



National Fire Protection Association

1 Batterymarch Park, Quincy, MA 02169-7471
Phone: 617-770-3000 • Fax: 617-770-0700 • www.nfpa.org

MEMORANDUM

TO: Code-Making Panel 5

FROM: Sarah Caldwell, *Project Administrator*

DATE: January 30, 2019

SUBJECT: NEC® Second Draft FINAL Ballot Results (A2019 Cycle)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot with the exception of **Second Revision No. 7793** as shown in the attached report.

17 Members Eligible to Vote
2 Members Not Returned (*O'Meara, Gallo*)

A Second Revision that fails Ballot will be designated as a Committee Comment, marked as Reject, and published in the Comment Section of the Second Draft Report.

When a Second Revision, that revised text proposed in a First Revision, fails Ballot a Supplementary Ballot shall be conducted to determine whether the Committee is in support of the related First Revision.

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 4.4.10.1 of the ***Regulations Governing the Development of NFPA Standards***.



Second Revision No. 7777-NFPA 70-2018 [Detail]

Please change 250.64(A)(1) to the following and ballot separately from 7775:

- (1) Bare or covered conductors ~~shall not be installed where subject to corrosive conditions or be installed in direct contact with masonry or the earth.~~ without an extruded polymeric covering shall not be installed where subject to corrosive conditions or be installed in direct contact with concrete.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 16:40:21 EDT 2018

Committee Statement

Committee Statement: CMP 5 clarified the types of covering that are acceptable.

Response Message: SR-7777-NFPA 70-2018

Ballot Results

✓ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

13 Affirmative All

1 Affirmative with Comments

1 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

Negative with Comment

Brender, David

“Polymeric” is not a defined word. The term “without polymeric covering” is not defined or described. There is no research submitted that the use of a polymeric covering would prevent or inhibit corrosion. The revision is unnecessary and may diminish safety. Present language ensures safety and is not in need of revision.



Second Revision No. 7810-NFPA 70-2018 [Detail]

Revised 200.6(E) Exception No. 1 as follows:

Exception No. 1: ~~Where the conditions of maintenance and supervision ensure that only qualified persons service the installation, grounded conductors in~~ Conductors within multiconductor cables shall be permitted to be ~~permanently identified~~ re-identified at their terminations at the time of installation by a distinctive white or gray marking or other equally effective means.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 12:02:28 EDT 2018

Committee Statement

Committee Statement: The phrase “Where the conditions of maintenance and supervision ensure that only qualified persons service the installation” was deleted from exception no. 1 to align with other sections of the code such as such as 200.6(D) and 210.7(C)(1).

Response Message: SR-7810-NFPA 70-2018

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

13 Affirmative All

1 Affirmative with Comments

1 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

Negative with Comment

Beckstrand, Gary A.

The requirements for maintenance and supervision should remain as the removal of the requirement exposes electrical workers to increased safety hazards. The new exception as written, effectively allows any conductor of a multiconductor cable to be reidentified as a grounded conductor, and reidentification of conductors, especially branch circuit conductors, is problematic. There is inconsistency of what is considered equally effective means with some AHJs requiring or not allowing markers, paint, marking tape or tags. Durability of markings is problematic as well when considering rework and renovation work to take place years later depending upon the environment leaving the electrical worker exposed to hazards of uncertainty of the difference of types of grounded or ungrounded conductors encountered. The industry is already producing the proper cable for all applications with the proper conductor identification and the modification to the exception is not needed. This will allow the improper cable, due to lack of planning and insight from the installer, to be installed with high potential of improper reidentification of the grounded conductor as it is a common Code violation by many installers especially outside of locations requiring maintenance and supervision.

**Second Revision No. 7797-NFPA 70-2018 [Definition: Bonding Jumper, Main.]****Bonding Jumper, Main.**

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

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 20:00:19 EDT 2018

Committee Statement

Committee Statement: The term "supply-side disconnect" has been removed as it is no longer used in the code as proposed in the first draft.

Response Message: SR-7797-NFPA 70-2018

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.



Second Revision No. 7804-NFPA 70-2018 [Definition: Grounded Conductor.]

Grounded Conductor.

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

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

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 11:17:34 EDT 2018

Committee Statement

Committee Statement: The new informational note is intended to clarify that an equipment grounding conductor is not subject to the identification and connection rules of a grounded conductor.

Response Message: SR-7804-NFPA 70-2018

Public Comment No. 1507-NFPA 70-2018 [Definition: Grounded Conductor.]

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.



Second Revision No. 7805-NFPA 70-2018 [Definition: Grounding Conductor, Equipment (EGC).]

Grounding Conductor, Equipment (EGC).

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

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

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

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 11:23:44 EDT 2018

Committee Statement

Committee Statement: CMP 5 deleted the word “provides” and replaced it with the phrase “is part of” to bring needed clarity to the definition of equipment grounding conductor. Existing Informational Note No. 1 serves to remind the user of the code that the equipment grounding conductor also performs bonding functions.

Response Message: SR-7805-NFPA 70-2018

[Public Comment No. 372-NFPA 70-2018 \[Definition: Grounding Conductor, Equipment \(EGC\).\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul
Gerstetter, David A.
Harding, G. Scott
Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

**Second Revision No. 7807-NFPA 70-2018 [Section No. 200.6(A)]****(A) Sizes 6 AWG or Smaller.**

An insulated grounded conductor of 6 AWG or smaller shall be identified by one of the following means:

- (1) ~~A~~ The insulated conductor shall have a continuous white outer finish.
- (2) ~~A~~ The insulated conductor shall have a continuous gray outer finish.
- (3) ~~Three~~ The insulated conductor shall have three continuous white or gray stripes along the conductor's entire length on other than green insulation.
- (4) ~~Wires~~ Insulated conductors that have their outer covering finished to show a white or gray color but have colored tracer threads in the braid identifying the source of manufacture are acceptable means of identification .
- (5) A single-conductor, sunlight-resistant, outdoor-rated cable used as a solidly grounded conductor in photovoltaic power systems, as permitted by 690.31 690.41 , shall be identified at the time of installation by markings at terminations in accordance with 200.6(A)(1) through (A)(4).
- (6) The grounded conductor of a mineral-insulated, metal-sheathed cable (Type MI) shall be identified at the time of installation by distinctive marking at its terminations.
- (7) Fixture wire shall comply with the requirements for grounded conductor identification as specified in 402.8.
- (8) For aerial cable, the identification shall ~~be as above~~ comply with one of the methods in 200.6(A) (1) through (A)(5) , or by means of a ridge located on the exterior of the cable so as to identify it.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 11:32:59 EDT 2018

Committee Statement

Committee Statement: The phrases in the revised list are converted to complete sentences and restructured for clarity and consistency. The reference to 690.31 was changed to 690.41 to correlate with changes in Article 690.

Response Message: SR-7807-NFPA 70-2018

[Public Comment No. 841-NFPA 70-2018 \[Section No. 200.6\(A\)\]](#)

[Public Comment No. 1483-NFPA 70-2018 \[Section No. 200.6\(A\)\]](#)

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7808-NFPA 70-2018 [Section No. 200.6(E)]**[Detail SR-7810](#)**(E) Grounded Conductors of Multiconductor Cables.**

The insulated grounded ~~conductors~~ conductor(s) in a multiconductor cable shall be identified by a continuous white or gray outer finish or by three continuous white or gray stripes on other than green insulation along its entire length. For ~~cables~~ conductors that are 4 AWG or larger in cables, identification of the grounded conductor shall be permitted to comply with 200.6(B). ~~Multiconductor~~ For multiconductor flat cable with conductors that are 4 AWG or larger, an external ridge shall be permitted to ~~employ an external ridge on~~ identify the grounded conductor.

Exception No. 1: ~~Where the conditions of maintenance and supervision ensure that only qualified persons service the installation, grounded conductors in~~ Conductors within multiconductor cables shall be permitted to be ~~permanently identified~~ re-identified at their terminations at the time of installation by a distinctive white or gray marking or other equally effective means.

Exception No. 2: The grounded conductor of a multiconductor varnished-cloth-insulated cable shall be permitted to be identified at its terminations at the time of installation by a distinctive white marking or other equally effective means.

Informational Note: The color gray may have been used in the past as an ungrounded conductor. Care should be taken when working on existing systems.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 11:35:12 EDT 2018

Committee Statement

Committee Statement: Editorial Revisions were made to this section to add clarity.

Response Message: SR-7808-NFPA 70-2018

[Public Comment No. 281-NFPA 70-2018 \[Section No. 200.6\(E\)\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.
Beckstrand, Gary A.
Bowmer, Trevor N.
Brender, David
Dobrowsky, Paul
Gerstetter, David A.
Harding, G. Scott
Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.



Second Revision No. 7813-NFPA 70-2018 [Section No. 200.9]

200.9 Means of Identification of Terminals.

In devices or utilization equipment with polarized connections, identification of terminals to which a grounded conductor is to be connected shall be substantially white or silver in color. The identification of other terminals shall be of a readily distinguishable different color.

Exception: Where the conditions of maintenance and supervision ensure that only qualified persons service the installations, terminals for grounded conductors shall be permitted to be permanently identified at the time of installation by a distinctive white marking or other equally effective means.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 12:10:17 EDT 2018

Committee Statement

Committee Statement: Silver is not "substantially white" in color. Terminals that are substantially white are rare. Most terminals intended for use with the grounded conductor are silver in color.

Response Message: SR-7813-NFPA 70-2018

[Public Comment No. 2104-NFPA 70-2018 \[Section No. 200.9\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

**Second Revision No. 7780-NFPA 70-2018 [Section No. 250.2]****250.2** ~~Definition.~~**Disconnect, Supply-Side.**

~~As used in this article, a disconnecting means, other than a meter disconnect, that is connected to the serving utility and is on the supply-side of the service disconnecting means. The supply-side disconnect is used for connection of equipment not supplied by a service and is intended to constitute the main control and cutoff of the supply.~~

~~Informational Note: Examples of supply-side disconnects are solar, fuel cell, wind, energy storage, or interconnected power production system disconnecting means for equipment permitted to be connected ahead of the service disconnecting means in accordance with the connection requirements of 230.82.~~

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 17:02:49 EDT 2018

Committee Statement

Committee Statement: Several Second Revisions are being made to address the concerns of grounding and bonding of disconnects and equipment for parallel power production such as for solar installations connected directly to the utility grid. Equipment, not just a disconnect, for parallel power production connected directly to the grid, and not recognized as a service, needs to be required to be grounded and bonded similar to a service as it is equipment connected directly to the utility. A task group with members from CMP-4, 5, and 10 should be formed to ensure the requirements for grounding and bonding of this type of equipment are addressed.

Response Message: SR-7780-NFPA 70-2018

[Public Comment No. 851-NFPA 70-2018 \[Section No. 250.2\]](#)

[Public Comment No. 2144-NFPA 70-2018 \[Section No. 250.2\]](#)

[Public Comment No. 910-NFPA 70-2018 \[Definition: Disconnect, Supply-Side. \]](#)

[Public Comment No. 2015-NFPA 70-2018 \[Definition: Disconnect, Supply-Side. \]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.



Second Revision No. 7815-NFPA 70-2018 [Section No. 250.3]

250.3 Application of Other Articles.

For other articles applying to particular cases of installation of conductors and equipment, grounding and bonding requirements are identified in Table 250.3 that are in addition to, or modifications of, those of this article.

