constant loads are not included *(see 620.13, Informational Note No. 2)*. For six elevators, the demand factor is 0.79. The feeder diverse ampacity is, therefore, 0.79 × 798 A = 630 A.

(d) In accordance with 430.24 and 215.5, the controller continuous current is 125% × 10 A = 13 A.

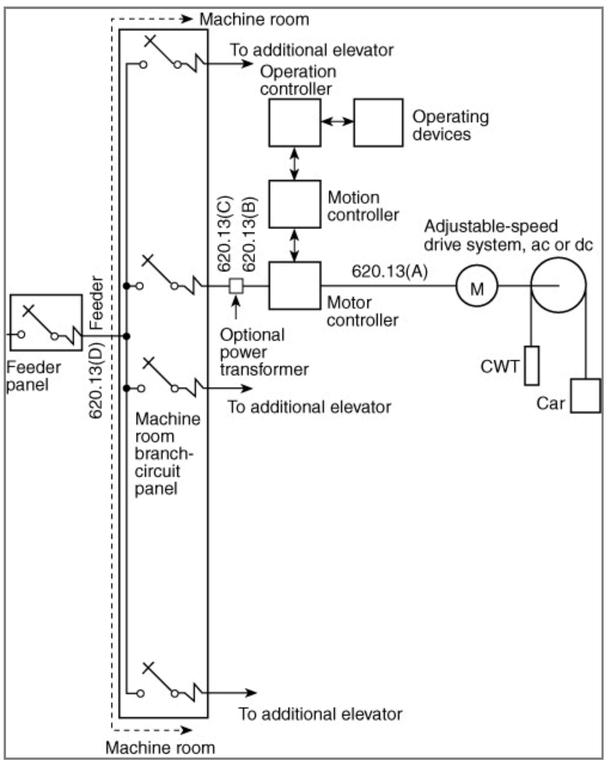
(e) The total feeder ampacity is the sum of the diverse current and all the controller constant current.

I_{total} = 630 A + (6 elevators × 12.5 A) = 705 A

(f) This ampacity would be permitted to be used to select the wire size.

See Figure D10.

Figure D10 Adjustable Speed Drive Control.



Example D11 Mobile Home

(see 550.18)

A mobile home floor is 70 ft by 10 ft and has two small appliance circuits; a 1000-VA, 240-V heater; a 200-VA, 120-V exhaust fan; a 400-VA, 120-V dishwasher; and a 7000-VA electric range.

Lighting and Small-Appliance Load

Lighting (70 ft × 10 ft × 3 VA per ft^2)		2,100 VA
Small-appliance (1500 VA× 2 circuits)		3,000 VA
Laundry (1500 VA × 1 circuit)		1,500 VA
	Subtotal	6,600 VA
First 3000 VA at 100%		3,000 VA
Remainder (6600 VA – 3000 VA = 3600 VA) × 35%		1,260 VA
	Total	4,260 VA

4260 VA ÷ 240 V = 17.75 A per leg

Amperes per Leg	Leg A	Leg B
Lighting and appliances	18	18
Heater (1000 VA ÷ 240 V)	4	4
Fan (200 VA × 125% ÷ 120 V)	2	—
Dishwasher (400 VA ÷ 120 V)	—	3
Range (7000 VA × 0.8 ÷ 240 V)	23	23
Total amperes per leg	47	48

Based on the higher current calculated for either leg, a minimum 50-A supply cord would be required.

For SI units, 0.093 m^2 = 1 ft^2 and 0.3048 m = 1 ft.

Example D12 Park Trailer

(see 552.47)

A park trailer floor is 40 ft by 10 ft and has two small appliance circuits, a 1000-VA, 240-V heater, a 200-VA, 120-V exhaust fan, a 400-VA, 120-V dishwasher, and a 7000-VA electric range.

Lighting and Small-Appliance Load		-
Lighting (40 ft × 10 ft × 3 VA per ft^2)		1,200 VA
Small-appliance (1500 VA× 2 circuits)		3,000 VA
Laundry (1500 VA × 1 circuit)		1,500 VA
	Subtotal	5,700 VA
First 3000 VA at 100%		3,000 VA
Remainder (5700 VA – 3000 VA = 2700 VA) × 35%		945 VA
	Total	3,945 VA

3945 VA÷ 240 V = 16.44 A per leg

Amperes per Leg	Leg A	Leg B
Lighting and appliances	16	16
Heater (1000 VA ÷ 240 V)	4	4
Fan (200 VA × 125% ÷ 120 V)	2	—
Dishwasher (400 VA ÷ 120 V)	—	3
Range (7000 VA × 0.8 ÷ 240 V)	23	23
Totals	45	46

Based on the higher current calculated for either leg, a minimum 50-A supply cord would be required.

For SI units, 0.093 m^2 = 1 ft^2 and 0.3048 m = 1 ft.

Example D13 Cable Tray Calculations

(See Article 392)

Multiconductor Cables 4/0 AWG and Larger

Use: *NEC*392.22(A)(1)(a)

Cable tray must have an inside width equal to or greater than the sum of the diameters (Sd) of the cables, which must be installed in a single layer.

Example: Cable tray width is obtained as follows:

Cable Size Being Used	(OD) Cable Outside Diameters (in.)	(N) Number of Cables	SD = (OD) × (N) (Sum of the Cable Diameters) (in.)
3–conductor Type MC cable — 4/0 AWG	1.57	12	18.84

The sum of the diameters (Sd) of all cables = 18.84 in., therefore a cable tray with an inside width of at least 18.84 in. is required.

Note: Cable outside diameter is a nominal diameter from catalog data.

Multiconductor Cables Smaller Than 4/0 AWG

Use: *NEC*392.22(A)(1)(b)

The sum of the cross-sectional areas of all the cables to be installed in the cable tray must be equal to or less than the allowable cable area for the tray width, as indicated in Table 392.22(A)(1), Column 1.

Table D13(b) from Table 392.22(A), Column 1

Inside Width of Cable Tray (in.)	Allowable Cable Area ($in.^2$)
6	7.0
9	10.5
12	14.0
18	21.0
24	28.0
30	35.0
36	42.0

Example: Cable tray width is obtained as follows:

Cable Size Being Used	(A) Cable Cross-Sectional Area ($in.^2$)	(N) Number of Cables	Multiply (A) × (N) (Which Is a Total Cable Cross-Sectional Area in $in.^2$)
4-conductor Type MC cable — 1 AWG	1.1350	9	12.15

The total cable cross-sectional area is 12.15 $in.^2$. Using Table D13(b) above, the next higher allowable cable area must be used, which is 14.0 $in.^2$. The table specifies that the cable tray inside width for an allowable cable area of 14.0 $in.^2$ is 12 in.

Note: Cable cross-sectional area is a nominal area from catalog data.

Single Conductor Cables 1/0 AWG through 4/0 AWG

Use: *NEC*392.22(B)(1)(d)

Cable tray must have an inside width equal to or greater than the sum of the diameters (Sd) of the cables. The cables must be evenly distributed across the cable tray.

Example: Cable tray width is obtained as follows:

Single Conductor Cable Size Being Used	(OD) Cable Outside Diameters (in.)	(N) Number of Cables	Sd = (OD) × (N) (Sum of the Cable Diameters) (in.)
THHN — 4/0 AWG	0.642	18	11.556

The sum of the diameters (Sd) of all cables = 11.56 in., therefore, a cable tray with an inside width of at least 11.56 in. is required.

Note: Cable outside diameter from Chapter 9, Table 5.

Single Conductor Cables 250 kcmil through 900 kcmil

Use: *NEC*392.22(B)(1)(b)

The sum of the cross-sectional areas of all the cables to be installed in the cable tray must be equal to or less than the allowable cable area for the tray width, as indicated in Table 392.22(B)(1), Column 1.

