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M E M O R A N D U M

TO: Code-Making Panel 6

FROM: Sarah Caldwell, *Senior Committee Administrator*

DATE: April 29, 2024

SUBJECT: NEC® First Draft CMP FINAL Ballot Results (A2025)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot with the exception of **First Revision No. 8231** as shown in the attached report.

When a First Revision fails Ballot, the changes proposed in the failed Revision shall be considered rejected and shall be deleted from the First Draft. Failed Revisions shall be redesignated as a Committee Input and shall be published in the Input section of the First Draft Report.

20 Members Eligible to Vote
1 Members Not Returned (*Planas*)

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for **each** revision.

To pass ballot, **each** revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $\frac{2}{3}$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.



First Revision No. 8034-NFPA 70-2024 [Detail]

Revise Table 310.15(C)(1) as follows:

Table 310.15(C)(1) Adjustment Factors for More Than Three Current-Carrying Conductors	
Number of Conductors*	Percent of Values in Table 310.16 Through Table 310.19, 310.18, and 310.20 as Adjusted for Ambient Temperature if Necessary
4 C	60

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 23:02:25 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The column heading has been revised to “Percent of Values in Tables 310.16, 310.18, and 310.20 as Adjusted for Ambient Temperature if Necessary”.

This change was made to correlate with the notes under the ampacity tables in Article 310.

Response Message: FR-8034-NFPA 70-2024

[Public Input No. 875-NFPA 70-2023 \[Section No. 310.15\(C\)\(1\)\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying notes from Ampacity tables

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8257-NFPA 70-2024 [Detail]

[See Attached Word Document "PI 1016" For Revision to 310.16]

310.16 Ampacities of Insulated Conductors in Raceway, Cable, or Earth (Directly Buried).

The ampacities shall be as specified in Table 310.16 where all of the following conditions apply:

- (1) Conductors are rated 0 volts through 2000 volts.
- (2) Conductors are rated 60°C (140°F), 75°C (167°F), or 90°C (194°F).
- (3) Wiring is installed in a 30°C (86°F) ambient temperature.
- (4) There are not more than three current-carrying conductors.

Table 310.16 Ampacities of Insulated Conductors with Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried)

Size AWG or kcmil	Temperature Rating of Conductor [See Table 310.4(1)]						Size AWG or kcmil
	60°C (140°F)	75°C (167°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	90°C (194°F)	
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, XHWN, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, PFA, RHH, RHW-2, THHN, THHW, THW-2, THWN- 2, USE-2, XHH, XHHW, XHHW-2, XHWN-2, XHHN, Z, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, XHWN, USE	Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE- 2, XHH, XHHW, XHHW-2, XHWN-2, XHHN	
	COPPER			ALUMINUM OR COPPER-CLAD ALUMINUM			
18*	—	—	14	—	—	—	—
16*	10	—	18	—	—	—	—
14*	15	20	25	10 <u>10</u> [†]	—	—	14 <u>14</u> [†]
12*	20	25	30	15	20	25	12*
10*	30	35	40	25	30	35	10*
8	40	50	55	35	40	45	8
6	55	65	75	40	50	55	6
4	70	85	95	55	65	75	4

3	85	100	115	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	145	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0
250	215	255	290	170	205	230	250
300	240	285	320	195	230	260	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400
500	320	380	430	260	310	350	500
600	350	420	475	285	340	385	600
700	385	460	520	315	375	425	700
750	400	475	535	320	385	435	750
800	410	490	555	330	395	445	800
900	435	520	585	355	425	480	900
1000	455	545	615	375	445	500	1000
1250	495	590	665	405	485	545	1250
1500	525	625	705	435	520	585	1500
1750	545	650	735	455	545	615	1750
2000	555	665	750	470	560	630	2000

Notes:

1. Section 310.15(B) shall be referenced for ampacity correction factors where the ambient temperature is other than 30°C (86°F).
2. Section 310.15(C)(1) shall be referenced for more than three current-carrying conductors.
3. Section 310.16 shall be referenced for conditions of use.

*Section 240.4(D) shall be referenced for conductor overcurrent protection limitations, except as modified elsewhere in the *Code*.

[†] [Applicable only to copper-clad aluminum conductors](#)

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
PI_1016.docx	Revision to the Table of 310.16	

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Sun Jan 21 09:23:19 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Ampacity ratings of 10 has been added for 14 AWG copper-clad aluminum and 16 AWG copper in the 60C column for ampacities of insulated conductors with not more than three current carrying conductors in raceway, cable or earth (directly buried). This change was made based on the data provided for 14 AWG copper-clad aluminum and historical use of 16 AWG copper.

Response Message: FR-8257-NFPA 70-2024

[Public Input No. 1016-NFPA 70-2023 \[Section No. 310.16\]](#)

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

7 Affirmative All

6 Affirmative with Comments

5 Negative with Comments

1 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Jackson, Derick

Newman Scearce, Susan

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Affirmative with Comment

Custer, Shane Douglas

affirmative

Graser, Peter

The ampacity of a conductor, as set in the ampacity tables, is the level of current an insulated conductor can carry without exceeding the temperature rating of the insulating material. This fact is set in the definition of “ampacity” for conductors in Article 100. Other code sections, such as 110.14(C) and 334.80 limit the current that can be applied to circuits, not necessarily because of the conductor, but due to the terminations or other limitations. The Table 310.16 ampacities are not there to determine what can and cannot be used for a branch circuit or any application but are there to set the limits for conductors having the different types of insulation. The application determinations and limits are under the purview of technical panels such as CMP-1, CMP-2, CMP-10, CMP-11, and others. Solid scientific evidence from qualified laboratory testing was provided to CMP-6 in the 2020 and 2023 cycles showing how much current a 14 AWG copper-clad aluminum (CCA) conductor can carry before reaching the insulation type temperatures of 60°C, 75°C and 90°C. The proposed ampacities from the public input are also clearly in line with the AWG step increases when comparing copper and CCA ampacity values. This data also shows clear favorable comparison results to equivalent ampacity copper as the baseline from the testing. For example, some wiring methods and device terminals limit conductors to a reduced current application despite having a higher insulation ampacity rating for the conductors. This is to account for factors particular to the environments and conditions of those wiring methods and terminations. These same conductors could be employed in other wiring methods and terminations that permit them to be applied at a higher ampacity rating. In other words, an NM-B cable with 6 AWG THHN copper conductors would be limited to 55 amperes, based on the 60°C column of Table 310.16 due to the limitations in 334.80 for that particular wiring method. However, the same 6 AWG THHN copper conductors installed in a different wiring method, such as MC cable or conduit, allows an ampacity rating of 65 amperes using the 75°C column where the terminals at each end are rated 75°C such as in many motor branch circuits. No evidence has been submitted to CMP-6 that 14 AWG copper-clad aluminum can only be applied at the 60°C rating. Valid comparative temperature data at the 75°C and 90°C ratings has been provided to the panel from several reports dating back to the 2020 NEC cycle. 14 AWG THHN CCA conductors can safely be used for a motor branch circuit, just like in the above example, at the proposed 75°C ampacity of 15 amperes. In addition, there are times that the conductor ampacity must be reduced with adjustment or correction factors based on 310.15. In these cases, the full conductor insulation ampacity rating, typically 90°C, are used for the calculation. By not providing these values in Table 310.16, the users of the code do not have the information needed to complete these allowed calculations. If the panel believes having these values for 14 AWG copper-clad aluminum is not necessary, then the 90°C rating for 18 AWG and 16 AWG copper that has been in the NEC for many code cycles is an error.

Kent, Gerald W.

As code now allows for a 10a lighting branch circuit it is proper to have a wire rated for 10amps. Data was provided to include #14 copper clad aluminum conductors can be safely used for this. That #16 copper conductor have been rated for 8 amp luminaire load for years without reported issues, it is proper to allow the non-derated ampacity of 10amp on 16 Copper

McDaniel, Greg

Change made due to adding 14-CCA and 16-Copper to Ampacity Table

Porcaro, Michael Thomas

The Electric Light & Power Task Force, representing the Edison Electric Institute (EEI) is in support of the public inputs to incorporate 14AWG CCA and 16AWG CU to the ampacity tables as indicated,

citing provided product testing to substantiate the use case. This is an expansion of the already listed use of CCA currently in the code. Additionally, supporting incorporating modifications to additional code sections related to construction specifications to align permissible minimum wire sizes with the ampacity table additions. Also supporting inclusion of 16AWG CCA for use with control and signal conductors based on provided product testing results.

Vincent, Alexander C.

Committee statement mentions historical use of #16AWG copper as a justification for the 10A ampacity. Specific substantiation is required for those unfamiliar with the history.

Negative with Comment

Crisman, Todd

I oppose this first revision. I support the introduction of 14awg CCA with 10 amp overcurrent protection; however, do not support the introduction of 16awg Copper with 10 amp overcurrent protection. The effort to permit a smaller minimum size CCA conductor for branch circuit wiring has been carefully vetted through a series of tests that have been submitted in reports with the associated Public Inputs over the last 3 code cycles. The Bimetallics Task Group consisting of industry experts was assembled to not only determine which tests should be performed to address the concerns of the panel members but also how to perform them. The results of this testing were submitted in the Menominee Falls Report which accompanied the associated public inputs. The public inputs and comments eventually led to the creation of new code requirements, some of which addressed the limitations of 14awg CCA with 10 amp overcurrent protection which included terminations on receptacles. The results of the heat rise testing on 14 awg cca protected at 10 amps proved the margin of safety from heat rise exceeded that of the known variable-14 awg copper with 15 amp overcurrent protection. Along with heat rise, terminations on circuit breakers and mechanical stability were also tested. It was my understanding that these test procedures were setting a precedence for determining the safe allowance of minimum size conductors moving forward. During the first draft meeting – 16 awg copper was added as a conductor that could be protected at 10 amps. I understand that 16 awg copper has been allowed in the National Electrical Code as a fixture wire with an ampacity of 8 amps and has proven its performance in the field over time. The transition of this conductor from an ampacity for fixture wire to conductors for branch circuit wiring broadens the application of the conductor. I would support this first revision if 16awg copper was removed or preferably if the same test procedures were implemented for 16 awg copper and the data proves a margin of safety that is comparable to that of 14 awg CCA protected at 10 amps. The decision whether or not to allow smaller size conductors should be done in a manner that represents fairness to all affected parties in the industry. This would include comparison testing with a known value that would be performed by a third party. The ultimate goal would be that the panel agrees on the criteria and parameters for the testing program including the margin of safety- similar to the process that was carried through with the “Bimetallics Task Group.” Once the results are presented to the panel, the decision should migrate from a debatable issue and then become a simple pass or fail. I do agree with the allowable ampacity being limited to the 60c column.

Deacy, Brian

Due to concerns of over-current and subsequent overheating of proposed 10-amp branch circuits, the minimum ampacity of branch circuits should remain at 15-amps. This negative vote is consistent with CDA's vote during the 2023 code cycle.

Earl, Tim

The proposed reduction in conductor sizes would be a substantial change to the code. As such, it must be supported by sufficient data to show that safety will not be compromised. I am not convinced that we have enough data to justify this yet.

Hunter, Christel K.

The information provided did not address the substantiation requested by the code-making panel in the 2023 NEC process. The panel spent significant time developing the test protocol, and the information provided did not meet those criteria. The Fire Protection Research Foundation Report concerning smaller branch circuit use concluded that: "In conclusion, the analysis reveals a series of knowledge gaps that, if addressed through further research and experimentation, would significantly enhance our understanding of the performance of small branch circuit conductors within thermal

building insulation." The questions raised regarding the practical, safe use of smaller branch circuits have not been sufficiently addressed.

Watson, Dave

The data supplied during the 2023 code cycle supported leaving the smallest conductor sizes as 14 AWG CU and 12 AWG AL or CCA. That data is still valid and has not been proven inaccurate. A negative vote is consistent with the NEMA votes from the 2023 code cycle.

Abstention

Nielsen, Dennis A.

NFPA 70 110.2 requires or permits conductors to be accepted if approved. The conditions for installation rely on the product listing. Without the product listing, the requirements are not available to establish the NEC requirements for the application to be approved.



First Revision No. 8047-NFPA 70-2024 [Definition: Cable, Nonmetallic-Sheathed (Type NM).]

Cable, Nonmetallic-Sheathed (Type NM).

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

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 09:04:43 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The revision increases the accuracy of the definition. Insulated is added to align with 334.108 and the product certification standard.

Response Message: FR-8047-NFPA 70-2024

Public Input No. 897-NFPA 70-2023 [Definition: Cable, Nonmetallic-Sheathed (Type NM).]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

It was understood that the reference to "circuit conductors" was used to provide a distinction between the equipment grounding conductor.

Custer, Shane Douglas

affirmative

McDaniel, Greg

Help the accuracy of the definition

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8048-NFPA 70-2024 [Definition: Cable, Nonmetallic-Sheathed (Type NMC).]

Cable, Nonmetallic-Sheathed (Type NMC).

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

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 09:06:04 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The revision increases the accuracy of the definition. Insulated is added to align with 334.108 and the product certification standard.

Response Message: FR-8048-NFPA 70-2024

Public Input No. 898-NFPA 70-2023 [Definition: Cable, Nonmetallic-Sheathed (Type NMC).]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

It was understood that the reference to "circuit conductors" was used to provide a distinction between the equipment grounding conductor.

Custer, Shane Douglas

affirmative

McDaniel, Greg

Help the accuracy of the definition

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 7919-NFPA 70-2024 [New Section after 310.1]

310.2 Listing Requirements.

The following shall be listed:

- (1) Insulated conductors
- (2) Copper-clad aluminum conductor material

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 09:13:35 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: A new section 310.2- Listing was added to comply with the parallel construction requirements in the NEC Style Manual. The copper clad aluminum conductor material listing requirements in 310.3(B)(4) were relocated to new 310.2. A clarification that insulated conductors must be listed was also added to this section.

Response Message: FR-7919-NFPA 70-2024

Public Input No. 3494-NFPA 70-2023 [New Section after 310.1]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style manual change. And addition of CCA to Insulated conductors
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8228-NFPA 70-2024 [Section No. 310.3(A)]

(A) Minimum Size of Conductors.

The minimum size of conductors for voltage ratings up to and including 2000 volts shall be 16 AWG copper, 14 AWG copper or 12 AWG aluminum or copper-clad aluminum, or 12 AWG aluminum, except as permitted elsewhere in this ~~Code~~ code.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Sat Jan 20 08:56:48 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Based on data provided the minimum sized conductor for copper-clad aluminum has been reduced to 14 AWG from 12 AWG. The copper minimum size was reduced from 14 AWG is based on historical use of 16 AWG copper.

Response Message: FR-8228-NFPA 70-2024

Public Input No. 1008-NFPA 70-2023 [Section No. 310.3(A)]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

7 Affirmative All

5 Affirmative with Comments

6 Negative with Comments

1 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Graser, Peter
Jackson, Derick
Newman Searce, Susan
Price, Robert Adrian
Reichstein, Alyson
Summers, Lawrence L.

Affirmative with Comment

Custer, Shane Douglas

affirmative

Kent, Gerald W.

As code now allows for a 10a lighting branch circuit it is proper to have a wire rated for 10amps. Data was provided to include #14 copper clad aluminum conductors can be safely used for this. That #16 copper conductor have been rated for 8 amp luminaire load for years without reported issues, it is proper to allow the non-derated ampacity of 10amp on 16 Copper

McDaniel, Greg

Change made due to adding 14-CCA and 16-Copper

Porcaro, Michael Thomas

The Electric Light & Power Task Force, representing the Edison Electric Institute (EEI) is in support of the public inputs to incorporate 14AWG CCA and 16AWG CU to the ampacity tables as indicated, citing provided product testing to substantiate the use case. This is an expansion of the already listed use of CCA currently in the code. Additionally, supporting incorporating modifications to additional code sections related to construction specifications to align permissible minimum wire sizes with the ampacity table additions. Also supporting inclusion of 16AWG CCA for use with control and signal conductors based on provided product testing results.

Vincent, Alexander C.

Committee statement mentions historical use of #16AWG copper as a justification for this minimum conductor gauge. Specific substantiation is required for those unfamiliar with the history.

Negative with Comment

Crisman, Todd

I oppose this first revision. I support the introduction of 14awg CCA with 10 amp overcurrent protection; however, do not support the introduction of 16awg Copper with 10 amp overcurrent protection. The effort to permit a smaller minimum size CCA conductor for branch circuit wiring has been carefully vetted through a series of tests that have been submitted in reports with the associated Public Inputs over the last 3 code cycles. The Bimetallics Task Group consisting of industry experts was assembled to not only determine which tests should be performed to address the concerns of the panel members but also how to perform them. The results of this testing were submitted in the Menominee Falls Report which accompanied the associated public inputs. The public inputs and comments eventually led to the creation of new code requirements, some of which addressed the limitations of 14awg CCA with 10 amp overcurrent protection which included terminations on receptacles. The results of the heat rise testing on 14 awg cca protected at 10 amps proved the margin of safety from heat rise exceeded that of the known variable-14 awg copper with 15 amp overcurrent protection. Along with heat rise, terminations on circuit breakers and mechanical stability were also tested. It was my understanding that these test procedures were setting a precedence for determining the safe allowance of minimum size conductors moving forward. During the first draft meeting – 16 awg copper was added as a conductor that could be protected at 10 amps. I understand that 16 awg copper has been allowed in the National Electrical Code as a fixture wire with an ampacity of 8 amps and has proven its performance in the field over time. The transition of this conductor from an ampacity for fixture wire to conductors for branch circuit wiring broadens the application of the conductor. I would support this first revision if 16awg copper was removed or

preferably if the same test procedures were implemented for 16 awg copper and the data proves a margin of safety that is comparable to that of 14 awg CCA protected at 10 amps. The decision whether or not to allow smaller size conductors should be done in a manner that represents fairness to all affected parties in the industry. This would include comparison testing with a known value that would be performed by a third party. The ultimate goal would be that the panel agrees on the criteria and parameters for the testing program including the margin of safety- similar to the process that was carried through with the "Bimetallics Task Group." Once the results are presented to the panel, the decision should migrate from a debatable issue and then become a simple pass or fail.

Deacy, Brian

Concerns of over-current and subsequent overheating of the proposed minimum conductor size remain. Therefore, the minimum conductor size should remain 14 AWG copper or 12 AWG aluminum or copper-clad aluminum. This negative vote is consistent with CDA's vote during the 2023 code cycle.

Earl, Tim

The proposed reduction in conductor sizes would be a substantial change to the code. As such, it must be supported by sufficient data to show that safety will not be compromised. I am not convinced that we have enough data to justify this yet.

Hunter, Christel K.

The information provided did not address the substantiation requested by the code-making panel in the 2023 NEC process. The panel spent significant time developing the test protocol, and the information provided did not meet those criteria. The Fire Protection Research Foundation Report conducted concerning smaller branch circuit use concluded that: "In conclusion, the analysis reveals a series of knowledge gaps that, if addressed through further research and experimentation, would significantly enhance our understanding of the performance of small branch circuit conductors within thermal building insulation." The questions raised regarding the practical, safe use of smaller branch circuits have not been sufficiently addressed.

Stene, Susan L.

CMP 6 reviewed similar proposals for the 2023 NEC and developed responses that carefully detailed testing considered necessary to process these changes. These tests have not been provided to the CMP for review. UL Solutions would consider revisions after reviewing results from the noted tests.

Watson, Dave

The data supplied during the 2023 code cycle supported leaving the smallest conductor sizes as 14 AWG CU and 12 AWG AL or CCA. That data is still valid and has not been proven inaccurate. A negative vote is consistent with the NEMA votes from the 2023 code cycle.

Abstention

Nielsen, Dennis A.

