

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #2933a)

2- 5 - (210, 220): Accept in Principle

Note: See the Technical Correlating Committee Note on Proposal 2-1.

SUBMITTER: Bernard J. Mezger, American Lighting Association
RECOMMENDATION: Incorporate "luminaire" into the 2002 NEC:

(a) To incorporate the use of the inclusive wording "luminaire" throughout the Code wherever the ambiguous wording "fixture" or "lighting fixture" is used an the intent and meaning is a complete lighting unit consisting of a fixture and the lamp(s), called a "luminaire".

(b) Add the definition of "luminaire" to Article 100-1 as follows: Luminaire. A complete lighting unit consisting of a lamp, or lamps, and a ballast (when applicable), together with the parts designed to distribute the light, to position the lamp(s), and connect the lamp(s) to the power supply.

(c) Delete the FPN from Article 410-1 (and identical definition).

SUBSTANTIATION: Clarify the true meaning and intent of the item described as a "fixture", or a "lighting fixture", by providing the proper wording for a complete lighting unit. A luminaire consists of a fixture plus lamp(s). The definition and use proposed is consistent with that published and used by IESNA and NEMA.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 2-1.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #677)

2- 6 - (210-3, Exception): Accept in Principle in Part

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Revise to read as follows:

Exception: Multioutlet branch circuits rated higher ~~greater~~ than 50-amperes shall be permitted to supply nonlighting loads on industrial premises where maintenance and supervision ensure ~~indicate~~ that only qualified persons will service equipment the installation.

SUBSTANTIATION: The type of occupancy should not be a prime criterion for safety. Since "industrial" is not Code-defined the exception can be interpreted as not applying to premises such as institutional, airports, sewage treatment plants, government facilities, and other nonindustrial installations where it would be useful, even where maintenance and supervision are by qualified persons. The condition of qualified persons should be "ensured" not "indicated" which is a weaker term. "Ensured" is the term used in similar exceptions. "Only" qualified persons should be indicated; present wording does not exclude others.

PANEL ACTION: Accept in Principle in Part.

The panel accepts the portion of the proposal relative to the use of the term "ensure" and "only", so that the Exception reads as follows:

"Exception: Multioutlet branch circuits greater than 50 amperes shall be permitted to supply nonlighting outlet loads on industrial premises where conditions of maintenance and supervision ensure that only qualified persons will service the equipment."

The panel rejects the remainder of the proposal.

PANEL STATEMENT: The panel notes that the term "greater" conveys the appropriate meaning. The panel does not accept the deletion of "industrial" since the original exception was designed specifically for those installations and the submitter has not presented any substantiation to expand the locations.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3652)

2- 7 - (210-4): Reject

SUBMITTER: Mahlon Davenport, Rep. Commonwealth Code Inspection Service Inc.

RECOMMENDATION: Revise text to read as follows:

"All ungrounded conductors of multi-wire circuits, with common neutral, must open simultaneously and shall originate from the same panelboard."

SUBSTANTIATION: Neutral may overload if common trip breakers are not used to assure circuit wires are not on same phase.

PANEL ACTION: Reject.

PANEL STATEMENT: The requirements for common trip circuit breakers are covered by Section 240-20(b). If the ungrounded circuit conductors do not originate on separate phases, the circuit would not be a multiwire branch circuit by definition and Section 210-4 would not apply.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #429)

2- 8 - (210-4(a) and 210-4(c) FPN): Reject

SUBMITTER: Vohn N. Peeler, Faith, NC

RECOMMENDATION: Remove the FPN under 210-4(c) and put that information in 210-4(a) as follows:

Drop the period after "panelboard" and add the following: and all grounded device connections must comply with Section 300-13(b).

SUBSTANTIATION: This eliminates an FPN and puts the reference in the text where it is easier to notice.

PANEL ACTION: Reject.

PANEL STATEMENT: The text that indicates the panelboard in question is where the branch circuit originated provides clarity to the section. Moving the Fine Print Note into the mandatory text is unnecessary, since Section 300-13(b) would already be mandatory because it is in Article 300.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #678)

2- 9 - (210-4(b), (d)): Reject

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Revise to read as follows:

(b) Dwelling Units. In dwelling units a multiwire branch circuit supplying more than one device or equipment on the same yoke shall be provided with a means to disconnect simultaneously all ungrounded conductors at the panelboard or other device where the branch circuit originated.

(d) Identification of Ungrounded Conductors. Where more than one nominal voltage system, or systems with different characteristics or systems supplied by different services exists in a building or other structure, the ungrounded conductors of a multiwire branch circuit shall be distinctly identified by phase and system. The means of identification shall be permanently posted at each branch circuit panelboard, switchboard, other circuit supply point.

SUBSTANTIATION: Multiwire circuits may be supplied by ac and dc systems with the same voltage such as 120/240-volts for which identification is not required. Likewise, multiwire circuits of the same voltage may be supplied by different services. These circuits may occasionally be installed in the same enclosure. It seems such circuits also warrant distinct identification.

If safety warrants identification for multiwire branch circuits, why not feeders? Some feeders and branch circuits may employ the same size and number of conductors. Since circuits may originate from other than panelboards, such as switchboards, circuit, and fused switches, they are proposed for identification also. The intent is apparently to require identification which will distinguish systems, but this is not explicit, and one should not have to rely on intent.

A dam, oil derrick, or the like may not be considered as buildings, and such other structures should be included.

PANEL ACTION: Reject.

PANEL STATEMENT: Multiwire branch circuits are presently required to originate from the same panelboard and not other devices. Additional text referencing different characteristics or systems is more confusing, as the existing text is sufficient.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #334)

2- 10 - (210-4(d)): Reject

SUBMITTER: Mike Theisen, St. Cloud, MN

RECOMMENDATION: At the end of the last sentence of section 210-4(d) add text to read:

This means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means and

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

shall be permanently posted at each branch-circuit panelboard which contains one or more multiwire branch circuits.
SUBSTANTIATION: This added text may help clarify that the "identification of ungrounded conductors" is not to be retroactive to all existing panelboards in the building, which may not contain multiwire branch circuits, even though more than one nominal voltage exists in the building.
PANEL ACTION: Reject.
PANEL STATEMENT: The additional text does not further clarify the intent.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #1500)

