

**ARTICLE 200 — USE AND IDENTIFICATION OF GROUNDED CONDUCTORS**

5-3 - (200): Reject

(Log #2560)

**SUBMITTER:** Fred W. Brown, HI Electron  
**RECOMMENDATION:** Delete the phrase "natural gray."  
**SUBSTANTIATION:** The color "natural gray" is not available as an insulation color from any electrical conductor manufacturer. The use of the phrase "natural gray" gives the false impression that the color "gray" is acceptable for a grounded conductor identification. The use of a gray colored conductor, in parts of the United States, is for ungrounded conductor identification. The phrase "natural gray" in the 1999 NEC presents an electrical safety hazard.  
**PANEL ACTION:** Reject.  
**PANEL STATEMENT:** The panel does not intend to prohibit the use of gray as a grounded conductor. The panel recognizes that natural gray is not defined and that gray colored insulated conductors are commonly used to identify grounded conductors. Also, see panel action and statement on Proposal 5-9.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
**AFFIRMATIVE:** 16

5-4 - (200): Reject

(Log #3005)

**SUBMITTER:** Rea Hamilton, Abbott Labs  
**RECOMMENDATION:** Replace all references to the words grounded conductor with the words neutral conductor.  
**SUBSTANTIATION:** Grounding is a very complex, misunderstood subject and the overuse of the word ground only adds to the confusion. Terminology clarification is needed to make the code more understandable.  
**PANEL ACTION:** Reject.  
**PANEL STATEMENT:** Conductors are defined based on where they are connected to the electrical supply system and their function. A neutral conductor is understood to be connected to the neutral or common point of an electrical supply system. Some systems such as a delta do not have a physical neutral connection point. The corner of a delta system (connection of two phase windings) may be grounded but is not a neutral point. The grounded conductor of a 2-wire circuit is also not a neutral conductor.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
**AFFIRMATIVE:** 16

5-5 - (200): Reject

(Log #3160)

**SUBMITTER:** Fred W. Brown, HI Electron  
**RECOMMENDATION:** "~~natural gray~~"  
Delete the phrase "natural gray."  
**SUBSTANTIATION:** The color "natural gray" is not available as an insulation color from any electrical conductor manufacturer. The use of the phrase "natural gray" gives the false impression that the color "gray" is acceptable for a grounded conductor identification. The use of a gray colored conductor, in parts of the United States, is for ungrounded conductor identification. The phrase "natural gray" in the 1999 NEC presents an electrical safety hazard.  
**PANEL ACTION:** Reject.  
**PANEL STATEMENT:** See panel action and statement on Proposal 5-3.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
**AFFIRMATIVE:** 16

5-6 - (200-1): Reject

(Log #1745)

**SUBMITTER:** Jamie McNamara, Hastings, MN  
**RECOMMENDATION:** Revise to read as follows:  
200-1. Scope  
This article provides requirements for the following:  
1. Identification of terminals and conductors.  
**SUBSTANTIATION:** To clarify that the scope of this article cover the use and identification of white, white with three stripes and natural gray conductor used as grounded as well as ungrounded conductor. An example is for the white conductor used as the

supply (hot ungrounded conductor) in a cable as permitted in 200-7(c) (2).  
**PANEL ACTION:** Reject.  
**PANEL STATEMENT:** The scope already covers conductors as items two and three in the list.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
**AFFIRMATIVE:** 16

5-7 - (200-4 (New)): Reject

(Log #4300)

**SUBMITTER:** Charles F. Mello, Milwaukie, OR  
**RECOMMENDATION:** Add new text to read as follows:  
"For the purposes of grounded conductor identification, the color gray shall be defined as having a neutral coloration on the Munsell color scale of not less than 4.5 and not greater than 7.0 with 6.0 being the ideal median."  
**SUBSTANTIATION:** The color "natural gray" is not defined by any product standard nor color standard and therefore to establish this as a suitable color for grounded circuit identification is impossible to enforce. For over 30 years the electrical industry has specified and used "gray" colored wire as the alternate identifier to white to comply with Article 200 requirements. There are literally 1000s of installations made with gray colored wire used for this purpose. Surveys of inspectors and installers across the United States have identified very few that use gray for other than a grounded conductor. In previous code cycles the issue of defining gray so that it was not too light to be confused with white and not too dark gray to be confused with black prevented resolution of this issue. ANSI/EIA Standard 359A is used by the electrical industry as the basis for color coding of wire and to establish the neutral base, hue and chroma that defines the color. The basis for this color scale is the Munsell color standard. NEMA uses this Munsell system for its definition of NEMA gray such as is used for receptacles colored gray. That color is defined by Munsell as N6. ANSI gray as typically found for painted electrical enclosures is Munsell N6.1 (commonly referred to as ASA 61). By establishing the limitations using a known color system for the gray to be used for the grounded conductor identification, then the potential confusion with white and black is eliminated. The NEMA manufacturing standards and UL wire and cable standards also then have a basis for determining compliance. Lastly, the electrical inspector will have a basis to determine if an installation of gray used for this purpose meets the requirements by using a readily available color scale if needed. With the limitations in Section 200-7, gray could not be used for any other purpose. This change will provide for the continuation of what has been a long standing industry practice and resolve the difficulties with enforcement.  
**PANEL ACTION:** Reject.  
**PANEL STATEMENT:** By providing a very specific color range for gray, a user could install a darker or lighter color gray as an ungrounded conductor. It is the panels intent that all grays are to be used only as a grounded conductor. See panel action and statement on Proposal 5-9.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
**AFFIRMATIVE:** 16

5-8 - (200-6): Accept

(Log #1049)

**SUBMITTER:** James M. Daly, BICC General  
**RECOMMENDATION:** Revise 200-6 as follows:  
200-6(a) - change "No. 6" to "6 AWG" in two places.  
200-6(b) - change "No. 6" to "6 AWG" in two places.  
200-6(c) - change "No. 4" to "4 AWG".  
**SUBSTANTIATION:** To provide consistency throughout the Code. The term "No." is not used in any of the Tables in Chapter 3. AWG and kcmil are trade size designators specifically authorized for use with the SI system of units in North America. Also, industry practice is to use AWG or kcmil only.  
This is one of a series of proposals to make this change throughout the Code.  
**PANEL ACTION:** Accept.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
**AFFIRMATIVE:** 16  
**COMMENT ON AFFIRMATIVE:**  
**DOBROWSKY:** The AWG designation should also be added to the NEC Style Manual.

(Log #2107)

5- 9 - (200-6): Accept in Principle

NOTE: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the actions on Proposals 5-10, 5-11, 5-12, 5-16, 5-17, 5-19, 5-21, 5-23, 5-28, 5-31, 5-33, 5-35, 5-37, 5-47, 5-49, and 5-52. It was also the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panels 6 in sections 310-12(c) and 400-22, Code-Making Panel 7 in Section 363-19, and Code-Making Panel 15 in section 520-53(h)(2) for action.

This action will be considered by the Panel as a Public Comment by all Code-Making Panels mentioned in this Note.

SUBMITTER: Kari Barrett, Chemical Manufacturers Assn.

RECOMMENDATION: Delete the word "natural" from Section 200-6 and where similarly used in the NEC.

SUBSTANTIATION: Natural gray is no longer manufactured. Basic colors not shades or gradation of color are typically used for identification means. The present language could be interpreted as allowing a conductor having light gray colored insulation to be used as an ungrounded conductor, creating a more dangerous condition. PANEL ACTION: Accept in Principle.

Additionally, add a new FPN to each section wherever the term "natural gray" is changed to "gray". This new FPN is to read as follows:

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

PANEL STATEMENT: The panel recognizes that natural gray is not defined and that gray colored insulated conductors are commonly used to identify grounded conductors. The panel also recognizes that gray has also been used as an ungrounded conductor. Therefore the panel is adding a FPN to caution the user. Refer to CMP's 6, 7, and 15 for information.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: The term "natural gray" is outdated and not really applicable to modern wiring systems. Having first appeared in the 1923 NEC, the term was probably used to describe unbleached cotton, which was permitted as insulation to identify a grounded conductor. The color of unpigmented pvc or rubber would probably best describe natural gray in modern wiring systems, however, this is rarely, if ever, used today. The need for a unique but obtainable wire for the grounded conductor of a second system when more than one voltage system is used in a building can be appreciated. However, this proposal would permit the use of gray to identify the grounded conductor where only a single system exists. To permit such a widespread use of gray as a grounded conductor can become a serious safety concern, especially when gray has previously been permitted for identification of an ungrounded conductor. To prevent that from occurring, gray should be added only in Section 200-6(d) as an alternate method to using white with a readily distinguishable different colored stripe. Proposal 5-26 accomplishes this accepting gray to identify a grounded conductor for systems exceeding 150V, where two or more voltage systems are used in the same building. This would eliminate the potential for confusion over gray conductors in residential dwellings and similar installations where untrained professionals may be attempting electrical repairs or circuit additions. Having gray specified in the code in this manner would not permit it to become the color identifying the grounded conductor in a single system installation, such as a home.

COMMENT ON AFFIRMATIVE:

MELLO: The issue of "gray" and "natural gray" has existed to some degree for over 40 years and has been an issue for at least three Code cycles. The advent of plastic insulation in the 1960's permitted more and better coloring of these insulating materials. Although the actual source of the color "natural gray" is not precisely known, it is known that it is not defined by any product standard and does not exist in today's products. For many reasons gray insulated wire has been used all over the United States to identify a grounded conductor. Although this was technically incorrect as a substitute for "natural gray", the practice has been long and widespread. Gray colored insulated wire has also properly been used as an ungrounded conductor. Based on show-of-hands surveys conducted at many meetings with a broad spectrum of electrical people all over the country, the use of gray over the last 30 years as a grounded conductor was substantially higher than its use as an ungrounded conductor was. The Panel had three choices to resolve this issue. First, they could do nothing, which would only perpetuate potentially hazardous conditions with mixed use because of the lack

of application of a defined color. Second, delete "natural gray" and effectively "gray" for use as a grounded conductor. The result of this could create a hazard for all those existing installations where gray had been used to identify the grounded conductor. Third, delete only the word "natural" and recognize what has been a widespread industry practice but also to acknowledge the hazard, believed to be limited, where gray wire had been previously used for an ungrounded conductor. This Panel Action appears to cause the least impact while the addition of the Fine Print Note alerts personnel to the potential hazard. The Fine Print Note should be considered good practice for anyone commencing work on existing circuit - understand the circuit and what the purpose of each conductor is even beyond any assumptions based on colors of the insulation.