Table D13(d) from Table 392.22(B)(1), Column 1

Inside Width of Cable Tray (in.)	Allowable Cable Area ($in.^2$)
6	6.5
9	9.5
12	13.0
18	19.5
24	26.0
30	32.5
36	39.0

Example: Cable tray width is obtained as follows:

Cable Size Being Used	(A) Cable Cross-Sectional Area ($in.^2$)	(N) Number of Cables	Multiply (A) × (N) (Which Is a Total Cable Cross-Sectional Area in $in.^2$)
THHN — 500 kcmil	0.707	9	6.36

The total cable cross-sectional area is 6.36 $in.^2$. Using Table D13(d), the next higher allowable cable area must be used, which is 6.5 $in.^2$. The table specifies that the cable tray inside width for an allowable cable area of 6.5 $in.^2$ is 6 in.

Note: Single-conductor cable cross-sectional area from Chapter 9, Table 5.

Example D14 Grounded Service Conductor

[see 250.24(D)]

A service installation has four parallel sets of 350 kcmil ungrounded service entrance conductors. All conductors are copper. No additional considerations for adjustments or corrections are included.

(A) Parallel Grounded Service Conductors in a Single Raceway/Wireway

Section 250.24(D)(1) requires a single grounded conductor to be installed in the raceway and be not smaller than specified in Table 250.102(C)(2). The size of the grounded conductor is based off the size of the equivalent area for parallel conductors.

350 kcmil × 4 = 1400 kcmil of equivalent area

According to Table 250.102(C)(2), Note 1, the grounded conductor is required not be smaller than 12.5 percent of the equivalent area of the parallel ungrounded conductors.

1400 kcmil × 12.5% = 175 kcmil

The smallest standard size wire that meets this criteria is 4/0 AWG copper.

(B) Parallel Grounded Service Conductors in Four Separate Raceways/Wireways

Section 250.24(D) states that a grounded conductor is to be routed with the ungrounded service conductors. There will be four grounded service conductors in total, one in each raceway or wireway. Section 250.24(D)(2) requires that each grounded conductor be sized in accordance with Table 250.102(C)(2), based on the size of the largest ungrounded conductor in the raceway, and not smaller than 1/0 AWG. See 310.10(G) for the requirements of circuit conductors installed in parallel. For this installation, Table 250.102(C)(2) would require the installation of a #2 conductor in each raceway. However, 250.24(D)(2) states that the grounded conductor installed is required not be smaller than 1/0 AWG. A 1/0 AWG copper grounded service conductor is required to be installed in each of the four raceways containing ungrounded service conductors.

(C) Parallel Grounded Service Conductors in Two Separate Raceways/Wireways

As noted in D14(B), a grounded conductor is required to be routed with the ungrounded service conductors. In this example, two parallel sets of the 350 kcmil ungrounded service conductors will be installed in each raceway or wireway. There will be two grounded service conductors in total, one in each raceway or wireway. Section 250.24(D)(2) applies, as well as the rules in 310.10(G). With two sets installed in one raceway, the size of the grounded conductor is required to be sized in accordance with Table 250.102(C)(2), and based off the equivalent area of the two sets of 350 kcmil ungrounded service conductors, or 700 kcmil. A 2/0 AWG grounded service conductor is required to be installed in each of the two raceways containing ungrounded service conductors.

Example D.15 Load Calculations Using Power Control Systems (PCS)

A new dwelling has a total service load of 29,040 volt-amperes (121 amperes, 240 volts) calculated according to Article 120, Parts III through VII. The available service from the electric utility is limited to 100 amperes. In order to accommodate the connected loads on the 100 ampere service, a power control system is used in accordance with 120.7. Examples D14(a) through D14(d) illustrate treatment of different PCS configurations in load calculations for the service.

Example D15(a) Monitoring Controlled and Noncontrolled Loads, 50 Ampere EVSE

The EVSE rated at 12,000 volt-amperes (50 amperes, 240 volts) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 0 amperes. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Example D15(a) Monitoring Controlled and Noncontrolled Loads, 50 A EVSE

The EVSE rated at 12,000 volt-amperes (50 amperes, 240 volts) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 0 A. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 17,040 volt-amperes (71 amperes, 240 volts)

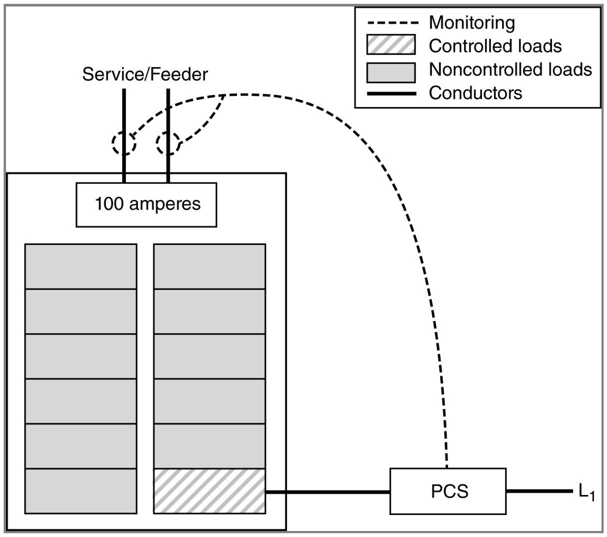
Controlled loads: Treated at minimum operating current of PCS = 0 volt-amperes (0 amperes, 240 volts)

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 17,040 volt-amperes (71 amperes, 240 volts)

See Figure D.15(a).

Figure D.15(a) Monitoring Controlled and Noncontrolled Loads, 50 Amperes EVSE.



Example D15(b) Monitoring Controlled and Noncontrolled Loads, 30 Amperes EVSE

The EVSE rated at 7,200 volt-amperes (30 amperes, 240 volts) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 8 amperes. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt-amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 21,840 volt-amperes (91 amperes, 240 volts)

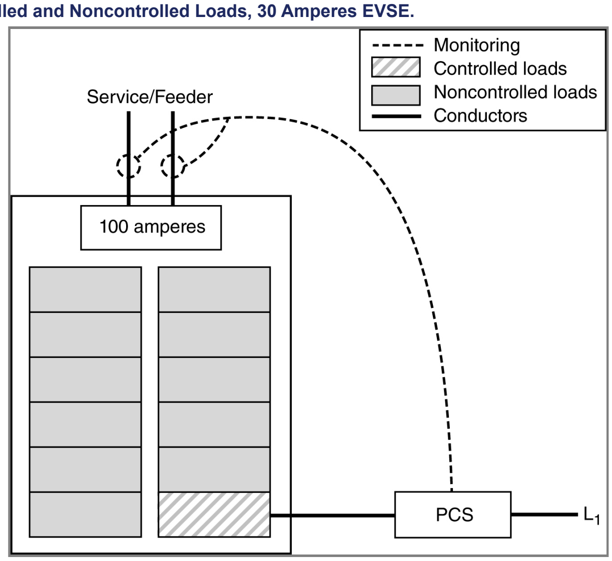
Controlled loads: Treated at minimum operating current of PCS = 1,920 volt-amperes (8 amperes, 240 volts)

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 23,760 volt-amperes (99 amperes, 240 volts)

See Figure D.15(b).

Figure D.15(b) Monitoring Controlled and Noncontrolled Loads, 30 Amperes EVSE.



Example D15(c) Monitoring Only Controlled Loads, 35 Amperes EVSE, 20 Amperes Pool Pump, and 30 Amperes HVAC Heat Pump

The EVSE rated at 8,400 volt-amperes (35 amperes, 240 volts), pool pump rated at 4,800 volt-amperes (20 amperes, 240 volts) and HVAC heat pump rated at 7,200 volt-amperes (30 amperes, 240 volts) are all placed under PCS control. The PCS is configured to monitor each of the branch circuits serving the three loads being controlled. The PCS modulates the EVSE, pool pump and HVAC heat pump loads to ensure that their combined demand does not exceed the current setpoint of the PCS. The PCS current setpoint is established by qualified personnel at 35 amperes, which is less than the maximum 80 percent of the 100 ampere OCPD protecting the service. Each individual branch circuit remains protected by its own OCPD. In this configuration, the PCS monitors only the controlled loads, so the controlled EVSE, pool pump, and HVAC heat pump are treated in service load calculations using the PCS current setpoint of 35 amperes. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 14,640 volt-amperes (61 amperes, 240 volts)

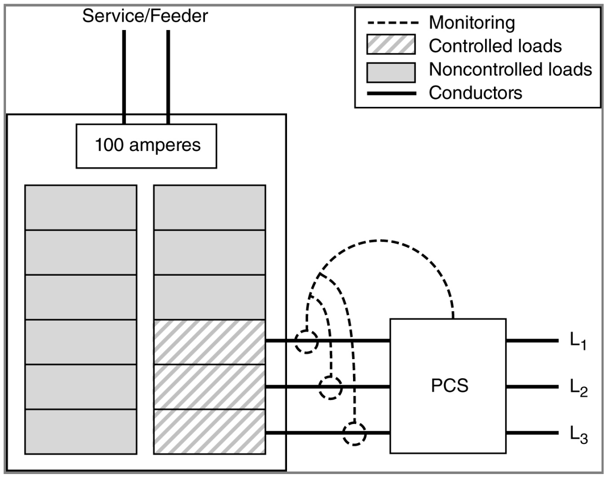
Controlled loads: Treated at current setpoint of PCS = 8,400 volt-amperes (35 amperes, 240 volts)

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 23,040 volt-amperes (96 amperes, 240 volts)

See Figure D.15(c).

