



# NATIONAL FIRE PROTECTION ASSOCIATION

The leading information and knowledge resource on fire, electrical and related hazards

## MEMORANDUM

**TO:** NEC<sup>®</sup> Code-Making Panel 5

**FROM:** Sarah Caldwell, *Project Administrator*

**DATE:** April 20, 2018

**SUBJECT:** National Electrical Code<sup>®</sup> First Draft FINAL Ballot Results (A2019)

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According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

**18 Members Eligible to Vote**

**1 Members Not Returned** (*Helfrich*)

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

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

Election:70\_NEC\_P05\_FD\_Ballot\_A2019

NEC Panel 5

Results by Revision

**TRUE**

[FR-7973, Section No. 250.64\(A\), See FR-7973](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

15

**Affirmative with Comment**

0

**Negative**

2

David Brender

No substantiation was submitted or considered that will prove that concrete that is at or below grade level is considered to be a dry location. It has been proven that concrete is fairly porous and will retain moisture thus it is effective as a vital component of concrete-encased grounding electrodes. No substantiation has been submitted to support the allegation that the interior of enclosures that are identified for a wet location are in fact a dry location. This location should be considered to be a location that is corrosive to aluminum connections until proven otherwise.

Nick Sasso

After careful consideration, I am changing my vote to negative. David Brender is correct. He states, "No substantiation has been submitted to support the allegation that the interior of enclosures that are identified for a wet location are in fact a dry location." This stands to reason. As we all know, even the interior of a PVC raceway, being impervious to water, is still a wet location. Section 300.5(B) states, ¶-----  
----- "(B) Wet Locations. The interior of enclosures or raceways installed underground shall be considered to be a wet location. Insulated conductors and cables installed in these enclosures or raceways in underground installations shall comply with 310.10(C)." ¶----- It is not without reason to think that an enclosure that is approved for wet location will not perform similarly. Thus, the theory that condensation may form is not without merit. This can be especially true in colder climates where the electrical gear will generate a mild amount of heat. Brender also states, "It has been proven that concrete is fairly porous and will retain moisture..." I can take it one step further and direct the panel to Table 110.26(A)(1), Condition 2, that states, ¶----- "Concrete, brick, or tile walls shall be considered as grounded" ¶----- We should all acknowledge the fact that moisture can be retained in the equipment - it takes decades for concrete degradation to complete. The correct action for the panel to consider would be to get rid of subsection (2) in its entirety. It is clearly incorrect.

**Abstain**

0

## Caldwell, Sarah

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**From:**  
**Sent:** Wednesday, March 28, 2018 10:49 PM  
**To:** Caldwell, Sarah  
**Subject:** 7973 & 8066

Hello Sarah,

I changed my vote to negative on 7973 and 8066. This is what my comment should look like (for both):

After careful consideration, I am changing my vote to negative. David Brender is correct. He states, "*No substantiation has been submitted to support the allegation that the interior of enclosures that are identified for a wet location are in fact a dry location.*" This stands to reason. As we all know, even the interior of a PVC raceway, being impervious to water, is still a wet location. Section 300.5(B) states,

***"(B) Wet Locations. The interior of enclosures or raceways installed underground shall be considered to be a wet location. Insulated conductors and cables installed in these enclosures or raceways in underground installations shall comply with 310.10(C)."***

It is not without reason to think that an enclosure that is approved for wet location will not perform similarly. Thus, the theory that condensation may form is not without merit. This can be especially true in colder climates where the electrical gear will generate a mild amount of heat. Brender also states, "*It has been proven that concrete is fairly porous and will retain moisture...*" I can take it one step further and direct the panel to Table 110.26(A)(1), Condition 2, that states,

***"Concrete, brick, or tile walls shall be considered as grounded"***

We should all acknowledge the fact that moisture can be retained in the equipment - it takes decades for concrete degradation to complete. The correct action for the panel to consider would be to get rid of subsection (2) in it's entirety. It is clearly incorrect.

Thanks,  
Nick Sasso  
CMP-5

**TRUE**

[FR-7980, Section No. 250.64\(E\)\(1\), See FR-7980](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes   Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7985, Section No. 250.68\(C\), See FR-7985](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes   Comments**

16

**Affirmative with Comment**

0

**Negative**

1

Nick Sasso

Comments exceed 4000 characters - reason for negative vote is being sent to Sarah Caldwell.

**Abstain**

0

**7985:**

I cannot vote in favor of this change. 250.68 as written presently has too many issues and the changes being proposed do not address those serious issues. I tried to bring this up at the first draft meeting. It would be very simple to correct all the flaws, so I will repeat the reasons why 250.68 needs further review:

Is the electrical inspector actually going to be responsible for coatings that may need to be applied to steel reinforcing bar used for system grounding?

In the 2017 National Electrical Code, it states, "The rebar extension shall not be exposed to contact with the earth *without corrosion protection*." This sounds fine, in theory. But in practicality this statement leaves many unanswered questions. What exactly is the "corrosion protection" supposed to consist of? There are various paints and epoxies that are available for steel reinforcing bar. Is the electrical inspector actually going to be responsible to inspect paints and epoxies? Some coatings only have a few years warranty. How will an electrical inspector be able to make the determination that the correct coating was applied - **and at the proper thickness, no less?**

Along with the rustproofing issue comes the additional problem that the below-grade portion of the rebar will more than likely be covered with dirt when the electrical inspector comes to perform the inspection (if it is extended outside the building). Should electrical inspectors require that the electrical contractor "dig up" the rebar extension at the time of inspection if the corrosion protection isn't immediately visible? Or should inspectors simply red-tag the job for "covered before inspection" and leave? To reiterate, this requirement to use corrosion protection sounds grand in theory, but in practicality it creates a snowdrift of enforcement issues.