NFPA 70 110.2 requires or permits conductors to be accepted if approved. The conditions for installation rely on the product listing. Without the product listing, the requirements are not available to establish the NEC requirements for the application to be approved.



First Revision No. 7930-NFPA 70-2024 [Section No. 310.3(B)]

(B) Conductor Material.

Conductors in this article shall be of copper, aluminum, or copper-clad aluminum, unless otherwise specified. Aluminum and copper-clad aluminum shall comply with the following:

- (1) Solid aluminum conductors 8, 10, and 12 AWG shall be made of an AA-8000 series electrical grade aluminum alloy conductor material.
- (2) Stranded aluminum conductors 8 AWG through 1000 kcmil marked as Type RHH, RHW, XHHW, XHHN, XHWN, THW, THHW, THWN, THHN, service-entrance Type SE Style U, and SE Style R shall be made of an AA-8000 series electrical grade aluminum alloy conductor material.
- (3) For copper-clad aluminum conductors, the copper shall form a minimum 10 percent of the cross-sectional area of a solid conductor or each strand of a stranded conductor. The aluminum core of a copper-clad aluminum conductor shall be made of an AA-8000 series electrical grade aluminum alloy conductor material.
- (3) ~~Copper-clad aluminum conductor material shall be listed.~~

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 10:08:14 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: This list item was deleted because a new section "310.2 Listing" was added that contained the same requirement for listing copper-clad aluminum conductor material.

Response Message: FR-7930-NFPA 70-2024

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Item Deleted because of New listing on 310.2

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 7931-NFPA 70-2024 [Section No. 310.4]

310.4 Conductor Constructions and Applications.

Insulated conductors shall comply with Table 310.4(1) and Table 310.4(2).

Informational Note: Thermoplastic insulation may stiffen at temperatures lower than -10°C (+14°F). Thermoplastic insulation may also be deformed at normal temperatures where subjected to pressure, such as at points of support.

Table 310.4(1) Conductor Applications and Insulations Rated 600 Volts

Trade Name	Type Letter	Maximum Operating Temperature	Application Provisions	Insulation	Thickness of Insulation					Outer Covering		
					AWG or kcmil	mm		mils				
Fluorinated ethylene propylene	FEP or FEPB	90°C (194°F)	Dry and damp locations	Fluorinated ethylene propylene	14–10	0.51		20		None		
		200°C (392°F)	Dry locations — special applications ²	Fluorinated ethylene propylene	8–2	0.76		30		Glass braid or other suitable braided material		
					14–8	0.36		14				
Mineral insulation (metal sheathed)	MI	90°C (194°F) 250°C (482°F)	Dry and wet locations	Magnesium oxide	18–16 ³	0.58		23		Copper alloy steel		
			For special applications ²		16–10	0.91		36				
					9–4	1.27		50				
					3–500	1.40		55				
Moisture-, heat-, and oil-resistant thermoplastic	MTW	60°C (140°F)	Machine tool wiring in wet locations	Flame-retardant, moisture-, heat-, and oil-resistant thermoplastic	22–12	(A)	(B)	(A)	(B)	(A) None		
		90°C (194°F)	Machine tool wiring in dry locations.			Informational Note: See NFPA 79-2021, <i>Electrical Standard for Industrial Machinery</i> .	0.76	0.38	30	15	(B) Nylon jacket or equivalent	
							10	0.76	0.51	30		20
							8	1.14	0.76	45		30
							6	1.52	0.76	60		30
							4–2	1.52	1.02	60		40
							1–4/0	2.03	1.27	80		50
							213–500	2.41	1.52	95		60
							501–1000	2.79	1.78	110		70
		Paper				85°C (185°F)	For underground service conductors, or by special permission	Paper				
Perfluoro-alkoxy	PFA	90°C (194°F)	Dry and damp locations	Perfluoro-alkoxy	14–10	0.51		20		None		
		200°C (392°F)	Dry locations — special applications ²		8–2	0.76		30				
					1–4/0	1.14		45				
Perfluoro-alkoxy	PFAH	250°C	Dry locations only. Only for alkoxy	Perfluoro-alkoxy	14–10	0.51		20		None		

Trade Name	Type Letter	Maximum Operating Temperature	Application Provisions	Insulation	Thickness of Insulation			Outer Covering
					AWG or kcmil	mm	mils	
		(482°F)	leads within apparatus or within raceways connected to apparatus (nickel or nickel-coated copper only)		8–2	0.76	30	
					1–4/0	1.14	45	
Thermoset	RHH	90°C	Dry and damp locations		14–10	1.14	45	Moisture-resistant flame-retardant nonmetallic covering
		8–2			1.52	60		
		1–4/0			2.03	80		
		213–500			2.41	95		
		501–1000			2.79	110		
		1001–2000			3.18	125		
Moisture-resistant thermoset	RHW	75°C (167°F)	Dry and wet locations	Flame-retardant, moisture-resistant thermoset	14–10	1.14	45	Moisture-resistant flame-retardant nonmetallic covering
	RHW-2	90°C			8–2	1.52	60	
		(194°F)			1–4/0	2.03	80	
					213–500	2.41	95	
					501–1000	2.79	110	
					1001–2000	3.18	125	
Silicone	SA		90°C (194°F)	Dry and damp locations	Silicone rubber	14–10	1.14	45
		200°C (392°F)	8–2			1.52	60	
			For special application ²			1–4/0	2.03	80
				213–500		2.41	95	
		501–1000		2.79		110		
		1001–2000	3.18	125				
Thermoset	SIS	90°C (194°F)	Switchboard and switchgear wiring only	Flame-retardant thermoset	14–10	0.76	30	None
		8–2			1.14	45		
		1–4/0			1.40	55		
Thermoplastic and fibrous outer braid	TBS	90°C	Switchboard and switchgear wiring only	Thermoplastic	14–10	0.76	30	Flame-retardant nonmetallic covering
		(194°F)			8	1.14	45	
					6–2	1.52	60	
					1–4/0	2.03	80	

Trade Name	Type Letter	Maximum Operating Temperature	Application Provisions	Insulation	Thickness of Insulation			Outer Covering
					AWG or kcmil	mm	mils	
Extended polytetrafluoroethylene	TFE	250°C	Dry locations only. Only for leads within apparatus or within raceways connected to apparatus, or as open wiring (nickel or nickel-coated copper only)	Extruded polytetrafluoroethylene	14–10	0.51	20	None
		8–2			0.76	30		
		1–4/0			1.14	45		
Heat-resistant thermoplastic	THHN	90°C (194°F)	Dry and damp locations	Flame-retardant, heat-resistant thermoplastic	14–12	0.38	15	Nylon jacket or equivalent
					10	0.51	20	
					8–6	0.76	30	
					4–2	1.02	40	
					1–4/0	1.27	50	
					250–500	1.52	60	
					501–1000	1.78	70	
Moisture- and heat-resistant thermoplastic	THHW	75°C (167°F) 90°C (194°F)	Wet location	Flame-retardant, moisture- and heat-resistant thermoplastic	14–10	0.76	30	None
					8	1.14	45	
					6–2	1.52	60	
			Dry location		1–4/0	2.03	80	
					213–500	2.41	95	
					501–1000	2.79	110	
					1001–2000	3.18	125	
Moisture- and heat-resistant thermoplastic	THW	75°C (167°F) 90°C (194°F)	Dry and wet locations	Flame-retardant, moisture- and heat-resistant thermoplastic	14–10	0.76	30	None
					8	1.14	45	
					6–2	1.52	60	
			Special applications within electric discharge lighting equipment. Limited to 1000 open-circuit volts or less. (Size 14-8 only as permitted in 410.68.)		1–4/0	2.03	80	
					213–500	2.41	95	
					501–1000	2.79	110	
					1001–2000	3.18	125	

Trade Name	Type Letter	Maximum Operating Temperature	Application Provisions	Insulation	Thickness of Insulation			Outer Covering
					AWG or kcmil	mm	mils	
	THW-2	90°C (194°F)	Dry and wet locations					
Moisture- and heat-resistant thermoplastic	THWN	75°C (167°F)	Dry and wet locations	Flame-retardant, moisture- and heat-resistant thermoplastic	14–12	0.38	15	Nylon jacket or equivalent
					10	0.51	20	
					8–6	0.76	30	
					4–2	1.02	40	
	THWN-2	90°C (194°F)			1–4/0	1.27	50	
					250–500	1.52	60	
					501–1000	1.78	70	
Moisture-resistant thermoplastic	TW	60°C (140°F)	Dry and wet locations	Flame-retardant, moisture-resistant thermoplastic	14–10	0.76	30	None
					8	1.14	45	
					6–2	1.52	60	
					1–4/0	2.03	80	
					213–500	2.41	95	
					501–1000	2.79	110	
					1001–2000	3.18	125	
Underground feeder and branch-circuit cable — single conductor (for Type UF cable employing more than one conductor, see Part II of Article 340, Part II).	UF	60°C (140°F)	See Part II of Article 340, Part II.	Moisture-resistant	14–10	1.52	60 ⁵	Integral with insulation
					8–2	2.03	80 ⁵	
		75°C (167°F) ⁴		Moisture- and heat-resistant	1–4/0	2.41	95 ⁵	
Underground service-entrance cable — single conductor (for Type USE cable employing more than one conductor, see Part II of Article 338, Part II).	USE	75°C (167°F) ⁴	See Part II of Article 338, Part II.	Heat- and moisture-resistant	14–10	1.14	45	Moisture-resistant nonmetallic covering (See 338.2.)
					8–2	1.52	60	
					1–4/0	2.03	80	
					213–500	2.41	95 ⁶	
					501–1000	2.79	110	
					1001–2000	3.18	125	

Trade Name	Type Letter	Maximum Operating Temperature	Application Provisions	Insulation	Thickness of Insulation			Outer Covering
					AWG or kcmil	mm	mils	
Article 338, Part II).	USE-2	90°C (194°F)	Dry and wet locations					
Thermoset	XHH	90°C (194°F)	Dry and damp locations	Flame-retardant thermoset	14–10	0.76	30	None
					8–2	1.14	45	
					1–4/0	1.40	55	
					213–500	1.65	65	
					501–1000	2.03	80	
					1001–2000	2.41	95	
Thermoset	XHHN	90°C (194°F)	Dry and damp locations	Flame-retardant thermoset	14–12	0.38	15	Nylon jacket or equivalent
					10	0.51	20	
					8–6	0.76	30	
					4–2	1.02	40	
					1–4/0	1.27	50	
					250–500	1.52	60	
					501–1000	1.78	70	
Moisture-resistant thermoset	XHHW	90°C (194°F)	Dry and damp locations	Flame-retardant, moisture-resistant thermoset	14–10	0.76	30	None
		75°C (167°F)	Wet locations		8–2	1.14	45	
					1–4/0	1.40	55	
					213–500	1.65	65	
					501–1000	2.03	80	
					1001–2000	2.41	95	
Moisture-resistant thermoset	XHHW-2	90°C (194°F)	Dry and wet locations	Flame-retardant, moisture-resistant thermoset	14–10	0.76	30	None
					8–2	1.14	45	
					1–4/0	1.40	55	
					213–500	1.65	65	
					501–1000	2.03	80	
					1001–2000	2.41	95	
Moisture-resistant thermoset	XHWN	75°C (167°F)	Dry and wet locations	Flame-retardant, moisture-resistant thermoset	14–12	0.38	15	Nylon jacket or equivalent
					10	0.51	20	
					8–6	0.76	30	

Trade Name	Type Letter	Maximum Operating Temperature	Application Provisions	Insulation	Thickness of Insulation			Outer Covering
					AWG or kcmil	mm	mils	
	XHWN-2	90°C (194°F)			4–2 1–4/0 250–500 501–1000	1.02 1.27 1.52 1.78	40 50 60 70	
Modified ethylene tetrafluoro-ethylene	Z	90°C (194°F)	Dry and damp locations	Modified ethylene tetrafluoro-ethylene	14–12	0.38	15	None
		150°C (302°F)	Dry locations — special applications ²		10	0.51	20	
					8–4	0.64	25	
					3–1	0.89	35	
					1/0–4/0	1.14	45	
Modified ethylene tetrafluoro-ethylene	ZW	75°C (167°F)	Wet locations	Modified ethylene tetrafluoro-ethylene	14–10	0.76	30	None
		90°C (194°F)	Dry and damp locations					
		150°C (302°F)	Dry locations — special applications ²					
		ZW-2	90°C (194°F)					

Note: Conductors in Table 310.4(1) shall be permitted to be rated up to 1000 volts if listed and marked.

¹Outer coverings shall not be required where listed without a covering.

²Higher temperature rated constructions shall be permitted where design conditions require maximum conductor operating temperatures above 90°C (194°F).

³Conductor sizes shall be permitted for signaling circuits permitting 300-volt insulation.

⁴The ampacity of Type UF cable shall be limited in accordance with 340.80.

⁵Type UF insulation thickness shall include the integral jacket.

⁶Insulation thickness shall be permitted to be 2.03 mm (80 mils) for listed Type USE conductors that have been subjected to special investigations. The nonmetallic covering over individual rubber-covered conductors of aluminum-sheathed cable and of lead-sheathed or multiconductor cable shall not be required to be flame retardant.

Table 310.4(2) Thickness of Insulation for Nonshielded Types RHH and RHW Solid Dielectric Insulated Conductors Rated 2000 Volts

<u>Conductor Size</u> <u>(AWG or kcmil)</u>	<u>Column A¹</u>		<u>Column B²</u>	
	<u>mm</u>	<u>mils</u>	<u>mm</u>	<u>mils</u>
14–10	2.03	80	1.52	60

<u>Conductor Size</u> <u>(AWG or kcmil)</u>	<u>Column A¹</u>		<u>Column B²</u>	
	<u>mm</u>	<u>mils</u>	<u>mm</u>	<u>mils</u>
8	2.03	80	1.78	70
6–2	2.41	95	1.78	70
1–2/0	2.79	110	2.29	90
3/0–4/0	2.79	110	2.29	90
213–500	3.18	125	2.67	105
501–1000	3.56	140	3.05	120
1001–2000	3.56	140	3.56	140

¹Column A insulations shall be limited to natural, SBR, and butyl rubbers.

²Column B insulations shall be materials such as cross-linked polyethylene, ethylene propylene rubber, and composites thereof.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 10:10:09 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: A revision was made to the “application provisions” column for USE and UF when addressing Parts of the specific articles. In both columns, the article number will be moved to precede the part number as recommended by the NEC Style Manual section 4.1.4.

Response Message: FR-7931-NFPA 70-2024

[Public Input No. 2656-NFPA 70-2023 \[Section No. 310.4\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 7958-NFPA 70-2024 [Section No. 310.6(C)]

(C) Ungrounded Conductors.

~~Conductors that are intended for use as ungrounded conductors, whether used as a single conductor or in multiconductor cables, shall be finished to be clearly distinguishable from grounded conductors and equipment grounding conductors. Distinguishing markings shall not conflict in any manner with the surface markings required by 310.8(B)(1). Branch-circuit ungrounded conductors shall be identified in accordance with 210.5(C). Feeders shall be identified in accordance with 215.12(C).~~

~~Exception: Conductor identification shall be permitted in accordance with 200.7.~~

(1) General.

Conductors that are intended for use as ungrounded conductors, whether used as a single conductor or in multiconductor cables, shall be finished to be clearly distinguishable from grounded conductors and equipment grounding conductors. Distinguishing markings shall not conflict in any manner with the surface markings required by 310.8(B)(1).

(2) Branch Circuit(s).

Branch-circuit ungrounded conductors supplied from more than one nominal voltage system shall be identified in accordance with 210.5(C).

(3) Feeder(s).

Feeders supplied from more than one nominal voltage system shall be identified in accordance with 215.12(C).

Exception: Conductor identification shall be permitted in accordance with 200.7.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-7958_310.6_C_.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 12:49:43 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: This paragraph was broken up into a list format as recommended in the NEC Style Manual section 3.5.1.2. The language “supplied from more than one nominal voltage system” was added to new second level subdivisions 2 and 3 to provide clarification on the differences in the marking requirements when there is more than one nominal voltage system.

Response FR-7958-NFPA 70-2024

Message:

[Public Input No. 3062-NFPA 70-2023 \[Section No. 310.6\(C\)\]](#)

[Public Input No. 3947-NFPA 70-2023 \[Section No. 310.6\(C\)\]](#)

Ballot Results

✔ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 7934-NFPA 70-2024 [Section No. 310.10(D)]

(D) ~~Locations~~ Conductors Exposed to Direct Sunlight.

~~Insulated conductors or cables used where~~ Conductors exposed to ~~direct the~~ rays of the sun shall comply with one of the following:

- (1) ~~Conductors~~ Be insulated and ~~cables shall be~~ listed as being sunlight resistant-
- (2) ~~Conductors and cables shall be~~ Be covered with insulating material, such as tape or sleeving, that is listed as being sunlight resistant-
- (3) Be bare or have insulation or covering that is not sunlight resistant where bare conductors are permitted elsewhere in this code

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 10:25:01 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The language in this section has been revised to clarify that an installer would not be required to remove insulation from a conductor due to a lack of listing for sunlight resistance when the conductor is permitted to be installed bare.

Response Message: FR-7934-NFPA 70-2024

Public Input No. 254-NFPA 70-2023 [Section No. 310.10(D)]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Covering is NOT required to be removed IF the wire is permitted to be bare elsewhere in the code.

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8030-NFPA 70-2024 [Section No. 310.10(G)(3)]

(3) Separate Cables or Raceways.

~~Where run in separate cables or raceways, the cables or raceways with conductors shall have the same number of conductors and shall have the same electrical characteristics. Conductors composing one paralleled set shall not be required to have the same physical characteristics as those of another paralleled set.~~

(A) Cable or Raceways.

Where run in separate cables or raceways, the cables or raceways with conductors shall have the same number of conductors and the cables or raceways shall have the same electrical characteristics.

(B) Conductors.

Conductors composing one paralleled set shall not be required to have the same physical characteristics as those of another paralleled set.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8030_310.10_G_3_.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 22:19:41 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: This section was formatted into two second level subdivisions to make it clear for Code users that there are multiple requirements. This action follows the recommendations of the NEC Style Manual section 3.5.1.2.

Response Message: FR-8030-NFPA 70-2024

Public Input No. 2201-NFPA 70-2023 [Section No. 310.10(G)(3)]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All
4 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Stye Manual Change
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 7943-NFPA 70-2024 [Section No. 310.12(A)]

(A) Services.

For a service rated 100 amperes through 400 amperes, the service conductors supplying the entire load associated with a one-family dwelling, or the service conductors supplying the entire load associated with an individual dwelling unit in a two-family or multifamily dwelling, shall be permitted to have an ampacity not less than 83 percent of the service rating. If no adjustment or correction factors are required, Table 310.12(A) shall be permitted to be applied for conductors or cables rated 75°C (167°F) or greater.

Table 310.12(A) Single-Phase Dwelling Services and Feeders

<u>Service or Feeder Rating</u> <u>(Amperes)</u>	<u>Conductor</u> <u>(AWG or kcmil)</u>	
	<u>Copper</u>	<u>Aluminum or Copper-Clad Aluminum</u>
100	4	2
110	3	1
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	3/0	250
250	4/0	300
300	250	350
350	350	500
400	400	600

Note: If no adjustment or correction factors are required, this table shall be permitted to be applied.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 11:05:37 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Language was added to the last sentence in 310.12(A) to clarify that installations using conductors or cables limited to 60C ampacities are not permitted to use the table.

“If no adjustment or correction factors are required, Table 310.12(A) shall be permitted to be applied for conductors or cables rated 75C or greater.”

Response FR-7943-NFPA 70-2024
Message:

Public Input No. 447-NFPA 70-2023 [Section No. 310.12(A)]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying only 75+ or greater to use this Table.