(Log #3672)

5- 10 - (200-6): Accept in Principle

SUBMITTER: George Ferguson, Eastern Michigan Univ.

RECOMMENDATION: Revise text as follows:

200-6(a) Sizes No. 6 or Smaller. An insulated grounded conductor of No. 6 or smaller shall be identified by a continuous white or natural gray outer finish... Wires that have their outer covering finished to show a white or natural gray color...

SUBSTANTIATION: There is a widespread use of brown, orange, yellow (boy) for 460/277 volt three phase wiring, with a THHN gray conductor for the grounded neutral. It should be time for the NEC to coordinate with industry practice. The arguments I have heard against dropping the "natural" have just as good an argument that this can be dealt with reasonably.

1) "That is it difficult to distinguish between black and gray."

(a) Anyone who has worked with a grounded white and an ungrounded yellow in anything but bright light knows this is as difficult to distinguish.

(b) Often the Code requires items that are not yet available on the market (i.e., conductors with "three or more continuous white stripes" [200-6(a)] or "arc-fault circuit-interrupter" [210-12]. In this case I believe that the wire manufacturers can develop a suitable gray.

2) The "natural" gray referred to in the NEC is not really a readily available item for common use anymore. Keep the Code current with today's standard. If gray THHN were to be widely used as ungrounded, there would be much confusion and danger where the gray THHN has been used as a grounded conductor.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #3823)

5- 11 - (200-6): Accept in Principle

SUBMITTER: Bob Friedel, Riviera Electric

RECOMMENDATION: As in Article 200 and various other places, the grounded conductor shall be white or "natural" gray. I propose that the word "natural" should be deleted.

SUBSTANTIATION: What in the world is "natural" gray? I believe the word "natural" cause some confusion.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #4284)

5- 12 - (200-6): Accept in Principle in Part

SUBMITTER: Charles F. Mello, Milwaukee, OR

RECOMMENDATION: Revise to read as follows:

(a) Sizes No. 6 or Smaller. An insulated grounded conductor of No. 6 or smaller shall be identified by a continuous white or natural gray outer finish or by three continuous white stripes on other than green insulation along its entire length. Wires that have their outer

covering finished to show a white or ~~natural~~ gray color but have colored tracer threads in the braid identifying the source of manufacture shall be considered as meeting the provisions of this section. Insulated grounded conductors shall also be permitted to be identified as follows:

(1) The grounded conductor of a mineral-insulated, metal-sheathed cable shall be identified at the time of installation by distinctive marking at its terminations.

(2) A single-conductor, sunlight-resistant, outdoor rated cable used as a grounded conductor in photovoltaic power systems as permitted in Section 690-31 shall be identified at the time of installation by distinctive white marking at all terminations.

(3) Fixture wire shall comply with the requirements for grounded conductor identification as specified in Section 402-8.

(4) For aerial cable, the identification shall be as above, or by means of a ridge located on the cable so as to identify it.

(b) Sizes Larger than No. 6. An insulated grounded conductor larger than No. 6 shall be identified either by a white or ~~natural~~ gray outer finish or by three continuous white stripes on other than green installations along its entire length at the time of installation by a distinctive white marking at its terminations. This marking shall encircle the conductor or insulation.

(c) Flexible Cords. An insulated conductor that is intended for use as a grounded conductor, where contained within a flexible cord, shall be identified by a white or ~~natural~~ gray outer finish or by three continuous white stripes on other than green insulation or by methods permitted by Section 400.22.

(d) Grounded Conductors of Different Systems. Where grounded conductors of different systems are installed in the same raceway, cable, box, auxiliary gutter, or other type enclosure, one system grounded conductor ~~if required~~, shall have an outer covering conforming to Section 200.6(a) or 200.6(b). Each other system grounded conductor shall have an outer covering of white with readily distinguishable stripes (not green) running along the insulation, or other and different means of identification as allowed by Section 200-6 (a) or (b) that will distinguish each system grounded conductor.

(e) Grounded Conductors in Multiconductor Cables. The insulated grounded conductors in a multiconductor cable, shall be identified by a continuous white or ~~natural~~ gray outer finish or by three continuous white stripes on other than green insulation along its entire length. Multiconductor flat cable No. 4 or larger shall be permitted to employ an external ridge in the grounded conductor. **SUBSTANTIATION:** Delete the word natural since the color natural gray is not defined and in fact does not exist as a specified color for wire insulation. This proposal goes with the definition of gray within a specified range of color per the Munsell color system as used by industry for wire color coding. The definition of the gray is provided in another proposal.

**PANEL ACTION:** Accept in Principle in Part.

Accept the deletion of "natural".

Reject the deletion of "if required"

**PANEL STATEMENT:** See panel action and statement on Proposal 5-9. The panel concludes that "if required" is important and there is no technical substantiation to remove this phrase.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 15

**NEGATIVE:** 1

**EXPLANATION OF NEGATIVE:**

**DIAZ:** See my Explanation of Negative Vote on Proposal 5-9.

(Log #674)

5-13 - (200-6(a)): Reject

**SUBMITTER:** Dan Leaf, Palmdale, CA

**RECOMMENDATION:** Revise to read as follows:

(a) Sizes No. 6 or Smaller. An insulated grounded conductor of No. 6 or smaller shall be identified by a continuous white or ~~natural~~ gray outer finish or by three continuous white stripes on other than green insulation along its entire length. Wires that have their outer covering finished to show a white or ~~natural~~ gray color but have colored tracer threads in the braid identifying the source of manufacture shall be considered as meeting the provisions of this section. Insulated grounded conductors shall also be permitted to be identified as follows:

(1) The grounded conductor of a mineral-insulated, metal-sheathed cable shall be permitted to be identified at the time of installation by a durable and distinctive white marking that shall encircle the insulating sleeve at its terminations.

(2) A single-conductor, sunlight-resistant, ~~outdoor rated~~ Type SE, UF, or USE cable used as a grounded conductor in solar photovoltaic power systems as permitted in Section 690-31 shall be

permitted to be identified at the time of installation by a durable and distinctive white marking that shall encircle the insulation at all terminations.

(3) ~~Fixture wire shall be permitted to be identified in accordance with the requirements for grounded conductor identification as specified in Section 402-8.~~

(4) For multiconductor aerial cable the identification shall be ~~permitted as above or~~ by means of a ridge located on the cable so as to identify ~~the grounded conductor.~~

(b) Sizes Larger than No. 6. An insulated grounded conductor larger than No. 6 shall be identified in accordance with (a) above, ~~either by a white or natural gray outer finish or by three continuous white stripes along its entire length or at the time of installation by a durable distinctive white color marking at its termination each termination, at each junction point except conduit bodies that do not contain splices or unused hubs, and at intervals not exceeding 6 ft (1.83 m), with not less than one such marking, where the conductor is installed in a wireway, auxiliary gutter or cable tray.~~

This marking shall encircle the conductor insulation.

(c) No change.

(d) Grounded Conductors of Different Systems. Where grounded conductors of different systems are installed in the same raceway, cablebus, cable, box, cable tray, auxiliary gutter, or other type enclosure, one system grounded conductor ~~if required~~, shall have an outer covering conforming to Section 200-6(a) or 200-6(b). Each other system grounded conductor shall have an outer covering of white with three readily distinguishable stripes (not green) running along the insulation, or other and different means of identification as allowed by Section 200 (a) or (b) that will distinguish each system grounded conductor. Where acceptable to the authority having jurisdiction, where one conductor larger than No. 6 is identified at the time of installation in accordance with (b) above, additional grounded conductors larger than No. 6 shall be permitted to be identified at the time of installation in accordance with (b) above, except that durable and permanent tagging in lieu of color shall distinguish the additional grounded conductors.

(e) Grounded Conductors in Multiconductor Cables. The insulated grounded conductors in a multiconductor cable, ~~other than Type MI, shall be identified by a continuous white or natural gray outer finish or by three continuous white stripes on other than green insulation along its entire length. Multiconductor flat cable No. 4 or larger shall be permitted to employ an external ridge in the grounded conductor.~~

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

**SUBSTANTIATION:** Natural gray is deleted due to widespread disagreement about its use. Section (a) (2), (b), and (c) exceptions do not specify natural gray, nor does (b) for field marking.

For editorial consistency "permitted" should be used in (a) (1), (2), (3) since those provisions are permitted by the first paragraph and the wording of (2) can infer white insulation is not permitted.

The present (a) (1) does not specify color of the "distinctive" marking.

The proposal requirement to encircle the conductor insulation should be applied to all field-marked conductors as it is a good requirement but only specified in (b).

The proposal for (b) includes marking at junction points where the conductor runs through boxes, contactors, switch enclosures, wireways, gutters, and cable trays without a splice (termination). Present wording does not require marking and differs from Sections 230-56 and 250-119(a) which require marking at junction points and where accessible.

An insulated grounded conductor larger than No. 6 run through a conduit body without splices or unused hubs does not appear to warrant identification.

The latter part of the proposal for (d) would cover a (perhaps rare) condition where multiple larger than No. 6 field-marked conductors are commingled, apparently permitted by reference to (b), but which only provides for white color marking.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** See panel action and statement on Proposal 5-3. This rewrite does not add clarity to the section. The 6 feet addition is not substantiated.