Figure D.15(c) Monitoring Only Controlled Loads, 35 Amperes EVSE, 20 Amperes Pool Pump, and 30 Amperes HVAC Heat Pump.



Example D15(d) Monitoring Only Controlled Loads, All Loads Controlled

The PCS is configured to monitor the service and to modulate all loads. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors only controlled loads, so the controlled loads are treated in service load calculations using the PCS current setpoint of 80 amperes.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 0 volt-amperes (0 amperes, 240 volts)

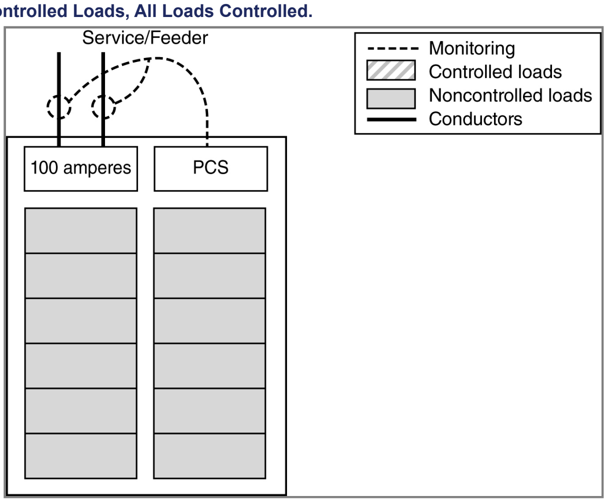
Controlled loads: Treated at current setpoint current of PCS = 19,200 volt-amperes (80 amperes, 240 volt)

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 19,200 volt-amperes (80 amperes, 240 volt)

See Figure D.15(d).

Figure D.15(d) Monitoring Only Controlled Loads, All Loads Controlled.



Additional Proposed Changes

File Name	Description	Approved
CN_215.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 215 appeared in the First Draft Report.

The Correlating Committee directs CMP 2 to review the examples in Annex D to ensure the examples accurately reflect the revisions made to Article 220 requirements in the first draft.

Related Item

- Correlating Committee Note No. 215

Submitter Information Verification

Submitter Full Name:	CC Notes
Organization:	NEC Correlating Committee
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jul 30 23:11:18 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7967-NFPA 70-2024
Statement:	Example D3 is revised to reflect the revisions in Article 120. This involves the delineation of load calculations based on Article 120 requirements, and sizing of the conductors and OCPD based on requirements in Articles 210, 215 and 230. These changes align with the requirement in 120.5(E).

Public Comment No. 1942-NFPA 70-2024 [Definition: Example D.15 Load Calculations Using Power Cont...]

Example D.15 Load Calculations Using Power Control Systems (PCS)

A new dwelling has a total service load of 29,040 volt-amperes (121 amperes, 240 volts) calculated according to Article 120, Parts III through VII. The available service from the electric utility is limited to 100 amperes. In order to accommodate the connected loads on the 100 ampere service, a power control system is used in accordance with 120.7. Examples ~~D14~~ D15 (a) through ~~D14~~ D15 (~~d~~ c) illustrate treatment of different PCS configurations in load calculations for the service.

Example D15(a) ~~Monitoring Controlled and Noncontrolled Loads, 50 Ampere EVSE~~ Total Circuit Load Managed by a PCS, with Noncontrolled Loads

The EVSE rated at 12,000 volt-amperes (50 amperes, 240 volts) is controlled by a PCS. A part of its PCS evaluation, the EVSE has the ability to reduce its load down to 0A as commanded by the PCS control system. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. ~~The minimum operating current of the EVSE is 0 amperes. The PCS current setpoint~~ The PCS control setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads ~~, so the controlled EVSE is treated using the minimum operating current of the PCS. The~~ on the service/feeder conductors, and will adjust the controlled EVSE load to prevent overload of those conductors. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

~~Example D15(a) Monitoring Controlled and Noncontrolled Loads, 50 A EVSE~~

~~The EVSE rated at 12,000 volt-amperes (50 amperes, 240 volts) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 0 A. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120 , Parts III through VII.~~

~~Total Load Before Application of the PCS~~

~~29,040 volt amperes (121 amperes~~

Application of the PCS

PCS control setpoint: 19,200 volt-amperes (80A , 240 volts)

~~Application of the PCS~~

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 17,040 volt-amperes (71 amperes, 240 volts)

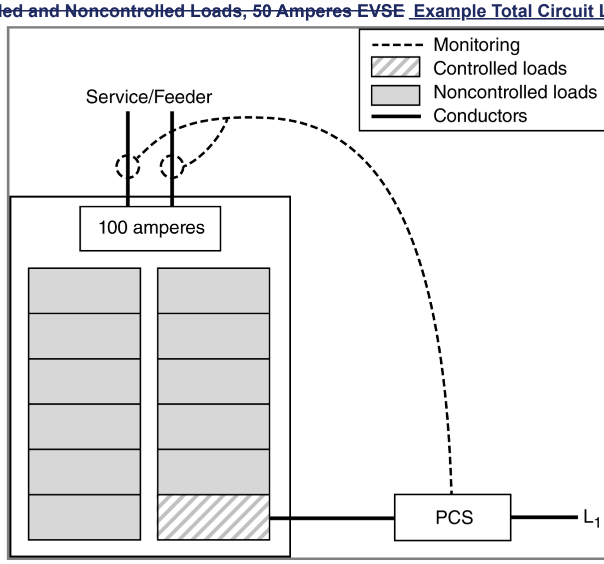
~~Controlled loads: Treated at minimum operating current of PCS = 0 volt-amperes (0 amperes, 240 volts)~~

Total Load After Application of the PCS

~~Total~~ Since the PCS control setpoint is greater than the total connected noncontrolled load, the total service load is ~~noncontrolled plus controlled loads~~ = ~~17~~ 19 ,~~040~~ 200 volt-amperes (~~71 amperes~~ 80 amperes , 240 volts)

See Figure D.15(a).

Figure D.15(a) ~~Monitoring Controlled and Noncontrolled Loads, 50 Amperes EVSE~~ Example Total Circuit Load Managed by a PCS .



