



## Public Comment No. 1651-NFPA 70-2024 [ Global Input ]

This Global Public Comment is for CMP-11 to review the use of the terms “overcurrent”, “overcurrent protective devices” and “overcurrent protection”.

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CMP-11_OCPD_TG-4_CMP-10.pdf	CMP-11_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

**Submitter Full Name:** David Williams  
**Organization:** Delta Charter Township  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submission Date:** Sun Aug 25 21:50:26 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8086-NFPA 70-2024](#)

**Statement:** During the review of the overcurrent language, the panel agrees with recommendations with some exceptions.

Modifications to the request in the public comment include:

409.21(B) – remove “this” from title and change one more reference to OCPD.

409.21(C) – change 2 references to OCPD.

440.52(B) – no change was made as this would make the sentence grammatically incorrect.

Additional changes were made to clarify the protection needed in 430.111 (A) and in the exception in 430.112. The recommended change to 430.206 (B)(2) was reworded to improve clarity. The CC request to review 430.206 (C) was completed but no change was needed.

**CMP-10 TG-4 Review of Overcurrent Language for the Articles under the purview of CMP-11**

CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
<b>11</b>	<b>Article 409</b>		
	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
<b>11</b>	<b>Article 430</b>		
	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	Branch-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 OCPD
	430.62(A)Ex.2	Overcurrent Protection	Fine as is
	430.62(B)	Feeder Overcurrent protective device	Feeder OCPD
	430.63Ex.	Feeder Overcurrent device	Feeder OCPD
	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
<b>11</b>	<b>Article 440</b>		
	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
<b>11</b>	<b>Article 460</b>		
	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 under the purview of CMP-1**

CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
1	<b>Article 110</b>		
	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 under the purview of CMP-2**

CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
2	<b>Article 100</b>		
	Branch Circuit (Branch-Circuit)	overcurrent device	overcurrent protective device (OCPD)
2	<b>Article 120</b>		
	120.5(E)	overcurrent device	OCPD
	120.7(B)	overcurrent protective device	OCPD
	120.87(3)	Overcurrent protection	Fine as is
2	<b>Article 210</b>		
	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	<del>overcurrent device</del> 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	<b>Annex D</b>		
		Overcurrent Protection	CMP-2 To review references to OCPD and the revised terms.
	D3. (X2)		
	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 under the purview of CMP-3**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>3</b>	<b>Article 100</b>		
	Fault Managed Power.	Overcurrent protection	Fine as is
	Fire Alarm Circuit	Overcurrent device	overcurrent protective device (OCPD)
<b>3</b>	<b>Article 300</b>		
	300.5-T	Overcurrent Protection	Fine as is
	300.17(l)	Overcurrent Device	OCPD
	300.28(C)(3). (X5)	Overcurrent Protection	Fine as is
<b>3</b>	<b>Article 590</b>		
	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
<b>3</b>	<b>Article 721</b>		
	721.50(A)	Overcurrent	Fine as is
<b>3</b>	<b>Article 722</b>		
	722.1	Overcurrent Protection	Fine as is
<b>3</b>	<b>Article 724</b>		
	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
<b>3</b>	<b>Article 725</b>		
	725.1 In	Overcurrent Protection	Fine as is

	725.127	Overcurrent Device	OCPD
<b>3</b>	<b>Article 760</b>		
	760.41(B)	Overcurrent protective device	OCPD
	760.41(B)	Overcurrent protection devices	OCPDs
	760.43. (X3)	Overcurrent Protection	Fine as is
	760.45. <b>Title</b>	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
<b>3</b>	<b>Article 794</b>		
	794.1	Overcurrent Protection	Fine as is

**CMP-10 TG-4 Review of Overcurrent Language for the Articles under the purview of CMP-4**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>4</b>	<b>Article 690</b>		
	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
<b>4</b>	<b>Article 692</b>		
	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
<b>4</b>	<b>Article 694</b>		
	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

<b>4</b>	<b>Article 705</b>		
	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 under the purview of CMP-5**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>5</b>	<b>Article 100</b>		
	Ground-Fault Current Path, Effective	overcurrent protective device	overcurrent protective device (OCPD)
	Ground-Fault Protection of Equipment	overcurrent device	overcurrent protective device (OCPD)
<b>5</b>	<b>Article 200</b>		
	200.10(E)	overcurrent device	OCPD
<b>5</b>	<b>Article 250</b>		
	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
<b>5</b>	<b>Article 270</b>		
	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 under the purview of CMP-6			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
<b>6</b>	<b>Article 310</b>		
	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
<b>6</b>	<b>Article 335</b>		
	335.90.	Overcurrent Protection	Fine as is
<b>6</b>	<b>Article 382</b>		
	382.4	Supplementary Overcurrent Protection	Supplementary Overcurrent Protective Device
<b>6</b>	<b>Article 400</b>		
	400.16	Overcurrent Protection	Fine as is
	400.16	protected against Overcurrent	shall be provided with overcurrent protection
<b>6</b>	<b>Article 402</b>		
	402.14 (X2)	Overcurrent Protection	Fine as is

**CMP-10 TG-4 Review of Overcurrent Language for the Articles under the purview of CMP-7**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>7</b>	<b>Article 100</b>		
	Service Equipment, Mobile Home	overcurrent protective devices	overcurrent protective devices (OCPDs)
<b>7</b>	<b>Article 545</b>		
	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
<b>7</b>	<b>Article 547</b>		
	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
<b>7</b>	<b>Article 550</b>		
	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
<b>7</b>	<b>Article 551</b>		
	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
<b>7</b>	<b>Article 552</b>		
	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
<b>7</b>	<b>Article 555</b>		
	555.53	Overcurrent protective device	OCPD
<b>7</b>	<b>Article 675</b>		
	675.6	Branch Circuit Overcurrent Protective Device	OCPD
	675.7	Branch Circuit Overcurrent Protective Devices	OCPDs
	675.8	Overcurrent Protection	Fine as is
<b>7</b>	<b>Article 682</b>		
	682.15(B)	Feeder Overcurrent protective device	Feeder OCPD

CMP-10 TG-4 Review of Overcurrent Language for the Articles under the purview of CMP-8			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
<b>8</b>	<b>Article 312</b>		
	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
<b>8</b>	<b>Article 366</b>		
	366.12	Overcurrent Devices	OCPDs
	366.56(D)	Overcurrent Protection	Fine as is
<b>8</b>	<b>Article 368</b>		
	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
<b>8</b>	<b>Article 370</b>		
	370.23. Title	Overcurrent Protection	Fine as is
	370.23	Protected against Overcurrent	shall be provided with overcurrent protection
<b>8</b>	<b>Article 371</b>		
	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 under the purview of CMP-9**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>9</b>	<b>Article 265</b>		
	265.18	Overcurrent Device	OCPD
	265.20.	Overcurrent Protection	Fine as is
	265.20.	Overcurrent protective devices	OCPDs
	265.20.	Overcurrent Devices	OCPDs
<b>9</b>	<b>Article 266</b>		
	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
<b>9</b>	<b>Article 268</b>		
	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
<b>9</b>	<b>Article 450</b>		
	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

		overcurrent sensing device	Fine As Is
	450.7(A)(2)	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
<b>9</b>	<b>Article 495</b>		
	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 under the purview of CMP-10			
CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
<b>10</b>	<b>Article 100</b>		
	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
<b>10</b>	<b>Article 215</b>		
	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
<b>10</b>	<b>Article 225</b>		
	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
<b>10</b>	<b>Article 230</b>		
	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
<b>10</b>	<b>Article 240</b>		
	240	Overcurrent Protection	Fine as is
	240.1 (X3)	Overcurrent protection	Fine as is
	240.2	branch-circuit Overcurrent protective devices	<del>branch-circuit</del> 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)		<del>(a) Fuses and circuit breakers in accordance with 240.7 marked for use with 14 AWG copper clad aluminum conductor</del> (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 ) . ( X 2 )	Overcurrent Protection	Fine As Is
	240.22 . ( X 2 )	Overcurrent device	OCPD
	240.24(A)	Supplementary overcurrent protection	Fine as is
	240.24(A). ( X 4 )	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) ( X 2 )	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)	<del>be protected</del>	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
<b>10</b>	<b>Article 242</b>		
	242.14(ABC)	Overcurrent device	OCPD
	242.16	Overcurrent protection	Branch-circuit OCPD
<b>10</b>	<b>Article 404</b>		
	404.5	Overcurrent Devices	OCPDs
<b>10</b>	<b>Article 408</b>		
	408.4(A)	Overcurrent device	OCPD
	408.6 (X2)	Overcurrent <b>protection</b> 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 <b>protection</b> devices	OCPDs
	408.52	Overcurrent devices	OCPDs
	408.54	Overcurrent devices	OCPDs

	408.55	Overcurrent devices	OCPDs
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**CMP-10 TG-4 Review of Overcurrent Language for the Articles under the purview of CMP-11**

CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
<b>11</b>	<b>Article 409</b>		
	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
<b>11</b>	<b>Article 430</b>		
	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	Branch-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 OCPD
	430.62(A)Ex.2	Overcurrent Protection	Fine as is
	430.62(B)	Feeder Overcurrent protective device	Feeder OCPD
	430.63Ex.	Feeder Overcurrent device	Feeder OCPD
	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
<b>11</b>	<b>Article 440</b>		
	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
<b>11</b>	<b>Article 460</b>		
	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 under the purview of CMP-12**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>12</b>	<b>Article 610</b>		
	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
<b>12</b>	<b>Article 620</b>		
	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
<b>12</b>	<b>Article 625</b>		
	625.60(C). (X4)	Overcurrent Protection	Fine as is
<b>12</b>	<b>Article 627</b>		
	627.41	Overcurrent Protection	Fine as is
	627.41(A)	Overcurrent Protection	Fine as is

	627.41(B)	Overcurrent Devices	OCPDs
<b>12</b>	<b>Article 630</b>		
	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
<b>12</b>	<b>Article 640</b>		
	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
<b>12</b>	<b>Article 645</b>		
	645.27	Overcurrent protective devices, (OCPD)	OCPDs
	645.27	Overcurrent protective devices	OCPDs
<b>12</b>	<b>Article 646</b>		
	646.7. (X11)	Overcurrent Protection	Fine as is
<b>12</b>	<b>Article 647</b>		
	647.5	Overcurrent Protection	Fine as is
<b>12</b>	<b>Article 650</b>		
	650.9	Overcurrent Protection	Fine as is
	650.9	Overcurrent Device	OCPD
<b>12</b>	<b>Article 660</b>		
	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
<b>12</b>	<b>Article 665</b>		
	665.24	Overcurrent Protection	Fine as is
<b>12</b>	<b>Article 668</b>		
	668.4(C)(2)	Overcurrent Protection	Fine as is
	668.21	Overcurrent Protection	Fine as is

	668.21	Overcurrent Device	OCPD
<b>12</b>	<b>Article 669</b>		
	669.9	Overcurrent Protection	Fine as is
	669.9	be protected from Overcurrent	shall be provided with overcurrent protection
<b>12</b>	<b>Article 670</b>		
	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
<b>12</b>	<b>Article 685</b>		
	685.10.	Overcurrent Devices	OCPDs

**CMP-10 TG-4 Review of Overcurrent Language for the Articles under the purview of CMP-13**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>13</b>	<b>Article 100</b>		
	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)
<b>13</b>	<b>Article 130</b>		
	130.80(C)	overcurrent devices	OCPDs
	130.80(C)	branch-circuit overcurrent device	OCPD
<b>13</b>	<b>Article 445</b>		
	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
<b>13</b>	<b>Article 455</b>		
	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
<b>13</b>	<b>Article 480</b>		
	480.4(B) IN.2	Overcurrent Protection	Fine As Is
	480.6. (X2)	Overcurrent Protection	Fine As Is
	480.7	Overcurrent Device	OCPD
<b>13</b>	<b>Article 695</b>		
	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
<b>13</b>	<b>Article 700</b>		
	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
<b>13</b>	<b>Article 701</b>		
	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
<b>13</b>	<b>Article 702</b>		
	702.5(C)	Overcurrent protective device	OCPD
<b>13</b>	<b>Article 706</b>		
	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
<b>13</b>	<b>Article 708</b>		
	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 under the purview of CMP-14**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>14</b>	<b>Article 500</b>		
	500.30(A)(2)	Branch Circuit Overcurrent Protection	OCPD
	500.30.	Overcurrent Protection	Fine as is
<b>14</b>	<b>Article 501</b>		
	501.105(B)(5)	Overcurrent Protection	Fine as is
	501.125(B)(2)	Motor Overcurrent	Fine as is
<b>14</b>	<b>Article 502</b>		
	502.120(A)	Overcurrent Devices	OCPDs
	502.120(B)(1)	Overcurrent Devices	OCPDs
	502.125	Motor Overcurrent	Fine as is
<b>14</b>	<b>Article 505</b>		
	505.30(A)(2)	Branch Circuit Overcurrent Protection	OCPD
	505.30.	Overcurrent Protection	Fine as is
<b>14</b>	<b>Article 506</b>		
	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 under the purview of CMP-15**

CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
<b>15</b>	<b>Article 100</b>		
	Bull Switch	Overcurrent protection	Fine as is
<b>15</b>	<b>Article 517</b>		
	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
<b>15</b>	<b>Article 518</b>		
	518.7(A)(1)	Overcurrent Protection	Fine as is
	518.17(A)(1) and (2)	Overcurrent Devices	OCPDs
<b>15</b>	<b>Article 520</b>		
	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
<b>15</b>	<b>Article 522</b>		
	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
<b>15</b>	<b>Article 525</b>		
	525.12	Overcurrent Device	OCPD
	525.23(B)	Overcurrent Device	OCPD
	525.23(C). (X2)	Overcurrent Protection	Fine as is
<b>15</b>	<b>Article 530</b>		
	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
<b>15</b>	<b>Article 540</b>		
	540.11(B)	Overcurrent Devices	OCPDs

**CMP-10 TG-4 Review of Overcurrent Language for the Articles under the purview of CMP-16**

CMP	NEC Section (using First Draft of 2026 NEC)	Current Language	"New" Language
<b>16</b>	<b>Article 830</b>		
	830.15. (X4)	Overcurrent Protection	Fine as is

**CMP-10 TG-4 Review of Overcurrent Language for the Articles under the purview of CMP-17**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>17</b>	<b>Article 422</b>		
	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
<b>17</b>	<b>Article 424</b>		
	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
<b>17</b>	<b>Article 425</b>		
	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
<b>17</b>	<b>Article 427</b>		
	427.57	Overcurrent Protection	Fine as is
	427.57	considered protected against Overcurrent	considered to have overcurrent protection
<b>17</b>	<b>Article 680</b>		
	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 under the purview of CMP-18**

<b>CMP</b>	<b>NEC Section (using First Draft of 2026 NEC)</b>	<b>Current Language</b>	<b>"New" Language</b>
<b>18</b>	<b>Article 393</b>		
	393.45. Title	Overcurrent ..... Protection	Overcurrent Protection ....
	393.45(A)	Overcurrent Protection	Fine as is
<b>18</b>	<b>Article 406</b>		
	406.46(F)	Overcurrent Device	OCPD
<b>18</b>	<b>Article 410</b>		
	410.59(A)	Branch-circuit overcurrent devices	Branch-Circuit OCPD
	410.153	Overcurrent Protection	Fine as is
<b>18</b>	<b>Article 600</b>		
	600.41	Overcurrent	CMP to Review



## Public Comment No. 697-NFPA 70-2024 [ Global Input ]

The Correlating Committee directs CMP 11 to review FR 7962 with respect to whether all the information deleted is redundant, or if some requirements are unique and should remain. Refer to comments provided in negative votes during balloting.

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_42.pdf		

### Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 42 appeared in the First Draft Report on First Revision No. 7962.

The Correlating Committee directs CMP 11 to review FR 7962 with respect to whether all the information deleted is redundant, or if some requirements are unique and should remain. Refer to comments provided in negative votes during balloting.

#### Related Item

- First Revision No. 7962

### Submitter Information Verification

**Submitter Full Name:** CC Notes

**Organization:** NEC Correlating Committee

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Fri Aug 02 12:25:48 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8056-NFPA 70-2024](#)

**Statement:** Returning 430.95 to the 2023 NEC language prevents the unintended consequences created by its deletion.

The term "high-impedance grounded neutral" was changed to "impedance grounded" for consistency with 250.36.



## Correlating Committee Note No. 42-NFPA 70-2024 [ Section No. 430.95 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:21:00 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs CMP 11 to review FR 7962 with respect to whether all the information deleted is redundant, or if some requirements are unique and should remain. Refer to comments provided in negative votes during balloting.

First Revision No. 7962-NFPA 70-2024 [Section No. 430.95]

### 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. 376-NFPA 70-2024 [ Section No. 409.22 ]

### 409.22 Short-Circuit Current Rating.

#### (A) Installation.

An industrial control panel shall not be installed where the available fault current exceeds its short-circuit current rating as marked in accordance with 409.110(3).

#### (B) Documentation.

If an industrial control panel is required to be marked with a short-circuit current rating in accordance with 409.110(3), the available fault current at the industrial control panel and the date the available fault current calculation was performed shall be documented and made available to those authorized to inspect, install, or maintain the installation.

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_40.pdf		

### Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 40 appeared in the First Draft Report on First Revision No. 8111.

The Correlating Committee directs CMP-11 to review FR 8111 and the requirements in 409.23(C). As requirements for 'Hazard Markings', which include "WARNING", are covered in 110.21(B), CMP 11 should consider a reference to that section rather than repeating requirements here.

#### Related Item

- First Revision No. 8111

### Submitter Information Verification

**Submitter Full Name:** CC Notes  
**Organization:** NEC Correlating Committee  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Jul 30 12:21:02 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** [SR-8063-NFPA 70-2024](#)  
**Statement:** The wording in 409.23(C) is redundant to 110.21(B), therefore 409.23(C) is replaced by a reference to 110.21(B). Section 409.23(A) is arranged into a list for clarity (ref 2.1.8 of the style manual).

Additional response for PC-1360: It is the intent of the requirement to have an option of marking on the product or using documentation available to persons. The first sentence is re-worded for clarity.



## Correlating Committee Note No. 40-NFPA 70-2024 [ Section No. 409.22 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:04:03 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs CMP-11 to review FR 8111 and the requirements in 409.23(C). As requirements for 'Hazard Markings', which include "WARNING", are covered in 110.21(B), CMP 11 should consider a reference to that section rather than repeating requirements here.

First Revision No. 8111-NFPA 70-2024 [New Section after 409.22]

### 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. 1360-NFPA 70-2024 [ Section No. 409.23 ]

### 409.23 Source(s) of Supply.

#### (A) Identification.

~~Industrial control panels shall identify the~~ The location of the means necessary to disconnect all sources of supply 50 volts or more ~~marked shall be marked on industrial control panels~~ in accordance with 409.23(C) ~~or documented in a manner that is available to those authorized to install, inspect, and maintain the equipment.~~

#### (B) Multiple Sources of Supply.

Industrial control panels supplied by more than one source operating at 50 volts or more, and where more than one disconnecting means is required to disconnect all circuits operating at 50 volts or more, shall be permanently marked with the following:

WARNING — MULTIPLE DISCONNECTING MEANS REQUIRED TO DE-ENERGIZE ALL SOURCES OF SUPPLY 50 VOLTS OR MORE

#### (C) Markings.

Markings installed to comply with the requirements of 409.23(A) or 409.23(B) shall be a label that complies with both of the following:

- (1) Be permanently affixed to the exterior of the enclosure and of sufficient durability to withstand the environment involved
- (2) Use a method that is not handwritten

#### (D) Documentation

The location of all disconnecting means shall be documented in a manner that is available to those authorized to install, inspect, and maintain the equipment.

### Statement of Problem and Substantiation for Public Comment

The industrial control panel can't identify anything. I believe what the panel meant to indicate that the marking should indicate the location of the disconnecting means. I don't believe that the existence of documentation about disconnects is an alternative to marking. Both are necessary.

#### Related Item

- FR 8111

### Submitter Information Verification

**Submitter Full Name:** Mark Earley

**Organization:** Alumni Code Consulting

**Affiliation:** Self

**Street Address:**

**City:**

**State:**

**Zip:**

**Submission Date:** Wed Aug 21 14:07:30 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** SR-8063-NFPA 70-2024

**Statement:** The wording in 409.23(C) is redundant to 110.21(B), therefore 409.23(C) is replaced by a reference to 110.21(B). Section 409.23(A) is arranged into a list for clarity (ref 2.1.8 of the style manual).

Additional response for PC-1360: It is the intent of the requirement to have an option of marking on the product or using documentation available to persons. The first sentence is re-worded for clarity.



## Public Comment No. 2004-NFPA 70-2024 [ Section No. 409.23(A) ]

### (A) Identification.

Industrial control panels shall identify the location of the means necessary to disconnect all sources of supply 50 volts or more marked in accordance with ~~409.110.23(B)~~ or documented in a manner that is available to those authorized to install, inspect, and maintain the equipment.

### Statement of Problem and Substantiation for Public Comment

The requirements of 409.23 (C) are a duplication of text that is already stated in 110.21(B). This is a violation of section 4.1.1 of the NEC Style manual.

### Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
<u>Public Comment No. 2005-NFPA 70-2024 [Section No. 409.23(C)]</u>	

#### Related Item

- PI 1518 and 1759

### Submitter Information Verification

**Submitter Full Name:** Arthur Neubauer  
**Organization:** Arseal Technologies  
**Affiliation:** American Petroleum Institute  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Wed Aug 28 15:09:13 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** SR-8063-NFPA 70-2024  
**Statement:** The wording in 409.23(C) is redundant to 110.21(B), therefore 409.23(C) is replaced by a reference to 110.21(B). Section 409.23(A) is arranged into a list for clarity (ref 2.1.8 of the style manual).

Additional response for PC-1360: It is the intent of the requirement to have an option of marking on the product or using documentation available to persons. The first sentence is re-worded for clarity.



## Public Comment No. 2005-NFPA 70-2024 [ Section No. 409.23(C) ]

### ~~(C)~~ Markings:

~~Markings installed to comply with the requirements of 409.23(A) or 409.23(B) shall be a label that complies with both of the following:~~

- ~~(1) Be permanently affixed to the exterior of the enclosure and of sufficient durability to withstand the environment involved~~
- ~~(2) Use a method that is not handwritten~~

### Statement of Problem and Substantiation for Public Comment

The requirements of 409.23 (C) are a duplication of text that is already stated in 110.21(B). This is a violation of section 4.1.1 of the NEC Style manual.

### Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 2004-NFPA 70-2024 [Section No. 409.23(A)]	PI 1518 and 1759
<u>Related Item</u>	
• PI 1518 and 1759	

### Submitter Information Verification

**Submitter Full Name:** Arthur Neubauer  
**Organization:** Arseal Technologies  
**Affiliation:** American Petroleum Institute  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Wed Aug 28 15:17:28 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** [SR-8063-NFPA 70-2024](#)  
**Statement:** The wording in 409.23(C) is redundant to 110.21(B), therefore 409.23(C) is replaced by a reference to 110.21(B). Section 409.23(A) is arranged into a list for clarity (ref 2.1.8 of the style manual).

Additional response for PC-1360: It is the intent of the requirement to have an option of marking on the product or using documentation available to persons. The first sentence is re-worded for clarity.



**TITLE OF NEW CONTENT**

Type your content here ...

**409.71. Cybersecurity**

**Industrial Control Panels, located in life safety-related infrastructures, that are connected to a communication network and have the capability to be controlled or permit control of any portion of the premises shall comply with either of the following:**

**(1) The ability to control the industrial control panel is limited to a direct connection through a local nonnetworked interface.**

**(2) The industrial control panel is connected through a networked interface complying with both of the following methods:**

**a. The industrial control panel and associated software are identified as being evaluated for cybersecurity.**

**b. A cybersecurity assessment of the industrial control panel is completed and documentation of the assessment and certification is available to those authorized to inspect, operate, and maintain the system. \_**

**Informational Note No. 1: See ANSI/ISA 62443, Cybersecurity Standards series, UL 2900, Cybersecurity Standard series, or the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1 for assessment requirements.**

**Informational Note No. 2: Examples used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:**

**(1) The ISA Security Compliance Institute (ISCI) conformity assessment program**

**(2) Certification of compliance by a nationally recognized test laboratory**

**(3) Manufacturer certification for the specific type and brand of system provided**

**Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities that could arise due to software defects, system configuration changes, or user interactions. Installation of devices that can be secured is an important first step but not sufficient to guarantee a secure system.**

**Informational Note No. 4: See NEMA CY70001-2023, Cybersecurity Implementation Guidance for Connected Electrical Infrastructure, for recommendations on how to meet this requirement.**

**Informational Note No. 5: Examples of life safety-related infrastructures include, but are not limited to, waste water treatment facilities, water supply facilities, police stations, call centers, financial centers, data centers, and military bases. \_**

**Statement of Problem and Substantiation for Public Comment**

At first glance the Panel statement to resolve PI 1243, "Considerations for cybersecurity should occur during the product development stage, not during installation stage. Entities involved in product development or listing should be responsible for addressing cybersecurity", seems to be an adequate response. However, upon further investigation, it becomes obvious that just the availability of cyber protected equipment is not enough. Manufacturers may produce equipment that is identified as being evaluated for cybersecurity, but, without a requirement in this Code, it doesn't guarantee that cyber protected equipment will be installed. This Code must include the requirement. Without the Code requirement, manufacturers may or may not produce cyber protected equipment, and the available cyber protected equipment might not be installed.

Most of the cybersecurity focus has been on IT systems. There has been very little public discussion about cybersecurity for Operational Technology (OT), but cyber attacks on OT occur on almost a daily basis. For an example of just how common cyber attacks on life safety related infrastructure have become, let's look at just the water supply and waste water treatment industry. The DNI (Director of National Intelligence), through the CTIIC (Cyber Threat Intelligence Integration Center) recently released a report of 12 cyber attacks on the industrial control systems of water utilities, water systems, and waste water treatment systems, for the six-month period from November 2023 through April 2024. This report can be found at

[https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.dni.gov/files/CTIIC/documents/products/Recent\\_Cyber\\_Attacks\\_on\\_US\\_Infrastructure\\_Underscore\\_Vulnerability\\_of\\_Crit\\_June2024.pdf&ved=2ahUKEwi5gP7-m4elAxUakYkEHasyIRQQFnoECB8QAQ&usg=AOvVaw3hJL2DMIRs-CECFmewcXVP](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.dni.gov/files/CTIIC/documents/products/Recent_Cyber_Attacks_on_US_Infrastructure_Underscore_Vulnerability_of_Crit_June2024.pdf&ved=2ahUKEwi5gP7-m4elAxUakYkEHasyIRQQFnoECB8QAQ&usg=AOvVaw3hJL2DMIRs-CECFmewcXVP)

While this example covered attacks on industrial control systems, successful attacks can occur on all electrical equipment that is continuously connected to the internet and even equipment that is only connected to the internet during system updates. (Cyber attacks can lay quiet for years, waiting for an update, and then do their intended damage during the update.)

Hackers can easily destroy unprotected equipment and shut down entire unprotected facilities. Our adversaries are continuously mounting cyber attacks on our life safety-related infrastructure. We have the ability, and obligation, to prevent this type of damage to our infrastructure from malicious cyber attacks.

Examples of "life safety-related infrastructure" were added in new Informational Note No. 5 because "life safety-related infrastructure" is not defined in Article 100. (It should be noted that "life safety equipment", in 110.3(A)(8), is a similar phrase used in conjunction with cybersecurity. It is not defined in Article 100 either. Public Comments have been submitted to add Informational Notes to 110.3(A)(8) providing examples of both life safety equipment and life safety-related infrastructures.)

Let's look at an example of a waste water treatment facility. 110.3(A)(8) currently requires that a fire alarm system in the waste water treatment facility, because it is life safety equipment, be evaluated in light of cybersecurity. However, there is no requirement for other non-life safety equipment/systems within the waste water treatment plant, such as industrial control panels, which could easily be compromised by a cyber attack. The proposed text in this Public Comment addresses this vulnerability.

Informational Note No. 4 was added to correlate with FR 9040 (110.3(A)(8)), FR 9210 (240.6(D)), and FR 8219 (708.7).

THIS PUBLIC COMMENT SIMPLY REQUIRES THAT INDUSTRIAL CONTROL PANELS, INSTALLED ONLY IN LIFE SAFETY-RELATED INFRASTRUCTURES, EITHER NOT BE CONNECTED TO THE INTERNET, OR IF THEY ARE CONNECTED TO THE INTERNET, THAT THEY BE IDENTIFIED FOR CYBERSECURITY AND THAT AN ASSESSMENT IS PROVIDED.

**Related Item**

• PI 1243

**Submitter Information Verification**

**Submitter Full Name:** Vincent Saporita  
**Organization:** Saporita Consulting  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Sat Aug 24 08:44:44 EDT 2024  
**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected

**Resolution:** Considerations for cybersecurity should occur during the product development stage, not during installation stage. Entities involved in product development or listing should be responsible for addressing cybersecurity. Not all connected equipment under the scope of this provision poses a hazard. It should be up to the user to determine their own risks and application of cybersecurity measures. There are already requirements for cybersecurity in other parts of the code such as 708.7 for COPS.



**TITLE OF NEW CONTENT**

Type your content here ...

409.71. Cybersecurity

Industrial Control Panels that are connected to a communication network and have the capability to be controlled or permit control of any portion of the premises shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) The industrial control panel is connected through a networked interface complying with both of the following methods:

a. The industrial control panel and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

Documentation of the assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, Cybersecurity Standards series; UL 2900, Cybersecurity Standards series; and the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1, for assessment guidelines.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

(3) Manufacturer certification for the specific type and brand of system provided

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities that could arise due to software defects, system configuration changes, or user interactions. Installation of devices that can be secured is an important first step but not sufficient to guarantee a secure system.

Informational Note No. 4: See NEMA CY70001-2023, Cybersecurity Implementation Guidance for Connected Electrical Infrastructure, for recommendations on how to meet this requirement.

**Statement of Problem and Substantiation for Public Comment**

Code Making Panel 11 is encouraged to reverse their position on the cybersecurity protection proposal for industrial control panels in PI 1243.

In the realm of industrial operations, automated processes play a critical role in ensuring the safety, stability, and efficiency of various systems. These processes, driven by a combination of Operational Technology (OT) and Information Technology (IT), rely heavily on sensors to measure physical world conditions such as temperature, pressure, flow, velocity, voltage, and current. However, despite their importance, these sensors are fraught with vulnerabilities that can lead to catastrophic outcomes.

One of the primary functions of automated systems is to maintain the stability and safety of operations by responding to changes in the operational environment. Sensors are crucial in this context, as they provide real-time data that informs corrective actions to fine-tune processes. In cases where systems become seriously unstable, sensors measure the extent of the instability, and rather than attempting corrective measures, the entire process may be shut down to prevent accidents and ensure safety.

As engineers will confirm, the accuracy and reliability of sensor readings are not infallible. Over time, sensors experience a phenomenon known as "drift," where their measurement readings become less accurate. This drift necessitates routine calibration to maintain the precision of the readings. Calibration typically comes from equipment manufacturer or vendor websites, accessed via the Internet. While this ensures that sensors provide accurate data, it introduces a significant security risk. The calibration connection via the Internet, often required for maintaining sensor accuracy, paradoxically compromises the security provided by air-gapped OT networks.

Air-gapping, a best practice in industrial systems, involves isolating OT networks from the Internet to prevent unauthorized access. However, the need for online calibration creates a potential pathway for cyber threats. During the calibration process, malicious actors can scan for specific sensor markers, such as manufacturer, model, and year of production, which are traceable via serial numbers. Once identified, these malefactors can exploit the Internet connection to insert malware into the OT systems. This malware can then move freely throughout the OT network, potentially compromising IT systems as well.