Table 250.3 Additional Grounding and Bonding Requirements

<u>Conductor/Equipment</u>	<u>Article</u>	<u>Section</u>
Agricultural buildings		547.9 and 547.10
Audio signal processing, amplification, and reproduction equipment		640.7
Branch circuits		210.5, 210.6, 406.3
Cablebus		370.9 <u>370.60</u>
Cable trays	392	392.60
Capacitors		460.10, 460.27
Circuits and equipment operating at less than 50 volts	720	
Communications circuits	800	
Community antenna television and radio distribution systems		820.93, 820.100, 820.103, 820.106 <u>800.106, 800.100</u>
Conductors for general wiring	310	
<u>Medium voltage conductors and cables</u>	<u>311</u>	
Cranes and hoists	610	
Electrically driven or controlled irrigation machines		675.11(C), 675.12, 675.13, 675.14, 675.15
Electric signs and outline lighting	600	
Electrolytic cells	668	
Elevators, dumbwaiters, escalators, moving walks, wheelchair lifts, and stairway chairlifts	620	
Fixed electric heating equipment for pipelines and vessels		427.29, 427.48
Fixed outdoor electric deicing and snow-melting equipment		426.27
Flexible cords and cables		400.22, 400.23
Floating buildings		553.8, 553.10, 553.11 <u>555.54, 555.55, 555.56</u>
Grounding-type receptacles, adapters, cord connectors, and attachment plugs		406.9 <u>406.10</u>
Hazardous (classified) locations	500–517	
Health care facilities	517	
Induction and dielectric heating equipment	665	
Industrial machinery	670	
Information technology equipment		<u>645.14,</u> 645.15
Intrinsically safe systems		504.50
Luminaires and lighting equipment		410.40, 410.42, 410.46, 410.155(B)
Luminaires, lampholders, and lamps	410	
Marinas and boatyards		555.15 <u>555.37, 555.38</u>
Mobile homes and mobile home park	550	
Motion picture and television studios and similar locations		530.20, 530.64(B)
Motors, motor circuits, and controllers	430	
Natural and artificially made bodies of water	682	682.30, 682.31, 682.32, 682.33
Network powered broadband communications circuits		<u>800.100, 800.106</u> , 830.93, 830.100, 830.106
Optical fiber cables		770.100
Outlet, device, pull, and junction boxes; conduit bodies; and fittings		314.4, 314.25

<u>Conductor/Equipment</u>	<u>Article</u>	<u>Section</u>
Over 600 volts, nominal, underground wiring methods		300.50(C)
Panelboards		408.40
Pipe organs	650	
Radio and television equipment	810	
Receptacles and cord connectors		406.3
Recreational vehicles and recreational vehicle parks	551	
Services	230	
Solar photovoltaic systems		690.41, 690.42, 690.43, 690.45, 690.47
Swimming pools, fountains, and similar installations	680	
Switchboards and panelboards		408.3(D) 408.18(C)
Switches		404.12
Theaters, audience areas of motion picture and television studios, and similar locations		520.81
Transformers and transformer vaults		450.10
Use and identification of grounded conductors	200	
X-ray equipment	660	517.78

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
70_SR7815_Table_250.3.docx	Updated T250.3--for staff use FINAL	

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 12:18:20 EDT 2018

Committee Statement

Committee Statement: The table is revised to reflect the changes in Chapter 8, see SR 7690 and SR 7692. The table is revised due to the division of Article 310 into Articles 310 and 311.

Response Message: SR-7815-NFPA 70-2018

[Public Comment No. 125-NFPA 70-2018 \[Section No. 250.3\]](#)

[Public Comment No. 2210-NFPA 70-2018 \[Global Input\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7817-NFPA 70-2018 [Section No. 250.6(D)]****(D) Limitations to Permissible Alterations.**

~~Electronic equipment~~ This section shall not be ~~permitted to be~~ considered as permitting electronic equipment to be operated on ac systems or branch circuits that are not connected to an equipment grounding conductor as required by this article. Currents that introduce ~~noise~~ electromagnetic interference or data errors in electronic equipment shall not be considered the objectionable currents addressed in this section.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 12:29:46 EDT 2018

Committee Statement

Committee Statement: The term "noise" is not sufficiently clear. The phrase electromagnetic interference replaces the word noise to improve clarity. Other editorial revisions were made to improve clarity.

Response Message: SR-7817-NFPA 70-2018

[Public Comment No. 2132-NFPA 70-2018 \[Section No. 250.6\(D\)\]](#)

[Public Comment No. 878-NFPA 70-2018 \[Section No. 250.6\(D\)\]](#)

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

**Second Revision No. 7782-NFPA 70-2018 [Section No. 250.24]****250.24 Grounding and Bonding of Service-Supplied Alternating-Current Systems.****~~(A) Grounded System.~~**

~~If an ac system operating at 1000 volts or less is grounded at any point, it shall comply with 250.24(A)(1) through (A)(3).~~

~~(1) Grounded Conductor Brought to Service Equipment.~~

~~A grounded conductor(s) shall be routed with the ungrounded conductors to each service disconnecting means. The grounded conductor(s) shall be connected to each disconnecting means grounded conductor(s) terminal or bus. The grounded conductor on a high impedance grounded neutral system shall be installed in accordance with 250.36 .~~

~~Exception: If two or more service disconnecting means are in a single assembly listed for use as service equipment, it shall be permitted to connect the grounded conductor(s) to the assembly common grounded conductor(s) terminal or bus. The assembly shall include a main bonding jumper for connecting the grounded conductor(s) to the assembly enclosure.~~

~~(0) Sizing of Grounding Conductor.~~

- ~~(0) The grounded service conductor(s) shall be sized not smaller than given in 250.102(C)(1) or (C)(2).~~
- ~~(0) The grounded conductor of a 3-phase, 3-wire delta service shall have an ampacity not less than that of the ungrounded conductors.~~

~~(0) Load-Side Connections. A grounded conductor shall not be connected to normally non-current-carrying metal parts of equipment, ground, or equipment grounding conductors on the load side of the service disconnecting means except as follows:~~

- ~~(0) Separately derived systems as permitted in 250.30~~
- ~~(0) Separate buildings or structures as permitted in 250.32~~
- ~~(0) Electric ranges and clothes dryers as permitted in 250.140~~
- ~~(0) Grounding of equipment as permitted in 250.142~~

~~Informational Note: See 310.10(H) for grounded conductors connected in parallel.~~

~~(2) Main Bonding Jumper.~~

~~For a solidly grounded system, an unspliced main bonding jumper shall be used to connect all of the following:~~

- ~~(0) The grounded service conductor to the equipment grounding conductor(s)~~
- ~~(0) The service disconnect within the enclosure for each service disconnect~~

~~–~~

~~Exception No. 1: If more than one service disconnecting means is located in an assembly listed for use as service equipment, an unspliced main bonding jumper shall bond the grounded conductor(s) to the assembly enclosure.~~

~~Exception No. 2: Impedance grounded neutral systems shall be permitted to be connected as provided in 250.36 and 250.187 .~~

(A) System Grounding Electrode Conductor Connections .

A premises wiring system supplied by a ~~solidly~~ grounded ac service shall have a grounding electrode conductor connected to the grounded service conductor connected to all of the following: , at each service, in accordance with 250.24(A)(1) through (A)(5).

(0) ~~The grounding electrode system in accordance with Part III~~

(0) ~~The equipment grounding conductors~~

(0) ~~The service equipment enclosures~~

(1) Grounding Electrode Conductor Connection General .

The grounding electrode conductor connection shall be made at any accessible point from the load end of the overhead service conductors, service drop, underground service conductors, or service lateral to, including the terminal or bus to which the grounded service conductor is connected at the service disconnecting means.

Informational Note: See definitions of *Service Conductors, Overhead; Service Conductors, Underground; Service Drop; and Service Lateral* in Article 100.

(2) Outdoor Transformer.

If ~~Where~~ the transformer supplying the service is located outside the building, at least one additional grounding connection shall be made from the grounded service conductor to a grounding electrode, either at the transformer or elsewhere outside the building.

Exception: The additional grounding electrode conductor connection shall not be made on high-impedance grounded neutral systems. The system shall meet the requirements of 250.36 .

(3) Dual-Fed Services.

For services that are dual fed (double ended) in a common enclosure or grouped together in separate enclosures and employing a secondary tie, a single grounding electrode conductor connection to the tie point of the grounded conductor(s) from each power source shall be permitted.

(4) Main Bonding Jumper as Wire or Busbar.

If ~~Where~~ the main bonding jumper specified in 250.28 is a wire or busbar and is installed from the grounded conductor terminal bar or bus to the equipment grounding terminal bar or bus in the service equipment, the grounding electrode conductor shall be permitted to be connected to the equipment grounding terminal, bar, or bus to which the main bonding jumper is connected.

(5) Load-Side Grounding Connections.

A grounded conductor shall not be connected to normally non-current-carrying metal parts of equipment, to equipment grounding conductor(s), or be reconnected to ground on the load side of the service disconnecting means except as otherwise permitted in this article.

Informational Note: See 250.30 for separately derived systems, 250.32 for connections at separate buildings or structures, and 250.142 for use of the grounded circuit conductor for grounding equipment.

(B) Main Bonding Jumper.

For a grounded system, an unspliced main bonding jumper shall be used to connect the equipment grounding conductor(s) and the service-disconnect enclosure to the grounded conductor within the enclosure for each service disconnect in accordance with 250.28 .

Exception No. 1: Where more than one service disconnecting means is located in an assembly listed for use as service equipment, an unspliced main bonding jumper shall bond the grounded conductor(s) to the assembly enclosure.

Exception No. 2: Impedance grounded neutral systems shall be permitted to be connected as provided in 250.36 and 250.187 .

(C) Grounded Conductor Brought to Service Equipment.

Where an ac system operating at 1000 volts or less is grounded at any point, the grounded conductor(s) shall be routed with the ungrounded conductors to each service disconnecting means and shall be connected to each disconnecting means grounded conductor(s) terminal or bus. A main bonding jumper shall connect the grounded conductor(s) to each service disconnecting means enclosure. The grounded conductor(s) shall be installed in accordance with 250.24(C)(1) through (C)(4).

Exception: Where two or more service disconnecting means are located in a single assembly listed for use as service equipment, it shall be permitted to connect the grounded conductor(s) to the assembly common grounded conductor(s) terminal or bus. The assembly shall include a main bonding jumper for connecting the grounded conductor(s) to the assembly enclosure.

(1) Sizing for a Single Raceway or Cable.

The grounded conductor shall not be smaller than specified in [Table 250.102\(C\)\(1\)](#) .

(2) Parallel Conductors in Two or More Raceways or Cables.

If the ungrounded service-entrance conductors are installed in parallel in two or more raceways or cables, the grounded conductor shall also be installed in parallel. The size of the grounded conductor in each raceway or cable shall be based on the total circular mil area of the parallel ungrounded conductors in the raceway or cable, as indicated in [250.24\(C\)\(1\)](#) , but not smaller than 1/0 AWG.

Informational Note: See [310.10\(G\)](#) for grounded conductors connected in parallel.

(3) Delta-Connected Service.

The grounded conductor of a 3-phase, 3-wire delta service shall have an ampacity not less than that of the ungrounded conductors.

(4) High Impedance.

The grounded conductor on a high-impedance grounded neutral system shall be grounded in accordance with [250.36](#) .

(D) Grounding Electrode Conductor.

A grounding electrode conductor shall be used to connect the equipment grounding conductors, the service-equipment enclosures, and, where the system is grounded, the grounded service conductor to the grounding electrode(s) required by Part III of this article. This conductor shall be sized in accordance with [250.66](#) .

High-impedance grounded neutral system connections shall be made as covered in [250.36](#) .

(E) Ungrounded System Grounding Connections.

A premises wiring system that is supplied by an ac service that is ungrounded shall have, at each service, a grounding electrode conductor connected in accordance with both of the following: To the grounding electrode(s) required by Part III of this article. ~~To~~ The grounding electrode conductor shall be connected to a metal enclosure of the service conductors at any accessible point from the load end of the overhead service conductors, service drop, underground service conductors, or service lateral to the service disconnecting means.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
70_SR7782_250.24.docx	FOR STAFF USE-Clean version	

Submitter Information Verification

Committee: NEC-P05

Submission Date: Thu Oct 25 17:13:09 EDT 2018

Committee Statement

Committee Statement: The intent of the First Revision was to reorganize and restructure 250.24 for usability and clarity, with no technical changes. Inadvertently, some technical changes occurred such as the sizing of the grounded conductor, and as such the second revision reverts the section back to the 2017 NEC language.

Response Message: SR-7782-NFPA 70-2018

[Public Comment No. 2110-NFPA 70-2018 \[Section No. 250.24\(A\)\(1\)\]](#)

[Public Comment No. 441-NFPA 70-2018 \[Section No. 250.24\]](#)

[Public Comment No. 2023-NFPA 70-2018 \[Section No. 250.24\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters
2 Not Returned
11 Affirmative All
4 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Steinman, Gregory J.

Affirmative with Comment

Bowmer, Trevor N.

The intent of the First Revision is a worthwhile objective to pursue in the next code cycle. Section 250.24 would benefit from a reorganization and restructuring effort.

Brender, David

We are voting "affirmative" on this SR with the understanding that this section is reverting to that in the 2017 NEC.

Porter, Christine T.

This should be reverting back to the 2017 version of this section, without changes

Sasso, Nick

Affirmative.

**Second Revision No. 7778-NFPA 70-2018 [Section No. 250.25]****250.25 Grounding and Bonding Supply-Side Disconnects Systems Permitted to Be Connected on the Supply Side of the Disconnect .**

~~A supply-side disconnect shall be grounded and bonded in accordance~~ The grounding of systems connected on the supply side of the service disconnect, as permitted in 230.82 , that are in enclosures separate from the service equipment enclosure shall comply with 250.25(A) through (C) or (B) .

(A) Grounded System.