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**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16**  
**VOTE ON PANEL ACTION:**  
**AFFIRMATIVE: 16**

(Log #3319)

5- 16 - (200-6(a), (b), (c), and (e)): Accept in Principle  
**SUBMITTER:** Paul E. Phelan, Rep. New Hampshire Electrical Contractors Assn.

**RECOMMENDATION:** Revise as follows:

(a) An insulated grounded conductor of No. 6 or smaller shall be identified by a continuous white or ~~natural~~ grey outer finish...

(b) ... continuous white or ~~natural~~ grey...

(c)... by a white or ~~natural~~ grey

**SUBSTANTIATION:** Delete the word "natural" from references to the grounded identification in this and all subsequent appropriate sections of this code. The word as used is archaic - probably dating back to when the outer covering of an insulated conductor was fabric (unbleached cotton).

Plastic-insulated conductors are grey when grey and the word natural has no significance and therefore tends to add confusion to an already difficult document.

**PANEL ACTION:** Accept in Principle.

**PANEL STATEMENT:** See panel action and statement on Proposal 5-9.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16**

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE: 15**

**NEGATIVE: 1**

**EXPLANATION OF NEGATIVE:**

**DIAZ:** See my Explanation of Negative Vote on Proposal 5-9.

(Log #3430)

5- 17 - (200-6(a)): Accept in Principle

**SUBMITTER:** Patrick White, Pompano Beach, FL

**RECOMMENDATION:** Revise text to read as follows:

(a) Sizes No. 6 or Smaller. An insulated grounded conductor of No. 6 or smaller shall be identified by a continuous white or ~~natural~~ grey outer finish or by three continuous white stripes on other than green insulation along its entire length. Wires that have their outer covering finished to show a white or ~~natural~~ gray color but have colored tracer threads in the braid identifying the source of manufacture shall be considered as meeting the provisions of this section. Insulated grounded conductors shall also be permitted to be identified as follows.

**SUBSTANTIATION:** The term "natural gray" specifies a particular shade of gray which few electricians actually know what that color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.

**PANEL ACTION:** Accept in Principle.

**PANEL STATEMENT:** See panel action and statement on Proposal 5-9.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16**

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE: 15**

**NEGATIVE: 1**

**EXPLANATION OF NEGATIVE:**

**DIAZ:** See my Explanation of Negative Vote on Proposal 5-9.

**Note: Sequence no. 5-18 now follows 5-28**

(Log #399)

5- 19 - (200-6(b)): Accept in Principle

**SUBMITTER:** Mark Lee Bryant, RPA Assoc., Inc.

**RECOMMENDATION:** Revise 200-6(b) to read as follows:

(b) Sizes Larger than No. 6. An insulated grounded conductor larger than No. 6 shall be identified either by a continuous white or natural gray outer finish or by three continuous white stripes on other than green insulation along its entire length or at the time of installation by a distinctive white or ~~natural~~ gray color marking at its terminations. This marking shall encircle the conductor or insulation.

**SUBSTANTIATION:** Add natural gray color for termination marking to be consistent with other sections of code where white and gray are acceptable for grounded conductor color. See Sections 200-6(a), 200-6(c), 200-6(e), 200-7(a), 200-7(b) and 200-7(c).

**PANEL ACTION:** Accept in Principle.

Revise 200-6(b) to read as follows:

(b) Sizes Larger than No. 6. An insulated grounded conductor larger than No. 6 shall be identified either by a continuous white or natural gray outer finish or by three continuous white stripes on other than green insulation along its entire length or at the time of installation by a distinctive white or ~~gray~~ color marking at its terminations. This marking shall encircle the conductor or insulation.

(Log #2509)

5- 14 - (200-6(a)): Reject

**SUBMITTER:** Richard E. Loyd, Perryville, AR

**RECOMMENDATION:** Revise as follows:

(a) Sizes No. 6 or Smaller. An insulated grounded conductor of No. 6 or smaller shall be identified by a continuous white or ~~natural~~ gray outer finish or by three continuous white stripes on other than green insulation along its entire length. Wires that have their outer covering finished to show a white or ~~natural~~ gray color but have colored tracer threads in the braid identifying the source of manufacture shall be considered as meeting the provisions of this section. Insulated grounded conductors shall also be permitted to be identified as follows.

**SUBSTANTIATION:** This term is undefined. The past Chairman of CMP 5 and others with historical data as to where this term originally came from all relate to products or product manufacturing process that has not been used for the past 35 to 50 years. Since it is a term that was used to define a product no longer made it should be deleted to eliminate the confusion that continues to exist in the industry.

There are many shades of white and many shades of black. How does one determine if gray is a shade of black or white? Different manufactures use various shades of each color and often two or three different manufactures wire will be installed on the same job site. The continued use of the term causes confusion and is or could be a safety issue that might result in life threatening shock hazard.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** See panel action and statement on Proposal 5-3.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16**

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE: 15**

**NEGATIVE: 1**

**EXPLANATION OF NEGATIVE:**

**DIAZ:** See my Explanation of Negative Vote on Proposal 5-9.

(Log #3318)

5- 15 - (200-6(a) and (b)): Reject

**SUBMITTER:** Paul E. Phelan, Rep. New Hampshire Electrical Contractors Assn.

**RECOMMENDATION:** Revise as follows:

200-6(a)

Sizes No. 6 ~~10~~ smaller.

An insulated grounded conductor of No. 6 ~~10~~ or smaller shall be identified...

200-6(b)

Sizes larger than No. 6 ~~10~~

An insulated grounded conductor larger than No. 6 ~~10~~ shall be identified...

**SUBSTANTIATION:** Change the provisions of 200-6(a) and (b) to allow identification of the grounded conductor at the time of installation by distinctive white markings at its terminations to include sizes No. 8 and No. 6.

Not all suppliers stock No. 8 and/or No. 6 in white. This change would assist the contractor by requiring less conductor colors in the larger sizes and would expedite installation.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** The lack of availability by some electrical suppliers is not technical substantiation for a change. Suppliers will stock materials where there is a demand for it.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16**

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE: 15**

**NEGATIVE: 1**

**EXPLANATION OF NEGATIVE:**

**DOBROWSKY:** This proposal should be accepted. Conductors with white or gray insulation in sizes larger than 6 AWG could also be manufactured and stocked. Conductors in size 10 AWG and smaller are most commonly used for branch circuits and are readily available with colored insulation. If termination marking is acceptable and considered safe for 4 AWG and larger why not in sizes 6 AWG and 8 AWG.

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

PANEL STATEMENT: See panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16  
VOTE ON PANEL ACTION:

AFFIRMATIVE: 15  
NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #2510)

5- 20 - (200-6(b)): Reject

SUBMITTER: Richard E. Loyd, Perryville, AR

RECOMMENDATION: Revise as follows:

(b) Sizes Larger than No. 6. An insulated grounded conductor larger than No. 6 shall be identified either by a continuous white or natural gray outer finish or by three continuous white stripes on other than green insulation along its entire length or at the time of installation by a distinctive white marking at its terminations. This marking shall encircle the conductor or insulation.

SUBSTANTIATION: This term is undefined. The past Chairman of CMP 5 and others with historical data as to where this term originally came from all relate to products or product manufacturing process that has not been used for the past 35 to 50 years. Since it is a term that was used to define a product no longer made it should be deleted to eliminate the confusion that continues to exist in the industry.

There are many shades of white and many shades of black. How does one determine if gray is a shade of black or white? Different manufactures use various shades of each color and often two or three different manufactures wire will be installed on the same job site. The continued use of the term causes confusion and is or could be a safety issue that might result in life threatening shock hazard.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 5-3.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15  
NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #3431)

5- 21 - (200-6(b)): Accept in Principle

SUBMITTER: Patrick White, Pompano Beach, FL

RECOMMENDATION: Revise text to read as follows:

(b) Sizes Larger than No. 6. An insulated grounded conductor larger than No. 6 shall be identified either by a continuous white or natural gray outer finish or by three continuous white stripes on other than green insulation along its entire length or at the time of installation by a distinctive white marking at its terminations. This marking shall encircle the conductor or insulation.

SUBSTANTIATION: The term "natural gray" specifies a particular shade of gray which few electricians actually know what the color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15  
NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #2511)

5- 22 - (200-6(c)): Reject

SUBMITTER: Richard E. Loyd, Perryville, AR

RECOMMENDATION: Revise as follows:

(c) Flexible Cords. An insulated conductor that is intended for use as a grounded conductor, where contained within a flexible cord, shall be identified by a white or natural gray outer finish or by three continuous white stripes on other than green insulation or by methods permitted by Section 400-22.

SUBSTANTIATION: This term is undefined. The past Chairman of CMP 5 and others with historical data as to where this term originally came from all relate to products or product manufacturing process that has not been used for the past 35 to 50 years. Since it is a term that was used to define a product no longer made it should be deleted to eliminate the confusion that continues to exist in the industry.

There are many shades of white and many shades of black. How does one determine if gray is a shade of black or white? Different manufactures use various shades of each color and often two or three different manufactures wire will be installed on the same job site. The continued use of the term causes confusion and is or could be a safety issue that might result in life threatening shock hazard.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 5-3.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15  
NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #3432)

5- 23 - (200-6(c)): Accept in Principle

SUBMITTER: Patrick White, Pompano Beach, FL

RECOMMENDATION: Revise text to read as follows:

(c) Flexible Cords. An insulated conductor that is intended for use as a grounded conductor, where contained within a flexible cord, shall be identified by a white or natural gray outer finish or by three continuous white stripes on other than green insulation or by methods permitted by Section 400-22.

SUBSTANTIATION: The term "natural gray" specifies a particular shade of gray which few electricians actually know what the color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15  
NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #2159)

5- 24 - (200-6(d)): Accept

SUBMITTER: Roland L. Comeau, Intermountain Power Service Corp.