2- 11 - (210-4(d)): Reject
SUBMITTER: Larry D. Wendt, State of Idaho/Rep. I.A.E.I.
RECOMMENDATION: Add the following text:
210-4(d) Identification of Ungrounded Conductors. Where more than one nominal voltage system exists in a building, each ungrounded conductor of a multiwire branch circuit where accessible, shall be identified by phase and system. This means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means and shall be permanently posted at each branch-circuit panelboard. See Section 110-15 for High-Leg Marking.
SUBSTANTIATION: This new sentence will make it clear that the marking required on the high-leg pertains to branch circuits as well as to services, feeders, and switchboards and panelboards. Please coordinate with the proposals on Sections 110-15, 215-8, 384-3(e), and 384-3(f).
PANEL ACTION: Reject.
PANEL STATEMENT: There is no substantiation presented to require that the high-leg be marked for branch circuits.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2019)

2- 12 - (210-4(d)): Reject
SUBMITTER: Jerry Knoerr, Village of Greendale, Village of Mukwonago, WI
RECOMMENDATION: Add new text to read:
"On any new panel or switchboard a provision shall be made in the label of the panel to provide the coding requirements such as blue, red, white, etc. that can be written in the field for the different systems in the building."
SUBSTANTIATION: It would be very helpful at this location so that everyone who looked in the panel could determine if there was any marking showing different voltages in the building.
PANEL ACTION: Reject.
PANEL STATEMENT: The requirements in 210-4(d) are to provide an identification means for multiwire branch circuits where more than one nominal voltage system exists in the building. There is no requirement for general color coding as indicated in the substantiation.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2523)

2- 13 - (210-4(d)): Reject
SUBMITTER: Richard P. Owen, City of St. Paul, MN
RECOMMENDATION: Revise as follows:
(d) Identification of Ungrounded Conductors. Where more than one nominal voltage system exists in a building, each ungrounded conductor of a multiwire branch circuit, where accessible, shall be identified by phase and system...
SUBSTANTIATION: Since the intent of this Section would seem to be to allow identification of differing systems within the same building, why should this now be required only for multiwire branch circuits? Identification of either single-phase or three-phase circuits, which could occupy the same raceway, trough, etc. as the multiwire circuits should be required for the qualified person to maintain the system after installation.

PANEL ACTION: Reject.
PANEL STATEMENT: The intent of the identification of ungrounded conductors in this section applies specifically to multiwire branch circuits.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3829)

2- 14 - (210-4(d)): Reject
SUBMITTER: Jasmin Dzabic, Rick Berajen, Riviera Electric
RECOMMENDATION: To standardize undergrounded conductors coloring for high and low voltages. The standard colors most widely used are: black, red, blue and white for low voltages and brown, orange, yellow and gray for high voltages.
SUBSTANTIATION: There are no standards for ungrounded conductors colors which can cause confusion and possible hazards.
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. There are methods to provide the identification required by this section other than color coding.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3164)

2- 15 - (210-4(e) (New)): Reject
SUBMITTER: Michael L. Last, Na'alehu, HI
RECOMMENDATION: Add the following text:
(e) Identification of Conductors. All grounded and ungrounded conductors of each multiwire branch circuit shall be identified as part of each particular multiwire branch circuit. Identification shall be at the origination panelboard and at all other locations where conductors, both grounded and ungrounded, are present. The means of identification shall be permanent.
SUBSTANTIATION: It is in the interest of safety that multiwire branch circuits be permanently identified to insure that all (two or three) ungrounded conductors originate from different lines (phases). Additionally, the continuity of the grounded conductor must always be maintained. If two or more ungrounded conductors of a multiwire branch circuit originate from the same line (phase), there exists the possibility that the current in the grounded conductor will exceed its capacity. If there is a loss of integrity in the grounded conductor while the ungrounded conductors are intact, a condition of severe voltage unbalance could result. The requirements of Section 300-13(b) do NOT ensure against these hazards. The submitter (in his capacity as an electrical professional) has documented instances in which the absence of this proposal contributed to numerous occurrences of serious consequences and the compromising of the safety of personnel and equipment. This proposal will greatly reduce the hazards associated with multiwire branch circuits.
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter has not provided sufficient substantiation. His substantiation refers to something other than a multiwire branch circuit. Refer to the definition of multiwire branch circuit in Article 100.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2381)

2- 16 - (210-6): Accept in Principle in Part
SUBMITTER: William E. Bickner, Stillwater, MN
RECOMMENDATION: Revise Section 210-6 as shown below:
210-6. Branch-Circuit Voltage Limitations. The nominal voltage of branch circuits shall not exceed the values permitted by (a) through (e) below.
[(a) through (d) unchanged]
(e) Over 600 volts Between Conductors. Branch circuits exceeding 600 volts, nominal, between conductors shall be permitted to supply

utilization equipment, other than lighting equipment, that is supervised and maintained by qualified persons.

SUBSTANTIATION: The voltage limitation for lighting units and cord- and plug-connected loads of 1440 va or less in dwelling units and guest rooms of hotels, etc., is properly established under Section 210-6(a). The permissive language of (b) through (d), interpreted literally, does not prohibit higher nominal voltages than those stated for branch circuits supplying other loads. For example, it is not a violation of Section 210-6(c)(4) to supply lighting fixtures equipped with "lampholders, other than the screw-shell type, applied within their voltage ratings" from branch circuits of more than 277 volts. Stating that 277 volts "shall be permitted" is not synonymous with stating that 600 volts, for example, is not permitted.

If it is erroneously assumed that the present language permits only those voltages that "shall be permitted," and prohibits higher voltages, nominal branch-circuit voltages of more than 600 volts are prohibited for industrial/commercial utilization equipment because "cord- and plug-connected or permanently connected utilization equipment" is specifically covered under present (b) through (d), which do not permit higher voltages. The proposed changes eliminate this anomaly, which resulted from editorial changes in the 1987 Code.

PANEL ACTION: Accept in Principle in Part.

Revise the proposed wording to read as follows:

"The nominal voltage of branch circuits shall not exceed the values permitted by (a) through (e)".

Add a new (e) to read as follows:

"(e) Over 600 Volts Between Conductors. Circuits exceeding 600 volts nominal between conductors shall be permitted to supply utilization equipment in installations where conditions of maintenance and supervision ensure that only qualified persons will service the installation."

PANEL STATEMENT: The revised wording meets the intent of the submitter, and provides clarity. The panel did not accept the exclusion of lighting equipment, as there are applications for specialized lighting systems in the over 600 volt category.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:

AFFIRMATIVE: 10

NEGATIVE: 2

EXPLANATION OF NEGATIVE:

BECKER: This proposal appears to be unnecessary. The substantiation states that "if it is erroneously assumed..." that voltages over 600 volts are prohibited, there may be a problem. It should be clear that items that are not specifically "included" are not, therefore "excluded". This proposal, if accepted, would establish a dangerous precedent for other Code Articles.

SIDHOM: I agree with Mr. Becker's Explanation of Negative Vote.