Should one of the most important parts of the electrical system even be allowed to utilize forms of corrosion protection?

We aren't simply talking about a piece of underground metal conduit, perhaps for a feeder. The grounding electrode system is one of the most important parts of the electrical system. Furthermore, Article 250 does not even permit mere equipment grounding conductors to be used where subject to corrosive conditions. For example, let's take Article 250.120(B)(6), which is one of the codes that is being revised in the 2020 cycle. The code states, "*Bare conductors shall not come in direct contact with masonry or the earth or where subject to corrosive conditions.*" Another good example would be Article 250.28, which states, "*Main bonding jumpers and system bonding jumpers shall be of copper or other corrosion-resistant material.*" Can the panel see the CONFLICT here? It sets an extremely bad precedent when we allow types of "corrosion protection" to be used for the steel grounding electrode rebar-extension. The present language is flawed.

The corrosion and enforcement problems can be totally eliminated by requiring that the rebar extension be turned up above slab with a 90° bend into a wall cavity where the wire-type grounding electrode conductor can then be connected to the extension and run to the main service disconnect. The better electrical contractors that I see do this usually turn the rebar up into an interior garage wall. Then a blank electrical plate is used after the sheetrock is installed to make the connection accessible after installation. This is actually extremely simple for the contractor to accomplish, and it solves most of the problems with the code language that we have now. The simple solution would be to eliminate the last three words in line (b) of the code change - change:

(b) *"The rebar extension shall not be exposed to contact with the earth without corrosion protection."*

to:

(b) *"The rebar extension shall not be exposed to contact with the earth."*

Making this change would eliminate the corrosion issues and the enforcement issues.

Lastly, the rebar extension is defined as a conductor - which gives rise to yet another issue. What jumps out at me here is that if the rebar extension is in fact "a conductor," used for grounding, then it should have a specified method of

connection. Take a quick gander at Article 250.8. I fully understand that steel reinforcing bar is not a "wire-type" conductor, which would have to be connected using one of the methods described in Article 250.8. But I think that 250.8 is self-evident and makes my point: since this widget is used for **system grounding**, exactly how the connection is to be made should be very specific. Currently, the overlap issue is completely ignored by the electrical code. It should be noted however that reinforcing bars are required to have proper overlap per the building code. For example, if there is #5 rebar in the footing that is being spliced onto another there will need to be approximately 25-inches of overlap for a tension splice. Proper lap is usually defined as being 40X the diameter of the reinforcing bar. Hence in the case of a #5 rebar, this distance works out to be 25-inches.

Certain jurisdictions are allowing the rebar extension to be installed perpendicular to the footing steel. This creates a mere 0.63-inches of overlap at any point that the extension is tied to the footing steel - usually by means of a common steel wire tie. Is 0.63-inches of steel-to-steel overlap enough? **Will this minimal lap continually maintain an inherently low enough resistance-to-ground to prevent damage to the footing during lightning events, and withstand the test of time?** Other jurisdictions are requiring the "full lap" as mandated by the building codes. Others still, are making up their own rules. Oregon comes to mind - the State of Oregon has incorporated into their building code that if a rebar extension is utilized for grounding electrode purposes, it must have at least 12-inches of lap. I feel that the electrical code should define the manner in which this grounding connection needs to be made; simply leaving it up to the installer creates inconsistencies from jurisdiction to jurisdiction - and we are supposed to have a *National* Electrical Code. Perhaps it doesn't need to be a full tension splice per the building code, but the contact length should be of some determinate value. If for nothing else, we at least need to have a determinate value for consistency's sake.

I hope that the panel will be receptive to what the AHJ member has to say.

**TRUE**

[FR-7990, Section No. 250.98, See FR-7990](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8198, Global Input, See FR-8198](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

15

**Affirmative with Comment**

2

Gary A. Beckstrand

New 250.25 was created to address the needs for prescriptive requirements for disconnects connected to the serving utility that are not defined as services. Currently equipment connected ahead of the service disconnect in accordance with 230.82(6) is not defined as a service. Supply-side disconnects should be grounded and bonded in a similar fashion to a service, and the new section is needed for those installations. More renewable and interconnected power production sources are being connected to the serving utility directly and need prescriptive grounding and bonding requirements properly located in Article 250.

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8196, Detail, See FR-8196](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

15

**Affirmative with Comment**

2

Gary A. Beckstrand

The new term is needed for connections permitted by 230.82(6) that are not considered services. The requirements for grounding and bonding any disconnecting means that is connected to the serving utility needs to be located in Article 250, especially for disconnects not defined as services. Adding the new term allows for new prescriptive requirements in new 250.25 to ensure disconnects, such as for solar, wind, or interconnected power production installations, are grounded and bonded properly.