RECOMMENDATION: Revise as follows:

Each other system grounded conductor shall have an outer covering of white with a readily distinguishable different colored stripe other than green (not green) running along the insulation....

SUBSTANTIATION: The exclusion of green in this rule is not parenthetical. It is part of the basic rule. The phrase "other than green" is used throughout this section [see 200-6(a), 200-6(b), and 200-6(e)] in a similar way. The elimination of parenthesis will make this rule more precise and explicit; the use of "other than green" will be more consistent with the style in other paragraphs in this section.

The Foreword to the NEC Style Manual states, "It is vitally important that the text be as explicit as possible and that maximum consistency be achieved in the language used in the text."

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 16

# NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #2879)

5- 25 - (200-6(d)): Reject

**SUBMITTER:** Gary Wright, Master Electrical Contractors Inc./Rep. Independent Electrical Contractors Assn.

**RECOMMENDATION:** Add text to read as follows:

The grounded conductor of all premises wiring ~~may~~ be referred to as the neutral conductor. The neutral conductor ~~may~~ shall be marked white or grey with a continuous outer sheath or with tape or other permanent means.

**SUBSTANTIATION:** The clear and concise approach of the code can and is often confusing concerning the definition of grounded and grounding. The everyday reference of a grounded conductor as the neutral should be recognized in the practical application of the code.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** Not all grounded conductors are neutrals.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

AFFIRMATIVE: 16

(Log #4159)

5- 26 - (200-6(d)): Reject

**SUBMITTER:** Frederic P. Hartwell, Hartwell Electrical Services,

Inc./Rep. Massachusetts Electrical Code Advisory Committee

**RECOMMENDATION:** Revise as follows:

(d) Grounded Conductors of Different Systems. Where conductors of different systems are installed in the same raceway, cable, box, auxiliary gutter, or other types of enclosure, ~~one system grounded conductor, if required, each grounded conductor shall have an outer covering conforming to Section 200-6(a) or 200-6(b), and shall be identified by system. Where the identification is by color, white shall be used on systems not exceeding 150 volts to ground, and gray shall be used for systems exceeding 150 volts to ground. Where additional systems are present, each other system grounded conductor shall have an outer covering of white with an identifiable colored stripe (not green) running along the insulation, or other and different means of identification as allowed by Section 200-6(a) or (b) that will distinguish each system grounded conductor.~~

**SUBSTANTIATION:** This proposal calls for the controlled color gray. If this cannot be distinguished from white (responding to prior CMP 5 rejections), is not yellow subject to the same confusion? The Code must recognize reality. No one is using white wire with stripes, because it is only available on a minimum order of about 40,000 feet. The result is greater confusion, because there is no rule that can be readily enforced. At the time the Massachusetts Electrical Code recognized reality (1993 cycle) and incorporated this rule, we surveyed electrical supply houses across the state and couldn't find a single one with striped wire available.

The Code should represent a consensus of the industry as to what is practicable. There is indeed a consensus, across the country, and it is to do what the proposal calls for. We have discussed this issue with numerous leading wire manufacturers, and they all continue to give the same answers: Yes, we can make striped white wire. No, we can't remember selling any. To be worthwhile, we would have to run (answers vary here between 40,000 to 50,000) feet. The result is arbitrary to virtually nonexistent enforcement of the rule.

The panel should bear in mind that "natural gray" came into the Code in 1923 to reflect uncolored latex and the cotton cloth served around it. At the time it was a reasonable change, but true "natural gray" insulation hasn't been made since the obsolescence of that technology roughly two generations ago. Retention of the term only serves to continue the illusion that gray wire is an option under present rules. Actually, by the literal text, gray wire is fully eligible for use as an ungrounded conductor. The panel continuing inaction on this subject, as duly recognized by its IAEL chair in the last cycle, perpetuates an actual hazard.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** There is no substantiation for requiring white for systems not exceeding 150 volts to ground although that may be common practice. The present wording permits different colors for different systems, but does not specify the colors.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

AFFIRMATIVE: 15

NEGATIVE: 1

**EXPLANATION OF NEGATIVE:**

**DIAZ:** The need for a unique but obtainable wire for the grounded conductor of a second system when more than one voltage system is used in a building can be appreciated. Gray should

be added only in Section 200-6(d) as an alternate method to using white with a readily distinguishable different colored stripe. Proposal 5-26 accomplishes this accepting gray to identify a grounded conductor for systems exceeding 150V, where two or more voltage systems are used in the same building. This would eliminate the potential for confusion over gray conductors in residential dwellings and similar installations where untrained professionals may be attempting electrical repairs or circuit additions. See comment for Proposal 5-9.

(Log #2512)

5- 27 - (200-6(e)): Reject

**SUBMITTER:** Richard E. Loyd, Perryville, AR

**RECOMMENDATION:** Revise as follows:

(e) Grounded Conductors of Multiconductor Cables. The insulated grounded conductors in a multiconductor cable shall be identified by a continuous white ~~or natural gray outer finish~~ or by three continuous white stripes on other than green insulation along its entire length. Multiconductor flat cable No. 4 or larger shall be permitted to employ an external ridge on the grounded conductor. **SUBSTANTIATION:** This term is undefined. The past Chairman of CMP 5 and others with historical data as to where this term originally came from all relate to products or product manufacturing process that has not been used for the past 35 to 50 years. Since it is a term that was used to define a product no longer made it should be deleted to eliminate the confusion that continues to exist in the industry.

There are many shades of white and many shades of black. How does one determine if gray is a shade of black or white? Different manufactures use various shades of each color and often two or three different manufactures wire will be installed on the same job site. The continued use of the term causes confusion and is or could be a safety issue that might result in life threatening shock hazard.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** See panel action and statement on Proposal 5-3.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

AFFIRMATIVE: 15

NEGATIVE: 1

**EXPLANATION OF NEGATIVE:**

**DIAZ:** See my Explanation of Negative Vote on Proposal 5-9.

(Log #3433)

5- 28 - (200-6(e)): Accept in Principle

**SUBMITTER:** Patrick White, Pompano Beach, FL

**RECOMMENDATION:** Revise text to read as follows:

(e) Grounded Conductors of Multiconductor Cables. The insulated grounded conductors in a multiconductor cable shall be identified by a continuous white ~~or natural gray outer finish~~ or by three continuous white stripes on other than green insulation along its entire length. Multiconductor flat cable No. 4 or larger shall be permitted to employ an external ridge on the grounded conductor. **SUBSTANTIATION:** The term "natural gray" specifies a particular shade of gray which few electricians actually know what the color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.

**PANEL ACTION:** Accept in Principle.

**PANEL STATEMENT:** See panel action and statement on Proposal 5-9.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

AFFIRMATIVE: 15

NEGATIVE: 1

**EXPLANATION OF NEGATIVE:**

**DIAZ:** See my Explanation of Negative Vote on Proposal 5-9.

(Log #2030)

5- 18 - (200-6(e) Exception No. 3): Reject

**SUBMITTER:** Daniel Kurelowech, The Scripps Research Inst.

**RECOMMENDATION:** Delete entire exception.

**SUBSTANTIATION:** My comment is directed at the topic: Different systems in the same enclosure/raceway.

# NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

The NEC Section 210-5(a): Color code for branch circuits, states that a grounded conductor of a different system is to be identified by a colored stripe on the insulation. NEC Section 200-6(a), Exception No. 3, modifies this obligation for markings at the termination points if only qualified persons will be servicing the electrical installation.

My problems are these:

1. Some contractors take this exception with minimal compliance.
2. Some contractors just tape the hot and neutral of the different system together. (Is this a different system, or a dedicated neutral?)
3. Devices in walls can be clearly marked for panel designation, but circuits pulled through the device box are rarely marked as a different system.
4. Although a facility has qualified electricians on site, nonqualified maintenance personnel may trouble shoot some minor electrical problems.

My request is this:

1. Delete Exception No. 3, of Section 200-6(a).
2. Modify Section 210-5(a) so it cannot be used for general use, such as receptacles, lights, switches, etc.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel is unclear as to the recommendation. Section 200-6(a) contains no exception.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 16

(Log #2022)

5- 29 - (200-6(f)): Reject

SUBMITTER: Jerry Knoerr, Village of Greendale, Village of Mukwonago, WI

RECOMMENDATION: Add new text to read:

"Add in conduit runs that run concealed, when a piece of metal conduit is used to either go in the floor, wall, etc. that would be concealed and PVC conduit is run in between and the other end is also a metal conduit, a label should be added at the panel board, junction box, or switchboard stating that a ground wire is required for circuits or feeders in this conduit run. The label should be permanent and posted at appropriate locations." Recommend that the panel decide where it should be installed.

SUBSTANTIATION: In industrial plants, shopping centers, etc. it is becoming more apparent that they will take a piece of IMC or rigid and go down in the floor or in the wall for protection, and then they run PVC concealed in the area for less cost and labor. I'm very concerned by the fact that a number of contractors may be working on the facility after the initial installation and has no way of knowing ground wire is required.

PANEL ACTION: Reject.

PANEL STATEMENT: The proposal appears to deal with an issue on equipment grounding and the necessity to require a conductor (wiring method). The proposed requirement is already required by Section 250-96. The article solely deals with the use and identification of grounded circuit conductors and terminal.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 16

COMMENT ON AFFIRMATIVE:

BRETT: The Panel is correct in rejecting this proposal because the recommended text addition is not appropriate to the section referenced however, I believe it has merit. I do not agree with the Panel Statement that it is currently required by Section 250-96.

I am aware of an incident where an electrician was severely injured. The original electrical contractor installed PVC conduit underground but used steel conduit above ground and for the stub-ups. Because of financial problems, a second contractor was hired to complete the installation. Unaware of the discontinuous ground path, a separate equipment grounding conductor was not installed.