(Log #CP203)

2- 17a - (210-7): Accept

SUBMITTER: CMP 2

RECOMMENDATION: In the submitter's recommendation on Proposal 2-18, add the following subdivision titles to (d) (1-3) to read as follows:

- "(1) Grounding Type Receptacles.
- (2) Ground-Fault Circuit-Interrupters.
- (3) Nongrounding-Type Receptacles."

SUBSTANTIATION: To comply with 2.1.5.2 of the NEC Style Manual.

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #597)

2- 17 - (210-7): Reject

SUBMITTER: Martin Sallach, Lincoln Electric

RECOMMENDATION: Article 210-7, new section to be inserted between section (c) and (d):

Method of Wiring. Where connected to a branch circuit supplying two or more receptacles or outlets, and where the device has terminals that are intended to receive two or more wires, both the incoming and outgoing circuit conductors may be terminated directly at the device.

SUBSTANTIATION: Many local municipalities continue to require that only one pair of conductors be terminated at the receptacle. This requires the use of wire nuts to make the splice on the box. If the wrong size of wire nut is selected or does not adequately grab all of the wires a poor connection is created. Additionally, the receptacle box begins to become overcrowded. The majority of the commercially available receptacles are designed and tested to accommodate terminating both the incoming and outgoing conductors. Inserting this paragraph into the code will establish a wiring method that provides a more secure termination.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Reject.

PANEL STATEMENT: This method of wiring is already allowed for approved devices listed for this purpose.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #635)

2- 18 - (210-7): Accept in Principle

NOTE: The Technical Correlating Committee advises that placement of Articles is the responsibility of the Technical Correlating Committee, and the Technical Correlating Committee assigns Article 406 as the proposed new Article. Final responsibility for the Article will reside with Code-Making Panel 18 upon completion of the NEC 2002 Code cycle. The Technical Correlating Committee directs that this Proposal be referred to Code-Making Panel 18 for information.

SUBMITTER: Jack Wells, Pass & Seymour/Legrand

RECOMMENDATION: Relocate Section 210-7 to proposed new Article 420 as Section 420-3 titled General Installation Requirements and add a new general statement.

420-3240-7. General Installation Requirements. Receptacle outlets shall be located in branch circuits in accordance with Part C of Article 210. General installation requirements shall be in accordance with (a) through (f) below:

(a) Grounding Type. Receptacles installed on 15- and 20-ampere branch circuits shall be of the grounding type. Grounding-type receptacles shall be installed only on circuits of the voltage class and current for which they are rated, except as provided in Tables 210-21(b)(2) and (b)(3).

Exception: Nongrounding-type receptacles installed in accordance with Section 210-7 420-3(d).

(b) To Be Grounded. Receptacles and cord connectors that have grounding contacts shall have those contacts effectively grounded.

Exception No. 1: Receptacles mounted on portable and vehicle-mounted generators in accordance with Section 250-34.

Exception No. 2: Replacement receptacles as permitted by Section 210-7 420-3(d).

(c) Method of Grounding. The grounding contacts of receptacles and cord connectors shall be grounded by connection to the equipment grounding conductor of the circuit supplying the receptacle or cord connector.

FPN: For installation requirements for the reduction of electrical noise, see Section 250-146(d). The branch-circuit wiring method shall include or provide an equipment grounding conductor to which the grounding contacts of the receptacle or cord connector shall be connected.

FPN No. 1: Section 250-118 describes acceptable grounding means.

FPN No. 2: For extensions of existing branch circuits, see Section 250-130.

(d) Replacements. Replacement of receptacles shall comply with (1), (2), and (3) as applicable.

(1) Where a grounding means exists in the receptacle enclosure or a grounding conductor is installed in accordance with Section 250-130(c), grounding-type receptacles shall be used and shall be connected to the grounding conductor in accordance with Sections 210-7 420-3(c) or 250-130(c).

(2) Ground-fault circuit-interrupter protected receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this code.

(3) Where a grounding means does not exist in the receptacle enclosure, the installation shall comply with (a), (b), or (c).

(a) A nongrounding-type receptacle(s) shall be permitted to be replaced with another nongrounding-type receptacle(s).

(b) A nongrounding-type receptacle(s) shall be permitted to be replaced with a ground-fault circuit interrupter-type receptacle(s). These receptacles shall be marked "No Equipment Ground." An

equipment grounding conductor shall not be connected from the ground-fault circuit interrupter-type receptacle to any outlet supplied from the ground-fault circuit interrupter receptacle.

(c) A nongrounding-type receptacle(s) shall be permitted to be replaced with a grounding-type receptacle(s) where supplied through a ground-fault circuit interrupter. Grounding-type receptacles supplied through the ground-fault circuit interrupter shall be marked "GFCI Protected" and "No Equipment Ground." An equipment grounding conductor shall not be connected between the grounding-type receptacles.

(e) Cord- and Plug-Connected Equipment. The installation of grounding-type receptacles shall not be used as a requirement that all cord- and plug-connected equipment be of the grounded type.

FPN: See Section 250-114 for types of cord- and plug-connected equipment to be grounded.

(f) Non-interchangeable Types. Receptacles connected to circuits that have different voltages, frequencies, or types of current (ac or dc) on the same premises shall be of such design that the attachment plugs used on these circuits are not interchangeable. **SUBSTANTIATION:** These are general installation requirements. They are more in line with the scope of proposed Article 420 than the scope of Article 210. Over many Code cycles the general installation and construction requirements for receptacles, attachment plugs and cord connectors have been adopted in various sections of the Code. The intent of this proposal is to locate the general installation requirements for receptacles and cord connectors to the new Article 420. New Article 420 covers requirements for installation, mounting, grounding and non-interchangeability. This proposal brings the related requirements into a single article thereby making it easier for the code user to locate them.

Article 420 establishes general requirements for how receptacles are to be installed. Article 210 appropriately establishes where receptacle outlets are to be installed. The proposed new general statement directs the user to Article 210 for receptacle outlet location requirements.

This proposal was developed by a Task Group of CMP 18 appointed by the chairman to consider separating 1999 NEC Article 410 into two articles, one covering fixtures and the other covering receptacles, attachment plugs and cord connectors. This Task Group was appointed in response to Proposal 18-55 for the revision of the 1996 NEC.

PANEL ACTION: Accept in Principle.

The panel accepts the submitter's recommendation to relocate the material in 210-7 into a new Chapter 4 article.

In addition, create a new 210-7 to read as follows:

"210-7 Branch Circuit Receptacle Requirements. Receptacle outlets shall be located in branch circuits in accordance with Part C of Article 210. Specific requirements for receptacles are covered in Article 420."