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7599, Definition: Ground-Fault Current Path., See FR-7599](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7602, Definition: Grounding Conductor, Equipment \(EGC\)., See FR-7602](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-7625, Section No. 200.6\(E\), See FR-7625](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	14	
<b>Affirmative with Comment</b>	2	
Gary A. Beckstrand		The proposed change should be accepted. By adding the new language, the identification of grounded conductors for multiconductor cables is aligned with the general rule in 200.6 (A) and (B). Grounded conductors whenever possible should be identified by a continuous white or grey color for safety.
Nick Sasso		Affirmative.
<b>Negative</b>	1	

David Brender

While CDA supports the revisions to 200.6(E), CMP-5's failure to accept PI-2775 is not acceptable. The substantiation that was provided is more than adequate to support the deletion of the requirement for qualified persons to identify the grounded conductor of multiconductor cables. PI-2775 should have been accepted.

**Abstain**

0

**TRUE**

[FR-7629, Section No. 200.9, See FR-7629](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Votes   Comments**

**Affirmative**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7631, Section No. 200.10\(B\), See FR-7631](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Votes   Comments**

**Affirmative**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7639, Section No. 250.12, See FR-7639](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7643, Section No. 250.20\(B\), See FR-7643](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

15

**Affirmative with Comment**

2

Gary A. Beckstrand

The new Informational Note directs code users to NFPA 70E-2018, Standard for Electrical Safety in the Workplace Annex O which addresses ways to limit incident energy levels of arcing currents through an overcurrent device during a faulted condition which are dependent on available fault current at the source of the fault. Users of the Code will find this information important for safety.

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7680, Section No. 250.26, See FR-7680](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-7685, Section No. 250.28\(A\), See FR-7685](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-7759, Section No. 250.32\(A\), See FR-7759](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7818, Section No. 250.34, See FR-7818](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7781, Section No. 250.36 \[Excluding any Sub-Sections\], See FR-7781](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7902, Section No. 250.64\(E\)\(3\), See FR-7902](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7920, Section No. 250.92\(B\), See FR-7920](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-7542, Section No. 250.136, See FR-7542](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

TRUE

[FR-7545, Section No. 250.142\(A\), See FR-7545](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<u>Votes</u>	<u>Comments</u>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

TRUE

[FR-7548, Section No. 250.142\(B\), See FR-7548](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<u>Votes</u>	<u>Comments</u>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

TRUE

[FR-7566, Section No. 250.174\(C\), See FR-7566](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<u>Votes</u>	<u>Comments</u>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

TRUE

[FR-7568, Section No. 250.176, See FR-7568](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<u>Votes</u>	<u>Comments</u>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-7814, Section No. 250.184\(A\)\(1\), See FR-7814](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7819, Section No. 250.184\(C\), See FR-7819](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

TRUE

[FR-7651, Part II., See FR-7651](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

TRUE

[FR-7527, Part VII., See FR-7527](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8070, Definition: Bonding Jumper, Main., See FR-8070](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

15

**Affirmative with Comment**

2

Gary A. Beckstrand

The Main Bonding Jumper frequently connects supply-side bonding jumpers to the grounded conductor in addition to the equipment grounding conductor. The modification to the definition should allow the definition of system bonding jumper (see new definition for supply-side bonding jumper) to eventually be integrated into this term for simplification of bonding terms.

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7614, Section No. 200.3, See FR-7614](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

TRUE

[FR-7624, Section No. 200.6\(A\), See FR-7624](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<u>Votes</u>	<u>Comments</u>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

TRUE

[FR-7637, Section No. 250.4, See FR-7637](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<u>Votes</u>	<u>Comments</u>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-8107, Section No. 250.6\(D\), See FR-8107](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes   Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8061, Section No. 250.24, See FR-8061](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes   Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8108, Section No. 250.28\(C\), See FR-8108](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8118, Section No. 250.28\(D\)\(2\), See FR-8118](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8097, Section No. 250.30, See FR-8097](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-8109, Section No. 250.32\(D\), See FR-8109](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-8060, Section No. 250.53, See FR-8060](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7898, Sections 250.64\(B\)\(2\), 250.64\(B\)\(3\), See FR-7898](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8110, Section No. 250.96\(B\), See FR-8110](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8111, Section No. 250.102\(B\), See FR-8111](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8031, Section No. 250.104\(A\)\(1\), See FR-8031](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

14

**Affirmative with Comment**

3

David Brender

It should be noted that although the Panel voted overwhelmingly for this FR, there were no studies or calculations submitted that justify revision of the largest grounding conductor from 4/0 to 3/0.

G. Scott Harding

This correction is important as the inadvertent increase was significant and unnecessary. For example, for a building with a 4000 amp service, the 2014 code (and all previous applicable editions back to 1978) required a maximum Grounding Electrode Conductor size to be 3/0 Copper. The 2017 code changed that to be 750Kcmil Copper. There has been no evidence of any problems in the field by using the sizing requirements established in the 1978 NEC.

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8033, Section No. 250.104\(A\)\(3\), See FR-8033](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-8034, Section No. 250.104\(C\), See FR-8034](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	15	
<b>Affirmative with Comment</b>	2	
G. Scott Harding		This correction is important as the inadvertent increase was significant and unnecessary. For example, for a building with a 4000 amp service, the 2014 code (and all previous applicable editions back to 1978) required a maximum Grounding Electrode Conductor size to be 3/0 Copper. The 2017 code changed that to be 750Kcmil Copper. There has been no evidence of any problems in the field by using the sizing requirements established in the 1978 NEC.
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-8035, Sections 250.104\(D\)\(1\), 250.104\(D\)\(2\), See FR-8035](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

15

**Affirmative with Comment**

2

G. Scott Harding

This correction is important as the inadvertent increase was significant and unnecessary. For example, for a building with a 4000 amp service, the 2014 code (and all previous applicable editions back to 1978) required a maximum Grounding Electrode Conductor size to be 3/0 Copper. The 2017 code changed that to be 750Kcmil Copper. There has been no evidence of any problems in the field by using the sizing requirements established in the 1978 NEC.