The consequences of such security breaches are dire. False or inaccurate sensor readings, if not acted upon, can lead to unsafe operations, property damage, and life-threatening conditions. In environments where automated measurements are crucial for safety and reliability, such as chemical plants or manufacturing facilities, the risk of fires, explosions, and other catastrophic events is significantly heightened. There is no network (logic layer) security solution to this glaring vulnerability. Any and all solutions must be fabricated at the physical layer where the sensors live. This is why engineering personnel must, in the future, be fully read-in and then actively included in process planning and updating.

Operational Technology (OT) networks, which serve as the communication pathways for sensor readings to actuators, are critical in translating physical world measurements into actionable responses. However, unlike IT systems, which generally handle business communications, OT networks are directly involved in controlling physical processes. The lack of cybersecurity measures for process sensors—devices that do not support passwords or other protective features—makes them particularly vulnerable to exploitation.

The intersection of OT and IT in industrial systems presents a complex challenge. While OT operates in the realm of physical measurements, IT functions in the logical world, managing business data and communications. The integration of these two domains, while necessary for modern industrial operations, creates potential points of vulnerability that can be exploited by cybercriminals, terrorist cells, and adverse nation-states which, on a wartime, wholesale level, would cripple an entire nation's supply chain for targeted commodities.

In conclusion, the vulnerabilities inherent in the automation of industrial processes, particularly those related to sensor calibration and cybersecurity, pose significant threats to safety and stability. The need for routine calibration of sensors, often conducted via Internet-based connections, undermines the security of air-gapped OT networks, opening the door to potential cyberattacks. As industrial systems continue to evolve, addressing these vulnerabilities through enhanced security measures and practices that include engineering expertise will be crucial in safeguarding against the real-world threats of property damage, loss of life, and catastrophic incidents such as fires and explosions.

The Code Making Panel statement claims that "considerations for cyber security should occur during the product development stage, not during installation stage", and that "entities involved in product development or listing should be responsible for addressing cyber security". There are serious and significant problems with

this logic. Even if cybersecurity considerations were to find their way into product development calendars/schedules and product safety standards calendars/schedules it can take three to ten years to be written, be accepted, and take effect. However, even more importantly, considerations for cybersecurity in the product development stage and in product safety standards don't insert requirements into the Code. Code Making Panel 11 has the possibility and responsibility to positively influence the safety and stability of our country through requirements for cybersecurity protection of industrial control panels.

**Related Item**

• PI 1243 • FR 9210 • FR 9040 • FR 8219

**Submitter Information Verification**

**Submitter Full Name:** Doug Ellsworth

**Organization:** Ellsworth Partners of USA

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Mon Aug 26 15:55:12 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected

**Resolution:** Considerations for cybersecurity should occur during the product development stage, not during installation stage. Entities involved in product development or listing should be responsible for addressing cybersecurity. Not all connected equipment under the scope of this provision poses a hazard. It should be up to the user to determine their own risks and application of cybersecurity measures. There are already requirements for cybersecurity in other parts of the code such as 708.7 for COPS.



## Public Comment No. 1780-NFPA 70-2024 [ Section No. 409.110 ]

### 409.110 Marking.

An industrial control panel shall have permanent markings that are visible after installation. The markings in 409.110(2) and 409.110(3) shall be attached to the outside of the enclosure. The markings in 409.110(1), 409.110(4), 409.110(5), and 409.110(6) shall be attached to either the inside or outside of the enclosure. The following markings shall be included:

- (1) Manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product can be identified.
- (2) Supply voltage, number of phases, frequency, and full-load current for each incoming supply circuit.
- (3) Short-circuit current rating of the industrial control panel based on one of the following:
  - (4) Short-circuit current rating of a listed and labeled assembly
  - (5) Short-circuit current rating established utilizing an approved method

Informational Note: See ANSI/UL 508A, *Standard for Industrial Control Panels*, Supplement SB, for an example of an approved method.

Exception to (3): Short-circuit current rating markings are not required for industrial control panels containing only control circuit components.

- (6) If the industrial control panel is intended as service equipment, marked to identify it as being suitable for use as service equipment.
- (7) Electrical wiring diagram, the identification number of a separate electrical wiring diagram, or a designation referenced in a separate wiring diagram.
- (8) An enclosure type number.

### Statement of Problem and Substantiation for Public Comment

The proposed text restores the exception for not requiring SCCR ratings for panels containing only control circuit components and exists in the 2023 NEC, but now with correct reference to reordered item (3). As SCCR ratings only apply to power circuits per UL508A, this exception is necessary control circuit only panels. The deletion of the exception was not proposed in the original PI's.

Note there are no proposed changes to list items a.) and b). and the underlining shown by Terra is in error. In addition, the exception text should be at the same indent level as item (3).

#### Related Item

- FR8126

### Submitter Information Verification

**Submitter Full Name:** Jay Tamblingson

**Organization:** Rockwell Automation

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Aug 27 10:55:53 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** SR-8067-NFPA 70-2024

**Statement:** The exception to item 3 was inadvertently removed during the development of the first draft. The verbiage from the 2023 code is being re-introduced.



## Public Comment No. 2027-NFPA 70-2024 [ Section No. 409.110 ]

### 409.110 Marking.

An industrial control panel shall have permanent markings that are visible after installation. The markings in 409.110(2) and 409.110(3) shall be attached to the outside of the enclosure. The markings in 409.110(1), 409.110(4), 409.110(5), and 409.110(6) shall be attached to either the inside or outside of the enclosure. The following markings shall be included:

- (1) Manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product can be identified.
- (2) Supply voltage, number of phases, frequency, and full-load current for each incoming supply circuit.
- (3) Short-circuit current rating of the industrial control panel based on one of the following:
  - (4) Short-circuit current rating of a listed and labeled assembly
  - (5) Short-circuit current rating established utilizing an approved method

Informational Note: See ANSI/UL 508A, *Standard for Industrial Control Panels*, Supplement SB, for an example of an approved method.

Exception to (3): Short-circuit current rating markings are not required for industrial control panels containing only control circuit components.

- (6) If the industrial control panel is intended as service equipment, marked to identify it as being suitable for use as service equipment.
- (7) Electrical wiring diagram, the identification number of a separate electrical wiring diagram, or a designation referenced in a separate wiring diagram.
- (8) An enclosure type number.

### Statement of Problem and Substantiation for Public Comment

No justification was provided for removing the exception for requiring short circuit ratings on enclosures with only control elements by either the submitter of the original public input 8116, public input 1747 or the committee statement. The removal of the exception was an editorial mistake. If this is not corrected, every 2 gang light switch will require a short circuit rating labeled on the face plate.

Please note that the underlining of items 4 and 5 and changing 3a and 3b to 4 and 5 are a Terra View error. No changes are submitted for anything besides the restoration of the exception.

#### Related Item

• PI 8126 • PI 1747

### Submitter Information Verification

**Submitter Full Name:** Arthur Neubauer

**Organization:** Arseal Technologies

**Affiliation:** American Petroleum Institute

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Wed Aug 28 16:12:01 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** SR-8067-NFPA 70-2024

**Statement:** The exception to item 3 was inadvertently removed during the development of the first draft. The verbiage from the 2023 code is being re-introduced.



## Public Comment No. 1456-NFPA 70-2024 [ Section No. 430.3 ]

### 430.3 Reconditioned Motors.

Reconditioned motors shall be permitted ~~to be installed~~ if the reconditioning has been conducted in accordance with the manufacturer's instructions or, if no instructions are provided, nationally recognized standards.

Reconditioned motors for use in hazardous (classified) locations shall be permitted where permitted elsewhere in this code.

Informational Note: See ANSI/EASA AR100-2020, *Recommended Practice for the Repair of Rotating Electrical Apparatus*, for information on the rewinding and repair of motors.

### Statement of Problem and Substantiation for Public Comment

The change brings the first sentence in line with the second sentence by removing the words "to be installed". This change is necessary to add clarity that a motor can be reconditioned even if it is in place. If the words "to be installed" are not removed, the language only applies to motors that are being installed and not if being reconditioned to any extent in place.

#### Related Item

- FR 7925

### Submitter Information Verification

**Submitter Full Name:** Thomas Domitrovich

**Organization:** Eaton Corporation

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Fri Aug 23 09:17:49 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected

**Resolution:** The current text provides the necessary guidance for on-site reconditioning, and the proposed changes would not improve clarity.



## Public Comment No. 381-NFPA 70-2024 [ Section No. 430.3 ]

### 430.3 Reconditioned Motors.

Reconditioned motors shall be permitted to be installed if the reconditioning has been conducted in accordance with the manufacturer's instructions or, if no instructions are provided, nationally recognized standards.

Reconditioned motors for use in hazardous (classified) locations shall be permitted where permitted elsewhere in this code.

Informational Note: See ANSI/EASAAR100-2020, *Recommended Practice for the Repair of Rotating Electrical Apparatus*, for information on the rewinding and repair of motors.

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_41.pdf		

### Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 41 appeared in the First Draft Report on First Revision No. 7925.

The Correlating Committee directs CMP 11 to review FR 7925 and consider whether the second paragraph is necessary, as requirements for equipment (including motors) installed in hazardous locations are addressed in the Chapter 5 articles for hazardous locations. Additionally, the Correlating Committee directs CMP 11 to consider deletion of the entire section, as the requirements are redundant with those in 110.20. The requirement regarding applying the original manufacturer's instructions is provided in 110.20(B)(2), and the requirements regarding "applicable standards" is provided in the parent language of 110.20. The title of 430.3 should be revised to comply with Section 2.2.1 of the NEC Style Manual.

#### Related Item

- First Revision No. 7925

### Submitter Information Verification

**Submitter Full Name:** CC Notes  
**Organization:** NEC Correlating Committee  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Jul 30 13:11:57 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** [SR-8000-NFPA 70-2024](#)  
**Statement:** Title changed per NEC style manual and second paragraph deleted as it is redundant language.



## Correlating Committee Note No. 41-NFPA 70-2024 [ Section No. 430.3 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:06:59 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs CMP 11 to review FR 7925 and consider whether the second paragraph is necessary, as requirements for equipment (including motors) installed in hazardous locations are addressed in the Chapter 5 articles for hazardous locations. Additionally, the Correlating Committee directs CMP 11 to consider deletion of the entire section, as the requirements are redundant with those in 110.20. The requirement regarding applying the original manufacturer's instructions is provided in 110.20(B)(2), and the requirements regarding "applicable standards" is provided in the parent language of 110.20. The title of 430.3 should be revised to comply with Section 2.2.1 of the NEC Style Manual.

First Revision No. 7925-NFPA 70-2024 [Section No. 430.2]

### 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. 1077-NFPA 70-2024 [ Section No. 430.6(A)(2) ]

### (2) Nameplate Values.

The motor nameplate current ratings shall be used to determine the values for the following:

- (1) Separate motor overload protection
- (2) For motors built for low speeds (less than 1200 RPM), high torques, canned pumps, or multispeed motors, the following:
  - a. Ampacity of conductors
  - b. Current ratings of switches
  - c. Current ratings of branch-circuit short-circuit and ground-fault protection
- (3) Large motors exceeding the values in Part XIV- ~~shall~~ and motors using voltages not listed in Part XIV shall be permitted to use the nameplate current rating for conductor sizing.

### Statement of Problem and Substantiation for Public Comment

This is a Public Comment to revive resolved Public Input 3662. The original substantiation was:

"There is more and more equipment that originates in foreign countries being installed under the rules of the NEC. In many cases these motors have operating voltages that are not standard in the US. Without this change there is no code compliant way to install this equipment as the current code only permits the use of the currents shown in the Part XIV Tables to size the motor circuit conductors."

The panel resolve statement said:

"The NEC contains the motor types and voltages approved for applications for the proper installation per this code. The addition of other motors cannot be accepted without further clarification on where they would be used and if they can be protected by the full range of motor controllers."

It appears to me that the application of the resolve statement is telling code users that motors with voltages other than those shown in the Article 430 Part XIV tables cannot be used for installations where the NEC applies. There is a large amount of equipment from foreign sources that have motors with voltages that are not provided for the the motor full load current tables. There has to be a code compliant way to use this equipment. This is an everyday installation for many industrial occupancies.

#### Related Item

- Public Input No. 2477-NFPA 70-2023

### Submitter Information Verification

**Submitter Full Name:** Don Ganiere

**Organization:** none

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Aug 13 19:18:57 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected

**Resolution:** The proposed changes did not address the concerns in the resolved public input statement. There was no data or documentation provided to show how the motors would be protected/controlled with readily available motor controllers.



**TITLE OF NEW CONTENT**

Type your content here ...

**430.19. Cybersecurity**

**Motors, motor circuits, and controllers, located in life safety-related infrastructures, that are connected to a communication network and have the capability to be controlled or permit control of any portion of the premises shall comply with either of the following:**

**(1) The ability to control the motor, motor circuit, and controller is limited to a direct connection through a local nonnetworked interface.**

**(2) The motor, motor circuit, and controller is connected through a networked interface complying with both of the following methods:**

**a. The motor, motor circuit, and controller is identified as being evaluated for cybersecurity.**

**b. A cybersecurity assessment of the motor, motor circuit, and controller is completed and documentation of the assessment and certification is available to those authorized to inspect, operate, and maintain the system.**

**Informational Note No. 1: See ANSI/ISA 62443, Cybersecurity Standards series, UL 2900, Cybersecurity Standard series, or the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1 for assessment requirements.**

**Informational Note No. 2: Examples used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:**

**(1) The ISA Security Compliance Institute (ISCI) conformity assessment program**

**(2) Certification of compliance by a nationally recognized test laboratory**

**(3) Manufacturer certification for the specific type and brand of system provided**

**Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities that could arise due to software defects, system configuration changes, or user interactions. Installation of devices that can be secured is an important first step but not sufficient to guarantee a secure system.**

**Informational Note No. 4: See NEMA CY70001-2023, Cybersecurity Implementation Guidance for Connected Electrical Infrastructure, for recommendations on how to meet this requirement.**

**Informational Note No. 5: Examples of life safety-related infrastructures include, but are not limited to, waste water treatment facilities, water supply facilities, police stations, call centers, financial centers, data centers, and military bases.**

**Statement of Problem and Substantiation for Public Comment**

At first glance the Panel statement to resolve "Considerations for cybersecurity should occur during the product development stage, not during installation stage. Entities involved in product development or listing should be responsible for addressing cybersecurity", seems to be an adequate response. However, upon further investigation, it becomes obvious that just the availability of cyber protected equipment is not enough. Manufacturers may produce equipment that is identified as being evaluated for cybersecurity, but, without a requirement in this Code, it doesn't guarantee that cyber protected equipment will be installed. This Code must include the requirement. Without the Code requirement, manufacturers may or may not produce cyber protected equipment, and the available cyber protected equipment might not be installed.

Most of the cybersecurity focus has been on IT systems. There has been very little public discussion about cybersecurity for Operational Technology (OT), but cyber attacks on OT occur on almost a daily basis. For an example of just how common cyber attacks on life safety related infrastructure have become, let's look at just the water supply and waste water treatment industry. The DNI (Director of National Intelligence), through the CTIIC (Cyber Threat Intelligence Integration Center) recently released a report of 12 cyber attacks on the industrial control systems of water utilities, water systems, and waste water treatment systems, for the six-month period from November 2023 through April 2024. This report can be found at

[https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.dni.gov/files/CTIIC/documents/products/Recent\\_Cyber\\_Attacks\\_on\\_US\\_Infrastructure\\_Underscore\\_Vulnerability\\_of\\_Crit\\_June2024.pdf&ved=2ahUKEwi5gP7-m4elAxUakYkEHasyIRQQFnoECB8QAQ&usg=AOVvaw3hJL2DMIRs-CECFmewcXVP](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.dni.gov/files/CTIIC/documents/products/Recent_Cyber_Attacks_on_US_Infrastructure_Underscore_Vulnerability_of_Crit_June2024.pdf&ved=2ahUKEwi5gP7-m4elAxUakYkEHasyIRQQFnoECB8QAQ&usg=AOVvaw3hJL2DMIRs-CECFmewcXVP)

While this example covered attacks on industrial control systems, successful attacks can occur on all electrical equipment that is continuously connected to the internet and even equipment that is only connected to the internet during system updates. (Cyber attacks can lay quiet for years, waiting for an update, and then do their intended damage during the update.)

Hackers can easily destroy unprotected equipment and shut down entire unprotected facilities. Our adversaries are continuously mounting cyber attacks on our life safety-related infrastructure. We have the ability, and obligation, to prevent this type of damage to our infrastructure from malicious cyber attacks.

Examples of "life safety-related infrastructures" were added in new Informational Note No. 5 because "life safety-related infrastructure" is not defined in Article 100. (It should be noted that "life safety equipment", in 110.3(A)(8), is a similar phrase used in conjunction with cybersecurity. It is not defined in Article 100 either. Public Comments have been submitted to add Informational Notes to 110.3(A)(8) providing examples of both life safety equipment and life safety-related infrastructure.)

Let's look at an example of a waste water treatment facility. 110.3(A)(8) requires that a fire alarm system in the waste water treatment facility, because it is life safety equipment, be evaluated in light of cybersecurity. However, there is no requirement for other non-life safety equipment/systems within the waste water treatment plant, such as motor controllers, which could easily be compromised by a cyber attack. The proposed text in this Public Comment addresses this vulnerability.

Informational Note No. 4 was added to correlate with FR 9040 (110.3(A)(8)), FR 9210 (240.6(D)), and FR 8219 (708.7).

THIS PUBLIC COMMENT SIMPLY REQUIRES THAT MOTORS, MOTOR CIRCUITS, AND CONTROLLERS, INSTALLED ONLY IN LIFE SAFETY-RELATED INFRASTRUCTURES, EITHER NOT BE CONNECTED TO THE INTERNET, OR IF THEY ARE CONNECTED TO THE INTERNET, THAT THEY BE IDENTIFIED FOR CYBERSECURITY AND THAT AN ASSESSMENT IS PROVIDED.

**Related Item**

• PI 1260

**Submitter Information Verification**

**Submitter Full Name:** Vincent Saporita  
**Organization:** Saporita Consulting  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Sat Aug 24 08:55:44 EDT 2024  
**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected

**Resolution:** Considerations for cyber security should occur during the product development stage, not during installation stage. Entities involved in product development or listing should be responsible for addressing cyber security. Not all connected equipment under the scope of this provision poses a hazard. It should be up to the user to determine their own risks and application of cybersecurity measures. There are already requirements for cybersecurity in other parts of the code such as 708.7 for COPS.



**430.22 Single Motor.**

Conductors that supply a single motor used in a continuous duty application shall have an ampacity of not less than 125 percent of the motor full-load current rating, as determined by 430.6(A)(1), or not less than specified in 430.22(A) through 430.22(G)(1).

**(A) Direct-Current Motor-Rectifier Supplied.**

For dc motors operating from a rectified power supply, the conductor ampacity on the input of the rectifier shall not be less than 125 percent of the rated input current to the rectifier. For dc motors operating from a rectified single-phase power supply, the conductors between the field wiring output terminals of the rectifier and the motor shall have an ampacity of not less than the following percentages of the motor full-load current rating:

- (1) Where a rectifier bridge of the single-phase, half-wave type is used, 190 percent.
- (2) Where a rectifier bridge of the single-phase, full-wave type is used, 150 percent.

**(B) Multispeed Motor.**

For a multispeed motor, the selection of branch-circuit conductors on the line side of the controller shall be based on the highest of the full-load current ratings shown on the motor nameplate. The ampacity of the branch-circuit conductors between the controller and the motor shall not be less than 125 percent of the current rating of the winding(s) that the conductors energize.

**(C) Wye-Start, Delta-Run Motor.**

For a wye-start, delta-run connected motor, the ampacity of the branch-circuit conductors on the line side of the controller shall not be less than 125 percent of the motor full-load current as determined by 430.6(A)(1). The ampacity of the conductors between the controller and the motor shall not be less than 72 percent of the motor full-load current rating as determined by 430.6(A)(1).

Informational Note: The individual motor circuit conductors of a wye-start, delta-run connected motor carry 58 percent of the rated load current. The multiplier of 72 percent is obtained by multiplying 58 percent by 1.25.

**(D) Part-Winding Motor.**

For a part-winding connected motor, the ampacity of the branch-circuit conductors on the line side of the controller shall not be less than 125 percent of the motor full-load current as determined by 430.6(A)(1). The ampacity of the conductors between the controller and the motor shall not be less than 62.5 percent of the motor full-load current rating as determined by 430.6(A)(1).

Informational Note: The multiplier of 62.5 percent is obtained by multiplying 50 percent by 1.25.

**(E) Other Than Continuous Duty.**

Conductors for a motor used in a short-time, intermittent, periodic, or varying duty application shall have an ampacity of not less than the percentage of the motor nameplate current rating shown in Table 430.22(E), unless the authority having jurisdiction grants special permission for conductors of lower ampacity.

Table 430.22(E) Duty-Cycle Service

<u>Classification of Service</u>	<u>Nameplate Current Rating Percentages</u>			
	<u>5-Minute</u> <u>Rated</u> <u>Motor</u>	<u>15-Minute</u> <u>Rated</u> <u>Motor</u>	<u>30- &amp; 60-Minute</u> <u>Rated</u> <u>Motor</u>	<u>Contin-</u> <u>uous</u> <u>Rated</u> <u>Motor</u>
Short-time duty operating valves, raising or lowering rolls, etc.	110	120	150	—
Intermittent duty freight and passenger elevators, tool heads, pumps, drawbridges, turntables, etc. (for arc welders, see 630.11)	85	85	90	140
Periodic duty rolls, ore- and coal-handling machines, etc.	85	90	95	140
Varying duty	110	120	150	200

Note: Any motor application shall be considered as continuous duty unless the nature of the apparatus it drives is such that the motor will not operate continuously with load under any condition of use.

**(F) Separate Terminal Enclosure.**

The conductors between a stationary motor rated 1 hp or less and the separate terminal enclosure permitted in 430.245(B) shall be permitted to be smaller than 14 AWG but not smaller than 18 AWG, provided they have an ampacity as specified in 430.22.

**(G) Conductors for Small Motors.**

Conductors for small motors shall not be smaller than 14 AWG unless otherwise permitted in 430.22(G)(1) or 430.22(G)(2).

**(1) 18 AWG Copper.**

18 AWG individual copper conductors installed in a cabinet or enclosure, copper conductors that are part of a jacketed multiconductor cable assembly, or copper conductors in a flexible cord shall be permitted, under either of the following sets of conditions:

- (1) The circuit supplies a motor with a full-load current rating, as determined by 430.6(A)(1), of greater than 3.5 amperes, and less than or equal to 5 amperes, and all the following conditions are met:
  - (2) The circuit is protected in accordance with 430.52.
  - (3) The circuit is provided with maximum Class 10 or Class 10A overload protection in accordance with 430.32.
  - (4) Overcurrent protection is provided in accordance with 240.4(D)(1)(2).
- (5) The circuit supplies a motor with a full-load current rating, as determined by 430.6(A)(1), of 3.5 amperes or less, and all the following conditions are met:
  - (6) The circuit is protected in accordance with 430.52.
  - (7) The circuit is provided with maximum Class 20 overload protection in accordance with 430.32.
  - (8) Overcurrent protection is provided in accordance with 240.4(D)(1)(2).

**(2) 16 AWG Copper.**

16 AWG individual copper conductors installed in a cabinet or enclosure, copper conductors that are part of a jacketed multiconductor cable assembly, or copper conductors in a flexible cord shall be permitted under either of the following sets of conditions:

- (1) The circuit supplies a motor with a full-load current rating, as determined by 430.6(A)(1), of greater than 5.5 amperes, and less than or equal to 8 amperes, and all the following conditions are met:
  - (2) The circuit is protected in accordance with 430.52.
  - (3) The circuit is provided with maximum Class 10 or Class 10A overload protection in accordance with 430.32.
  - (4) Overcurrent protection is provided in accordance with 240.4(D)(2)(2).
- (5) The circuit supplies a motor with a full-load current rating, as determined by 430.6(A)(1), of 5.5 amperes or less, and all the following conditions are met:
  - (6) The circuit is protected in accordance with 430.52.
  - (7) The circuit is provided with maximum Class 20 overload protection in accordance with 430.32.
  - (8) Overcurrent protection is provided in accordance with 240.4(D)(2)(2).

## Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEMA_additional_PC_to_430.22_H_docx	NEMA proposed PC_430.22(H)	

## Statement of Problem and Substantiation for Public Comment

This comment is a companion to the NEMA submitted public comment for Table 430.251(C) introduced into the NEC with First Revision No. 8006-NFPA 70-2024 (Public Input 1472) and, to eliminate potential safety issues, proposes requirements to ensure the protection of conductors supplying Design BE and CE motors not only during continuous operation (as 430.22 presently addresses), but also at the locked-rotor current values in Table 430.251(C).

These motors have typical values of full-load current according to Table 430.250 just as other three-phase alternating-current motors do. This means that, according to the present requirements of 430.22, the size of conductors supplying Design BE and CE motors is the same as those supplying other three-phase alternating current motors not addressed in 430.22(A) through 430.22(G). A significant difference, however, between Design BE and CE motors and other three-phase alternating-current motors such as Design B, C, and D motors is a higher maximum value of locked-rotor current as can be seen by comparing Table 430.251(C) to Table 430.251(B). Except for cases where a locked-rotor current reduction technique such as starting with an adjustable speed drive or a reduced voltage motor controller or starting on wye connection and running on delta connection is utilized, the higher locked-rotor current warrants an analysis regarding whether heating due to this current is the limiting factor for selecting the minimum size of conductors supplying Design BE and CE motors. This analysis was conducted per the methods described in these documents which are based upon the material in ANSI/CEA P-32-382-2007 (R2018):

- Conductor Short-Circuit Protection (<https://www.eaton.com/content/dam/eaton/products/electrical-circuit-protection/fuses/solution-center/bus-ele-tech-lib-conductor-protection-wire-cable-protection-2.pdf>) published in 2000 by Cooper Bussmann, Inc, now known as Eaton's Bussmann Business.
- Short Circuit Currents of Insulated Cables (2307-Short-Circuit-Currents-Insulated-Cables-Whitepaper-PRINT.pdf (southwire.com)) published in 2023 by Southwire Company, LLC.

The one exception in the analysis relative to the methods described in the above referenced documents is that the maximum short circuit temperature of thermoset insulated conductors was, for the sake of safety, assumed to be the more conservative value of 200 degrees C specified for rubber insulated conductors in ANSI/CEA P-32-382-2007 (R2018) instead of the 250 degrees C value specified for thermoset insulated conductors in that standard. As rubber is a thermoset material, there is an ambiguity as to how to cross reference certain conductor insulation Types in Table 310.4(1) to the classification of thermoset insulated (250 C maximum short circuit temperature) or to rubber insulated (200 C maximum short circuit temperature) in ANSI/CEA P-32-382-2007 (R2018). The chair of the working group for ANSI/CEA P-32-382 has acknowledged this and agreed to address this ambiguity in the next revision of the standard. For example, Type RHH is identified in Table 310.4(1) as thermoset, but can be supplied as either non-rubber thermoset (e.g., cross-linked polyethylene) with a short circuit temperature of 250 C or rubber thermoset (e.g., ethylene propylene rubber) with a short circuit temperature of 200 C. Since the distinction of rubber or non-rubber insulation is not identified on the cable, it is unclear to the installer which of these two short circuit temperatures is the appropriate one to apply. Therefore, this comment proposes the more conservative value.

The objective of the analysis was to determine if the following currents potentially drawn by a Design BE or CE motor during starting elevate the temperature of conductors of minimum size selected per the sizing requirements in 430.22 beyond the maximum short-circuit temperature of the conductors:

- 1) Current at the instantaneous-trip breaker setting of 2750% of full-load current value proposed on Public Input 1470 for Design BE and CE motors for the following time durations: ½ AC 60 Hz cycle (.0083 seconds), 1 AC 60 Hz cycle (.0167 seconds), 1 ½ AC 60 Hz cycles (.025 seconds), 2 AC 60 Hz cycles (.0333 seconds)
- 2) RMS current at the locked-rotor current values in Table 430.251(C) for Design BE and CE motors for a time duration of 5 seconds.

The analysis was performed for both copper and aluminum conductors which are thermoplastic insulated or thermoset insulated. This accounts for all conductor types in Tables 310.16 – 310.20 and Table 400.5(A)(1) with the exception of the following:

UF: underground feeder and branch circuit cable  
USE and USE-2: underground service entrance cable  
Z, ZW, and ZW-2: modified ethylene tetrafluoro-ethylene

FEP and FEPB: fluorinated ethylene propylene  
MI: mineral insulation (metal sheathed)  
PFA and PFAH: perfluoro-alkoxy  
TFE: extended polytetra-fluoro-ethylene

These conductor types were not included in the analysis because ANSI/ICEA P-32-382-2007 (R2018) does not define the maximum short-circuit temperature for the insulation in these conductor types.

For all the types of conductors analyzed, it was found that current at the instantaneous-trip breaker setting for the time durations listed in item 1) does not elevate the temperature beyond the maximum short-circuit temperature of the conductors for any horsepower rating in Table 430.251(C). In the worst case, the current is 93% of that required to elevate the conductor temperature to the maximum short-circuit temperature of the conductors. This worst case is current for a 10 horsepower Design BE or CE motor at the instantaneous-trip breaker setting continuously for 2 AC 60 Hz cycles when the conductors are minimum-sized 90°C copper conductors with thermoplastic insulation from Table 310.17 (single-insulated conductors in free-air).

Cases were found for which minimum-sized conductors are elevated beyond the maximum short-circuit temperature of the conductors when RMS current at the locked-rotor current values in Table 430.251(C) persists for 5 seconds. These cases are limited to horsepower ratings ranging from 3 to 100 horsepower and are limited to conductors with a temperature rating of 90°C or less. For conductors of these temperature ratings and of the types considered in the analysis, this public comment addresses this by proposing a requirement for Design BE and CE motors with a horsepower rating ranging from 3 to 100 HP and not utilizing a locked-rotor current reduction technique which in some cases results in the supply conductors being larger than would otherwise be required. This proposal requires in these cases that the allowable short circuit current computed with the provided formula is greater than or equal to the locked-rotor current in Table 430.251(C) for the corresponding motor horsepower and voltage rating. Some examples for which this requirement results in supply conductors being larger than would otherwise be required are:

- 7.5 horsepower motor supplied by 75°C copper conductors with thermoplastic insulation from Table 310.16 (not more than three current carrying conductors in raceway, cable, or earth); conductor size is required to increase to 12 AWG from the otherwise required 14 AWG
- 20 horsepower motor supplied by 75°C copper conductors with thermoset insulation from Table 310.17 (single-insulated conductors in free-air); conductor size is required to increase to 10 AWG from the otherwise required 12 AWG

## Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
<u>Public Comment No. 1362-NFPA 70-2024 [Section No. 430.251(C)]</u>	
<u>Related Item</u>	
• FR8006 • PI1472	

## Submitter Information Verification

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**Submittal Date:** Sun Aug 18 21:54:24 EDT 2024  
**Committee:** NEC-P11

## Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** SR-8012-NFPA 70-2024  
**Statement:** This requirement will provide an adequate level of safety for the protection of conductors for these motor designs. Language changes were made to clarify the references to short circuit current temperatures.

## Additional comments for NEMA Proposed Public Comment No. 1262-NFPA 70-2024

### (H) Design BE or CE Motor.

Conductors that supply a single Design BE or CE motor used in a continuous duty application shall have an ampacity of not less than 125 percent of the motor full-load current rating, as determined by 430.6(A)(1). Conductors that supply a single Design BE or CE motor used in an application other than continuous duty shall have an ampacity per 430.22(E).