If the utility supply system is grounded, the grounding of systems permitted to be connected on the supply side of the service disconnect and are installed in one or more separate enclosures from the service equipment enclosure shall comply with the requirements of 250.24(A) through (D).

(B) Ungrounded Systems.

If the utility supply system is ungrounded, the grounding of systems permitted to be connected on the supply side of the service disconnect and are installed in one or more separate enclosures from the service equipment enclosure shall comply with the requirements of 250.24(E) .

(A) Bonding.

~~The normally non-current-carrying metal parts of equipment containing conductors from the supply-side disconnect to the serving utility shall be bonded together in accordance with 250.92 .~~

(A) Grounded AC Systems.

~~A supply-side disconnect, supplied by an ac system operating at 1000 volts or less that is grounded at any point, shall comply with 250.25(B)(1) through (4).~~

(1) Main Bonding Jumper.

~~An unspliced main bonding jumper shall be used to connect the equipment grounding conductor(s) and the supply-side disconnect enclosure to the grounded conductor(s) within each supply-side disconnect enclosure in accordance with 250.28 .~~

~~*Exception: If more than one supply-side disconnect is located in an assembly listed for use as service equipment, an unspliced main bonding jumper shall bond the grounded conductor(s) to the assembly enclosure.*~~

~~(2) Grounded Conductor.~~

~~The grounded conductor(s) shall be installed and routed with the ungrounded supply conductors from the point of connection to the serving utility to the supply-side disconnect and terminated to the supply-side disconnects grounded conductor(s) terminal or bus. The grounded conductor(s) shall comply with 250.25(B)(2) (a), (B)(2)(b), or (B)(2)(c).~~

~~(0) Sizing.~~

~~The grounded conductor(s) shall be sized in accordance with 250.25(B)(2) (a)(1), (2), or (3).~~

~~(0) Single Raceway or Cable.~~

~~The grounded conductor shall not be smaller than specified in 250.102(C)(1) based upon the ungrounded supply conductors.~~

~~(0) Parallel Conductors in Two or More Raceways or Cables.~~

~~If ungrounded supply conductors are installed in parallel in two or more raceways or cables, the grounded conductor shall also be installed in parallel. The size of the grounded conductor in each raceway or cable shall be based on the total circular mil area of the parallel ungrounded conductors in the raceway or cable, as required in 250.25(B)(2) (a)(1), but shall not be smaller than 1/0 AWG.~~

~~Informational Note to (2): See 310.10(H) for grounded conductors connected in parallel.~~

~~(0) Delta Connected Supply-Side Disconnect.~~

~~The grounded conductor of a 3-phase, 3-wire delta supply-side disconnect shall have an ampacity not less than that of the ungrounded conductors.~~

~~(0) Load-Side Grounding Connections.~~

~~A grounded conductor shall not be connected to normally non-current-carrying metal parts of equipment, be connected to equipment grounding conductor(s), or be reconnected to ground on the load side of the supply-side disconnect except as otherwise permitted in this article.~~

~~Informational Note: See 250.30 for separately derived systems, 250.32 for connections at separate buildings or structures, and 250.142 for use of the grounded circuit conductor for grounding equipment.~~

~~(0) High Impedance.~~

~~The grounded conductor for a high impedance system supplying a supply-side disconnect shall be installed in accordance with 250.36 .~~

~~(3) Grounding Electrode Connection.~~

~~The grounded conductor supplying a supply-side disconnect shall be connected to the grounding electrode conductor(s) in accordance with 250.25(B)(3) (a) through (B)(3)(c).~~

~~(0) General.~~

~~The grounding electrode conductor connection shall be made either within the supply-side disconnect or at any accessible point up to the supply conductor's connection to the serving utility.~~

~~(0) Main Bonding Jumper as Wire or Busbar.~~

~~If the supply-side disconnect bonding jumper is a wire or busbar and is installed from the grounded conductor terminal bar or bus to the equipment grounding terminal bar or bus in the supply-side disconnect, the grounding electrode conductor shall be permitted to be connected to the equipment grounding terminal, bar, or bus to which the supply-side disconnect bonding jumper is connected.~~

~~(0) Outdoor Transformer.~~

~~If the transformer supplying the supply-side disconnect is located outside the building, at least one additional grounding connection shall be made from the grounded supply conductor to a grounding electrode, either at the transformer or elsewhere outside the building.~~

~~(4) Grounding Electrode Conductor.~~

~~A grounding electrode conductor shall be used to connect the equipment grounding conductor(s), the supply-side disconnect enclosure, and the grounded conductor(s) to the grounding electrode(s) required by Part III of this article. The grounding electrode conductor shall be sized in accordance with 250.66 based upon the ungrounded supply conductors.~~

~~(A) Ungrounded AC Systems.~~

~~A supply-side disconnect that is supplied by an ungrounded ac system operating at 1000 volts or less shall comply with 250.25(C)(1) and (C)(2).~~

~~(1) Grounding Electrode Connection.~~

~~The supply-side disconnect shall be connected to the grounding electrode(s) as required by Part III of this article. The grounding electrode conductor connection shall be made either within the supply-side disconnect or at any accessible point up to the supply conductor's connection to the serving utility. If the grounding electrode connection is made at any point outside of the supply-side disconnect, the grounding electrode conductor shall be connected to the supply-side disconnect by a supply-side bonding jumper.~~

~~(2) Grounding Electrode Conductor.~~

~~A grounding electrode conductor shall be used to connect the equipment grounding conductor(s), the supply-side disconnect enclosure, and the supply-side bonding jumper(s) to the grounding electrode(s) required by Part III of this article. The grounding electrode conductor shall be sized in accordance with 250.66 based upon the ungrounded supply conductors.~~

Submitter Information Verification

Committee: NEC-P05

Submission Date: Thu Oct 25 16:59:22 EDT 2018

Committee Statement

Committee Statement: The revision removes the redundancy of 250.25. Not all equipment connected to the utility is considered a service such as parallel power production equipment but should be grounded and bonded with the same requirements. In some instances, such as solar installations, the parallel power production equipment is connected in parallel with a service and in some cases connected directly to the utility solely for power production to the utility with no service equipment in parallel. The addition of 250.25 and pointing to the appropriate parts of 250.24, ensures that supply side equipment is connected to a grounding electrode system, has an effective fault path whether it be a grounded service conductor or supply-side bonding jumper, and is bonded with the more robust requirements of 250.92 and 250.102(C). The structure of Article 250 is maintained and redundancy is removed. A task group with CMP-4, CMP-5, and CMP-10 should be formed to ensure proper correlation for the requirements of these installations.

Response Message: SR-7778-NFPA 70-2018

[Public Comment No. 2057-NFPA 70-2018 \[Section No. 250.25\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7784-NFPA 70-2018 [Section No. 250.28(D)(2)]****(2) Main Bonding Jumper for Service with More Than One Enclosure.**

If a service consists of more than a single enclosure as permitted in ~~230.71(A)~~ 230.71(B) , ~~or if there are two or more supply-side disconnect enclosures,~~ the main bonding jumper for each enclosure shall be sized in accordance with 250.28(D)(1) based on the largest ungrounded service ~~or supply~~ conductor serving that enclosure.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 17:55:45 EDT 2018

Committee Statement

Committee Statement: The term supply-side disconnects is removed as it is not a defined term in the Code and is unnecessary.

Response Message: SR-7784-NFPA 70-2018

Public Comment No. 462-NFPA 70-2018 [Section No. 250.28(D)(2)]

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7785-NFPA 70-2018 [Section No. 250.30(A)(2)]****(2) Supply-Side Bonding Jumper.**

If the source of a separately derived system and the source of the first disconnecting means are located in separate enclosures, a supply-side bonding jumper shall be installed with the circuit conductors from the source enclosure to the first disconnecting means enclosure. A supply-side bonding jumper shall not be required to be larger than the derived ungrounded conductors. The supply-side bonding jumper shall be permitted to be of nonflexible metal raceway type or of the wire or bus type as follows:

- (1) A supply-side bonding jumper of the wire type shall comply with 250.102(C), based on the size of the derived ungrounded conductors.
- (2) A supply-side bonding jumper of the bus type shall have a cross-sectional area not smaller than a supply-side bonding jumper of the wire type as determined in 250.102(C).

Exception: A supply-side bonding jumper shall not be required between enclosures for installations made in compliance with 250.30(A)(1), Exception No. 2.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 17:57:54 EDT 2018

Committee Statement

Committee Statement: Removing the words "the source of" removes the confusion of when a supply-side bonding jumper is required to be installed. If the source of the separately derived system is not in the same enclosure as the first disconnecting means, then a supply-side bonding jumper is required to be installed.

Response Message: SR-7785-NFPA 70-2018

[Public Comment No. 2113-NFPA 70-2018 \[Section No. 250.30\(A\)\(2\)\]](#)

[Public Comment No. 466-NFPA 70-2018 \[Section No. 250.30\(A\)\(2\)\]](#)

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.
Beckstrand, Gary A.
Bowmer, Trevor N.
Brender, David
Dobrowsky, Paul
Gerstetter, David A.
Harding, G. Scott
Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

**Second Revision No. 7786-NFPA 70-2018 [Section No. 250.32(A)]****(A) Grounding Electrode.**

A building(s) or structure(s) supplied by a feeder(s) or branch circuit(s) shall have a grounding electrode ~~or system and~~ grounding electrode ~~system conductor~~ installed in accordance with Part III of Article 250. Where there is no existing grounding electrode, the grounding electrode(s) required in 250.50 shall be installed.

Exception: A grounding electrode shall not be required where only a single branch circuit, including a multiwire branch circuit, supplies the building or structure and the branch circuit includes an equipment grounding conductor for grounding the normally non-current-carrying metal parts of equipment.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 18:02:14 EDT 2018

Committee Statement

Committee Statement: The text is clarified to require a grounding electrode system and grounding electrode conductor to be installed in accordance with Part III of Article 250.

Response Message: SR-7786-NFPA 70-2018

Public Comment No. 405-NFPA 70-2018 [Section No. 250.32(A)]

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott
Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

**Committee Comment No. 7793-NFPA 70-2018 [Section No. 250.34(C)]**

This was a Second Revision that failed ballot.

(C) Grounded Conductor Bonding.

A system conductor that is required to be grounded by 250.26 shall be connected to the generator frame under all of the following conditions:

- (1) ~~where the~~ The generator is a component of a separately derived system.
- (2) A grounding-type receptacle(s) is mounted on the generator or is supplied by the generator.
- (3) A receptacle mounted on the generator or is supplied by the generator has ground-fault circuit-interrupter protection.

Informational Note: For grounding portable generators supplying fixed wiring systems, see 250.30.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 18:29:19 EDT 2018

Committee Statement

Committee Statement: This section is revised to ensure that a proper ground fault current path is installed. The section has been revised to coordinate with UL 943, the UL Standard on GFCI protection, which requires that GFCI devices be used only on grounded neutral systems. For portable generators, bonding the neutral to the frame accomplishes this.

Response Message: CC-7793-NFPA 70-2018

[Public Comment No. 371-NFPA 70-2018 \[Section No. 250.34\(C\)\]](#)

Ballot Results

✖ This item has failed ballot

- 17 Eligible Voters
- 2 Not Returned
- 10 Negative with Comments
- 3 Affirmative All
- 1 Affirmative with Comments
- 1 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Negative with Comment

Andre, Joseph F.

Portable generators may be used in many different ways; the same equipment may be used as a stand-alone system one day and be connected as a backup to the fixed wiring system the next. It may be installed as a separately derived system or with the grounded conductor solidly connected to the premises wiring system grounded conductor. Bonding of the frame in all instances covered by 250.34(C) is unwarranted as nearly all portable generators will be connected

to a grounding-type receptacle at some point.

Beckstrand, Gary A.

The proposed modification should be reject as it will prohibit the use of "floating neutral" generators. No substantiation was provided to show the hazards of floating neutral generators which have a long proven record of safety.

Bowmer, Trevor N.

The current 250.34C language correctly links this requirement to bond the neutral to the frame to the Section 250.26 for ac systems that are required to grounded. The proposed 250.34C introduces confusion about the permitted usage of unbonded (floating neutral) portable generators in stand-alone applications. If a change is required for concerns with the application in separately derived systems or in generators, such revisions belong in 250.30 or in the generator sections (e.g., 445) . The 2017 language in 250.34C is sufficient and clear.

Gerstetter, David A.

The existing Code only requires bonding of the grounded conductor to the generator frame when the generator is part of a separately derived system. This practice allows "floating neutral" generators, which is permitted in Article 445 (RE: 445.20(B)), and acknowledged in Article 702 (RE: 702.7(C)). Additionally, as noted in 445.20(B), these "floating neutral" generators are required to have GFCI protection on all 125-volt, 15- and 20-ampere receptacles. This change to 250.34 would result in inconsistencies with Articles 445 and 702, and presents a conflict with 445.20. If this change is pursued, a consistent approach must be agreed upon between CMP's 5 and 13.