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8038, Section No. 250.106, See FR-8038](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8039, Section No. 250.112\(K\), See FR-8039](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-8040, Section No. 250.114, See FR-8040](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

TRUE

[FR-8041, Section No. 250.118, See FR-8041](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes   Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

TRUE

[FR-8043, Section No. 250.119\(B\), See FR-8043](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes   Comments**

15

**Affirmative with Comment**

0

**Negative**

2

Gary A. Beckstrand

Removal of the requirements of conditions maintenance and supervision to ensure qualified persons service the installation negates the requirements of the general rule for continuous identification of the equipment grounding conductor. Removal of the language is a serious reduction in safety for identification requirements for the EGC. Requiring the equipment grounding conductor pulled into a raceway to be continuously identified green and an equipment grounding conductor installed in a cable not to be continuously identified is in complete contradiction which the result of this modification and should be rejected. The equipment grounding conductor serves an essential and vital safety function for grounding and bonding equipment and it is imperative that it be clearly identified for installers. Multiconductor cables are available with correctly identified equipment grounding conductors. The proper cable should be used for the installation rather than re-identifying an equipment grounding conductor in the field to make the wrong cable suitable for the installation. Too frequently failure to re-identify a conductor in a cable is a common violation and could lead to inadvertent energization of equipment enclosures. The NEC should be consistent, and removal of the language will make it inconsistent with the requirements of 200.6(E). The Panel had voted in favor of keeping the identical requirement in place for 200.6(E) based upon a similar public input and the requirement should remain in place and this revision rejected.

Nick Sasso

After pondering this change some, I'm voting against it. ¶-----  
-- Would the average homeowner running a piece of NM cable actually take the time to re-identify a conductor? ¶----- For example, if a homeowner makes a grounded conductor green by the use of green tape (from white to green) at one end of the run, would they actually go back to the panel and properly re-identify the conductor at that end? ¶----- In many cases, probably not. This could lead to problems, especially if the homeowner is working out of a sub-panel. If the house is ever sold, the new owner could inherit a potential problem. ¶----- I believe that the code is written the way it is for a reason, and a lot of it has to do with NM cable and residential work being done by people that are not qualified. I think that this section should stay as it is.

Abstain

0

**TRUE**

[FR-8066, Section No. 250.120\(B\), See FR-8066](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

15

**Affirmative with Comment**

0

**Negative**

2

David Brender

No substantiation was submitted or considered that will prove that concrete that is at or below grade level is considered to be a dry location. It has been proven that concrete is fairly porous and will retain moisture thus it is effective as a vital component of concrete-encased grounding electrodes. No substantiation has been submitted to support the allegation that the interior of enclosures that are identified for a wet location are in fact a dry location. This location should be considered to be a location that is corrosive to aluminum connections until proven otherwise.

Nick Sasso

After careful consideration, I am changing my vote to negative. David Brender is correct. He states, "No substantiation has been submitted to support the allegation that the interior of enclosures that are identified for a wet location are in fact a dry location." This stands to reason. As we all know, even the interior of a PVC raceway, being impervious to water, is still a wet location. Section 300.5(B) states, ¶-----  
----- "(B) Wet Locations. The interior of enclosures or raceways installed underground shall be considered to be a wet location. Insulated conductors and cables installed in these enclosures or raceways in underground installations shall comply with 310.10(C)." ¶----- It is not without reason to think that an enclosure that is approved for wet location will not perform similarly. Thus, the theory that condensation may form is not without merit. This can be especially true in colder climates where the electrical gear will generate a mild amount of heat. Brender also states, "It has been proven that concrete is fairly porous and will retain moisture..." I can take it one step further and direct the panel to Table 110.26(A)(1), Condition 2, that states, ¶----- "Concrete, brick, or tile walls shall be considered as grounded" ¶----- We should all acknowledge the fact that moisture can be retained in the equipment - it takes decades for concrete degradation to complete. The correct action for the panel to consider would be to get rid of subsection (2) in its entirety. It is clearly incorrect.

Abstain

0

## Caldwell, Sarah

---

**From:**  
**Sent:** Wednesday, March 28, 2018 10:49 PM  
**To:** Caldwell, Sarah  
**Subject:** 7973 & 8066

Hello Sarah,

I changed my vote to negative on 7973 and 8066. This is what my comment should look like (for both):

After careful consideration, I am changing my vote to negative. David Brender is correct. He states, "*No substantiation has been submitted to support the allegation that the interior of enclosures that are identified for a wet location are in fact a dry location.*" This stands to reason. As we all know, even the interior of a PVC raceway, being impervious to water, is still a wet location. Section 300.5(B) states,

***"(B) Wet Locations. The interior of enclosures or raceways installed underground shall be considered to be a wet location. Insulated conductors and cables installed in these enclosures or raceways in underground installations shall comply with 310.10(C)."***

It is not without reason to think that an enclosure that is approved for wet location will not perform similarly. Thus, the theory that condensation may form is not without merit. This can be especially true in colder climates where the electrical gear will generate a mild amount of heat. Brender also states, "*It has been proven that concrete is fairly porous and will retain moisture...*" I can take it one step further and direct the panel to Table 110.26(A)(1), Condition 2, that states,

***"Concrete, brick, or tile walls shall be considered as grounded"***

We should all acknowledge the fact that moisture can be retained in the equipment - it takes decades for concrete degradation to complete. The correct action for the panel to consider would be to get rid of subsection (2) in it's entirety. It is clearly incorrect.