I believe that if a tag or label was placed, as the submitter recommends, at both ends of the circuit this incident may have been avoided.

I believe that if accepted during the ROC meeting the recommended text should be placed in a new Section 250-120(d) or added to Section 250-120(a).

(Log #675)

5- 30 - (200-7): Reject

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Revise to read as follows:

Use of Insulation of a white or natural gray color or with three continuous white stripes.

(a) The following shall be used only for the grounded circuit conductor, unless otherwise permitted in (b) and (c):

(1) A conductor with continuous white or natural gray insulation covering.

(2) A conductor with three continuous white stripes on other than green insulation.

(3) A marking at the termination of white or natural gray color, excluding any marking required by Section 310-11.

(b) Circuits of Less than 50 Volts. A conductor with white or natural gray color insulation or three continuous white stripes, or having a marking of white or natural gray color, excluding any marking required by Section 310-11, shall not be required to be grounded only except as required by Section 250-20(a).

(c) Circuits of 50 Volts or More. The use of insulation that is white or natural gray or that has three continuous white stripes, for other than a grounded conductor shall be permitted only in accordance with (1) and (2) through (3) below.

(1) If part of a cable assembly and where the insulation is permanently reidentified to indicate its use as an ungrounded conductor by painting or other effective means marking other than white that shall encircle the conductor insulation at each termination, and at each location where the conductor is visible and accessible.

(2) Delete.

(3) (2) Where a flexible cord, having one conductor identified by a white or natural gray outer finish or by three continuous white stripes or by any other means permitted specified by Section 400-22, is used for connecting an appliance or equipment permitted in Section 400-7. This shall apply to flexible cords connected to outlets whether or not the outlet is supplied by a circuit that has a grounded conductor.

SUBSTANTIATION: Editorial. Natural gray is deleted due to ongoing controversy of what constitutes this color. It is not permitted as a color for field marking of larger than No. 6 conductors nor as continuous striping color.

While Section 200-6(a) specifies three continuous white stripes for a grounded conductor identification, the number of stripes should not be noted in this section, as it literally does not limit a conductor with one or two white stripes from being used as other than a grounded conductor. An ungrounded conductor with one or two white stripes is an invitation to safety problems. I have seen specialty striping done on conductors after manufacture, and if two stripes, (or one, or four) are not covered by this section, and used as ungrounded conductors, the fine distinction between number of stripes can be lost. Deletion of the word "three" in this section does not alter the requirement for "three" in Section 200-6(a).

In (a) (3) and (b) "the termination" (singular) may infer the load end only; a conductor with white marking in a junction or pull box without splice (termination) should be limited to a grounded conductor. Natural gray is deleted in (a) (3) as a (field) marking; not permitted in Section 200-6(b).

For technical correctness any marking required by Section 310-11 which may be white should be excluded.

Section (c) (1) is revised, to correlate with field marking requirement of Section 200-6(b) to encircle the insulation, which is a good requirement for field marking of all conductors. "Visible and accessible" are two concurrent conditions and is unnecessary since conductor terminations are generally required to be accessible but not visible. Visible is not Code-defined but a reasonable interpretation would be that a conductor above a dropped ceiling or in an enclosure is not visible, but is accessible.

In (c) (2) the prohibition of a white reidentified conductor from the switch to the outlet is a holdover from the previous code when the white conductor if used as the supply was not required to be reidentified... This is in conflict with (c) (1) which doesn't prohibit a reidentified white conductor on the load side of a snap switch, fused switch, circuit breaker, or other device. If two separate cables are installed to a switch of this section (supply and load) there is no switch loop and the white reidentified conductor could be used as a conductor from the switch to the outlet. The provisions of (c) (1) and (2) do not correlate well and indicate or suggest a hazard peculiar to single-pole, 3-way or 4-way switch loops but not switch loops for a 3-pole 3-phase switch.

Section 400-22 has required means of identification, which doesn't seem to include three white stripes in the individual conductor. The last sentence of (c) (3) seems superfluous as the subject of (c) relates to use as ungrounded conductors.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 5-3. This rewrite does not add clarity to the section. The submitter has not provided substantiation that three stripes is a problem. The reference to Section 310-11 is incorrect and has nothing to do with

identification for use, but is for wire markings required for manufacturers.  
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16  
VOTE ON PANEL ACTION:  
AFFIRMATIVE: 16

(Log #4285)

5- 31 - (200-7): Accept in Principle  
SUBMITTER: Charles F. Mello, Milwaukee, OR  
RECOMMENDATION: Revise text to read as follows:  
200.7. Use of Insulation of a White or ~~Natural~~ Gray Color or With Three Continuous White Stripes.  
(a) General. The following shall be used only for the grounded circuit conductor, unless otherwise permitted in (b) and (c).  
1. A conductor with continuous white or ~~natural~~ gray covering  
2. A conductor with three continuous white stripes on other than green insulation  
3. A marking at the termination of white or ~~natural~~ gray color  
(b) Circuits of Less than 50 Volts. A conductor with white or ~~natural~~ gray color insulation or three continuous white stripes or having a marking of white or ~~natural~~ gray at the termination for circuits of less than 50 volts shall be required to be grounded only as required by Section 250.20(a).  
(c) Circuits of 50 Volts or More. The use of insulation that is white or ~~natural~~ gray or that has three continuous white stripes for other than a grounded conductor for circuits of 50 volts or more shall be permitted only as in (1) through (3).  
1. If part of a cable assembly and where the insulation is permanently re-identified to indicate its use as an ungrounded conductor, by painting or other effective means at its termination, and at each location where the conductor is visible and accessible.  
2. Where a cable contains an insulated conductor for single-pole, 3-way, or 4-way switch loops, and the conductor with white or ~~natural~~ gray insulation or a marking of three continuous white stripes is used the supply to the switch, but not as a return conductor from the switch to the switched outlet. In these applications, the conductor with white or ~~natural~~ gray insulation or with three continuous white stripes shall be permanently re-identified to indicate its use by painting or other effective means at its termination's and at each location where the conductor is visible and accessible.  
3. Where a flexible cord, having one conductor identified by a white or ~~natural~~ gray outer finish or three continuous white stripes or by any other means permitted by Section 400.22, is used for connecting an appliance or equipment permitted by Section 400.7. This shall apply to flexible cords connected to outlets whether or not the outlet is supplied by a circuit that has a grounded conductor.

SUBSTANTIATION: Delete the word natural since the color natural gray is not defined and in fact does not exist as a specified color for wire insulation. This proposal goes with the definition of gray within a specified range of color per the Munsell color system as used by industry for wire color coding. The definition of the gray is provided in another proposal.  
PANEL ACTION: Accept in Principle.  
PANEL STATEMENT: See panel action and statement on Proposal 5-9.  
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16  
VOTE ON PANEL ACTION:  
AFFIRMATIVE: 15  
NEGATIVE: 1  
EXPLANATION OF NEGATIVE:  
DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #2513)

5- 32 - (200-7(a)): Reject  
SUBMITTER: Richard E. Loyd, Perryville, AR  
RECOMMENDATION: Revise as follows:  
200.7. Use of Insulation of a White or ~~Natural Gray Color~~ or With Three Continuous White Stripes  
(a) General. The following shall be used only for the grounded circuit conductor, unless otherwise permitted in (b) and (c):  
1. A conductor with continuous white or ~~natural gray covering~~  
2. A conductor with three continuous white stripes on other than green insulation  
3. A marking at the termination of white or ~~natural gray color~~.  
SUBSTANTIATION: This term is undefined. The past Chairman of CMP 5 and others with historical data as to where this term

originally came from all relate to products or product manufacturing process that has not been used for the past 35 to 50 years. Since it is a term that was used to define a product no longer made it should be deleted to eliminate the confusion that continues to exist in the industry.

There are many shades of white and many shades of black. How does one determine if gray is a shade of black or white? Different manufactures use various shades of each color and often two or three different manufactures wire will be installed on the same job site. The continued use of the term causes confusion and is or could be a safety issue that might result in life threatening shock hazard.  
PANEL ACTION: Reject.  
PANEL STATEMENT: See panel action and statement on Proposal 5-3.  
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16  
VOTE ON PANEL ACTION:  
AFFIRMATIVE: 15  
NEGATIVE: 1  
EXPLANATION OF NEGATIVE:  
DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #3667)

5- 33 - (200-7(a)(3)): Accept in Principle  
SUBMITTER: Patrick White, Pompano Beach, FL  
RECOMMENDATION: Revise text as follows:  
200.7. Use of Insulation of a White or ~~Natural~~ Gray Color or with Three Continuous White Stripes.  
(a)(3) A marking at the termination of white or ~~natural~~ gray color.  
SUBSTANTIATION: The term natural gray specifies a particular shade of gray which few electricians actually know what that color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.  
PANEL ACTION: Accept in Principle.  
PANEL STATEMENT: See panel action and statement on Proposal 5-9.  
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16  
VOTE ON PANEL ACTION:  
AFFIRMATIVE: 15  
NEGATIVE: 1  
EXPLANATION OF NEGATIVE:  
DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #2514)

5- 34 - (200-7(b)): Reject  
SUBMITTER: Richard E. Loyd, Perryville, AR  
RECOMMENDATION: Revise as follows:  
(b) Circuits of Less than 50 Volts. A conductor with white or ~~natural gray color insulation~~ or three continuous white stripes or having a marking of white or ~~natural gray~~ at the termination for circuits of less than 50 volts shall be required to be grounded only as required by Section 250-20(a).  
SUBSTANTIATION: This term is undefined. The past Chairman of CMP 5 and others with historical data as to where this term originally came from all relate to products or product manufacturing process that has not been used for the past 35 to 50 years. Since it is a term that was used to define a product no longer made it should be deleted to eliminate the confusion that continues to exist in the industry.  
There are many shades of white and many shades of black. How does one determine if gray is a shade of black or white? Different manufactures use various shades of each color and often two or three different manufactures wire will be installed on the same job site. The continued use of the term causes confusion and is or could be a safety issue that might result in life threatening shock hazard.  
PANEL ACTION: Reject.  
PANEL STATEMENT: See panel action and statement on Proposal 5-3.  
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16  
VOTE ON PANEL ACTION:  
AFFIRMATIVE: 15  
NEGATIVE: 1  
EXPLANATION OF NEGATIVE:  
DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #3669)

5- 35 - (200-7(b)): Accept in Principle

SUBMITTER: Patrick White, Pompano Beach, FL

RECOMMENDATION: Revise text as follows:

(b) Circuits of less than 50 Volts. A conductor with white or ~~natural~~ gray color insulation or three continuous white stripes or having a marking of white or ~~natural~~ gray at the termination for circuits of less than 50 volts shall be required to be grounded only as required by Section 250-20(a).