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 7953-NFPA 70-2024 [Section No. 310.12(B)]

(B) Feeders.

For a feeder rated 100 amperes through 400 amperes, the feeder conductors supplying the entire load associated with a one-family dwelling, or the feeder conductors supplying the entire load associated with an individual dwelling unit in a two-family or multifamily dwelling, shall be permitted to have an ampacity not less than 83 percent of the feeder rating. If no adjustment or correction factors are required, Table 310.12(A) shall be permitted to be applied for conductors or cables rated 75°C (167°F) or greater .

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 11:30:55 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: a

Response Message: FR-7953-NFPA 70-2024

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree It's possible the committee statement for 7943 would be applicable to 7953.
Custer, Shane Douglas
affirmative
McDaniel, Greg
Clarifying only 75+ or greater to use this Table.
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8031-NFPA 70-2024 [Section No. 310.12 [Excluding any Sub-Sections]]

For one-family dwellings and the individual dwelling units of two-family and multifamily dwellings, service and feeder conductors supplied by a single-phase, 120/240-volt system shall be permitted to be sized in accordance with 310.12(A) through 310.12(D).

For one-family dwellings and the individual dwelling units of two-family and multifamily dwellings, single-phase feeder conductors consisting of two ungrounded conductors and the neutral conductor from a 208Y/120 volt system shall be permitted to be sized in accordance with 310.12(A) through 310.12(C).

Where correction or adjustment factors are required by 310.15(B) or 310.15(C), they shall be permitted to be applied to the ampacity associated with the temperature rating of the conductor.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 22:27:23 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: “Where correction or adjustment factors are required by 310.15 (B) or (C), they shall be permitted to be applied to the ampacity associated with the temperature rating of the conductor” has been relocated from first level subdivision (D) to the main section requirements to make it clear that the correction and adjustment factors apply to all service and feeder circuit conductors and not just the grounded conductors.

Response Message: FR-8031-NFPA 70-2024

Public Input No. 884-NFPA 70-2023 [Section No. 310.12]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Moved from subsection to main to help clarify requirements

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 7955-NFPA 70-2024 [Section No. 310.14(A)(2)]

(2) Selection of Ampacity.

Where more than one ampacity applies for a given circuit length, the lowest value shall be used.

Exception: Where different ampacities resulting from 310.15(B) or 310.15(C) calculations apply to portions of a circuit, the higher ampacity shall be permitted to be used if the total portion(s) of the circuit with lower ampacity does not exceed the lesser of 3.0 m (10 ft) or 10 percent of the total circuit. the following:

(1) 3.0 m (10 ft)

(2) 10 percent of the total circuit

Informational Note: See 110.14(C) for conductor temperature limitations due to termination provisions.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-7955_310.14_A_2_.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 11:36:46 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Editorial changes were made for clarity. The value(s) of ampacity are calculated and applied with various conditions affecting the conductor selection for installation. It is after this step the determination can be made for applying the exception and therefore the language was changed to represent this step.

Response Message: FR-7955-NFPA 70-2024

Public Input No. 749-NFPA 70-2023 [Section No. 310.14(A)(2)]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned
15 Affirmative All
4 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Clarifying Language
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 7959-NFPA 70-2024 [Section No. 310.15(A)]

(A) General.

Ampacities for conductors rated 0 volts to 2000 volts shall be as specified in the Ampacity Table 310.16 through Table 310.21, as modified by 310.15(A) through 310.15(F) and 310.12. Under engineering supervision, ampacities of sizes not shown in ampacity tables for conductors meeting the general wiring requirements shall be permitted to be determined by interpolation of the adjacent conductors based on the conductor's circular-mil area.

The temperature correction and adjustment factors shall be permitted to be applied to the ampacity for the temperature rating of the conductor, if the corrected and adjusted ampacity does not exceed the ampacity for the temperature rating of the termination in accordance with 110.14(C).

Informational Note No. 1: Table 310.16 through Table 310.19 are application tables for use in determining conductor sizes on loads calculated in accordance with Article 220, Part II, Part III, Part IV, or Part V of ~~Article 220~~. Ampacities result from consideration of one or more of the following:

- (1) Temperature compatibility with connected equipment, especially the connection points
- (2) Coordination with circuit and system overcurrent protection
- (3) Compliance with the requirements of product listings or certifications.
- (4) Preservation of the safety benefits of established industry practices and standardized procedures

Informational Note No. 2: See Chapter 9, Table 8; ~~Conductor Properties~~, for conductor area. Interpolation is based on the conductor circular-mil area and not the conductor overall area.

Informational Note No. 3: See 400.5 for the ampacities of flexible cords and cables. See 402.5 for the ampacities of fixture wires.

Informational Note No. 4: See Table 310.4(1) and Table 310.4(2) for explanation of type letters used in tables and for recognized sizes of conductors for the various conductor insulations. See 310.1 through 310.14 and the various articles of this ~~Code~~ code for installation requirements. See Table 400.4, Table 400.5(A)(1), and Table 400.5(A)(2) for flexible cords.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 12:55:32 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: A revision was made to Informational note No. 1. The article number "Article 220" will be moved to precede the part number of the article as recommended by the NEC Style Manual section 4.1.4.

Response Message: FR-7959-NFPA 70-2024

Public Input No. 2657-NFPA 70-2023 [Section No. 310.15(A)]

Ballot Results

✔ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree I wasn't sure if the removal of the title of Chapter 9 Table 8 - "Conductor Properties" was editorial.

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 7961-NFPA 70-2024 [Section No. 310.15(B)(2)]

(2) Rooftop.

For raceways or cables exposed to direct sunlight on or above rooftops where the distance above the roof to the bottom of the raceway or cable is less than 19 mm ($\frac{3}{4}$ in.), a temperature adder of 33°C (60°F) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.15(B)(1)(1) or Table 310.15(B)(1)(2).

Exception: Type XHHW-2 insulated conductors shall not be subject to this ~~ampacity adjustment~~ temperature correction.

Informational Note: The *ASHRAE Handbook — Fundamentals* is one source for the ambient temperatures in various locations.

Table 310.15(B)(1)(1) Ambient Temperature Correction Factors Based on 30°C (86°F)

For ambient temperatures other than 30°C (86°F), multiply the ampacities specified in the ampacity tables by the appropriate correction factor shown below.

Ambient Temperature (°C)	Temperature Rating of Conductor			Ambient Temperature (°F)
	60°C	75°C	90°C	
10 or less	1.29	1.20	1.15	50 or less
11–15	1.22	1.15	1.12	51–59
16–20	1.15	1.11	1.08	60–68
21–25	1.08	1.05	1.04	69–77
26–30	1.00	1.00	1.00	78–86
31–35	0.91	0.94	0.96	87–95
36–40	0.82	0.88	0.91	96–104
41–45	0.71	0.82	0.87	105–113
46–50	0.58	0.75	0.82	114–122
51–55	0.41	0.67	0.76	123–131
56–60	—	0.58	0.71	132–140
61–65	—	0.47	0.65	141–149
66–70	—	0.33	0.58	150–158
71–75	—	—	0.50	159–167
76–80	—	—	0.41	168–176
81–85	—	—	0.29	177–185

Note: Table 310.15(B)(1)(1) shall be used with Table 310.16 and Table 310.17 as required.

Table 310.15(B)(1)(2) Ambient Temperature Correction Factors Based on 40°C (104°F)

For ambient temperatures other than 40°C (104°F), multiply the ampacities specified in the ampacity tables by the appropriate correction factor shown below.

Ambient Temperature (°C)	Temperature Rating of Conductor						Ambient Temperature (°F)
	60°C	75°C	90°C	150°C	200°C	250°C	
10 or less	1.58	1.36	1.26	1.13	1.09	1.07	50 or less
11–15	1.50	1.31	1.22	1.11	1.08	1.06	51–59
16–20	1.41	1.25	1.18	1.09	1.06	1.05	60–68
21–25	1.32	1.2	1.14	1.07	1.05	1.04	69–77
26–30	1.22	1.13	1.10	1.04	1.03	1.02	78–86
31–35	1.12	1.07	1.05	1.02	1.02	1.01	87–95
36–40	1.00	1.00	1.00	1.00	1.00	1.00	96–104
41–45	0.87	0.93	0.95	0.98	0.98	0.99	105–113

For ambient temperatures other than 40°C (104°F), multiply the ampacities specified in the ampacity tables by the appropriate correction factor shown below.

<u>Ambient Temperature (°C)</u>	<u>Temperature Rating of Conductor</u>						<u>Ambient Temperature (°F)</u>
	<u>60°C</u>	<u>75°C</u>	<u>90°C</u>	<u>150°C</u>	<u>200°C</u>	<u>250°C</u>	
46–50	0.71	0.85	0.89	0.95	0.97	0.98	114–122
51–55	0.50	0.76	0.84	0.93	0.95	0.96	123–131
56–60	—	0.65	0.77	0.90	0.94	0.95	132–140
61–65	—	0.53	0.71	0.88	0.92	0.94	141–149
66–70	—	0.38	0.63	0.85	0.90	0.93	150–158
71–75	—	—	0.55	0.83	0.88	0.91	159–167
76–80	—	—	0.45	0.80	0.87	0.90	168–176
81–90	—	—	—	0.74	0.83	0.87	177–194
91–100	—	—	—	0.67	0.79	0.85	195–212
101–110	—	—	—	0.60	0.75	0.82	213–230
111–120	—	—	—	0.52	0.71	0.79	231–248
121–130	—	—	—	0.43	0.66	0.76	249–266
131–140	—	—	—	0.30	0.61	0.72	267–284
141–160	—	—	—	—	0.50	0.65	285–320
161–180	—	—	—	—	0.35	0.58	321–356
181–200	—	—	—	—	—	0.49	357–392
201–225	—	—	—	—	—	0.35	393–437

Note: Table 310.15(B)(1)(2) shall be used with Table 310.18, Table 310.19, Table 310.20, and Table 310.21 as required.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 13:00:25 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The words “ampacity adjustment” have been replaced with “temperature correction” to more accurately describe the exception that is permitted for XHHW-2 conductors when installed on rooftops exposed to direct sunlight.

Response Message: FR-7961-NFPA 70-2024

Public Input No. 960-NFPA 70-2023 [Section No. 310.15(B)(2)]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Wording change from "adjustment" to "correction" for accuracy

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8033-NFPA 70-2024 [Section No. 310.15(C)(1)]

Detail FR-8034

(1) More than Three Current-Carrying Conductors.

The ampacity of each conductor shall be reduced as shown in Table 310.15(C)(1) where the number of current-carrying conductors in a raceway or cable exceeds three, ~~or installed without maintaining spacing for a continuous length longer than 600 mm (24 in.).~~

The ampacity of each conductor shall be reduced as shown in Table 310.15(C)(1) where single conductors or multiconductor cables not installed in raceways are installed without maintaining spacing for a continuous length longer than 600 mm (24 in.).

Each current-carrying conductor of a paralleled set of conductors shall be counted as a current-carrying conductor.

Where conductors of different systems, as provided in 300.5, are installed in a common raceway or cable, the adjustment factors shown in Table 310.15(C)(1) shall apply only to the number of power and lighting conductors.

Informational Note No. 1: See Informative Annex B for adjustment factors for more than three current-carrying conductors in a raceway or cable with load diversity.

Informational Note No. 2: See 366.23 for adjustment factors for conductors and ampacity for bare copper and aluminum bars in auxiliary gutters and 376.22(B) for adjustment factors for conductors in metal wireways.

(a) Where conductors are installed in cable trays, 392.80 shall apply.

(b) Adjustment factors shall not apply to conductors in raceways having a length not exceeding 600 mm (24 in.).

(c) Adjustment factors shall not apply to underground conductors entering or leaving an outdoor trench if those conductors have physical protection in the form of rigid metal conduit, intermediate metal conduit, rigid polyvinyl chloride conduit (PVC), or reinforced thermosetting resin conduit (RTRC) having a length not exceeding 3.05 m (10 ft), and if the number of conductors does not exceed four.

(d) Adjustment factors shall not apply to Type AC cable or to Type MC cable under the following conditions:

- (1) The cables do not have an overall outer jacket.
- (2) Each cable has not more than three current-carrying conductors.
- (3) The conductors are 12 AWG copper.
- (4) Not more than 20 current-carrying conductors are installed without maintaining spacing, are stacked, or are supported on "bridle rings."

Exception to (4): If cables meeting the requirements in 310.15(C)(1)(d)(1) through 310.15(C)(1)(d)(3) with more than 20 current-carrying conductors are installed longer than 600 mm (24 in.) without maintaining spacing, are stacked, or are supported on bridle rings, a 60 percent adjustment factor shall be applied.

Table 310.15(C)(1) Adjustment Factors for More Than Three Current-Carrying Conductors

<u>Number of</u>	<u>Percent of Values in</u>
<u>Conductors</u> *	<u>Table 310.16 Through Table 310.19, 310.18, and 310.20 as Adjusted for</u>
	<u>Ambient Temperature if Necessary</u>
4–6	80
7–9	70
10–20	50
21–30	45
31–40	40
41 and above	35

* Number of conductors is the total number of conductors in the raceway or cable, including spare conductors. The count shall be adjusted in accordance with 310.15(E) and 310.15(F). The count shall not include conductors that are connected to electrical components that cannot be simultaneously energized.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 22:51:23 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The first paragraph of 310.15c1 has been split up to provide distinction between the 2 requirements. This revision complies with NEC Style Manual section 3.5.1.2.

Response Message: FR-8033-NFPA 70-2024

Public Input No. 3958-NFPA 70-2023 [Section No. 310.15(C)(1)]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8035-NFPA 70-2024 [Section No. 310.15(E)]

(E) Neutral Conductor.

~~Neutral conductors shall be considered current-carrying in accordance with any of the following: When applying 310.15(C), neutrals shall comply with 310.15(A) or 310.15(B).~~

- ~~(0) A neutral conductor that carries only the unbalanced current from other conductors of the same circuit shall not be required to be counted when applying the provisions of 310.15(C)(1) :~~
- ~~(0) In a 3-wire circuit consisting of two phase conductors and the neutral conductor of a 4-wire, 3-phase, wye-connected system, the neutral conductor carries approximately the same current as the line-to-neutral load currents of the other conductors and shall be counted when applying 310.15(C)(1) :~~
- ~~(0) On a 4-wire, 3-phase wye circuit where the major portion of the load consists of nonlinear loads, harmonic currents are present in the neutral conductor; the neutral conductor shall therefore be considered a current-carrying conductor.~~

(1) Current-Carrying.

A neutral conductor shall be considered as current-carrying in any of the following circuits:

- (1) A 2 wire circuit consisting of one ungrounded and one neutral conductor
- (2) A 3 wire circuit consisting of two ungrounded conductors and the neutral conductor of a 4-wire, 3 phase, wye connected system

Informational Note: When two ungrounded conductors and a neutral originate from a 4-wire, 3 phase, wye connected system, the neutral conductor carries approximately the same current as the line-to-neutral load current of the other conductors.

- (3) A 4-wire, 3-phase wye circuit where the major portion of the load consists of nonlinear loads

Informational Note: Where the major portion of the loads consists of nonlinear loads in a 4-wire, 3 phase wye circuit, harmonic currents are present in the neutral conductor.

(2) Non-Current-Carrying.

A neutral conductor that carries only the unbalanced current from the other conductors of the same circuit shall not be considered current-carrying.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Pls_779_and_3112_-_FR_8035.docx	Revision Clarification	
Pls_779_and_3112_-_FR_8035_310.15_E_.docx	For prod use	

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 23:07:55 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: This section has been reorganized to provide clarity and to comply with the NEC Style Manual.

Response Message: FR-8035-NFPA 70-2024

Public Input No. 779-NFPA 70-2023 [Section No. 310.15(E)]

Public Input No. 3112-NFPA 70-2023 [Section No. 310.15(E)]

Ballot Results

✔ This item has passed ballot

- 20 Eligible Voters
- 1 Not Returned
- 15 Affirmative All
- 4 Affirmative with Comments
- 0 Negative with Comments
- 0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

- Cross, Joseph W.
- Deacy, Brian
- Earl, Tim
- Graser, Peter
- Hunter, Christel K.
- Jackson, Derick
- Kent, Gerald W.
- Newman Searce, Susan
- Nielsen, Dennis A.
- Price, Robert Adrian
- Reichstein, Alyson
- Stene, Susan L.
- Summers, Lawrence L.
- Vincent, Alexander C.
- Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8036-NFPA 70-2024 [Sections 310.16, 310.17]

[Detail FR-8257](#)

310.16 Ampacities of Insulated Conductors in Raceway, Cable, or Earth (Directly Buried).

The ampacities shall be as specified in Table 310.16 where all of the following conditions apply:

- (1) Conductors are rated 0 volts through 2000 volts.
- (2) Conductors are rated 60°C (140°F), 75°C (167°F), or 90°C (194°F).
- (3) Wiring is installed in a 30°C (86°F) ambient temperature.
- (4) There are not more than three current-carrying conductors.

Table 310.16 Ampacities of Insulated Conductors with Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried)

Size AWG or kcmil	Temperature Rating of Conductor [See Table 310.4(1)]						Size AWG or kcmil
	60°C (140°F)	75°C (167°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	90°C (194°F)	
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, XHWN, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, PFA, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, XHWN, XHWN-2, XHHN, Z, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, XHWN, USE	Types TBS, SA, SIS, THHN, THHW, THW-2, THWN- 2, RHH, RHW- 2, USE-2, XHH, XHHW, XHHW- 2, XHWN, XHWN-2, XHHN	
	COPPER			ALUMINUM OR COPPER-CLAD ALUMINUM			
18*	—	—	14	—	—	—	—
16*	—10	—	18	—	—	—	—
14*	15	20	25	—10 [‡]	—	—	—14 [‡]
12*	20	25	30	15	20	25	12*
10*	30	35	40	25	30	35	10*
8	40	50	55	35	40	45	8
6	55	65	75	40	50	55	6
4	70	85	95	55	65	75	4
3	85	100	115	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	145	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0
250	215	255	290	170	205	230	250
300	240	285	320	195	230	260	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400
500	320	380	430	260	310	350	500
600	350	420	475	285	340	385	600
700	385	460	520	315	375	425	700
750	400	475	535	320	385	435	750
800	410	490	555	330	395	445	800

900	435	520	585	355	425	480	900
1000	455	545	615	375	445	500	1000
1250	495	590	665	405	485	545	1250
1500	525	625	705	435	520	585	1500
1750	545	650	735	455	545	615	1750
2000	555	665	750	470	560	630	2000

Notes:

1. Section 310.15(B) shall be referenced for ampacity correction factors where the ambient temperature is other than 30°C (86°F).
 2. Section 310.15(C)(1) shall be referenced for more than three current-carrying conductors.
 3. Section 310.16 shall be referenced for conditions of use.
- *Section 240.4(D) shall be referenced for conductor overcurrent protection limitations, except as modified elsewhere in the ~~Code~~ code.
- [‡]Ampacity shall be applicable only to copper-clad aluminum conductors.

310.17 Ampacities of Single-Insulated Conductors in Free Air.

The ampacities shall be as specified in Table 310.17 where all of the following conditions apply:

- (1) Conductors are rated 0 volts through 2000 volts.
- (2) Conductors are rated 60°C (140°F), 75°C (167°F), or 90°C (194°F).
- (3) Wiring is installed in a 30°C (86°F) ambient temperature.