Harding, G. Scott

The requirements for the internal wiring of portable generators are found in Article 445 and changes to these requirements should be directed to CMP 13 for review. This revision conflicts with 445.20 which allows the use of GFCI receptacles on ungrounded systems. The Correlating Committee should review this action with the existing text in Article 445. Although reasonable concerns have been raised about how portable generators are used, not enough evidence has been submitted to prohibit the numerous existing generators that are currently in use.

Harding, Joseph

"Floating neutral" portable generators, where the neutral conductor on receptacles is not connected to the equipment grounding conductor, represent approximately 50% of all portable generators sold in the United States, and have been sold on the U.S. market for several decades. There are many millions of these types of portable generators that are safely operating today. On "bonded neutral" portable generators, the neutral conductor on receptacles is bonded to the equipment grounding conductor. Second revision 7793 would require the redesign of all floating neutral portable generators on the U.S. market today and it would make the millions of floating neutral portable generators in use today unusable in accordance with the NEC, since there is no "effectivity date" for this revision (i.e. it would be retroactive). There is no justifiable reason for making this revision. Floating neutral portable generators are perfectly safe in accordance with the current requirements in NEC 2017. There are two typical applications for portable generators. One application is to provide "backup power" to premises wiring systems. Another application is to provide power in "stand-alone" mode, for example at a campsite. For the backup power application, there is no difference between a floating neutral and bonded neutral portable generator. For floating neutral, the neutral wire is bonded to the equipment grounding conductor through the main bonding jumper of the premises wiring. On bonded neutral, the neutral is bonded to the equipment grounding conductor through the bond on the generator itself. Electrically, the systems are identical. I do not believe that there is any dispute among CMP-5 members regarding the safety of portable generators in the backup power application. Therefore, it makes no sense to not allow grounded receptacles or GFCIs on floating neutral portable generators. Indeed, 445.20(A) requires GFCIs on 15- and 20-amp receptacles of floating neutral generators under certain conditions, with the backup power to premises wiring application in mind. Another application, as mentioned above, is operation in "stand-alone" mode. By this I mean operation in accordance with 250.34(A), where it is not required that the frame of a portable generator be connected to a grounding electrode. In this application, the portable generator is not part of a grounded system. A floating neutral portable generator is perfectly safe in this application as well. The reason is because it takes two separate faults in order to create a shock hazard. A single fault on the load side of a bonded neutral generator would result in an electric shock to persons. On the other hand, a single fault on the load side of a floating neutral generator would not result in an electric shock to persons. Even in the very unlikely event of two separate faults while using a floating neutral portable generator in stand-alone mode, any GFCI-protected receptacle would trip. There are other examples of this type of construction, such as in UL 1776, Standard for High-Pressure Cleaning Machines, which requires GFCIs on double-insulated products (i.e. have no grounded conductor). Please note that this is not a purely theoretical argument. As previously mentioned, there are many millions of floating neutral portable generators in use not only today but also over the last several decades, for both backup power as well as stand-alone mode. They have an outstanding track record for safety, with no known incidents of electric shock to persons. Therefore, there is no justification for requiring the redesign of all floating neutral portable generators, as well as making the many millions of existing floating neutral portable generators in use today unusable in accordance with the NEC.

Pancake, III, William A.

Having this change would affect what is currently out there to be purchased and have been purchased. The redesign of all floating neutral portable generators on the U.S. market today, it would make the many millions of floating neutral

portable generators unusable in accordance with the NEC, since there is no "effectivity date" for this revision (i.e. it would be retroactive). There is no justifiable or substantiation reason for making this revision. Floating neutral portable generators have been safe in accordance with the current requirements in NEC 2017.

Philips, Nathan

This revision applies to the internal wiring performed by manufacturers of generators and is outside the scope of Article 250. The requirements for internal wiring of portable generators are found in Article 445 and changes to them should be directed to CMP 13. This revision conflicts with 445.20 which allows the use of GFCI receptacles on ungrounded systems. The requirements for the use of a bonded or floating (ungrounded) neutral conductor in a portable generator are found in 445.11. This revision would make millions of generators that are being safely used today no longer code compliant. The committee statement does not provide justification for this or for superseding the requirements in Article 445. The committee heard no evidence of any accidents or injuries resulting from the use of ungrounded portable generators. While there are legitimate concerns about how portable generators are frequently used in stand-by power applications, this revision does not prevent homeowners and others from incorrectly connecting a portable generator to a grounded premises wiring system.

Porter, Christine T.

I agree with the negative comments expressed by others as this will not allow portable generators in non-separately derived systems.

Steinman, Gregory J.

The proposed wording is confusing as it's not clear whether all three items are applied or whether each of the three items can be applied individually. 1. The present requirement of 250.34(C) in the 2017 NEC is already provided in 250.30(A)(1)(a). That requirement is for the bonding of the grounded conductor to the portable generator frame when it is a separately derived system. 250.34(C) should remain as is or be removed since it is covered in 250.30(A)(1)(a). 2. PC No. 371 and SR No. 7793 have included additional requirements to bond the grounded conductor to the frame if grounded-type or GFCI protected receptacles are mounted on or supplied by the generator. This requirement invalidates utilizing portable generators with floating neutrals that are connected to a fixed wiring system's service-supplied system grounding conductor in transfer arrangements that do not switch the neutral conductor. 3. The generator grounded conductor can be connected as follows; a) Bonded to the generator frame without a grounding electrode for portable operation in accordance with 250.34(A). b) Bonded to the portable generator frame with the frame connected to a grounding electrode as a separately derived source in accordance with 250.34(C) of the 2017 NEC and 250.30(A)(1)(a); used either to supply equipment or receptacles not mounted on but supplied by the portable generator from fixed wiring or in transfer arrangements that switch the neutral conductor. c) Directly to the service-supplied system grounded conductor that is bonded at the service equipment; used in transfer arrangements that do not switch the neutral conductor. 4. The bonding of the grounded conductor of portable generators is defined in 702.11 for both separately derived and nonseparately derived systems. PC No. 371 and SR No. 7793 incorrectly disallow the use of portable generators in nonseparately derived systems. 5. The revised language in 250.34(C) requires any grounding-type receptacle or GFCI receptacle mounted on the generator, not supplied by the generator, to connect the system grounded conductor to the generator frame. This is a direct violation of 250.24(A) and should be reviewed by the Correlating Committee

Affirmative All

Abernathy, Paul W.

Dobrowsky, Paul

Mohla, Daleep C.

Affirmative with Comment

Brender, David

1. The Portable Generator Manufacturers Association (PGMA) state in Section 5.1.2.5 of their ANSI approved Safety Standard "Safety and Performance of Portable Generators": Ground Fault Circuit Interrupters, if provided, shall comply with UL 943. (This requires a bonded neutral generator.) 2. The PGMA also requires in 5.1.2.4 of their safety standard, that portable generators intended for use during temporary wiring have GFCI protection "for personnel on all 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets". 3. NEMA manufacturers of GFCI receptacles require that they be installed on a grounded electrical system. 4. NEMA manufacturers require compliance with listing requirements by reference to 110.3(B). 5. As included in the Panel Statement, the UL Standard 943 requires that the GFCI be installed on a grounded system. UL knows they cannot otherwise provide the intended safety protection against electric shock. For portable generators, this equates to having a bonded neutral on the portable generator.

Abstention

Sasso, Nick

Abstain.

J. Harding Comments on NEC Second Revision 7793

(250.34(C)) Revised January 4, 2019

I am voting negatively on this second revision, for the reasons detailed below.

“Floating neutral” portable generators, where the neutral conductor on receptacles is not connected to the equipment grounding conductor, represent approximately 50% of all portable generators sold in the United States, and have been sold on the U.S. market for several decades. In particular, inverter-type portable generators and other portable generators with a rated power of less than 5000 watts tend to be of the floating neutral type. There are many millions of these types of portable generators that are safely operating today.

On “bonded neutral” portable generators, the neutral conductor on receptacles is bonded to the equipment grounding conductor.

Second revision 7793 would not only require the redesign of all floating neutral portable generators on the U.S. market today, it would make the many millions of floating neutral portable generators in use today unusable in accordance with the NEC, since there is no “effectivity date” for this revision (i.e. it would be retroactive). There is no justifiable reason for making this revision. Floating neutral portable generators are perfectly safe in accordance with the current requirements in NEC 2017. I will explain this further.

There are two typical applications for portable generators. One application is to provide “backup power” to premises wiring systems. Another application is to provide power in “stand-alone” mode, for example at a campsite.

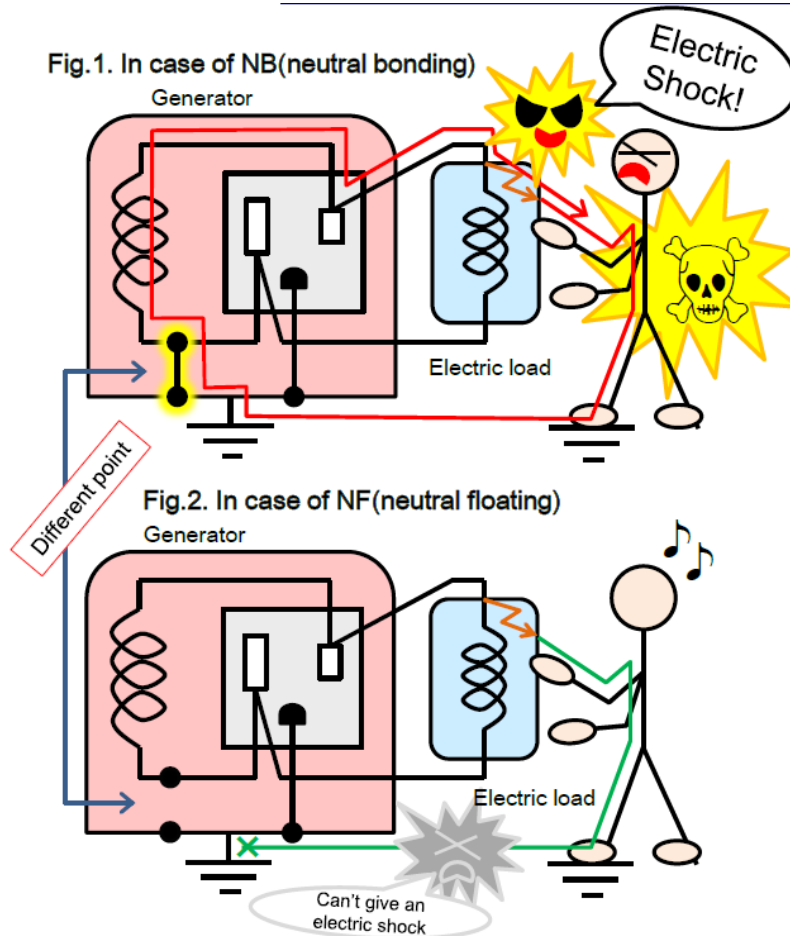
For the backup power application, the portable generator is typically connected to the premises wiring through a transfer switch. In this scenario, the portable generator is part of a grounded system. The only difference between using a floating neutral and a bonded neutral portable generator (in a typical 120/240 V, single phase a.c. system) is that for a floating neutral generator, the neutral conductors of the premises wiring and the generator are connected together (i.e. as a non-separately derived system). The neutral conductor of the floating neutral portable generator is bonded to the equipment grounding conductors of both the premises wiring and the generator through the main bonding jumper of the premises wiring.

For bonded neutral portable generators, the neutral conductors of the premises wiring and the generator are not connected together (i.e. as a separately derived system). The neutral conductor of the bonded neutral portable generator is bonded to the equipment grounding conductor through the bond on the generator itself.

For backup power, the end result is exactly the same. You have a grounded system with a bond between the neutral and equipment grounding conductor. I do not believe that there is any dispute among CMP-5 members regarding the safety of portable generators in the backup power application. Therefore, it makes no sense to not allow grounded receptacles or GFCIs on floating neutral portable generators, as proposed in second revision 7793. Indeed, 445.20(A) specifically requires GFCIs on 15- and 20-amp receptacles of floating neutral generators under certain conditions, with the backup power to premises wiring application in mind.

Another application, as mentioned above, is operation in “stand-alone” mode. By this I mean operation in accordance with 250.34(A), where it is not required that the frame of a portable generator be connected to a grounding electrode. In this application, the portable generator is not part of a grounded system.

A floating neutral portable generator is perfectly safe in this application as well. The reason is because it takes **two separate faults** in order to create a shock hazard. A single fault on the load side of a bonded neutral generator would result in an electric shock to persons. On the other hand, a single fault on the load side of a floating neutral generator **would not** result in an electric shock to persons. This is shown in Figures 1 and 2 below.