The sizing of any thermoplastic insulated or thermoset insulated copper or aluminum conductors with a temperature rating of 90°C or less supplying a single Design BE or CE motor shall additionally limit the temperature of the conductors to a value not exceeding the maximum short-circuit temperature of the conductors when locked-rotor current equal to that in Table 430.251(C) for the corresponding motor horsepower and voltage rating is drawn for a time duration of 5 seconds with the conductors initially at their rated maximum operating temperature. The temperature is limited in this manner under any of the following conditions:

- (1) The motor rating is less than or equal to 2 horsepower or greater than or equal to 125 horsepower
- (2) The motor locked-rotor current is reduced relative to that associated with full voltage, across-the-line starting by any of the following means:
  - a. The motor is started with an adjustable speed drive.
  - b. The motor is started with a reduced voltage motor controller.
  - c. Starting on wye connection and running on delta connection is utilized.
- (3) The allowable short circuit current computed with the following formula is greater than or equal to the locked-rotor current in Table 430.251(C) for the corresponding motor horsepower and voltage rating:

$I = [A/(\text{square root of } t)] * \{\text{square root of } [c * \log[(T_2+k)/(T_1+k)]]\} = [A/(\text{square root of } t)] * F_c$ , where:

I is the allowable short circuit current in Amperes

A is the conductor area in circular mils as determined per Table 8 in Chapter 9

t is a time duration of 5 seconds

c is equal to .0297 for copper conductors and equal to .0125 for aluminum conductors

T<sub>1</sub> is the rated maximum operating temperature of the conductor in degrees Celsius

T<sub>2</sub> is the maximum short-circuit temperature of the conductor which is equal to 150°C for thermoplastic insulated conductors and 200°C for thermoset insulated conductors

k is equal to 234 for copper conductors and is equal to 228 for aluminum conductors

F<sub>c</sub> is the conductor short circuit factor which is equal to  $\{\text{square root of } [c * \log[(T_2+k)/(T_1+k)]]\}$  and has a numerical value as follows:

(1) .0662 for copper thermoset insulated conductors with T<sub>1</sub> = 75°C and T<sub>2</sub> = 200°C

(2) .0614 for copper thermoset insulated conductors with T<sub>1</sub> = 90°C and T<sub>2</sub> = 200°C

- (3) .0587 for copper thermoplastic insulated conductors with  $T_1 = 60^\circ\text{C}$  and  $T_2 = 150^\circ\text{C}$
- (4) .0529 for copper thermoplastic insulated conductors with  $T_1 = 75^\circ\text{C}$  and  $T_2 = 150^\circ\text{C}$
- (5) .0468 for copper thermoplastic insulated conductors with  $T_1 = 90^\circ\text{C}$  and  $T_2 = 150^\circ\text{C}$
- (6) .0433 for aluminum thermoset insulated conductors with  $T_1 = 75^\circ\text{C}$  and  $T_2 = 200^\circ\text{C}$
- (7) .0402 for aluminum thermoset insulated conductors with  $T_1 = 90^\circ\text{C}$  and  $T_2 = 200^\circ\text{C}$
- (8) .0384 for aluminum thermoplastic insulated conductors with  $T_1 = 60^\circ\text{C}$  and  $T_2 = 150^\circ\text{C}$
- (9) .0346 for aluminum thermoplastic insulated conductors with  $T_1 = 75^\circ\text{C}$  and  $T_2 = 150^\circ\text{C}$
- (10) .0306 for aluminum thermoplastic insulated conductors with  $T_1 = 90^\circ\text{C}$  and  $T_2 = 150^\circ\text{C}$

Informational Note: In some cases, satisfying 430.22(H)(3) requires the size of the conductors supplying a Design BE or CE motor to be larger than would otherwise be required.



**430.24** Several Motors or a Motor(s) and Other Load(s).

Conductors supplying several motors, or a motor(s) and other load(s), shall have an ampacity not less than the sum of each of the following:

- (1) 125 percent of the full-load current rating of the highest rated motor, as determined by 430.6(A)
- (2) Sum of the full-load current ratings of all the other motors in the group, as determined by 430.6(A)
- (3) 100 percent of the noncontinuous non-motor load
- (4) 125 percent of the continuous non-motor load.

Informational Note: See Informative Annex D, Example No. D8.

Exception No. 1: Where one or more of the motors of the group are used for short-time, intermittent, periodic, or varying duty, the ampere rating of such motors to be used in the summation shall be determined in accordance with 430.22(E). For the highest rated motor, the greater of either the ampere rating from 430.22(E), or the largest continuous duty motor full-load current multiplied by 1.25 shall be used in the summation.

Exception No. 2: The ampacity of conductors supplying motor-operated fixed electric space-heating equipment shall comply with 424.4(B).

Exception No. 3: Where the circuitry is interlocked so as to prevent simultaneous operation of selected motors or other loads, the conductor ampacity shall be permitted to be based on the summation of the currents of the motors and other loads to be operated simultaneously that results in the highest total current.

Exception No. 4: Where one or more of the motors of the group are Design BE or CE motor(s) the conductors supplying the group shall have an ampacity not less than the sum of each of 430.24(1) through 430.24(4). Additionally, the sizing of any thermoplastic insulated or thermoset insulated copper or aluminum conductors with a temperature rating of 90 °C or less supplying the group shall limit the temperature of the conductors to a value not exceeding their maximum short-circuit temperature when locked-rotor current for any Design BE or CE motor(s) not subject to any of the conditions in 430.22(H)(1) or 430.22(H)(2) is drawn for a time duration of 5 seconds with the conductors initially at their rated maximum operating temperature. The determination that the conductor temperature is limited in this manner shall be according to the method this determination is made for a single Design BE or CE motor in 430.22(H) with the exception that the locked-rotor current shall be the sum of the current values from Table 430.251(C) for the horsepower and voltage rating(s) corresponding to all the Design BE or CE motors not subject to any of the following conditions in 430.22(H)(1) or 430.22(H)(2) which can be started simultaneously. In cases where there are Design BE or CE motors not subject to any of the following conditions in 430.22(H)(1) or 430.22(H)(2) which cannot be started simultaneously and multiple locked-rotor current values are obtained, the largest value obtained shall be used.

Informational Note: In some cases, the requirements in Exception No. 4 related to limited conductor temperature when locked-rotor current is drawn for a time duration of 5 seconds result in the required size of the supply conductors being larger than would otherwise be required.

## Statement of Problem and Substantiation for Public Comment

This comment is a companion to the NEMA submitted public comment for Table 430.251(C) introduced into the NEC with First Revision No. 8006-NFPA 70-2024 (Public Input 1472) and, to eliminate potential safety issues, proposes requirements to ensure the protection of conductors supplying Design BE and CE motors not only during continuous operation (as 430.22 presently addresses), but also at the locked-rotor current values in Table 430.251(C).

These motors have typical values of full-load current according to Table 430.250 just as other three-phase alternating-current motors do. This means that, according to the present requirements of 430.24, the size of conductors supplying Design BE or CE motors in combination with other motors and/or loads is the same as those supplying other three-phase alternating current motors not addressed in Exception No. 1, 2, or 3 of 430.24 when in combination with the same motors and/or loads. A significant difference, however, between Design BE and CE motors and other three-phase alternating-current motors such as Design B, C, and D motors is a higher maximum value of locked-rotor current as can be seen by comparing Table 430.251(C) to Table 430.251(B). Except for cases where a locked-rotor current reduction technique such as starting with an adjustable speed drive or a reduced voltage motor controller or starting on wye connection and running on delta connection is utilized, the higher locked-rotor current warrants an analysis regarding whether heating due to this current is the limiting factor for selecting the minimum size of conductors supplying Design BE and CE motors. This analysis was conducted per the methods described in the following documents which are based upon the material in ANSI/ICEA P-32-382-2007 (R2018) and, for the sake of simplicity, was performed only for conductors supplying a single motor (as in 430.22) as opposed to several motors (as in 430.24):

- Conductor Short-Circuit Protection (<https://www.eaton.com/content/dam/eaton/products/electrical-circuit-protection/fuses/solution-center/bus-ele-tech-lib-conductor-protection-wire-cable-protection-2.pdf>) published in 2000 by Cooper Bussmann, Inc, now known as Eaton's Bussmann Business.
- Short Circuit Currents of Insulated Cables (2307-Short-Circuit-Currents-Insulated-Cables-Whitepaper-PRINT.pdf (southwire.com)) published in 2023 by Southwire Company, LLC.

The objective of the analysis was to determine if the following currents potentially drawn by a single Design BE or CE motor(s) during starting elevate the temperature of conductors of minimum size selected per the sizing requirements in 430.24 beyond the maximum short-circuit temperature of the conductors:

- 1) Current at the instantaneous-trip breaker setting of 2750% of full-load current value proposed on Public Input 1470 for Design BE and CE motors for the following time durations: ½ AC 60 Hz cycle (.0083 seconds), 1 AC 60 Hz cycle (.0167 seconds), 1 ½ AC 60 Hz cycles (.025 seconds), 2 AC 60 Hz cycles (.0333 seconds)
- 2) RMS current at the locked-rotor current values in Table 430.251(C) for Design BE and CE motors for a time duration of 5 seconds.

The analysis was performed for both copper and aluminum conductors which are thermoplastic insulated or thermoset insulated. This accounts for all conductor types in Tables 310.16 – 310.20 and Table 400.5(A)(1) with the exception of the following:

UF: underground feeder and branch circuit cable  
USE and USE-2: underground service entrance cable  
Z, ZW, and ZW-2: modified ethylene tetrafluoro-ethylene  
FEP and FEPB: fluorinated ethylene propylene  
MI: mineral insulation (metal sheathed)  
PFA and PFAH: perfluoro-alkoxy  
TFE: extended polytetra-fluoro-ethylene

These conductor types were not included in the analysis because ANSI/ICEA P-32-382-2007 (R2018) does not define the maximum short-circuit temperature for the insulation in these conductor types.

Cases were found for which minimum-sized conductors are elevated beyond the maximum short-circuit temperature of the conductors when RMS current at the locked-rotor current values in Table 430.251(C) persists for 5 seconds. These cases are limited to horsepower ratings ranging from 3 to 100 horsepower and are limited to conductors with a temperature rating of 90°C or less. For conductors of these temperature ratings and of the types considered in the analysis, the accompanying public comment submitted by NEMA for 430.22 addresses this by proposing a requirement for Design BE and CE motors with a horsepower rating ranging from 3 to 100 HP and not utilizing a locked-rotor current reduction technique which in some cases results in the supply conductors being larger than would

otherwise be required. The NEMA submitted proposal for 430.22 requires in these cases that the allowable short circuit current computed with the provided formula is greater than or equal to the locked-rotor current in Table 430.251(C) for the corresponding motor horsepower and voltage rating. Some examples for which this requirement results in supply conductors being larger than would otherwise be required are:

- 7.5 horsepower motor supplied by 75°C copper conductors with thermoplastic insulation from Table 310.16 (not more than three current carrying conductors in raceway, cable, or earth): conductor size is required to increase to 12 AWG from the otherwise required 14 AWG
- 20 horsepower motor supplied by 75°C copper conductors with thermoset insulation from Table 310.17 (single-insulated conductors in free-air): conductor size is required to increase to 10 AWG from the otherwise required 12 AWG

The analysis shows that, for conductors supplying a single Design BE or CE motor (as in 430.22), RMS locked-rotor current persisting for a time duration of 5 seconds is in some cases the limiting factor for the selection of the minimum allowable conductor size. It follows that this will also be true in some cases for conductors supplying several Design BE or CE motors (as in 430.24) and, therefore, the locked-rotor current should be considered in 430.24 for the selection of minimum supply conductor size.

## Related Public Comments for This Document

<u>Public Comment No.</u>	<u>Related Comment</u>	<u>Relationship</u>
1362-NFPA 70-2024	[Section No. 430.251(C)]	
	<u>Related Item</u>	
FR8006	PI1472	

## Submitter Information Verification

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**Submittal Date:** Sun Aug 18 22:37:25 EDT 2024  
**Committee:** NEC-P11

## Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** [SR-8015-NFPA 70-2024](#)  
**Statement:** This requirement will provide an adequate level of safety for the protection of conductors for these motor designs. Editorial changes were made as requested by the submitter.



**Public Comment No. 2044-NFPA 70-2024 [ Section No. 430.98(A) ]**

**(A) Motor Control Centers.**

Motor control centers shall be marked according to 110.21, and the marking shall be plainly visible after installation. Marking shall also include common power bus current rating and motor control center short-circuit current rating. When supplied by a feeder(s), motor control centers shall be permanently marked in accordance with the following: With the w ith the identification and location(s) of the means necessary to disconnect all power to the motor control center

- ~~• With a label that is permanently affixed and of sufficient durability to withstand the environment involved~~
- ~~• Using a method that is not handwritten~~

-

**Statement of Problem and Substantiation for Public Comment**

Repeating the text of earlier sections of the code are not allowed by Section 4.1.1 of the NEC style Manual. By making the proposed adjustments, all of the desired requirements are still preserved with violating the style guide.

**Related Item**

- PI 1519 and PI1760

**Submitter Information Verification**

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**Submittal Date:** Wed Aug 28 16:43:35 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8020-NFPA 70-2024](#)

**Statement:** Change "when" to "where" and make changes to clarify wording to meet NEC style manual section 4.1.1. Items (2) and (3) on the list were replaced with a reference to 110.21(B) to avoid redundant language within the code.



## Public Comment No. 388-NFPA 70-2024 [ Section No. 430.98(A) ]

### (A) Motor Control Centers.

Motor control centers shall be marked according to 110.21, and the marking shall be plainly visible after installation. Marking shall also include common power bus current rating and motor control center short-circuit current rating. When supplied by a feeder(s), motor control centers shall be permanently marked in accordance with the following:

- (1) With the identification and location(s) of the means necessary to disconnect all power to the motor control center
- (2) With a label that is permanently affixed and of sufficient durability to withstand the environment involved
- (3) Using a method that is not handwritten

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_43.pdf		

### Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 43 appeared in the First Draft Report on First Revision No. 7981.

The Correlating Committee directs CMP 11 to review FR 7981 with respect to 430.98(A) regarding the use of "when" that should be "where" or "if". Refer to the NEC Style Manual 3.5.4. Additionally, in 430.98(A) the reference to 110.21 provides the marking requirements therefore, 430.98(A)(2) and 430.98(A)(3) can be deleted. With the deletion of (2) and (3), (1) should be revised to be in the main paragraph for clarity.

#### Related Item

- First Revision No. 7981

### Submitter Information Verification

**Submitter Full Name:** CC Notes  
**Organization:** NEC Correlating Committee  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Jul 30 14:18:04 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** SR-8020-NFPA 70-2024  
**Statement:** Change "when" to "where" and make changes to clarify wording to meet NEC style manual section 4.1.1. Items (2) and (3) on the list were replaced with a reference to 110.21(B) to avoid redundant language within the code.



## Correlating Committee Note No. 43-NFPA 70-2024 [ Section No. 430.98(A) ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:22:34 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs CMP 11 to review FR 7981 with respect to 430.98(A) regarding the use of “when” that should be “where” or “if”. Refer to the NEC Style Manual 3.5.4. Additionally, in 430.98(A) the reference to 110.21 provides the marking requirements therefore, 430.98(A)(2) and 430.98(A)(3) can be deleted. With the deletion of (2) and (3), (1) should be revised to be in the main paragraph for clarity.

First Revision No. 7981-NFPA 70-2024 [Section No. 430.98(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. 390-NFPA 70-2024 [ Section No. 430.99 ]**

**430.99** Short-Circuit Rating.

**(A)** Installation.

Motor control centers shall not be installed where the available fault current exceeds its short-circuit current rating as marked in accordance with 430.98(A).

**(B)** Available Fault Current.

The available fault current at the motor control center and the date the available fault current calculation was performed shall be documented and made available to those authorized to inspect, install, or maintain the installation.

**Additional Proposed Changes**

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_44.pdf		

**Statement of Problem and Substantiation for Public Comment**

NOTE: The following CC Note No. 44 appeared in the First Draft Report on First Revision No. 8043.

The Correlating Committee directs CMP 11 to review FR 8043 and consider revising 430.99 (A) for clarity. A suggested revision is: "Motor control centers shall have a short-circuit current rating not less than the available fault current as marked in accordance with 430.98(A)."

Related Item

- First Revision No. 8043

**Submitter Information Verification**

**Submitter Full Name:** CC Notes

**Organization:** NEC Correlating Committee

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Jul 30 14:22:10 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8021-NFPA 70-2024](#)

**Statement:** Change made to the section to increase the clarity and readability of the section.



## Correlating Committee Note No. 44-NFPA 70-2024 [ Section No. 430.99 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:24:19 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs CMP 11 to review FR 8043 and consider revising 430.99 (A) for clarity. A suggested revision is: "Motor control centers shall have a short-circuit current rating not less than the available fault current as marked in accordance with 430.98(A)."

First Revision No. 8043-NFPA 70-2024 [Section No. 430.99]

### 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. 6-NFPA 70-2024 [ Section No. 430.110(A) ]

### (A)– General: ~~Single Motor~~

A disconnecting means serving a single motor circuit shall be selected on the basis of the full-load current and locked-rotor current, respectively, of the motor as follows.

**(1) Ampere Rating** . The disconnecting means for motor circuits rated 1000 volts ac, 1500 volts dc, nominal, or less shall have a current rating not less than 115 percent of the full-load current rating of the motor.

Exception: A listed unfused motor-circuit switch having a horsepower rating not less than the motor horsepower shall be permitted to have a current rating less than 115 percent of the full-load current rating of the motor.

**(2) Equivalent Horsepower.** To determine the equivalent horsepower in complying with the requirements of 430.109, the horsepower rating shall be selected from Table 430.248, Table 430.249, or Table 430.250 corresponding to the full-load current, and also the horsepower rating from table 430.251(A) or Table 430.251(B) corresponding to the locked-rotor current. In case the full-load current and locked-rotor current do not correspond to the currents shown in Table 430.248, Table 430.249, Table 430.250, Table 430.251(A), or Table 430.251(B), the horsepower rating corresponding to the next higher value shall be selected. In case different horsepower ratings are obtained when applying these tables, a horsepower rating at least equal to

### Statement of Problem and Substantiation for Public Comment

This comment is in regards to the Resolution found in the Committee Statement section of Public Input No. 525-NFPA 70-2023 which announces that the Input was rejected on the basis "The concerns brought up are currently covered in 430.110(C)(1)."

430.110(C)(1) pertains to combination loads. If it is the intention of 430.110(C)(1) to pertain to single motor applications as well as combination load situations, the language should be located in 430.110(A).

As written, there is no prescribed means to determine equivalent horsepower rating which could subject disconnecting means to loads in excess of their rating.

Article 430.109(A) states that where a motor circuit switch is used, is shall be rated in HP. This change would clarify acceptable means to determine equivalent horsepower rating. In addition, this would create consistency with requirements for disconnecting means in Article 440.

#### Related Item

- Public Input No. 525-NFPA 70-2023

### Submitter Information Verification

**Submitter Full Name:** Steven Gibson

**Organization:** ETA of Western Oklahoma

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Wed Jul 10 10:07:33 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected

**Resolution:** Section 430.110(C)(1) pertains to both single and multiple motor applications. In a single motor application, the disconnect must have a rating suitable for the motor it is disconnecting. Substantiation has not been provided to demonstrate that disconnecting means would be used in excess of their ratings. The problem is not defined well enough and the addition of equivalent horsepower would create confusion.



Public Comment No. 54-NFPA 70-2024 [ Section No. 430.110(C)(1) ]

(1) Horsepower Rating.

The rating of the disconnecting means shall be determined from the sum of all currents, including resistance loads, at the full-load condition and also at the locked-rotor condition. The combined full-load current and the combined locked-rotor current so obtained shall be considered as a single motor for the purpose of this requirement, as required by 430.110(C)(1)(a) and 430.110(C)(1)(b).

(a). The full-load current equivalent to the horsepower rating of each motor shall be selected from Table 430.247, Table 430.248, Table 430.249, or Table 430.250. These full-load currents shall be added to the rating in amperes of other loads to obtain an equivalent full-load current for the combined load.

(b). The locked-rotor current equivalent to the horsepower rating of each motor shall be selected from Table 430.251(A), Table 430.251(B), or Table 430.251(A). The locked-rotor currents shall be added to the rating in amperes of other loads to obtain an equivalent locked-rotor current for the combined load. Where two or more motors or other loads cannot be started simultaneously, the largest sum of locked-rotor currents of a motor or group of motors that can be started simultaneously and the full-load currents of other concurrent loads shall be permitted to be used to determine the equivalent locked-rotor current for the simultaneous combined loads.

In cases where different ~~current~~ horsepower ratings are obtained when applying these tables, ~~the largest value obtained shall~~ a horsepower rating at least equal to the larger of the values shall be used.

Exception No. 1: The locked-rotor current equivalent to the horsepower rating of each polyphase motor with design letter A shall be one of following:

- (1) If available, the motor's marked value of locked-rotor amperes
- (2) In the absence of a marked value of locked-rotor amperes for the motor, the value calculated from Equation 430.110(C)(1)a

$$\text{locked-rotor amperes} = \left( \frac{kVA}{hp} \right) \times \frac{(1000 \times \text{motor's marked value of rated horsepower})}{(\text{motor's marked value of rated volts}) \times (\sqrt{3})} \quad [430.110(C)(1)a]$$

where:

kVA/hp = maximum range value of kilovolt-amperes per horsepower with locked rotor in Table 430.7(B) associated with the motor's marked locked-rotor indicating code letter

Informational Note: Equation 430.110(C)(1)a is obtained by solving for locked-rotor amperes in the formula for "kilovolt-amperes per horsepower with locked rotor," as follows:

$$\frac{kVA}{hp} = \frac{(\sqrt{3}) \times (\text{motor's marked value of rated volts}) \times (\text{locked-rotor amperes})}{(1000 \times \text{motor's marked value of rated horsepower})} \quad [430.110(C)(1)b]$$

The numerator of Equation 430.110(C)(1)b for kilovolt-amperes per horsepower is the apparent power input to a three-phase motor with locked rotor in units of volt-amperes. The factor of 1000 VA/kVA in the denominator converts this value to units of kilovolt-amperes, and "(marked value of rated horsepower)" in the denominator converts this to kilovolt-amperes per horsepower. Note that "motor's marked value of rated volts" is a line-to-line value and "locked-rotor amperes" is a line value as opposed to a phase value.

Exception No. 2: Where part of the concurrent load is resistance load, and where the disconnecting means is a switch rated in horsepower and current, the switch used shall be permitted to have a horsepower rating not less than the combined load of the motor(s) if the current rating of the switch is not less than the locked-rotor current of the motor(s) plus the resistance load.

Statement of Problem and Substantiation for Public Comment

Third level subdivisions added for clarity per NEC Style Manual section 2.6.1.3 which states sections shall be permitted to be subdivided for clarity, with each subdivision representing either a rule or a part of a rule, and section 3.5.1.2 which states additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

The word current should be replaced with the word horsepower as, in regards to equivalent horsepower, LRC will always be higher than FLC, but equivalent horsepower may be less which could expose disconnects to loads above their rated horsepower.

For example, consider a disconnect serving a 10 amp load and a 10 HP 460v 3 phase squirrel cage motor. Using FLC Table 430.250, the motor FLC and added 10 amp load would result in an equivalent full-load current for the combined load of 24 amps and 20 HP rating. Using the LRC Table 430.251(B) the motor LRC and added 10 amp load would result in an equivalent locked-rotor current for the combined load of 91 amps and 15 HP rating. In this case the current rating is higher but the HP rating is lower using LRC compared to FLC.

FLC 14 A + 10 A = 24 A  
Table 430.250 equivalent HP = 20 HP

LRC 81 A + 10 A = 91 A  
Table 430.251(B) equivalent HP = 15 HP

Current is higher using LRC but HP equivalent HP is lower

Related Item

- Public Input No. 521-NFPA 70-202

Submitter Information Verification

**Submitter Full Name:** Steven Gibson

**Organization:** ETA of Western Oklahoma

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Sat Jul 13 15:28:52 EDT 2024

**Committee:** NEC-P11

### **Committee Statement**

**Committee Action:** Rejected

**Resolution:** Changes do not improve clarity and the change from current to HP is not needed as the existing technical requirements cover the concern.



(1) Horsepower Rating.

The rating of the disconnecting means shall be determined from the sum of all currents, including resistance loads, at the full-load condition and also at the locked-rotor condition. The combined full-load current and the combined locked-rotor current so obtained shall be considered as a single motor for the purpose of this requirement.

The full-load current equivalent to the horsepower rating of each motor shall be selected from Table 430.247, Table 430.248, Table 430.249, or Table 430.250. These full-load currents shall be added to the rating in amperes of other loads to obtain an equivalent full-load current for the combined load.

The locked-rotor current equivalent to the horsepower rating of each motor shall be selected from Table 430.251(A), Table 430.251(B), or Table 430.251(A-C). The locked-rotor currents shall be added to the rating in amperes of other loads to obtain an equivalent locked-rotor current for the combined load. Where two or more motors or other loads cannot be started simultaneously, the largest sum of locked-rotor currents of a motor or group of motors that can be started simultaneously and the full-load currents of other concurrent loads shall be permitted to be used to determine the equivalent locked-rotor current for the simultaneous combined loads. In cases where different current ratings are obtained when applying these tables, the largest value obtained shall be used.

Exception No. 1: The locked-rotor current equivalent to the horsepower rating of each polyphase motor with design letter A shall be one of following:

- (1) If available, the motor's marked value of locked-rotor amperes
- (2) In the absence of a marked value of locked-rotor amperes for the motor, the value calculated from Equation 430.110(C)(1)a

$$\text{locked-rotor amperes} = \left( \frac{kVA}{hp} \right) \times \frac{(1000 \times \text{motor's marked value of rated horsepower})}{(\text{motor's marked value of rated volts}) \times (\sqrt{3})} \quad [430.110(C)(1)a]$$

where:

kVA/hp = maximum range value of kilovolt-amperes per horsepower with locked rotor in Table 430.7(B) associated with the motor's marked locked-rotor indicating code letter

Informational Note: Equation 430.110(C)(1)a is obtained by solving for locked-rotor amperes in the formula for "kilovolt-amperes per horsepower with locked rotor," as follows:

$$\frac{kVA}{hp} = \frac{(\sqrt{3}) \times (\text{motor's marked value of rated volts}) \times (\text{locked-rotor amperes})}{(1000 \times \text{motor's marked value of rated horsepower})} \quad [430.110(C)(1)b]$$

The numerator of Equation 430.110(C)(1)b for kilovolt-amperes per horsepower is the apparent power input to a three-phase motor with locked rotor in units of volt-amperes. The factor of 1000 VA/kVA in the denominator converts this value to units of kilovolt-amperes, and "(marked value of rated horsepower)" in the denominator converts this to kilovolt-amperes per horsepower. Note that "motor's marked value of rated volts" is a line-to-line value and "locked-rotor amperes" is a line value as opposed to a phase value.

Exception No. 2: Where part of the concurrent load is resistance load, and where the disconnecting means is a switch rated in horsepower and current, the switch used shall be permitted to have a horsepower rating not less than the combined load of the motor(s) if the current rating of the switch is not less than the locked-rotor current of the motor(s) plus the resistance load.

Statement of Problem and Substantiation for Public Comment

The first draft apperas to contain an error, as the panel statement discusses 430.251(C) but the text does not.

Related Item

- FR 7996

Submitter Information Verification

Submitter Full Name: Ryan Jackson  
 Organization: Self-employed  
 Street Address:  
 City:  
 State:  
 Zip:  
 Submittal Date: Sun Aug 04 16:11:20 EDT 2024  
 Committee: NEC-P11

Committee Statement

Committee Action: Rejected but see related SR  
 Resolution: SR-8089-NFPA 70-2024  
 Statement: Change makes a correction to the table needed to be referenced.



## Public Comment No. 391-NFPA 70-2024 [ Section No. 430.122 ]

### 430.122 Conductors — Minimum Size and Ampacity.

#### (A) Branch/Feeder Circuit Conductors.

Circuit conductors supplying power conversion equipment included as part of an adjustable-speed drive system shall have an ampacity not less than 125 percent of the rated input current to the power conversion equipment.

Informational Note: Power conversion equipment can have multiple power ratings and corresponding input currents.

#### (B) Output Conductors.

##### (1) Output Motor Conductors.

The conductors between the power conversion equipment and the motor shall have an ampacity equal to or larger than 125 percent of the motor full-load current as determined by 430.6(A) or 430.6(B).

##### (2) Suitable for Output Motor Conductor Protection.

When power conversion equipment is listed and marked as "Suitable for Output Motor Conductor Protection," the conductors between the power conversion equipment and the motor shall have an ampacity equal to or greater than the larger of the following:

- (1) 125 percent of the motor full-load current as determined by 430.6(A) or 430.6(B)
- (2) The ampacity of the minimum conductor size marked on the power conversion equipment

Informational Note No. 1: See 430.130 and 430.131 for branch circuit protection requirements. The minimum ampacity required of output conductors is often different than that of the conductors supplying the power conversion equipment.

Informational Note No. 2: Circuit conductors on the output of an adjustable-speed drive system are susceptible to breakdown under certain conditions due to the characteristics of the output waveform of the drive. Factors affecting the conductors include, but are not limited to, the output voltage, frequency, and current; the length of the conductors; the spacing between the conductors; and the dielectric strength of the conductor insulation. Methods to mitigate breakdown include consideration of one or more of these factors.

#### (C) Bypass Device.

The ampacity of circuit conductors supplying power conversion equipment included as part of an adjustable-speed drive system that utilizes a bypass device shall be the larger of either of the following:

- (1) 125 percent of the rated input current to the power conversion equipment
- (2) 125 percent of the motor full-load current rating determined in accordance with 430.6

#### (D) Several Motors or a Motor and Other Loads.

Conductors supplying several motors or a motor and other loads, including power conversion equipment, shall have ampacity in accordance with 430.24, using the rated input current of the power conversion equipment for purposes of calculating ampacity.

## Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_45.pdf		

## Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 45 appeared in the First Draft Report on First Revision No. 7999.

The Correlating Committee directs CMP 11 to review FR 7999 regarding the use of the term "when". Section 430.122(B)(2) describes a condition, not a time. The panel is directed to review 3.5.4 of the NEC Style Manual, to establish whether "if" is the correct word, rather than "when."

### Related Item

- First Revision No. 7999

## Submitter Information Verification

**Submitter Full Name:** CC Notes  
**Organization:** NEC Correlating Committee  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Jul 30 14:29:05 EDT 2024  
**Committee:** NEC-P11

## Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** [SR-8024-NFPA 70-2024](#)  
**Statement:** Change from "when" to "where" to comply with the NEC style manual.



## Correlating Committee Note No. 45-NFPA 70-2024 [ Section No. 430.122(B) ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:26:02 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs CMP 11 to review FR 7999 regarding the use of the term “when”. Section 430.122(B)(2) describes a condition, not a time. The panel is directed to review 3.5.4 of the NEC Style Manual, to establish whether “if” is the correct word, rather than “when.”

First Revision No. 7999-NFPA 70-2024 [Section No. 430.122(B)]

### Ballot Results

✓ **This item has passed ballot**

12 Eligible Voters

1 Not Returned

11 Affirmative All

0 Affirmative with Comments

0 Negative with Comments

0 Abstention

#### **Not Returned**

McDaniel, Roger D.

#### **Affirmative All**

Ayer, Lawrence S.

Bowmer, Trevor N.

Hickman, Palmer L.

Holub, Richard A.

Jackson, Peter D.

Kendall, David H.

Manche, Alan

Osborne, Robert D.

Porter, Christine T.

Schultheis, Timothy James

Williams, David A.



**Public Comment No. 1843-NFPA 70-2024 [ Section No. 430.122(B)(2) ]**

(2) Suitable for Output Motor Conductor Protection.