Table 310.17 Ampacities of Single-Insulated Conductors in Free Air

<u>Size AWG or kcmil</u>	<u>Temperature Rating of Conductor [See Table 310.4(1)]</u>						<u>Size AWG or kcmil</u>
	<u>60°C (140°F)</u>	<u>75°C (167°F)</u>	<u>90°C (194°F)</u>	<u>60°C (140°F)</u>	<u>75°C (167°F)</u>	<u>90°C (194°F)</u>	
	<u>Types TW, UF</u>	<u>Types RHW, THHW, THW, THWN, XHHW, XHWN, ZW</u>	<u>Types TBS, SA, SIS, FEP, FEPB, MI, PFA, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE- 2, XHH, XHHW, XHHW-2, XHWN, XHWN - 2, XHHN, Z, ZW- 2</u>	<u>Types TW, UF</u>	<u>Types RHW, THHW, THW, THWN, XHHW, XHWN</u>	<u>Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE-2, XHH, XHHW, XHHW-2, XHWN, XHWN -2, XHHN</u>	
	<u>COPPER</u>			<u>ALUMINUM OR COPPER-CLAD ALUMINUM</u>			
18	—	—	18	—	—	—	—
16	—	—	24	—	—	—	—
14*	25	30	35	—	—	—	—
12*	30	35	40	25	30	35	12*
10*	40	50	55	35	40	45	10*
8	60	70	80	45	55	60	8
6	80	95	105	60	75	85	6
4	105	125	140	80	100	115	4
3	120	145	165	95	115	130	3
2	140	170	190	110	135	150	2
1	165	195	220	130	155	175	1
1/0	195	230	260	150	180	205	1/0
2/0	225	265	300	175	210	235	2/0
3/0	260	310	350	200	240	270	3/0
4/0	300	360	405	235	280	315	4/0
250	340	405	455	265	315	355	250
300	375	445	500	290	350	395	300
350	420	505	570	330	395	445	350
400	455	545	615	355	425	480	400
500	515	620	700	405	485	545	500
600	575	690	780	455	545	615	600
700	630	755	850	500	595	670	700
750	655	785	885	515	620	700	750
800	680	815	920	535	645	725	800

900	730	870	980	580	700	790	900
1000	780	935	1055	625	750	845	1000
1250	890	1065	1200	710	855	965	1250
1500	980	1175	1325	795	950	1070	1500
1750	1070	1280	1445	875	1050	1185	1750
2000	1155	1385	1560	960	1150	1295	2000

Notes:

1. Section 310.15(B) shall be referenced for ampacity correction factors where the ambient temperature is other than 30°C (86°F).
 2. Section 310.17 shall be referenced for conditions of use.
- *Section 240.4(D) shall be referenced for conductor overcurrent protection limitations, except as modified elsewhere in the ~~Code~~ code.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 23:23:34 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: An editorial revision has been made to Tables 310.16 and 310.17 to remove XHWN insulation from the 90 degree C columns. This was done because XHWN insulation is rated for 75 degrees C.

Response Message: FR-8036-NFPA 70-2024

[Public Input No. 773-NFPA 70-2023 \[Section No. 310.16\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

3 Affirmative with Comments

1 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Custer, Shane Douglas

affirmative

McDaniel, Greg

XHWN-2 not rated for over 75°C

Porcaro, Michael Thomas

In support based on provided evidence

Negative with Comment

Crisman, Todd

I oppose this first revision. I support the introduction of 14awg CCA with 10 amp overcurrent protection; however, do not support the introduction of 16awg Copper with 10 amp overcurrent protection. The effort to permit a smaller minimum size CCA conductor for branch circuit wiring has been carefully vetted through a series of tests that have been submitted in reports with the associated Public Inputs over the last 3 code cycles. The Bimetallics Task Group consisting of industry experts was assembled to not only determine which tests should be performed to address the concerns of the panel members but also how to perform them. The results of this testing were submitted in the Menominee Falls Report which accompanied the associated public inputs. The public inputs and comments eventually led to the creation of new code requirements, some of which addressed the limitations of 14awg CCA with 10 amp overcurrent protection which included terminations on receptacles. The results of the heat rise testing on 14 awg cca protected at 10 amps proved the margin of safety from heat rise exceeded that of the known variable-14 awg copper with 15 amp overcurrent protection. Along with heat rise, terminations on circuit breakers and mechanical stability were also tested. It was my understanding that these test procedures were setting a precedence for determining the safe allowance of minimum size conductors moving forward. During the first draft meeting – 16 awg copper was added as a conductor that could be protected at 10 amps. I understand that 16 awg copper has been allowed in the National Electrical Code as a fixture wire with an ampacity of 8 amps and has proven its performance in the field over time. The transition of this conductor from an ampacity for fixture wire to conductors for branch circuit wiring broadens the application of the conductor. I would support this first revision if 16awg copper was removed or preferably if the same test procedures were implemented for 16 awg copper and the data proves a

margin of safety that is comparable to that of 14 awg CCA protected at 10 amps. The decision whether or not to allow smaller size conductors should be done in a manner that represents fairness to all affected parties in the industry. This would include comparison testing with a known value that would be performed by a third party. The ultimate goal would be that the panel agrees on the criteria and parameters for the testing program including the margin of safety- similar to the process that was carried through with the "Bimetallics Task Group." Once the results are presented to the panel, the decision should migrate from a debatable issue and then become a simple pass or fail. I do agree with the allowable ampacity being limited to the 60c column.



First Revision No. 7993-NFPA 70-2024 [Section No. 320.6]

320.2 Listing Requirements.

~~Type AC cable and associated fittings shall be listed.~~ The following shall be listed and identified:

- (1) Type AC cable
- (2) Support and securement hardware
- (3) Fittings used for connecting Type AC cable to boxes, cabinets, or other equipment

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-7993_320.6.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 15:29:50 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 320.6 has been relocated to new section 320.2 due to the new required parallel numbering format in the NEC Style Manual section 2.2.1. New listing requirements have been added for support and securement hardware and requirements have been broken out into a list format. Support and Securement need to be listed to avoid damage to Type AC cable from inadequate and untested supporting and securement methods. For example, the use of a bent nail is not an adequate method of supporting or securing the cable. Using listed support and securement hardware will reduce the risk of damage and undue stress being transferred to electrical connections.

Response Message: FR-7993-NFPA 70-2024

Public Input No. 3505-NFPA 70-2023 [Section No. 320.6]

Public Input No. 2881-NFPA 70-2023 [Section No. 320.6]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

- 1 Not Returned
- 13 Affirmative All
- 4 Affirmative with Comments
- 2 Negative with Comments
- 0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

List Format per Style Manual and clarifying language

Porcaro, Michael Thomas

In support based on provided evidence

Negative with Comment

Nielsen, Dennis A.

A definition of "hardware" is needed to eliminate the potential for listing requirements to be applied to structural members and similar supporting materials.

Watson, Dave

NEMA does not support the mandatory listing requirements for cable support hardware, other than cable ties. No field evidence of a problem has been submitted. Listing of supporting hardware such as

two by fours is unrealistic for listing. The AHJ needs leeway for approval all securement and supporting hardware, other than cable ties.



First Revision No. 8027-NFPA 70-2024 [Section No. 320.23(A)]

(A) Cables Run Across the Top of Framing Members.

~~Where run across the top of framing members, or across the face of rafters or studding within 2.1 m (7 ft) of the floor or horizontal surface, the cable shall be protected by guard strips that are at least as high as the cable. Where this space is not accessible by permanently installed stairs or ladders, protection shall only be required within 1.8 m (6 ft) of the nearest edge of the scuttle hole or attic entrance.~~

(1) Accessible by Permanent Means.

Where run across the top of framing members, or across the face of rafters or studding within 2.1 m (7 ft) of the floor or horizontal surface, the cable shall be protected by guard strips that are at least as high as the cable where the space is accessible by permanently installed stairs or ladders.

(2) Not Accessible by Permanent Means.

Where this space is not accessible by permanently installed stairs or ladders, protection shall only be required within 1.8 m (6 ft) of the nearest edge of the scuttle hole or attic entrance.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8027_320.23_A_.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 21:42:18 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Language was added to this section to clarify that where the attics or roof spaces have permanent stairs or ladders the cables must be protected by guard strips within 7ft of the floor or horizontal surface of the entire attic or roof space. Two first level subdivisions were created to separate the two requirements in this section. This was done to comply with the NEC Style Manual section 3.5.1.2.

Response Message: FR-8027-NFPA 70-2024

Public Input No. 3050-NFPA 70-2023 [Section No. 320.23(A)]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8028-NFPA 70-2024 [Section No. 320.30(A)]

(A) General.

Type AC cable shall be supported and secured by ~~staples~~, cable ties listed and identified for securement and support; listed staples, straps, hangers, or similar fittings; or other approved means designed and installed so as not to damage the cable.

Type AC cable fittings and connectors shall be permitted as a means of cable support.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 21:45:55 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The language “Type AC cable fittings shall be permitted as a means of cable support” was not relocated as recommended by the submitter because it belongs in the general requirement 320.30(A) to ensure that it will apply to all sections including references to cable supports in 320.30(D). The word “connectors” was added after fittings where referenced as a permitted means of support in 320.30(A) to provide clarity.

The word “staples” was relocated in the text, and now staples, hangers, straps, and similar fittings are required to be listed. “Other approved means” remains as an option to provide support for cables. Support and Securement need to be listed to avoid damage to Type AC cable from inadequate and untested supporting and securement methods. For example, the use of a bent nail is not an adequate method of supporting or securing the cable. Using listed support and securement hardware will reduce the risk of damage and undue stress being transferred to electrical connections.

Response Message: FR-8028-NFPA 70-2024

[Public Input No. 2244-NFPA 70-2023 \[Section No. 320.30\]](#)

[Public Input No. 2882-NFPA 70-2023 \[Section No. 320.30\(A\)\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying Language

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8008-NFPA 70-2024 [Section No. 320.30(D)]

(D) Unsupported and Unsecured Cables.

Type AC cable shall be permitted to be unsupported and unsecured where the cable complies with any of the following:

- (1) Is fished between access points through concealed spaces in finished buildings or structures and supporting is impracticable
- (2) Is not more than 600 mm (2 ft) in length at terminals where flexibility is necessary
- (3) Is not more than 1.8 m (6 ft) in length from the last point of cable support to the point of connection to a luminaire(s) or other electrical equipment and the cable and point of connection are within an accessible ceiling

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 16:25:03 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The revised title aligns with the requirements making it clear that the section addresses both support and securement.

Response Message: FR-8008-NFPA 70-2024

Public Input No. 2245-NFPA 70-2023 [Section No. 320.30(D)]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying Language

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8029-NFPA 70-2024 [Section No. 320.80(A)]

(A) Thermal Insulation.

~~Armored cable installed in thermal insulation shall have conductors rated at 90°C (194°F). The ampacity of cable installed in these applications shall not exceed that of a 60°C (140°F) rated conductor. The 90°C (194°F) rating shall be permitted to be used for ampacity adjustment and correction calculations; however, the ampacity shall not exceed that of a 60°C (140°F) rated conductor.~~

~~Where more than two Type AC cables containing two or more current-carrying conductors in each cable are installed in contact with thermal insulation, caulk, or sealing foam without maintaining spacing between cables, the ampacity of each conductor shall be adjusted in accordance with Table 310.15(C)(1) :~~

(1) General.

Armored cable installed in thermal insulation shall have conductors rated at 90°C (194°F). The ampacity of cable installed in these applications shall not exceed that of a 60°C (140°F) rated conductor. The 90°C (194°F) rating shall be permitted to be used for ampacity adjustment and correction calculations; however, the ampacity shall not exceed that of a 60°C (140°F) rated conductor.

(2) Ampacity Adjustment.

Where more than two Type AC cables containing two or more current-carrying conductors in each cable are installed in contact with thermal insulation, caulk, or sealing foam without maintaining spacing between cables, the ampacity of each conductor shall be adjusted in accordance with Table 310.15(C)(1).

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8029_320.80_A_.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 21:51:29 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Two first level subdivisions were created to separate the two requirements in this section. This was done to comply with the NEC Style Manual section 3.5.1.2.

Response Message: FR-8029-NFPA 70-2024

Public Input No. 3987-NFPA 70-2023 [Section No. 320.80(A)]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8010-NFPA 70-2024 [Section No. 322.6]

322.2 Listing Requirements.

Type FC and associated fittings shall be listed.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 16:28:46 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 322.6 has been relocated to new section 322.2 due to the new Required Parallel Numbering Format in the NEC Style Manual section 2.2.1.

Response Message: FR-8010-NFPA 70-2024

[Public Input No. 3507-NFPA 70-2023 \[Section No. 322.6\]](#)

[Public Input No. 2863-NFPA 70-2023 \[Section No. 322.6\]](#)

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style Manual change
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8011-NFPA 70-2024 [Section No. 324.6]

324.2 Listing Requirements.

Type FCC cable and associated fittings shall be listed.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 16:30:59 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 324.6 has been relocated to new section 324.2 due to the new Required Parallel Numbering Format in the NEC Style Manual section 2.2.1.

Response Message: FR-8011-NFPA 70-2024

[Public Input No. 2864-NFPA 70-2023 \[Section No. 324.6\]](#)

[Public Input No. 3508-NFPA 70-2023 \[Section No. 324.6\]](#)

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style Manual change
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8229-NFPA 70-2024 [Section No. 324.100(A)]

(A) Type FCC Cable.

Type FCC cable shall be listed for use with the FCC system and shall consist of three, four, or five flat copper or copper-clad aluminum conductors, one of which shall be an equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Sat Jan 20 09:57:08 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Copper-clad aluminum is added as a permissible conductor material for FCC cable constructions. Copper-clad aluminum is permitted as a conductor material of article 310 for branch circuits.

Response Message: FR-8229-NFPA 70-2024

Public Input No. 1019-NFPA 70-2023 [Section No. 324.100(A)]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

10 Affirmative All

3 Affirmative with Comments

5 Negative with Comments

1 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Graser, Peter

Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.

Affirmative with Comment

Custer, Shane Douglas

affirmative

McDaniel, Greg

CCA added per 310

Porcaro, Michael Thomas

The Electric Light & Power Task Force, representing the Edison Electric Institute (EEI) is in support of the public inputs to incorporate 14AWG CCA and 16AWG CU to the ampacity tables as indicated, citing provided product testing to substantiate the use case. This is an expansion of the already listed use of CCA currently in the code. Additionally, supporting incorporating modifications to additional code sections related to construction specifications to align permissible minimum wire sizes with the ampacity table additions. Also supporting inclusion of 16AWG CCA for use with control and signal conductors based on provided product testing results.

Negative with Comment

Crisman, Todd

I oppose this first revision due to concern of not knowing the impact of configuring a cca conductor into a flat conductor assembly and the impact it would have on its performance.

Deacy, Brian

Due to concerns of over-current and subsequent overheating of proposed 10-amp branch circuits, the minimum ampacity of branch circuits should remain at 15-amps. This negative vote is consistent with CDA's vote during the 2023 code cycle.

Earl, Tim

No data was provided regarding the performance of CCA in this application (flat conductor cable).

Hunter, Christel K.

The substantiation for this PI referred to PI 1008, which did not provide any testing or other substantiation for this type of cable (Type FCC).

Watson, Dave

No substantiation or testing data was provided specifically for Type FCC wiring systems including listed associated accessories.

Abstention

Nielsen, Dennis A.

NFPA 70 110.2 requires or permits conductors to be accepted if approved. The conditions for installation rely on the product listing. Without the product listing, the requirements are not available to establish the NEC requirements for the application to be approved.



First Revision No. 8038-NFPA 70-2024 [Section No. 330.6]

330.2 Listing Requirements.

~~Type MC cable shall be listed. Fittings used for connecting Type MC cable to boxes, cabinets, or other equipment~~ The following items shall be listed and identified for such use: :

- (1) Type MC cable
- (2) Support and securement hardware
- (3) Fittings used for connecting Type MC cable to boxes, cabinets, or other equipment

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8038_330.6.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 23:48:13 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 330.6 has been relocated to new section 330.2 due to the new Required Parallel Numbering Format in the NEC Style Manual section 2.2.1. New listing requirements have been added for support and securement hardware and requirements have been broken out into a list format.

Response Message: FR-8038-NFPA 70-2024

[Public Input No. 3509-NFPA 70-2023 \[Section No. 330.6\]](#)

[Public Input No. 2883-NFPA 70-2023 \[Section No. 330.6\]](#)

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

13 Affirmative All

4 Affirmative with Comments

2 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

List Format per Style Manual and clarifying language.

Porcaro, Michael Thomas

In support based on provided evidence

Negative with Comment

Nielsen, Dennis A.

A definition of "hardware" is needed to eliminate the potential for listing requirements to be applied to structural members and similar supporting materials.

Watson, Dave

NEMA does not support the mandatory listing requirements for cable support hardware, other than cable ties. No field evidence of a problem has been submitted. Listing of supporting hardware such as two by fours is unrealistic for listing. The AHJ needs leeway for approval all securement and supporting hardware, other than cable ties.



First Revision No. 8039-NFPA 70-2024 [Section No. 330.10(A)]

(A) General Uses.

Type MC cable shall be permitted as follows:

- (1) For services, feeders, and branch circuits.
- (2) For power, lighting, control, and signal circuits.
- (3) Indoors or outdoors.
- (4) Exposed or concealed.
- (5) To be direct buried where identified for such use.
- (6) In cable tray where identified for such use.
- (7) In any raceway.
- (8) As aerial cable on a messenger.
- (9) In hazardous (classified) locations where specifically permitted by other articles in this ~~Code~~ code.
- (10) In dry locations and embedded in plaster finish on brick or other masonry except in damp or wet locations.
- (11) In damp or wet locations where ~~a corrosion-resistant jacket is provided over the metallic covering and~~ any of the following conditions are met:
 - a. The metallic covering is impervious to moisture.
 - b. A moisture-impervious jacket ~~resistant to moisture~~ is provided under the metal covering.
 - c. The insulated conductors under the metallic covering are listed for use in wet locations.
- (12) Where single-conductor cables are used, all phase conductors and, where used, the grounded conductor shall be grouped together to minimize induced voltage on the sheath.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
PI_3788_-_FR_8039.docx	Revision Clarification For 330.10(A)	

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 23:52:27 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The language was modified to permit a metallic covering that is impervious to moisture to be used in damp or wet locations, a moisture-impervious jacket under a metal covering, or a corrosion-resistant nonmetallic jacket over a metal covering with insulated conductors listed for wet locations. Each of these options provides a suitable solution for installations of Type MC Cable in damp and wet locations, and correlates with 310.10(C) requirements for wet location conductors and cables.

Response Message: FR-8039-NFPA 70-2024

Public Input No. 3788-NFPA 70-2023 [Section No. 330.10(A)]

Ballot Results

✔ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying Language

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8040-NFPA 70-2024 [Section No. 330.10(B) [Excluding any Sub-Sections]]

Type MC cable shall be permitted to be installed in compliance with Article 725, Parts II and III of ~~Article 725~~ and 770.133 as applicable and in accordance with 330.10(B)(1) through 330.10(B)(4).

Informational Note: The “Uses Permitted” is not an all-inclusive list.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 23:57:31 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: A revision was made to the language in 330.10b. The article number “Article 725” will be moved to precede the part number of the article as recommended by the NEC Style Manual section 4.1.4.

Response Message: FR-8040-NFPA 70-2024

Public Input No. 2661-NFPA 70-2023 [Section No. 330.10(B)]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style Manual and clarifying language.
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8041-NFPA 70-2024 [Section No. 330.30(A)]

(A) General.

Type MC cable shall be supported and secured by ~~staples~~; cable ties listed and identified for securement and support; ~~listed staples~~, straps, hangers, or similar fittings; or other approved means designed and installed so as not to damage the cable.