Example D15(b)

~~Monitoring Controlled and Noncontrolled Loads, 30 Amperes EVSE~~

~~The EVSE rated at 7,200 volt-amperes (30 amperes, 240 volts) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 8 amperes. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120 , Parts III through VII.~~

~~***Total Load Before Application of the PCS***~~

~~29,040 volt-amperes (121 amperes, 240 volts)~~

~~***Application of the PCS***~~

~~Noncontrolled loads: Treated according to Article 120 , Parts III through VII = 21,840 volt-amperes (91 amperes, 240 volts)~~

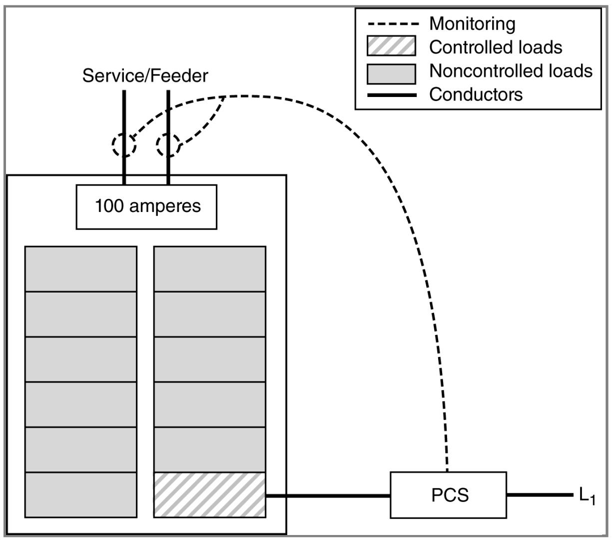
~~Controlled loads: Treated at minimum operating current of PCS = 1,920 volt-amperes (8 amperes, 240 volts)~~

~~***Total Load After Application of the PCS***~~

~~Total service load is noncontrolled plus controlled loads = 23,760 volt-amperes (99 amperes, 240 volts)~~

~~See Figure D.15(b) .~~

~~**Figure D.15(b) Monitoring Controlled and Noncontrolled Loads, 30 Amperes EVSE.**~~



~~***Example D15(c) Monitoring Only Controlled Loads, 35 Amperes EVSE, 20 Amperes Pool Pump, and 30 Amperes HVAC Heat Pump***~~

Partial Circuit Load Managed by PCS , with both PCS and Noncontrolled Loads

The EVSE rated at 8,400 volt-amperes (35 amperes, 240 volts), pool pump rated at 4,800 volt-amperes (20 amperes, 240 volts) and HVAC heat pump rated at 7,200 volt-amperes (30 amperes, 240 volts) are all placed under PCS control. The PCS is configured to monitor each of the branch circuits serving the three loads being controlled. The PCS modulates the EVSE, pool pump and HVAC heat pump loads to ensure that their combined demand does not exceed the current setpoint of the PCS. The PCS current setpoint is established by qualified personnel at 35 amperes, which is less than the maximum 80 percent of the 100 ampere OCPD protecting the service. Each individual branch circuit remains protected by its own OCPD. In this configuration, the PCS monitors only

~~the controlled loads~~

a portion of the connected load to the service , so the controlled EVSE, pool pump, and HVAC heat pump are treated in service load calculations using the PCS current setpoint of 35 amperes. The noncontrolled loads are treated as specified in Article 120 , Parts III through VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120 , Parts III through VII = 14,640 volt-amperes (61 amperes, 240 volts)

~~Controlled loads: Treated at current setpoint of PCS =~~

PCS control setpoint: 8,400 volt-amperes (35 amperes, 240 volts)

Total Load After Application of the PCS

Total service load is noncontrolled plus

~~controlled loads~~

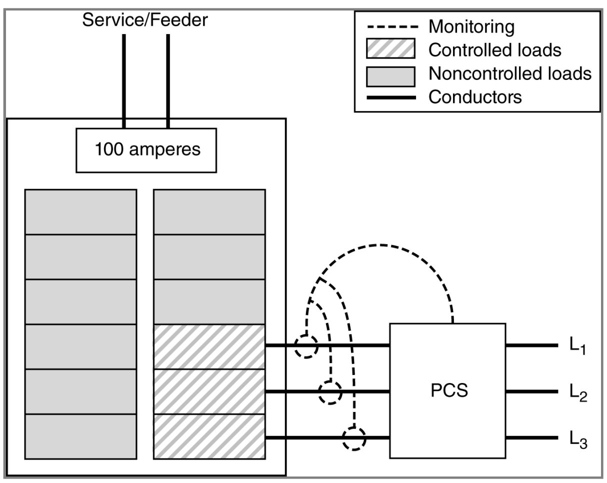
the PCS control setpoint = 23,040 volt-amperes (96 amperes, 240 volts)

See Figure D.15(c) .

Figure D.15(

~~c) Monitoring Only Controlled Loads, 35 Amperes EVSE, 20 Amperes Pool Pump, and 30 Amperes HVAC Heat Pump~~

b) Partial Circuit Load Managed by PCS, with both PCS and Noncontrolled Loads .



Example D15(

~~d) Monitoring Only Controlled Loads, All Loads Controlled~~

c) Total Circuit Load Managed by a PCS, with No Noncontrolled Loads

The PCS is configured to monitor the service and to modulate all loads. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors

~~only controlled~~

the entire load on the service, and there are no noncontrolled loads, so the

~~controlled~~

total of all connected loads are treated in service load calculations using the PCS current setpoint of 80 amperes.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120 , Parts III through VII = 0 volt-amperes (0 amperes, 240 volts)

~~Controlled loads: Treated at current setpoint current of PCS = 19~~

PCS control setpoint: 19 ,200 volt-amperes (80 amperes, 240 volt)

Total Load After Application of the PCS

~~Total service load is noncontrolled plus controlled loads~~

Since the PCS control setpoint is greater than the total connected noncontrolled load, the total service load is = 19,200 volt-amperes (80 amperes, 240 volt)

See Figure D.15(

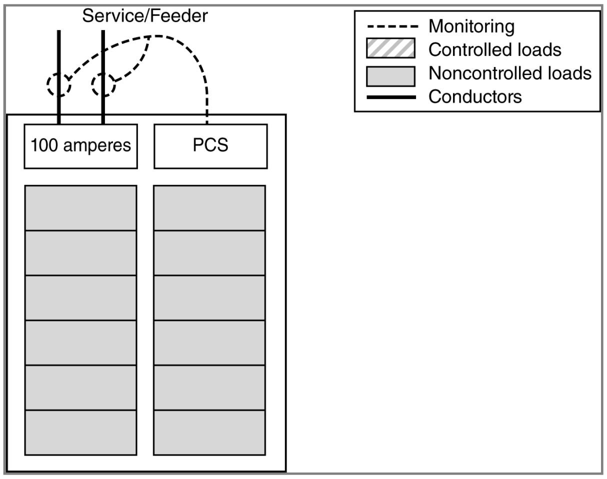
~~d~~

c) .

Figure D.15(

~~d) Monitoring Only Controlled Loads, All Loads Controlled.~~

c) Total Circuit Load Managed by a PCS, with No Noncontrolled Loads



Statement of Problem and Substantiation for Public Comment

The changes suggested to this section are intended to align with the changes proposed to section 120.7(C) in my related PC 1939.
While it appears that I have made many changes, the actual results are the same or similar to the first draft examples.
The need for these changes is to better align with different types of PCS applications and how they are addressed in related articles such as in 705.13, and most importantly, to align with the product standard that will be used for the listing of these systems UL 3141.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1939-NFPA 70-2024 [Section No. 120.7(C)]	Requirements covered in these examples
Public Comment No. 1939-NFPA 70-2024 [Section No. 120.7(C)]	

Related Item

- FR-8204

Submitter Information Verification

Submitter Full Name: Jason Fisher
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Zip:
Submittal Date: Wed Aug 28 11:59:35 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7869-NFPA 70-2024

Statement: The language in Example D.15 was modified to align with the changes that were made in Section 120.7. For PC 1942, refer to actions taken on PC 1939, as not all suggested revisions were included in the Second Revision to 120.7.

Figure D.15(D) was corrected to show that the PCS is monitoring only controlled loads.

The titles to Examples D15(a) and D15(b) were expanded to provide additional information regarding the content of those examples.

There was an error in the first revision that resulted in duplicate text in the beginning of Example D.15(a). This duplicate text is removed.

Example D15(c) was incorrect, as it mentioned monitoring all loads, which was not consistent with the drawing. The example was modified to address recommendations in PC 1850 and ensure the drawing and the calculations in the example accurately reflect application of the requirements in 120.7.

Public Comment No. 526-NFPA 70-2024 [Definition: Example D.15 Load Calculations Using Power Cont...]

Example D.15 Load Calculations Using Power Control Systems (PCS)

A new dwelling has a total service load of 29,040 volt-amperes (121 amperes, 240 volts) calculated according to Article 120, Parts III through VII. The available service from the electric utility is limited to 100 amperes. In order to accommodate the connected loads on the 100 ampere service, a power control system is used in accordance with 120.7. Examples D14(a) through D14(d) illustrate treatment of different PCS configurations in load calculations for the service.