PANEL STATEMENT: The panel has approved the relocation and has developed a new 210-7 to cover the requirements specific to branch circuits in Article 210.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #639)

2-19 - (210-7): Accept in Principle

SUBMITTER: Jack Wells, Pass & Seymour/Legrand

RECOMMENDATION: Add Section 210-7, changing only the appropriate section references within the text, to proposed new Article 420 as Section 420-3 titled General Installation Requirements.

420-3210-7. General Installation Requirements. Receptacle outlets shall be located in branch circuits in accordance with Part C of Article 210. General installation requirements shall be in accordance with (a) through (f) below:

(a) Grounding Type. Receptacles installed on 15- and 20-ampere branch circuits shall be of the grounding type. Grounding-type receptacles shall be installed only on circuits of the voltage class and current for which they are rated, except as provided in Tables 210-21(b)(2) and (b)(3).

Exception: Nongrounding-type receptacles installed in accordance with Section 210-7 420-3(d).

(b) To Be Grounded. Receptacles and cord connectors that have grounding contacts shall have those contacts effectively grounded.

Exception No. 1: Receptacles mounted on portable and vehicle-mounted generators in accordance with Section 250-34.

Exception No. 2: Replacement receptacles as permitted by Section 210-7 420-3(d).

(c) Methods of Grounding. The grounding contacts of receptacles and cord connectors shall be grounded by connection to the equipment grounding conductor of the circuit supplying the receptacle or cord connector.

FPN No. 1: For installation requirements for the reduction of electrical noise, see Section 250-146(d). The branch-circuit wiring method shall include or provide an equipment grounding conductor to which the grounding contacts of the receptacle or cord connector shall be connected.

FPN No. 2: Section 250-118 describes acceptable grounding means.

FPN No. 3: For extensions of existing branch circuits, see Section 250-130.

(d) Replacements. Replacement of receptacles shall comply with (1), (2), and (3) as applicable.

(1) Where a grounding means exists in the receptacle enclosure or a grounding conductor is installed in accordance with Section 250-130(c), grounding-type receptacles shall be used and shall be connected to the grounding conductor in accordance with Sections 210-7 420-3(c) or 250-130(c).

(2) Ground-fault circuit-interrupter protected receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this code.

(3) Where a grounding means does not exist in the receptacle enclosure, the installation shall comply with (a), (b), or (c).

(a) A nongrounding-type receptacle(s) shall be permitted to be replaced with another nongrounding-type receptacle(s).

(b) A nongrounding-type receptacle(s) shall be permitted to be replaced with a ground-fault circuit interrupter-type of receptacle(s). These receptacles shall be marked "No Equipment Ground." An equipment grounding conductor shall not be connected from the ground-fault circuit-interrupter-type receptacle to any outlet supplied from the ground-fault circuit-interrupter receptacle.

(c) A nongrounding-type receptacle(s) shall be permitted to be replaced with a grounding-type receptacle(s) where supplied through a ground-fault circuit interrupter. Grounding-type receptacles supplied through the ground-fault circuit interrupter shall be marked "GFCI Protected" and "No Equipment Ground". An equipment grounding conductor shall not be connected between the grounding-type receptacles.

(e) Cord- and Plug-Connected Equipment. The installation of grounding-type receptacles shall not be used as a requirement that all cord- and plug-connected equipment be of the grounded type.

FPN: See Section 250-114 for types of cord- and plug-connected equipment to be grounded.

(f) Non-interchangeable Types. Receptacles connected to circuits that have different voltages, frequencies, or types of current (ac or dc) on the same premises shall be of such design that the attachment plugs used on these circuits are not interchangeable. **SUBSTANTIATION:** These are general installation requirements. They are more in line with the scope of proposed Article 420 than the scope of Article 210. Over many Code cycles the general installation and construction requirements for receptacles, attachment plugs and cord connectors have been adopted in various sections of the code. The intent of this proposal is to locate the general installation requirements for receptacles and cord connectors to the new Article 420. New Article 420 covers requirements for installation, mounting, grounding and noninterchangeability. This proposal brings the related requirements into a single article thereby making it easier for the code user to locate them.

This proposal was developed by a Task Group of CMP 18 appointed by the chairman to consider separating 1999 NEC Article 410 into two articles, one covering fixtures and the other covering receptacles, attachment plugs and cord connectors. This Task Group was appointed in response to Proposal 18-55 for the revision of the 1996 NEC.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 2-18.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4469)

2-20 - (210-7(a)(1)): Reject

NOTE: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 18 for information.

SUBMITTER: Gordon E. Berg, W. St. Paul, MN

RECOMMENDATION: Add new text to read:

"The ungrounded screws on 15- and 20-amp receptacles shall be covered or protected before receptacles are installed in a metal box."

SUBSTANTIATION: The ungrounded receptacle screws on 15- and 20-amp receptacles should be covered before securing them in a metal electrical box. This additional protection would prohibit loose unused screws, strands of wire or a uncentered receptacle from coming in contact with the grounded edge of an electrical box and also avoid the danger of exposed screws should the plates ever come off or break.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter describes a workmanship issue that is not properly addressed by the recommendation. Receptacles and boxes designed and installed in accordance with existing standards should not encounter this problem. The panel requests the Technical Correlating Committee forward this proposal to Code-Making Panel 18 for information.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1163)

2- 22 - (210-7(d)(3)b): Reject

SUBMITTER: Richard E. Manrod, Mesa, AZ

RECOMMENDATION: Revise text to read:

210-7(d)(3)b. A non-grounding-type receptacle(s) shall be permitted to be replaced with a listed ground-fault circuit-interrupter-type (GFCI) of receptacle(s). These receptacles shall have the ground pin opening, but without the ability to connect to ground. They shall be marked "NO EQUIPMENT GROUND." An equipment grounding conductor shall not be connected from the ground-fault circuit-interrupter-type receptacle to any outlet supplied from the ground-fault circuit-interrupter receptacle. **SUBSTANTIATION:** Many of the homes wired before the early 1960's were wired using either two wire Nonmetallic-Sheathed Cable (Romex) or Knob and Tube wiring. Most of these installations used a metal box.

There is a good possibility that the older insulation (RR, RHW, TW, etc.) on those solid wires, could crack with age or may have been nicked during installation. When a GFCI receptacle is installed in those single gang metal boxes, there is a possibility of the hot conductor touching the metal box.

The GFCI receptacle's ground pin is connected to the metal box through the mounting screw and strap. A live connection from the box may then be made to the GFCIs ground pin. The outer case or housing of any equipment (i.e., drill motor, kitchen appliance, etc.) connected to the GFCI will become energized thus creating a shock hazard with possible injury or death.