Even in the very unlikely event of two separate faults while using a floating neutral portable generator in stand-alone mode, any GFCI-protected receptacle **would** trip. There are other examples of this type of construction, such as in UL 1776, *Standard for High-Pressure Cleaning Machines*, which requires GFCIs on double-insulated products (i.e. have no grounded conductor).

Please note that this is not a purely theoretical argument. As previously mentioned, there are many millions of floating neutral portable generators in use not only today but also over the last several decades, for both backup power as well as stand-alone mode. They have an outstanding track record for safety, with no known incidents of electric shock to persons. Therefore, there is no justification for requiring the redesign of all floating neutral portable generators, as well as making the many millions of existing floating neutral portable generators in use today unusable in accordance with the NEC.

**Second Revision No. 7818-NFPA 70-2018 [Section No. 250.53(C)]****(C) Bonding Jumper.**

The bonding jumper(s) used to connect the grounding electrodes together to form the grounding electrode system shall be installed in accordance with 250.64(A), (B), and (E), shall be sized in accordance with 250.66, and shall be connected in the manner specified in 250.70. Rebar shall not be used as a conductor to interconnect the electrodes of grounding electrode systems.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 12:40:35 EDT 2018

Committee Statement

Committee Statement: Adding the first revision text created in Section 250.68(C)(3)(c) to 250.53(C). The language is appropriate in Section 250.53(C) as it contains the rules for bonding jumper interconnection of electrodes. The first revision text is also to remain in 250.68(C)(3)(c).

Response Message: SR-7818-NFPA 70-2018

[Public Comment No. 1740-NFPA 70-2018 \[Section No. 250.53\(C\)\]](#)

[Public Comment No. 2077-NFPA 70-2018 \[New Section after 250.53\(F\)\]](#)

[Public Comment No. 1738-NFPA 70-2018 \[Section No. 250.68\(C\)\]](#)

[Public Comment No. 2069-NFPA 70-2018 \[Section No. 250.68\(C\)\]](#)

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

0 Affirmative with Comments

1 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Negative with Comment

Sasso, Nick

Negative. ----- Reinforcing bar***** ----- I've addressed using slang building code terminology at more than one meeting. The term "rebar" is a slang term and is the short version of "reinforcing bar." ----- It's like saying, "footer" when actually proper building code terminology is "footing." ----- NFPA standards should never use slang. We are better than this. ----- The only Article of NEC that uses this term (rebar) is Article 250. I think that NFPA standards should clearly state, "steel reinforcing bar." A informational note could also be provided stating how steel reinforcing bar is sometimes referred to as "rebar." ----- The International Building Codes, as well as ACI, make multiple references simply to "bar" and "reinforcing bar," for example, take the following definition: ----- [FABRICATED ITEM: Structural, load-bearing or lateral load-resisting assemblies consisting of materials assembled prior to installation in a building or structure or subjected to operations such as heat treatment, thermal cutting, cold working or reforming after manufacture and prior to installation in a building or structure. Materials produced in accordance with standard specifications referenced by this code, such as rolled structural steel shapes, steel-REINFORCING BARS, masonry units and wood structural panels, or in accordance with a standard, listed in Chapter 35, which provides requirements for quality control done under the supervision of a third-party quality control agency shall not be considered "fabricated items."] ----- ****[Note: Emphasis in CAPS [mine]. I emphasize certain points using CAPS because the current editor does not give us the option of typographical emphasis (bold, underline, etc.), or making separate paragraphs. This should not be interpreted as "yelling." It is merely trying to draw attention to what I consider to be an important point.]

**Second Revision No. 7775-NFPA 70-2018 [Section No. 250.64(A)]**[Detail SR-7777](#)**(A) Aluminum or Copper-Clad Aluminum Conductors.**

Grounding electrode conductors of bare, covered, or insulated aluminum or copper-clad aluminum shall comply with the following:

- (1) Bare or covered conductors ~~shall not be installed where subject to corrosive conditions or be installed in direct contact with masonry or the earth. without an extruded polymeric covering shall not be installed where subject to corrosive conditions or be installed in direct contact with concrete.~~
- (2) Terminations made within outdoor enclosures that are listed enclosures and identified for outdoor use the environment shall be permitted within 450 mm (18 in.) of the earth. ~~If open bottom enclosures are installed on a concrete pad, the concrete shall not be considered earth bottom of the enclosure .~~
- (3) Aluminum or copper-clad aluminum conductors external to buildings or equipment enclosures shall not be terminated within 450 mm (18 in.) of the earth, ~~unless insulated. The termination shall be listed as a sealed wire connector system and listed as grounding and bonding equipment .~~

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 16:20:33 EDT 2018

Committee Statement

Committee Statement: Concrete was added to the list of prohibited locations to clarify that concrete is a type of masonry. The bottom of open-bottom enclosures is the material, other than earth, where the enclosure is mounted. The sealed wire connector system was deleted since CMP 5 is not aware of a product that is both a sealed wire connector system that is also listed for grounding and bonding of terminations of aluminum grounding and bonding conductors.

This revision does not include the addition of "without an extruded polymeric covering". The addition of that phrase is being done by a separate SR, Detail SR 7777.

Response Message: SR-7775-NFPA 70-2018

[Public Comment No. 1718-NFPA 70-2018 \[Section No. 250.64\(A\)\]](#)

[Public Comment No. 1642-NFPA 70-2018 \[Section No. 250.64\(A\)\]](#)

[Public Comment No. 2087-NFPA 70-2018 \[Section No. 250.64\(A\)\]](#)

Ballot Results

✔ This item has passed ballot

- 17 Eligible Voters
- 2 Not Returned
- 13 Affirmative All
- 2 Affirmative with Comments
- 0 Negative with Comments
- 0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Brender, David

I assume Second Revision 7777 addresses item #1 above as a separate issue; therefore I vote affirmative on Second Revision.

Sasso, Nick

Affirmative. For the record, I previously stated at two meetings during the 2017 cycle that I was not aware of a sealed wire connector system that would serve this purpose.



Second Revision No. 7825-NFPA 70-2018 [Section No. 250.66 [Excluding any Sub-Sections]]

The size of the grounding electrode conductor at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at a separately derived system of a grounded or ungrounded ac system shall not be less than given in Table 250.66, except as permitted in 250.66(A) through (C).

Table 250.66 Grounding Electrode Conductor for Alternating-Current Systems

<u>Size of Largest Ungrounded Service-Entrance Conductor or Equivalent Area for Parallel Conductors^a (AWG/kcmil)</u>		<u>Size of Grounding Electrode Conductor (AWG/kcmil)</u>	
<u>Copper</u>	<u>Aluminum or Copper-Clad Aluminum</u>	<u>Copper</u>	<u>Aluminum or Copper-Clad Aluminum^b</u>
2 or smaller	1/0 or smaller	8	6
1 or 1/0	2/0 or 3/0	6	4
2/0 or 3/0	4/0 or 250	4	2
Over 3/0 through 350	Over 250 through 500	2	1/0
Over 350 through 600	Over 500 through 900	1/0	3/0
Over 600 through 1100	Over 900 through 1750	2/0	4/0
Over 1100	Over 1750	3/0	250

Notes:

1. If multiple sets of service-entrance conductors connect directly to a service drop, set of overhead service conductors, set of underground service conductors, or service lateral, the equivalent size of the largest service-entrance conductor shall be determined by the largest sum of the areas of the corresponding conductors of each set.
2. Where there are no service-entrance conductors, the grounding electrode conductor size shall be determined by the equivalent size of the largest service-entrance conductor required for the load to be served.
3. See installation restrictions in 250.64.

^a ~~This table also applies to the derived conductors of separately derived ac systems.~~

^b ~~See installation restrictions in 250.64(A).~~

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
70_SR7825_Table250.66.docx	FOR STAFF USE	

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 14:08:28 EDT 2018

Committee Statement

Committee Statement: The phrase "service-entrance" were deleted from the table heading since the table refers to installations that involve other than service-entrance conductors. Editorial revisions are made to delete the existing footnote "a" since it is left over from when this table was used to size the neutral (grounded conductor) for services and separately derived systems. Footnote "b" was changed to Note 3 and clarified to reference 250.64 in its entirety.

Response SR-7825-NFPA 70-2018

Message:

[Public Comment No. 473-NFPA 70-2018 \[Section No. 250.66 \[Excluding any Sub-Sections\]\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7838-NFPA 70-2018 [Section No. 250.94(A)]****(A) The Intersystem Bonding Termination Device.**

An intersystem bonding termination (IBT) for connecting intersystem bonding conductors shall be provided external to enclosures at the service equipment or metering equipment enclosure and at the disconnecting means for any additional buildings or structures. If an IBT is used, it shall comply with the following:

- (1) Be accessible for connection and inspection.
- (2) Consist of a set of terminals with the capacity for connection of not less than three intersystem bonding conductors.
- (3) Not interfere with opening the enclosure for a service, building or structure disconnecting means, or metering equipment.
- (4) At the service equipment, be securely mounted and electrically connected to an enclosure for the service equipment, to the meter enclosure, or to an exposed nonflexible metallic service raceway, or be mounted at one of these enclosures and be connected to the enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.
- (5) At the disconnecting means for a building or structure, be securely mounted and electrically connected to the metallic enclosure for the building or structure disconnecting means, or be mounted at the disconnecting means and be connected to the metallic enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.
- (6) The terminals shall be listed as grounding and bonding equipment.

Exception: In existing buildings or structures where any of the intersystem bonding and grounding electrode conductors required by 770.100(B)(2), ~~805.100(B)(2)~~ 800.100(B)(2), 810.21(F)(2), ~~820.100(B)(2)~~ 820.100, and ~~830.100(B)(2)~~ 830.100 exist, installation of the intersystem bonding termination is not required. An accessible means external to enclosures for connecting intersystem bonding and grounding electrode conductors shall be permitted at the service equipment and at the disconnecting means for any additional buildings or structures by at least one of the following means:

- (1) *Exposed nonflexible metallic raceways*
- (2) *An exposed grounding electrode conductor*
- (3) *Approved means for the external connection of a copper or other corrosion-resistant bonding or grounding electrode conductor to the grounded raceway or equipment*

Informational Note No. 1: A 6 AWG copper conductor with one end bonded to the grounded nonflexible metallic raceway or equipment and with 150 mm (6 in.) or more of the other end made accessible on the outside wall is an example of the approved means covered in 250.94, Exception item (3).

Informational Note No. 2: See 770.100, ~~805.100~~ 800.100, 810.21, 820.100, and 830.100 for intersystem bonding and grounding requirements for conductive optical fiber cables, communications circuits, radio and television equipment, CATV circuits and network-powered broadband communications systems, respectively.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 15:46:32 EDT 2018

Committee Statement

Committee Statement: The general grounding requirements of several Articles (805, 820, 830) were consolidated into 800.100, so 805.100 has been replaced with 800.100 in the exception and informational note. See second revision 7690 for actions taken on referenced sections by CMP-16.

Response Message: SR-7838-NFPA 70-2018

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7794-NFPA 70-2018 [Section No. 250.96(B)]****(B) Isolated Grounding Circuits.**

Where installed for the reduction of ~~electrical noise~~ (electromagnetic interference) on the grounding circuit, an equipment enclosure supplied by a branch circuit shall be permitted to be isolated from a raceway containing circuits supplying only that equipment by one or more listed nonmetallic raceway fittings located at the point of attachment of the raceway to the equipment enclosure. The metal raceway shall comply with this article and shall be supplemented by an internal insulated equipment grounding conductor installed in accordance with 250.146(D) to ground the equipment enclosure.

Informational Note: Use of an isolated equipment grounding conductor does not relieve the requirement for grounding the raceway system.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 18:59:50 EDT 2018

Committee Statement

Committee Statement: This section is revised to be consistent with the use of the term electromagnetic interference in other parts of the Code.

Response Message: SR-7794-NFPA 70-2018

Public Comment No. 1206-NFPA 70-2018 [Section No. 250.96(B)]

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7795-NFPA 70-2018 [Section No. 250.104(B)]****(B) Other Metal Piping.**

If installed in or attached to a building or structure, a metal piping system(s), including gas piping, that is likely to become energized shall be bonded to any of the following:

- (1) Equipment grounding conductor for the circuit that is likely to energize the piping system
- (2) Service equipment enclosure
- (3) Grounded conductor at the service
- (4) Grounding electrode conductor, if of sufficient size
- (5) One or more grounding electrodes used, if the grounding electrode conductor or bonding jumper to the grounding electrode is of sufficient size

The bonding conductor(s) or jumper(s) shall be sized in accordance with Table 250.122, and equipment grounding conductors shall be sized in accordance with Table 250.122 using the rating of the circuit that is likely to energize the piping system(s). The points of attachment of the bonding jumper(s) shall be accessible.