SUBSTANTIATION: The term natural gray specifies a particular shade of gray which few electricians actually know what that color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #2515)

5- 36 - (200-7(c)): Reject

SUBMITTER: Richard E. Loyd, Perryville, AR

RECOMMENDATION: Revise as follows:

(c) Circuits of 50 Volts or More. The use of insulation that is white or ~~natural~~ gray or that has three continuous white stripes for other than a grounded conductor for circuits of 50 volts or more shall be permitted only as in (1) through (3).

1. If part of a cable assembly and where the insulation is permanently reidentified to indicate its use as an ungrounded conductor, by painting or other effective means at its termination, and at each location where the conductor is visible and accessible.

2. Where a cable contains an insulated conductor for single-pole, 3-way, or 4-way switch loops, and the conductor with white or ~~natural~~ gray insulation or a marking of three continuous white stripes is used for the supply to the switch, but not as a return conductor from the switch to the switched outlet. In these applications, the conductor with white or ~~natural~~ gray insulation or with three continuous white stripes shall be permanently reidentified to indicate its use by painting or other effective means at its terminations and at each location where the conductor is visible and accessible.

3. Where a flexible cord, having one conductor identified by a white or ~~natural~~ gray outer finish or three continuous white stripes or by any other means permitted by Section 400-22, is used for connecting an appliance or equipment permitted by Section 400-7. This shall apply to flexible cords connected to outlets whether or not the outlet is supplied by a circuit that has a grounded conductor.

SUBSTANTIATION: This term is undefined. The past Chairman of CMP 5 and others with historical data as to where this term originally came from all relate to products or product manufacturing process that has not been used for the past 35 to 50 years. Since it is a term that was used to define a product no longer made it should be deleted to eliminate the confusion that continues to exist in the industry.

There are many shades of white and many shades of black. How does one determine if gray is a shade of black or white? Different manufactures use various shades of each color and often two or three different manufactures wire will be installed on the same job site. The continued use of the term causes confusion and is or could be a safety issue that might result in life threatening shock hazard.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 5-3.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

5- 37 - (200-7(c)): Accept in Principle

SUBMITTER: Patrick White, Pompano Beach, FL

RECOMMENDATION: Revise text as follows:

(c) Circuits of 50 Volts or More. The use of insulation that is white or ~~natural~~ gray or that has three continuous white stripes for other than a grounded conductor for circuits of 50 volts or more shall be permitted only as in (1) through (3).

SUBSTANTIATION: The term natural gray specifies a particular shade of gray which few electricians actually know what that color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #3924)

5- 38 - (200-7(c)): Reject

SUBMITTER: Charles J. Palmieri, Palmieri Assoc.

RECOMMENDATION: Strike the following as indicated, also replace and or renumber as I have in the text below:

(c) Circuits of 50 Volts or More. The use of insulation that is white or natural gray or that has three continuous white stripes for other than a grounded conductor for circuits of 50 volts or more shall be permitted only as in (1) through (3).

2. Where a cable contains an insulated conductor for single-pole, 3-way, or 4-way switch loops, and the conductor with white or natural gray insulation or a marking of three continuous white stripes is used for the supply to the switch, but not as a return conductor from the switch to the switched outlet. In these applications, ~~the conductor with white or natural gray insulation or with three continuous white stripes shall be required to be permanently re-identified to indicate its use by painting or other effective means at its terminations and at each location where the conductor is visible and accessible.~~ Re-identification of the conductor with white or natural gray insulation or a marking of three continuous white stripes will not be required.

SUBSTANTIATION: During the last code making process CMP No. 5 extracted the many exceptions to this section and rewrote them into positive text. Through the process one submitter sited electricians and apprentices (A98 ROP 5-30) applying the white wire in switch loops incorrectly and creating a cornucopia of errors throughout North America. Frankly it's not happening! Another proposal indicated remodeling contractors. For the 30 odd years that I've been working in this industry the only people I have encountered that miss apply this color code are nonelectricians and the last time I checked the amateurs refused to spend the \$50 bucks for a code book! Simply this practice of using the white wire in a factory assembled cable as a hot leg to the switch, with the unidentified conductor as the return (switch leg) to the load has worked good and lasted a long time, and the beauty was we all knew it! Usually a code panel will refuse to accept a proposal such as the one 1996 without documentation of a safety infraction (CPSC or other reliable source), apparently there was not one available during the last code cycle. Accept the revised text and let the professionals get on with earning a living.

PANEL ACTION: Reject.

PANEL STATEMENT: Field identification is inexpensive, easily accomplished and supports the safety concept of identifying all conductors that are ungrounded.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

RAPPAPORT: The original proposal to require reidentification (A98 ROP 5-30) was based upon an instructor who often had to correct Journeymen on the proper wiring of 3-way switch loops. The documentation did not indicate any problems in the field with single pole switches or that the problem with 3 and 4-way switching was related to the fact that there was a white wire. This proposal relates only to cables with a white wire and one or two other colored wires. For single pole switches, there is no confusion with a white

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wire at the switch since there are only two wires to connect. For 3 and 4-way switches, I fail to see how reidentifying the white wire helps someone who is unclear on the concept of switching from two or more locations. If the white wire is reidentified "blue", which two colors are the messengers? Is that any different than using the red and white as the messengers and having the black as the return to the luminaire? There are a total of seven proposals to revert back to the pre 1999 wording with documentation that it has not and is not a problem in the field. (Three and 4-way switching may always be a problem with some people.) It seems to me that the change to the 1999 NEC was an attempt to make things uniform and nice rather than base a change on identified field problems.

(Log #3925)

5-39 - (200-7(c)): Reject

**SUBMITTER:** Charles J. Palmieri, Palmieri Assoc.  
**RECOMMENDATION:** Strike the following as indicated, also replace and or renumber as I have in the text below:

(c) Circuits of 50 Volts or More. The use of insulation that is white or natural gray or that has three continuous white stripes for other than a grounded conductor for circuits of 50 volts or more shall be permitted only as in (1) through (3). Replace with (1) and (2).

1. If part of a cable assembly and where the insulation is permanently re-identified to indicate its use as an ungrounded conductor, by painting or other effective means at its termination, and at each location where the conductor is visible and accessible.

~~2. Where a cable contains an insulated conductor for single-pole, 3-way, or 4-way switch loops, and the conductor with white or natural gray insulation or a marking of three continuous white stripes is used for the supply to the switch, but not as a return conductor from the switch to the switched outlet. In these applications, the conductor with white or natural gray insulation or with three continuous white stripes shall be permanently re-identified to indicate its use by painting or other effective means at its terminations and at each location where the conductor is visible and accessible.~~

2. Where a flexible cord, having one conductor identified by a white or natural gray outer finish or three continuous white stripes or by any other means permitted by Section 400.22, is used for connecting an appliance or equipment permitted by Section 400.7. This shall apply to flexible cords connected to outlets whether or not the outlet is supplied by a circuit that has a grounded conductor.

**SUBSTANTIATION:** The two paragraphs are redundant. Paragraph (1) allows the use of a cable conductor that is marked white or natural gray or has three or more white stripes as a ungrounded circuit conductor if effectively re-identified.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** Although 200-7(c)(2) may appear to be redundant, it adds clarity in that the Code requires single pole, three-way, and four-way switch legs (and travelers) to be reidentified as ungrounded conductors.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 15

**NEGATIVE:** 1

**EXPLANATION OF NEGATIVE:**

**RAPPAPORT:** See my Explanation of Negative Vote on Proposal 5-38.

(Log #382)

5-40 - (200-7(c)(1)): Reject

**SUBMITTER:** Tom Helbig, Madison Area Technical College/Rep. IBEW Local 159

**RECOMMENDATION:** Revise 200-7(c)(1) to read as follows:

(1) If part of a cable assembly and where the insulation is permanently reidentified to indicate its use as an ungrounded conductor, by painting or other effective means at its termination, and at each location where the conductor is visible and accessible.

**SUBSTANTIATION:** There are no paints listed and approved for use on insulation. There are no listed insulations tested for painting.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** No substantiation has been provided to indicate a problem. There is no requirement for paint to be listed.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 16

(Log #381)

5-41 - (200-7(c)(2)): Reject

**SUBMITTER:** Tom Helbig, Madison Area Technical College/Rep. IBEW Local 159

**RECOMMENDATION:** Revise to read as follows:

(2) Where a cable contains an insulated conductor for single-pole, 3-way, or 4-way switch loops, and the conductor with white or natural gray insulation or a marking of three continuous white stripes is used for the supply to the switch, but not as a return conductor from the switch to the switched outlet. In these applications, the conductor with white or natural gray insulation or with three continuous white stripes shall be permanently re-identified to indicate its use by painting or other effective means at its terminations and at each location where the conductor is visible and accessible.