Thanks,  
Nick Sasso  
CMP-5

**TRUE**

[FR-7544, Section No. 250.121, See FR-7544](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

16

**Affirmative with Comment**

1

Nick Sasso

I'm voting yes on the change. ¶----- However for the record, the exception needs to be stricken from this code. It is practically impossible that the exception could ever be complied with. It also creates great difficulty from an enforcement perspective. The exception does not help the inspector. ¶-----  
----- It's like saying - you can have a chandelier in your shower "as long as it complies with the rest of the electrical code."

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8114, Section No. 250.122, See FR-8114](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Affirmative with Comment**

Gary A. Beckstrand

Mike O'Meara

Ernest J. Gallo

G. Scott Harding

David Brender

Joseph Harding

Trevor N. Bowmer

Nathan Philips

**Negative**

**Votes   Comments**

6

8

Table 250.122 does not reflect the final action of CMP 5. See the Panel Chair Comments.

EEl agrees with the direction the panel is going with the changes to 250.122 that are proposed in FR-8114, but we have a concern that the proposed changes require further study in order to identify any potential impacts such a major change will have to other parts of the code and the industry in general. EEl would like to see a task group formed to study the impacts prior to the second draft meeting.

Concur with the Panel Chair's comment on this FR-8114 that the Table 250.122 as currently shown in Terra does not reflect the final action of CMP 5.

Refer to Panel Chair, Nathan Phillip's Ballot comment

The following errors in Terra View from that accepted by CMP-5 require correction: The text immediately above the two left columns is to read, "Size of Largest Ungrounded Circuit Conductor or Equivalent Area for Parallel Conductors (AWG or kcmil)". Under the left "copper" column in Table 250.122, in the 5th row, change "3/0" to "2/0". Under the left "copper" column in Table 250.122, in the 6th row, change "4/0" to "3/0".

Please refer to the Panel Chair's comment.

Concur with the Panel Chair's comment on this FR-8114 that the Table 250.122 as currently shown in Terra does not reflect the final action of CMP 5.

Comment was emailed to Sarah Caldwell on 3/14/18. In addition, the reference in 250.122(E)(1)(d) to 250.188 is a transcription error. The reference should be to 250.118.

3

Gregory J. Steinman

Joseph F. Andre

NEMA supports the concept but needs to see more substantiation to verify that the new requirements provide a safe installation.

The FR should be rejected on lack of need, lack of technical substantiation, and the resultant decrease in safety. There is no reason given or implied that making such a drastic change is needed. No information is provided to indicate the existing Table 250.122, based on the size of the overcurrent device, is wrong, inadequate, or confusing, or that this change will be an improvement. In fact, the existing Table is simple and straightforward and has been proven safe for decades. The Panel statement only says that the Table is being changed but does not give any technical reason for doing so. The use of a UL Standard for MC cable and TC cable is not representative of all installations or conditions: it addresses a specific, tightly controlled factory manufactured wiring method, in which the equipment grounding conductor is installed within a jacket in a determined location/configuration. This concept cannot possibly be valid for all configurations where the proximity of the EGC to the phase conductors is random, as in a trench, wireway, or raceway. The physics of these installations should not be assumed to be the same as for construction of specific cables. It needs to be noted that these standards were not made available to the Panel at time of the Public Input, nor during the deliberations during the PI hearings; only a few minutes was offered to a few CMP-5 members. This in itself should disqualify the change due to lack of ability to review the standards for relevancy. The comment that this action is consistent with sizing of supply-side bonding conductors and grounded conductors in Table 250.102(C)(1) is not accurate, as those conductors generally do not have an known overcurrent protection. Only the protective device applied by the utility is applicable, and is not controlled by the NEC and often will not come close to protecting a conductor sized per the NEC. The hope is that the supply-side bonding jumper will survive long enough to open some device on the utility side of the premises wiring, or possibly until the shorted conductor burns through.

Decades of experience indicates that this is not a precise application. Obviously, the function of these conductors is vastly different from the equipment grounding conductors regulated by 250.122 and cannot be realistically compared. The change to 250.122(F) for parallel circuits is equally troubling. There is no technical substantiation for such a radical change. This proposed modification will drastically reduce the size of the EGC and put electrical installations at unnecessary risk. It was stated that there is only a single, rare condition in which a single EGC might be required to carry the entire fault current in a parallel installation, and the philosophy is that risk is acceptable. However, there are multiple publications that identify a much more likely situation: in which an insulation failure in a run of cable or non-metallic raceway faults to a bare equipment grounding conductor. This situation is not so uncommon and I have personally been involved in two repairs of just such a fault. As is stated in Soares, this fault is fed from both ends by all of the parallel ungrounded phase conductors, and the single EGC must carry that entire fault for the distance between the fault and the termination. Again as pointed out in Soares, most of these faults are of the arcing type, adding to the impedance imposed by the single EGC, making it less likely that a large frame breaker could clear the fault before significant damage to the components, or even before the EGC completely melts through. The rare conflict that is noted between provisions of 250.122(B) and Table 250.122 in the current NEC can be resolved in a much less radical method, by requiring the increase only when the upsizing of the phase conductor would require a larger equipment grounding conductor. We must also remember that the membership of NFPA rejected the proposed change to (F) in 2016.