Example D15(a) Monitoring Controlled and Noncontrolled Loads, 50 Ampere EVSE

The EVSE rated at 12,000 volt-amperes (50 amperes, 240 volts) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 0 amperes. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Example D15(a) Monitoring Controlled and Noncontrolled Loads, 50 A EVSE

The EVSE rated at 12,000 volt-amperes (50 amperes, 240 volts) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 0 A. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 17,040 volt-amperes (71 amperes, 240 volts)

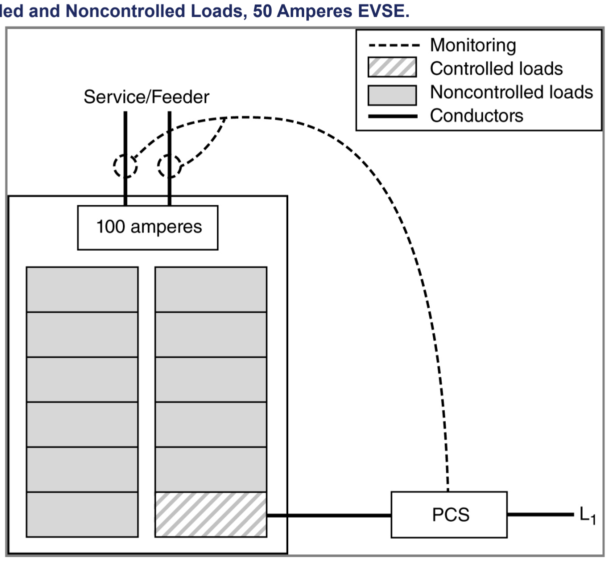
Controlled loads: Treated at minimum operating current of PCS = 0 volt-amperes (0 amperes, 240 volts)

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 17,040 volt-amperes (71 amperes, 240 volts)

See Figure D.15(a).

Figure D.15(a) Monitoring Controlled and Noncontrolled Loads, 50 Amperes EVSE.



Example D15(b) Monitoring Controlled and Noncontrolled Loads, 30 Amperes EVSE

The EVSE rated at 7,200 volt-amperes (30 amperes, 240 volts) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 8 amperes. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt-amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 21,840 volt-amperes (91 amperes, 240 volts)

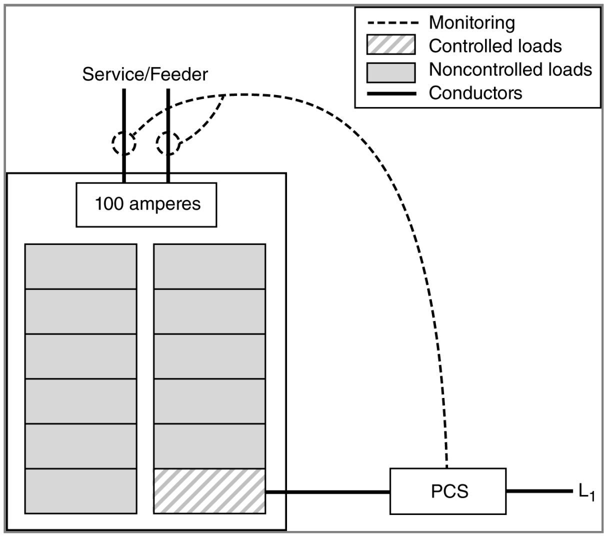
Controlled loads: Treated at minimum operating current of PCS = 1,920 volt-amperes (8 amperes, 240 volts)

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 23,760 volt-amperes (99 amperes, 240 volts)

See Figure D.15(b).

Figure D.15(b) Monitoring Controlled and Noncontrolled Loads, 30 Amperes EVSE.



Example D15(c) Monitoring Only Controlled Loads, 35 Amperes EVSE, 20 Amperes Pool Pump, and 30 Amperes HVAC Heat Pump

The EVSE rated at 8,400 volt-amperes (35 amperes, 240 volts), pool pump rated at 4,800 volt-amperes (20 amperes, 240 volts) and HVAC heat pump rated at 7,200 volt-amperes (30 amperes, 240 volts) are all placed under PCS control. The PCS is configured to monitor each of the branch circuits serving the three loads being controlled. The PCS modulates the EVSE, pool pump and HVAC heat pump loads to ensure that their combined demand does not exceed the current setpoint of the PCS. The PCS current setpoint is established by qualified personnel at 35 amperes, which is less than the maximum 80 percent of the 100 ampere OCPD protecting the service. Each individual branch circuit remains protected by its own OCPD. In this configuration, the PCS monitors only the controlled loads, so the controlled EVSE, pool pump, and HVAC heat pump are treated in service load calculations using the PCS current setpoint of 35 amperes. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 14,640 volt-amperes (61 amperes, 240 volts)

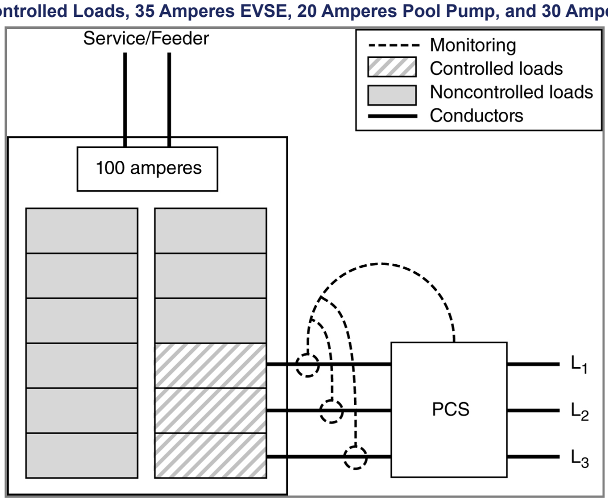
Controlled loads: Treated at current setpoint of PCS = 8,400 volt-amperes (35 amperes, 240 volts)

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 23,040 volt-amperes (96 amperes, 240 volts)

See Figure D.15(c).

Figure D.15(c) Monitoring Only Controlled Loads, 35 Amperes EVSE, 20 Amperes Pool Pump, and 30 Amperes HVAC Heat Pump.



Example D15(d) Monitoring Only Controlled Loads, All Loads Controlled

The PCS is configured to monitor the service and to modulate all loads. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors only controlled loads, so the controlled loads are treated in service load calculations using the PCS current setpoint of 80 amperes.

Total Load Before Application of the PCS

29,040 volt amperes (121 amperes, 240 volts)

Application of the PCS

Noncontrolled loads: Treated according to Article 120, Parts III through VII = 0 volt-amperes (0 amperes, 240 volts)

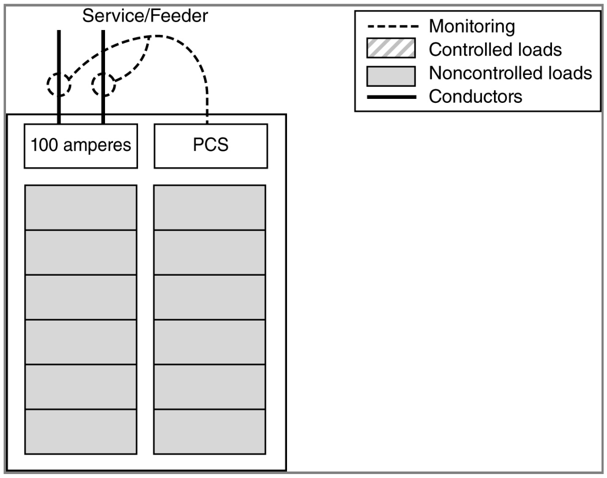
Controlled loads: Treated at current setpoint current of PCS = 19,200 volt-amperes (80 amperes, 240 volt)

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 19,200 volt-amperes (80 amperes, 240 volt)

See Figure D.15(d).

Figure D.15(d) Monitoring Only Controlled Loads, All Loads Controlled.



Additional Proposed Changes

File Name	Description	Approved
CN_210.pdf		

Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 210 appeared in the First Draft Report on First Revision No. 8204.