**SUBSTANTIATION:** There are no paints listed and approved for use on insulation. There are no insulations tested for painting.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** See panel action and statement on Proposal 5-40.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 16

(Log #433)

5-42 - (200-7(c)(2)): Reject

**SUBMITTER:** Vohn N. Peeler, Faith, NC

**RECOMMENDATION:** Revise 200-7(c)(2) to read as follows:

Where a cable contains an insulated conductor for single-pole, 3-way, or 4-way switch loops, and the conductor with white or natural gray insulation or a marking of three continuous white stripes is used for the supply to the switch, but not as a return conductor from the switch to the switched outlet, reidentification of these conductors shall not be required. In these applications, the conductor with white or natural gray insulation or with three continuous white stripes shall be permanently re-identified to indicate its use by painting or other effective means at its terminations and at each location where the conductor is visible and accessible.

**SUBSTANTIATION:** This proposal would restore the rule that we had prior to the 1999 NEC. Doing this presents absolutely no problem for people who are knowledgeable about cable wiring and the NEC. The main justification for this change was that "Weekend Warriors" were confused by the use of a white wire to feed a switch. The NEC is not written for untrained people. Putting additional requirements in the NEC will not solve the problem of untrained people (who never look at the NEC anyway) doing hazardous electrical work. Personally, I think the marking tape or painting makes for a more confusing situation.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** See Panel action and statement on Proposal 5-38.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 15

**NEGATIVE:** 1

**EXPLANATION OF NEGATIVE:**

**RAPPAPORT:** See my Explanation of Negative Vote on Proposal 5-38.

(Log #1442)

5-43 - (200-7(c)(2)): Reject

**SUBMITTER:** Barry F. Tower, Patten, ME

**RECOMMENDATION:** Replace the last sentence with the following:

In these applications, reidentification of the conductor with white or natural gray insulation or with three continuous white stripes shall not be required.

**SUBSTANTIATION:** This proposal essentially changes the "code" back to the way it was for generations. It was changed in 1999 (ROP 5-30) because of one person's concern that "weekend warriors" could get into trouble replacing a switch. Absolutely no evidence

was presented to show that there was any safety hazard with this long standing practice. Do you really think that the "weekend warriors" will bother to reidentify the white conductor on switch loops? They never reidentify the white conductor when they wire up their own 240V water heater. In fact, the average home handyman will not recognize reidentification at all. Most of us use electrical tape to reidentify an ungrounded conductor. That electrical tape has real meaning to the professional (usually a 240V circuit), but has absolutely no meaning to the "weekend warrior". To them it is just some tape (perhaps repairing a damaged wire). As far as training new electricians is concerned, the concept of "switch loops" is really very easy compared to other things that they must learn before they are ready to go out into the field. Any professional electrician immediately recognizes "switch loops" at a glance from three feet away. When we see a single pole switch with a black conductor on one terminal and a white one on the other - we instantly know everything that we need to know about how that switch is wired. While replacing such a switch, there are two wires and there are two screws on the switch - what could be simpler? If they don't know how to wire that switch, then they should call a professional. The "code" is not intended to be an instruction manual for untrained persons. Again, there was absolutely no safety issue here unless the homeowner didn't know enough to turn off the circuit breaker before beginning work. Reidentification won't prevent them from getting a shock. In the case of 3-way or 4-way switches, the worst thing that the homeowner can do is wire the switch in a way that it won't work properly. Reidentification would not help them anyway. They probably don't understand what the common terminal is on a 3-way switch. They won't notice that the screw is a darker color on the common terminal, or if they do they might assume that the reidentified conductor always goes on the common terminal. That would be an incorrect assumption. In some cases (power goes to the light first, then to the first 3-way switch, and then continues on to the other 3-way switch) the white wire would go on the common terminal. In another case (power goes to the light first, then it splits and goes to both switches with two cables) the white wire will be one of the traveler conductors and will not go to the common terminal of that 3-way switch. Reidentification of the white conductor on 3-way and 4-way switches can cause more confusion than it will solve (even for electricians). Reidentification of the white conductor on 240V circuits such as 240V water heaters, pump motors, etc. does serve a safety purpose. Reidentification of the white conductor in this case is usually the way that we immediately discover the voltage of the circuit. A 240V circuit presents a much greater electrocution hazard than a 120V circuit because many older homes still have two plug type fuses supplying 240V loads. In this case, it reminds us that there are two fuses to remove - not one. The entire paragraph of 200-7(c)(2) now says nothing at all. The first sentence has to do with making sure that the white conductor is used for the supply to the switch, and the other one requires reidentification. Reidentification is already covered in part 1. There should be no need to require the white conductor to be used for the supply to the switch, if reidentification is required anyway. It is just a lot of circular words. If you do not accept this proposal, you should at least delete the entire paragraph (see my other alternate proposal).

**PANEL ACTION:** Reject.  
**PANEL STATEMENT:** See Panel action and statement on Proposal 5-38.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
 AFFIRMATIVE: 15  
 NEGATIVE: 1  
**EXPLANATION OF NEGATIVE:**  
 RAPPAPORT: See my Explanation of Negative Vote on Proposal 5-38.

(Log #1443)

5- 44 - (200-7(c)(2)): Reject  
**SUBMITTER:** Barry F. Tower, Patten, ME  
**RECOMMENDATION:** Delete the entire paragraph (both sentences).  
**SUBSTANTIATION:** This is an alternate to another proposal that I have submitted. I would very much prefer that you accept the other one instead.  
 The entire paragraph of 200-7(c)(2) now says almost nothing at all as it is. The first sentence has to do with making sure that the white conductor is used for the supply to the switch, and the other sentence requires reidentification.  
 There would be no need to require the white conductor to be used for the supply to the switch since reidentification is now required as of 1999. There is no possible situation where an installation would

be safer using a reidentified white conductor as the supply to the switch than if the reidentified white conductor was used as the return from the switch. The whole reason for requiring that the white conductor be used as the supply to the switch was that it actually was a reliable way to identify the conductors. It insured that we wouldn't be left with two white wires to connect to the lampholder. Now that is all history. That requirement is now obsolete because of a stricter requirement that requires reidentification of all white conductors. Since the reidentification is already covered in 200-7(c)(2), the entire paragraph should just be deleted.

**PANEL ACTION:** Reject.  
**PANEL STATEMENT:** See Panel action and statement on Proposal 5-38.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
 AFFIRMATIVE: 15  
 NEGATIVE: 1  
**EXPLANATION OF NEGATIVE:**  
 RAPPAPORT: See my Explanation of Negative Vote on Proposal 5-38.

(Log #2780)

5- 45 - (200-7(c)(2)): Reject  
**SUBMITTER:** Daniel L. Robertus, State of Montana Electrical Insp. Dept.  
**RECOMMENDATION:** Revise as follows:  
 "but not as a return conductor from the switch to the switched outlet. ~~In these applications, the conductor with white or natural gray insulation or with three continuous white stripes shall be permanently reidentified to indicate its use by painting or other effective means at its terminations and at each location where the conductor is visible and accessible.~~

**SUBSTANTIATION:** It has been common practice and knowledge that the white conductor in romex cable, when used as a switch leg, was not a grounded conductor. This remarking requirement is an attempt to provide protection to a person who is not qualified to work on the installation in the first place. This requirement will be an unnecessary time consuming process for the installer, increasing the costs of the installation, and providing no further protection to the uneducated person who may come in contact with the conductor.

**PANEL ACTION:** Reject.  
**PANEL STATEMENT:** See Panel action and statement on Proposal 5-38.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
 AFFIRMATIVE: 15  
 NEGATIVE: 1  
**EXPLANATION OF NEGATIVE:**  
 RAPPAPORT: See my Explanation of Negative Vote on Proposal 5-38.

(Log #3347)

5- 46 - (200-7(c)(2)): Accept  
**SUBMITTER:** Paul Dobrowsky, Holley, NY  
**RECOMMENDATION:** Revise as follows:  
 2. Where a cable assembly contains an insulated conductor for single-pole, 3-way, or 4-way switch loops, and the conductor with white or natural gray insulation or a marking of three continuous white stripes is used for the supply to the switch, but not as a return conductor from the switch to the switched outlet. In these applications, the conductor with white or natural gray insulation or with three continuous white stripes shall be permanently reidentified to indicate its use by painting or other effective means at its termination and at each location where the conductor is visible and accessible.

**SUBSTANTIATION:** The word assembly should be added to be consistent with Section 200-7(c)(1).  
**PANEL ACTION:** Accept.  
**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16  
**VOTE ON PANEL ACTION:**  
 AFFIRMATIVE: 16

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(Log #3670)

5- 47 - (200-7(c)(2)): Accept in Principle

SUBMITTER: Patrick White, Pompano Beach, FL

RECOMMENDATION: Revise text as follows:

(2) Where a cable contains an insulated conductor for single-pole, 3-way, 4-way switch loops, and the conductor with white or ~~natural~~ gray insulation or a marking of three continuous white stripes is used for the supply to the switch, but not as a return conductor from the switch to the switched outlet. In these applications the conductor with white or ~~natural~~ gray insulation or with three continuous white stripes shall be permanently re-identified to indicate its use by painting or other effective means at its terminations and at each location where the conductor is visible and accessible.

SUBSTANTIATION: The term natural gray specifies a particular shade of gray which few electricians actually know what that color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #4160)

5- 48 - (200-7(c)(2)): Reject

SUBMITTER: Frederic P. Hartwell, Hartwell Electrical Services, Inc./ Rep. Massachusetts Electrical Code Advisory Committee

RECOMMENDATION: Revise as follows:

(2) Where a cable contains an insulated conductor for single-pole, 3-way, or 4-way switch loops, and the conductor with white or natural gray insulation or a marking of three continuous white stripes is used for the supply to the switch, but not as a return conductor from the switch to the switched outlet. In these applications, reidentification of the conductor with white or natural gray insulation or with three continuous white stripes shall not be required, be permanently re-identified to indicate its use by painting or other effective means at its terminations and at each location where the conductor is visible and accessible.