A special GFCI receptacle, marked "FOR NON-GROUNDED APPLICATIONS ONLY" should be used where a ground is not available. This special GFCI should not have the ground pin brought out for connection.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has described a theoretical situation that could also occur with a two wire receptable used with a ground adapter. The GFCI does provide for improved safety above what was in the original installation.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4452)

2- 21 - (210-7(d)(3)(a)): Reject

SUBMITTER: David E. Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

RECOMMENDATION: Revise text to read as follows:

"...permitted to be replaced with another nongrounding-type receptacle. Such a receptacle shall be marked, by a means integral to the receptacle, "no equipment ground."

SUBSTANTIATION: A two-prong receptacle as replacement may well be, and very commonly is, used with a three-prong adapter; this marking should dissuade some users from doing so. In every second or third older house I look at I find three-prong adapters that rely on receptacles cover screws for grounding. To the best of my recollection, over the twenty-some years I have been contracting and consulting in older homes, none of these have been tested to confirm the presence, of ground until I happened on them.

Where are the bodies? We protect the public by grounding three-prong equipment; we consider this need to be substantiated by adequate evidence. There always will be people who willfully defeat safety measures; this proposal is not about protecting them, but about protecting the vast majority of people who are threatened due to ignorance. Section 230(c)(3)(b) and (c) service the same function. This will not address existing nongrounding type receptacles, but the Code cannot require retrofitting parts of the electrical system that are not being worked on. The phrasing, "permanently and durably.0" presently is construed to mean, "having a paper label taped on." This arguably is acceptable in the case of GFCI protection precisely because in large measure GFCI coverage protects life whether users are aware of it or not, whether integral grounding is present or not. However, every inspector and every installer is aware that these are peeled off and painted over. If integral to devices, say embossing, these are more likely to remain visible — in part because they are less likely to be unattractive. This does not force the hand of ANSI committees, as authorities having jurisdiction do not require the use of products that are not on the market. However, it does make the statement that this protection is important to life safety. I have submitted the relevant part of a page from the instructions for utilization equipment that explicitly warn against the use of such adapters. I have many others that warn against defeating grounding. Why include such instructions except for the fact that adapters so commonly do constitute "cheaters." Explicit, integral wording is likely to cut down on such practices.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Reject.

PANEL STATEMENT: Marking by a means integral to the receptacle would be of little value to the user given the limited space available on the receptacle face.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3666)

2- 23 - (210-7(d)(3)(b) and (c)): Reject

SUBMITTER: James M. Naughton, Boston Globe

RECOMMENDATION: Delete (b) and (c) in its entirety.

SUBSTANTIATION: The practice of replacing nongrounding type receptacles has been a controversial issue since the time GFCI receptacles were introduced in the early 1970s.

The receptacle being replaced is fed by a two wire ungrounded system that in most cases is at least fifty years old.

The consumer does not think of the wiring system being used, that's our responsibility. To label or mark a ground-fault circuit interrupter receptacle in reality does not last. Receptacles and covers are painted, wallpapered and blocked making it unreadable.

Two wire ungrounded systems have served their purpose. This is the time we should update the circuit to a grounded system.

PANEL ACTION: Reject.

PANEL STATEMENT: The GFCI provides a method to replace older two wire receptacles with a method that improves safety for the user.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1043)

2- 24 - (210-7(g)): Reject

SUBMITTER: Randall S. Bell, Greenwood, IN

RECOMMENDATION: I would like to propose that Receptacles have to be ground up.

SUBSTANTIATION: I have looked and studied that it would be safer for people. I think it would be a very good thing for the NEC to adopt this proposal.

PANEL ACTION: Reject.

PANEL STATEMENT: There is no evidence to support a required orientation of the ground pin for a receptacle outlet. The panel notes that receptacles have been installed with the ground pin up,

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

down, and horizontally for many years with no established trend of one orientation being safer than the other.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #1896)

2- 25 - (210-7(g) (New)): Reject
SUBMITTER: Charles M. Trout, Maron Electric Co. Inc.
RECOMMENDATION: Add a new paragraph (g) to read:
(g) Multiple Receptacles. Where more than one receptacle is mounted on the same yoke means shall be provided to disconnect simultaneously all ungrounded conductors feeding these receptacles at the panelboard where the branch circuit(s) originate.
SUBSTANTIATION: As presently written Section 210-4(b) refers to multi-wire circuits in dwelling units. The protection intended by that section should not be limited to dwelling units. Extending that protection to other than dwelling units would be justifiably within the purpose of the National Electrical Code.

Limiting the protection intended to only multi-wire circuits allows the installer to remove the break off tabs from both the ungrounded and the grounded terminals on the receptacle and feed the two separate receptacles on the same yoke with separate ungrounded and separate grounded conductors (not a multi-wire circuit) in any type of occupancy and circumvent the intended protection of Section 210-4(b). The listing as shown in the UL White Book refers only to the removal of tabs from these receptacles for their use in multi-wire circuits but does not expressly state that this is a requirement. The fact that the tabs are present on the grounded terminal of the receptacles indicates their use is anticipated.

Prohibiting the manufacture of receptacles with break off tabs on the grounded terminal would be the best answer to prevent persons from unintentionally working on energized circuits they had thought were disconnected. This of course would not help the person in other than dwelling units and this is an important consideration.

PANEL ACTION: Reject.
PANEL STATEMENT: The submitter's concern is noted, however, the submitter relates the proposal to multiwire branch circuits but does not provide substantiation that the proposal presents the same hazard as multiwire branch circuits.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3865)

2- 26 - (210-7(g) (New)): Accept in Principle
SUBMITTER: J. Philip Simmons, Olympia, WA
RECOMMENDATION: Add a new Section 210-7(g) to read as follows:
"Receptacle Outlet Position. Receptacle outlets in dwelling units shall not be installed in a face-up position in the work surfaces or countertops."
SUBSTANTIATION: At the present time, similar or identical wording is found in three locations in Article 210.
Section 210-8(a) (7) where the subject is GFCI protection, not location of the receptacle outlet.
Section 210-52(c) (5) which covers the location requirements for receptacle outlets in dwelling unit kitchens and dining rooms.
Section 210-52(d) for location of receptacle outlets for dwelling unit bathrooms.
It seems that locating the requirement in one location will suffice and correct the improper wording in Section 210-8(a) (7).
PANEL ACTION: Accept in Principle.
PANEL STATEMENT: See panel action and statement on Proposal 2-53.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4353)