The requirements in this section should be revised to correct references and align the terminology with Article 750, Part II, “EMS with PCS”, as determined by CMP 13 in FR 8095. References to Article 750 should be adjusted based on the relocation to Chapter 1, Article 130.

Related Item

• First Revision No. 8204

Submitter Information Verification

Submitter Full Name: CC Notes
Organization: NEC Correlating Committee
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 30 23:06:25 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected
Resolution: No action was necessary as the terminology in Example D.15 aligns correctly with the terminology in Article 130.

Public Comment No. 1078-NFPA 70-2024 [Definition: Example D1(b) One-Family Dwelling]

Example D1(b) One-Family Dwelling

Assume same conditions as Example No. D1(a), plus addition of one 6-A, 230-V, room air-conditioning unit and one 12-A, 115-V, room air-conditioning unit,* one 8-A, 115-V, rated waste disposer, and one 10-A, 120-V, rated dishwasher. See Article 430 for general motors and Article 440, Part VII, for air-conditioning equipment. Motors have nameplate ratings of 115 V and 230 V for use on 120-V and 240-V nominal voltage systems.

*(For feeder neutral, use larger of the two appliances for unbalance.)

From Example D1(a), feeder current is ~~78 A~~ 72 A (3-wire, 240 V).

	-	Line A	Neutral	Line B
Amperes from Example D1(a)	~~78~~ 72	~~61~~ 56	~~78~~ 72	
One 230-V air conditioner	6	—	6	
One 115-V air conditioner and 120-V dishwasher	12	12	10	
One 115-V disposer	—	8	8	
25% of air-conditioner *(see 440.33)*	3	3	2	
Total amperes per conductor	~~99~~ 93	~~84~~ 79	~~104~~ 98	

Therefore, the service would be rated

~~110 A~~

100 A .

Additional Proposed Changes

File Name	Description	Approved
Example_D1_for_PC.docx		

Statement of Problem and Substantiation for Public Comment

Although I do not agree with the reduction of VA per Sq Ft in a dwelling, Example D1 must be amended to reflect these changes. D1 is a commonly used example for users and the result of the changes made at First Revision should be shown.

An attached word document is provided if needed.

Thank You

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1345-NFPA 70-2024 [Definitions (D): General Loa... to Calculated ...]	
Public Comment No. 1347-NFPA 70-2024 [Definitions (D): General Loa... to Calculated ...]	

Related Item

- FR-8013

Submitter Information Verification

Submitter Full Name: Daniel Naughton
Organization: JATC of Greater Boston
Affiliation: IBEW
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 14 06:17:11 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7958-NFPA 70-2024
Statement: Example D1(b) is revised to reflect the changes made in Example D1(a), which was based on revisions in Article 120.

Public Comment No. 1079-NFPA 70-2024 [Definition: Example D2(a) Optional Calculation for One-Fami...]

Example D2(a) Optional Calculation for One-Family Dwelling, Heating Larger Than Air Conditioning

(see 120.82)

The dwelling has a floor area of 1500 ft^2, exclusive of an unfinished cellar not adaptable for future use, unfinished attic, and open porches. It has a 12-kW range, a 2.5-kW water heater, a 1.2-kW dishwasher, 9 kW of electric space heating installed in five rooms, a 5-kW clothes dryer, and a 6-A, 230-V, room air-conditioning unit. Assume range, water heater, dishwasher, space heating, and clothes dryer kW ratings equivalent to kVA.

Air Conditioner kVA Calculation

6 A × 230 V ÷ 1000 = 1.38 kVA

This 1.38 kVA [item 1 from 120.82(C)] is less than 40% of 9 kVA of separately controlled electric heat [item 6 from 120.82(C)], so the 1.38 kVA need not be included in the service calculation.

General Load

1500 ft^2 at ~~3 VA~~ 2 VA		~~4~~ 3 ,~~500 VA~~ 000 VA
Two 20-A appliance outlet circuits at 1500 VA each		3,000 VA
Laundry circuit		1,500 VA
Range (at nameplate rating)		12,000 VA
Water heater		2,500 VA
Dishwasher		1,200 VA
Clothes dryer		5,000 VA
	Total	~~29~~ 28 ,~~700 VA~~ 200 VA

Application of Demand Factor

[see 120.82(B)]

First ~~10 kVA~~ 8 kVA of general load at 100%		~~10~~ 8 ,~~000 VA~~ 000 VA
Remainder of general load at 40% (~~19.7 kVA~~ 20,200 VA × 0.4)		~~7~~ 8 ,~~880 VA~~ 080 VA
	Total of general load	~~17~~ 16 ,~~880 VA~~ 080 VA
9 kVA of heat at 40% (9000 VA × 0.4) =		3,600 VA
	Total	~~21~~ 19 ,~~480 VA~~ 680 VA

Calculated Load for Service Size

~~21.48 kVA = 21,480 VA~~

~~21,480 VA~~ 19,680 VA ÷ 240 V = ~~90 A~~ 82 A

Therefore, the minimum service rating would be 100 A in accordance with 230.42 and 230.79.

Feeder Neutral Load in Accordance with 120.61

1500 ft^2 at ~~3 VA~~ 2 VA		~~4~~ 3 ,~~500 VA~~ 000 VA
Three 20-A circuits at 1500 VA		4,500 VA
	Total	~~9~~ 7 ,~~000 VA~~ 500 VA
3000 VA at 100%		3,000 VA
~~9000 VA~~ 7500 VA - 3000 VA = ~~6000 VA~~ 4500 VA at 35%		~~2~~ 1 ,~~100 VA~~ 575 VA
	Subtotal	~~5~~ 4 ,~~100 VA~~ 575 VA
Range: 8 kVA at 70%		5,600 VA
Clothes dryer: 5 kVA at 70%		3,500 VA
Dishwasher		1,200 VA
	Total	~~15~~ 14 ,~~400 VA~~ 875 VA

Calculated Load for Neutral

~~15~~ 14 ,~~400 VA~~ 875 VA ÷ 240 V= ~~64 A~~ 62 A

Additional Proposed Changes

File Name	Description	Approved
Example_D1_for_PC.docx		

Statement of Problem and Substantiation for Public Comment

Although I do not agree with the reduction of VA per Sq Ft in a dwelling, Example D1 must be amended to reflect these changes. D1 is a commonly used example for users and the result of the changes made at First Revision should be shown.

An attached word document is provided if needed.

Thank You

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1345-NFPA 70-2024 [Definitions (D): General Loa... to Calculated ...]	
Public Comment No. 1347-NFPA 70-2024 [Definitions (D): General Loa... to Calculated ...]	

Related Item

- FR 8013

Submitter Information Verification

Submitter Full Name: Daniel Naughton
Organization: JATC of Greater Boston
Affiliation: IBEW
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 14 06:29:42 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-7961-NFPA 70-2024
Statement: Example D2(a) is revised to reflect the revisions in Article 120.

Public Comment No. 1887-NFPA 70-2024 [Definition: Heat Pump kVA Calculation]

Heat Pump kVA Calculation

24 A × 240 V ÷ 1000 = 5.76 kVA

This 5.

~~76 kVA is less than 15 kVA~~

76 kVA load is combined with 65% of the backup heat

~~; therefore, the heat pump load need not be included in the service calculation [see 120~~

.

5.76kVA + (65% x 15kVA) = 5.76kVA + 9.75kVA = HVAC load is 15.51kVA

[see 2 20 .82(C) (3)] .

Statement of Problem and Substantiation for Public Comment

To align the heat pump calculation in D2(c) with the requirements in Article 220.82(C)(3)

Related Item

• Correction of calculation method

Submitter Information Verification

Submitter Full Name: Steve Parnell
Organization: Brandt Electrical Services
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 27 20:58:42 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7966-NFPA 70-2024

Statement: Example D2(c) is revised to reflect the revisions in Article 120. Additionally, the statement regarding the “Heat Pump kVA Calculation” is removed, as it is repeated below the table. Lastly, the terminology, and information provided as an “*” note is revised to be consistent with the associated requirement in 120.82(C).