Type MC cable fittings and connectors shall be permitted as a means of cable support.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 00:01:13 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The language “Type MC cable fittings shall be permitted as a means of cable support” was not relocated as recommended by the submitter because it belongs in the general requirement 330.30(A) to ensure that it will apply to all sections including references to cable supports in 330.30(D). The word “connectors” was added after fittings where referenced as a permitted means of support in 330.30(A) to provide clarity.

The word “staples” was relocated in the text, and now staples, hangers, straps, and similar fittings are required to be listed. “Other approved means” remains as an option to provide support for cables. Support and Securement need to be listed to avoid damage to Type AC cable from inadequate and untested supporting and securement methods. For example, the use of a bent nail is not an adequate method of supporting or securing the cable. Using listed support and securement hardware will reduce the risk of damage and undue stress being transferred to electrical connections.

Response Message: FR-8041-NFPA 70-2024

[Public Input No. 2247-NFPA 70-2023 \[Section No. 330.30\]](#)

[Public Input No. 2884-NFPA 70-2023 \[Section No. 330.30\(A\)\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying language.

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8019-NFPA 70-2024 [Section No. 330.30(D)]

(D) Unsupported and Unsecured Cables.

Type MC cable shall be permitted to be unsupported and unsecured where the cable complies with any of the following:

- (1) Is fished between access points through concealed spaces in finished buildings or structures and supporting is impractical
- (2) Is not more than 1.8 m (6 ft) in length from the last point of cable support to the point of connection to luminaires or other electrical equipment and the cable and point of connection are within an accessible ceiling
- (3) Is Type MC of the interlocked armor type in lengths not exceeding 900 mm (3 ft) from the last point where it is securely fastened and is used to connect equipment where flexibility is necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 16:52:00 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The revised title aligns with the requirements making it clear that the section addresses both support and securement.

Response Message: FR-8019-NFPA 70-2024

[Public Input No. 2248-NFPA 70-2023 \[Section No. 330.30\(D\)\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying language.

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8230-NFPA 70-2024 [Section No. 330.104]

330.104 Conductors.

For ungrounded, grounded, and equipment grounding conductors, the minimum conductor sizes shall be ~~14~~ 16 AWG copper, nickel, or nickel-coated copper ~~and 12 AWG aluminum or 14 AWG copper-clad aluminum, and 12 AWG aluminum~~.

For control and signal conductors, minimum conductor sizes shall be 18 AWG copper, nickel, or nickel-coated copper, ~~14~~ 16 AWG copper-clad aluminum, and 12 AWG aluminum.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Sat Jan 20 10:24:59 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Based on the data provided 14 AWG copper-clad aluminum is added as the smallest sized branch circuit conductor for Metal-Clad cable. 16 AWG copper is added based on its historical use. 16 AWG copper-clad aluminum is being added as the smallest remote control and signal wire for use in Metal-Clad Cable.

Response Message: FR-8230-NFPA 70-2024

[Public Input No. 1009-NFPA 70-2023 \[Section No. 330.104\]](#)

[Public Input No. 1018-NFPA 70-2023 \[Section No. 330.104\]](#)

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

8 Affirmative All

4 Affirmative with Comments

6 Negative with Comments

1 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Graser, Peter

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Summers, Lawrence L.

Affirmative with Comment

Custer, Shane Douglas

affirmative

McDaniel, Greg

14-CCA and 16-Copper are now smallest size branch circuits permitted. 16-CCA added to remote/signal circuits.

Porcaro, Michael Thomas

The Electric Light & Power Task Force, representing the Edison Electric Institute (EEI) is in support of the public inputs to incorporate 14AWG CCA and 16AWG CU to the ampacity tables as indicated, citing provided product testing to substantiate the use case. This is an expansion of the already listed use of CCA currently in the code. Additionally, supporting incorporating modifications to additional code sections related to construction specifications to align permissible minimum wire sizes with the ampacity table additions. Also supporting inclusion of 16AWG CCA for use with control and signal conductors based on provided product testing results.

Vincent, Alexander C.

Committee statement mentions historical use of #16AWG copper as a justification for this minimum conductor gauge. Specific substantiation is required for those unfamiliar with the history.

Negative with Comment

Crisman, Todd

I oppose this first revision. I support the introduction of 14awg CCA with 10 amp overcurrent protection; however, do not support the introduction of 16awg Copper with 10 amp overcurrent protection. The effort to permit a smaller minimum size CCA conductor for branch circuit wiring has been carefully vetted through a series of tests that have been submitted in reports with the associated Public Inputs over the last 3 code cycles. The Bimetallics Task Group consisting of industry experts was assembled to not only determine which tests should be performed to address the concerns of the panel members but also how to perform them. The results of this testing were submitted in the Menominee Falls Report which accompanied the associated public inputs. The public inputs and comments eventually led to the creation of new code requirements, some of which addressed the limitations of 14awg CCA with 10 amp overcurrent protection which included terminations on receptacles. The results of the heat rise testing on 14 awg cca protected at 10 amps proved the margin of safety from heat rise exceeded that of the known variable-14 awg copper with 15 amp overcurrent protection. Along with heat rise, terminations on circuit breakers and mechanical stability were also tested. It was my understanding that these test procedures were setting a precedence for determining the safe allowance of minimum size conductors moving forward. During the first draft meeting – 16 awg copper was added as a conductor that could be protected at 10 amps. I understand that 16 awg copper has been allowed in the National Electrical Code as a fixture wire with an ampacity of 8 amps and has proven its performance in the field over time. The transition of this conductor from an ampacity for fixture wire to conductors for branch circuit wiring broadens the

application of the conductor. I would support this first revision if 16awg copper was removed or preferably if the same test procedures were implemented for 16 awg copper and the data proves a margin of safety that is comparable to that of 14 awg CCA protected at 10 amps. The decision whether or not to allow smaller size conductors should be done in a manner that represents fairness to all affected parties in the industry. This would include comparison testing with a known value that would be performed by a third party. The ultimate goal would be that the panel agrees on the criteria and parameters for the testing program including the margin of safety- similar to the process that was carried through with the "Bimetallics Task Group." Once the results are presented to the panel, the decision should migrate from a debatable issue and then become a simple pass or fail. I oppose allowing 16 awg cca for control and signaling conductors. The data submitted in the Copperweld report that compared 16awg cca to 18 awg copper did show good performance with regards to heat rise. Additional data would be needed in order for me to vote to move forward with allowing 16awg cca in MC cable construction. This would include third party testing.

Deacy, Brian

Data supports maintaining the minimum conductor sizes at the specifications in the 2023 code.

Earl, Tim

The proposed reduction in conductor sizes would be a substantial change to the code. As such, it must be supported by sufficient data to show that safety will not be compromised. I am not convinced that we have enough data to justify this yet.

Hunter, Christel K.

The information provided did not address the substantiation requested by the code-making panel in the 2023 NEC process. The panel spent significant time developing the test protocol, and the information provided did not meet those criteria. The Fire Protection Research Foundation Report concerning smaller branch circuit use concluded that: "In conclusion, the analysis reveals a series of knowledge gaps that, if addressed through further research and experimentation, would significantly enhance our understanding of the performance of small branch circuit conductors within thermal building insulation." The questions raised regarding the practical, safe use of smaller branch circuits have not been sufficiently addressed.

Stene, Susan L.

CMP 6 reviewed similar proposals for the 2023 NEC and developed responses that carefully detailed testing considered necessary to process these changes. These tests have not been provided to the CMP for review. UL Solutions would consider revisions after reviewing results from the noted tests.

Watson, Dave

The data supplied during the 2023 code cycle supported leaving the smallest conductor sizes as 14 AWG CU and 12 AWG AL or CCA. That data is still valid and has not been proven inaccurate. A negative vote is consistent with the NEMA votes from the 2023 code cycle.

Abstention

Nielsen, Dennis A.

NFPA 70 110.2 requires or permits conductors to be accepted if approved. The conditions for installation rely on the product listing. Without the product listing, the requirements are not available to establish the NEC requirements for the application to be approved.



First Revision No. 8022-NFPA 70-2024 [Section No. 330.130]

330.126 Hazardous (Classified) Locations.

Where required to be marked MC-HL, the cable shall be listed and shall have a gas/vapor tight continuous corrugated metallic sheath, an overall jacket of suitable polymeric material, and a separate equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Thu Jan 18 17:03:03 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: This section was renumbered for parallel construction with other articles as required by the NEC Style Manual section 2.2.1.1.

Response Message: FR-8022-NFPA 70-2024

Public Input No. 3143-NFPA 70-2023 [Section No. 330.130]

Ballot Results

✓ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8053-NFPA 70-2024 [Section No. 332.6]

332.2 Listing Requirements.

~~Type MI cable and associated fittings~~ The following items shall be listed and identified for such use: -

- (1) Type MI cable
- (2) Support and securement hardware
- (3) Fittings used for connecting Type MI cables to boxes, cabinets, or other equipment

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8053_332.6.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 09:25:58 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 332.6 has been relocated to new section 332.2 due to the new required parallel numbering format in the NEC Style Manual section 2.2.1. New listing requirements have been added for support and securement hardware and requirements have been broken out into a list format. Support and Securement need to be listed to avoid damage to Type MI cable from inadequate and untested supporting and securement methods. Using listed support and securement hardware will reduce the risk of damage and undue stress being transferred to electrical connections.

Response Message: FR-8053-NFPA 70-2024

Public Input No. 2885-NFPA 70-2023 [Section No. 332.6]

Public Input No. 3510-NFPA 70-2023 [Section No. 332.6]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

13 Affirmative All
4 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
List Format per Style Manual and clarifying language.
Porcaro, Michael Thomas
In support based on provided evidence

Negative with Comment

Nielsen, Dennis A.
A definition of "hardware" is needed to eliminate the potential for listing requirements to be applied to structural members and similar supporting materials.
Watson, Dave
NEMA does not support the mandatory listing requirements for cable support hardware, other than cable ties. No field evidence of a problem has been submitted. Listing of supporting hardware such as two by fours is unrealistic for listing. The AHJ needs leeway for approval all securement and supporting hardware, other than cable ties.



First Revision No. 8055-NFPA 70-2024 [Section No. 332.30 [Excluding any Sub-Sections]]

Type MI cable shall be supported and secured by ~~staples, straps, hangers, or similar fittings, designed and installed so as not to damage the cable,~~ at intervals not exceeding 1.8 m (6 ft) by one of the following: -

- (1) Listed straps, hangers, or similar fittings
- (2) Other approved means designed and installed so as not to damage the cable

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8055_332.20_para.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 09:38:51 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Staples are not designed for MI cable and therefore have been removed from the list of items used for support and securement.

Support and Securement hardware need to be listed to avoid damage to Type MI cable from inadequate and untested supporting and securement methods. Using listed support and securement hardware will reduce the risk of damage and undue stress being transferred to electrical connections.

"Other approved Means" was added to provide the AHJ the ability to approve equivalent methods of support and securement.

Response Message: FR-8055-NFPA 70-2024

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying language.

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8061-NFPA 70-2024 [Section No. 334.6]

334.2 Listing Requirements.

~~Type NM and Type NMC cables and associated fittings~~ The following items shall be listed and identified for such use: -

- (1) Type NM and Type NMC cables
- (2) Support and securement hardware
- (3) Fittings used for connecting Type NM and Type NMC cables to boxes, cabinets, or other equipment

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8061_334.6.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 10:09:41 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 334.6 has been relocated to new section 334.2 due to the new required parallel numbering format in the NEC Style Manual section 2.2.1. New listing requirements have been added for support and securement hardware and requirements have been broken out into a list format. Support and Securement hardware need to be listed to avoid damage to Type NM and NMC cables from inadequate and untested supporting and securement methods. Using listed support and securement hardware will reduce the risk of damage and undue stress being transferred to electrical connections.

Response Message: FR-8061-NFPA 70-2024

Public Input No. 2886-NFPA 70-2023 [Section No. 334.6]

Public Input No. 3511-NFPA 70-2023 [Section No. 334.6]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned
14 Affirmative All
4 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
List Format per Style Manual and clarifying language.
Porcaro, Michael Thomas
In support based on provided evidence

Negative with Comment

Watson, Dave

NEMA does not support the mandatory listing requirements for cable support hardware, other than cable ties. No field evidence of a problem has been submitted. Listing of supporting hardware such as two by fours is unrealistic for listing. The AHJ needs leeway for approval all securement and supporting hardware, other than cable ties.



First Revision No. 9005-NFPA 70-2024 [Section No. 334.12]

334.12 Uses Not Permitted.

Types NM and NMC cables shall not be permitted as follows:

- (1) In any dwelling or structure not specifically permitted in 334.10(1), 334.10(2), 334.10(3), and 334.10(5).
- (2) Exposed within a dropped or suspended ceiling cavity in other than one- and two-family and multifamily dwellings
- (3) As service-entrance cable
- (4) In commercial garages having hazardous (classified) locations as defined in 511.3
- (5) In theaters and similar locations, except where permitted in 518.6(C)
- (6) In motion picture studios
- (7) In storage battery rooms
- (8) In hoistways or on elevators or escalators
- (9) Embedded in poured cement, concrete, or aggregate
- (10) In hazardous (classified) locations, except where specifically permitted by other articles in this ~~Code~~ code
- (11) Direct-buried in the earth
- (12) Where subject to physical damage

~~(A) Types NM and NMC.~~

(A) Type NM.

Type NM cables shall not be ~~used under the following conditions or in the following locations~~ permitted as follows :

- (1) Where exposed to corrosive fumes or vapors
- (2) Where embedded in masonry, concrete, adobe, fill, or plaster
- (3) In a shallow chase in masonry, concrete, or adobe and covered with plaster, adobe, or similar finish
- (4) In wet or damp locations

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Pls_104_2178_-_FR_9005.docx	Revision Clarification	
NEC_CMP6_FR-9005_334.12.docx	For prod use	

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Wed Jan 24 16:20:05 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: This revision clarifies that Types NM Cable and NMC Cable are not permitted for direct burial. Text is revised to clarify that Types NM and NMC Cable are not permitted to be exposed to physical damage.

Response Message: FR-9005-NFPA 70-2024

[Public Input No. 2178-NFPA 70-2023 \[Section No. 334.12\(A\)\]](#)

[Public Input No. 104-NFPA 70-2023 \[Section No. 334.12\]](#)

Ballot Results

✔ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying language.

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8098-NFPA 70-2024 [Section No. 334.15(B)]

(B) Protection from Physical Damage.

~~Cable shall be protected from physical damage where necessary by rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, RTRC marked with the suffix -XW, or other approved means. Where passing through a floor, the cable shall be enclosed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, RTRC marked with the suffix -XW, or other approved means extending at least 150 mm (6 in.) above the floor. Conduit or tubing shall be provided with a bushing or adapter that provides protection from abrasion at the point the cable enters and exits the raceway.~~

~~Type NMC cable installed in shallow chases or grooves in masonry, concrete, or adobe shall be protected in accordance with the requirements in 300.4(F) and covered with plaster, adobe, or similar finish.~~

(1) Types NM and NMC.

(a) General. Cable shall be protected from physical damage where necessary by rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, RTRC marked with the suffix -XW, or other approved means.

(b) Passing Through a Floor. Where passing through a floor, the cable shall be enclosed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, RTRC marked with the suffix -XW, or other approved means extending at least 150 mm (6 in.) above the floor.

(c) Protection from Abrasion. Conduit or tubing shall be provided with a bushing or adapter that provides protection from abrasion at the point the cable enters and exits the raceway.

(2) Type NMC.

Type NMC cable installed in shallow chases or grooves in masonry, concrete, or adobe shall be protected in accordance with the requirements in 300.6(F) and covered with plaster, adobe, or similar finish.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8098_334.15_B_.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 11:58:33 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with NEC Style Manual Section 3.5.1.2. The first three items identified by the submitter are related, therefore the revision is modified to parallel the section structure in 334.10 and 334.12.

Response Message: FR-8098-NFPA 70-2024

Public Input No. 3988-NFPA 70-2023 [Section No. 334.15(B)]

Ballot Results

✔ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8085-NFPA 70-2024 [Section No. 334.19]

334.19 Cable Entries.

The sheath on nonmetallic-sheathed cable shall extend not less than 6 mm (¼ in.) and not greater than 25.4 mm (1 in.) beyond any cable clamp or cable entry in the enclosure .

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 11:26:16 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The revised text recognizes the need to minimize box fill due to unnecessary excess sheath left on the cable.

Response Message: FR-8085-NFPA 70-2024

Public Input No. 1128-NFPA 70-2023 [Section No. 334.19]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Clarifying Language
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8088-NFPA 70-2024 [Section No. 334.24]

334.24 Bending Radius.

Bends in Types NM and NMC cable shall be so made that the cable will not be damaged. The radius of the curve of the inner edge of any bend during or after installation shall not be less than five times the diameter of the cable. For flat cables, the ~~major~~ minor diameter dimension of the cable shall be used to determine the bending radius when bending on the flat side of the cable . For all other bends, the major diameter dimension shall be used.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 11:38:53 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The revised text allows installation relief for flat cables when making bends on the flat side of the cable. The original bend radius multiplier is unaffected, thus maintaining the safety of the installation.

Response Message: FR-8088-NFPA 70-2024

[Public Input No. 409-NFPA 70-2023 \[Section No. 334.24\]](#)

[Public Input No. 1555-NFPA 70-2023 \[Section No. 334.24\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Revised text with Clarifying Language

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8094-NFPA 70-2024 [Section No. 334.30]

334.30 Securing and Supporting.

Nonmetallic-sheathed cable shall be supported and secured by ~~staples~~, cable ties listed and identified for securement and support, or listed staples, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4½ ft) and within 300 mm (12 in.) of every cable entry into enclosures such as outlet boxes, junction boxes, cabinets, or fittings. The cable length between the cable entry and the closest cable support shall not exceed 450 mm (18 in.). Flat cables shall not be stapled on edge.

Sections of cable protected from physical damage by raceway shall not be required to be secured within the raceway.

(A) Horizontal Runs Through Holes and Notches.

In other than vertical runs, cables installed in accordance with 300.6 shall be considered to be supported and secured where such support does not exceed 1.4 m (4½ ft) intervals and the nonmetallic-sheathed cable is securely fastened in place ~~by an approved means~~ within 300 mm (12 in.) of each box, cabinet, conduit body, or other nonmetallic-sheathed cable termination.

Informational Note: See 314.17(B)(1) for support where nonmetallic boxes are used.

(B) Unsupported and Unsecured Cables.

Nonmetallic-sheathed cable shall be permitted to be unsupported and unsecured where the cable is installed in accordance with either of the following :

- (1) Is fished between access points through concealed spaces in finished buildings or structures where securing and supporting is impracticable-
- (2) Is not more than 1.4 m (4½ ft) from the last point of cable support to the point of connection to a luminaire or other piece of electrical equipment and the cable and point of connection are within an accessible ceiling in one-, two-, or multifamily dwellings-

(C) Wiring Device Without a Separate Outlet Box.

A wiring device identified for the use, without a separate outlet box, and incorporating an integral cable clamp shall be permitted where the cable is secured in place at intervals not exceeding 1.4 m (4½ ft) and within 300 mm (12 in.) from the wiring device wall opening, and there shall be at least a 300 mm (12 in.) loop of unbroken cable or 150 mm (6 in.) of a cable end available on the interior side of the finished wall to permit replacement.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 11:54:27 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to require listed staples, hangars, or similar fittings to avoid damage and undue stress to Type NM Cable installations, especially in light of recent advancements in installation tool technology.

The text is revised to include (lack of) securement for this installation type.