Informational Note No. 1: Bonding all piping and metal air ducts within the premises will provide additional safety.

Informational Note No. 2: Additional information for gas piping systems can be found in Section 7.13 of NFPA 54-2018, National Fuel Gas Code, and NFPA 780 -2017, Standard for the Installation of Lightning Protection Systems.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 19:31:06 EDT 2018

Committee Statement

Committee Statement: The Informational Note is simplified to reference NFPA 54-2018, National Fuel Gas Code to avoid conflicting section numbers when revisions are made to NFPA 54.

The Informational Note is simplified to reference NFPA 54-2018, National Fuel Gas Code to avoid conflicting section numbers when revisions are made to NFPA 54. Adding the reference to NFPA 780 provides further guidance on protection of CSST systems. Requiring bonding of CSST in the NEC to protect against lightning events has been brought to CMP 5 for 4-5 cycles. The Correlating Committee and the standards council have affirmed that this issue is outside the scope of the NEC. A failure of CSST is due to lightning events, not through the use of electricity. Protection of CSST from the effects of lightning is more properly found in NFPA 780 Standard for the Installation of Lightning Protection Systems. Bonding of metal piping systems other than water piping is required where likely to become energized and is already found in 250.104(B).

Response Message: SR-7795-NFPA 70-2018

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.



Second Revision No. 7839-NFPA 70-2018 [New Section after 250.110]

250.109 Metal Enclosures.

Metal enclosures shall be permitted to be used to connect bonding jumpers or equipment grounding conductors, or both, together to become a part of an effective ground-fault current path. Metal covers and metal fittings attached to these metal enclosures shall be considered as being connected to bonding jumpers or equipment grounding conductors, or both.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 16:02:26 EDT 2018

Committee Statement

Committee Statement: Presently metal items such as cabinets, boxes, wireways and their covers are required to be connected to equipment grounding conductors by 250.110. Stating that these metal items can be used to establish an effective ground fault current path solves the problem better than just adding those items to the list in 250.118 as suggested by the public comments.

Response Message: SR-7839-NFPA 70-2018

[Public Comment No. 232-NFPA 70-2018 \[Section No. 250.118\]](#)

[Public Comment No. 10-NFPA 70-2018 \[Section No. 250.118\]](#)

[Public Comment No. 448-NFPA 70-2018 \[Section No. 250.118\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

13 Affirmative All

0 Affirmative with Comments

2 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott
Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Negative with Comment

Andre, Joseph F.

While the lack of metal enclosures in the list of recognized equipment grounding conductors in 250.118 is philosophically problematic, the proposed SR is also problematic in its all-inclusiveness. Not all metal enclosures are tested and listed equally. Per the UL Bulletin "Grounding and Bonding with Concentric and Eccentric Knockouts" metal cabinets, pull boxes, cutout boxes and junction boxes are not tested to the same grounding standard as metal outlet boxes, and as such, unused concentric or eccentric KO's require a wire-type bonding jumper around the knockout. https://www.ul.com/wpcontent/uploads/2014/04/ul_BondingAroundConcentricKnockouts.pdf The language in SR 7839 indicates this is not necessary and is in direct conflict with 250.97. This should be rejected for more precise wording in the next edition. Since the industry has recognized the proper application of 250.97 for many years without this confusing new section, there is no urgency to address it unless until is technically accurate and not in conflict with another requirement in Article 250.

Sasso, Nick

The argument was never that metal enclosures aren't capable of carrying current. I feel that the conversation has become so twisted, that we can no longer see the forest through the trees. -----

Metal enclosures are not equipment grounding conductors, per 250.118. Many may also not be listed. Allowing such practice would result in a hodgepodge of grounding connections, scattered about a metal enclosure, MAKING IT MORE DIFFICULT FOR THE ELECTRICAL INSPECTOR TO DO THEIR JOB.

----- This would conflict with the intent other sections of the NEC; one that comes to mind is 450.10: ----- [450.10 Grounding. (A) Dry-Type Transformer Enclosures.

Where separate equipment grounding conductors and supply-side bonding jumpers are installed, a terminal bar for all grounding and bonding conductor connections shall be secured inside the transformer enclosure. The terminal bar shall be bonded to the enclosure in accordance with 250.12 and shall not be installed on or over any vented portion of the enclosure.] ----- This section was specifically tweaked to

AVOID having bonding and grounding connections made at different locations WITHIN THE transformer-metal ENCLOSURE. The same principle should be maintained throughout the NEC. -----

This is also what is required for panelboards 408.40, and is really the correct way to proceed at this point rather than to write another section of code that conflicts with the NEC and simply may not work. There has been no testing to allow this blanket statement, to allow an enclosure to become an effective "link" as an equipment grounding conductor. ----- I'm asking that the correlating committee take a look at

this, and refrain from permitting this new section of code as it directly conflicts with other sections of NEC and the intent of those sections. ----- The proper method would be to require an equipment

ground bar terminal, in my opinion. ----- There are simply too many metal enclosures, some of which are custom made by the installer and have not been tested for grounding and bonding. Some enclosures have hinges, closing mechanisms, and other characteristics of construction whereby it would be impossible to ascertain how current would flow on such an enclosure in the event of a fault.

----- There should be no blanket statement, or code section, to allow for a metal enclosure to become an effective ground-pathway, effectively making the enclosure or frame the equivalent of an approved equipment grounding conductor. Does a metal enclosure conduct? Yes - that is why we bond to it. But to allow it to become an approved ground path is something else entirely. This new section should be stricken in it's entirety.****[Note: Emphasis in CAPS [mine]. I emphasize certain points using CAPS because the current editor does not give us the option of typographical emphasis (bold, underline, etc.), or making separate paragraphs. This should not be interpreted as "yelling." It is merely trying to draw attention to what I consider to be an important point.]



Second Revision No. 7840-NFPA 70-2018 [Section No. 250.119 [Excluding any Sub-Sections]]

Unless required elsewhere in this *Code*, equipment grounding conductors shall be permitted to be bare, covered, or insulated. Individually covered or insulated equipment grounding conductors shall have a continuous outer finish that is either green or green with one or more yellow stripes except as permitted in this section. Conductors with insulation or individual covering that is green, green with one or more yellow stripes, or otherwise identified as permitted by this section shall not be used for ungrounded or grounded circuit conductors.

Exception No. 1: Power-limited Class 2 or Class 3 cables, power-limited fire alarm cables, or communications cables containing only circuits operating at less than 50 volts ac or 60 volts dc where connected to equipment not required to be grounded in accordance with 250.112(I) shall be permitted to use a conductor with green insulation or green with one or more yellow stripes for other than equipment grounding purposes.

Exception No. 2: Flexible cords having an integral insulation and jacket without an equipment grounding conductor shall be permitted to have a continuous outer finish that is green.

Informational Note: An example of a flexible cord with integral-type insulation is Type SPT-2, 2 conductor.

Exception No. 3: Conductors with green insulation shall be permitted to be used as ungrounded signal conductors where installed between the output terminations of traffic signal control and traffic signal indicating heads. Signaling circuits installed in accordance with this exception shall include an equipment grounding conductor in accordance with 250.118. Wire-type equipment grounding conductors shall be bare or have insulation or covering that is green with one or more yellow stripes.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 16:07:14 EDT 2018

Committee Statement

Committee Statement: The 60 volt dc threshold was added to be consistent with many other requirements in the NEC that use 50 volts ac with a dc voltage level. This will also allow the present use of green insulated conductors for PoE circuits as they are required to be less than 60 volts dc. The reference to 250.112(I) was deleted because it applies to circuits and this section applies to cables. It is not necessary to restate existing requirements, Communication cables were not deleted because they can be used for other than communication systems such as covered in 725.154.

Response Message: SR-7840-NFPA 70-2018

[Public Comment No. 174-NFPA 70-2018 \[Section No. 250.119 \[Excluding any Sub-Sections\]\]](#)

[Public Comment No. 188-NFPA 70-2018 \[Section No. 250.119 \[Excluding any Sub-Sections\]\]](#)

[Public Comment No. 1469-NFPA 70-2018 \[Section No. 250.119 \[Excluding any Sub-Sections\]\]](#)

[Public Comment No. 1974-NFPA 70-2018 \[Section No. 250.119 \[Excluding any Sub-Sections\]\]](#)

[Public Comment No. 1259-NFPA 70-2018 \[Section No. 250.119 \[Excluding any Sub-Sections\]\]](#)

[Public Comment No. 204-NFPA 70-2018 \[Section No. 250.119 \[Excluding any Sub-Sections\]\]](#)

[Public Comment No. 1258-NFPA 70-2018 \[Section No. 250.119 \[Excluding any Sub-Sections\]\]](#)

Ballot Results

✓ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7774-NFPA 70-2018 [Section No. 250.120(B)]****(B) Aluminum and Copper-Clad Aluminum Conductors.**

Equipment grounding conductors of bare, covered, or insulated aluminum or copper-clad aluminum shall comply with the following:

- (1) ~~Bare~~ Unless part of a suitable Chapter 3 cable wiring method, ~~bare or covered~~ conductors shall not be installed where subject to corrosive conditions or be installed in direct contact with concrete, masonry, or the earth.
- (2) Terminations made within outdoor enclosures that are listed enclosures and identified for outdoor use the environment shall be permitted within 450 mm (18 in.) of the ~~earth. If open bottom enclosures are installed on a concrete pad, the concrete shall not be considered as earth bottom of the enclosure .~~
- (3) Aluminum or copper-clad aluminum conductors external to buildings or enclosures shall not be terminated within 450 mm (18 in.) of the earth, unless ~~insulated. The termination shall be listed as a sealed terminated within a listed~~ wire connector system.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 16:09:10 EDT 2018

Committee Statement

Committee Statement: Revisions clarify where bare or covered aluminum and copper-clad aluminum conductors can be installed and protected from corrosion. Concrete was added to the list of prohibited locations to clarify that concrete is a type of masonry. Equipment enclosures must be identified as suitable for connecting aluminum and copper-clad aluminum conductors. The bottom of open-bottom enclosures is the material, other than earth, where the enclosure is mounted.

Additional revisions specify that underground terminations be protected with a listed termination method suitable for the application.

Response Message: SR-7774-NFPA 70-2018

[Public Comment No. 1745-NFPA 70-2018 \[Section No. 250.120\(B\)\]](#)

[Public Comment No. 1964-NFPA 70-2018 \[Section No. 250.120\(B\)\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

0 Affirmative with Comments

1 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Negative with Comment

Sasso, Nick

Negative. Does this section not conflict with the Panel Statement from SR-7775, which states that, "CMP 5 is not aware of a product that is both a sealed wire connector system that is also listed for grounding and bonding of terminations of aluminum grounding and bonding conductors." ???

**Second Revision No. 7757-NFPA 70-2018 [Section No. 250.121]****250.121** ~~Prohibited~~ Restricted Use of Equipment Grounding Conductors.**(A)** Grounding Electrode Conductor.

An equipment grounding conductor shall not be used as a grounding electrode conductor.

Exception: A wire-type equipment grounding conductor installed in compliance with 250.6(A) and the applicable requirements for both the equipment grounding conductor and the grounding electrode conductor in Parts II, III, and VI of this article shall be permitted to serve as both an equipment grounding conductor and a grounding electrode conductor.

(B) Metal Frame of Building or Structure.

The structural metal frame of a building or structure shall not be used as an equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 11:22:51 EDT 2018

Committee Statement

Committee Statement: The title of 250.121 has been modified to reflect the content of the subsection.

Removing the reference to 250.6(A) would be a change that has not had public review.

Response Message: SR-7757-NFPA 70-2018

[Public Comment No. 411-NFPA 70-2018 \[Section No. 250.121\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

0 Affirmative with Comments

0 Negative with Comments

1 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul
Gerstetter, David A.
Harding, G. Scott
Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Abstention

Sasso, Nick

Abstain. If we are serious about making the code less confusing to users, then the exception to part (A) should be completely stricken, since it is impossible to achieve. This particular code - as written - IS CONFUSING. The exception may be theoretically achievable but in practicality (in the real world), it is not. THERE WAS NEVER A NEED for this exception language. The exception does not aid the user of the NEC, and it certainly DOES NOT HELP THE ELECTRICAL INSPECTOR in the performance of his/her duties. It may even serve to encourage and facilitate arguments with electrical contractors. ****[Note: Emphasis in CAPS [mine]. I emphasize certain points using CAPS because the current editor does not give us the option of typographical emphasis (bold, underline, etc.), or making separate paragraphs. This should not be interpreted as "yelling." It is merely trying to draw attention to what I consider to be an important point.]