2- 27 - (210-7(g) (New)): Reject
SUBMITTER: R. Gerald Irvine, Suffern, NY
RECOMMENDATION: Add new text to read as follows:
210-7(g) Methods of Installation. Receptacles installed on 15- and 20-ampere branch circuits shall be installed as follows:
(1) Vertically installed receptacles shall be oriented with the ground pin up.
(2) Horizontally installed receptacles shall be oriented with the neutral conductor uppermost.
SUBSTANTIATION: Recommendations from Crouse Hinds, Eagle Electric, General Electric, and Power CET Corp. provide these reasons: (a) Compliance with UL requirements; (b) In the event a metallic object were to fall against the plug blades while the plug was not fully inserted, such an object would hit the harmless grounding prong rather than short-circuit against the hot and neutral conductors.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel action and statement on Proposal 2-24.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #410)

2- 28 - (210-8): Reject
SUBMITTER: Randy L. Smith, Las Vegas, NV
RECOMMENDATION: Add new text as follows:
Where self-contained ground-fault circuit-interrupter receptacles are used to meet the requirements of 210-8(4), receptacles shall be marked for personnel protection as provided in Article 110, to identify the branch circuit panelboard, and branch circuit disconnecting means.
SUBSTANTIATION: In the last 5 years, I have changed out approximately 50 of these receptacles in open areas. In each case the receptacle was deadfront, and the line side branch circuit was energized. The only way to determine this is to remove the receptacle. In areas such as in Article 680 G, this is clearly a potentially hazardous removal. In the last 6 months, I have seen 250 of these receptacles installed for the associated equipment of Article 680 G, and in each area there is probability of water, and grounded metal conditions. Each of these installations were inspected and passed.
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter's intent is not clear as to what is proposed to be marked and what GFCI is in question.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2925)

2- 29 - (210-8): Reject
SUBMITTER: Frank Pologruto, Rep. IBEW L.U. 98
RECOMMENDATION: Add to Section 210-8:
"All 20 ampere, 125 volt receptacles in commercial kitchens shall have GFCI protection."
SUBSTANTIATION: The GFCI protection has protected people for over twenty years, and has expanded to areas like garages, outdoors, basement, etc., however, commercial kitchens are not mentioned in the code.
In commercial kitchens 20 ampere, 125 volt receptacles are constantly in use for small kitchen appliances, that are exposed to metal sinks, stoves, etc., that are conductive and should be GFCI protected.
Shouldn't commercial kitchen personnel be protected by the same GFCI protection that residential kitchens have?
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter relates the requirement to dwelling units but has provided no substantiation to show that the same potential hazard exists for nondwelling units. The original substantiation for GFCI protection on kitchen and wet bar receptacles is related to dwelling unit applications.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #3942)

2- 30 - (210-8): Reject

SUBMITTER: Jim Crocker, Insp. Div, City of Chattanooga, TN

RECOMMENDATION: Revise text to read as follows:

210.8 Ground Fault Circuit-Interrupter Protection for Personnel

(b) Other than Dwelling Units. All 125-volt, single phase 15- and 20-ampere receptacles installed in the locations specified below shall have ground-fault circuit-interruption protection of personnel.

- (1) Bathrooms;
- (2) Roof tops;
- (3) in wash down areas;
- (4) within 6 ft of all sinks;

SUBSTANTIATION: In fast food restaurants and other businesses where mop sinks, handwash sinks, etc. and where floors require washing down and outlets are present, employees may use for radios, fans, small heat units, etc., GFCI is needed.

PANEL ACTION: Reject.

PANEL STATEMENT: Insufficient substantiation has been presented to show that the receptacles around all sinks and washdown areas present the same potential hazard. Receptacle covers or other means are available to provide the protection contemplated by the recommendation.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4463)

2- 31 - (210-8): Reject

SUBMITTER: Charles M. Williams, Stealth Electric

RECOMMENDATION: This article should be changed to include a requirement that a circuit supplying switches for lights, fans, etc., in a bathroom of a dwelling be protected by a GFCI, if located within 5 ft of a tub or shower.

SUBSTANTIATION: It is not unusual in a small bathroom to have these switches placed within 5 ft of a tub or shower enclosure, due to lack of any other wall location that is suitable. GFCI protection of these circuits can only enhance safety, in the event these switches can be reached from a tub or shower.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has not provided any evidence of a hazard relating to a properly installed switch in proximity to a tub or shower.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3685)

2- 32 - (210-8(3)): Reject

SUBMITTER: Steve Campolo, Leviton Manufacturing Co., Inc.

RECOMMENDATION: Revise text to read as follows:

210.8. Ground-Fault Circuit-Interrupter Protection for Personnel.
(a) Dwelling Units...

(3) Outdoors. The device(s) providing ground-fault circuit-interrupter protection for personnel shall incorporate features that render the device incapable of being reset unless its proper operation is verified by the successful completion of the built-in in supervisory test.

SUBSTANTIATION: Data available from the files of the U.S. Consumer Product Safety Commission (CPSC) and Underwriters Laboratory (UL) indicate that a significant number of ground-fault circuit-interrupter (GFCI) devices installed in the field are inoperative. Current product is capable of restoring power when the GFCI no longer provides personal protection. Analysis has shown that GFCI(s) could be damaged by nearby lightning strikes and voltage surges. High voltage surges can cause GFCI(s) to trip in the process of damaging various electronic components. This proposal would prevent a nonfunctioning GFCI from being reset and restoring unprotected power, as can presently occur.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Reject.

PANEL STATEMENT: With the support of Underwriters Laboratories Inc., the GFCI manufacturers of the National Electrical Manufacturers Association are in the process of conducting a comprehensive national survey to evaluate the performance of GFCIs installed in the electrical infrastructure.

The panel understands that UL will issue a bulletin stating that no action will be taken regarding revision of the GFCI standard, UL943, until the data from the GFCI survey is compiled and analyzed.

The submitter proposes a design change that may or may not be supported by the outcome of the GFCI survey. It is the understanding of the panel that UL will take the necessary action to revise the product standard to accommodate any GFCI changes that may be indicated by an analysis of the GFCI survey data.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

COMMENT ON AFFIRMATIVE:

NISSEN: The concept of utilizing advancements in product technology to enhance the effectiveness of personnel protection devices should be encouraged, as well as the efforts of the National Electrical Manufacturers Association to study the state of GFCI units in the field, learn if units are non-operational, and if so, to determine the extent and cause of their non-operation. If as a result of this study, additional product requirements are deemed necessary, these changes more appropriately belong in the product safety standard, and not in the NEC.

(Log #3834)

2- 33 - (210-8(3)): Reject

SUBMITTER: Buck Chavarrios, Riviera Electric

RECOMMENDATION: Revise text to read as follows:

210-8(3) Other than Dwelling Unit. All 125 volt single phase 15- and 20-ampere receptacles installed in locations specified below shall have ground-fault-circuit interrupters protection for personnel.

- (1) Bathrooms
- (2) Rooftops
- (3) Outdoors.