Response Message: FR-8094-NFPA 70-2024

[Public Input No. 2887-NFPA 70-2023 \[Section No. 334.30\]](#)

[Public Input No. 253-NFPA 70-2023 \[Section No. 334.30\(B\)\]](#)

[Public Input No. 2250-NFPA 70-2023 \[Section No. 334.30\(B\)\]](#)

Ballot Results

✔ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Revised text with Clarifying Language

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8100-NFPA 70-2024 [Section No. 334.80]

334.80 Ampacity.

The ampacity of Types NM and NMC cable shall be determined in accordance with 310.14. The ampacity shall not exceed that of a 60°C (140°F) rated conductor. The 90°C (194°F) rating shall be permitted to be used for ampacity adjustment and correction calculations, provided the final calculated ampacity does not exceed that of a 60°C (140°F) rated conductor. The ampacity of Types NM and NMC cable installed in cable trays shall be determined in accordance with 392.80(A).

Where more than two NM cables containing two or more current-carrying conductors are installed, without maintaining spacing between the cables, through the same opening in wood framing that is to be sealed with thermal insulation, caulk, or sealing foam, the ampacity of each conductor shall be adjusted in accordance with Table 310.15(C)(1) and 310.14(A)(2). Exception, shall not apply.

Where more than two NM cables containing two or more current-carrying conductors are installed in contact with thermal insulation without maintaining spacing between cables, the ampacity of each conductor shall be adjusted in accordance with Table 310.15(C)(1) and 310.14(A)(2). Exception shall not apply.

(A) General.

The ampacity of Types NM and NMC cable shall be determined in accordance with 310.14. The ampacity shall not exceed that of a 60°C (140°F) rated conductor. The 90°C (194°F) rating shall be permitted to be used for ampacity adjustment and correction calculations, provided the final calculated ampacity does not exceed that of a 60°C (140°F) rated conductor. The ampacity of Types NM and NMC cable installed in cable trays shall be determined in accordance with 392.80(A).

(B) Cables Through same Opening.

Where more than two Types NM and NMC cables containing two or more current-carrying conductors are installed, without maintaining spacing between the cables, through the same opening in wood framing that is to be sealed with thermal insulation, caulk, or sealing foam, the ampacity of each conductor shall be adjusted in accordance with Table 310.15(C)(1), and 310.14(A)(2). Exception, shall not apply.

(C) Cables in Contact with Thermal Insulation.

Where more than two Types NM and NMC cables containing two or more current-carrying conductors are installed in contact with thermal insulation without maintaining spacing between cables, the ampacity of each conductor shall be adjusted in accordance with Table 310.15(C)(1), and 310.14(A)(2). Exception shall not apply.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8100_334.80.docx		

Submitter Information Verification

Committee: NEC-P06
Submittal Date: Fri Jan 19 13:03:35 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with NEC Style Manual Section 3.5.1.2.

Response Message: FR-8100-NFPA 70-2024

Public Input No. 3051-NFPA 70-2023 [Section No. 334.80]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8220-NFPA 70-2024 [Section No. 336.6]

336.2 Listing Requirements.

~~Type TC cables and associated fittings~~ The following items shall be listed and identified for such use - :

- (1) Type TC cables
- (2) Support and securement hardware
- (3) Fittings used for connecting Type TC cable to boxes, cabinets, or other equipment

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 21:32:21 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 336.6 has been relocated to new section 336.2 due to the new Required Parallel Numbering Format in the NEC Style Manual section 2.2.1. New listing requirements have been added for support and securement hardware and requirements have been broken out into a list format.

Response Message: FR-8220-NFPA 70-2024

Public Input No. 3512-NFPA 70-2023 [Section No. 336.6]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

14 Affirmative All

4 Affirmative with Comments

1 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence

Negative with Comment

Watson, Dave

NEMA does not support the mandatory listing requirements for cable support hardware, other than cable ties. No field evidence of a problem has been submitted. Listing of supporting hardware such as two by fours is unrealistic for listing. The AHJ needs leeway for approval all securement and supporting hardware, other than cable ties.



First Revision No. 8221-NFPA 70-2024 [Section No. 336.10]

336.10 Uses Permitted.

Type TC cable shall be permitted to be used as follows:

- (1) For power, lighting, control, and signal circuits.
- (2) In cable trays, including those with mechanically discontinuous segments up to 300 mm (1 ft).
- (3) In raceways.
- (4) In outdoor locations supported by a messenger wire.
- (5) For Class 1 circuits ~~as permitted in Parts II and III of Article 725~~ installed in accordance with 300.28.
- (6) For non-power-limited fire alarm circuits if conductors comply with the requirements of 760.49.
- (7) Between a cable tray, raceway, or enclosure and the utilization equipment or device(s), provided all of the following apply:
 - a. The cable is Type TC-ER: and is surface marked "TC-ER."
 - b. The cable is installed in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation.
 - c. The cable is continuously supported and protected against physical damage using mechanical protection such as struts, angles, or channels.
 - c. ~~The cable complies with the crush and impact requirements of Type MC cable and is identified with the marking "TC-ER."~~
 - d. The cable is secured at intervals not exceeding 1.8 m (6 ft).
 - e. Equipment grounding for the utilization equipment is provided by an equipment grounding conductor within the cable. In cables containing conductors sized 6 AWG or smaller, the equipment grounding conductor shall be provided within the cable or, at the time of installation, one or more insulated conductors shall be permanently identified as an equipment grounding conductor in accordance with ~~250.119(G)~~ 250.119.

Exception to (7): Where not subject to physical damage, Type TC-ER shall be permitted to transition between cable trays and between cable trays and equipment or devices for a distance not to exceed 1.8 m (6 ft) without continuous support. The cable shall be mechanically supported where exiting the cable tray to ensure that the minimum bending radius is not exceeded.

- (8) Type TC cable shall be resistant to moisture and corrosive agents where installed in wet locations.
- (9) For one- and two-family dwelling units, Type TC-ER-JP cable containing conductors for both power and control circuits shall be permitted for branch circuits and feeders. Type TC-ER-JP cable used as interior wiring shall be installed per the requirements of Article 334, Part II of ~~Article 334~~ and where installed as exterior wiring shall be installed per the requirements of Article 340, Part II of ~~Article 340~~.

Exception: Where used to connect a generator and associated equipment having terminals rated 75°C (140°F) or higher, the cable shall not be limited in ampacity by 334.80 or 340.80.

Informational Note No. 1: See 725.136 for limitations on Class 2 or 3 circuits contained within the same cable with conductors of electric light, power, or Class 1 circuits.

- (10) Direct buried, where identified for such use.
- (11) In hazardous (classified) locations where specifically permitted by other articles in this ~~Code~~ code.
- (12) For service-entrance conductors where identified for such use and marked Type TC-ER.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
PLs_2662_1387_3385_1409_-_FR_8221.docx	Revision Clarification	

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 21:40:10 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: List items 7a and 7d are combined into item 7a to improve clarity. List items 7e and 7f are renumbered to 7d and 7e respectively. Cables marked TC-ER are required to go through a crush and impact tests as indicated in the product standard and therefore a separate line item is not needed.

Tray cables can also be installed in raceways and enclosures as well as cable trays, therefore these wiring methods should be included in this permitted use.

The reference in 336.10(5) is updated to point to the correct section (that was modified in the 2023 NEC).

Response Message: FR-8221-NFPA 70-2024

[Public Input No. 2662-NFPA 70-2023 \[Section No. 336.10\]](#)

[Public Input No. 1387-NFPA 70-2023 \[Section No. 336.10\]](#)

[Public Input No. 3385-NFPA 70-2023 \[Section No. 336.10\]](#)

[Public Input No. 1409-NFPA 70-2023 \[Section No. 336.10\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying Language

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8107-NFPA 70-2024 [Section No. 336.104(B)]

(B) Thermocouple Circuits.

Conductors in Type TC cable used for thermocouple circuits in accordance with Article 725 , Part III of ~~Article 724~~ shall also be permitted to be any of the materials used for thermocouple extension wire.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 13:35:06 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4 regarding the use of Parts. The reference has also been corrected for Class 2 and Class 3 circuits.

Response Message: FR-8107-NFPA 70-2024

Public Input No. 2663-NFPA 70-2023 [Section No. 336.104(B)]

Ballot Results

✓ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8232-NFPA 70-2024 [Section No. 336.104 [Excluding any Sub-Sections]]

For ungrounded, grounded, and equipment grounding conductors, the conductor sizes shall be ~~14~~ 16 AWG through 1000 kcmil copper, nickel, or nickel-coated copper, ~~and 12~~ 14 AWG through 1000 kcmil ~~aluminum or copper-clad aluminum, and 12 AWG through 1000 kcmil~~ aluminum . Insulation types shall be one of the types listed in Table 310.4(1) or Table 310.4(2) that is suitable for branch circuit and feeder circuits or one that is identified for such use.

For control and signal conductors, the minimum conductor sizes shall be 18 AWG copper, nickel, or nickel-coated copper, ~~14~~ 16 AWG copper-clad aluminum, and 12 AWG aluminum.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Sat Jan 20 11:13:33 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Based on the data provided 14 AWG copper-clad aluminum is added as the smallest conductor for TC cable. 16 AWG copper is added based on its historical use. 16 AWG copper-clad aluminum is being added as the smallest control and signal wire for use in TC Cable.

Response Message: FR-8232-NFPA 70-2024

[Public Input No. 1022-NFPA 70-2023 \[Section No. 336.104 \[Excluding any Sub-Sections\]\]](#)

[Public Input No. 1014-NFPA 70-2023 \[Section No. 336.104 \[Excluding any Sub-Sections\]\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

8 Affirmative All

4 Affirmative with Comments

6 Negative with Comments

1 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Graser, Peter

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Summers, Lawrence L.

Affirmative with Comment

Custer, Shane Douglas

affirmative

McDaniel, Greg

Updating based on 14-CCA and 16-Copper for Signal wiring.

Porcaro, Michael Thomas

The Electric Light & Power Task Force, representing the Edison Electric Institute (EEI) is in support of the public inputs to incorporate 14AWG CCA and 16AWG CU to the ampacity tables as indicated, citing provided product testing to substantiate the use case. This is an expansion of the already listed use of CCA currently in the code. Additionally, supporting incorporating modifications to additional code sections related to construction specifications to align permissible minimum wire sizes with the ampacity table additions. Also supporting inclusion of 16AWG CCA for use with control and signal conductors based on provided product testing results.

Vincent, Alexander C.

Committee statement mentions historical use of #16AWG copper as a justification for this minimum power conductor gauge. Specific substantiation is required for those unfamiliar with the history.

Negative with Comment

Crisman, Todd

I oppose this first revision. I support the introduction of 14awg CCA with 10 amp overcurrent protection; however, do not support the introduction of 16awg Copper with 10 amp overcurrent protection. The effort to permit a smaller minimum size CCA conductor for branch circuit wiring has been carefully vetted through a series of tests that have been submitted in reports with the associated Public Inputs over the last 3 code cycles. The Bimetallics Task Group consisting of industry experts was assembled to not only determine which tests should be performed to address the concerns of the panel members but also how to perform them. The results of this testing were submitted in the Menominee Falls Report which accompanied the associated public inputs. The public inputs and comments eventually led to the creation of new code requirements, some of which addressed the limitations of 14awg CCA with 10 amp overcurrent protection which included terminations on receptacles. The results of the heat rise testing on 14 awg cca protected at 10 amps proved the margin of safety from heat rise exceeded that of the known variable-14 awg copper with 15 amp overcurrent protection. Along with heat rise, terminations on circuit breakers and mechanical stability were also tested. It was my understanding that these test procedures were setting a precedence for determining the safe allowance of minimum size conductors moving forward. During the first draft meeting – 16 awg copper was added as a conductor that could be protected at 10 amps. I understand that 16 awg copper has been allowed in the National Electrical Code as a fixture wire with an ampacity of 8 amps and has proven its performance in the field over time. The transition of this

conductor from an ampacity for fixture wire to conductors for branch circuit wiring broadens the application of the conductor. I would support this first revision if 16awg copper was removed or preferably if the same test procedures were implemented for 16 awg copper and the data proves a margin of safety that is comparable to that of 14 awg CCA protected at 10 amps. The decision whether or not to allow smaller size conductors should be done in a manner that represents fairness to all affected parties in the industry. This would include comparison testing with a known value that would be performed by a third party. The ultimate goal would be that the panel agrees on the criteria and parameters for the testing program including the margin of safety- similar to the process that was carried through with the "Bimetallics Task Group." Once the results are presented to the panel, the decision should migrate from a debatable issue and then become a simple pass or fail. I oppose allowing 16 awg cca for control and signaling conductors. The data submitted in the Copperweld report that compared 16awg cca to 18 awg copper did show good performance with regards to heat rise. Additional data would be needed in order for me to vote to move forward with allowing 16awg cca in MC cable construction. This would include third party testing.

Deacy, Brian

Data supports maintaining conductor sizes at the specifications in the 2023 code.

Earl, Tim

The proposed reduction in conductor sizes would be a substantial change to the code. As such, it must be supported by sufficient data to show that safety will not be compromised. I am not convinced that we have enough data to justify this yet.

Hunter, Christel K.

The information provided did not address the substantiation requested by the code-making panel in the 2023 NEC process. The panel spent significant time developing the test protocol, and the information provided did not meet those criteria. The Fire Protection Research Foundation Report concerning smaller branch circuit use concluded that: "In conclusion, the analysis reveals a series of knowledge gaps that, if addressed through further research and experimentation, would significantly enhance our understanding of the performance of small branch circuit conductors within thermal building insulation." The questions raised regarding the practical, safe use of smaller branch circuits have not been sufficiently addressed.

Stene, Susan L.

CMP 6 reviewed similar proposals for the 2023 NEC and developed responses that carefully detailed testing considered necessary to process these changes. These tests have not been provided to the CMP for review. UL Solutions would consider revisions after reviewing results from the noted tests.

Watson, Dave

The data supplied during the 2023 code cycle supported leaving the smallest conductor sizes as 14 AWG CU and 12 AWG AL or CCA. That data is still valid and has not been proven inaccurate. A negative vote is consistent with the NEMA votes from the 2023 code cycle.

Abstention

Nielsen, Dennis A.

NFPA 70 110.2 requires or permits conductors to be accepted if approved. The conditions for installation rely on the product listing. Without the product listing, the requirements are not available to establish the NEC requirements for the application to be approved.



First Revision No. 8114-NFPA 70-2024 [Section No. 336.130]

336.126 Hazardous (Classified) Location Cable.

Cable listed and marked Type TC-ER-HL shall comply with the following:

- (1) The overall nonmetallic jacket shall be suitable for the environment.
- (2) The overall cable construction shall be essentially circular in cross-section.
- (3) The overall nonmetallic jacket shall be continuous and gas/vapor tight.
- (4) For construction greater than 25.4 mm (1 in.) in diameter, the following shall apply:
 - a. The equipment grounding conductor shall be bare.
 - b. A metallic shield shall be included over all conductors under the outer jacket.

Informational Note: See ANSI/UL 2225-2022, *Cables and Cable Fittings for Use in Hazardous (Classified) Locations*, for information on construction, testing, and marking of cables.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 13:58:57 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Renumbering to "336.126" to comply with the style manual for parallel numbering. The informational note provides a reference to the additional standard that contains requirements specifically for hazardous locations marking.

Response Message: FR-8114-NFPA 70-2024

Public Input No. 3144-NFPA 70-2023 [Section No. 336.130]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8222-NFPA 70-2024 [Section No. 337.6]

337.2 Listing Requirements.

~~Type P cables and associated fittings~~ The following items shall be listed and identified for such use -:

- (1) Type P cables
- (2) Support and securement hardware
- (3) Fittings used for connecting Type P cable to boxes, cabinets, or other equipment

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 21:54:03 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 337.6 has been relocated to new section 337.2 due to the new Required Parallel Numbering Format in the NEC Style Manual section 2.2.1. New listing requirements have been added for support and securement hardware and requirements have been broken out into a list format.

Response Message: FR-8222-NFPA 70-2024

Public Input No. 3513-NFPA 70-2023 [Section No. 337.6]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

13 Affirmative All

4 Affirmative with Comments

2 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence

Negative with Comment

Nielsen, Dennis A.

A definition of “hardware” is needed to eliminate the potential for listing requirements to be applied to structural members and similar supporting materials.

Watson, Dave

NEMA does not support the mandatory listing requirements for cable support hardware, other than cable ties. No field evidence of a problem has been submitted. Listing of supporting hardware such as two by fours is unrealistic for listing. The AHJ needs leeway for approval all securement and supporting hardware, other than cable ties.



First Revision No. 8223-NFPA 70-2024 [Section No. 338.6]

338.2 Listing Requirements.

~~Type SE and USE cables and associated fittings~~ The following items shall be listed and identified for such use: -

- (1) Type SE and Type USE cables
- (2) Support and securement hardware
- (3) Fittings used for connecting Type SE and Type USE cable to boxes, cabinets, or other equipment

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8223_338.6.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 22:02:11 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 338.6 has been relocated to new section 338.2 due to the new Required Parallel Numbering Format in the NEC Style Manual section 2.2.1. New listing requirements have been added for support and securement hardware and requirements have been broken out into a list format.

Response Message: FR-8223-NFPA 70-2024

Public Input No. 3514-NFPA 70-2023 [Section No. 338.6]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

13 Affirmative All

4 Affirmative with Comments

2 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence

Negative with Comment

Nielsen, Dennis A.

A definition of “hardware” is needed to eliminate the potential for listing requirements to be applied to structural members and similar supporting materials.

Watson, Dave

NEMA does not support the mandatory listing requirements for cable support hardware, other than cable ties. No field evidence of a problem has been submitted. Listing of supporting hardware such as two by fours is unrealistic for listing. The AHJ needs leeway for approval all securement and supporting hardware, other than cable ties.



338.10 Uses Permitted.

(A) Service-Entrance Conductors.

Service-entrance cable shall be permitted to be used as service-entrance conductors and shall be installed in accordance with 230.6, 230.7, and Article 230 , Parts II, III, and IV ~~of Article 230~~ .

(B) Branch Circuits or Feeders.

(1) Grounded Conductor Insulated.

Type SE service-entrance cables shall be permitted in wiring systems where all of the circuit conductors of the cable are of the thermoset or thermoplastic type.

(2) Use of Uninsulated Conductor.

Type SE service-entrance cable shall be permitted for use where the insulated conductors are used for circuit wiring and the uninsulated conductor is used only for equipment grounding purposes.

Exception: In existing installations, uninsulated conductors shall be permitted as a grounded conductor in accordance with 250.32 and 250.140; where the uninsulated grounded conductor of the cable originates in service equipment, and with 225.30 through 225.40.

(3) Temperature Limitations.

Type SE service-entrance cable used to supply appliances shall not be subject to conductor temperatures in excess of the temperature specified for the type of insulation involved.

(4) Installation Methods for Branch Circuits and Feeders.

(a) *Interior Installations.* Interior installations shall comply with the following:

- (1) In addition to the provisions of this article, Type SE service-entrance cable used for interior wiring shall comply with the installation requirements of Article 334, ~~Part II of Article 334~~, excluding 334.80.
- (2) Where more than two Type SE cables containing two or more current-carrying conductors in each cable are installed in contact with thermal insulation, caulk, or sealing foam without maintaining spacing between cables, the ampacity of each conductor shall be adjusted in accordance with Table 310.15(C)(1).
- (3) For Type SE cable with ungrounded conductor sizes 10 AWG and smaller, where installed in contact with thermal insulation, the ampacity shall be in accordance with 60°C (140°F) conductor temperature rating. The maximum conductor temperature rating shall be permitted to be used for ampacity adjustment and correction purposes; if the final ampacity does not exceed that for a 60°C (140°F) rated conductor.

(b) *Exterior Installations.* Exterior installations shall comply with the following:

- (1) In addition to the provisions of this article, service-entrance cable used for feeders or branch circuits, where installed as exterior wiring, shall be installed in accordance with Article 225, ~~Part I of Article 225~~. The cable shall be supported in accordance with 334.30.
- (2) Type USE cable installed as underground feeder and branch circuit cable shall comply with Article 340, ~~Part II of Article 340~~.