~~When~~ Where power conversion equipment is listed and marked as "Suitable for Output Motor Conductor Protection," the conductors between the power conversion equipment and the motor shall have an ampacity equal to or greater than the larger of the following:

- (1) 125 percent of the motor full-load current as determined by 430.6(A) or 430.6(B)
- (2) The ampacity of the minimum conductor size marked on the power conversion equipment

Informational Note No. 1: See 430.130 and 430.131 for branch circuit protection requirements. The minimum ampacity required of output conductors is often different than that of the conductors supplying the power conversion equipment.

Informational Note No. 2: Circuit conductors on the output of an adjustable-speed drive system are susceptible to breakdown under certain conditions due to the characteristics of the output waveform of the drive. Factors affecting the conductors include, but are not limited to, the output voltage, frequency, and current; the length of the conductors; the spacing between the conductors; and the dielectric strength of the conductor insulation. Methods to mitigate breakdown include consideration of one or more of these factors.

**Statement of Problem and Substantiation for Public Comment**

"Where" is preferred term per the NEC manual of style language vs. "when".

**Related Item**

- FR7999

**Submitter Information Verification**

**Submitter Full Name:** Jay Tamblingson

**Organization:** Rockwell Automation

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Aug 27 16:51:59 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8024-NFPA 70-2024](#)

**Statement:** Change from "when" to "where" to comply with the NEC style manual.



## Public Comment No. 831-NFPA 70-2024 [ Section No. 430.122(D) ]

### (D) Several Motors or a Motor and Other Loads.

Conductors supplying several motors or a motor and other loads, including power conversion equipment, shall have ampacity in accordance with 430.24, using the ~~rated input~~ full-load current ~~rating~~ of the ~~power conversion equipment for connected motor load for~~ purposes of calculating ampacity.

### Statement of Problem and Substantiation for Public Comment

430.131 allows branch circuit protective device sizing using the full-load current rating of the connected motor load. However, 430.122(D) requires using the input rating of the power conversion equipment. This disparity results in circuits with oversized conductors according to the protective device ahead of them. The conductor would be adequately protected if sized the same way as the protective device using the connected motor load. The specific problem solved is oversized conductors in group installations of small motor loads controlled by power conversion equipment. The proposed change better aligns 430.122(D) with 430.131.

#### Related Item

- 430.122 Feedback from Mike Holt related to the ampacity of the conductor according to the connected motor horsepower versus the drive input rating.

### Submitter Information Verification

**Submitter Full Name:** Gregory Doppke  
**Organization:** General Motors  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Aug 06 07:47:55 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected  
**Resolution:** This section provides sizing requirements and considers thermal concerns not just short circuit concerns.



## Public Comment No. 270-NFPA 70-2024 [ Section No. 430.205 [Excluding any Sub-Sections] ]

The ampacities of conductors supplying equipment rated over 1000 volts ac, 1500 volts dc, nominal, shall be determined in accordance with 315.60-~~or~~ and 430.205(A)-~~and~~ or 430.205(B).

### Statement of Problem and Substantiation for Public Comment

It appears this text was revised in the 2023 edition and I believe the words "and" and "or" were unintentionally swapped in the specific locations cited. In the event there is an oversized adjustable speed drive that subsequently feeds a motor directly, you can more closely size conductors to the actual load expected (and not the oversized drive input current, like a spare, standardization of drive size, etc.). This assumes the conductors are adequately protected at the point they receive supply by a feeder protection relay, for example.

#### Related Item

- adjustable speed drive

### Submitter Information Verification

**Submitter Full Name:** Austen Bryan

**Organization:** LHB Corp

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Fri Jul 26 17:12:25 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8030-NFPA 70-2024](#)

**Statement:** Changes made to correct the language in the section.



## Public Comment No. 832-NFPA 70-2024 [ Section No. 430.208 ]

### 430.208– 208 . Disconnecting Means.

Disconnecting means in motor circuits over 1000 Volts AC, 1500 V dc, shall comply with 430.208(A) through 430.208(E). The requirements for disconnecting means in Part IX of this Article are applicable only as referenced in 430.208(A) and 430.208(B).

(A) Motor Controller Disconnecting Means. The disconnecting means for a motor controller shall comply with 430.102(A) and shall be lockable in accordance with 110.25.

(B) Disconnecting Means in Motor Circuits . All disconnecting means

shall be a switch or circuit breaker having a voltage in motor circuits shall comply with 430.103, 430.104, 430.105, 430.107, 430.112, and 430.113.

(C) Voltage Rating. All disconnecting means in motor circuits shall have a voltage rating not less than that of the circuit involved , and shall be lockable open in accordance with 110.25 . The disconnecting means shall

(D) Device Type. All disconnecting means in motor circuits shall be one of the devices in (1) through (3)

- (1) A switch with make and break current ratings no less than the full load current of the circuit involved.
- (2) An isolating switch, in series with a contactor or circuit breaker, that is interlocked with a contactor or circuit breaker such that the contactor or circuit breaker must be in the open position before the isolating switch is opened or closed.
- (3) A draw-out-type contactor or circuit breaker, interlocked such that it must be in the open position before it can be moved out of or into the connected position.

(E) Current Rating. All disconnecting means in motor circuits shall have a current rating of not less than 400 percent of the full-load current rating of the motor. For

the overload trip current setting of overcurrent (overload) relays or other motor-protective devices used.

Exception to (E): For adjustable-speed drive systems, the disconnecting

means shall

means on the line side of the adjustable-speed drive shall have a current rating not less than

400 percent of the rated input

100 percent of the rated maximum input current of the power conversion equipment , regardless of the current setting of motor protective devices .

Informational Note: Where a disconnecting means is included as part of a listed motor controller, the current rating of the disconnecting means has been determined to be acceptable as part of the controller listing.

## Statement of Problem and Substantiation for Public Comment

This Public Comment is submitted on behalf of a Correlating Committee Medium Voltage Task Group consisting of Robert Osborne (Chair), Paul Barnhart, Lou Grahor, Donny Cook, Scott Higgins, Mike Querry, Roger McDaniel, Dave Burns, Rod Belisle, Kevin Rogers, Tony Ricciuti, Paul Knapp, Paul Sullivan, George Smith, Eric Simmon, Kevin Arnold, Larry Wildermuth, and Kyle Krueger.

This Public Comment is an update to Public Input 3072, with revisions to address statements in the Committee Statement for that PI.

As currently written in 430.201, Part XI of Article 430 adds to or amends the other provision of Article 430. It is unclear if Section 430.208 adds to, revises, or replaces some or all of the requirements for disconnect switches that appear in Part IX of Article 430. The proposed changes clarify exactly what requirements are applicable to disconnecting means in circuits above 1000 V ac, 1500 V dc, including the appropriate type of disconnects for those circuits.

A specific reference to 430.102(A) is included to identify the proper location of a motor controller disconnecting means.

430.208(B) identifies additional portions of Part IX that are applicable to disconnecting means that are specifically located in motor circuits.

The type of devices noted in 430.109 are not appropriate for circuits above 1000 V ac, 1500 V dc, so the proposed addition of 430.208(D) identifies the specific types of devices that are appropriate, and also include appropriate interlocking requirements when the switch is not rated for making or breaking current in a motor circuit.

430.208(E) provides the appropriate requirements for the current rating of disconnects in circuits above 1000 V ac, 1500 V dc. This makes it clear that the requirements of 430.110 are specifically applicable to circuits of 1000 V ac, 1500 V dc and below, and are not applicable for the higher voltage circuits.

The term "ultimate overload trip current setting" that appeared in the original public input has been replaced by "overload trip current setting" to avoid the use of an undefined term.

An Informational Note is included to recognize that when a disconnect switch is integral to a listed motor controller, the listing determines the disconnect switch rating is appropriate for the controlled motor circuit.

### Related Item

- PI 3072

## Submitter Information Verification

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**City:**

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**Submittal Date:** Tue Aug 06 09:21:05 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8031-NFPA 70-2024](#)

**Statement:** One change is added to include motor disconnect requirements in 430.102 to improve the accuracy of the changes.



**430.247** Direct-Current Motors.

Table 430.247- ~~shall provide~~ provides the values of full-load currents, which are average dc quantities, for motors running at base speeds.

Table 430.247 Full-Load Current in Amperes, Direct-Current Motors

Horsepower	Armature Voltage Rating*					
	90 Volts	120 Volts	180 Volts	240 Volts	500 Volts	550 Volts
¼	4.0	3.1	2.0	1.6	—	—
½	5.2	4.1	2.6	2.0	—	—
¾	6.8	5.4	3.4	2.7	—	—
1	9.6	7.6	4.8	3.8	—	—
1½	12.2	9.5	6.1	4.7	—	—
2	—	13.2	8.3	6.6	—	—
3	—	17	10.8	8.5	—	—
5	—	25	16	12.2	—	—
7½	—	40	27	20	—	—
10	—	58	—	29	13.6	12.2
15	—	76	—	38	18	16
20	—	—	—	55	27	24
25	—	—	—	72	34	31
30	—	—	—	89	43	38
40	—	—	—	106	51	46
50	—	—	—	140	67	61
60	—	—	—	173	83	75
75	—	—	—	206	99	90
100	—	—	—	255	123	111
125	—	—	—	341	164	148
150	—	—	—	425	205	185
200	—	—	—	506	246	222
250	—	—	—	675	330	294

\*These are average dc quantities.

**Statement of Problem and Substantiation for Public Comment**

The first occurrence of the word "shall" (Table xyz SHALL provide...) is nonsensical. How do you violate that "requirement"? It seems that only the CMP could. And how do I enforce it? And over whom? The table provides information, the table is not "required" to provide information.

**Related Public Comments for This Document**

Related Comment

Relationship

[Public Comment No. 754-NFPA 70-2024 \[Section No. 430.248\]](#)

[Public Comment No. 755-NFPA 70-2024 \[Section No. 430.249\]](#)

[Public Comment No. 757-NFPA 70-2024 \[Section No. 430.250\]](#)

Related Item

- FR 8006

**Submitter Information Verification**

**Submitter Full Name:** Ryan Jackson

**Organization:** Self-employed

**Street Address:**

**City:**

**State:**

**Zip:**

**Submission Date:** Sun Aug 04 16:22:24 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected

**Resolution:** NEC Style Manual 2.1.7.2 requires all tables to be mandatory requirements. The proposed change removes the mandatory language from the section.



**430.248** Single-Phase Alternating-Current Motors.

Table 430.248 ~~shall provide~~ provides the values of full-load currents for motors running at usual speeds and motors with normal torque characteristics. The voltages listed shall be rated motor voltages. The currents listed ~~shall be permitted~~ are for system voltage ranges of 110 volts to 120 volts and 220 volts to 240 volts, nominal.

Table 430.248 Full-Load Currents in Amperes, Single-Phase Alternating-Current Motors

<u>Horsepower</u>	<u>115</u>	<u>200</u>	<u>208</u>	<u>230</u>
	<u>Volts</u>	<u>Volts</u>	<u>Volts</u>	<u>Volts</u>
1/8	4.4	2.5	2.4	2.2
1/4	5.8	3.3	3.2	2.9
1/3	7.2	4.1	4.0	3.6
1/2	9.8	5.6	5.4	4.9
3/4	13.8	7.9	7.6	6.9
1	16	9.2	8.8	8.0
1 1/2	20	11.5	11.0	10
2	24	13.8	13.2	12
3	34	19.6	18.7	17
5	56	32.2	30.8	28
7 1/2	80	46.0	44.0	40
10	100	57.5	55.0	50

**Statement of Problem and Substantiation for Public Comment**

The first occurrence of the word "shall" (Table xyz SHALL provide...) is nonsensical. How do you violate that "requirement"? It seems that only the CMP could. And how do I enforce it? And over whom? The table provides information, the table is not "required" to provide information. Using this table is not a permission, it is a requirement. The permissive text needs to be removed. Also, without the word "nominal" in the text, the table could not be used for a circuit voltage of, say, 121V.

**Related Public Comments for This Document**

<u>Related Comment</u>	<u>Relationship</u>
<a href="#">Public Comment No. 755-NFPA 70-2024 [Section No. 430.249]</a>	
<a href="#">Public Comment No. 756-NFPA 70-2024 [Section No. 430.247]</a>	
<a href="#">Public Comment No. 757-NFPA 70-2024 [Section No. 430.250]</a>	

Related Item

- FR 8006

**Submitter Information Verification**

**Submitter Full Name:** Ryan Jackson  
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**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Sun Aug 04 16:14:23 EDT 2024  
**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected  
**Resolution:** NEC Style Manual 2.1.7.2 requires all tables to be mandatory requirements. The proposed change removes the mandatory language from the section.



Public Comment No. 755-NFPA 70-2024 [ Section No. 430.249 ]

**430.249** Two-Phase Alternating-Current Motors (4-Wire).

Table 430.249- ~~shall provide~~ provides values of full-load current for motors running at speeds usual for belted motors and motors with normal torque characteristics. Current in the common conductor of a 2-phase, 3-wire system shall be 1.41 times the value given. The voltages listed shall be rated motor voltages. The currents listed ~~shall be permitted~~ are for system voltage ranges of 110 volts to 120 volts, 220 volts to 240 volts, 440 volts to 480 volts, and 550 volts to 600 volts, nominal.

Table 430.249 Full-Load Current, Two-Phase Alternating-Current Motors (4-Wire)

<u>Horsepower</u>	<u>Induction-Type Squirrel Cage and</u>				
	<u>Wound Rotor (Amperes)</u>				
	<u>115</u>	<u>230</u>	<u>460</u>	<u>575</u>	<u>2300</u>
	<u>Volts</u>	<u>Volts</u>	<u>Volts</u>	<u>Volts</u>	<u>Volts</u>
1/2	4.0	2.0	1.0	0.8	—
3/4	4.8	2.4	1.2	1.0	—
1	6.4	3.2	1.6	1.3	—
1 1/2	9.0	4.5	2.3	1.8	—
2	11.8	5.9	3.0	2.4	—
3	—	8.3	4.2	3.3	—
5	—	13.2	6.6	5.3	—
7 1/2	—	19	9.0	8.0	—
10	—	24	12	10	—
15	—	36	18	14	—
20	—	47	23	19	—
25	—	59	29	24	—
30	—	69	35	28	—
40	—	90	45	36	—
50	—	113	56	45	—
60	—	133	67	53	14
75	—	166	83	66	18
100	—	218	109	87	23
125	—	270	135	108	28
150	—	312	156	125	32
200	—	416	208	167	43

**Statement of Problem and Substantiation for Public Comment**

The first occurrence of the word "shall" (Table xyz SHALL provide...) is nonsensical. How do you violate that "requirement"? It seems that only the CMP could. And how do I enforce it? And over whom? The table provides information, the table is not "required" to provide information. Using this table is not a permission, it is a requirement. The permissive text needs to be removed. Also, without the word "nominal" in the text, the table could not be used for a circuit voltage of, say, 121V.

**Related Public Comments for This Document**

<u>Related Comment</u>	<u>Relationship</u>
<a href="#">Public Comment No. 754-NFPA 70-2024 [Section No. 430.248]</a>	Same issue.
<a href="#">Public Comment No. 756-NFPA 70-2024 [Section No. 430.247]</a>	
<a href="#">Public Comment No. 757-NFPA 70-2024 [Section No. 430.250]</a>	

Related Item

- FR 8006

**Submitter Information Verification**

**Submitter Full Name:** Ryan Jackson  
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**Submittal Date:** Sun Aug 04 16:17:58 EDT 2024  
**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected

**Resolution:** NEC Style Manual 2.1.7.2 requires all tables to be mandatory requirements. The proposed change removes the mandatory language from the section.



**430.250** Three-Phase Alternating-Current Motors.

Table 430.250-~~shall provide~~ provides values of full-load currents typical for motors running at speeds usual for belted motors and motors with normal torque characteristics. The voltages listed shall be rated motor voltages. The currents listed ~~shall be permitted~~ are for system voltage ranges of 110 volts to 120 volts, 220 volts to 240 volts, 440 volts to 480 volts, and 550 volts to 600 volts, nominal.

Table 430.250 Full-Load Current, Three-Phase Alternating-Current Motors

Horsepower	Induction-Type Squirrel Cage and Wound Rotor (Amperes)								Synchronous-Type Unity Power			
									Factor* (Amperes)			
	115 Volts	200 Volts	208 Volts	230 Volts	460 Volts	575 Volts	2300 Volts		230 Volts	460 Volts	575 Volts	2300 Volts
1/2	4.4	2.5	2.4	2.2	1.1	0.9	—	—	—	—	—	—
3/4	6.4	3.7	3.5	3.2	1.6	1.3	—	—	—	—	—	—
1	8.4	4.8	4.6	4.2	2.1	1.7	—	—	—	—	—	—
1 1/2	12.0	6.9	6.6	6.0	3.0	2.4	—	—	—	—	—	—
2	13.6	7.8	7.5	6.8	3.4	2.7	—	—	—	—	—	—
3	—	11.0	10.6	9.6	4.8	3.9	—	—	—	—	—	—
5	—	17.5	16.7	15.2	7.6	6.1	—	—	—	—	—	—
7 1/2	—	25.3	24.2	22	11	9	—	—	—	—	—	—
10	—	32.2	30.8	28	14	11	—	—	—	—	—	—
15	—	48.3	46.2	42	21	17	—	—	—	—	—	—
20	—	62.1	59.4	54	27	22	—	—	—	—	—	—
25	—	78.2	74.8	68	34	27	—	53	26	21	—	—
30	—	92	88	80	40	32	—	63	32	26	—	—
40	—	120	114	104	52	41	—	83	41	33	—	—
50	—	150	143	130	65	52	—	104	52	42	—	—
60	—	177	169	154	77	62	16	123	61	49	12	—
75	—	221	211	192	96	77	20	155	78	62	15	—
100	—	285	273	248	124	99	26	202	101	81	20	—
125	—	359	343	312	156	125	31	253	126	101	25	—
150	—	414	396	360	180	144	37	302	151	121	30	—
200	—	—	552	528	480	240	192	49	400	201	161	40
250	—	—	—	—	302	242	60	—	—	—	—	—
300	—	—	—	—	361	289	72	—	—	—	—	—
350	—	—	—	—	414	336	83	—	—	—	—	—
400	—	—	—	—	477	382	95	—	—	—	—	—
450	—	—	—	—	515	412	103	—	—	—	—	—
500	—	—	—	—	590	472	118	—	—	—	—	—

\*For 90 and 80 percent power factor, the figures shall be multiplied by 1.1 and 1.25, respectively.

**Statement of Problem and Substantiation for Public Comment**

The first occurrence of the word "shall" (Table xyz SHALL provide...) is nonsensical. How do you violate that "requirement"? It seems that only the CMP could. And how do I enforce it? And over whom? The table provides information, the table is not "required" to provide information. Using this table is not a permission, it is a requirement. The permissive text needs to be removed. Also, without the word "nominal" in the text, the table could not be used for a circuit voltage of, say, 121V.

**Related Public Comments for This Document**

Related Comment

Relationship

[Public Comment No. 754-NFPA 70-2024 \[Section No. 430.248\]](#)

[Public Comment No. 755-NFPA 70-2024 \[Section No. 430.249\]](#)

[Public Comment No. 756-NFPA 70-2024 \[Section No. 430.247\]](#)

Related Item

- FR 8006

**Submitter Information Verification**

**Submitter Full Name:** Ryan Jackson

**Organization:** Self-employed

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Sun Aug 04 16:23:44 EDT 2024

**Committee:** NEC-P11

## Committee Statement

**Committee Action:** Rejected

**Resolution:** NEC Style Manual 2.1.7.2 requires all tables to be mandatory requirements. The proposed change removes the mandatory language from the section.



(C) Polyphase Design BE and Design CE Maximum Locked-Rotor Currents.

Table 430.251(C) shall provide conversions for polyphase Design BE and Design CE maximum locked-rotor currents for selection of disconnecting means and controllers.

Table 430.251(C) Conversion Table of Polyphase Design BE and Design CE Maximum Locked-Rotor Currents for Selection of Disconnecting Means and Controllers as Determined from Horsepower and Voltage Rating and Design Letter

Note: This table is for use only with 430.22, 430.24, 430.110, 440.12, 440.41, and 455.8(C).

Maximum Motor Locked-Rotor Current in Amperes, Two- and Three-Phase, Design BE and Design CE						
Rated Horsepower	115 Volts BE, CE	200 Volts BE, CE	208 Volts BE, CE	230 Volts BE, CE	460 Volts BE, CE	575 Volts BE, CE
½	41.2	23.7	22.8	20.6	10.3	8.2
¾	53.3	30.7	29.5	26.7	13.3	10.7
1	63.6	36.6	35.2	31.8	15.9	12.7
1½	84.2	48.4	46.6	42.1	21.1	16.8
2	112	64.6	62.1	56.2	28.1	22.5
3	—	96.9	93.1	84.2	42.1	33.7
5	—	161	155	140	70.2	56.2
7½	—	242	233	211	105	84.2
10	—	301	290	262	131	105
15	—	452	435	393	197	157
20	—	603	580	524	262	210
25	—	753	724	655	328	262
30	—	904	869	786	393	314
40	—	1119	1076	973	487	389
50	—	1399	1345	1217	608	487
60	—	1679	1614	1460	730	584
75	—	2099	2018	1825	913	730
100	—	2583	2484	2246	1123	898
125	—	3229	3105	2808	1404	1123
150	—	3875	3726	3369	1685	1348
200	—	5166	4968	4492	2246	1797
250	—	—	—	—	2808	2246
300	—	—	—	—	3369	2695
350	—	—	—	—	3931	3145
400	—	—	—	—	4492	3594
450	—	—	—	—	5054	4043
500	—	—	—	—	5616	4492

Note: This table is for use only with 430.110, 440.12, 440.41, and 455.8(C).

Informational Note: Values in Table 430.251(C) should be carefully considered when replacing Design B, C, or D motors with Design BE or Design CE motors, which are capable of higher efficiency levels. Motor control devices tested for Design B, C, or D motors, such as those covered in UL 508 and UL 60947-4-1, might not have been evaluated to these higher locked rotor current values.

Statement of Problem and Substantiation for Public Comment

This comment proposes to change Design BE and CE Table 430.251(C) which was introduced into the NEC on First Revision No. 8006-NFPA 70-2024 (Public Input 1472). The proposed change is to add 430.22 and 430.24 to the list of articles appearing in the "For use only with..." statement which appears below the title of Table 430.251(C).

This comment is in addition to a separate NEMA submitted public comment for Table 430.251(C) which proposes to reduce the maximum value of locked-rotor current for some ratings. The reference to 430.22 and 430.24 in this comment is proposed because NEMA submitted public comments for 430.22 and 430.24, which are also in response to FR-8006 (PI 1472), propose to add to those articles a requirement under certain conditions to utilize the locked-rotor current values in Table 430.251(C) when determining the minimum allowable size of conductors supplying Design BE or CE motor(s).

The purpose of the NEMA submitted public comments for 430.22 and 430.24 is to eliminate potential safety issues in installations of the Design BE or CE motors dealt with in Table 430.251(C). These potential safety issues are eliminated by adding requirements to 430.22 and 430.24 which ensure the protection of conductors supplying Design BE and CE motors not only during continuous operation (as 430.22 presently addresses), but also at the locked-rotor current values in Table 430.251(C).

The complete substantiation for the proposal to utilize under certain conditions the locked-rotor current values in Table 430.251(C) when determining the minimum allowable size of conductors supplying Design BE or CE motors appears in the NEMA submitted public comments for 430.22 and 430.24. That substantiation is summarized as follows:

Design BE and CE motors have typical values of full-load current according to Table 430.250 just as other three-phase alternating-current motors do. This means that, according to the present requirements of 430.22, the size of conductors supplying Design BE and CE motors is the same as those supplying other three-phase alternating current motors not addressed in 430.22(A) through 430.22(G). A significant difference, however, between Design BE and CE motors and other three-phase alternating-current motors such as Design B, C, and D motors is a higher maximum value of locked-rotor current as can be seen by comparing Table 430.251(C) to Table 430.251(B). Except for cases where a locked-rotor current reduction technique such as starting with an adjustable speed drive or a reduced voltage motor controller or starting on wye connection and running on delta connection is utilized, the higher locked-rotor current warrants an analysis regarding whether heating due to this current is the limiting factor for selecting the minimum size of conductors supplying Design BE and CE motors. This analysis was conducted per the methods described in these documents which are based upon the material in ANSI/ICEA P-32-382-2007 (R2018):

•Conductor Short-Circuit Protection (<https://www.eaton.com/content/dam/eaton/products/electrical-circuit-protection/fuses/solution-center/bus-ele-tech-lib->

conductor-protection-wire-cable-protection-2.pdf) published in 2000 by Cooper Bussmann, Inc, now known as Eaton's Bussmann Business.  
• Short Circuit Currents of Insulated Cables (2307-Short-Circuit-Currents-Insulated-Cables-Whitepaper-PRINT.pdf (southwire.com)) published in 2023 by Southwire Company, LLC.

The one exception in the analysis relative to the methods described in the above referenced documents is that the maximum short circuit temperature of thermoset insulated conductors was, for the sake of safety, assumed to be the more conservative value of 200 degrees C specified for rubber insulated conductors in ANSI/ICEA P-32-382-2007 (R2018) instead of the 250 degrees C value specified for thermoset insulated conductors in that standard. As rubber is a thermoset material, there is an ambiguity as to how to cross reference certain conductor insulation Types in Table 310.4(1) to the classification of thermoset insulated (250 C maximum short circuit temperature) or to rubber insulated (200 C maximum short circuit temperature) in ANSI/ICEA P-32-382-2007 (R2018). The chair of the working group for ANSI/ICEA P-32-382 has acknowledged this and agreed to address this ambiguity in the next revision of the standard. For example, Type RHH is identified in Table 310.4(1) as thermoset, but can be supplied as either non-rubber thermoset (e.g., cross-linked polyethylene) with a short circuit temperature of 250 C or rubber thermoset (e.g., ethylene propylene rubber) with a short circuit temperature of 200 C. Since the distinction of rubber or non-rubber insulation is not identified on the cable, it is unclear to the installer which of these two short circuit temperatures is the appropriate one to apply. Therefore, this comment proposes the more conservative value.

The objective of the analysis was to determine if the following currents potentially drawn by a Design BE or CE motor during starting elevate the temperature of conductors of minimum size selected per the sizing requirements in 430.22 beyond the maximum short-circuit temperature of the conductors:

- 1) Current at the instantaneous-trip breaker setting of 2750% of full-load current value proposed on Public Input 1470 for Design BE and CE motors for the following time durations: ½ AC 60 Hz cycle (.0083 seconds), 1 AC 60 Hz cycle (.0167 seconds), 1 ½ AC 60 Hz cycles (.025 seconds), and 2 AC 60 Hz cycles (.0333 seconds)
- 2) RMS current at the locked-rotor current values in Table 430.251(C) for Design BE and CE motors for a time duration of 5 seconds.

The analysis was performed for both copper and aluminum conductors which are thermoplastic insulated or thermoset insulated. This accounts for all conductor types in Tables 310.16 – 310.20 and Table 400.5(A)(1) with the exception of the following:

- UF: underground feeder and branch circuit cable
- USE and USE-2: underground service entrance cable
- Z, ZW, and ZW-2: modified ethylene tetrafluoro-ethylene
- FEP and FEPB: fluorinated ethylene propylene
- MI: mineral insulation (metal sheathed)
- PFA and PFAH: perfluoro-alkoxy
- TFE: extended polytetra-fluoro-ethylene

These conductor types were not included in the analysis because ANSI/ICEA P-32-382-2007 (R2018) does not define the maximum short-circuit temperature for the insulation in these conductor types.

For all the types of conductors analyzed, it was found that current at the instantaneous-trip breaker setting for the time durations listed in item 1) does not elevate the temperature beyond the maximum short-circuit temperature of the conductors for any horsepower rating in Table 430.251(C). In the worst case, the current is 93% of that required to elevate the conductor temperature to the maximum short-circuit temperature of the conductors. This worst case is current for a 10 horsepower Design BE or CE motor at the instantaneous-trip breaker setting continuously for 2 AC 60 Hz cycles when the conductors are minimum-sized 90°C copper conductors with thermoplastic insulation from Table 310.17 (single-insulated conductors in free-air).

Cases were found for which minimum-sized conductors are elevated beyond the maximum short-circuit temperature of the conductors when RMS current at the locked-rotor current values in Table 430.251(C) persists for 5 seconds. These cases are limited to horsepower ratings ranging from 3 to 100 horsepower and are limited to conductors with a temperature rating of 90°C or less. For conductors of these temperature ratings and of the types considered in the analysis, the public comment submitted by NEMA for 430.22 addresses this by proposing a requirement for Design BE and CE motors with a horsepower rating ranging from 3 to 100 HP and not utilizing a locked-rotor current reduction technique which in some cases results in the supply conductors being larger than would otherwise be required. This proposal for 430.22 requires in these cases that the allowable short circuit current computed with the provided formula is greater than or equal to the locked-rotor current in Table 430.251(C) for the corresponding motor horsepower and voltage rating. Some examples for which this requirement results in supply conductors being larger than would otherwise be required are:

- 7.5 horsepower motor supplied by 75°C copper conductors with thermoplastic insulation from Table 310.16 (not more than three current carrying conductors in raceway, cable, or earth): conductor size is required to increase to 12 AWG from the otherwise required 14 AWG
- 20 horsepower motor supplied by 75°C copper conductors with thermoset insulation from Table 310.17 (single-insulated conductors in free-air): conductor size is required to increase to 10 AWG from the otherwise required 12 AWG

## Related Public Comments for This Document

### Related Comment

### Relationship

[Public Comment No. 1262-NFPA 70-2024 \[Section No. 430.22\]](#)

[Public Comment No. 1263-NFPA 70-2024 \[Section No. 430.24\]](#)

### Related Item

• FR8006 • P11472 • PC No. 1262-NFPA 70-2024 • PC No. 1263-NFPA 70-2024

## Submitter Information Verification

**Submitter Full Name:** Megan Hayes

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**Submittal Date:** Wed Aug 21 14:18:55 EDT 2024

**Committee:** NEC-P11

## Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8049-NFPA 70-2024](#)

**Statement:** Table was updated based on the locked rotor currents that are to be published in the next edition of ANSI/NEMA MG 00001.



(C) Polyphase Design BE and Design CE Maximum Locked-Rotor Currents.

Table 430.251(C) shall provide conversions for polyphase Design BE and Design CE maximum locked-rotor currents for selection of disconnecting means and controllers.

Table 430.251(C) Conversion Table of Polyphase Design BE and Design CE Maximum Locked-Rotor Currents for Selection of Disconnecting Means and Controllers as Determined from Horsepower and Voltage Rating and Design Letter

Note: This table is for use only with 430.110, 440.12, 440.41, and 455.8(C).

Maximum Motor Locked-Rotor Current in Amperes, Two- and Three-Phase, Design BE and Design CE						
Rated Horsepower	115 Volts BE, CE	200 Volts BE, CE	208 Volts BE, CE	230 Volts BE, CE	460 Volts BE, CE	575 Volts BE, CE
½	41.2	23.7	22.8	20.6	10.3	8.2
¾	53.3	30.7	29.5	26.7	13.3	10.7
1	63.6	36.6	35.2	31.8	15.9	12.7
1½	84.2	48.4	46.6	42.1	21.1	16.8
2	112	64.6	62.1	56.2	28.1	22.5
3	—	96.9	93.1	84.2	42.1	33.7
5	—	161	155	140	70.2	56.2
7½	—	242	233	211	105	84.2
10	—	301	290	262	131	105
15	—	452	435	393	197	157
20	—	603	580	524	262	210
25	—	753	724	655	328	262
30	—	904	869	786	393	314
40	—	1119	1076	973	487	389
50	—	1399	1345	1217	608	487
60	—	1679	1614	1460	730	584
75	—	2099	2018	1825	913	730
100	—	2583	2484	2246	1123	898
125	—	3229	3105	2808	1404	1123
150	—	3875	3726	3369	1685	1348
200	—	5166	4968	4492	2246	1797
250	—	—	—	—	2808	2246
300	—	—	—	—	3369	2695
350	—	—	—	—	3931	3145
400	—	—	—	—	4492	3594
450	—	—	—	—	5054	4043
500	—	—	—	—	5616	4492

Note: This table is for use only with 430.110, 440.12, 440.41, and 455.8(C).