SUBSTANTIATION: To reduce the risk of any electrical hazards to the general public or commercial building personnel to prevent any lawsuits that could come from these risks.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has not provided sufficient substantiation to show that the potential hazards exist through the use of outdoor receptacles for nondwelling applications. Some proposals received on this topic suggest that GFCI protection on all outdoor receptacles is necessary because it is provided for dwelling units. However, it was how those receptacles were used at dwelling units that resulted in the requirement. The original data that justified dwelling unit applications is not directly applicable to nondwelling unit applications.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

ABSTENTION: 1

EXPLANATION OF ABSTENTION:

PAULEY: NEMA acknowledges the Panel Statement, but recognizes that safety would be enhanced if all 125V, 15 and 20A outdoor receptacles were protected by a GFCI. NEMA encourages public comments with supporting data.

(Log #388)

2- 34 - (210-8(a)): Reject

SUBMITTER: Mitchell R. Iles, City of Rogers Insp. Division, AR

RECOMMENDATION: Add receptacles within 6 ft of water source require GFCI protection (residential).

SUBSTANTIATION: In laundry rooms with sinks no provision is specified. They are not bar sinks. Slop sinks may also be included.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 2-36.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1912)

2- 35 - (210-8(a)): Reject

SUBMITTER: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

RECOMMENDATION: Revise text to read as follows:

210-8. Ground-Fault Circuit-Interrupter Protection for Personnel
FPN: See Section 215-9 for ground-fault circuit-interrupter protection for personnel on feeders.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(a) **Dwelling Units, All Occupancies.** All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified below shall have ground-fault circuit-interrupter protection for personnel.

1. **Bathrooms.**

2. **Garages, and also accessory buildings that have a floor located at or below grade level not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use.**

Exception No. 1: Receptacles that are not readily accessible.

Exception No. 2: A single receptacle or a duplex receptacle for two appliances located within dedicated space for each appliance that, in normal use, is not easily moved from one place to another, and that is cord-and plug-connected in accordance with Section 400-7(a) (6), (a) (7), or (a) (8).

Receptacles installed under the exceptions to Section 210-8(a) (2) shall not be considered as meeting the requirements of Section 210-52(g).

3. **Outdoors.**

Exception: Receptacles that are not readily accessible and are supplied by a dedicated branch circuit for electric snow-melting or deicing equipment shall be permitted to be installed in accordance with the applicable provisions of Article 426.

4. **Crawl spaces.** Where the crawl space is at or below grade level.

5. **Unfinished basements.** For purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms and limited to storage areas, work areas, and the like.

Exception No. 1: Receptacles that are not readily accessible.

Exception No. 2: A single receptacle or a duplex receptacle for two appliances located within dedicated space for each appliance that, in normal use, is not easily moved from one place to another, and that is cord-and plug-connected in accordance with Section 400-7(a) (6), (a) (7), or (a) (8).

Receptacles installed under the exceptions to Section 210-8(a) (5) shall not be considered as meeting the requirements of Section 210-52(g).

6. **Kitchens.** Where the receptacles are installed to serve the countertop surfaces.

7. **Wet bar sinks.** Where the receptacles are installed to serve the countertop surfaces and are located within 6 ft (1.83 m) of the outside edge of the wet bar sink. Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertops.

SUBSTANTIATION: The requirement for GFCI receptacles should not be different for a kitchen, bathroom, crawl space, outdoor, unfinished basement, garages, storage-work area, and wet bar sink in commercial building since the degree of hazard is the same. People service babies, make coffee, do all cooking the same in a dwelling. Servicing equipment is the same in all occupancies. What makes other than dwelling units locations less hazardous? It should only make sense to apply the same requirements to all locations. Personnel safety should be the first consideration in evaluating this proposal. The receptacles in these locations named in this section should all be afforded the protection of GFCI. They provide the same protection whether it's commercial occupancy or residential.

PANEL ACTION: Reject.

PANEL STATEMENT: Insufficient substantiation has been presented to extend all of the GFCI requirements to all occupancies. The original substantiation to add the requirements outlined in Section 210-8(a) is based on data provided for dwelling unit applications.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2891)

2- 36 - (210-8(a) and (b)): Reject

SUBMITTER: James Maldonado, City of Tempe, AZ/Rep. Central Arizona Chapter IAEL

RECOMMENDATION: Revise Section 210-8 (a) as follows:

Changing Dwelling Units to All Occupancies and add new section (8) to read as follows:

(8) Within 6 ft (1.83 m) of any sink, wash basin, tub, or shower.

Delete Section (b).

SUBSTANTIATION: The requirement for GFCI protection of receptacles should be no different for kitchens, bathrooms, crawl spaces, outdoors, unfinished basements, garages, storage work areas or wet bar sinks in commercial buildings since the same degree of hazard exists.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has presented insufficient substantiation to show that the receptacles around other sinks in dwelling units and in other than dwelling units, such as laundry sinks, tubs, basins or showers, are used in similar fashion as kitchen sinks and wet bar sinks in dwelling units, and present the same potential hazard.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3848)

2- 37 - (210-8(a) and (b)): Reject

SUBMITTER: Lanny McMahlil, Phoenix, AZ

RECOMMENDATION: Change Subsection (a), "Dwelling Units" to "All Occupancies."

Delete Subsection (b), "Other than Dwelling Units."

SUBSTANTIATION: The requirements for ground-fault circuit-interrupter protection for personnel should apply consistently in the Code. The hazards are the same for all occupancies.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 2-35.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4467)

2- 38 - (210-8(a) and (b)): Reject

SUBMITTER: David Skeen, Nugent Electric

RECOMMENDATION: Add text:

"That any receptacles within 6 ft of any sink, shower, bathtub be GFCI protected."

SUBSTANTIATION: None.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 2-36.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1686)

2- 39 - (210-8(a)(1)): Reject

SUBMITTER: Harold R. Edean, III, Township of Montville, NJ

RECOMMENDATION: After the following word... "Bathrooms", add "See Section 210-52(d)."

SUBSTANTIATION: I feel that when an inspector is out in the field trying to answer questions or looking up in the code book it is very easy to overlook Section 250-52(d).

PANEL ACTION: Reject.

PANEL STATEMENT: Section 210-8 deals with GFCI requirements.

The proposed reference would not add any clarity.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2750)

2- 40 - (210-8(a)(2)): Reject

SUBMITTER: Joseph N. Fiorello, Sr., Fiorello Electric Inc.