Exception: Single-conductor Type USE and multi-rated USE conductors shall not be subject to the ampacity limitations of ~~Part II of Article 340~~, Part II.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
PI_2664_-_FR_8117.docx	Revision Clarification	

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 14:09:22 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4 regarding the use of Parts.

Response Message: FR-8117-NFPA 70-2024

Public Input No. 2664-NFPA 70-2023 [Section No. 338.10]

Ballot Results

✔ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8128-NFPA 70-2024 [Section No. 338.12]

338.12 Uses Not Permitted.

(A) Service-Entrance Cable.

Type SE cable shall not be used under the following conditions or in the following locations:

- (1) Where subject to physical damage unless protected in accordance with 230.50(B)
- (2) Underground with or without a raceway
- (3) For exterior branch circuits and feeder wiring unless the installation complies with ~~Part I of~~ Article 225, Part I, and is supported in accordance with 334.30 or is used as messenger-supported wiring as permitted in ~~Part II of~~ Article 396, Part II

(B) Underground Service-Entrance Cable.

Type USE cable shall not be used under the following conditions or in the following locations:

- (1) For interior wiring
- (2) For aboveground installations except where USE cable emerges from the ground and is terminated in an enclosure at an outdoor location and the cable is protected in accordance with 300.7(D)
- (3) As aerial cable unless it is a multiconductor cable identified for use aboveground and installed as messenger-supported wiring in accordance with 225.10 and ~~Part II of~~ Article 396, Part II

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 14:33:06 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4 regarding the use of Parts.

Response Message: FR-8128-NFPA 70-2024

Public Input No. 2665-NFPA 70-2023 [Section No. 338.12]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned
15 Affirmative All
4 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style Manual change
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8121-NFPA 70-2024 [Section No. 338.24]

338.24 Bending Radius.

Bends in Types USE and SE cable shall be so made that the cable will not be damaged. The radius of the curve of the inner edge of any bend, during or after installation, shall not be less than five times the diameter of the cable. For flat cables, the ~~major~~ minor diameter dimension of the cable shall be used to determine the bending radius when bending on the flat side of the cable. For all other bends, the major diameter dimension shall be used. .

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 14:18:41 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The revised text allows installation relief for flat cables when making bends on the flat side of the cable. The original bend radius multiplier is unaffected, thus maintaining the safety of the installation.

Response Message: FR-8121-NFPA 70-2024

Public Input No. 408-NFPA 70-2023 [Section No. 338.24]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Clarifying Language
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8224-NFPA 70-2024 [Section No. 340.6]

340.2 Listing Requirements.

~~Type UF cable and associated fittings~~ The following items shall be listed- and identified for such use:

- (1) Type UF cable
- (2) Support and securement hardware
- (3) Fittings used for connecting Type UF cable to boxes, cabinets, or other equipment

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 22:15:54 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 340.6 has been relocated to new section 340.2 due to the new Required Parallel Numbering Format in the NEC Style Manual section 2.2.1. New listing requirements have been added for support and securement hardware and requirements have been broken out into a list format.

Response Message: FR-8224-NFPA 70-2024

Public Input No. 3515-NFPA 70-2023 [Section No. 340.6]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

14 Affirmative All

4 Affirmative with Comments

1 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence

Negative with Comment

Watson, Dave

NEMA does not support the mandatory listing requirements for cable support hardware, other than cable ties. No field evidence of a problem has been submitted. Listing of supporting hardware such as two by fours is unrealistic for listing. The AHJ needs leeway for approval all securement and supporting hardware, other than cable ties.



First Revision No. 8124-NFPA 70-2024 [Section No. 340.10]

340.10 Uses Permitted.

Type UF cable shall be permitted as follows:

- (1) For use underground, including direct burial in the earth.
- (2) As single-conductor cables. Where installed as single-conductor cables, all conductors of the feeder or branch circuit, including the grounded conductor and equipment grounding conductor, if any, shall be installed in accordance with 300.5.
- (3) For wiring in wet, dry, or corrosive locations.
- (4) Installed as nonmetallic-sheathed cable. Where so installed, the installation and conductor requirements shall comply with Article 334, Parts II and III, ~~of Article 334~~; except for 334.12(A), and shall be of the multiconductor type.
- (5) As single-conductor cables as the nonheating leads for heating cables as provided in 424.43.
- (6) Supported by cable trays. Type UF cable supported by cable trays shall be of the multiconductor type.

Informational Note: See 310.14(A)(3) for temperature limitation of conductors.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 14:23:27 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4 regarding the use of Parts.

Response Message: FR-8124-NFPA 70-2024

[Public Input No. 2666-NFPA 70-2023 \[Section No. 340.10\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters
1 Not Returned
15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8130-NFPA 70-2024 [Section No. 340.12]

340.12 Uses Not Permitted.

Type UF cable shall not be used as follows:

- (1) As service-entrance cable
- (2) In commercial garages
- (3) In theaters and similar locations
- (4) In motion picture studios
- (5) In storage battery rooms
- (6) In hoistways or on elevators or escalators
- (7) In hazardous (classified) locations, except as specifically permitted by other articles in this ~~Code~~ code
- (8) Embedded in poured cement, concrete, or aggregate, except where embedded in plaster as nonheating leads where permitted in 424.43
- (9) Where exposed to direct rays of the sun, unless identified as sunlight resistant

Informational Note: The sunlight-resistant marking on the jacket does not apply to the individual conductors.
- (10) Where subject to physical damage
- (11) As overhead cable, except where installed as messenger-supported wiring in accordance with ~~Part II of~~ Article 396, Part II

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 14:51:00 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4 regarding the use of Parts.

Response Message: FR-8130-NFPA 70-2024

[Public Input No. 2667-NFPA 70-2023 \[Section No. 340.12\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8133-NFPA 70-2024 [Section No. 340.24]

340.24 Bending Radius.

Bends in Type UF cable shall be so made that the cable is not damaged. The radius of the curve of the inner edge of any bend shall not be less than five times the diameter of the cable. For flat cables, the ~~major~~ minor diameter dimension of the cable shall be used to determine the bending radius when bending on the flat side of the cable. For all other bends, the major diameter dimension shall be used .

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 14:52:15 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The revised text allows installation relief for flat cables when making bends on the flat side of the cable. The original bend radius multiplier is unaffected, thus maintaining the safety of the installation.

Response Message: FR-8133-NFPA 70-2024

Public Input No. 410-NFPA 70-2023 [Section No. 340.24]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style Manual change
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8233-NFPA 70-2024 [Section No. 340.104]

340.104 Conductors.

The conductors shall be sizes 14 AWG through 4/0 AWG copper or ~~12 AWG aluminum or copper-clad aluminum through , or 12 AWG through~~ 4/0 AWG aluminum .

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Sat Jan 20 11:25:52 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Based on the data provided 14 AWG copper-clad aluminum is added as the smallest conductor for UF cable.

Response Message: FR-8233-NFPA 70-2024

Public Input No. 1015-NFPA 70-2023 [Section No. 340.104]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

9 Affirmative All

3 Affirmative with Comments

6 Negative with Comments

1 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Graser, Peter

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Summers, Lawrence L.

Vincent, Alexander C.

Affirmative with Comment

Crisman, Todd

agree

McDaniel, Greg

14-CCA was added to Ampacity table

Porcaro, Michael Thomas

The Electric Light & Power Task Force, representing the Edison Electric Institute (EEI) is in support of the public inputs to incorporate 14AWG CCA and 16AWG CU to the ampacity tables as indicated, citing provided product testing to substantiate the use case. This is an expansion of the already listed use of CCA currently in the code. Additionally, supporting incorporating modifications to additional code sections related to construction specifications to align permissible minimum wire sizes with the ampacity table additions. Also supporting inclusion of 16AWG CCA for use with control and signal conductors based on provided product testing results.

Negative with Comment

Custer, Shane Douglas

The addition of the smaller size copper clad aluminum conductors should not be allowed in residential installations or available for installation by non-qualified persons after a dwelling unit has been inspected and approved by the local authority having jurisdiction. There are currently no 10A overcurrent protective devices installed in residential existing panelboards and the possibility of misuse and misapplication during unsupervised and unpermitted installations could result in 10A wire being installed on a 15A or 20A breaker overcurrent device by an unqualified person.

Deacy, Brian

Data supports maintaining conductor sizes at the specifications in the 2023 code.

Earl, Tim

The proposed reduction in conductor sizes would be a substantial change to the code. As such, it must be supported by sufficient data to show that safety will not be compromised. I am not convinced that we have enough data to justify this yet.

Hunter, Christel K.

The information provided did not address the substantiation requested by the code-making panel in the 2023 NEC process. The panel spent significant time developing the test protocol, and the information provided did not meet those criteria. The Fire Protection Research Foundation Report concerning smaller branch circuit use concluded that: "In conclusion, the analysis reveals a series of knowledge gaps that, if addressed through further research and experimentation, would significantly enhance our understanding of the performance of small branch circuit conductors within thermal building insulation." The questions raised regarding the practical, safe use of smaller branch circuits have not been sufficiently addressed.

Stene, Susan L.

CMP 6 reviewed similar proposals for the 2023 NEC and developed responses that carefully detailed testing considered necessary to process these changes. These tests have not been provided to the CMP for review. UL Solutions would consider revisions after reviewing results from the noted tests.

Watson, Dave

The data supplied during the 2023 code cycle supported leaving the smallest conductor sizes as 14 AWG CU and 12 AWG AL or CCA. That data is still valid and has not been proven inaccurate. A negative vote is consistent with the NEMA votes from the 2023 code cycle.

Abstention

Nielsen, Dennis A.

NFPA 70 110.2 requires or permits conductors to be accepted if approved. The conditions for installation rely on the product listing. Without the product listing, the requirements are not available to establish the NEC requirements for the application to be approved.



First Revision No. 8185-NFPA 70-2024 [Section No. 382.6]

382.2 Listing Requirements.

Concealable nonmetallic extensions and associated fittings and devices shall be listed. ~~The starting/source tap device for the extension shall contain and provide the following protection for all load-side extensions and devices:~~

- ~~(0) Supplementary overcurrent protection~~
- ~~(0) Level of protection equivalent to a Class A GFCI~~
- ~~(0) Level of protection equivalent to a portable GFCI~~
- ~~(0) Line and load-side miswire protection~~
- ~~(0) Provide protection from the effects of arc faults~~

382.4 Load-Side Protection.

The starting/source tap device for the extension shall contain and provide the following protection for all load-side extensions and devices:

- (1) Supplementary overcurrent protection
- (2) Level of protection equivalent to a Class A GFCI
- (3) Level of protection equivalent to a portable GFCI
- (4) Line and load-side miswire protection
- (5) Provide protection from the effects of arc faults

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8185_382.6.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 17:12:09 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: NEC style manual, clause 2.2.1, "Required Parallel Numbering Format" The Listing requirements have been relocated from 382.6 to 382.2 per the 2023 NEC style manual, clause 2.2.1, "Required Parallel Numbering Format."

The requirements for protection have been relocated to a new Section as it is a

separate topic from “listing requirements.”

Response FR-8185-NFPA 70-2024
Message:

[Public Input No. 2871-NFPA 70-2023 \[Section No. 382.6\]](#)

[Public Input No. 3533-NFPA 70-2023 \[Section No. 382.6\]](#)

[Public Input No. 2872-NFPA 70-2023 \[New Section after 382.6\]](#)

Ballot Results

✔ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

The public inputs associated with this first revision were not included in our task group work.

Custer, Shane Douglas

affirmative

McDaniel, Greg

List Format per Style Manual and clarifying language.

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8186-NFPA 70-2024 [Section No. 396.10(A)]

(A) Cable Types.

The following cable types in ~~Table 396.10(A)~~ shall be permitted to be installed in messenger-supported wiring under the conditions described in ~~the~~ their respective article or section referenced for each:

- (1) Medium-voltage cable
- (2) Metal-clad cable
- (3) Mineral-insulated, metal-sheathed cable
- (4) Multiconductor service-entrance cable
- (5) Multiconductor underground feeder and branch-circuit cable
- (6) Other factory-assembled, multiconductor control, signal, or power cables that are identified for the use
- (7) Power and control tray cable
- (8) Power-limited tray cable

~~Table 396.10(A) Cable Types~~

<u>Cable Type</u>	<u>Section</u>	<u>Article</u>
Medium-voltage cable		315
Metal-clad cable		330
Mineral-insulated, metal-sheathed cable		332
Multiconductor service-entrance cable		338
Multiconductor underground feeder and branch-circuit cable		340
Other factory-assembled, multiconductor control, signal, or power cables that are identified for the use		
Power and control tray cable		336
Power-limited tray cable	Table 722.135(B), 722.135(C), and 722.179(A) (6)	

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
PI_995_-_FR_8186.docx	Revision Clarification	

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 17:20:51 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Section 4.1.4 of the NEC Style Manual prohibits referencing an entire article with the exception of Article 100 or where required for context. As such, the table has been converted into a list format.

Response Message: FR-8186-NFPA 70-2024

Public Input No. 995-NFPA 70-2023 [Section No. 396.10(A)]

Ballot Results

✔ This item has passed ballot

- 20 Eligible Voters
- 1 Not Returned
- 15 Affirmative All
- 4 Affirmative with Comments
- 0 Negative with Comments
- 0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

- Cross, Joseph W.
- Deacy, Brian
- Earl, Tim
- Graser, Peter
- Hunter, Christel K.
- Jackson, Derick
- Kent, Gerald W.
- Newman Searce, Susan
- Nielsen, Dennis A.
- Price, Robert Adrian
- Reichstein, Alyson
- Stene, Susan L.
- Summers, Lawrence L.
- Vincent, Alexander C.
- Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Stule Manual updating to list formatting

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8187-NFPA 70-2024 [Section No. 398.10]

398.10 Uses Permitted.

Open wiring on insulators shall be permitted only for industrial or agricultural establishments on systems of not over 1000 volts ac, 1500 volts dc , nominal, ~~or less,~~ as follows:

- (1) Indoors or outdoors
- (2) In wet or dry locations
- (3) Where subject to corrosive vapors
- (4) For services

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 17:26:04 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Requirements are revised to include the same voltage demarcation used in many places throughout the Code.

Response Message: FR-8187-NFPA 70-2024

Public Input No. 2431-NFPA 70-2023 [Section No. 398.10]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying language

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8225-NFPA 70-2024 [Section No. 400.33]

400.33 Equipment Grounding Conductors.

Equipment grounding conductors shall be connected in accordance with [Article 250](#) , Parts VI and VII of ~~Article 250~~ .

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 22:31:11 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4 regarding the use of Parts.

Response Message: FR-8225-NFPA 70-2024

[Public Input No. 2675-NFPA 70-2023 \[Section No. 400.33\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style Manual change
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8147-NFPA 70-2024 [Section No. 400.34]

400.34 Minimum Bending Radii Radius .

The Portable cable shall be installed with a minimum bending radii for portable cables radius that will prevent damage to the cable during installation and handling in service shall be adequate to prevent damage to the cable .

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP6_FR-8147_400.34.docx		

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 15:22:53 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: According to the NEC Style Manual 2023 version, section 3.2 Word Choices; 3.2.1 Unenforceable Terms, the use of the word "adequate" is possibly an unenforceable or vague term and should not be used.

Response Message: FR-8147-NFPA 70-2024

[Public Input No. 1269-NFPA 70-2023 \[Section No. 400.34\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Style Manual change and remove unenforcable terms

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8226-NFPA 70-2024 [Section No. 400.46]

400.46 Equipment Grounding Conductors.

Equipment grounding conductors shall be connected in accordance with [Article 250](#) , Parts VI and VII of ~~Article 250~~ .

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 22:38:18 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4 regarding the use of Parts.

Response Message: FR-8226-NFPA 70-2024

[Public Input No. 2676-NFPA 70-2023 \[Section No. 400.46\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style Manual change
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8152-NFPA 70-2024 [Section No. 400.47]

400.47 ~~Minimum~~ Conductor Bending Radii Radius .

~~The minimum bending radii for portable~~ Portable power feeder cables rated from 2000 volts to 5000 volts shall not ~~exceed~~ be bent to a radius less than six times the overall cable outer diameter. ~~The minimum bending radii for portable cables~~ Portable power feeder cables rated from 5001 volts to 25,000 volts shall not ~~exceed~~ be bent to a radius less than eight times the overall cable outer diameter.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 15:36:54 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The purpose is to clarify and be uniform with other Code language. The original verbiage contradicted the title. (Title was concerning the “minimum” and verbiage was in conjunction with a “maximum” bending radius. The language was not consistent. (using “shall not exceed”). Radii is plural and should have been singular since we are speaking of a particular bend. Language was also corrected to correlate with 305.5.

Response Message: FR-8152-NFPA 70-2024

[Public Input No. 515-NFPA 70-2023 \[Section No. 400.47\]](#)

[Public Input No. 4543-NFPA 70-2023 \[Section No. 400.47\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian

Earl, Tim

Graser, Peter

Hunter, Christel K.

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Nielsen, Dennis A.

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Watson, Dave

Affirmative with Comment

Crisman, Todd

agree

Custer, Shane Douglas

affirmative

McDaniel, Greg

Clarifying Language

Porcaro, Michael Thomas

In support based on provided evidence



First Revision No. 8157-NFPA 70-2024 [Section No. 402.2]

402.2 Other Articles.

Fixture wires shall comply with this article and also with the applicable provisions of other articles of this code.

Informational Note: See Article 410, Part VI of ~~Article 410~~ for application in luminaires.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 15:44:55 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4 regarding the use of Parts.

Response Message: FR-8157-NFPA 70-2024

Public Input No. 2677-NFPA 70-2023 [Section No. 402.2]

Ballot Results

✓ **This item has passed ballot**

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
I believe it should be Article 410 as opposed to Article 210.
Custer, Shane Douglas
affirmative
McDaniel, Greg
Style Manual change
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8234-NFPA 70-2024 [Section No. 402.5]

402.5 Ampacities for Fixture Wires.

The ampacity of fixture wire shall be as specified in Table 402.5.

No conductor shall be used under such conditions that its operating temperature exceeds the temperature specified in Table 402.3 for the type of insulation involved.

Informational Note: See 310.14(A)(3) for temperature limitation of conductors.

Table 402.5 Ampacity for Fixture Wires

<u>Size (AWG)</u>	<u>Ampacity</u>
18 <u>copper</u> or 16 <u>copper-clad aluminum</u>	6
16 <u>copper</u> or 14 <u>copper-clad aluminum</u>	8
14 <u>copper</u>	17
12 <u>copper</u>	23
10 <u>copper</u>	28

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Sat Jan 20 11:39:45 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: Based on the data provided 16 AWG and 14 AWG copper-clad aluminum are added to the ampacity table for fixture wire.

Response Message: FR-8234-NFPA 70-2024

Public Input No. 1431-NFPA 70-2023 [Section No. 402.5]

Ballot Results

✓ This item has passed ballot

20 Eligible Voters

1 Not Returned

11 Affirmative All

3 Affirmative with Comments

4 Negative with Comments

1 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.

Earl, Tim

Graser, Peter

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Stene, Susan L.

Summers, Lawrence L.

Vincent, Alexander C.

Affirmative with Comment

Custer, Shane Douglas

affirmative

McDaniel, Greg

Updating based on addition of 14 & 16 CCA

Porcaro, Michael Thomas

In support based on provided evidence, also aligning with approval of similar proposal in CMP3.