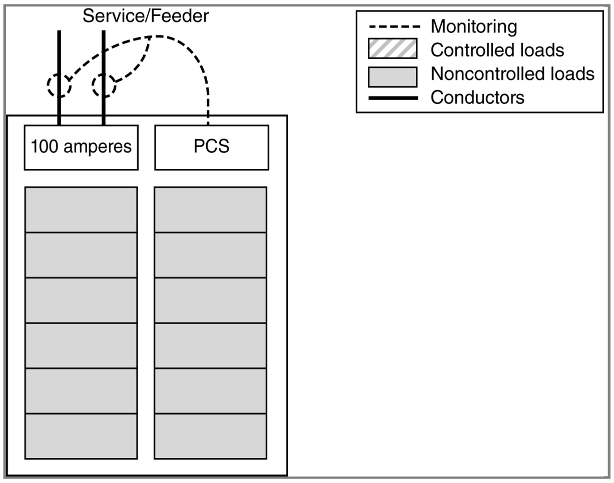
Public Comment No. 88-NFPA 70-2024 [Definition: Total Load After Application of the PCS]

Total Load After Application of the PCS

Total service load is noncontrolled plus controlled loads = 19,200 volt-amperes (80 amperes, 240 volt)

See Figure D.15(d).

Figure D.15(d) Monitoring Only Controlled Loads, All Loads Controlled.



Statement of Problem and Substantiation for Public Comment

Figure D.15(d) appears to be incorrect, in that the figure shows all branch circuits as Noncontrolled Loads (solid grey), while the example text clearly states that the PCS monitors only controlled loads, which means all branch circuits should be revised to use the diagonal grey and white coloring.

Related Item

• FR-8204

Submitter Information Verification

Submitter Full Name: Brennan Less
Organization: LBNL
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jul 16 13:45:14 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7869-NFPA 70-2024

Statement: The language in Example D.15 was modified to align with the changes that were made in Section 120.7. For PC 1942, refer to actions taken on PC 1939, as not all suggested revisions were included in the Second Revision to 120.7.

Figure D.15(D) was corrected to show that the PCS is monitoring only controlled loads.

The titles to Examples D15(a) and D15(b) were expanded to provide additional information regarding the content of those examples.

There was an error in the first revision that resulted in duplicate text in the beginning of Example D.15(a). This duplicate text is removed.

Example D15(c) was incorrect, as it mentioned monitoring all loads, which was not consistent with the drawing. The example was modified to address recommendations in PC 1850 and ensure the drawing and the calculations in the example accurately reflect application of the requirements in 120.7.

Public Comment No. 992-NFPA 70-2024 [Definitions (D): General Lig... to Calculated ...]

Definitions (D): General Lig... to Calculated ...

General Lighting Load

1500 ft^2 at ~~3 VA~~ 2 VA /ft^2 = ~~4500 VA~~ 3,000 VA

Minimum Number of Branch Circuits Required

[see 210.11(A)]

General Lighting Load:

~~4500 VA~~ 3,000 VA ÷ 120 V = ~~38 A~~ 25 A

This requires ~~three 15~~ two 15 -A,- ~~2~~ 2 -wire ~~or two 20-A, 2-wire~~ circuits.

Small-Appliance Load: Two 2-wire, 20-A circuits *[see 210.11(C)(1)]*

Laundry Load: One 2-wire, 20-A circuit *[see 210.11(C)(2)]*

Bathroom Branch Circuit: One 2-wire, 20-A circuit (no additional load calculation is required for this circuit) *[see 210.11(C)(3)]*

Minimum Size Feeder Required

[see 120.40]

General Lighting		~~4~~ 3 ,~~500 VA~~ 000 VA	
Small Appliance		3,000 VA	
Laundry		1,500 VA	
	Total	~~9~~ 7 ,500 VA	
3, 000 VA	~~3000 VA~~ at 100%		3,000 VA
~~9000 VA – 3000 VA = 6000 VA~~ 7,500 VA – 3,000 VA = 4,500 VA at 35%		~~2~~ 1 ,~~100 VA~~ 575 VA	
	Net Load	~~5~~ 4 ,~~100 VA~~ 575 VA	
Range *(see Table 120.55)*		8,000 VA	
Dryer Load *(see Table 120.54)(@85%)*		~~5~~ 4 ,~~500 VA~~ 675 VA	
Net Calculated Load		~~18~~ 17 ,~~600 VA~~ 250 VA	

Net Calculated Load for 120/240-V, 3-wire, single-phase service or feeder

~~18~~ 17 ,~~600 VA~~ 250 VA ÷ 240 V = ~~78 A~~ 71.875 or 72 A

Sections 230.42(B) and 230.79(C) require service conductors and disconnecting means rated not less than 100 amperes.

Calculation for Neutral for Feeder and Service

Lighting and Small-Appliance Load		~~5~~ 4 ,~~100 VA~~ 575 VA
Range: ~~8000 VA~~ 8,000 VA at 70% *(see 120.61)*		5,600 VA
Dryer: ~~5500 VA~~ 4,675 VA at 70% *(see 120.61)*		3,~~850 VA~~ 273 VA
	Total	~~14~~ 13 ,~~550 VA~~ 448 VA

Calculated Load for Neutral

~~14~~ 13 ,~~550 VA~~ 448 VA ÷ 240 V = ~~61 A~~ 56 A

Additional Proposed Changes

File Name	Description	Approved
Example_D1_for_PC.docx	Word Version of proposed changes	

Statement of Problem and Substantiation for Public Comment

Although I do not agree with the reduction of VA per Sq Ft in a dwelling, Example D1 must be amended to reflect these changes. D1 is a commonly used example for users and the result of the changes made at First Revision should be shown.

Please note that there is an assumption that the dryer will be calculated at 85% due to an issue in First Revision 8044 (220.54). If that is not the case, those numbers will need to be adjusted.

Thanks

Related Item

• FR-8013 • FR-8044

Submitter Information Verification

Submitter Full Name: Daniel Naughton
Organization: JATC of Greater Boston
Affiliation: IBEW
Street Address:
City:
State:
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Submittal Date: Fri Aug 09 14:14:57 EDT 2024

Committee: NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7950-NFPA 70-2024
Statement:	Example D1(a) is revised to reflect the revisions in Article 120. Additionally, “dryer” is identified as “clothes dryer” to be consistent with other examples and with the requirements in 120.54

Public Comment No. 1345-NFPA 70-2024 [Definitions (D): General Loa... to Calculated ...]

Definitions (D): General Loa... to Calculated ...

General Load

~~10,000 VA~~

1500 ft^2 at ~~3 VA~~ 2 VA		~~4~~ 3 ,~~500 VA~~ 000 VA	
Two 20-A small-appliance		-	
circuits at 1500 VA each		3,000 VA	
Laundry circuit		1,500 VA	
Two ovens		8,000 VA	
One cooking unit		5,100 VA	
Water heater		4,500 VA	
Dishwasher		1,200 VA	
Washer/dryer		5,000 VA	
Total general load		~~32~~ 31 ,~~800 VA~~ 300 VA	
First ~~10 kVA~~ 8 kVA at 100%	120.82(B)		8,000 VA
Remainder at 40%		-	
(~~22.8 kVA ×~~ (23,300 VA × 0.4 ~~× 1000~~)		9,~~120 VA~~ 320 VA	
Subtotal general load		~~19~~ 17 ,~~120 VA~~ 320 VA	
Air conditioning		10,080 VA	
Total		~~29~~ 27 ,~~200 VA~~ 400 VA	

Calculated Load for Service

~~29~~ 27 ,~~200 VA~~ 400 VA ÷ 240 V = ~~122 A~~ 114 A (service rating)

Feeder Neutral Load, in accordance with 120.61

Assume that the two 4-kVA wall-mounted ovens are supplied by one branch circuit, the 5.1-kVA counter-mounted cooking unit by a separate circuit.