Informational Note: Values in Table 430.251(C) should be carefully considered when replacing Design B, C, or D motors with Design BE or Design CE motors, which are capable of higher efficiency levels. Motor control devices tested for Design B, C, or D motors, such as those covered in UL 508 and UL 60947-4-1, might not have been evaluated to these higher locked rotor current values.

Additional Proposed Changes

File Name	Description	Approved
Table_430.251_C_for_submission_to_NFPA.docx		

Statement of Problem and Substantiation for Public Comment

This comment proposes to change Design BE and CE Table 430.251(C) which was introduced into the NEC on First Revision No. 8006-NFPA 70-2024 (Public Input 1472). The proposed change reduces the maximum value of locked-rotor current for some ratings. This reduction is proposed for the purpose of harmonizing with the locked-rotor current values for IEC motor design letters NE and HE as defined in Table 3 of IEC 60034-12:2024 so that Design BE and CE motors are compatible with the controllers for Design NE and HE motors. This comment is in addition to a separate NEMA submitted public comment for Table 430.251(C) which proposes to add 430.22 and 430.24 to the list of articles that Table 430.251(C) states it is intended for use with.

The logic used for determining the proposed changes to the maximum values of locked-rotor current in Table 430.251(C) is as follows:

The locked-rotor current values in Table 430.251(C) from FR-8006 (PI 1472) result in a ratio of locked rotor apparent power to motor output power that exactly matches Table 3 of IEC 60034-12:2024, but the locked-rotor current values are only an approximate match for some ratings. These ratings are those for which the horsepower output power in Table 430.251(C) is only an approximate match to the nearest standard kW output power value defined in Table 6 of IEC 60072-1:2022. This slight difference in the denominator of the ratio of locked rotor apparent power to motor output power results in the same difference in the numerator of this ratio and, therefore, the same slight difference in the locked-rotor current value.

For ratings for which the Design BE and CE locked-rotor current is presently lower than the IEC Design NE and HE locked-rotor current, no change is proposed in this comment for Table 430.251(C) since lower current does not adversely affect compatibility with the controller for Design NE and HE motors. For ratings for which the Design BE and CE locked-rotor current is presently higher than the IEC Design NE and HE locked-rotor current, a reduction in the locked-rotor current value in Table 430.251(C) is proposed to match the value for IEC Designs NE and HE. The size of the proposed reductions fall within the range of 0.71% to 4.21%.

The revised values from this comment are what will appear in ANSI/NEMA MG 00001-2024 when it is published. At the time this public comment was written, such publication had not occurred, but it is expected to occur around August 2024.

**Related Item**

• FR8006 • PI1472

**Submitter Information Verification**

**Submitter Full Name:** Megan Hayes

**Organization:** NEMA

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Wed Aug 21 14:29:36 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8049-NFPA 70-2024](#)

**Statement:** Table was updated based on the locked rotor currents that are to be published in the next edition of ANSI/NEMA MG 00001.

Table 430.251(C) as proposed in NEMA PC No. 1363-NFPA 70-2024

Rated Horsepower	Maximum Motor Locked-Rotor Current in Amperes, Two- and Three-Phase, Design BE and CE					
	115 Volts	200 Volts	208 Volts	230 Volts	460 Volts	575 Volts
	BE, CE	BE, CE	BE, CE	BE, CE	BE, CE	BE, CE
½	<del>41.240.9</del>	<del>23.723.5</del>	<del>22.822.6</del>	<del>20.620.4</del>	<del>10.310.2</del>	8.2
¾	<del>53.352.5</del>	<del>30.730.2</del>	<del>29.529.0</del>	<del>26.726.2</del>	<del>13.313.1</del>	<del>10.710.5</del>
1	63.6	36.6	35.2	31.8	15.9	12.7
1½	<del>84.282.8</del>	<del>48.447.6</del>	<del>46.645.8</del>	<del>42.141.4</del>	<del>21.120.7</del>	<del>16.816.6</del>
2	112	64.6	62.1	56.2	28.1	22.5
3		<del>96.995.3</del>	<del>93.191.6</del>	<del>84.282.8</del>	<del>42.141.4</del>	<del>33.733.1</del>
5		<del>161160</del>	<del>155154</del>	<del>140139</del>	<del>70.269.7</del>	<del>56.255.7</del>
7½		<del>242238</del>	<del>233229</del>	<del>211207</del>	<del>105104</del>	<del>84.282.8</del>
10		301	290	262	131	105
15		<del>452445</del>	<del>435427</del>	<del>393387</del>	<del>197193</del>	<del>157155</del>
20		603	580	524	262	210
25		<del>753748</del>	<del>724719</del>	<del>655650</del>	<del>328325</del>	<del>262260</del>
30		<del>904889</del>	<del>869855</del>	<del>786773</del>	<del>393387</del>	<del>314309</del>
40		1119	1076	973	487	389
50		<del>13991389</del>	<del>13451335</del>	<del>12171207</del>	<del>608604</del>	<del>487483</del>
60		1679	1614	1460	730	584
75		<del>20992064</del>	<del>20181985</del>	<del>18251795</del>	<del>913897</del>	<del>730718</del>
100		2583	2484	2246	1123	898
125		<del>32293118</del>	<del>31052998</del>	<del>28082711</del>	<del>14041356</del>	<del>11231084</del>
150		<del>38753811</del>	<del>37263664</del>	<del>33693313</del>	<del>16851657</del>	<del>13481325</del>
200		5166	4968	4492	2246	1797
250					<del>28082786</del>	<del>22462229</del>
300					<del>33693313</del>	<del>26952651</del>
350					<del>39313765</del>	<del>31453012</del>
400					4492	3594
450					<del>50545046</del>	<del>40434036</del>
500					5616	4492



440.2 Listing Requirements.

(A) Listing Required. Factory-assembled electric motor-driven air-conditioning equipment and refrigerating equipment shall be listed.

(B) Field Installed Electric Heaters. Electric heaters field installed within the enclosure of listed electric motor-driven air-conditioning equipment shall be identified as a listed field installable accessory as part of the listed equipment.

### Statement of Problem and Substantiation for Public Comment

This Public Comment is provided as a follow-up to Public Input No. 3909. In addition to the substantiation provided in PI 3909, additional substantiation is provided in response to CMP 11's Committee Statement. For consideration:

1. Not all jurisdictions which adopt the NEC also adopt a mechanical code. Two domestic examples are the states of Vermont and Hawaii. Adoption is also spotty in jurisdictions which do not have state-wide codes, or in international jurisdictions.
2. Mechanical codes do not usually apply to residential occupancies.
3. There is not always a clear distinction between the various trades and their associated AHJs. HVAC/R routinely involves electrical, mechanical, gas, plumbing, and fire codes. Consistency across codes is important in the circumstances where inspection responsibilities overlap and may be unclear.
4. 110.3(B) requires products that are listed to be installed and used in accordance with the listing; however, 110.3(B) doesn't require listing. A listing requirement for equipment under the scope of Article 440 belongs in 440.2 (per the NEC Style Manual, cl. 2.2.1), which is the purpose of this Public Comment. If 440.2 doesn't require listing, then unlisted HVAC equipment may be approved, and 110.3(B) would not apply.
5. In addition, it is important to supplement the general requirement of 110.3(B) in the specific case of field installed electric heaters for the following reasons:
  - a. There is a history of inconsistent application of 110.3(B) to field installed electric heaters
  - b. This equipment is often supplied by one of the largest electrical circuits in most buildings
  - c. There have been numerous fire incidents as a result of this misapplication and the available energy in these circuits.
6. The committee's statement did not address the concerns associated with the new flammable refrigerants:
  - a. Electrical sources of ignition are one of the primary concerns with these systems. The product listing drives product and installation requirements to mitigate these hazards.
  - b. The use of the manufacturer's specified electric heaters is even more critical with flammable refrigerants. The listing evaluates these kits as potential hot surface ignition sources, requires they be interlocked with circulating fan operation, and requires coordination with equipment mitigation controls which activate if a refrigerant leak is detected.
7. This PI correlates with NFPA 1 which require listing for this equipment through adoption of ASHRAE 15, which requires the listing.

Original Substantiation submitted with PI 3909:

EPA Significant New Alternative Policy Program (SNAP) rules regarding low-GWP refrigerants will essentially require the use of refrigerants with higher flammability safety classifications per ASHRAE 34. These refrigerants introduce new hazards compared to those used previously. These concerns are addressed in the standards used to evaluate this equipment for listing (UL 60335-2-40 for air-conditioning equipment, and UL 60335-2-89 for refrigerating equipment). Requiring listing of factory-built equipment is consistent with mechanical code requirements.

Field installed electric heaters within the enclosure of listed air-conditioning (which includes heat pumps) are covered by the scope of the end product standard (UL 60335-2-40). The heaters are required to be evaluated and tested as part of the equipment. The product standard requires that the equipment be marked to identify which field installed accessories are approved as part of the equipment listing.

Because the heaters addressed by this proposal are installed in the enclosure of heat pump and air conditioning equipment, these heaters are not clearly in scope of Article 422 (which covers gas and electric furnaces) or Article 424 (which covers duct heaters). The most appropriate location is Article 440 since the heaters are installed within the equipment covered by this Article. Due to the high levels of energy available in these circuits and equipment, there is a need for more clearly defined requirements.

The HVAC industry has seen an increase in installation of third-party manufactured electric heaters. These heaters are not approved by the equipment manufacturer and are not evaluated by the listing of the equipment. As a result, manufacturers have received numerous reports of fire incidents resulting from these installations.

The wording offered here is similar to wording in 312.8(B)(1), which addresses installation of power monitoring and energy monitoring equipment in enclosures for switches or overcurrent devices (such as panelboards), ensuring appropriate listing requirements are applied. The option for a listed third-party kit evaluated for field installation presently does not exist for electric heaters, therefore that provision from 312.8(B)(1) is not included in this public input.

PI 3909 CMP 11 Committee Statement:

Resolution: The requirement for this equipment to be Listed is better suited in the mechanical code. This is addressed by 110.3(B). Air conditioning equipment is required to be listed by the mechanical code, any accessories installed within the enclosure for listed equipment should be within the listing of the air conditioning equipment. Section 110.3(B) requires that listed equipment be in accordance with listing instructions.

#### Related Item

- Public Input No. 3909-NFPA 70-2023

### Submitter Information Verification

**Submitter Full Name:** Chris Mobley

**Organization:** UL Solutions

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Aug 27 16:02:42 EDT 2024

**Committee:** NEC-P11

## Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8070-NFPA 70-2024](#)

**Statement:** Listing requirements are added to Article 440 to clarify that factory assembled HVAC equipment and field installed electric heaters shall be listed.



#### **440.3 Cybersecurity**

An HVAC System that is connected to a communication network and permits system control shall comply with the following:

(1) Connected directly through a local non-networked interface.

(2) Connected through a networked interface complying with one of the following methods:

a. The HVAC System and associated software for adjusting the settings are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment of the network is completed. Documentation of the assessment shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards series*, UL 2900 *Cybersecurity Standard series*, or the NIST *Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1 for assessment requirements.

Informational Note No. 2: Examples of the evaluation or assessment used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) Certification of compliance by a nationally recognized test laboratory.

(2) Manufacturer declaration for the specific type and brand of system provided.

Informational Note No. 3: Cybersecurity is a specialized field requiring constant, vigilant attention to security vulnerabilities that could arise due to software defects, system configuration changes, or user interactions. Installation of devices that can be secured is an important first step but not sufficient to guarantee a secure system.

#### **Statement of Problem and Substantiation for Public Comment**

HVAC system product safety standards for connected products do not contain cybersecurity requirements. It would take time for the product safety technical committee to add to a standard and then provide the amount of time for manufacturers to comply. During that time many systems will be attacked and by providing both product and system protection options will protect the public from safety issues that can and have arisen during attacks on HVAC systems. HVAC systems are highly connected as a lot of remote maintenance is conducted in this market.

HVAC systems, either, IoT sensors viewing from your computer they do need to connect to the internet for data gathering, remote control and analytics. Their direct access to the internet does make them a target of cyber attackers, posing serious security threats for buildings and their occupants.

A key example is the Target cyber-attack: it was national news for months on end. Ultimately, it was determined that a third-party HVAC system company was the entry point for the hackers.

Another example is from the Boston area where HVAC incident is said to affect Boston area hospitals.  
<https://www.healthcareinfosecurity.com/alleged-hvac-hack-shines-spotlight-on-ot-risks-to-healthcare-a-17320>

<https://www.ashrae.org/news/ashraejournal/protecting-hvac-systems-from-cybersecurity-threats>  
This article published in the ASHRAE Journal Newsletter in September of 2021 provides a broad view of why Cybersecurity protection is needed for HVAC Systems. Each incident can cause in excess of \$7.5M which has a major impact on government entities and large corporations. However over small and medium size businesses are also being attacked. In 2019 43% of online attacks were aimed as small businesses.

Cyber-security is becoming more important every day. By including these requirements within a consensus document that is adopted by all states, consistency in the protection will be achieved. Without using consensus standards, the industry could have to address requirements differently for each state, territory, or federal government.

#### **Related Item**

• PI-3370

#### **Submitter Information Verification**

**Submitter Full Name:** Chad Kennedy

**Organization:** Schneider Electric

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Aug 27 21:40:54 EDT 2024

**Committee:** NEC-P11

#### **Committee Statement**

**Committee Action:** Rejected

**Resolution:** Considerations for cybersecurity should occur during the product development stage, not during installation stage. Entities involved in product development or listing should be responsible for addressing cybersecurity. Not all connected equipment under the scope of this provision poses a hazard. It should be up to the user to determine their own risks and application of cybersecurity measures. There are already requirements for cybersecurity in other parts of the code such as 708.7 for COPS.



**440.4 Marking on Hermetic Refrigerant Motor-Compressors and Equipment.**

**(A) Hermetic Refrigerant Motor-Compressor Nameplate.**

A hermetic refrigerant motor-compressor shall be provided with a visible nameplate that shall indicate the manufacturer’s name, trademark, or symbol; identifying designation; phase; voltage; and frequency. The rated-load current in amperes of the motor-compressor shall be marked by the equipment manufacturer on either or both the motor-compressor nameplate and the nameplate of the equipment in which the motor-compressor is used. The locked-rotor current of each single-phase motor-compressor having a rated-load current of more than 9 amperes at 115 volts, or more than 4.5 amperes at 230 volts, and each polyphase motor-compressor shall be marked on the motor-compressor nameplate. Where a thermal protector complying with 440.52(A)(2) and 440.52(B)(2) is used, the motor-compressor nameplate or the equipment nameplate shall be marked with the words “thermally protected.” Where a protective system complying with 440.52(A)(4) and 440.52(B)(4) is used and is furnished with the equipment, the equipment nameplate shall be marked with the words, “thermally protected system.” Where a protective system complying with 440.52(A)(4) and 440.52(B)(4) is specified, the equipment nameplate shall be appropriately marked.

**(B) Multimotor and Combination-Load Equipment.**

Multimotor and combination-load equipment shall be provided with a visible nameplate marked with the maker’s name, the rating in volts, frequency and number of phases, minimum supply circuit conductor ampacity, the maximum rating of the branch-circuit short-circuit and ground-fault protective device, and the short-circuit current rating of the motor controllers or industrial control panel. The ampacity shall be calculated by using Part IV and counting all the motors and other loads that will be operated at the same time. The branch-circuit short-circuit and ground-fault protective device rating shall not exceed the value calculated by using Part III. Multimotor or combination-load equipment for use on two or more circuits shall be marked with the above information for each circuit.

*Exception No. 1: Multimotor and combination-load equipment that is suitable under the provisions of this article for connection to a single 15- or 20-ampere, 120-volt, or a 15-ampere, 208- or 240-volt, single-phase branch circuit shall be permitted to be marked as a single load.*

*Exception No. 2: The minimum supply circuit conductor ampacity and the maximum rating of the branch-circuit short-circuit and ground-fault protective device shall not be required to be marked on a room air conditioner complying with 440.62(A).*

*Exception No. 3: Multimotor and combination-load equipment used in one- and two-family dwellings or cord-and-attachment-plug-connected equipment shall not be required to be marked with a short-circuit current rating.*

**(C) Branch-Circuit Selection Current.**

A hermetic refrigerant motor-compressor, or equipment containing such a compressor, having a protection system that is approved for use with the motor-compressor that it protects and that permits continuous current in excess of the specified percentage of nameplate rated-load current given in 440.52(B)(2) or 440.52(B)(4) shall also be marked with a branch-circuit selection current that complies with 440.52(B)(2) or 440.52(B)(4). This marking shall be provided by the equipment manufacturer and shall be on the nameplate(s) where the rated-load current(s) appears.

**Additional Proposed Changes**

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_46.pdf		

**Statement of Problem and Substantiation for Public Comment**

NOTE: The following CC Note No. 46 appeared in the First Draft Report on First Revision No. 8023.

The Correlating Committee directs CMP 11 to review FR 8023 and clarify the intent of the CMP regarding “the nameplate to be “accessible and visible” where “the equipment nameplate could not be installed against a wall or other obstacle, or it would not be “visible” in 440.4(A) and 440.4(B).

Additionally, with respect to 440.4(A) and 440.4(B), consider a list format (NEC Style Manual Section 2.1.9.3) or short, simple declarative sentences (NEC Style Manual Section 3.5.1.1)

Lastly, the term “suitable” in 440.4(B), Exception #1, should be clarified, considering if the term “permitted” is more appropriate.

Related Item

- First Revision No. 8023

**Submitter Information Verification**

**Submitter Full Name:** CC Notes  
**Organization:** NEC Correlating Committee  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Jul 30 14:31:33 EDT 2024  
**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected but see related SR  
**Resolution:** SR-8073-NFPA 70-2024  
**Statement:** The requirement for the nameplate to be visible is changed to accessible as the defined term accessible will ensure that the nameplate can be found after installation. Also, 440.4 is re-formatted into lists in order to increase clarity and usability. The term “suitable” is changed to “permitted” in exception 1 to 440.4(B) as “permitted” is more appropriate. The second requirement for the marking for protective systems is deleted as it is redundant to the first requirement for marking for protective systems.



## Correlating Committee Note No. 46-NFPA 70-2024 [ Section No. 440.4 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:31:55 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs CMP 11 to review FR 8023 and clarify the intent of the CMP regarding “the nameplate to be “accessible and visible” where “the equipment nameplate could not be installed against a wall or other obstacle, or it would not be “visible” in 440.4(A) and 440.4(B).

Additionally, with respect to 440.4(A) and 440.4(B), consider a list format (NEC Style Manual Section 2.1.9.3) or short, simple declarative sentences (NEC Style Manual Section 3.5.1.1)

Lastly, the term “suitable” in 440.4(B), Exception #1, should be clarified, considering if the term “permitted” is more appropriate.

First Revision No. 8023-NFPA 70-2024 [Section No. 440.4(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.



**TITLE OF NEW CONTENT**

Exception: The calculated available fault current at the equipment shall be permitted to be reduced using the let-through curves of current-limiting overcurrent protective devices upstream of the equipment, provided the equipment does not contain overcurrent protective devices with an interrupting rating less than the calculated available fault current.

**Additional Proposed Changes**

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
MN_Inspector_SCCR_form.pdf	MN SCCR Inspection Form	

**Statement of Problem and Substantiation for Public Comment**

It is not unusual to have installations where the installed HVAC equipment marked SCCR is less than the calculated available fault current. Installations where the equipment SCCR is inadequate for the available fault current, may result in serious electrical hazards such as electrical shock, fire, and shrapnel. In addition, where the installed HVAC equipment SCCR is less than the calculated available fault current, there is currently no cost-effective way address this safety issue, nor is it currently addressed in the NEC.

The use of current-limiting fuses has been an effective and industry accepted method of reducing the available fault current to protect certain types of equipment where the available fault current exceeds the equipment marked short-circuit current ratings. There is only one NEC requirement where this method is not permitted, and that is for the protection of circuit breakers in panelboards and switchboards in NEC 240.86. The proposed text specifically states the equipment cannot contain overcurrent protective devices with interrupting rating less than the calculated fault current, which would prevent the use of 240.86.

In addition, it is important to separate UL 508A and required marking of equipment short-circuit current rating with the electrical system available fault current. UL 508A Supplement SB is an approved method of determining the required marked short-circuit current rating. This proposal is not intended to revise the marked SCCR of the equipment, which could only be done using a field evaluation. Instead, this proposal allows the available fault current analysis to use the published manufacturer RMS let-through as part of the available fault current analysis at certain types of equipment. There is no guidance on how to calculate the available fault current in the NEC. Industry practice has been to determine the available fault current at equipment by considering the impedance effects of transformers, conductors and busway. Once this calculation is completed, then it has been industry practice to consult the published manufacturer RMS let-through of upstream current-limiting overcurrent protective devices, if present, which can reduce the available fault current at certain types of equipment.

This proposal is intended to address smaller (200A and less) HVAC equipment, because this is a type of equipment where this method would be suitable. It would likely not be suitable for larger equipment which has an industrial control panel. The reason for this is that smaller HVAC equipment often does not contain overcurrent protective devices, or if it does this proposal requires those overcurrent devices to have adequate interrupting ratings based on the calculated available fault current. This method is suitable for motor controllers, including VFDs, since this is dealing with the reduction of available fault current. The issue of with VFDs applied on systems with higher available fault currents is a heating and useful life issue, not a safety issue where there is concern for protection of the VFD and it's associated marked SCCR rating.

In some jurisdictions, such as in Minnesota, the Electrical Inspectors allow (and publish per the attached document) four methods to address this safety issue:

Install longer length of conductor required to lower the available fault current to a value equal or less than the marked equipment SCCR.

Install a transformer rated for the load, with a KVA and impedance that reduces the available fault current to a value equal to or less than the marked equipment SCCR.

Modify the equipment components to achieve the required SCCR and conduct a field evaluation to relabel the equipment with the revised equipment SCCR.

Install current limiting fuses that reduce the available fault current to a value equal or less than the marked equipment SCCR, provided the equipment does not contain overcurrent protective devices with an interrupting rating less than the calculated available fault current.

The added exception provides a cost-effective method to address the safety issue with installed equipment with inadequate equipment SCCR without having to add additional sources of impedance or require modification and reevaluation of the equipment.

**Related Item**

- PI 2452

**Submitter Information Verification**

**Submitter Full Name:** Daniel Neeser

**Organization:** Eaton Bussmann Series

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Thu Aug 22 12:17:43 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected

**Resolution:** This concept is the same concept that is addressed in supplement SB of ANSI/UL 508A for industrial control panels, as referenced in the substantiation. However, the method being proposed in this comment does not contain many of the requirements that are found in the consensus standard. Requirements to allow this in Article 440 should be consistent.

## Short-Circuit Current Ratings

Short-Circuit Current Ratings are in place to protect equipment and overcurrent devices from sustaining damage when exposed to a high level of current during a short-circuit condition. In the National Electrical Code (NEC), Sections 110.9 and 110.10, addresses those general requirements; however, there are many **equipment specific** SCCR requirements where the AHJ can request documentation. When it is determined that an equipment installation is not within the available fault current, field wiring alterations or modifications to the electrical equipment could be a solution. There are four options to ensure equipment SCCR compliance:

1. Install an isolation transformer.
2. Increase conductor length.
3. Change the equipment components (requires a field evaluation).
4. Install current limiting fuses - where permitted by the AHJ. In this application, if overcurrent devices are present, they must have an interrupting rating equal to or greater than the available fault current.

\*\*If option 4 is used, please fill out the information below and upload the document to our electronic record (permit).

Permit Number:	
Project Name:	
Project Address:	
Calculation Completed By (please print):	
Type of App Used for the calculation (if applicable):	
Date of Calculation:	
Fuse rating and new equipment fault current rating:	
Signature:	Date of Signature:



## Public Comment No. 1763-NFPA 70-2024 [ Section No. 440.11 ]

### 440.11 General.

~~Disconnecting. A disconnecting means shall be capable of disconnecting provided to disconnect air-conditioning and refrigerating equipment, including motor-compressors and controllers, from the circuit conductors. If the disconnecting means is readily accessible to unqualified persons, any enclosure door or hinged cover of a disconnecting means enclosure that exposes energized parts when open shall have its door or cover locked or require a tool to be opened. \_~~

### Statement of Problem and Substantiation for Public Comment

The requirement for the access to internal components of an enclosed switch are addressed in 404.30. As the requirements in 404 apply 'generally', there is no need to repeat them here.

### Related Public Comments for This Document

#### Related Comment

[Public Comment No. 1758-NFPA 70-2024 \[Section No. 404.30\]](#)

[Public Comment No. 1758-NFPA 70-2024 \[Section No. 404.30\]](#)

#### Relationship

#### Related Item

- Correlating Committee Note No. 47-NFPA 70-2024

### Submitter Information Verification

**Submitter Full Name:** Bryan Tatum

**Organization:** Underwriters Laboratories

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Aug 27 08:31:54 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8074-NFPA 70-2024](#)

**Statement:** Response for PC-1763: The first sentence of 440.11 is revised for clarity. The second sentence will remain because there are requirements in the second sentence not found in 404.30. Section 404.30 is limited to disconnects that are in the closed position. Section 440.11 is for disconnects in both the open and closed positions.

Response for PC-758: The wording ", from the circuit conductors." is removed from 440.11 since it is redundant to the Article 100 definition of disconnecting means.



## Public Comment No. 1795-NFPA 70-2024 [ Section No. 440.11 ]

### 440.11 General.

Disconnecting means shall be capable of disconnecting air-conditioning and refrigerating equipment, including motor-compressors and controllers, from the circuit conductors. ~~If the disconnecting means is Section 404.30 shall apply only to disconnects that are~~ readily accessible to unqualified persons; ~~any enclosure door or hinged cover of a disconnecting means enclosure that exposes energized parts when open shall have its door or cover locked or require a tool to be opened. \_~~

### Statement of Problem and Substantiation for Public Comment

Requirements found in Section 404.30 are removed for clarity and consistency. This comment was developed by a task group reviewing CN 47 consisting of Nathan Philips, Jim Rogers, Dirk Mueller, Keith Waters and Seth Carlton.

#### Related Item

- CN 47, FR 8025

### Submitter Information Verification

**Submitter Full Name:** Nathan Philips  
**Organization:** Integrated Electronic Systems  
**Affiliation:** NECA  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Aug 27 11:58:20 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected  
**Resolution:** The second sentence will remain because there are requirements in the second sentence not found in 404.30. Section 404.30 is limited to disconnects that are in the closed position. Section 440.11 is for disconnects in both the open and closed positions.



## Public Comment No. 394-NFPA 70-2024 [ Section No. 440.11 ]

### 440.11 General.

Disconnecting means shall be capable of disconnecting air-conditioning and refrigerating equipment, including motor-compressors and controllers, from the circuit conductors. If the disconnecting means is readily accessible to unqualified persons, any enclosure door or hinged cover of a disconnecting means enclosure that exposes energized parts when open shall have its door or cover locked or require a tool to be opened.

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_47.pdf		

### Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 47 appeared in the First Draft Report on First Revision No. 8025.

The Correlating Committee directs that a Task Group with members from CMP's 4, 10, and 11 review requirements in 440.11 and 690.13 and consider if the intent is met by the requirements of 404.30, refer to that section in 440.11 and 690.13. If the requirements of 404.30 do not meet the intent of 440.11 and 690.13, develop revisions to 404.30 that meet the intent of these three requirements.

#### Related Item

- First Revision No. 8025

### Submitter Information Verification

**Submitter Full Name:** CC Notes  
**Organization:** NEC Correlating Committee  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Jul 30 14:33:10 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected  
**Resolution:** The second sentence will remain because there are requirements in the second sentence not found in 404.30. Section 404.30 is limited to disconnects that are in the closed position. Section 440.11 is for disconnects in both the open and closed positions.



## Correlating Committee Note No. 47-NFPA 70-2024 [ Section No. 440.11 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:54:10 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs that a Task Group with members from CMP's 4, 10, and 11 review requirements in 440.11 and 690.13 and consider if the intent is met by the requirements of 404.30, refer to that section in 440.11 and 690.13. If the requirements of 404.30 do not meet the intent of 440.11 and 690.13, develop revisions to 404.30 that meet the intent of these three requirements.

First Revision No. 8025-NFPA 70-2024 [Section No. 440.11]

### 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. 758-NFPA 70-2024 [ Section No. 440.11 ]

### 440.11 General.

Disconnecting means shall be capable of disconnecting air-conditioning and refrigerating equipment, including motor-compressors and controllers, from ~~the circuit~~ their ungrounded supply conductors. If the disconnecting means is readily accessible to unqualified persons, any enclosure door or hinged cover of a disconnecting means enclosure that exposes energized parts when open shall have its door or cover locked or require a tool to be opened.

### Statement of Problem and Substantiation for Public Comment

The committee response to PI 582 is nonsensical. My PI is to clarify that ONLY the ungrounded conductors need to be disconnected. As currently written, nearly every 120V equipment covered by this article is a violation because the disconnect does not open all the circuit conductors, it only opens the ungrounded conductors. My change was to recognize this fact and allow it, because that is obviously the intent of this section. The committee response points to a section that ALLOWS the grounded conductor to be disconnected, but 440.11 REQUIRES the grounded conductor to be disconnected. Is it really the intent of the committee that grounded conductor ALWAYS be disconnected? Because that is what is currently required. This section needs to change.

#### Related Item

- PI 582

### Submitter Information Verification

**Submitter Full Name:** Ryan Jackson

**Organization:** Self-employed

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Sun Aug 04 16:30:02 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8074-NFPA 70-2024](#)

**Statement:** Response for PC-1763: The first sentence of 440.11 is revised for clarity. The second sentence will remain because there are requirements in the second sentence not found in 404.30. Section 404.30 is limited to disconnects that are in the closed position. Section 440.11 is for disconnects in both the open and closed positions.

Response for PC-758: The wording ", from the circuit conductors." is removed from 440.11 since it is redundant to the Article 100 definition of disconnecting means.



## Public Comment No. 759-NFPA 70-2024 [ Section No. 440.12(A)(2) ]

### (2) Equivalent Horsepower.

To determine the equivalent horsepower in complying with the requirements of 430.109, the horsepower rating shall be selected from Table 430.248, Table 430.249, or Table 430.250 corresponding to the rated-load current or branch-circuit selection current, whichever is greater, and also the horsepower rating from Table 430.251(A), Table 430.251(B), or Table 430.251(C) ~~corresponding~~ corresponding to the locked-rotor current. In case the nameplate rated-load current or branch-circuit selection current and locked-rotor current do not correspond to the currents shown in Table 430.248, Table 430.249, Table 430.250, Table 430.251(A), Table 430.251(B), or Table 430.251(C), the horsepower rating corresponding to the next higher value shall be selected. In case different horsepower ratings are obtained when applying these tables, a horsepower rating at least equal to the larger of the values obtained shall be selected.

### Statement of Problem and Substantiation for Public Comment

Fixing what appears to be an error.