SUBSTANTIATION: The only substantiation for this change in the 1999 NEC addressed wiring practice by an unqualified individual. By doing so, CMP 5 started down a dangerous path without any end, namely, to try to write this Code for the benefit of untrained persons, in contravention of Sec. 90-1(c). Generations of electricians have been trained in how to wire switch legs. It's a subject every first year apprentice learns. The NEC should re-turn to the 1996 principle, which had been in the NEC since before the 1937 Code. The people who use this Code won't be confused by a switch leg, and the people who don't use this Code won't know the significance of white vs. black anyway. By this proposal, Massachusetts gives notice that it has continued the old practice without incident.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 5-38.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

RAPPAPORT: See my Explanation of Negative Vote on Proposal 5-38.

(Log #3671)

5- 49 - (200-7(c)(3)): Accept in Principle

SUBMITTER: Patrick White, Pompano Beach, FL

RECOMMENDATION: Revise text as follows:

(3) Where a flexible cord, having one conductor identified by a white or ~~natural~~ gray outer finish or three continuous white stripes or by any other means permitted by Section 400-22, is used for connecting an appliance or equipment permitted by Section 400-7. This shall apply to flexible cords connected to outlets whether or not the outlet is supplied by a circuit that has a grounded conductor.

SUBSTANTIATION: The term natural gray specifies a particular shade of gray which few electricians actually know what that color is. In practice gray (no specific shade) is used as a neutral conductor and this change would accept a common practice. There are various shades of white and this section does not specify any particular shade of white.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See Panel action and statement on Proposal 5-9.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #676)

5- 50 - (200-10(a)): Accept

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Revise to read as follows:

(a) All devices, excluding ~~lighting and appliance branch circuit~~ panelboards, provided with terminals for the attachment of conductors ... (remainder unchanged).

SUBSTANTIATION: Editorial. As presently worded a panelboard designated as a power panelboard is required to have terminals marked. Since the designation as to type of panel may be unknown until overcurrent devices and circuits are installed, is field marking intended?

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 16

(Log #2507)

5- 51 - (200-10(d)): Reject

SUBMITTER: Richard E. Loyd, Perryville, AR

RECOMMENDATION: Revise as follows:

(d) Screw Shell Devices with Leads. For screw shell devices with attached leads, the conductor attached to the screw shell shall have a white or ~~natural gray finish~~. The outer finish of the other conductor shall be of a solid color that will not be confused with the white or ~~natural gray finish~~ used to identify the grounded conductor.

SUBSTANTIATION: This term is undefined. The past Chairman of CMP 5 and others with historical data as to where this term originally came from all relate to products or product manufacturing process that has not been used for the past 35 to 50 years. Since it is a term that was used to define a product no longer made it should be deleted to eliminate the confusion that continues to exist in the industry.

There are many shades of white and many shades of black. How does one determine if gray is a shade of black or white? Different manufactures use various shades of each color and often two or three different manufactures wire will be installed on the same job site. The continued use of the term causes confusion and is or could be a safety issue that might result in life threatening shock hazard.

PANEL ACTION: Reject.

PANEL STATEMENT: See Panel action and statement on Proposal 5-3.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 16

VOTE ON PANEL ACTION:

AFFIRMATIVE: 15

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

DIAZ: See my Explanation of Negative Vote on Proposal 5-9.

(Log #4283)

5- 52 - (200-10(d)): Accept in Principle

SUBMITTER: Charles F. Mello, Milwaukie, OR

RECOMMENDATION: Revise text to read as follows:

(d) Screw Shell Devices with Leads. For screw shell devices with attached leads, the conductor attached to the screw shell shall have a white or ~~natural~~ gray finish. The outer finish of the other conductor shall be of a solid color that will not be confused with the white or ~~natural~~ gray finish used to identify the grounded conductor.

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**SUBSTANTIATION:** Delete the word natural since the color natural gray is not defined and in fact does not exist as a specified color for insulation. This proposal goes with the definition of gray within a specified range of color per the Munsell color system as used by industry for wire color coding. The definition of the gray is provided in another proposal.

**PANEL ACTION:** Accept in Principle.

**PANEL STATEMENT:** See Panel action and statement on Proposal 5-9.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 15

**NEGATIVE:** 1

**EXPLANATION OF NEGATIVE:**

**DIAZ:** See my Explanation of Negative Vote on Proposal 5-9.

(Log #3825)

5- 53 - (200-10(f)): Reject

**SUBMITTER:** Harley Kilgore, Riviera Electric

**RECOMMENDATION:** My proposal is for the NEC to enact a measure to protect people from neutral hazards by creating a neutral panel schedule to put with CB Schedule.

**SUBSTANTIATION:** There is no way of knowing what ungrounded conductor is paired with what branch circuit(s). It creates an electrical hazard for all involved on the ungrounded conductor.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** There is no specific recommendation made by the submitter in the proposal. Section 4.3.3(c) of the Regulations Governing Committee Projects requires proposals to include proposed text, including the wording to be added, revised (and/or) revise, or deleted.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 16

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 16

15. In Section 210-52(c) (3), replace "24 in. (610 mm)" with "600 mm (24 in.)".

16. In Section 210-52(c) (3), replace "12 in. (305 mm)" with "300 mm (12 in.)".

17. In Section 210-52(c) (5), replace "18 in. (458 mm)" with "450 mm (18 in.)".

18. In Section 210-52(c) (5), Exception, replace "12 in. (305 mm)" with "300 mm (12 in.)".

19. In Section 210-52(c) (5), Exception, replace "6 in. (153 mm)" with "150 mm (12 in.)".

20. In Section 210-52(c) (5) Exception (b), replace "18 in. (458 mm)" with "450 mm (18 in.)".

21. In Section 210-52(d), replace "36 in. (914 mm)" with "900 mm (3 ft)".

22. In Section 210-52(e), replace "6 1/2 ft (1.98 m)" with "2.0 m (6 1/2 ft)".

23. In Section 210-52(h), replace "10 ft (3.05 m)" with "3.0 m (10 ft)".

24. In Section 210-62, replace "12 linear ft (3.66 m)" with "3.7 linear m (12 ft)".

25. In Section 210-63, replace "25 ft (7.62 m)" with "7.5 m (25 ft)".

**SUBSTANTIATION:** The proposed revision is intended to comply with the NFPA No. 1M Manual of Style Section 4.1 with respect to the placement of units and values of measurement, i.e., show the SI units as the preferred and the inch-pound units immediately following in parenthesis.

**PANEL ACTION:** Accept in Principle.

In item 19 of the proposal, change "(12 in.)" to "(6 in.)".

**PANEL STATEMENT:** The panel accepts the concept, however, has corrected what is believed to be a typographical error in Item 19.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 12

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 11

**NEGATIVE:** 1

**EXPLANATION OF NEGATIVE:**

**BROWN:** The use of "hard Conversions" should be reevaluated. The proposed metric measurements do not correlate with the respective English measurements as used in such documents as model building codes, and standards such as ANSI A117.1. The Technical Correlating Committee should correlate all of these metric changes in the NEC with those dimensions already accepted throughout the industry.

## ARTICLE 210 — BRANCH CIRCUITS

(Log #450)

2- 3 - (210): Accept in Principle

**SUBMITTER:** Technical Correlating Committee National Electrical Code

**RECOMMENDATION:** 1. In Section 210-6(d) (1) (a), replace "22 ft. (6.71 m)" with "6.7 m (22 ft)".

2. In Section 210-6(d) (1) (b), replace "18 ft. (5.49 m)" with "5.5 m (18 ft)".

3. In Section 210-8(a) (7), replace "6 ft. (1.83 m)" with "1.8 m (6 ft)".

4. In Section 210-19(d), Exception No. 1(a), replace "18 in. (457 mm)" with "450 mm (18 in.)".

5. In Section 210-19(d), Exception No. 1(c), replace "18 in. (457 mm)" with "450 mm (18 in.)".

6. In Section 210-50(c), replace "6 ft. (1.83 m)" with "1.8 m (6 ft)".

7. In Section 210-52, replace "5 1/2 ft. (1.68 m)" with "1.7 m (5 1/2 ft)".

8. In Section 210-52(a) (1), replace "6 ft. (1.83 m)" with "1.8 m (6 ft)".

9. In Section 210-52(a) (2) (a), replace "2 ft. (610 mm)" with "600 mm (2 ft)".

10. In Section 210-52(a) (3), replace "18 in. (457 mm)" with "450 mm (18 in.)".

11. In Section 210-52(c) (1), replace "12 in. (305 mm)" with "300 mm (12 in.)".

12. In Section 210-52(c) (1), replace "24 in. (610 mm)" with "600 mm (24 in.)".

13. In Section 210-52(c) (2), replace "24 in. (610 mm)" with "600 mm (24 in.)".

14. In Section 210-52(c) (2), replace "12 in. (305 mm)" with "300 mm (12 in.)".

(Log #1151)

2- 4 - (210): Reject

**SUBMITTER:** Don R. Fowlkes, City of Chattanooga, TN

**RECOMMENDATION:** Possible wording:

"Somewhere in Article 210 or 300 needs heading "Complete Wiring System".

**SUBSTANTIATION:** Before an electrical wiring system can be considered complete, it must form proper connections between the power source and the final outlet and/or load.

As an inspector, I am required to refer to a code reference to disapprove any code violation. At present, there is no code reference stating when wiring is incomplete (namely branch circuits). It would help the inspectors to be able to cite a code reference when wiring is not complete. Any wording to this effect would be very helpful.

**PANEL ACTION:** Reject.

**PANEL STATEMENT:** The submitter has not provided specific proposed code text in accordance with Section 4-3.3 of the Regulations Governing Committee Projects. The submitter's intent was not clear.

**NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE:** 12

**VOTE ON PANEL ACTION:**

**AFFIRMATIVE:** 12