1500 ft^2 at ~~3 VA~~ 2 VA		~~4~~ 3 ,~~500 VA~~ 000 VA
Three 20-A circuits at 1500 VA		4,500 VA
	Subtotal	~~9~~ 7 ,~~000 VA~~ 500 VA
3000 VA at 100%		3,000 VA
~~9000 VA~~ 7500 VA - 3000 VA = ~~6000 VA~~ 4500 VA at 35%		~~2~~ 1 ,~~100 VA~~ 575 VA
	Subtotal	~~5~~ 4 ,~~100 VA~~ 575 VA

Two 4-kVA ovens plus one 5.1-kVA cooking unit = 13.1 kVA. Table 120.55 permits 55% demand factor or 13.1 kVA × 0.55 = 7.2 kVA feeder capacity.

	Subtotal from above	~~5~~ 4 ,~~100 VA~~ 575 VA
Ovens and cooking unit: 7200 VA × 70% for neutral load		5,040 VA
Clothes washer/dryer: 5 kVA × 70% for neutral load		3,500 VA
Dishwasher		1,200 VA
	Total	14,~~840 VA~~ 315 VA

Calculated Load for Neutral

14,~~840 VA~~ 315 VA ÷ 240 V = ~~62~~ 60

Additional Proposed Changes

File Name	Description	Approved
Example_D2_for_PC.docx	Example D2 for PC	

Statement of Problem and Substantiation for Public Comment

Although I do not agree with the reduction of VA per Sq Ft in a dwelling, Example D2 must be amended to reflect these changes. D2 is a commonly used example for users and the result of the changes made at First Revision should be shown.

An attached word document is provided if needed.

Thank You

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1078-NFPA 70-2024 [Definition: Example D1(b) One-Family Dwelling]	
Public Comment No. 1079-NFPA 70-2024 [Definition: Example D2(a) Optional Calculation for One-Fami...]	
Public Comment No. 1347-NFPA 70-2024 [Definitions (D): General Loa... to Calculated ...]	

Related Item

- FR 8082

Submitter Information Verification

Submitter Full Name: Daniel Naughton
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Street Address:
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State:
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Submittal Date: Wed Aug 21 06:25:23 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-7964-NFPA 70-2024

Statement: Example D2(b) is revised to reflect the revisions in Article 120. Additionally, the example is modified to address a “clothes dryer” rather than a “combination clothes washer and dryer”, as 120.61(B)(1) does not address a combination washer/dryer.

Public Comment No. 1347-NFPA 70-2024 [Definitions (D): General Loa... to Calculated ...]

Definitions (D): General Loa... to Calculated ...

General Load

2000 ft^2 at ~~3 VA~~ 2 VA	~~6~~ 4 ,~~000 VA~~ 000 VA
Two 20-A appliance outlet circuits at 1500 VA each	3,000 VA
Laundry circuit	1,500 VA
Range (at nameplate rating)	12,000 VA
Water heater	4,500 VA
Dishwasher	1,200 VA
Clothes dryer	5,000 VA
Subtotal general load	~~33~~ 31 ,~~200 VA~~ 200 VA
First ~~10 kVA~~ 8 kVA at 100%	~~10~~ 8 ,000 VA
Remainder of general load at 40% (23,200 VA × 0.4)	9,280 VA
Total net general load	~~19~~ 17 ,280 VA

Heat Pump and Supplementary Heat*

240 V × 24 A = 5760 VA

15 kW Electric Heat:

5760 VA + (15,000 VA × 65%) = 5.76 kVA + 9.75 kVA = 15.51 kVA

***If supplementary heat is not on at same time as heat pump, heat pump kVA need not be added to total.**

Totals	-
Net general load	~~19~~ 17 ,280 VA
Heat pump and supplementary heat	15,510 VA
Total	~~34~~ 32 ,790 VA

Calculated Load for Service

~~34.79 kVA × 1000 ÷~~ 32,790 VA ÷ 240 V= ~~145 A~~ 137 A

Therefore, this dwelling unit would be permitted to be served by a 150-A service.

Additional Proposed Changes

File Name	Description	Approved
Example_D2_for_PC.docx	Example D2 for PC	

Statement of Problem and Substantiation for Public Comment

Although I do not agree with the reduction of VA per Sq Ft in a dwelling, Example D2 must be amended to reflect these changes. D2 is a commonly used example for users and the result of the changes made at First Revision should be shown.

An attached word document is provided if needed.

Thank You

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1079-NFPA 70-2024 [Definition: Example D2(a) Optional Calculation for One-Fami...]	
Public Comment No. 1078-NFPA 70-2024 [Definition: Example D1(b) One-Family Dwelling]	
Public Comment No. 1345-NFPA 70-2024 [Definitions (D): General Loa... to Calculated ...]	

Related Item

- FR 8082

Submitter Information Verification

Submitter Full Name: Daniel Naughton
Organization: JATC of Greater Boston
Affiliation: IBEW
Street Address:
City:
State:
Zip:

Submittal Date: Wed Aug 21 06:49:21 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7966-NFPA 70-2024
Statement:	Example D2(c) is revised to reflect the revisions in Article 120. Additionally, the statement regarding the “Heat Pump kVA Calculation” is removed, as it is repeated below the table. Lastly, the terminology, and information provided as an “*” note is revised to be consistent with the associated requirement in 120.82(C).

Public Comment No. 1850-NFPA 70-2024 [Definition: Example D15(b) Monitoring Controlled and Noncon...]

~~The~~ Three EVSE rated at 7,200 volt-amperes (30 amperes, 240 volts) ~~is~~ are controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of ~~the~~ each EVSE is 8 amperes. The PCS current setpoint is established by qualified personnel at 80 amperes, based on the maximum 80 percent of the 100 ampere OCPD protecting the service. In this configuration, the PCS monitors both controlled and noncontrolled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The noncontrolled loads are treated as specified in Article 120, Parts III through VII.

Additional Proposed Changes

File Name	Description	Approved
NEC_Anned_D_G70-679.jpg	Amended diagram showing the PCS using one breaker, but managing 3 loads.	

Statement of Problem and Substantiation for Public Comment

A quite typical use of PCS is to have a single breaker used to manage more than one load.
The diagram has been updated to show three loads.

In this case the PCS may offer up to 100A if there's no load on the main. That current may flow to one or more loads.
Or, offer 8A to each of the three EVSE if there's capacity.
Or, hard shutdown and offer 0A.

See attached diagram which is like the supplied diagram except with L1, L2 and L3 on the output side.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 1833-NFPA 70-2024 [Section No. 625.42(B)]	

Related Item

• Correlating Committee Note No. 210-NFPA 70-2024 • First Revision No. 8204-NFPA 70-2024

Submitter Information Verification

Submitter Full Name:	Bryce Nesbitt
Organization:	Obviously Inspects
Affiliation:	Member of the EV Charging for All Coalition (EVCAC) and the Panel Optimization Work and Electrical Reassessments (POWER) group
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 27 17:26:41 EDT 2024
Committee:	NEC-P02

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-7869-NFPA 70-2024
Statement:	The language in Example D.15 was modified to align with the changes that were made in Section 120.7. For PC 1942, refer to actions taken on PC 1939, as not all suggested revisions were included in the Second Revision to 120.7. Figure D.15(D) was corrected to show that the PCS is monitoring only controlled loads. The titles to Examples D15(a) and D15(b) were expanded to provide additional information regarding the content of those examples. There was an error in the first revision that resulted in duplicate text in the beginning of Example D.15(a). This duplicate text is removed. Example D15(c) was incorrect, as it mentioned monitoring all loads, which was not consistent with the drawing. The example was modified to address recommendations in PC 1850 and ensure the drawing and the calculations in the example accurately reflect application of the requirements in 120.7.

Public Comment No. 1240-NFPA 70-2024 [Part III.]

Part III. ~~Required~~ Outlets

Statement of Problem and Substantiation for Public Comment

Accepted language in 210.52(C)(4) expands Part III to include nonrequired outlets. That is a good change and it was necessary. Part of the reason it was necessary is the title of Part III. The title of this Part needs to change now.

Related Item

- FR 8192

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Sun Aug 18 13:25:45 EDT 2024
Committee: NEC-P02

Committee Statement

Committee Action: Rejected

Resolution: Making this change could have unintended consequences. CMP-2 is not aware of this causing confusion for users of the code and does not see how this would not increase the usability of the Code. Other receptacles that are provided and not required must also meet the requirements of 210.52(C)(4).