Nick Sasso

There is no technical substantiation for this change. The simple fact that there are a couple of UL tables based on wire size instead of breaker size does not warrant a change of this magnitude. ¶----- The net effect of the proposed change is that it would no longer require equipment grounding conductors to be sized at "full size" for parallel feeder installations. The size of the equipment grounding conductor in each parallel leg is sized to carry the maximum amount of fault current that can be imposed at any one time. Hence, each equipment grounding conductor is fully dependent upon the size of the overcurrent device. I cannot vote for this code change since it would allow the equipment grounding conductors to be sized SMALLER with regard to parallel installations. We would in effect, "lessen" the current code. ¶----- I have researched as far back as the 1968 NEC. Table 250.122 has always been there. The year is now 2018. If we do the math, this makes half a century that 250.122 has been successfully used in the form that it exists now. There is no ambiguous language that has existed for the last 50 years. General contractors, electricians, journeyman electricians, electrical helpers, architects, engineers, and others have come to know and rely on Table 250.122. To attempt to change the table now will only detract from the National Electrical Code, not add value to it. Users of the code consider this section as "etched in stone." Working-class people have come to rely and depend on that article as it is now. Article 250.122 is a "keystone" to the National Electrical Code. Let us not change one of the NEC's most proven articles. ¶----- Another point that needs to be made - is that we no longer live in a relatively safe world. We must not just be able to "think outside of the box;" we must be willing to go even further - way beyond the box - with regard to electrical construction. I try never to think of "what could go wrong." I never predict how an accident or disaster may or may not unfold. While it may be

extremely rare to have a 100% line fault imposed on any single leg of a parallel feed, in the event of a bomb blast or other type of impact - we don't know exactly what could happen, or what faults could be imposed on the parallel conductors. We should think about the world we live in when considering the electrical code changes and the various wiring methods used in large buildings. Having the full-sized equipment grounding conductor is still valid, especially given the challenges we face today as a nation. ¶-----  
----- Lastly and speaking as an AHJ, I take exception to the statement, "...and make it easier for the AHJ to enforce compliance." It will do no such thing. A change of this magnitude would only serve to confuse and confound entire generations of users of the National Electrical Code that have come to know the code in it's present form. The change will not simplify anything, nor increase "usability." It would not make my job any easier. ¶----- We are all stewards of the National Electrical Code, and we take the job seriously. Each panel member is brilliant in their own right and brings something unique to CMP-5. The Supreme Court once said, "With great power comes great responsibility." Sometimes just because we can change something...doesn't necessarily mean that we should change something. Table 250.122 is a "keystone" to the National Electrical Code. The NEC is used here in the United States and other countries and is the most widely adopted electrical standard IN THE WORLD. 250.122 has proven itself, and it has withstood the test of time. Leave it be.

**Abstain**

0

**CMP 5 Chair's Ballot Comment on FR 8114:**

Table 250.122 does not reflect the final action of CMP 5. The range of conductor sizes in the table should be modified as follows:

Cu	AL
2 - <del>23</del> /0	1/0 - 4/0
34/0 - 300	250 - 450

CMP 5 prepared the following table identifying other sections of the 2017 NEC that are affected by PI 8114. This table was provided to the Correlating Committee for its use and is provided here as public information:

<b>Sections of 2017 NEC Affected by Changes to 250.122</b>		
<b>SECTION</b>	<b>AFFECTED TEXT</b>	<b>PROPOSED REVISED TEXT</b>
215.2(A)(2)(b)(2)	(2) Grounded Conductor. The size of the feeder circuit grounded conductor shall not be smaller than that required by 250.122, except that 250.122(F) shall not apply where grounded conductors are run in parallel.	(2) Grounded Conductor. The size of the feeder circuit grounded conductor shall not be smaller than that required by 250.122.
215.2(B)	<b>(B) Feeders over 600 Volts.</b> The ampacity of conductors shall be in accordance with 310.15 and 310.60 as applicable. Where installed, the size of the feeder-circuit grounded conductor shall not be smaller than that required by 250.122, except that 250.122(F) shall not apply where grounded conductors are run in parallel. Feeder conductors over 600 volts shall be sized in accordance with 215.2(B)(1), (B)(2), or (B)(3).	<b>(B) Feeders over 600 Volts.</b> The ampacity of conductors shall be in accordance with 310.15 and 310.60 as applicable. Where installed, the size of the feeder-circuit grounded conductor shall not be smaller than that required by 250.122, except that 250.122(E) shall not apply where grounded conductors are run in parallel. Feeder conductors over 600 volts shall be sized in accordance with 215.2(B)(1), (B)(2), or (B)(3).
250.102(D) (Not addressed at FD meeting)	<b>(D) Size – Equipment Bonding Jumper on Load Side of an Overcurrent Device.</b> The equipment bonding jumper on the load side of an overcurrent device(s) shall be sized in accordance with 250.122. A single common continuous equipment bonding jumper shall be permitted to connect two or more raceways or cables if the bonding jumper is sized in accordance with 250.122 for the largest overcurrent device supplying circuits therein.	<b>(D) Size – Equipment Bonding Jumper on Load Side of an Overcurrent Device.</b> The equipment bonding jumper on the load side of an overcurrent device(s) shall be sized in accordance with 250.122. A single common continuous equipment bonding jumper shall be permitted to connect two or more raceways or cables if the