Negative with Comment

Crisman, Todd

I support the introduction of 14awg cca to the 402.5 ampacity table. I do not support allowing 16 awg cca for fixture wires. The data submitted in the Copperweld report that compared 16awg cca to 18 awg copper did show good performance with regards to heat rise. Additional data would be needed in order for me to vote to move forward with allowing 16awg cca as a fixture wire. This would include third party testing.

Deacy, Brian

Data supports maintaining conductor sizes at the specifications in the 2023 code.

Hunter, Christel K.

The limited internal testing provided as substantiation for including copper-clad aluminum in fixture wire constructions was insufficient and did not address connectors nor the many uses for this type of wire.

Watson, Dave

There is insufficient substantiation for the proposed changes. The submitted report only included temperature testing and there was a faulty thermocouple connection during the CU testing. Testing for thermal expansion and the effects of current cycling were not included.

Abstention

Nielsen, Dennis A.

NFPA 70 110.2 requires or permits conductors to be accepted if approved. The conditions for installation rely on the product listing. Without the product listing, the requirements are not available to establish the NEC requirements for the application to be approved.



First Revision No. 8175-NFPA 70-2024 [Definition: Example D7 Sizing of Service Conductors for Dwe...]

Example D7 Sizing of Service Conductors for Dwelling(s)

Service conductors and feeders for certain dwellings are permitted to be sized in accordance with 310.12.

The terminal temperature rating is assumed to be 75°C (167°F) for the example.

With No Required Adjustment or Correction Factors. If a 175-ampere service rating is selected, a service conductor for a single-phase dwelling is then sized as follows: per 310.12(A) :

The single-phase dwelling service rating is calculated:

175 amperes $\times$ 0.83 = 145.25 amperes ~~per 310.12~~ .

If no other adjustments or corrections are required for the installation, then, in accordance with Table 310.16, a 1/0 AWG Cu or a 3/0 AWG Al meets this rating at 75°C (167°F).

With Required Temperature Correction Factor.

If a 175-ampere service rating is selected, a service conductor is then for a single-phase dwelling is then sized as follows per 310.12(A) :

First, the single phase dwelling service rating is calculated:

$$175 \text{ amperes} \times 0.83 = 145.25 \text{ amperes-per 310.12 .}$$

If the conductors are installed in an ambient temperature of ~~38~~ 49 °C (100 120 °F), the conductor ampacity must be multiplied by the appropriate correction factor in Table 310.15(B) (1)(1). In this case, we will use example, using an XHHW-2 conductor, so we use (Temperature Rating = 90°C (194°F)), will require a correction factor of 0.94 82 to find obtain the minimum corrected conductor ampacity and size for this installation:

$$145.25 / .94 = 159.6 \text{ amperes}$$

In accordance with Table 310.16 , a 2/0 AWG Cu or a 4/0 AWG Al would be required.

Per 110.14(C) and 310.15(A) , compare the corrected conductor ampacity based upon the conductor temperature rating with the conductor ampacity based upon the termination temperature rating and use the smaller of the two values. For the purposes of this calculation, no adjustment or correction factors are applied to the conductor ampacity that is based upon the termination temperature rating.

Starting with the sizes determined above, the corrected conductor ampacities are:

For 1/0 AWG Cu XHHW-2 at 90°C (194°F): $170 \text{ amperes} \times 0.82 = 139.4 \text{ amperes}$

For 3/0 AWG Al XHHW-2 at 90°C (194°F): $175 \text{ amperes} \times 0.82 = 143.5 \text{ amperes}$

The conductor ampacities for the termination temperature rating are:

For 1/0 AWG Cu XHHW-2 at 75°C (167°F): 150 amperes

For 3/0 AWG Al XHHW-2 at 75°C (167°F): 155 amperes

Choosing the smaller of these values:

For 1/0 AWG Cu: 139.4 amperes

For 3/0 AWG Al: 143.5 amperes

Since these results are below the single-phase dwelling service rating calculated above (145.25 amperes), try the next larger size:

For 2/0 AWG Cu XHHW-2 at 90°C (194°F): $195 \text{ amperes} \times 0.82 = 159.9 \text{ amperes}$

For 4/0 AWG Al XHHW-2 at 90°C (194°F): $205 \text{ amperes} \times 0.82 = 168.1 \text{ amperes}$

The conductor ampacities for the termination temperature rating are:

For 2/0 AWG Cu XHHW-2 at 75°C (167°F): 175 amperes

For 4/0 AWG Al XHHW-2 at 75°C (167°F): 180 amperes

Choosing the smaller of these values:

For 2/0 AWG Cu: 159.9 amperes

For 4/0 AWG Al: 168.1 amperes

These results are above the single-phase dwelling service rating calculated earlier (145.25 amperes), so the required conductor size is a 2/0 AWG Cu or a 4/0 AWG Al.

If no temperature correction or ampacity adjustment factors are required, the following table includes conductor sizes calculated using the requirements in 310.12. This table is based on 75°C terminations and without any adjustment or correction factors.

Table D.7 Single-Phase Dwelling Services and Feeders

Service or Feeder Rating (Amperes)	Conductor (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum
100	4	2
110	3	1

<u>Service or Feeder Rating (Amperes)</u>	<u>Conductor (AWG or kcmil)</u>	
	<u>Copper</u>	<u>Aluminum or Copper-Clad Aluminum</u>
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	3/0	250
250	4/0	300
300	250	350
350	350	500
400	400	600

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 16:36:40 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: a

Response Message: FR-8175-NFPA 70-2024

[Public Input No. 79-NFPA 70-2023 \[Definition: With Required Temperature Correction Factor.\]](#)

[Public Input No. 451-NFPA 70-2023 \[Definition: With Required Temperature Correction Factor.\]](#)

[Public Input No. 647-NFPA 70-2023 \[Definition: Example D7 Sizing of Service Conductors for Dwe...\]](#)

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned

15 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Updating using clarifying language in temperature adjustment factor
Porcaro, Michael Thomas
In support based on provided evidence



First Revision No. 8179-NFPA 70-2024 [Annex E]

Informative Annex E ~~Types of Construction~~ Reserved

~~This informative annex is not a part of the requirements of this NFPA document but is included for informational purposes only.~~

E.1

Table E.1 Fire Resistance Ratings for Type I Through Type V Construction (hr)

	Type I		Type II			Type III		Type IV	Type V	
	442	332	222	111	000	211	200	2HH	111	000
Exterior Bearing Walls ^a	-	-	-	-	-	-	-	-	-	-
Supporting more than one floor, columns, or other bearing walls	4	3	2	1	0 ^b	2	2	2	1	0 ^b
Supporting one floor only	4	3	2	1	0 ^b	2	2	2	1	0 ^b
Supporting a roof only	4	3	1	1	0 ^b	2	2	2	1	0 ^b
Interior Bearing Walls	-	-	-	-	-	-	-	-	-	-
Supporting more than one floor, columns, or other bearing walls	4	3	2	1	0	1	0	2	1	0
Supporting one floor only	3	2	2	1	0	1	0	1	1	0
Supporting roofs only	3	2	1	1	0	1	0	1	1	0
Columns	-	-	-	-	-	-	-	-	-	-
Supporting more than one floor, columns, or other bearing walls	4	3	2	1	0	1	0	H	1	0
Supporting one floor only	3	2	2	1	0	1	0	H	1	0
Supporting roofs only	3	2	1	1	0	1	0	H	1	0
Beams, Girders, Trusses, and Arches	-	-	-	-	-	-	-	-	-	-
Supporting more than one floor, columns, or other bearing walls	4	3	2	1	0	1	0	H	1	0
Supporting one floor only	2	2	2	1	0	1	0	H	1	0
Supporting roofs only	2	2	1	1	0	1	0	H	1	0
Floor/Ceiling Assemblies	2	2	2	1	0	1	0	H	1	0
Roof/Ceiling Assemblies	2	1 1/2	1	1	0	1	0	H	1	0
Interior Nonbearing Walls	0	0	0	0	0	0	0	0	0	0
Exterior Nonbearing Walls ^c	0 ^b	0 ^b	0 ^b	0 ^b	0 ^b	0 ^b	0 ^b	0 ^b	0 ^b	0 ^b

Source: Table 7.2.1.1 from *NFPA 5000, Building Construction and Safety Code*, 2021 edition.

H: Heavy timber members.

^a See 7.3.2.1 in *NFPA 5000*.

^b See Section 7.3 in *NFPA 5000*.

^c See 7.2.3.2.12, 7.2.4.2.3, and 7.2.5.6.8 in *NFPA 5000*.

E.1

Table E.1 contains the fire resistance rating, in hours, for Types I through V construction. The five different types of construction can be summarized briefly as follows (see also Table E.2):

E.1.1

Type I is a fire-resistive construction type. All structural elements and most interior elements are required to be noncombustible. Interior, nonbearing partitions are permitted to be 1- or 2-hour rated. For nearly all occupancy types, Type I construction can be of unlimited height.

Type II construction has three categories: fire-resistive, one-hour rated, and nonrated. The number of stories permitted for multifamily dwellings varies from two for nonrated and four for one-hour rated to 12 for fire-resistive construction.

Type III construction has two categories: one-hour rated and nonrated. Both categories require the structural framework and exterior walls to be of noncombustible material. One-hour rated construction requires all interior partitions to be one-hour rated. Nonrated construction allows nonbearing interior partitions to be of nonrated construction. The maximum permitted number of stories for multifamily dwellings and other structures is two for nonrated and four for one-hour rated.

Type IV construction includes traditional heavy timber construction and mass timber construction. In heavy timber construction, the structural framework and the exterior walls are required to be noncombustible except that wood members of certain minimum sizes are allowed. In mass timber construction, structural elements of cross-laminated timber (CLT) are permitted. Allowable building height for mass timber is much higher than for heavy timber.

Type V construction has two categories: one-hour rated and nonrated. One-hour rated construction requires a minimum of one-hour rated construction throughout the building. Nonrated construction allows nonrated interior partitions with certain restrictions. The maximum permitted number of stories for multifamily dwellings and other structures is two for nonrated and three for one-hour rated.

Table E.2 Maximum Number of Stories for Types V, IV, and III Construction

Construction Type	Maximum Number of Stories Permitted
V Nonrated	2
V Nonrated, Sprinklered	3
V One-Hour Rated	3
V One-Hour Rated, Sprinklered	4
IV Heavy Timber	4
IV Heavy Timber, Sprinklered	5
IV Mass Timber	12
III Nonrated	2
III Nonrated, Sprinklered	3
III One-Hour Rated	4
III One-Hour Rated, Sprinklered	5

E.1

In Table E.1 the system of designating types of construction also includes a specific breakdown of the types of construction through the use of arabic numbers. These arabic numbers follow the roman numeral notation where identifying a type of construction [for example, Type I(442), Type II(111), Type III(200)] and indicate the fire resistance rating requirements for certain structural elements as follows:

- (0) First arabic number — exterior bearing walls
- (0) Second arabic number — columns, beams, girders, trusses and arches, supporting bearing walls, columns, or loads from more than one floor
- (0) Third arabic number — floor construction

E.1.1

Table E.3 provides a comparison of the types of construction for various model building codes. [5000 : A.7.2.1.1]

Table E.3 Cross-Reference of Building Construction Types

<i>NFPA 5000</i>	I (442)	I (332)	II (222)	II (111)	II (000)	III (211)	III (200)	IV (2HH)	V (111)	V (000)
UBC	—	I-FR	II-FR	II-1 hr	II-N	III-1 hr	III-N	IV-HT	V-1 hr	V-N
B/NBC	1A	1B	2A	2B	2C	3A	3B	4	5A	5B
SBC	I	II	—	IV-1 hr	IV-UNP	V-1 hr	V-UNP	III	VI-1 hr	VI-UNP
IBC	—	IA	IB	IIA	IIB	IIIA	IIIB	IV*	VA	VB

*Mass timber in the IBC is Type IV A, IV B, and IV C

Source: Table A.7.2.1.1 from *NFPA 5000, Building Construction and Safety Code*, 2021 edition.

UBC: *Uniform Building Code* :

FR: Fire-rated.

N: Nonsprinklered.

HT: Heavy timber.

B/NBC: *National Building Code* :

SBC: *Standard Building Code* :

UNP: Unprotected.

IBC: *International Building Code* :

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Fri Jan 19 16:52:39 EST 2024

Correlating Committee Actions

The correlating committee may override this FR with a First Correlating Revision or with a Committee Note

Create FCR or CN

Committee Statement

Committee Statement: The annex is outdated. NFPA 5000 can be found and viewed for free on the NFPA website and other information can be found online.

Response Message: FR-8179-NFPA 70-2024

Public Input No. 1359-NFPA 70-2023 [Annex E]

Ballot Results

✔ This item has passed ballot

20 Eligible Voters

1 Not Returned
15 Affirmative All
4 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Planas, Gonzalo

Affirmative All

Cross, Joseph W.
Deacy, Brian
Earl, Tim
Graser, Peter
Hunter, Christel K.
Jackson, Derick
Kent, Gerald W.
Newman Searce, Susan
Nielsen, Dennis A.
Price, Robert Adrian
Reichstein, Alyson
Stene, Susan L.
Summers, Lawrence L.
Vincent, Alexander C.
Watson, Dave

Affirmative with Comment

Crisman, Todd
agree
Custer, Shane Douglas
affirmative
McDaniel, Greg
Removed from code
Porcaro, Michael Thomas
In support based on provided evidence



Committee Input No. 8231-NFPA 70-2024 [Section No. 334.104]

This was a First Revision that failed ballot.

334.104 Conductors.

The 600-volt insulated power conductors shall be sizes ~~14~~ 16 AWG through 2 AWG copper conductors or, sizes ~~12 AWG through 2 AWG aluminum or~~ 14 AWG through 2 AWG copper-clad aluminum conductors, or sizes 12 AWG through 2 AWG aluminum conductors. Control and signaling conductors shall be no smaller than ~~18 AWG copper~~ 18 AWG copper or 16 AWG copper-clad aluminum.

Submitter Information Verification

Committee: NEC-P06

Submittal Date: Sat Jan 20 10:58:14 EST 2024

Committee Statement and Meeting Notes

Committee Statement: Based on the data provided 14 AWG copper-clad aluminum is added as the smallest conductor for NM and NMC cable. 16 AWG copper is added based on its historical use. 16 AWG copper-clad aluminum is being added as the smallest control and signal wire for use in NM and NMC Cable.

Response Message: CI-8231-NFPA 70-2024

[Public Input No. 1021-NFPA 70-2023 \[Section No. 334.104\]](#)

[Public Input No. 1010-NFPA 70-2023 \[Section No. 334.104\]](#)

Ballot Results

✖ This item has failed ballot

20 Eligible Voters

1 Not Returned

7 Negative with Comments

8 Affirmative All

3 Affirmative with Comments

1 Abstention

Not Returned

Planas, Gonzalo

Negative with Comment

Crisman, Todd

I oppose this first revision. I support the introduction of 14awg CCA with 10 amp overcurrent protection; however, do not support the introduction of 16awg Copper with 10 amp overcurrent protection. The effort to permit a smaller minimum size CCA conductor for branch circuit wiring has been carefully vetted

through a series of tests that have been submitted in reports with the associated Public Inputs over the last 3 code cycles. The Bimetallics Task Group consisting of industry experts was assembled to not only determine which tests should be performed to address the concerns of the panel members but also how to perform them. The results of this testing were submitted in the Menominee Falls Report which accompanied the associated public inputs. The public inputs and comments eventually led to the creation of new code requirements, some of which addressed the limitations of 14awg CCA with 10 amp overcurrent protection which included terminations on receptacles. The results of the heat rise testing on 14 awg cca protected at 10 amps proved the margin of safety from heat rise exceeded that of the known variable-14 awg copper with 15 amp overcurrent protection. Along with heat rise, terminations on circuit breakers and mechanical stability were also tested. It was my understanding that these test procedures were setting a precedence for determining the safe allowance of minimum size conductors moving forward. During the first draft meeting – 16 awg copper was added as a conductor that could be protected at 10 amps. I understand that 16 awg copper has been allowed in the National Electrical Code as a fixture wire with an ampacity of 8 amps and has proven its performance in the field over time. The transition of this conductor from an ampacity for fixture wire to conductors for branch circuit wiring broadens the application of the conductor. I would support this first revision if 16awg copper was removed or preferably if the same test procedures were implemented for 16 awg copper and the data proves a margin of safety that is comparable to that of 14 awg CCA protected at 10 amps. The decision whether or not to allow smaller size conductors should be done in a manner that represents fairness to all affected parties in the industry. This would include comparison testing with a known value that would be performed by a third party. The ultimate goal would be that the panel agrees on the criteria and parameters for the testing program including the margin of safety- similar to the process that was carried through with the “Bimetallics Task Group.” Once the results are presented to the panel, the decision should migrate from a debatable issue and then become a simple pass or fail.

Custer, Shane Douglas

The addition of the smaller size copper clad aluminum conductors should not be allowed in residential installations or available for installation by non-qualified persons after a dwelling unit has been inspected and approved by the local authority having jurisdiction. There are currently no 10A overcurrent protective devices installed in residential existing panelboards and the possibility of misuse and misapplication during unsupervised and unpermitted installations could result in 10A wire being installed on a 15A or 20A breaker overcurrent device by an unqualified person.

Deacy, Brian

Data supports maintaining conductor sizes at the specifications in the 2023 code.

Earl, Tim

The proposed reduction in conductor sizes would be a substantial change to the code. As such, it must be supported by sufficient data to show that safety will not be compromised. I am not convinced that we have enough data to justify this yet.

Hunter, Christel K.

The information provided did not address the substantiation requested by the code-making panel in the 2023 NEC process. The panel spent significant time developing the test protocol, and the information provided did not meet those criteria. The Fire Protection Research Foundation Report concerning smaller branch circuit use concluded that: "In conclusion, the analysis reveals a series of knowledge gaps that, if addressed through further research and experimentation, would significantly enhance our understanding of the performance of small branch circuit conductors within thermal building insulation." The questions raised regarding the practical, safe use of smaller branch circuits have not been sufficiently addressed.

Stene, Susan L.

CMP 6 reviewed similar proposals for the 2023 NEC and developed responses that carefully detailed testing considered necessary to process these changes. These tests have not been provided to the CMP for review. UL Solutions would consider revisions after reviewing results from the noted tests.

Watson, Dave

The data supplied during the 2023 code cycle supported leaving the smallest conductor sizes as 14 AWG CU and 12 AWG AL or CCA. That data is still valid and has not been proven inaccurate. A negative vote is consistent with the NEMA votes from the 2023 code cycle.

Affirmative All

Cross, Joseph W.

Graser, Peter

Jackson, Derick

Kent, Gerald W.

Newman Searce, Susan

Price, Robert Adrian

Reichstein, Alyson

Summers, Lawrence L.

Affirmative with Comment

McDaniel, Greg

Updating based on 14-CCA and 16-Copper for Signal wiring

Porcaro, Michael Thomas

The Electric Light & Power Task Force, representing the Edison Electric Institute (EEI) is in support of the public inputs to incorporate 14AWG CCA and 16AWG CU to the ampacity tables as indicated, citing provided product testing to substantiate the use case. This is an expansion of the already listed use of CCA currently in the code. Additionally, supporting incorporating modifications to additional code sections related to construction specifications to align permissible minimum wire sizes with the ampacity table additions. Also supporting inclusion of 16AWG CCA for use with control and signal conductors based on provided product testing results.

Vincent, Alexander C.

Committee statement mentions historical use of #16AWG copper as a justification for this minimum power conductor gauge. Specific substantiation is required for those unfamiliar with the history.

Abstention

Nielsen, Dennis A.

NFPA 70 110.2 requires or permits conductors to be accepted if approved. The conditions for installation rely on the product listing. Without the product listing, the requirements are not available to establish the NEC requirements for the application to be approved.

Editorial Comment

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