#### Related Item

- FR 8045

### Submitter Information Verification

**Submitter Full Name:** Ryan Jackson

**Organization:** Self-employed

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Sun Aug 04 16:35:43 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8076-NFPA 70-2024](#)

**Statement:** The second reference to Table 430.251(A) is corrected to Table 430.251(C).



## Public Comment No. 1352-NFPA 70-2024 [ Section No. 440.14 ]

### 440.14 Location.

Disconnecting means shall be located within sight from, and readily accessible from, the air-conditioning or refrigerating equipment. The disconnecting means shall be permitted to be installed on or within the air-conditioning or refrigerating equipment. Disconnecting means shall meet the working space requirements of 110.26(A).

The disconnecting means shall not be located on panels that are designed to allow access to the air-conditioning or refrigeration equipment or where it obscures the equipment nameplate(s).

*Exception No. 1: Where the disconnecting means provided in accordance with 430.102(A) is lockable open in accordance with 110.25 and the refrigerating or air-conditioning equipment is essential to an industrial process in a facility with written safety procedures, and where the conditions of maintenance and supervision ensure that only qualified persons service the equipment, a disconnecting means within sight from the equipment shall not be required.*

*Exception No. 2: Where an attachment plug and receptacle serve as the disconnecting means in accordance with 440.13, their location shall be accessible but shall not be required to be readily accessible.*

*Exception No.3: Residential non fused single phase 250 volt or less and 60 amperes shall be in site and accessible.*

Informational Note: See Article 430, Parts VII and IX for additional requirements.

### Statement of Problem and Substantiation for Public Comment

I have made changes per the Panel's recommendations on their statement.

The location for the disconnecting means does not need to be readily accessible only and not be readily accessible. The size of disconnecting means and limited need for operation does not need the space required for larger units. The incident energy on these residential units is not high and does not pose the dangers of larger equipment.

PI No. 1444-NFPA 70-2023 Section 440.14

#### Related Item

- PI 1444- NFPA 70-2023

### Submitter Information Verification

**Submitter Full Name:** George Tidden

**Organization:** IES Residential

**Affiliation:** CHP 11 IEC

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Wed Aug 21 09:58:36 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** SR-8079-NFPA 70-2024

**Statement:** Non-fusible disconnect switches rated 250 V single phase and 60 A (or less) are allowed to be located in sight from the equipment, as opposed to readily accessible and within sight. These switches do not require the same level of work for maintenance and operation as fusible switches and those with higher ratings.



## Public Comment No. 395-NFPA 70-2024 [ Section No. 440.15 ]

### 440.15 Split-System Disconnect Identification.

In other than one- and two-family dwellings, in addition to the requirements of 110.22(A), the disconnecting means located at the exterior unit of a split-system HVAC shall identify the location of all indoor units supplied by the disconnect.

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_48.pdf		

### Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 48 appeared in the First Draft Report on First Revision No. 8026.

The Correlating Committee directs that CMP 11 review FR 8026. The list of standard terms in the NEC Style includes "disconnecting means" (a noun that is defined in Article100), rather than "disconnect" (a verb). The Correlating Committee directs CMP 11 to review the two instances of "disconnect" being used as a noun.

#### Related Item

- First Revision No. 8026

### Submitter Information Verification

**Submitter Full Name:** CC Notes

**Organization:** NEC Correlating Committee

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Jul 30 14:35:01 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR

**Resolution:** [SR-8080-NFPA 70-2024](#)

**Statement:** The title is revised to more accurately reflect the requirements. The requirements are rewritten for clarity.



## Correlating Committee Note No. 48-NFPA 70-2024 [ Section No. 440.15 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:55:49 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs that CMP 11 review FR 8026. The list of standard terms in the NEC Style includes “disconnecting means” (a noun that is defined in Article 100), rather than “disconnect” (a verb). The Correlating Committee directs CMP 11 to review the two instances of “disconnect” being used as a noun.

First Revision No. 8026-NFPA 70-2024 [New Section after 440.14]

### 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. 1460-NFPA 70-2024 [ Section No. 460.3 ]**

**460.3** Reconditioned Equipment.

Reconditioned capacitors shall not be ~~installed~~ permitted.

**Statement of Problem and Substantiation for Public Comment**

This public comment is made to address an issue with the first draft language changes. The proposed language in this first revision allows electrical equipment to be reconditioned in place as the language pertains to the installation process and not to when any equipment is reconditioned in place. With the existing language in this first revision, the only time reconditioned equipment would not be permitted is if it is being installed. The Code does apply to existing equipment when additions or modifications are being made. The proposed language change from "installed" to "permitted" is more inclusive.

**Related Item**

- FR 8136

**Submitter Information Verification**

**Submitter Full Name:** Thomas Domitrovich

**Organization:** Eaton Corporation

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Fri Aug 23 09:28:54 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected

**Resolution:** The current text provides the necessary guidance for on-site reconditioning, and the proposed changes would not improve clarity.



## Public Comment No. 405-NFPA 70-2024 [ Sections 460.8, 460.9, 460.10 ]

### Sections 460.8, 460.9, 460.10

#### 460.8 Conductors — Ampacity.

The ampacity of capacitor circuit conductors shall not be less than 135 percent of the rated current of the capacitor. The ampacity of conductors that connect a capacitor to the terminals of a motor or to motor circuit conductors shall not be less than one-third the ampacity of the motor circuit conductors and in no case less than 135 percent of the rated current of the capacitor.

#### 460.9 Overcurrent Protection.

An overcurrent device shall be provided in each ungrounded conductor for each capacitor bank. The rating or setting of the overcurrent device shall be as low as practicable.

*Exception: A separate overcurrent device shall not be required for a capacitor connected on the load side of a motor overload protective device.*

#### 460.10 Disconnecting Means.

A disconnecting means shall be provided in each ungrounded conductor for each capacitor bank and shall meet the following requirements:

- (1) The disconnecting means shall open all ungrounded conductors simultaneously.
- (2) The disconnecting means shall be permitted to disconnect the capacitor from the line as a regular operating procedure.
- (3) The rating of the disconnecting means shall not be less than 135 percent of the rated current of the capacitor.

*Exception: A separate disconnecting means shall not be required where a capacitor is connected on the load side of a motor controller.*

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_49.pdf		

### Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 49 appeared in the First Draft Report on First Revision No. 8144.

The Correlating Committee directs that CMP 11 review FR 8144 and clarify in 460.9 "low as practicable" as the phrase is vague and unenforceable. The objective criteria for device settings should be identified. Refer to the NEC Style Manual Section 3.5.4.

#### Related Item

- First Revision No. 8144

### Submitter Information Verification

**Submitter Full Name:** CC Notes

**Organization:** NEC Correlating Committee

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Jul 30 15:26:36 EDT 2024

**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected

**Resolution:** The requirement is designed to allow for manufacturing tolerances of the capacitors, which can cause variation in the inrush and normal running current drawn by the capacitors.



## Correlating Committee Note No. 49-NFPA 70-2024 [ Sections 460.8, 460.9, 460.10 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:57:36 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs that CMP 11 review FR 8144 and clarify in 460.9 “low as practicable” as the phrase is vague and unenforceable. The objective criteria for device settings should be identified. Refer to the NEC Style Manual Section 3.5.4.

First Revision No. 8144-NFPA 70-2024 [Section No. 460.8]

### 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. 1461-NFPA 70-2024 [ Section No. 470.3 ]**

**470.3** Reconditioned Equipment.

(A) Permitted- ~~to be installed~~ .

Reconditioned reactors shall be permitted- ~~to be installed~~ .

(B) Not Permitted- ~~to be installed~~ .

Reconditioned resistors shall not be ~~installed~~ permitted .

**Statement of Problem and Substantiation for Public Comment**

This public comment is made to address an issue with the first draft language changes. The proposed language in this first revision allows electrical equipment to be reconditioned in place as the language pertains to the installation process and not to when any equipment is reconditioned in place. With the existing language in this first revision, the only time reconditioned equipment would not be permitted is if it is being installed. The Code does apply to existing equipment when additions or modifications are being made. The proposed language change from "installed" to "permitted" is more inclusive.

**Related Item**

- FR 8148

**Submitter Information Verification**

**Submitter Full Name:** Thomas Domitrovich

**Organization:** Eaton Corporation

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Fri Aug 23 09:30:54 EDT 2024

**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected

**Resolution:** The current text provides the necessary guidance for on-site reconditioning, and the proposed changes would not improve clarity.



Public Comment No. 374-NFPA 70-2024 [ Section No. A.1 ]



**Table A.1(a) Product Safety Standards for Conductors and Equipment That Have an Associated Listing Requirement**

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
110	UL 10C-2016	Positive Pressure Fire Tests of Door Assemblies
	UL 305-2012	Panic Hardware
	UL 486D-2015	Sealed Wire Connector Systems
	UL 2043-2013	Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces
	UL 62275-2021	Cable Management Systems — Cable Ties for Electrical Installations
130	UL 60730-1	Automatic Electrical Controls
210	UL 498-2017	Attachment Plugs and Receptacles
	UL 935-2001	Fluorescent-Lamp Ballasts
	UL 943-2016	Ground Fault Circuit Interrupters
	UL 1029-1994	High-Intensity-Discharge Lamp Ballasts
	UL 1699-2017	Arc-Fault Circuit-Interrupters
	UL 1699A-2010	Outlet Branch Circuit Outlet Branch Circuit Arc-Fault Circuit-Interrupters
225	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel
	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
230	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 67-2018	Panelboards
	UL 98-2016	Enclosed and Dead-Front Switches
	UL 218-2015	Fire Pump Controllers
	UL 231-2016	Power Outlets
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 414-2016	Meter Sockets
	UL 486A-486B-2016	Wire Connectors
	UL 486C-2018	Splicing Wire Connectors
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 508-2018	Industrial Control Equipment
	UL 508A-2018	Industrial Control Panels
	UL 514B-2012	Conduit, Tubing and Cable Fittings
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 845-2021	Motor Control Centers
	UL 857-2009	Busways
	UL 869A-2006	Reference Standard for Service Equipment
	UL 891-2019	Switchboards
	UL 977-2012	Fused Power-Circuit Devices
	UL 1008-2014	Transfer Switch Equipment
	UL 1008M-2022	Meter-Mounted Transfer Switches
	UL 1008S-2012	Solid-State Transfer Switches
	UL 1053-2015	Ground-Fault Sensing and Relaying Equipment
	UL 1062-1997	Unit Substations
	UL 1066-2022	Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel
	UL 1429-2000	Pullout Switches
	UL 1449-2021	Surge Protective Devices
	UL 1558-2016	Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear
	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit
	UL 1740-2018	Robots and Robotic Equipment
	UL 1953-2020	Power Distribution Blocks
	UL 2011-2022	Machinery
	UL 2200-2012	Stationary Engine Generator Assemblies
	UL 2416-2015	Audio/Video, Information and Communication Technology Equipment Cabinet, Enclosure and Rack Systems
	UL 2446-2004	Unitary Boiler Room Systems
	UL 2565-2013	Industrial Metalworking and Woodworking Machine Tools
	UL 2735-2011	Electric Utility Meters
	UL 2745-2014	Meter Socket Adapters for Communications Equipment
	UL 2876-2022	Remote Racking Devices for Switchgear and Controlgear
	UL 4248-1-2022	Fuseholders — Part 1: General Requirements
	UL 60947-1-2012	Low-Voltage Switchgear and Controlgear — Part 1: General Rules
	UL 61800-5-1-2022	Adjustable Speed Electrical Power Drive Systems — Part 5-1: Safety Requirements — Electrical, Thermal and Energy

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>	
240	UL 248-1-2000	Low-Voltage Fuses — Part 1: General Requirements	
	UL 248-2-2000	Low-Voltage Fuses — Part 2: Class C Fuses	
	UL 248-3-2000	Low-Voltage Fuses — Part 2: Class CA and CB Fuses	
	UL 248-4-2000	Low-Voltage Fuses — Part 4: Class CC Fuses	
	UL 248-5-2000	Low-Voltage Fuses — Part 5: Class G Fuses	
	UL 248-6-2000	Low-Voltage Fuses — Part 6: Class H Non-Renewable Fuses	
	UL 248-8-2011	Low-Voltage Fuses — Part 8: Class J Fuses	
	UL 248-9-2000	Low-Voltage Fuses — Part 9: Class K Fuses	
	UL 248-10-2011	Low-Voltage Fuses — Part 10: Class L Fuses	
	UL 248-11-2011	Low-Voltage Fuses — Part 11: Plug Fuses	
	UL 248-12-2011	Low-Voltage Fuses — Part 12: Class R Fuses	
	UL 248-15-2018	Low-Voltage Fuses — Part 15: Class T Fuses	
	UL 248-17-2018	Low-Voltage Fuses — Part 17: Class CF Fuses	
	UL 248-18-2022	Low-Voltage Fuses — Part 18: Class CD Fuses	
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures	
	UL 489I-2022	Solid State Molded-Case Circuit Breakers	
	UL 943-2016	Ground-Fault Circuit-Interrupters	
	UL 1053-2015	Ground-Fault Sensing and Relaying Equipment	
	UL 1066-2022	Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures	
	242	UL 4248-1-2022	Fuseholders — Part 1: General Requirements
UL 1449-2021		Surge Protective Devices	
250	UL 1-2005	Flexible Metal Conduit	
	UL 4-2004	Armored Cable	
	UL 5-2016	Surface Metal Raceways and Fittings	
	UL 6-2022	Electrical Rigid Metal Conduit — Steel	
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel	
	UL 153-2014	Portable Electric Luminaires	
	UL 360-2013	Liquid-Tight Flexible Metal Conduit	
	UL 467-2022	Grounding and Bonding Equipment	
	UL 486A-486B-2018	Wire Connectors	
	UL 486C-2018	Splicing Wire Connectors	
	UL 486D-2015	Sealed Wire Connector Systems	
	UL 498-2017	Attachment Plugs and Receptacles	
	UL 504-2022	Mineral-Insulated, Metal-Sheathed Cable	
	UL 514A-2013	Metallic Outlet Boxes	
	UL 514B-2012	Conduit, Tubing, and Cable Fittings	
	UL 797-2007	Electrical Metallic Tubing — Steel	
	UL 797A-2014	Electrical Metallic Tubing — Aluminum	
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel	
	UL 1569-2018	Metal-Clad Cables	
	UL 1652-2006	Flexible Metallic Tubing	
	300	UL 4-2004	Armored Cable
		UL 44-2018	Thermoset-Insulated Wires and Cables
		UL 83-2017	Thermoplastic-Insulated Wires and Cables
		UL 83A-2016	Fluoropolymer Insulated Wire
		UL 263-2011	Fire Tests of Building Construction and Materials
		UL 504-2022	Mineral-Insulated, Metal-Sheathed Cable
		UL 746C-2018	Polymeric Materials — Use in Electrical Equipment Evaluations
UL 1569-2018		Metal-Clad Cable	
UL 1581-2001		Reference Standard for Electrical Wires, Cables, and Flexible Cords	
UL 2239-2015		Hardware for Support of Conduit, Tubing and Cable	
UL 2556-2021		Wire and Cable Test Methods	
UL 62275-2021		Cable Management Systems — Cable Ties for Electrical Installations	
310		UL 44-2018	Thermoset-Insulated Wires and Cables
		UL 83-2017	Thermoplastic-Insulated Wires and Cables
		UL 83A-2016	Fluoropolymer Insulated Wire
		UL 83B	Switchboard and Switchgear Wires and Cables
		UL 224-2021	Extruded Insulating Tubing
	UL 493-2018	Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables	
	UL 854-2020	Service-Entrance Cables	
	UL 1063-2017	Machine-Tool Wires and Cables	
	UL 1441-2021	Coated Electrical Sleeving	
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	312	UL 50-2015	Enclosures for Electrical Equipment
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UL 514C-2014		Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers	

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	UL 2808-2020	Energy Monitoring Equipment
	UL 61010-1-2012	Electrical Equipment for Measurement, Control, and Laboratory Use — Part 1: General Requirements
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	UL 1953-2020	Power Distribution Blocks
315	ANSI C119.4	Electric Connectors — Connectors for Use between Aluminum-to-Aluminum and Aluminum-to-Copper Conductors Designed for Normal Operation at or Below 93°C and Copper-to-Copper Conductors Designed for Normal Operation at or Below 100°C
	IEEE 48	IEEE Standard for Test Procedures and Requirements for Alternating-Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5 kV through 765 kV or Extruded Insulation Rated 2.5 kV through 500 kV
	IEEE 386	IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Rated 2.5 kV through 35 kV
	IEEE 404	IEEE Standard for Extruded and Laminated Dielectric Shielded Cable Joints Rated 2.5 kV to 500 kV
	UL 4-2004	Armored Cable
	UL 504-2022	Mineral-Insulated, Metal-Sheathed Cable
	UL 1072-2006	Medium Voltage Power Cables
	UL 1569-2018	Metal-Clad Cable
320	UL 4-2004	Armored Cable
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	UL 83-2017	Thermoplastic-Insulated Wires and Cables
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	UL 1063-2017	Machine-Tool Wires and Cables
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324	UL 486A-486B-2018	Wire Connectors
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	UL 2225-2013	Cables and Cable-Fittings For Use In Hazardous (Classified) Locations
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	UL 514B-2012	Conduit, Tubing and Cable Fittings
334	UL 719-2015	Nonmetallic-Sheathed Cables
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	UL 62275-2021	Cable Management Systems — Cable Ties for Electrical Installations
335	UL 2250-2017	Instrumentation Tray Cable
336	UL 514B-2012	Conduit, Tubing, and Cable Fittings
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337	UL 1309A-2020	Cable for Use in Mobile Installations
338	UL 514B-2012	Conduit, Tubing, and Cable Fittings
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340	UL 514B-2012	Conduit, Tubing, and Cable Fittings
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	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel

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	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 514B-2012	Conduit, Tubing, and Cable Fittings
348	UL 1-2005	Flexible Metal Conduit
	UL 62275-2021	Cable Management Systems — Cable Ties for Electrical Installations
350	UL 360-2013	Liquid-Tight Flexible Steel Conduit
	UL 514B-2012	Conduit, Tubing, and Cable Fittings
	UL 62275-2021	Cable Management Systems — Cable Ties for Electrical Installations
352	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
353	UL 651A-2011	Schedule 40 and 80 High Density Polyethylene (HDPE) Conduit
354	UL 1990-2013	Nonmetallic Underground HDPE Conduit with Conductors
355	UL 2420-2009	Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
	UL 2515A-2011	Supplemental Requirements for Extra-Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
356	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit
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358	UL 514B-2012	Conduit, Tubing, and Cable Fittings
	UL 797-2007	Electrical Metallic Tubing — Steel
	UL 797A-2014	Electrical Metallic Tubing — Aluminum and Stainless Steel
360	UL 514B-2012	Conduit, Tubing, and Cable Fittings
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362	UL 1653-2019	Electrical Nonmetallic Tubing
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368	UL 509-2015	Bus Drop Cable
370	ANSI/CSA C22.2 No. 273	Cablebus
371	UL 1386-2022	Flexible Bus Systems
	UL 1387-2022	Flexible Insulated Bus
374	UL 209-2011	Cellular Metal Floor Raceways and Fittings
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
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376	UL 870-2016	Wireways, Auxiliary Gutters, and Associated Fittings
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378	UL 870-2016	Wireways, Auxiliary Gutters, and Associated Fittings
382	UL 5A-2015	Nonmetallic Surface Raceways and Fittings
	UL183-2009	Manufactured Wiring Systems
	UL 467-2022	Grounding and Bonding Equipment
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	UL 498D-2020	Attachment Plugs, Cord Connectors and Receptacles with Arcuate (Locking Type) Contacts
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	UL 498F-2020	Plugs, Socket-Outlets and Couplers with Arcuate (Locking Type) Contacts
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	UL 514D-2013	Cover Plates for Flush-Mounted Wiring Devices
	UL 746C-2018	Polymeric Materials — Use in Electrical Equipment Evaluations
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 991-2004	Tests for Safety-Related Controls Employing Solid-State Devices
	UL 1077-2015	Supplementary Protectors for Use in Electrical Equipment
	UL 1699-2017	Arc-Fault Circuit-Interrupters
	UL 1998-2013	Software in Programmable Components
384	UL 5B-2004	Strut-Type Channel Raceways and Fittings
386	UL 5-2016	Surface Metal Raceways and Fittings
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392	UL 62275-2021	Cable Management Systems — Cable Ties for Electrical Installations
393	UL 13-2015	Power-Limited Circuit Cables
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	UL 514C-2014	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
	UL 1310-2018	Class 2 Power Units
	UL 2043-2013	Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces
	UL 2577-2013	Suspended Ceiling Power Grid Systems and Equipment
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
396	UL 1072-2006	Medium-Voltage Power Cables
	ANSI/NEMA WD 6– 2016	Wiring Devices — Dimensional Specifications
404	UL 20-2018	General-Use Snap Switches
	UL 98-2016	Enclosed and Dead-Front Switches

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	UL 98A-2014	Open-Type Switches
	UL 363-2011	Knife Switches
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	UL 773-2016	Plug-In Locking Type Photocontrols for Use with Area Lighting
	UL 773A-2016	Nonindustrial Photoelectric Switches for Lighting Control
	UL 917-2006	Clock-Operated Switches
	UL 977-2012	Fused Power-Circuit Devices
	UL 1066-2022	Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
	UL 1472-2015	Solid-State Dimming Controls
	UL 1429-2000	Pullout Switches
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	UL 60730-2-7-2014	Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Timers and Time Switches
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	UL 498M-2020	Marine Shore Power Inlets
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	UL 1286-2022	Office Furnishings Systems
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410	ANSI/CSA-C22.2 No. 184.2	Solid-State Controls for Lighting Systems (SSCLS)
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	UL 970-2020	Retail Fixtures and Merchandising Displays
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	UL 1574-2004	Track Lighting Systems
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	UL 1598C-2014	Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits
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422	ANSI/CSA-C22.2 No. 339	Hand-held motor-operated electric tools — Safety — Particular requirements for chain beam saws
	UL 22-2008	Amusement and Gaming Machines
	UL 73-2011	Motor-Operated Appliances
	UL 82-2017	Electric Gardening Appliances
	UL 122-2007	Photographic Equipment
	UL 141-2011	Garment Finishing Appliances
	UL 174-2004	Household Electric Storage Tank Water Heaters
	UL 197-2010	Commercial Electric Cooking Appliances
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	UL 399-2017	Drinking Water Coolers
	UL 430-2015	Waste Disposers
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UL 60745-2-4-2004		Hand-Held Motor-Operated Electric Tools — Safety — Part 2-4: Particular Requirements for Sanders and Polishers Other Than Disk Type
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UL 60745-2-22-2012		Hand-Held Motor-Operated electric Tools — Safety — Part 2-22: Particular Requirements for Cut-Off Machines
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	UL 62841-4-1-2020	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 4-1: Particular Requirements for Chain Saws
	UL 62841-4-2-2019	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 4-2: Particular Requirements for Hedge Trimmers
	UL 62841-4-1000-2020	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 4-1000: Particular Requirements For Utility Machines
424	UL 499-2014	Electric Heating Appliances
	UL 1042-2009	Electric Baseboard Heating Equipment
	UL 1673-2010	Electric Space Heating Cables
	UL 1693-2010	Electric Radiant Heating Panels and Heating Panel Sets
	UL 1995-2015	Heating and Cooling Equipment
	UL 1996-2009	Electric Duct Heaters
	UL 2021-2015	Fixed and Location-Dedicated Electric Room Heaters
	UL 2683-2020	Electric Heating Products for Floor and Ceiling Installation
425	UL 508-2018	Industrial Control Equipment
	UL 2021-2015	Fixed and Location-Dedicated Electric Room Heaters
426	IEEE 515	Testing, Design, Installation and Maintenance of Electrical Resistance Trace Heating for Industrial Applications
	UL 1588-2002	Roof and Gutter De-Icing Cable Units
	UL 2049-2006	Residential Pipe Heating Cable
427	IEEE 515	Testing, Design, Installation and Maintenance of Electrical Resistance Trace Heating for Industrial Applications
	UL 515-2015	Electrical Resistance Heat Tracing for Commercial Applications
	UL 2049-2006	Residential Pipe Heating Cable
430	UL 4-2004	Armored Cable
	UL 98-2016	Enclosed and Dead-Front Switches
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 508-2018	Industrial Control Equipment
	UL 705-2017	Power Ventilators
	UL 745-1-2007	Portable Electric Tools
	UL 845-2021	Motor Control Centers
	UL 987-2011	Stationary and Fixed Electric Tools
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	UL 1004-2-2014	Impedance Protected Motors
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	UL 1004-8-2013	Inverter Duty Motors
	UL 1004-9-2016	Form Wound and Medium Voltage Rotating Electrical Machines
	UL 1066-2022	Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
	UL 1569-2018	Metal Clad Cables
	UL 1812-2013	Ducted Heat Recovery Ventilators
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	UL 2565-2013	Industrial Metalworking and Woodworking Machine Tools
	UL 60034-1-2018	Rotating Electrical Machines — Part 1: Rating and Performance
	UL 60335-2-40-2019	Household and Similar Electrical Appliances — Part 2: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers
	UL 60730-2-22-2017	Automatic Electrical Controls — Part 2: Particular Requirements for Thermal Motor Protectors
	UL 60745-1-2007	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 1: General Requirements
	UL 60745-2-1-2004	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-1: Particular Requirements For Hand-Held Drills and Impact Drills
	UL 60745-2-2-2004	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-2: Particular Requirements For Screwdrivers And Impact Wrenches
	UL 60745-2-3-2007	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-3: Particular Requirements For Hand-Held Grinders, Polishers, and Disk-Type Sanders
	UL 60745-2-4-2004	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-4: Particular Requirements For Hand-Held Sanders And Polishers Other Than Disc Type
	UL 60745-2-5-2012	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-5: Particular Requirements For Hand-Held Circular Saws
	UL 60745-2-8-2004	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-8: Particular Requirements For Hand-Held Shears and Nibblers

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	UL 60947-4-1-2022	Low-Voltage Switchgear and Controlgear — Part 4-1: Contactors and Motor-Starters — Electromechanical Contactors and Motor-Starters
	UL 60947-4-2-2022	Low-Voltage Switchgear and Controlgear — Part 4-2: Contactors and Motor-Starters — AC Semiconductor Motor Controllers and Starters
	UL 60947-5-1-2022	Low-Voltage Switchgear and Controlgear — Part 5-1: Control Circuit Devices and Switching Elements — Electromechanical Control Circuit Devices
	UL 60947-5-2-2022	Low-Voltage Switchgear and Controlgear — Part 5-2: Control Circuit Devices and Switching Elements — Proximity Switches
	UL 61800-5-1-2012	Adjustable Speed Electrical Power Drive Systems — Part 5-1: Safety Requirements — Electrical, Thermal and Energy
	UL 62841-2-9-2016	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-9: Particular Requirements For Hand-Held Tappers And Threaders
	UL 62841-2-10-2017	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-10: Particular Requirements For Hand-Held Mixers
	UL 62841-2-11-2017	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-11: Particular Requirements For Hand-Held Reciprocating Saws
	UL 62841-2-14-2016	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-14: Particular Requirements For Hand-Held Planers
	UL 62841-2-17-2018	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-17: Particular Requirements For Hand-Held Routers
	UL 62841-2-21-2018	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 2-21: Particular Requirements For Hand-Held Drain Cleaners
	UL 62841-3-1-2016	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-1: Particular Requirements For Transportable Table Saws
	UL 62841-3-4-2016	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-4: Particular Requirements for Transportable Bench Grinders
	UL 62841-3-6-2016	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-6: Particular Requirements For Transportable Diamond Drills with Liquid System
	UL 62841-3-9-2021	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-9: Particular Requirements For Transportable Mitre Saws
	UL 62841-3-10-2016	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-10: Particular requirements for Transportable Cut-Off Machines
	UL 62841-3-12-2019	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-12: Particular requirements for Transportable Threading Machines
	UL 62841-3-13-2018	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-13: Particular Requirements For Transportable Drills
	UL 62841-3-14-2019	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-14: Particular requirements for Transportable Drain Cleaners
	UL 62841-3-1000-2019	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 3-1000: Particular Requirements for Transportable Laser Engravers
	UL 62841-4-1-2020	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 4-1: Particular Requirements for Chain Saws
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	UL 62841-4-1000-2020	Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery — Safety — Part 4-1000: Particular Requirements For Utility Machines
440	UL 98-2016	Enclosed and Dead-Front Switches
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	UL 484-2014	Room Air Conditioners
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	UL 508-2018	Industrial Control Equipment
	UL 541-2016	Refrigerated Vending Machines
	UL 563-2009	Ice Makers
	UL 1429-2000	Pullout Switches
	UL 1995-2015	Heating and Cooling Equipment
	UL 60335-2-24-2017	Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers
	UL 60335-2-40-2019	Household and Similar Electrical Appliances, Part 2: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers
	UL 60335-2-89-2017	Household and Similar Electrical Appliances — Safety — Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor
	UL 60947-4-1-2022	Low-Voltage Switchgear and Controlgear — Part 4-1: Contactors and Motor-Starters — Electromechanical Contactors and Motor-Starters
	UL 60947-4-2-2022	Low-Voltage Switchgear and Controlgear — Part 4-2: Contactors and Motor-Starters — AC Semiconductor Motor Controllers and Starters
	UL 61800-5-1-2012	Adjustable Speed Electrical Power Drive Systems — Part 5-2: Safety Requirements — Functional
445	UL 508-2018	Industrial Control Equipment
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	UL 1004-4-2018	Electric Generators
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450	UL 10C-2016	Positive Pressure Fire Tests of Door Assemblies

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480	UL 10C-2016	Positive Pressure Fire Tests of Door Assemblies
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	UL 1973-2022	Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications
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	UL 2054-2021	Household and Commercial Batteries
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490	UL 347-2020	Medium-Voltage AC Contactors, Controllers, and Control Centers
	UL 347A-2021	Medium Voltage Power Conversion Equipment
	UL 347C-2014	Medium Voltage Solid State Resistive Load Controllers, Up to 15kV
	UL 1008A-2017	Transfer Switch Equipment, Over 1000 Volts
500	FM 121303	Guide for Use of Detectors for Flammable Gases
	IEEE 844.1	Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — General, Testing, Marking, and Documentation Requirements
	IEEE 1349	Guide for the Application of Electric Machines in Zone 2 and Class I, Division 2 Hazardous (Classified) Locations
	NFPA 33-2024	Standard for Spray Application Using Flammable or Combustible Materials
	NFPA 34-2024	Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids
	NFPA 496-2024	Standard for Purged and Pressurized Enclosures for Electrical Equipment
	UL 674-2022	Electric Motors and Generators for Use in Hazardous (Classified) Locations
	UL 698A-2018	Industrial Control Panels Relating to Hazardous (Classified) Locations
	UL 783-2003	Electric Flashlights and Lanterns for Use in Hazardous (Classified) Locations
	UL 823-2006	Electric Heaters For Use in Hazardous (Classified) Locations
	UL 844-2012	Electric Heaters For Use in Hazardous (Classified) Locations
	UL 913-1997	Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations
	UL 1203-2013	Explosionproof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations
	UL 1389-2019	Plant Oil Extraction Equipment for Installation and Use in Ordinary (Unclassified) Locations and Hazardous (Classified) Locations
	UL 1836-2022	Electric Motors and Generators for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2 and Zone 22 Hazardous (Classified) Locations
	UL 2225-2013	Cable and Cable Fittings for Use in Hazardous (Classified) Locations
	UL 60079-28-2017	Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation.
	UL 60079-29-1-2019	Explosive Atmospheres — Part 29-1: Gas Detectors — Performance Requirements of Detectors for Flammable Gases
	UL 60079-29-4-2018	Explosive Atmospheres — Part 29-4: Gas Detectors — Performance Requirements of Open Path Detectors for Flammable Gases
	UL 60079-30-1-2017	Explosive Atmospheres — Electrical Resistance Trace Heating — General and Testing Requirements
	UL 60079-33-2021	Explosive Atmospheres — Part 33: Equipment Protection by Special Protection "s"
	UL 121201-2017	Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
	UL 121303-2020	Guide for Use of Detectors for Flammable Gases
	UL 122001-2014	General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations
	UL 122701-2022	Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids
501	IEEE 844.1	Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — General, Testing, Marking, and Documentation Requirements
	IEEE 1349	Guide for the Application of Electric Machines in Zone 2 and Class I, Division 2 Hazardous (Classified) Locations
	NFPA 496-2024	Standard for Purged and Pressurized Enclosures for Electrical Equipment
	UL 674-2022	Electric Motors and Generators for Use in Hazardous (Classified) Locations
	UL 783-2003	Electric Flashlights and Lanterns for Use in Hazardous (Classified) Locations
	UL 823-2006	Electric Heaters For Use in Hazardous (Classified) Locations
	UL 844-2012	Luminaires for Use in Hazardous (Classified) Locations
	UL 1072-2006	Medium-Voltage Power Cables
	UL 1203-2013	Explosionproof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations
	UL 1277-2018	Electrical Power and Control Tray Cables with Optional Optical-Fiber Members
	UL 1309A-2020	Cable for Use in Mobile Applications
	UL 1836-2022	Electric Motors and Generators for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2 and Zone 22 Hazardous (Classified) Locations
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	UL 60079-30-1-2017	Explosive Atmospheres — Part 30-1: Electrical Resistance Trace Heating — General and Testing Requirements