Second Revision No. 7760-NFPA 70-2018 [Section No. 250.122]

250.122 Size of Equipment Grounding Conductors.

(A) General.

Copper, aluminum, or copper-clad aluminum equipment grounding conductors of the wire type shall not be smaller than shown in Table 250.122. The equipment grounding conductor shall not be required to be larger than the circuit conductors supplying the equipment. If a cable tray, a raceway, or a cable armor or sheath is used as the equipment grounding conductor, as provided in 250.118 and 250.134(A), it shall comply with 250.4(A)(5) or (B)(4).

Equipment grounding conductors shall be permitted to be sectioned within a multiconductor cable, provided the combined circular mil area complies with Table 250.122.

(B) Increased in Size.

If ungrounded conductors are increased in size for any reason other than as required in 310.15(B) or 310.15(C), wire-type equipment grounding conductors, if installed, shall be increased in size proportionately to the increase in circular mil area of the ungrounded conductors.

Exception: Equipment grounding conductors shall be permitted to be sized by a qualified person to provide an effective ground fault current path in accordance with 250.4(A)(5) or (B)(4).

(C) Multiple Circuits.

A single equipment grounding conductor shall be permitted to be installed for multiple circuits that are installed in the same raceway, cable, trench, or cable tray. It shall be sized from Table 250.122 for the largest overcurrent device protecting circuit conductors in the raceway, cable, trench, or cable tray. Equipment grounding conductors installed in cable trays shall meet the minimum requirements of 392.10(B)(1)(c).

(D) Motor Circuits.

Equipment grounding conductors for motor circuits shall be sized in accordance with ~~(C)(1)~~ 250.122(D)(1) or ~~(C)(2)~~ (D)(2).

(1) General.

The equipment grounding conductor size shall not be smaller than determined by Table ~~250.122~~ 250.122(A) based on the size rating of the branch-circuit short-circuit or ~~feeder conductor~~ and ground-fault protective device.

(2) Instantaneous-Trip Circuit Breaker and Motor Short-Circuit Protector.

If the overcurrent device is an instantaneous-trip circuit breaker or a motor short-circuit protector, the equipment grounding conductor shall be sized not smaller than that given by ~~Table 250.122~~ 250.122(A) using the size maximum permitted rating of ~~the~~ a dual element time-delay fuse selected for branch-circuit conductor short-circuit and ground-fault protection in accordance with 430.52(C)(1), Exception No. 1.

(E) Flexible Cord and Fixture Wire.

The equipment grounding conductor in a flexible cord with the largest circuit conductor 10 AWG or smaller, and the equipment grounding conductor used with fixture wires of any size in accordance with 240.5, shall not be smaller than 18 AWG copper and shall not be smaller than the circuit conductors. The equipment grounding conductor in a flexible cord with a circuit conductor larger than 10 AWG shall be sized in accordance with Table 250.122.

(F) Conductors in Parallel.

For circuits of parallel conductors as permitted in 310.10(G), the equipment grounding conductor shall be installed in accordance with 250.122(F)(1) or ~~(E)(2)~~ (F)(2). ~~Equipment grounding conductors that are not smaller than that provided in Table 250.122 shall be permitted to be connected in parallel for circuit conductors that are connected in parallel.~~

(1) Conductor Installations in Raceways, Auxiliary Gutters, or Cable Trays.

(a) *Single Raceway or Cable Tray, Auxiliary Gutter, or Cable Tray.* Equipment grounding conductors for ~~if~~ circuit conductors that are connected in parallel in the same raceway, auxiliary gutter, or cable tray, a single wire-type conductor shall be installed in compliance permitted as the equipment grounding conductor. The wire-type equipment grounding conductor shall be sized in accordance with ~~one of the following: 250.122~~, based on the overcurrent protective device for the feeder or branch circuit.

(0) ~~An equipment grounding conductor shall be installed with each set of circuit conductors that are connected in parallel. The wire-type equipment grounding conductor for each set shall be sized in accordance with Table 250.122.~~

(0) ~~A single wire-type equipment grounding conductor shall be installed and sized in accordance with Table 250.122, based on the total circular mil area of the largest set of circuit conductors for any phase that is connected in parallel. Where the total area does not result in a standard size conductor, the next larger conductor shall be selected from Chapter 9, Table 8.~~

(b) *Multiple Raceways.* If conductors are installed in parallel in multiple raceways, ~~and are connected in parallel, a~~ wire-type equipment grounding conductors, ~~where conductor, if used,~~ shall be installed in parallel in each raceway and shall be connected in parallel. The equipment grounding conductor installed in each raceway shall be sized in compliance accordance with 250.122 based on the largest rating of the overcurrent protective device for the feeder or branch circuit conductor in the raceway. Metal raceways or auxiliary gutters in accordance with 250.118 or cable trays complying with 392.60(B) shall be permitted as the equipment grounding conductor.

(c) *Wire-Type Equipment Grounding Conductors in Cable Trays.* Wire-type equipment grounding conductors installed in cable trays shall meet the minimum requirements of 392.10(B)(1)(c).

(d) *Metal Raceways, Auxiliary Gutters, or Cable Trays.* Metal raceways or auxiliary gutters in accordance with 250.188 or cable trays complying with 392.60(B) shall be permitted as the equipment grounding conductor.

(2) Multiconductor Cables.

(a) Except as provided in 250.122(F)(2) (c) for raceway or cable tray installations, the equipment grounding conductor in each multiconductor cable shall be sized in accordance with 250.122 based on the overcurrent protective device for the feeder or branch circuit.

(b) If circuit conductors of multiconductor cables are connected in parallel, the equipment grounding conductor(s) in each cable shall be connected in parallel.

(c) ~~The~~ If multiconductor cables are paralleled in the same raceway, auxiliary gutter, or cable tray, a single equipment grounding conductor in each multiconductor cable shall be that is sized in compliance accordance with ~~Table 250.122~~ 250.122 shall be permitted in combination with the equipment grounding conductors provided within the multiconductor cables and shall all be connected together.

(d) Equipment grounding conductors installed in cable trays shall meet the minimum requirements of 392.10(B)(1)(c). Cable trays complying with 392.60(B), metal raceways in accordance with 250.118, or auxiliary gutters shall be permitted as the equipment grounding conductor.

(G) Feeder Taps.

Equipment grounding conductors installed with feeder taps shall not be smaller than shown in Table 250.122 based on the size rating of the overcurrent device ahead of the feeder conductor on the supply side ahead of the tap but shall not be required to be larger than the tap conductors.

Table 250.122 Minimum Size Equipment Grounding Conductors for Grounding Raceway and Equipment

<u>Size of Largest Ungrounded Circuit Conductor (AWG or kcmil)</u>		<u>Smallest Size of Equipment Grounding Conductor (AWG or kcmil)</u>	
<u>Copper</u>	<u>Aluminum or Copper-clad Aluminum</u>	<u>Copper</u>	<u>Aluminum or Copper-clad Aluminum*</u>
14	12	14	12
12	10	12	10
10-8	8-6	10	8
6-3	4-1	8	6
2-3/0	1/0-4/0	6	4
4/0-300	250-450	4	2
350-550	500-800	3	1
600-800	900-1300	2	1/0
900-1300	1400-2000	1	2/0
1400-2000	-	1/0	3/0

Notes:

1. If necessary to comply with 250.4(A)(5) or (B)(4), the equipment grounding conductor shall be sized larger than given in this table.
2. If the equivalent area of the largest ungrounded circuit conductor is larger than 2000 kcmil in a single raceway, auxiliary gutter, or cable tray, the equipment grounding conductor shall have an area not less than $12\frac{1}{2}$ percent of the equivalent area of the largest ungrounded conductor.

*See installation restrictions in 250.120.

Table 250.122 Minimum Size Equipment Grounding Conductors for Grounding Raceway and Equipment

<u>Rating or Setting of Automatic Overcurrent Device in Circuit Ahead of Equipment, Conduit, etc., Not Exceeding (Amperes)</u>	<u>Size (AWG or kcmil)</u>	
	<u>Copper</u>	<u>Aluminum or Copper- Clad Aluminum*</u>
<u>15</u>	<u>14</u>	<u>12</u>
<u>20</u>	<u>12</u>	<u>10</u>
<u>60</u>	<u>10</u>	<u>8</u>
<u>100</u>	<u>8</u>	<u>6</u>
<u>200</u>	<u>6</u>	<u>4</u>
<u>300</u>	<u>4</u>	<u>2</u>
<u>400</u>	<u>3</u>	<u>1</u>
<u>500</u>	<u>2</u>	<u>1/0</u>
<u>600</u>	<u>1</u>	<u>2/0</u>
<u>800</u>	<u>1/0</u>	<u>3/0</u>
<u>1000</u>	<u>2/0</u>	<u>4/0</u>

<u>Rating or Setting of Automatic Overcurrent Device in Circuit Ahead of Equipment, Conduit, etc., Not Exceeding (Amperes)</u>	<u>Size (AWG or kcmil)</u>	
	<u>Copper</u>	<u>Aluminum or Copper-Clad Aluminum*</u>
<u>1200</u>	<u>3/0</u>	<u>250</u>
<u>1600</u>	<u>4/0</u>	<u>350</u>
<u>2000</u>	<u>250</u>	<u>400</u>
<u>2500</u>	<u>350</u>	<u>600</u>
<u>3000</u>	<u>400</u>	<u>600</u>
<u>4000</u>	<u>500</u>	<u>750</u>
<u>5000</u>	<u>700</u>	<u>1250</u>
<u>6000</u>	<u>800</u>	<u>1250</u>

Note: Where necessary to comply with 250.4(A)(5) or (B)(4), the equipment grounding conductor shall be sized larger than given in this table.

*See installation restrictions in 250.120.

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
70_SR7760_T250.122.docx	For staff use

Submitter Information Verification

Committee: NEC-P05

Submission Date: Thu Oct 25 11:39:18 EDT 2018

Committee Statement

Committee Statement: This revision returns to using the overcurrent device for sizing the equipment grounding conductor (EGC). During the comment phase of the 2020 NEC, the public identified numerous issues that collectively provided compelling evidence that revising the basis for sizing the changes the method for sizing the EGC needs more study before implementation. Specifically, there has been no test data to confirm the determined sizes will not jeopardize the ability of the conductor to safely carry potential fault current. Additionally, there are specific areas in the Code such as Articles 430 and 310, to raise the concern of unintended consequences from this change. The panel concludes that changing the table at this time would not be prudent without further investigation.

Sizes for aluminum and copper-clad aluminum for overcurrent devices rated at 5000 and 6000 amperes have been adjusted in Table 250.122 to correlate with sizes identified in Chapter 9, Table 8.

Revisions to (B) clarify the intent that adjustment and/or correction factors do not require an increase in the size of the EGC. The exception was added to allow the EGC to be sized by a qualified person, provided an effective ground fault current path can be established.

Changes to the language in the first draft phase should have considered adding trench to the list of locations permitting a single equipment grounding conductor. NEC 300.3 has the same conditions for installation in a trench as the other cited locations.

This revision corrects an editorial error in 250.122(E)(1)(d) and removes redundant language in 250.122(E)(1)(b).

Response Message: SR-7760-NFPA 70-2018

[Public Comment No. 2179-NFPA 70-2018 \[Section No. 250.122\(F\)\]](#)

[Public Comment No. 1373-NFPA 70-2018 \[Sections 250.122\(C\)\(1\), 250.122\(C\)\(2\)\]](#)

[Public Comment No. 885-NFPA 70-2018 \[Section No. 250.190\(C\)\(3\)\]](#)

[Public Comment No. 1755-NFPA 70-2018 \[Section No. 250.122\(F\)\]](#)

[Public Comment No. 55-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 478-NFPA 70-2018 \[New Section after 250.122\(A\)\]](#)

[Public Comment No. 905-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 1163-NFPA 70-2018 \[Section No. 250.122\(C\)\]](#)

[Public Comment No. 1666-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 1444-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 487-NFPA 70-2018 \[Section No. 250.122\(E\)\]](#)

[Public Comment No. 1290-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 2189-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 884-NFPA 70-2018 \[Section No. 250.104\(B\)\]](#)

[Public Comment No. 1910-NFPA 70-2018 \[Section No. 250.122\(A\)\]](#)

[Public Comment No. 966-NFPA 70-2018 \[Section No. 250.122\(B\)\]](#)

[Public Comment No. 883-NFPA 70-2018 \[Section No. 250.102\(D\)\]](#)

[Public Comment No. 488-NFPA 70-2018 \[Section No. 250.122\(C\)\]](#)

[Public Comment No. 36-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 207-NFPA 70-2018 \[Section No. 250.122\(E\)\(1\)\]](#)

[Public Comment No. 1222-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 1694-NFPA 70-2018 \[Section No. 250.122\(F\)\]](#)

[Public Comment No. 1699-NFPA 70-2018 \[Section No. 250.122\]](#)

[Public Comment No. 2131-NFPA 70-2018 \[Section No. 250.122\(F\)\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

10 Affirmative All

4 Affirmative with Comments

1 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Affirmative with Comment

Andre, Joseph F.