		bonding jumper is sized in accordance with 250.122.
250.104(B) (Not addressed at FD meeting)	<p><b>(B) Other Metal Piping.</b> 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:</p> <ul style="list-style-type: none"> <li>(1) Equipment grounding conductor for the circuit that is likely to energize the piping system</li> <li>(2) Service equipment enclosure</li> <li>(3) Grounded conductor at the service</li> <li>(4) Grounding electrode conductor, if of sufficient size</li> <li>(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.</li> </ul>	<p><b>(B) Other Metal Piping.</b> 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:</p> <ul style="list-style-type: none"> <li>(1) Equipment grounding conductor for the circuit that is likely to energize the piping system</li> <li>(2) Service equipment enclosure</li> <li>(3) Grounded conductor at the service</li> <li>(4) Grounding electrode conductor, if of sufficient size</li> <li>(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 size of the circuit conductors likely to energize the piping system(s). The points of attachment of the bonding jumper(s) shall be accessible.</li> </ul>
250.190(C)(3) (Not addressed at FD meeting)	<p><b>(3) Sizing.</b> Equipment grounding conductors shall be sized in accordance with Table 250.122 based on the current rating of the fuse or the overcurrent setting of the protective relay.</p> <p>Informational Note: The overcurrent rating for a circuit breaker is the combination of the current transformer ratio and the current pickup setting of the protective relay.</p>	<p><b>(3) Sizing.</b> Equipment grounding conductors shall be sized in accordance with Table 250.122.</p>
525.11	<p><b>525.11 Multiple Sources of Supply.</b> Where multiple services or separately derived systems, or both, supply portable structures, the equipment grounding</p>	<p><b>525.11 Multiple Sources of Supply.</b> Where multiple services or separately derived systems, or both, supply portable structures,</p>

	conductors of all the sources of supply that serve such structures separated by less than 3.7 m (12 ft) shall be bonded together at the portable structures. The bonding conductor shall be copper and sized in accordance with Table 250.122 based on the largest overcurrent device supplying the portable structures, but not smaller than 6 AWG.	the equipment grounding conductors of all the sources of supply that serve such structures separated by less than 3.7 m (12 ft) shall be bonded together at the portable structures. The bonding conductor shall be copper and sized in accordance with Table 250.122, but not smaller than 6 AWG.
600.7(A)(2)	<b>(2) Size of Equipment Grounding Conductor.</b> The equipment grounding conductor size shall be in accordance with 250.122 based on the rating of the overcurrent device protecting the branch circuit or feeder conductors supplying the sign or equipment.	<b>(2) Size of Equipment Grounding Conductor.</b> The equipment grounding conductor size shall be in accordance with 250.122.
690.45	<b>690.45 Size of Equipment Grounding Conductors.</b> Equipment grounding conductors for PV source and PV output circuits shall be sized in accordance with 250.122. Where no overcurrent protective device is used in the circuit, an assumed overcurrent device rated in accordance with 690.9(B) shall be used when applying Table 250.122. Increases in equipment grounding conductor size to address voltage drop considerations shall not be required. An equipment grounding conductor shall not be smaller than 14 AWG.	<b>690.45 Size of Equipment Grounding Conductors.</b> Equipment grounding conductors for PV source and PV output circuits shall be sized in accordance with 250.122. An equipment grounding conductor shall not be smaller than 14 AWG.
<b>Annex D Example D3(a) Industrial Feeders in a Common Raceway (Last paragraph)</b>	<b>Feeder Neutral Conductor</b> ( <i>see 220.61</i> ) Because 210.11(B) does not apply to these buildings, the load cannot be assumed to be evenly distributed across phases. Therefore the maximum imbalance must be assumed to be the full lighting load in this case, or 11,600 VA. ( $11,600 \text{ VA} / 277\text{V} = 42$ amperes.) The ability of the neutral to return fault current [ <i>see 250.32(B) Exception(2)</i> ] is not a factor in this calculation. Because the neutral runs between the main switchboard and the building panelboard, likely terminating on a busbar at both locations, and not on overcurrent devices, the effects of continuous loading can be disregarded in evaluating its terminations [ <i>see 215.2(A)(1) Exception No. 2</i> ]. That calculation is (11,600	<b>Feeder Neutral Conductor</b> ( <i>see 220.61</i> ) Because 210.11(B) does not apply to these buildings, the load cannot be assumed to be evenly distributed across phases. Therefore the maximum imbalance must be assumed to be the full lighting load in this case, or 11,600 VA. ( $11,600 \text{ VA} / 277\text{V} = 42$ amperes.) The ability of the neutral to return fault current [ <i>see 250.32(B) Exception(2)</i> ] is not a factor in this calculation. Because the neutral runs between the main switchboard and the building panelboard, likely terminating on a busbar at both locations, and not on

	<p><math>VA \div 277V = 42</math> amperes, to be evaluated under the 75°C column of Table 310.15(B)(16). The minimum size of the neutral might seem to be 8 AWG, but that size would not be sufficient to be depended upon in the event of a line-to-neutral short circuit [see 215.2(A)(1), second paragraph]. Therefore, since the minimum size equipment grounding conductor for a 150 ampere circuit, as covered in Table 250.122, is 6 AWG, that is the minimum neutral size required for this feeder.</p>	<p>overcurrent devices, the effects of continuous loading can be disregarded in evaluating its terminations [see 215.2(A)(1) Exception No. 2]. That calculation is <math>(11,600 VA \div 277V) = 42</math> amperes, to be evaluated under the 75°C column of Table 310.15(B)(16). The minimum size of the neutral might seem to be 8 AWG, but that size would not be sufficient to be depended upon in the event of a line-to-neutral short circuit [see 215.2(A)(1), second paragraph]. Therefore, since the equipment grounding conductor size , as covered in Table 250.122, is 6 AWG, that is the minimum neutral size required for this feeder.</p>
Index	Various references will need to be updated.	