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502	UL 122701-2022	Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids
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	NFPA 496-2024	Standard for Purged and Pressurized Enclosures for Electrical Equipment
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	UL 1203-2013	Explosionproof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations
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	UL 1836-2022	Outline of Investigation for Electric Motors and Generators for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2 and Zone 22 Hazardous (Classified) Locations
	UL 2225-2013	Cable and Cable-Fittings for Use in Hazardous (Classified) Locations
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	UL 121201-2017	Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
503	IEEE 844.1	Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — General, Testing, Marking, and Documentation Requirements
	UL 823-2006	Electric Heaters For Use in Hazardous (Classified) Locations
	UL 844-2012	Luminaires for Use in Hazardous (Classified) Locations
	UL 1836-2022	Electric Motors and Generators for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2 and Zone 22 Hazardous (Classified) Locations
	UL 60079-30-1-2017	Explosive Atmospheres — Electrical Resistance Trace Heating — General and Testing Requirements
	UL 121201-2017	Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
504	UL 698A-2018	Industrial Control Panels Relating to Hazardous (Classified) Locations
	UL 913-1997	Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations
505	UL 120202-2014	Recommendations for the Preparation, Content, and Organization of Intrinsic Safety Control Drawings
	FM 121303	Guide for Use of Detectors for Flammable Gases
	IEEE 844.1	Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — General, Testing, Marking, and Documentation Requirements
	IEEE 1349	Guide for the Application of Electric Machines in Zone 2 and Class I, Division 2 Hazardous (Classified) Locations
	UL 1309A-2020	Cable for Mobile Installations
	UL 2225-2013	Cable and Cable-Fittings for Use in Hazardous (Classified) Locations
	UL 60079-0-2013	Explosive Atmospheres — Part 0: Equipment — General Requirements
	UL 60079-1-2015	Explosive Atmospheres — Part 1: Equipment Protection by Flameproof Enclosures “d”
	UL 60079-2-2017	Explosive Atmospheres — Part 2: Equipment protection by pressurized enclosure “p”
	UL 60079-5-2016	Explosive Gas Atmospheres — Part 5: Type of Protection — Powder Filling “q”
	UL 60079-6-2016	Explosive Atmospheres — Part 6: Equipment Protection by Liquid Immersion “o”
	UL 60079-7-2008	Explosive Atmospheres — Part 7: Equipment Protection by Increased Safety “e”
	UL 60079-10-1	Explosive Atmospheres — Part 10-1: Classification of Areas — Explosive Gas Atmospheres
	UL 60079-11-2013	Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety “i”
	UL 60079-13-2022	Explosive Atmospheres — Part 13: Equipment Protection by Pressurized Room “p” and Artificially Ventilated Room “v”
	UL 60079-15-2013	Explosive Atmospheres — Part 15: Equipment Protection by Type of Protection “n”
	UL 60079-18-2015	Explosive Atmospheres — Part 18: Equipment Protection by Encapsulation “m”
	UL 60079-25-2011	Explosive Atmospheres — Part 25: Intrinsically Safe Electrical Systems
	UL 60079-26-2017	Explosive Atmospheres — Part 26: Equipment with Equipment Protection Level (EPL) Ga
	UL 60079-28-2017	Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation
	UL 60079-29-1-2019	Explosive Atmospheres — Part 29-1: Gas Detectors — Performance Requirements of Detectors for Flammable Gases
	UL 60079-29-4-2018	Explosive Atmospheres — Part 29-4: Gas Detectors — Performance Requirements of Open Path Detectors for Flammable Gases
	UL 60079-30-1-2017	Explosive Atmospheres — Part 30-1: Electrical Resistance Trace Heating — General and Testing Requirements
	UL 60079-33-2021	Explosive Atmospheres — Part 33: Equipment Protection by Special Protection “s”
	UL 80079-36-2021	Explosive Atmospheres — Part 36: Non-Electrical Equipment for Explosive Atmospheres — Basic Method and Requirements
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	UL 121303-2020	Guide for Use of Detectors for Flammable Gases
	UL 122701-2022	Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids
506	IEEE 844.1	Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — General, Testing, Marking, and Documentation Requirements
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	UL 60079-11-2013	Explosive Atmospheres — Part 11: Equipment Protection by Intrinsic Safety "i"
	UL 60079-18-2015	Explosive Atmospheres — Part 18: Equipment Protection by Encapsulation "m"
	UL 60079-25-2011	Explosive Atmospheres — Part 25: Intrinsically Safe Electrical Systems
	UL 60079-28-2017	Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation
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	UL 60079-31-2015	Explosive Atmospheres — Part 31: Equipment Dust Ignition Protection by Enclosure "t"
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	UL 62784	Vacuum Cleaners and Dust Extractors Providing Equipment Protection Level Dc for the Collection of Combustible Dusts — Particular Requirements
	UL 80079-36-2021	Explosive Atmospheres — Part 36: Non-Electrical Equipment for Explosive Atmospheres — Basic Method and Requirements
	UL 80079-37-2021	Explosive Atmospheres — Part 37: Non-Electrical Equipment for Explosive Atmospheres — Non Electrical Type of Protection Constructional Safety "c", Control of Ignition Source "b", Liquid Immersion "k"
512	UL 1389-2019	Plant Oil Extraction Equipment for Installation and Use in Ordinary (Unclassified) Locations and Hazardous (Classified) Locations
516	NFPA 33-2024	Standard for Spray Application Using Flammable or Combustible Materials
	NFPA 34-2024	Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids
	UL 844-2012	Luminaires for Use in Hazardous (Classified) Locations
517	AAMI ES 60601-1	Medical electrical equipment — Part 1: General requirements for basic safety and essential performance
	UL 5-2016	Surface Metal Raceways and Fittings
	UL 5A-2015	Nonmetallic Surface Raceways and Fittings
	UL 467-2022	Grounding and Bonding Equipment
	UL 498-2017	Attachment Plugs and Receptacles
	UL 498D-2020	Attachment Plugs, Cord Connectors and Receptacles with Arcuate (Locking Type) Contacts
	UL 498E-2020	Attachment Plugs, Cord Connectors and Receptacles — Enclosure Types for Environmental Protection
	UL 498F-2020	Plugs, Socket-Outlets and Couplers with Arcuate (Locking Type) Contacts
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 1022-2012	Line Isolation Monitors
	UL 1047-2015	Isolated Power Systems Equipment
	UL 1286-2022	Office Furnishing Systems
	UL 2930-2020	Cord-and-Plug-connected Health Care Facility Outlet Assemblies
	UL 60601-1-2003	Medical Electrical Equipment — Part 1: General Requirements for Safety
	UL 122701-2022	Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids
518	UL 498-2017	Attachment Plugs and Receptacles
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	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 943C-2012	Special Purpose Ground-Fault Circuit-Interrupters
	UL 2305-2001	Exhibition Display Units, Fabrication and Installation
520	UL 62-2018	Flexible Cords and Cables
	UL 334-2022	Theater Lighting Distribution and Control Equipment
	UL 489-2016	Attachment Plugs and Receptacles
	UL 1573-2003	Stage and Studio Luminaires and Connector Strips
	UL 1640-2016	Portable Power-Distribution Equipment
	UL 1691-2021	Single Pole Locking-Type Separable Connectors
522	UL 13-2015	Power Limited Circuit Cables
	UL 1063-2017	Machine-Tool Wires and Cables
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525	UL 62-2018	Flexible Cords and Cables
	UL 817-2015	Cord Sets and Power-Supply Cords
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 943C-2012	Special Purpose Ground-Fault Circuit-Interrupters
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530	UL 62-2-18	Flexible Cords and Cables
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	UL 1573-2003	Stage and Studio Luminaires and Connector Strips
	UL 1680-2003	Stage and Lighting Cables
	UL 1691-2021	Single Pole Locking-Type Separable Connectors
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	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
540	UL 67-2018	Panelboards
	UL 943-2016	Ground-Fault Circuit Interrupters
	UL 1640-2016	Portable Power-Distribution Equipment

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
545	UL 5-2016	Surface Metal Raceways and Fittings
	UL 5A-2015	Nonmetallic Surface Raceways and Fittings
	UL 5B-2004	Strut-Type Channel Raceways and Fittings
	UL 5C-2016	Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits
	UL 20-2018	General Use Snap Switches
	UL 209-2011	Cellular Metal Floor Raceways and Fittings
	UL 498-2017	Attachment Plugs and Receptacles
	UL 498D-2020	Attachment Plugs, Cord Connectors and Receptacles with Arcuate (Locking Type) Contacts
	UL 498E-2020	Attachment Plugs, Cord Connectors and Receptacles — Enclosure Types for Environmental Protection
	UL 498F-2020	Plugs, Socket-Outlets and Couplers with Arcuate (Locking Type) Contacts
	UL 514A-2013	Metallic Outlet Boxes
	UL 514C-2014	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
	UL 2024-2014	Cable Routing Assemblies and Communications Raceways
547	UL 50-2015	Enclosures for Electrical Equipment, Non-Environmental Considerations
	UL 50E-2020	Enclosures for Electrical Equipment, Environmental Considerations
	UL 62-2018	Flexible Cords and Cables
	UL 514A-2013	Metallic Outlet Boxes
	UL 514B-2012	Conduit, Tubing, and Cable Fittings
	UL 514C-2014	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
	UL 1598-2008	Luminaires
	UL 2225-2013	Cable and Cable-Fittings for Use in Hazardous (Classified) Locations
550	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 83-2017	Thermoplastic-Insulated Wires and Cables
	UL 307A-2018	Liquid Fuel-Burning Heating Appliances for Manufactured Homes and Recreational Vehicles
	UL 307B-2006	Gas-Burning Heating Appliances for Manufactured Homes and Recreational Vehicles
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 467-2022	Grounding and Bonding Equipment
	UL 498-2017	Attachment Plugs and Receptacles
	UL 498D-2020	Attachment Plugs, Cord Connectors and Receptacles with Arcuate (Locking Type) Contacts
	UL 498E-2020	Attachment Plugs, Cord Connectors and Receptacles — Enclosure Types for Environmental Protection
	UL 498F-2020	Plugs, Socket-Outlets and Couplers with Arcuate (Locking Type) Contacts
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 817-2015	Cord Sets and Power-Supply Cords
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel
	UL 1462-2006	Mobile Home Pipe Heating Cable
	UL 1598-2008	Luminaires
	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit
	UL 2108-2015	Low-Voltage Lighting Systems
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
551	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 62-2018	Flexible Cords and Cables
	UL 231-2016	Power Outlets
	UL 234-2005	Low Voltage Lighting Fixtures for use in Recreational Vehicles
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 467-2022	Grounding and Bonding Equipment
	UL 486C-2018	Splicing Wire Connectors
	UL 498-2017	Attachment Plugs and Receptacles
	UL 498D-2020	Attachment Plugs, Cord Connectors and Receptacles with Arcuate (Locking Type) Contacts
	UL 498E-2020	Attachment Plugs, Cord Connectors and Receptacles — Enclosure Types for Environmental Protection
	UL 498F-2020	Plugs, Socket-Outlets and Couplers with Arcuate (Locking Type) Contacts
	UL 514A-2013	Metallic Outlet Boxes
	UL 514C-2014	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
	UL 514D-2013	Cover Plates for Flush-Mounted Wiring Devices
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 817-2015	Cord Sets and Power-Supply Cords
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 1004-4-2018	Electric Generators
	UL 1008-2014	Transfer Switch Equipment
	UL 1008M-2022	Transfer Switch Equipment, Meter Mounted
	UL 1008S-2012	Solid-State Transfer Switches
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel
	UL 1449-2021	Surge Protective Devices
	UL 1598-2008	Luminaires
	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 2200-2012	Stationary Engine Generator Assemblies
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
	UL 60730-1-2009	Automatic Electrical Controls; Part 1: General Requirements
	UL 60730-2-9-2010	Automatic Electrical Controls; Part 2: Particular Requirements for Temperature Sensing Controls
552	SAE J1128-2015	Low Voltage Primary Cable, for Types GXL, HDT, and SXL
	SAE J1127-2015	Low Voltage Battery Cable, for Types SGT and SGR
	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 50-2015	Enclosures for Electrical Equipment, Non-Environmental Considerations
	UL 50E-2020	Enclosures for Electrical Equipment, Environmental Considerations
	UL 62-2018	Flexible Cords and Cables
	UL 67-2018	Panelboards
	UL 231-2016	Power Outlets
	UL 234-2005	Low Voltage Lighting Fixtures for Use in Recreational Vehicles
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 430-2015	Waste Disposers
	UL 467-2022	Grounding and Bonding Equipment
	UL 514A-2013	Metallic Outlet Boxes
	UL 514B-2012	Conduit, Tubing, and Cable Fittings
	UL 514C-2014	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 817-2015	Cord Sets and Power-Supply Cords
	UL 916-2015	Energy Management Equipment
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 1004-4-2018	Electric Generators
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel
	UL 1563-2009	Electric Spas, Equipment Assemblies, and Associated Equipment
	UL 1598-2008	Luminaires
	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit
	UL 2108-2015	Low Voltage Lighting Systems
	UL 2200-2012	Stationary Engine Generator Assemblies
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
555	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 231-2016	Power Outlets
	UL 486D-2015	Sealed Wire Connector Systems
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 676-2015	Underwater Luminaires and Submersible Junction Boxes
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 1053-2015	Ground-Fault Sensing and Relaying Equipment
	UL 1399	Leakage Current Measurement Devices for Use in Marina Applications
	UL 1650-2015	Portable Power Cable
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
590	UL 496-2017	Lampholders
	UL 514B-2012	Conduit, Tubing, and Cable Fittings
	UL 588-2015	Seasonal and Holiday Decorative Products
	UL 817-2015	Cord Sets
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 1088-2015	Temporary Lighting Strings
	UL 1377-2019	Wire used in Low Voltage Seasonal Lighting Products In Circuits With a Maximum Available Power of 15W
	UL 1640-2016	Portable Power-Distribution Equipment
600	UL 1-2005	Flexible Metal Conduit
	UL 5-2016	Surface Metal Raceways and Fittings
	UL 5A-2015	Nonmetallic Surface Raceways and Fittings
	UL 13-2015	Power-Limited Circuit Cables
	UL 48-2011	Electric Signs
	UL 50-2015	Enclosures for Electrical Equipment, Non-Environmental Considerations
	UL 50E-2020	Enclosures for Electrical Equipment, Environmental Considerations
	UL 98B-2015	Enclosed and Dead-Front Switches for Use in Photovoltaic Systems
	UL 248-19-2015	Low-Voltage Fuses — Part 19: Photovoltaic Fuses
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 489B-2016	Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures For Use With Photovoltaic (PV) Systems
	UL 508I-2015	Disconnect Switches Intended for Use in Photovoltaic Systems
	UL 814-2011	Gas-Tube-Sign Cable
	UL 879-2009	Electric Sign Components
	UL 879A-2012	LED Sign and Sign Retrofit Kits

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 879B-2002	Polymeric Enclosure Systems for the Splice Between Neon Tubing Electrode Leads and GTO Cable, and the GTO Cable Leading to the Splice
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 1310-2018	Class 2 Power Units
	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit
	UL 1699B-2018	Photovoltaic (PV) DC Arc-Fault Circuit Protection
	UL 1741-2021	Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
	UL 2161-2016	Neon Transformers and Power Supplies
	UL 2703-2015	Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels
	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3003-2015	Distributed Generation Cables
	UL 3703-2015	Solar Trackers
	UL 4703-2014	Photovoltaic Wire
	UL 6703-2014	Connectors for Use in Photovoltaic Systems
	UL 7103-2019	Investigation for Building-Integrated Photovoltaic Roof Coverings
	UL 8703-2011	Concentrator Photovoltaic Modules and Assemblies
	UL 9703-2018	Distributed Generation Wiring Harnesses
	UL 61730-1-2022	Photovoltaic (PV) Module Safety Qualification — Part 1: Requirements For Construction
	UL 61730-2-2022	Photovoltaic (PV) Module Safety Qualification — Part 2: Requirements For Testing
	UL 62109-2014	Power Converters for Use in Photovoltaic Power Systems — Part 1: General Requirements
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
604	UL 1-2005	Flexible Metal Conduit
	UL 4-2004	Armored Cable
	UL 5-2016	Surface Metal Raceways and Fittings
	UL 5A-2015	Nonmetallic Surface Raceways and Fittings
	UL 5B-2004	Strut-Type Channel Raceways and Fittings
	UL 5C-2016	Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits
	UL 62-2018	Flexible Cords and Cables
	UL 183-2009	Manufactured Wiring Systems
	UL 209-2011	Cellular Metal Floor Raceways and Fittings
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 797-2007	Electrical Metallic Tubing — Steel
	UL 797A-2014	Electrical Metallic Tubing — Aluminum and Stainless Steel
	UL 857-2009	Busways
	UL 1569-2018	Metal-Clad Cables
	UL 2024-2014	Cable Routing Assemblies and Communications Raceways
605	UL 962-2014	Household and Commercial Furnishings
	UL 1286-2022	Office Furnishings Systems
	UL 1310-2018	Class 2 Power Units
	UL 2999-2020	Individual Commercial Office Furnishings
	UL 5085-3-2006	Low Voltage Transformers — Part 3: Class 2 and Class 3 Transformers
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
610	UL 62-2018	Flexible Cords and Cables
	UL 2273-2019	Festoon Cable
620	UL 62-2018	Flexible Cords and Cables
	UL 83-2017	Thermoplastic-Insulated Wires and Cables
	UL 98-2016	Enclosed and Dead-Front Switches
	UL 104-2016	Elevator Door Locking Devices and Contacts
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 508-2018	Industrial Control Equipment
	UL 508A-2018	Industrial Control Panels
	UL 1066-2022	Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
	UL 1310-2018	Class 2 Power Units
	UL 1449-2021	Surge Protective Devices
	UL 1685-2015	Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables
	UL 2556-2021	Wire and Cable Test Methods
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
625	UL 62-2018	Flexible Cords and Cables
	UL 1650-2015	Portable Power Cable
	UL 1741-2021	Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
	UL 2202-2022	DC Charging Equipment for Electric Vehicles
	UL 2231-1-2012	Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits — Part 1: General Requirements
	UL 2231-2-2012	Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits — Part 2: Particular Requirements for Protection Devices for Use in Charging Systems
	UL 2251-2017	Plugs, Receptacles and Couplers for Electrical Vehicles
	UL 2580-2020	Batteries for Use in Electric Vehicles

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 2594-2022	Electric Vehicle Supply Equipment
	UL 9741-2021	Electric Vehicle Power Export Equipment (EVPE)
	UL 60730-1	Automatic Electrical Controls
626	UL 62-2018	Flexible Cords and Cables
	UL 231-2016	Power Outlets
	UL 498-2017	Attachment Plugs and Receptacles
	UL 498D-2020	Attachment Plugs, Cord Connectors and Receptacles with Arcuate (Locking Type) Contacts
	UL 498E-2020	Attachment Plugs, Cord Connectors and Receptacles — Enclosure Types for Environmental Protection
	UL 498F-2020	Plugs, Socket-Outlets and Couplers with Arcuate (Locking Type) Contacts
	UL 817-2015	Cord Sets and Power-Supply Cords
	UL 1651-2015	Optical Fiber Cable
	UL 1686-2012	Pin and Sleeve Configurations
630	UL 551-2009	Transformer-Type Arc-Welding Machines
640	UL 13-2015	Power Limited Circuit Cables
	UL 62-2018	Flexible Cords and Cables
	UL 813-1996	Commercial Audio Equipment
	UL 1310-2018	Class 2 Power Units
	UL 1419-2016	Professional Video and Audio Equipment
	UL 1492-1996	Audio-Video Products and Accessories
	UL 1711-2006	Amplifiers for Fire Protective Signaling Systems
	UL 2269-2021	Optical Fiber/Communications/Signaling/Coaxial Cable Outlet Boxes
	UL 6500-1999	Audio/Video and Musical Instrument Apparatus for Household, Commercial, and Similar General Use
	UL 60065-2015	Audio, Video and Similar Electronic Apparatus — Safety Requirements
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
645	UL 38-2008	Manual Signaling Boxes for Fire Alarm Systems
	UL 268-2023	Smoke Detectors for Fire Alarm Systems
	UL 444-2017	Communications Cables
	UL 464-2016	Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories
	UL 497B-2004	Protectors for Data Communications and Fire Alarm Circuits
	UL 833-2021	Control Units and Accessories for Fire Alarm Systems
	UL 864-2014	Control Units and Accessories for Fire Alarm Systems
	UL 1424-2015	Cables for Power-Limited Fire-Alarm Circuits
	UL 1425-2015	Cables for Non-Power-Limited Fire-Alarm Circuits
	UL 1449-2021	Surge Protective Devices
	UL 1480-2016	Speakers for Fire Alarm and Signaling Systems, Including Accessories
	UL 1638-2016	Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories
	UL 1651-2015	Optical Fiber Cable
	UL 1685-2015	Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables
	UL 1690-2015	Data-Processing Cable
	UL 1778-2014	Uninterruptible Power Systems
	UL 2024-2014	Cable Routing Assemblies and Communications Raceways
	UL 60950-1-2007	Information Technology Equipment Safety — Part 1: General Requirements
	UL 60950-21-2003	Information Technology Equipment Safety — Part 21: Remote Power Feeding
	UL 60950-22-2017	Information Technology Equipment Safety — Part 22: Equipment to be Installed Outdoors
	UL 60950-23-2007	Information Technology Equipment Safety — Part 23: Large Data Storage Equipment
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
646	UL 10C-2016	Positive Pressure Fire Tests of Door Assemblies
	UL 62-2018	Flexible Cords and Cables
	UL 67-2018	Panelboards
	UL 98-2016	Enclosed and Dead-Front Switches
	UL 305-2012	Panic Hardware
	UL 347-2020	Medium-Voltage AC Contactors, Controllers, and Control Centers
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 508-2018	Industrial Control Equipment
	UL 508A-2018	Industrial Control Panels
	UL 845-2021	Motor Control Centers
	UL 869A-2006	Reference Standard for Service Equipment
	UL 891-2019	Switchboards
	UL 924-2016	Emergency Lighting and Power Equipment
	UL 977-2012	Fused Power-Circuit Devices
	UL 1008-2014	Transfer Switch Equipment
	UL 1008A-2017	Transfer Switch Equipment, Over 1000 Volts
	UL 1008M-2022	Meter-Mounted Transfer Switches
	UL 1008S-2012	Solid-State Transfer Switches
	UL 1062-1997	Unit Substations
	UL 1066-2022	Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
	UL 1429-2000	Pullout Switches

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 1449-2021	Surge Protective Devices
	UL 1655-2009	Community-Antenna Television Cables
	UL 1989-2013	Standby Batteries
	UL 2755-2018	Modular Data Centers
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
647	UL 1598-2008	Luminaires
650	UL 1310-2018	Class 2 Power Units
	UL 1581-2001	Reference Standard for Electrical Wires, Cables, and Flexible Cords
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
670	ANSI/CSA-C22.2 No. 19085-1	Woodworking machines — Safety — Part 1: Common requirements
	UL 508-2018	Industrial Control Equipment
	UL 61800-5-1-2012	Adjustable Speed Electrical Power Drive Systems — Part 5-1: Safety Requirements — Electrical, Thermal and Energy
675	UL 493-2018	Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables
	UL 1581-2001	Reference Standard for Electrical Wires, Cables, and Flexible Cords
680	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 20-2018	General Use Snap-Switches
	UL 62-2018	Flexible Cords and Cables
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 379-2013	Power Units for Fountain, Swimming Pool, and Spa Luminaires
	UL 467-2022	Grounding and Bonding Equipment
	UL 486D-2015	Sealed Wire Connector Systems
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 676-2015	Underwater Luminaires and Submersible Junction Boxes
	UL 676A-2003	Potting Compounds for Swimming Pool, Fountain, and Spa Equipment
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 943C-2012	Special Purpose Ground-Fault Circuit-Interrupters
	UL 1004-10-2020	Pool Pump Motors
	UL 1081-2016	Swimming Pool Pumps, Filters, and Chlorinators
	UL 1241-2003	Junction Boxes for Swimming Pool Luminaires
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel
	UL 1261-2016	Electric Water Heaters for Pools and Tubs
	UL 1563-2009	Electric Spas, Equipment Assemblies, and Associated Equipment
	UL 1569-2018	Metal-Clad Cables
	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit
	UL 1795-2016	Hydromassage Bathtubs
	UL 2420-2009	Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
	UL 2452-2006	Electric Swimming Pool and Spa Cover Operators
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
	UL 2515A-2011	Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
	UL 2995-2016	Lifts for Swimming Pools and Spas
	UL 60335-2-1000-2017	Household and Similar Electrical Appliances: Particular Requirements for Electrically Powered Pool Lifts
682	UL 486D-2015	Sealed Wire Connector Systems
	UL 943-2016	Ground-Fault Circuit-Interrupters
	UL 1053-2015	Ground-Fault Sensing and Relaying Equipment
	UL 1650-2015	Portable Power Cable
	UL 1838-2003	Low Voltage Landscape Lighting Systems
690	UL 98B-2015	Enclosed and Dead-Front Switches for Use in Photovoltaic Systems
	UL 248-19-2015	Low-Voltage Fuses — Part 19: Photovoltaic Fuses
	UL 467-2022	Grounding and Bonding Equipment
	UL 489B-2016	Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures For Use With Photovoltaic (PV) Systems
	UL 508I-2015	Disconnect Switches Intended for Use in Photovoltaic Systems
	UL 1569-2018	Metal-Clad Cables
	UL 1699B-2018	Photovoltaic (PV) DC Arc-Fault Circuit Protection
	UL 1703-2002	Flat-Plate Photovoltaic Modules and Panels
	UL 1741-2021	Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
	UL 2703-2015	Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels
	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3003-2015	Distributed Generation Cables
	UL 3703-2015	Solar Trackers
	UL 3730-2014	Photovoltaic Junction Boxes