It appears that there are additional beneficial changes associated with this SR that should not be lost, therefore affirmative with comment. The change in the size of the largest equipment grounding conductor in Table 250.122 is unjustified. The rationale for the change was because there is no standard 1200 kcmil conductor. But there was no complaint that this has been problematic, and the reality is that this size is rarely if ever installed. Rather, the installation for this size equipment is usually installed with parallel conductors combining to yield 1200 kcmil. The change to upsize this conductor has no technical justification.

Porter, Christine T.

The committee should reconsider the increase in size of the EGC for 5000 - 6000A OCDs from 1200kcmil AL to 1250kcmil AL, it is not clear there is a technical need for this upsize of conductor.

Sasso, Nick

Affirmative.

Steinman, Gregory J.

There was no technical justification provided for increasing the required EGC for 5000 and 6000 amp OCPDs from 1200 kcmil to 1250 kcmil. Particularly in conductor sizes this large, correlation with Ch. 9 T8 is not required for safety or practical application of the Code. Both 1200 kcmil and 1250 kcmil are acceptable industry-recognized conductor sizes, and paralleling of conductors can also achieve the equivalent result

Negative with Comment

Abernathy, Paul W.

There is insufficient technical substantiation to increase the aluminum EGC size in Table 250.122 from 1200 kcmil to 1250 kcmil. The minimum conductor size does not have to correspond to a standard conductor size, and paralleling conductors can easily achieve 1200 kcmil.

**Second Revision No. 7841-NFPA 70-2018 [Section No. 250.132]****250.132** Short Sections of Raceway.

Isolated sections of metal raceway or cable armor, ~~where if~~ required to be grounded, ~~shall be~~ connected to an equipment grounding conductor, ~~shall be connected~~ in accordance with 250.134.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 16:34:40 EDT 2018

Committee Statement

Committee Statement: The language was editorially revised and to be consistent with 250.86 Ex. No. 3, 250.135 and the use of the term "grounded".

Response Message: SR-7841-NFPA 70-2018

[Public Comment No. 416-NFPA 70-2018 \[Section No. 250.132\]](#)

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.



Second Revision No. 7842-NFPA 70-2018 [Section No. 250.138 [Excluding any Sub-Sections]]

Non-current-carrying metal parts of cord-and-plug-connected equipment, if ~~grounded~~, shall ~~required to~~ be connected to an equipment grounding conductor, shall be connected by one of the methods in 250.138(A) or (B).

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 16:37:20 EDT 2018

Committee Statement

Committee Statement: The language was editorially revised to be consistent with the use of the term "grounded" and with 250.138(A) & (B). Not all metal parts are required to be connected to equipment grounding conductors such as household use toasters and some portable luminaires.

Response Message: SR-7842-NFPA 70-2018

Public Comment No. 417-NFPA 70-2018 [Section No. 250.138]

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7843-NFPA 70-2018 [Section No. 250.142(A)]****(A) Supply-Side Equipment.**

A grounded circuit conductor shall be permitted to be connected to non-current-carrying metal parts of equipment, raceways, and other enclosures under at any of the following conditions locations :

- (1) On the supply side or within the enclosure of the ac service disconnecting means
- (2) On the supply side or within the enclosure of the main disconnecting means for separate buildings as provided in 250.32(B)(1) Exception No. 1
- (3) On the supply side or within the enclosure of the main disconnecting means or overcurrent devices of a separately derived system where permitted by 250.30(A)(1)
- (3) ~~On the supply side or within the enclosure of a supply-side disconnect(s)~~

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 16:54:03 EDT 2018

Committee Statement

Committee Statement: The word "conditions" was replaced with "locations" because the list items are locations. List item (4) was deleted because the term "supply-side disconnect" is no longer used.

Response Message: SR-7843-NFPA 70-2018

Public Comment No. 898-NFPA 70-2018 [Section No. 250.142(A)]

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul
Gerstetter, David A.
Harding, G. Scott
Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

**Second Revision No. 7845-NFPA 70-2018 [Section No. 250.142(B)]****(B) Load-Side Equipment.**

Except as permitted in 250.30(A)(1), 250.32(B)(1), Exception No. 1, and Part X of Article 250, a grounded circuit conductor shall not be connected to non-current-carrying metal parts of equipment on the load side of the service disconnecting means, ~~on the supply-side disconnect~~, or on the load side of a separately derived system disconnecting means or the overcurrent devices for a separately derived system not having a main disconnecting means.

Exception No. 1: The frames of ranges, wall-mounted ovens, counter-mounted cooking units, and clothes dryers under the conditions permitted for existing installations by 250.140 shall be permitted to be connected to the grounded circuit conductor.

Exception No. 2: It shall be permissible to connect meter enclosures to the grounded circuit conductor on the load side of the service disconnect if all of the following conditions apply:

- (1) Ground-fault protection of equipment is not installed.*
- (2) All meter enclosures are located immediately adjacent to the service disconnecting means.*
- (3) The size of the grounded circuit conductor is not smaller than the size specified in Table 250.122 for equipment grounding conductors.*

Exception No. 3: Electrode-type boilers operating at over 1000 volts shall be grounded as required in 490.72(E)(1) and 490.74.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 16:59:32 EDT 2018

Committee Statement

Committee Statement: The term "supply-side disconnect" was deleted because it is no longer used. Therefore, the proposed additional wording is not necessary.
Response Message: SR-7845-NFPA 70-2018

Public Comment No. 568-NFPA 70-2018 [Section No. 250.142(B)]

Ballot Results

✔ This item has passed ballot

17 Eligible Voters
2 Not Returned
14 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Gallo, Ernest J.
O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.

**Second Revision No. 7844-NFPA 70-2018 [Section No. 250.146(D)]****(D) Isolated Ground Receptacles.**

Where installed for the reduction of ~~electrical noise~~ (electromagnetic interference) on the equipment grounding conductor, a receptacle in which the grounding terminal is purposely insulated from the receptacle mounting means shall be permitted. The receptacle grounding terminal shall be connected to an insulated equipment grounding conductor run with the circuit conductors. This equipment grounding conductor shall be permitted to pass through one or more panelboards without a connection to the panelboard grounding terminal bar as permitted in 408.40, Exception, so as to terminate within the same building or structure directly at an equipment grounding conductor terminal of the applicable derived system or service. Where installed in accordance with this section, this equipment grounding conductor shall also be permitted to pass through boxes, wireways, or other enclosures without being connected to such enclosures.

Informational Note: Use of an isolated equipment grounding conductor does not relieve the requirement for grounding connecting the raceway system and outlet box to an equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 16:56:15 EDT 2018

Committee Statement

Committee Statement: The language in the first sentence was changed to be consistent with 406.3(D). Deleting that language would be inconsistent with 406.3(D) and could create confusion. The informational note language was editorially revised to be consistent with the use of the term "grounded".

Response Message: SR-7844-NFPA 70-2018

[Public Comment No. 406-NFPA 70-2018 \[Section No. 250.146\(D\)\]](#)

[Public Comment No. 1208-NFPA 70-2018 \[Section No. 250.146\(D\)\]](#)

[Public Comment No. 2135-NFPA 70-2018 \[Section No. 250.146\(D\)\]](#)

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.
Beckstrand, Gary A.
Bowmer, Trevor N.
Brender, David
Dobrowsky, Paul
Gerstetter, David A.
Harding, G. Scott
Harding, Joseph
Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

**Second Revision No. 7846-NFPA 70-2018 [Section No. 250.148]****250.148** Continuity of Equipment Grounding Conductors and Attachment to ~~Metal in~~ Boxes.

If circuit conductors are spliced within a box or terminated on equipment within or supported by a box, all wire-type equipment grounding conductor(s) associated with any of those circuit conductors shall be connected ~~together~~ within the box or to the box in accordance with 250.8 and 250.148(A) through (D).

Exception: The equipment grounding conductor permitted in 250.146(D) shall not be required to be connected to the other equipment grounding conductors or to the box.

(A) Connections and Splices.

Connections and splices shall be made in accordance with 110.14(B) except that insulation shall not be required.

(B) Equipment Grounding Conductor Continuity.

The arrangement of grounding connections shall be such that the disconnection or the removal of a luminaire, receptacle, or other device fed from the box does not interrupt the electrical continuity of the equipment grounding conductor(s) providing an effective ground-fault current path.

(C) Metal Boxes.

A connection used for no other purpose shall be made between the metal box and the equipment grounding conductor(s) in accordance with 250.8.

(D) Nonmetallic Boxes.

One or more equipment grounding conductors brought into a nonmetallic outlet box shall be arranged such that a connection can be made to any fitting or device in that box requiring connection to an equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 17:07:35 EDT 2018

Committee Statement

Committee Statement: The title was changed to more accurately reflect the section content. The phrase "associated with any of those circuit conductors" was added because only the circuit conductors that are spliced or terminated need to have an equipment grounding conductor connected within a nonmetallic box or to a metal box. Connecting all equipment grounding conductors together, especially if of considerably different sizes, is impractical and unnecessary.

Response Message: SR-7846-NFPA 70-2018

[Public Comment No. 373-NFPA 70-2018 \[Section No. 250.148 \[Excluding any Sub-Sections\]\]](#)

[Public Comment No. 1972-NFPA 70-2018 \[Section No. 250.148 \[Excluding any Sub-Sections\]\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.

Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.



Second Revision No. 7847-NFPA 70-2018 [Section No. 250.176]

250.176 Cases of Instruments, Meters, and Relays — Operating at Over 1000 Volts.

Where instruments, meters, and relays have current-carrying parts of over 1000 volts to ground, they shall be isolated by elevation or protected by suitable barriers, grounded metal, or insulating covers or guards. Their cases shall not be connected to the equipment grounding conductor.

Exception: Cases of electrostatic ground detectors where shall be permitted to be connected to an equipment grounding conductor if the internal ground segments of the instrument are connected to the instrument case and grounded and the ground detector is isolated by elevation.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 17:43:20 EDT 2018

Committee Statement

Committee Statement: The language in the exception was editorially revised to create a complete sentence.

Response Message: SR-7847-NFPA 70-2018

[Public Comment No. 902-NFPA 70-2018 \[Section No. 250.176\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

Harding, Joseph

Mohla, Daleep C.
Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.

**Second Revision No. 7848-NFPA 70-2018 [Section No. 250.187(B)]**

(B) Insulated.

The ~~grounding system~~ grounded conductor shall be insulated for the maximum neutral voltage.

Informational Note: The maximum neutral voltage in a 3-phase wye system is 57.7 percent of the phase-to-phase voltage.

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Fri Oct 26 17:46:52 EDT 2018

Committee Statement

Committee Statement: The term "grounding system conductor" was replaced with "grounded conductor" to use the defined term.

Response Message: SR-7848-NFPA 70-2018

[Public Comment No. 569-NFPA 70-2018 \[Section No. 250.187\(B\)\]](#)

[Public Comment No. 2121-NFPA 70-2018 \[Section No. 250.187\(B\)\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

Bowmer, Trevor N.

Brender, David

Dobrowsky, Paul

Gerstetter, David A.

Harding, G. Scott

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Pancake, III, William A.
Philips, Nathan
Porter, Christine T.
Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick
Affirmative.



Second Revision No. 7781-NFPA 70-2018 [Part II.]

Part II. System Grounding and Bonding

Submitter Information Verification

Committee: NEC-P05

Submittal Date: Thu Oct 25 17:08:49 EDT 2018

Committee Statement

Committee Statement: Part II is intended to apply to grounding of electrical systems and if they are to be connected to ground. Bonding requirements are covered by Part V. The term Bonding in the title of Part II would add confusion for Code users.

Response Message: SR-7781-NFPA 70-2018

[Public Comment No. 1706-NFPA 70-2018 \[Part II.\]](#)

Ballot Results

✔ This item has passed ballot

17 Eligible Voters

2 Not Returned

14 Affirmative All

1 Affirmative with Comments

0 Negative with Comments

0 Abstention

Not Returned

Gallo, Ernest J.

O'Meara, Mike

Affirmative All

Abernathy, Paul W.

Andre, Joseph F.

Beckstrand, Gary A.

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Pancake, III, William A.

Philips, Nathan

Porter, Christine T.

Steinman, Gregory J.

Affirmative with Comment

Sasso, Nick

Affirmative.