**8114:**

There is no technical substantiation for this change. The simple fact that there are a couple of UL tables based on wire size instead of breaker size does not warrant a change of this magnitude.

The net effect of the proposed change is that it would no longer require equipment grounding conductors to be sized at "full size" for parallel feeder installations. The size of the equipment grounding conductor in each parallel leg is sized to carry the maximum amount of fault current that can be imposed at any one time. Hence, each equipment grounding conductor is fully dependent upon the size of the overcurrent device. I cannot vote for this code change since it would allow the equipment grounding conductors to be sized SMALLER with regard to parallel installations. We would in effect, "lessen" the current code.

I have researched as far back as the 1968 NEC. Table 250.122 has always been there. The year is now 2018. If we do the math, this makes half a century that 250.122 has been successfully used in the form that it exists now. There is no ambiguous language that has existed for the last 50 years. General contractors, electricians, journeyman electricians, electrical helpers, architects, engineers, and others have come to know and rely on Table 250.122. To attempt to change the table now will only detract from the National Electrical Code, not add value to it. Users of the code consider this section as "etched in stone." Working-class people have come to rely and depend on that article as it is now. Article 250.122 is a "keystone" to the National Electrical Code. Let us not change one of the NEC's most proven articles.

Another point that needs to be made - is that we no longer live in a relatively safe world. We must not just be able to "think outside of the box;" we must be willing to go even further - *way beyond the box* - with regard to electrical construction. I try never to think of "what could go wrong." I never predict how an accident or disaster may or may not unfold. While it may be extremely rare to have a 100% line fault imposed on any single leg of a parallel feed, in the event of a bomb blast or other type of impact - we don't know exactly what could happen, or what faults could be imposed on the parallel conductors. We should think about the world we live in when considering the electrical code changes and the various wiring methods used in large buildings. Having the full-sized equipment grounding conductor is still valid, especially given the challenges we face today as a nation.

Lastly and speaking as an AHJ, I take exception to the statement, "*...and make it easier for the AHJ to enforce compliance.*" It will do no such thing. A change of this magnitude would only serve to confuse and confound entire generations of users of the National Electrical Code that have come to know the code in it's present form. The change will not simplify anything, nor increase "usability." It would not make my job any easier.

We are all stewards of the National Electrical Code, and we take the job seriously. Each panel member is brilliant in their own right and brings something unique to CMP-5. The Supreme Court once said, "With great power comes great responsibility." Sometimes just because we *can* change something...doesn't necessarily mean that we *should* change something. Table 250.122 is a "keystone" to the National Electrical Code. The NEC is used here in the United States and other countries and is the most widely adopted electrical standard IN THE WORLD. 250.122 has proven itself, and it has withstood the test of time. Leave it be.

**TRUE**

[FR-7541, Section No. 250.134, See FR-7541](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes   Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-7654, Section No. 250.146, See FR-7654](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes   Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8115, Section No. 250.148, See FR-8115](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8112, Section No. 250.168, See FR-8112](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes    Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

**TRUE**

[FR-8113, Section No. 250.180, See FR-8113](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	1	
Nick Sasso		Affirmative.
<b>Negative</b>	0	
<b>Abstain</b>	0	

**TRUE**

[FR-7820, Section No. 250.187, See FR-7820](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

	<b><u>Votes</u></b>	<b><u>Comments</u></b>
<b>Affirmative</b>	16	
<b>Affirmative with Comment</b>	0	
<b>Negative</b>	1	

Nick Sasso

I'm voting against this change because it makes the code less safe. The reason for the proposed change is nothing more than semantics. Using the term "Impedance Grounded Neutral System" is still appropriate because it alerts the user of the NEC that something different is being done with the neutral, and this system is different from most systems and the usual "neutral." ¶----- The proposed change considers the word "neutral" by itself, and the complete code language in this section is being taken out of context. I disagree that the NEC can no longer use the phrase "Impedance Grounded Neutral System." ¶----- The term "Impedance Grounded Neutral System" is still the correct language and should be retained. Using the terms, "Impedance Grounded System" and "Grounded System Conductor Connection" is too general, and does not immediately alert the NEC user to the fact that there is something different about the neutral being used in this type of system. ¶----- This change can even be dangerous. This code should not be changed because an individual has a problem with the semantics. ¶----- The existing language in subsection (A), "Location. The grounding impedance shall be inserted in the grounding electrode conductor between the grounding electrode of the supply system and the neutral point of the supply transformer or generator" ...clearly explains what is going on here and there is nothing ambiguous or improper in what the existing language says.

**Abstain**

0

TRUE

[FR-8116, Sections 280, 285, See FR-8116](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

TRUE

[FR-9007, Detail, See FR-9007](#)

**Eligible to Vote: 18**

**Not Returned : 1**

William J. Helfrich

**Vote Selection**

**Affirmative**

**Votes**    **Comments**

16

**Affirmative with Comment**

1

Nick Sasso

Affirmative.

**Negative**

0

**Abstain**

0