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 3741-2020	Photovoltaic Hazard Control
	UL 4703-2014	Photovoltaic Wire
	UL 6703-2014	Connectors for Use in Photovoltaic Systems
	UL 7103-2019	Investigation for Building-Integrated Photovoltaic Roof Coverings
	UL 8703-2011	Concentrator Photovoltaic Modules and Assemblies
	UL 8801-2022	Photovoltaic Luminaire Systems
	UL 9703-2018	Distributed Generation Wiring Harnesses
	UL 9741-2021	Electric Vehicle Power Export Equipment (EVPE)
	UL 61730-1-2022	Photovoltaic (PV) Module Safety Qualification — Part 1: Requirements for Construction
	UL 61730-2-2022	Photovoltaic (PV) Module Safety Qualification — Part 2: Requirements for Testing
	UL 62109-1-2014	Power Converters for Use in Photovoltaic Power Systems — Part 1: General Requirements
	UL 62109-2	Power Converters for Use in Photovoltaic Power Systems — Part 2: Particular Requirements for Inverters
	UL 62275-2021	Cable Management Systems — Cable Ties for Electrical Installations
692	UL 2262-2012	Fuel Cell Modules for Use in Portable and Stationary Equipment
	UL 2262A-2011	Borohydride Fuel Cartridges with Integral Fuel Processing for Use with Portable Fuel Cell Power Systems or Similar Equipment
	UL 2265-2012	Fuel Cell Power Units and Fuel Storage Containers for Portable Devices
	UL 2265A-2018	Hand-held or Hand-Transportable Fuel Cell Power Units with Disposable Methanol Fuel Cartridges for use in Original Equipment Manufacturer's Information Technology Equipment
	UL 2265C-2006	Hand-Held or Hand-Transportable Alkaline (Direct Borohydride) Fuel Cell Power Units and Borohydride Fuel Cartridges For Use With Consumer Electronics or Information Technology Equipment
	UL 2266-2007	Electromagnetic Compatibility, Electrical Safety, and Physical Protection of Stationary and Portable Fuel Cell Power Systems for Use with Commercial Network Telecommunications Equipment
	UL 2267-2020	Fuel Cell Power Systems for Installation in Industrial Electric Trucks
694	UL 467-2022	Grounding and Bonding Equipment
	UL 489C-2012	Molded-Case Circuit Breakers and Molded-Case Switches for Use with Wind Turbines
	UL 1741-2021	Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
	UL 2227-2007	Flexible Motor Supply Cable and Wind Turbine Tray Cable
	UL 2736-2010	Single Pole Separable Interconnecting Cable Connectors for Use with Wind Turbine Generating Systems
	UL 4143-2018	Wind Turbine Generator — Life Time Extension (LTE)
	UL 6141-2016	Wind Turbines Permitting Entry of Personnel
	UL 6142-2012	Small Wind Turbine Generating Systems
695	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 218-2015	Fire Pump Controllers
	UL 448-2020	Centrifugal Stationary Pumps for Fire-Protection Service
	UL 448B-2023	Residential Fire Pumps Intended for One- and Two-Family Dwellings and Manufactured Homes
	UL 448C-2023	Stationary, Rotary-Type, Positive-Displacement Pumps for Fire Protection Service
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
	UL 1004-5-2014	Fire Pump Motors
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel
	UL 1569-2018	Metal-Clad Cables
	UL 1724-2006	Fire Tests for Electrical Circuit Protective Systems
	UL 2196-2017	Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
700	UL 924-2016	Emergency Lighting and Power Equipment
	UL 1008-2014	Transfer Switch Equipment
	UL 1008A-2017	Transfer Switch Equipment, Over 1000 Volts
	UL 1449-2021	Surge Protective Devices
	UL 1724-2006	Fire Tests for Electrical Circuit Protective Systems
	UL 2196-2017	Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables
	UL 2200-2012	Stationary Engine Generator Assemblies
701	UL 924-2016	Emergency Lighting and Power Equipment
	UL 1008-2014	Transfer Switch Equipment
	UL 1008A-2017	Transfer Switch Equipment, Over 1000 Volts
702	UL 98-2016	Enclosed and Dead-Front Switches
	UL 1008-2014	Transfer Switch Equipment
	UL 1008A-2017	Transfer Switch Equipment, Over 1000 Volts
	UL 1008M-2022	Meter-Mounted Transfer Switches
	UL 1008S-2012	Solid-State Transfer Switches
705	UL 62-2018	Flexible Cords and Cables
	UL 98-2016	Enclosed and Dead-Front Switches
	UL 486D-2015	Sealed Wire Connector Systems
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 1066-2022	Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
	UL 1429-2000	Pullout Switches
	UL 1741-2021	Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 2200-2012	Stationary Engine Generator Assemblies
	UL 3001	Distributed Energy Resource Systems
	UL 3003-2015	Distributed Generation Cables
	UL 3010	Single Site Energy Systems
	UL 6141-2016	Wind Turbines Permitting Entry of Personnel
	UL 6142-2012	Small Wind Turbine Systems
	UL 9540-2020	Energy Storage Systems and Equipment
	UL 9741-2021	Electric Vehicle Power Export Equipment (EVPE)
	UL 62109-1	Power Converters for Use in Photovoltaic Power Systems — Part 1: General Requirements
	UL 62109-2	Power Converters for Use in Photovoltaic Power Systems — Part 2: Particular Requirements for Inverters
706	UL 248-2-2000	Low-Voltage Fuses — Part 2: Class C Fuses
	UL 248-3-2000	Low-Voltage Fuses — Part 3: Class CA and CB Fuses
	UL 248-4-2000	Low-Voltage Fuses — Part 4: Class CC Fuses
	UL 248-5-2000	Low-Voltage Fuses — Part 5: Class G Fuses
	UL 248-6-2000	Low-Voltage Fuses — Part 6: Class H Non-Renewable Fuses
	UL 248-8-2011	Low-Voltage Fuses — Part 8: Class J Fuses
	UL 248-9-2000	Low-Voltage Fuses — Part 9: Class K Fuses
	UL 248-10-2011	Low-Voltage Fuses — Part 10: Class L Fuses
	UL 248-12-2011	Low-Voltage Fuses — Part 12: Class R Fuses
	UL 248-15-2018	Low-Voltage Fuses — Part 15: Class T Fuses
	UL 248-17-2018	Low-Voltage Fuses — Part 17: Class CF Fuses
	UL 248-18-2022	Low-Voltage Fuses — Part 18: Class CD Fuses
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 489H-2017	Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures, for Use with Direct Current (DC) Microgrids
	UL 1066-2022	Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures
	UL 1741-2021	Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
	UL 9540-2020	Energy Storage Systems and Equipment
708	UL 1-2005	Flexible Metal Conduit
	UL 4-2004	Armored Cable
	UL 83-2017	Thermoplastic-Insulated Wires and Cables
	UL 360-2013	Liquid-Tight Flexible Metal Conduit
	UL 493-2018	Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables
	UL 497A-2001	Secondary Protectors for Communications Circuits
	UL 1008-2014	Transfer Switch Equipment
	UL 1008A-2017	Transfer Switch Equipment, Over 1000 Volts
	UL 1008M-2022	Meter-Mounted Transfer Switches
	UL 1008S-2012	Solid-State Transfer Switches
	UL 1569-2018	Metal-Clad Cables
	UL 2196-2017	Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables
710	UL 1741-2021	Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
	UL 2200-2012	Stationary Engine Generator Assemblies
	UL 8801-2022	Photovoltaic Luminaire Systems
	UL 9540-2020	Energy Storage Systems and Equipment
	UL 9741-2021	Electric Vehicle Power Export Equipment (EVPE)
	UL 62109-1-2014	Power Converters for use in Photovoltaic Power Systems — Part 1: General Requirements
	UL 62109-2	Power Converters for Use in Photovoltaic Power Systems — Part 2: Particular Requirements for Inverters
722	UL 13-2015	Power-Limited Circuit Cables
	UL 444-2017	Communications Cables
	UL 1424-2015	Cables for Power-Limited Fire-Alarm Circuits
	UL 1651-2015	Optical Fiber Cable
	UL 1666-2007	Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
	UL 1685-2015	Vertical-Tray Fire-Propagation and Smoke- Release Test for Electrical and Optical-Fiber Cables
	UL 1724-2006	Fire Tests for Electrical Circuit Protective Systems
	UL 2024-2019	Commercial Closed-Circuit Television Equipment
	UL 2196-2017	Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables
	UL 2556-2021	Wire and Cable Test Methods
725	UL 1310-2018	Class 2 Power Units
	UL 5085-3-2006	Low Voltage Transformers — Part 3: Class 2 and Class 3 Transformers
	UL 9990-2021	Information and Communication Technology (ICT) Power Cables
	UL 60730-1	Automatic Electrical Controls
	UL 61010-2-201-2018	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use — Part 2-201: Particular Requirements for Control Equipment
	UL 61800-5-1-2012	Adjustable Speed Electrical Power Drive Systems — Part 5-1: Safety Requirements — Electrical, Thermal and Energy
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
726	UL 1400-1-2022	Fault-Managed Power Systems — Part 1 General Requirements

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 1400-2-2022	Fault-Managed Power Systems — Part 2 Requirements for Cables
	UL 1666-2007	Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
	UL 1685-2015	Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables
	UL 2556-2021	Wire and Cable Test Methods
728	UL 5-2016	Surface Metal Raceways and Fittings
	UL 5A-2015	Nonmetallic Surface Raceways and Fittings
	UL 5B-2004	Strut-Type Channel Raceways and Fittings
	UL 5C-2016	Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits
	UL 209-2011	Cellular Metal Floor Raceways and Fittings
	UL 467-2022	Grounding and Bonding Equipment
	UL 514A-2013	Metallic Outlet Boxes
	UL 514C-2014	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
	UL 568-2002	Nonmetallic Cable Tray Systems
	UL 884-2016	Underfloor Raceways and Fittings
	UL 1724-2006	Fire Tests for Electrical Circuit Protective Systems
	UL 2024-2014	Cable Routing Assemblies and Communications Raceways
	UL 2196-2017	Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables
760	UL 268-2023	Smoke Detectors for Fire Alarm Systems
	UL 268A-2008	Smoke Detectors for Duct Application
	UL 486C-2018	Splicing Wire Connectors
	UL 497B-2004	Protectors for Data Communication and Fire Alarm Circuits
	UL 1424-2015	Cables for Power-Limited Fire-Alarm Circuits
	UL 1425-2015	Cables for Non-Power-Limited Fire-Alarm Circuits
	UL 1480-2016	Speakers for Fire Alarm and Signaling Systems, Including Accessories
	UL 1666-2007	Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
	UL 1685-2015	Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables
	UL 2196-2017	Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables
	UL 60730-2-14-2013	Automatic Electrical Controls; Part 2: Particular Requirements for Electric Actuators
770	UL 467-2022	Grounding and Bonding Equipment
	UL 568-2002	Nonmetallic Cable Tray Systems
	UL 1651-2015	Optical Fiber Cable
	UL 2024-2014	Optical Fiber and Communication Cable Raceway
	UL 2196-2017	Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables
	UL 62275-2021	Cable Management Systems — Cable Ties for Electrical Installations
800	UL 444-2017	Communications Cables
	UL 467-2022	Grounding and Bonding Equipment
	UL 489A-2008	Circuit Breakers for Use in Communication Equipment
	UL 497-2001	Protectors for Paired-Conductor Communications Circuits
	UL 497A-2001	Secondary Protectors for Communications Circuits
	UL 497C-2001	Protectors for Coaxial Communications Circuits
	UL 497E-2011	Protectors for Antenna Lead-In Conductors
	UL 523-2006	Telephone Service Drop Wire
	UL 568-2002	Nonmetallic Cable Tray Systems
	UL 723-2018	Test for Surface Burning Characteristics of Building Materials
	UL 1581-2001	Reference Standard for Electrical Wires, Cables, and Flexible Cords
	UL 1666-2007	Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
	UL 1685-2015	Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables
	UL 1724-2006	Outline for Fire Tests for Electrical Circuit Protective Systems
	UL 1863-2004	Communication Circuit Accessories
	UL 2024-2014	Cable Routing Assemblies and Communications Raceways
	UL 2043-2013	Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces
	UL 2196-2017	Tests for Fire Resistive Cables
	UL 2556-2021	Wire and Cable Test Methods
	UL 62275-2021	Cable Management Systems — Cable Ties for Electrical Installations
805	UL 62368-1	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
	UL 497-2001	Protectors for Paired-Conductor Communications Circuits
	UL 497A-2001	Secondary Protectors for Communications Circuits
	UL 497C-2001	Protectors for Coaxial Communications Circuits
	UL 497E-2011	Protectors for Antenna Lead-In Conductors
	UL 523-2015	Telephone Service Drop Wire

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
810	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
	UL 150-2004	Antenna Rotators
	UL 452-2006	Antenna-Discharge Units
	UL 467-2022	Grounding and Bonding Equipment
820	UL 497E-2011	Protectors for Antenna Lead-In Conductors
	UL 444-2017	Communications Cables
	UL 497E-2011	Protectors for Antenna Lead-In Conductors
830	UL 1655-2009	Community-Antenna Television Cables
	UL 444-2017	Communications Cables
	UL 497A-2001	Secondary Protectors for Communications Circuits
	UL 497C-2001	Protectors for Coaxial Communications Circuits
840	UL 497E-2011	Protectors for Antenna Lead-In Conductors
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
	UL 444-2017	Communications Cables
	UL 467-2022	Grounding and Bonding Equipment
	UL 498A-2008	Current Taps and Adapters
	UL 1310-2018	Class 2 Power Units
	UL 1651-2015	Optical Fiber Cable
	UL 1863-2004	Communication Circuit Accessories
	UL 2024-2014	Cable Routing Assemblies and Communications Raceways
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
Tables 11(A) and 11(B)	UL 1310-2018	Class 2 Power Units
	UL 1434-1998	Thermistor-Type Devices
	UL 5085-3-2006	Low Voltage Transformers — Part 3: Class 2 and Class 3 Transformers
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements
Tables 12(A) and 12(B)	UL 1310-2018	Class 2 Power Units
	UL 1434-1998	Thermistor-Type Devices
	UL 5085-3-2006	Low Voltage Transformers — Part 3: Class 2 and Class 3 Transformers
	UL 62368-1-2012	Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements

Table A.1(b) Product Safety Standards for Conductors and Equipment That Do Not Have an Associated Listing Requirement

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>	
110	NEMA CY 10000-2023	Cybersecurity Implementation Guidance for Connected Electrical Infrastructure	
	UL 969-2017	Marking and Labeling Systems	
	UL 9691-2021	Recommended Practice for Nameplates for Use in Electrical Installations	
210	UL 1053-2015	Ground-Fault Sensing and Relaying Equipment	
215	UL 1053-2015	Ground-Fault Sensing and Relaying Equipment	
235	UL 6-2022	Electrical Rigid Metal Conduit — Steel	
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel	
	UL 347	Medium-Voltage AC Contactors, Controllers, and Control Centers	
	UL 360	Liquid-Tight Flexible Metal Conduit	
	UL 486C-2018	Splicing Wire Connectors	
	UL 514B-2012	Conduit, Tubing and Cable Fittings	
	UL 651-2011	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings	
	UL 1008A-2017	Transfer Switch Equipment, Over 1000 Volts	
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel	
	UL 1660-2019	Liquid-Tight Flexible Nonmetallic Conduit	
	UL 2200-2012	Stationary Engine Generator Assemblies	
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings	
	UL 2876-2022	Remote Racking Devices for Switchgear and Controlgear	
	240	NEMA CY 10000-2023	Cybersecurity Implementation Guidance for Connected Electrical Infrastructure
	245	IEEE C37.09	IEEE Standard Test Procedures for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V
IEEE C37.41		IEEE Standard Design Tests for High-Voltage (>1000 V) Fuses and Accessories	
IEEE C37.42		IEEE Standard Specifications for High-Voltage (>1000 V) Fuses and Accessories	
NEMA C37.54		NEMA Standard Indoor AC High Voltage Circuit Breakers Applied as Removable Elements in Metal-Enclosed Switchgear — Conformance Test Procedures	
300	UL 635-2012	Insulating Bushings	
314	UL 514B-2012	Conduit, Tubing, and Cable Fittings	
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable	
	UL 3004	Outline of Investigation for Medium Voltage Junction Boxes	
320	UL 514A-2013	Metallic Outlet Boxes	
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable	
322	UL 5-2016	Surface Metal Raceways and Fittings	
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable	
324	UL 5-2016	Surface Metal Raceways and Fittings	

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
330	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
332	UL 1565-2022	Positioning Devices
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
334	UL 6-2022	Electrical Rigid Metal Conduit — Steel
	UL 6A-2008	Electrical Rigid Metal Conduit — Aluminum, Red Brass and Stainless Steel
	UL 514B-2012	Conduit, Tubing, and Cable Fittings
	UL 651-2011	Schedule 40 and 80 Rigid PVC Conduit
	UL 797-2007	Electrical Metallic Tubing — Steel
	UL 797A-2014	Electrical Metallic Tubing — Aluminum and Stainless Steel
	UL 1242-2006	Electrical Intermediate Metal Conduit — Steel
	UL 1565-2022	Positioning Devices
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
	UL 2420-2009	Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
	UL 2515-2019	Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
	UL 2515A-2011	Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
335	UL 2250-2017	Instrumentation Tray Cable
337	UL 1565-2022	Positioning Devices
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
340	UL 493-2018	Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables
342	UL 635-2012	Insulating Bushings
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
344	UL 635-2012	Insulating Bushings
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
348	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
350	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
352	UL 635-2012	Insulating Bushings
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
353	UL 635-2012	Insulating Bushings
355	UL 635-2012	Insulating Bushings
	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
356	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
358	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
362	UL 2239-2015	Hardware for the Support of Conduit, Tubing and Cable
368	UL 857-2009	Busways
392	UL 568-2002	Nonmetallic Cable Tray Systems
400	UL 62-2018	Flexible Cords and Cables
	UL 498-2017	Attachment Plugs and Receptacles
	UL 498B-2022	Receptacles with Integral Switching Means
	UL 498D-2020	Attachment Plugs, Cord Connectors and Receptacles with Arcuate (Locking Type) Contacts
	UL 498E-2020	Attachment Plugs, Cord Connectors and Receptacles — Enclosure Types for Environmental Protection
	UL 514B-2012	Conduit, Tubing, and Cable Fittings
	UL 817-2015	Cord Sets and Power-Supply Cords
	UL 1650-2015	Portable Power Cable
	UL 1680-2003	Stage and Lighting Cables
402	UL 66-2023	Fixture Wire
408	UL 50-2015	Enclosures for Electrical Equipment, Non-Environmental Considerations
	UL 50E-2020	Enclosures for Electrical Equipment, Environmental Considerations
409	UL 1436	Outlet Circuit Testers and Other Similar Indicating Devices
	UL 61010-1	Electrical Equipment for Measurement, Control, and Laboratory Use — Part 1: General Requirements
	UL 61010-2-030	Electrical Equipment for Measurement, Control, and Laboratory Use — Part 2-30: Particular Requirements for Testing and Measuring Circuits
424	UL 834-2004	Heating, Water Supply, and Power Boilers — Electric
	UL 1693-2010	Electric Radiant Heating Panels and Heating Panel Sets
	UL 1995-2015	Heating and Cooling Equipment
	UL 1996-2009	Electric Duct Heaters
	UL 60335-1-2204	Safety of Household and Similar Electrical Appliances, Part 1: General Requirements
	UL 60335-2-40-2019	Household and Similar Electrical Appliances — Safety — Part 2-40: Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers
425	UL 834-2004	Heating, Water Supply, and Power Boilers — Electric
426	UL 1588-2002	Roof and Gutter De-Icing Cable Units
427	UL 515-2015	Electrical Resistance Trace Heating for Commercial Applications
	UL 1462-2006	Mobile Home Pipe Heating Cable
	UL 2049-2006	Residential Pipe Heating Cable
430	UL 248-13-2022	Low Voltage Fuses — Part 13: Semiconductor Fuses
	UL 347	Medium-Voltage AC Contactors, Controllers, and Control Centers
	UL 347A	Medium Voltage Power Conversion Equipment

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
445	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3010	Single Site Energy Systems
450	IEEE C57.12.00	IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
	IEEE C57.12.28	IEEE Standard for Pad-Mounted Equipment — Enclosure Integrity
	IEEE C57.12.29	IEEE C57.12.29 IEEE Standard for Pad-Mounted Equipment — Enclosure Integrity for Coastal Environments
	IEEE C57.16	IEEE Standard for Requirements, Terminology, and Test Code for Dry-Type Air-Core Series-Connected Reactors
	UL 50-2015	Enclosures for Electrical Equipment, Non-Environmental Considerations
	UL 50E-2020	Enclosures for Electrical Equipment, Environmental Considerations
	UL 248-1-2022	Low-Voltage Fuses — Part 1: General Requirements
	UL 248-2-2000	Low-Voltage Fuses — Part 2: Class C Fuses
	UL 248-3-2000	Low-Voltage Fuses — Part 3: Class CA and CB Fuses
	UL 248-4-2000	Low-Voltage Fuses — Part 4: Class CC Fuses
	UL 248-5-2000	Low-Voltage Fuses — Part 5: Class G Fuses
	UL 248-8-2011	Low-Voltage Fuses — Part 8: Class J Fuses
	UL 248-9-2000	Low-Voltage Fuses — Part 9: Class K Fuses
	UL 489-2016	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
	UL 1561-2011	Dry-Type General Purpose and Power Transformers
	UL 1562	Standard for Transformers, Distribution, Dry-Type Over 600 Volts
	UL 5085-2-2021	Low Voltage Transformers — Part 2: General Purpose Transformers
460	UL 810-2019	Capacitors
	UL 1283-2017	Electromagnetic Interference Filters
	UL 60384-14-2014	Fixed Capacitors for Use in Electronic Equipment — Part 14: Sectional Specification: Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains
470	UL 508-2018	Industrial Control Equipment
	UL 1283-2017	Electromagnetic Interference Filters
495	IEEE C37.09	IEEE Standard Test Procedures for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V
	IEEE C37.20.2	IEEE Standard for Metal-Clad Switchgear
	IEEE C37.20.3	IEEE Standard for Metal-Enclosed Interrupter Switchgear (1 kV–38 kV)
	IEEE C37.20.4	IEEE Standard for Indoor AC Switches (1 kV to 38 kV) for Use in Metal-Enclosed Switchgear
	IEEE C37.20.6	IEEE Standard for 4.76 kV to 38 kV Rated Ground and Test Devices Used in Enclosures
	IEEE C37.20.9	IEEE Standard for Metal-Enclosed Switchgear Rated 1 kV to 52 kV Incorporating Gas Insulating Systems
	IEEE C37.23	IEEE Standard for Metal-Enclosed Bus
	IEEE C37.41	IEEE Standard Design Tests for High-Voltage (>1000 V) Fuses and Accessories
	IEEE C37.42	IEEE Standard Specifications for High-Voltage (>1000 V) Fuses and Accessories
	IEEE C37.59	IEEE Standard for Requirements for Conversion of Power Switchgear Equipment
	IEEE C37.60	IEEE International Standard — High-voltage switchgear and controlgear — Part 111: Automatic circuit reclosers for alternating current systems up to and including 38 kV
	IEEE C37.74	IEEE Standard Requirements for Subsurface, Vault, and Padmounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems up to 38 kV
	NEMA C37.54	American National Standard for Indoor AC High Voltage Circuit Breakers Applied as Removable Elements in Metal-Enclosed Switchgear — Conformance Test Procedures
	NEMA C37.55	American National Standard for Switchgear — Medium Voltage Metal-Clad Assemblies — Conformance Test Procedures
	NEMA C37.57	American National Standard for Switchgear — Metal-Enclosed Interrupter Switchgear Assemblies — Conformance Testing
	NEMA C37.58	American National Standard for Switchgear — Indoor AC Medium Voltage Switches for Use in Metal-Enclosed Switchgear — Conformance Test Procedures
	UL 347	Medium-Voltage AC Contactors, Controllers, and Control Centers
	UL 347A	Medium Voltage Power Conversion Equipment
	UL 347C	Outline of Investigation for Medium Voltage Solid State Resistive Load Controllers, Up to 15KV
	UL 1008A-2017	Transfer Switch Equipment, Over 1000 Volts
	UL 2748	Arcing Fault Quenching Equipment
	UL 2877	Power Supplies, Medium Voltage
	UL 3004	Outline of Investigation for Medium Voltage Junction Boxes
500	ANSI/IEEE C2	National Electrical Safety Code, Section 127A, Coal Handling Areas
	ANSI/UL 121203	Recommended Practice for Portable/Personal Electronic Products Suitable for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2, Class III, Division 1, Class III, Division 2, Zone 21 and Zone 22 Hazardous (Classified) Locations
	API RP 14F	Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1 and Division 2 Locations
	API RP 500	Recommended Practice for Classification of Locations of Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
	API RP 2003	Protection Against Ignitions Arising Out of Static Lightning and Stray Currents.
	ASHRAE 15	Safety Standard for Refrigeration Systems.
	ASME B1.20.1	Pipe Threads, General Purpose (Inch)
	IEEE 844.2	Standard for Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — Application Guide for Design, Installation, Testing, Commissioning, and Maintenance
	IEEE 60079-30-2	IEEE/IEC International Standard for Explosive atmospheres — Part 30-2: Electrical resistance trace heating — Application guide for design, installation, and maintenance
	IAR 2	Standard for Safe Design of Closed-Circuit Ammonia Refrigeration Systems
	ISA-12.10	Area Classification in Hazardous (Classified) Dust Locations
	ISO 965-1	ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	ISO 965-3	ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads
	NFPA 30-2024	Flammable and Combustible Liquids Code
	NFPA 32-2021	Standard for Drycleaning Facilities
	NFPA 33-2024	Standard for Spray Application Using Flammable or Combustible Materials
	NFPA 34-2024	Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids
	NFPA 35-2021	Standard for the Manufacture of Organic Coatings
	NFPA 36-2025	Standard for Solvent Extraction Plants
	NFPA 45-2024	Standard on Fire Protection for Laboratories Using Chemicals
	NFPA 55-2026	Compressed Gases and Cryogenic Fluids Code
	NFPA 58-2024	Liquefied Petroleum Gas Code
	NFPA 59-2024	Utility LP-Gas Plant Code
	NFPA 77-2024	Recommended Practice on Static Electricity
	NFPA 497-2024	Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
	NFPA 499-2024	Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
	NFPA 780-2026	Standard for the Installation of Lightning Protection Systems
	NFPA 820-2024	Standard for Fire Protection in Wastewater Treatment and Collection Facilities
	UL 60079-29-2-2018	Explosive Atmospheres — Part 29-2: Gas detectors — Selection, installation, use and maintenance of detectors for flammable gases and oxygen
	UL 120002-2022	Certificate Standard for AEx Equipment for Hazardous (Classified) Locations
	UL 120101-2019	Definitions and Information Pertaining to Electrical Equipment in Hazardous (Classified) Locations
	UL 121303-2020	Guide for Combustible Gas Detection as a Method of Protection
501	UL 62-2018	Flexible Cord and Cable
	UL 504-2022	Mineral-Insulated, Metal-Sheathed Cable
503	NFPA 505-2024	Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations
504	ISA-RP 12.06.01	Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation — Part 1: Intrinsic Safety
505	ANSI/API RP 14FZ	Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Zone 0, Zone 1, and Zone 2 Locations
	API RP 505	Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2
	API RP 2003	Protection Against Ignitions Arising Out of Static Lightning and Stray Currents.
	ASME B1.20.1	Pipe Threads, General Purpose (Inch)
	EI 15	Model Code of Safe Practice, Part 15: Area Classification Code for Installations Handling Flammable Fluids
	IEEE 844.2	Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — Application Guide for Design, Installation, Testing, Commissioning, and Maintenance
	IEEE 60079-30-2	Explosive Atmospheres — Part 30-2: Electrical resistance trace heating — Application guide for design, installation and maintenance
	IIR 2	Standard for Safe Design of Closed-Circuit Ammonia Refrigeration Systems
	ISA-60079-10-1 (12.24.01)	Explosive Atmospheres — Part 10-1: Classification of Areas — Explosive gas atmospheres
	ISA-60079-29-2	Explosive Atmospheres — Part 29-2: Gas detectors — Selection, installation, use and maintenance of detectors for flammable gases and oxygen
	ISO 965-1	ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data
	ISO 965-3	ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads
	NFPA 30-2024	Flammable and Combustible Liquids Code
	NFPA 77-2024	Recommended Practice on Static Electricity
	NFPA 497-2024	Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
	NFPA 780-2026	Standard for the Installation of Lightning Protection Systems
	UL 80079-20-1-2020	Explosive Atmospheres — Part 20-1: Material Characteristics for Gas and Vapour Classification — Test Methods and Data
	UL 120101-2019	Definitions and Information Pertaining to Electrical Equipment in Hazardous (Classified) Locations
	UL 121303-2020	Guide for Use of Detectors for Flammable Gases
506	ASME B1.20.1	Pipe Threads, General Purpose (Inch)
	IEEE 844.2	Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — Application Guide for Design, Installation, Testing, Commissioning, and Maintenance
	IEEE 60079-30-2	Explosive Atmospheres — Part 30-2: Electrical resistance trace heating — Application guide for design, installation and maintenance
	ISA-60079-10-2 (12.10.05)	Explosive Atmospheres — Part 10-2: Classification of Areas — Combustible Dust Atmospheres
	NFPA 499-2024	Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
511	NFPA 30A-2024	Code for Motor Fuel Dispensing Facilities and Repair Garages
	NFPA 88A-2023	Standard for Parking Structures

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
512	ICC IFC	International Fire Code
	NFPA 1-2023	Fire Code
	NFPA 30-2024	Flammable and Combustible Liquids Code
	NFPA 33-2024	Standard for Spray Application Using Flammable or Combustible Materials
	NFPA 36-2025	Standard for Solvent Extraction Plants
	NFPA 58-2024	Liquefied Petroleum Gas Code
	NFPA 70B-2023	Standard for Electrical Equipment Maintenance
	NFPA 497-2024	Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
513	NFPA 30-2024	Flammable and Combustible Liquids Code
	NFPA 33-2024	Standard for Spray Application Using Flammable or Combustible Materials
	NFPA 409-2022	Standard on Aircraft Hangars
514	NFPA 2-2023	Hydrogen Technologies Code
	NFPA 30A-2024	Code for Motor Fuel Dispensing Facilities and Repair Garages
	NFPA 52-2023	Vehicular Natural Gas Fuel Systems Code
	NFPA 58-2024	Liquefied Petroleum Gas Code
	NFPA 59-2024	Utility LP-Gas Plant Code
	NFPA 303-2026	Fire Protection Standard for Marinas and Boatyards
515	NFPA 30-2024	Flammable and Combustible Liquids Code
516	NFPA 13-2025	Standard for the Installation of Sprinkler Systems
	NFPA 33-2024	Standard for Spray Application Using Flammable or Combustible Materials
	NFPA 34-2024	Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids
	NFPA 77-2024	Recommended Practice on Static Electricity
	NFPA 91-2026	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids
	NFPA 701-2023	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
620	UL 4-2004	Armored Cable
	UL 44-2018	Thermoset-Insulated Wires and Cables
	UL 66-2023	Fixture Wire
	UL 504-2022	Mineral Insulated Wire
	UL 1063-2017	Machine-Tool Wires and Cables
	UL 1569-2018	Metal-Clad Cable
625	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3010	Single Site Energy Systems
630	UL 1276-2015	Welding Cable
650	UL 1651-2015	Optical Fiber Cable
660	UL 62-2018	Flexible Cords and Cables
	UL 817-2015	Cord Sets and Power Supply Cords
668	UL 4-2004	Armored Cable
	UL 62-2018	Flexible Cords and Cables
670	UL 1740-2018	Standard for Robots and Robotic Equipment
	UL 2011-2022	Machinery
	UL 3100	Standard for Automated Mobile Platforms (AMPs)
675	UL 44-2018	Thermoset-Insulated Wires and Cables
	UL 83-2017	Thermoplastic-Insulated Wires and Cables
	UL 83A-2016	Fluoropolymer Insulated Wire
	UL 1063-2017	Machine-Tool Wires and Cables
	UL 1263-2020	Irrigation Cable
690	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3010	Single Site Energy Systems
691	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3010	Single Site Energy Systems
692	UL 44-2018	Thermoset-Insulated Wires and Cables
	UL 83-2017	Thermoplastic-Insulated Wires and Cables
	UL 83A-2016	Fluoropolymer Insulated Wire
	UL 1063-2017	Machine-Tool Wires and Cables
	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3010	Single Site Energy Systems
694	UL 44-2018	Thermoset-Insulated Wires and Cables
	UL 62-2018	Flexible Cords and Cables
	UL 83-2017	Thermoplastic-Insulated Wires and Cables
	UL 83A-2016	Fluoropolymer Insulated Wire
	UL 1063-2017	Machine-Tool Wires and Cables
	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3010	Single Site Energy Systems
700	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3008	Automatic Interconnection Switches for Emergency Systems
701	UL 3001-2023	Distributed Energy Generation and Storage Systems

<u>Article</u>	<u>Standard Number</u>	<u>Standard Title</u>
	UL 3008	Automatic Interconnection Switches for Emergency Systems
702	UL 3001-2023	Distributed Energy Generation and Storage Systems
705	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3010	Single Site Energy Systems
708	NEMA CY 10000-2023	Cybersecurity Implementation Guidance for Connected Electrical Infrastructure
710	UL 3001-2023	Distributed Energy Generation and Storage Systems
	UL 3010	Single Site Energy Systems

### Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CN_39.pdf		

### Statement of Problem and Substantiation for Public Comment

NOTE: The following CC Note No. 39 appeared in the First Draft Report on First Revision No. 8154.

The Correlating Committee directs CMP 11 to review FR 8154 and include the edition or dates of the standards in Annex A.

#### Related Item

- First Revision No. 8154

### Submitter Information Verification

**Submitter Full Name:** CC Notes  
**Organization:** NEC Correlating Committee  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Jul 30 12:17:57 EDT 2024  
**Committee:** NEC-P11

### Committee Statement

**Committee Action:** Rejected but see related SR  
**Resolution:** [SR-8084-NFPA 70-2024](#)  
**Statement:** Edition dates are added to the standards that were added to Table A.1(b) during first draft stage under FR 8154.



## Correlating Committee Note No. 39-NFPA 70-2024 [ Section No. A.1 ]

### Submitter Information Verification

**Committee:** NEC-AAC

**Submittal Date:** Tue May 07 15:01:31 EDT 2024

### Committee Statement

**Committee Statement:** The Correlating Committee directs CMP 11 to review FR 8154 and include the edition or dates of the standards in Annex A.

[First Revision No. 8154-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. 105-NFPA 70-2024 [ New Part after I. ]**

**Mini Split units.**

Mini split units shall not use the equipment grounding conductor as a current carrying conductor for the neutral load of the 120 volt fan motor or any other 120 volt load. A separate grounded conductor shall be supplied for all units that have 120 volt loads.

Reason for comment. Most if not all 240 volt mini split units have a 3 conductor circuit installed to a terminal board on the condenser unit and then uses the equipment grounding conductor to get 120 volts to the indoor head unit for the fan motor and controls which induces voltage on the equipment grounding conductor. with a mini split unit with 1 blower head running, a current leakage test indicates in excess of 40mA which will trip a GFCI or 30mA GFP which is the A/C unit of choice on floating structures.

**Statement of Problem and Substantiation for Public Comment**

This would remove current induced on the equipment ground of the mini split and resolve current leakage and tripping GFCI and GFP devices making the installation safer especially on floating structures.

**Related Item**

- Air conditioning and re Fridgeration

**Submitter Information Verification**

**Submitter Full Name:** Bruce Shelton  
**Organization:** State of Tennessee  
**Affiliation:** State Fire Marshals Office Electrical Inspection  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Wed Jul 17 15:47:20 EDT 2024  
**Committee:** NEC-P11

**Committee Statement**

**Committee Action:** Rejected  
**Resolution:** This equipment is required to be listed and labeled and this issue should be addressed through the listing process. Adequate substantiation of the problem was not provided via actual field data or statistical data.