RECOMMENDATION: Revise as follows:

(2) Garages, and accessory buildings that have a floor located at or below grade level (~~not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use.~~)

SUBSTANTIATION: During Hurricane Floyd, while working as an electrical inspector as part of a FEMA advance team, I noted that buildings of the above said article had been flooded. Occupants in their haste to remove water and humidity were forced to use non-GFCI receptacles for pumps, dehumidifiers and fans. Although the areas were finished as the code states, these areas pose significant danger to occupants and should be GFI protected. If an area not suitable for habitable use is protected, all the more an area that is suitable for habitable use.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

PANEL ACTION: Reject.
PANEL STATEMENT: The submitter is requesting a change based on a hazard during a natural disaster such as a flood. The hazards under such conditions can be numerous and cannot be anticipated by the NEC rules.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3944)

2- 41 - (210-8(a)(2)): Reject
SUBMITTER: William J. Richert, Atlas, MI
RECOMMENDATION: Delete all of sentence after the word garages. Make a new paragraph (3) as follows:
(3) General use receptacles serving a floor at or below grade level of accessory building supplies power from a dwelling and not used for farm or commercial purposes or intended as habitable rooms and limited to storage areas, work areas and areas of similar use.
SUBSTANTIATION: Accessory buildings are frequently installed to serve farm and commercial enterprises and there is also a dwelling on the property confusion arises as to whether small buildings or these properties fall under this rule.
PANEL ACTION: Reject.
PANEL STATEMENT: Article 547 covers specific requirements for buildings used in agricultural installations and would prevail over the requirements for accessory buildings in 210-8. The submitters' reference to "commercial enterprise" is not clear. If there were a commercial building (business, etc.) that is also on dwelling property, then the building would not be an accessory building to a dwelling unit.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4437)

2- 42 - (210-8(a)(2)): Reject
SUBMITTER: Mark Dolan, Cupertino Electric
RECOMMENDATION: Revise text to read as follows:
"Garages, and also accessory buildings that have a floor located at or below grade level not intended as habitable rooms and limited to storage areas, and areas of similar use."
SUBSTANTIATION: My understanding as told and interpreted by inspectors is that above ground level garages and accessory buildings require GFCI protection. This change would clarify this interpretation.
PANEL ACTION: Reject.
PANEL STATEMENT: The panel concludes that the present text which requires GFCI protection in all dwelling unit garages and accessory buildings at or below grade level is clear.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2261)

2- 43 - (210-8(a)(3) (New)): Reject
SUBMITTER: Steve Campolo, Leviton Manufacturing Co., Inc.
RECOMMENDATION: Add the following text:
210-8. Ground-Fault Circuit-Interrupter Protection for Personnel.
(a) Dwelling Units...
(3) Outdoors. The device(s) providing ground-fault circuit-interrupter protection for personnel shall incorporate features that render the device incapable of being reset unless its proper operation is verified by the successful completion of the built in supervisory test.
SUBSTANTIATION: Data available from the files of the U.S. Consumer Product Safety Commission (CPSC) and Underwriters Laboratories (UL) indicate that a significant number of ground-fault circuit-interrupter (GFCI) devices installed in the field are inoperative. Current product is capable of restoring power when the GFCI no longer provides personal protection. Analysis has shown that GFCI(s) could be damaged by nearby lightning strikes and voltage surges. High voltage surges can cause GFCI(s) to trip in the process of damaging various electronic components. This proposal would prevent a nonfunctioning GFCI from being reset

and restoring unprotected power, as can presently occur.
Note: Supporting material available for review from NFPA Headquarters.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel action and statement on Proposal 2-32.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12
COMMENT ON AFFIRMATIVE:
NISSEN: See my Comment on Affirmative on Proposal 2-32.

(Log #2454)

2- 44 - (210-8(a)(3)): Reject
SUBMITTER: William H. King, Jr., U.S. Consumer Product Safety Comm.
RECOMMENDATION: Revise as follows:
210-8. Ground-Fault Circuit-Interrupter Protection for Personnel.
(a) Dwelling Units...
(3) Outdoors. The device(s) providing ground-fault circuit-interrupter protection for personnel shall remove the power normally available for the loads at protected receptacles, and not restore this power, if the protection device fails to operate as intended in the test mode.
SUBSTANTIATION: Data available from the files of the U.S. Consumer Product Safety Commission (CPSC) and Underwriters Laboratories (UL) indicate that a significant number of ground-fault circuit-interrupter (GFCI) devices installed in the field are inoperative. Until recently, the only GFCI devices that were available did not remove electrical power to loads when the device failed to operate as intended in the test mode. For example, when a GFCI test button was pushed and the reset button did not actuate, the GFCI still permitted the delivery of electrical power. Now, however, GFCIs are available that prevent the restoration of electrical power when the device is tested and fails the test. Such enhanced GFCIs should be used, as a minimum, to protect outdoor receptacles, because outdoor receptacles are considered to be high risk locations with many grounded surfaces.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel action and statement on Proposal 2-32.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12
COMMENT ON AFFIRMATIVE:
NISSEN: See my Comment on Affirmative on Proposal 2-32.

(Log #2553)

2- 45 - (210-8(a)(5)): Reject
SUBMITTER: James B. Mahoney, D&D Electrical Cont., Inc.
RECOMMENDATION: Revise as follows:
Unfinished or finished below grade basements where standing water may collect from water piping, drains, forced hot water piping for heat or ground water shall require GFI protection for all receptacles within the walls of the below grade basement. GFI protection shall be required in all below grade dwelling areas unfinished or habitable for all receptacle circuits dedicated or not.
SUBSTANTIATION: I am requesting this life saving change be made in memory of my only brother (name deleted) who died under the stated conditions above. He was entering his basement level bedroom in my parent's home (constructed a finished basement in the 70's) on June 13th 1998. The basement had been flooded with approximately 3 inches of water from a rain storm. As he entered the room he slipped and fell, knocking over a table lamp causing his electrocution and death. Please make this change.
PANEL ACTION: Reject.
PANEL STATEMENT: The panel recognizes the benefits provided by GFCI and has dealt diligently over the years to require GFCIs in areas where hazards can be foreseen. The incident referenced by the submitter occurred during flooding which can introduce many electrical (as well as other) hazards.
Although the submitter indicates a specific incident involving a basement, an occurrence such as flooding could happen at any level of the dwelling unit. The NEC cannot add general installation rules attempting to anticipate such hazards as may occur during a flood.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #2751)

2- 46 - (210-8(a)(5)): Reject
SUBMITTER: Joseph N. Fiorello, Sr., Fiorello Electric Inc.
RECOMMENDATION: Delete text:
(5) ~~(Unfinished) Basements. (For the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms and limited to storage areas, work areas and the like.~~
SUBSTANTIATION: During Hurricane Floyd, while working as an electrical inspector as part of a FEMA Advance team, I noted that basements of the above said article had been flooded. Occupants in their haste to remove water and humidity were forced to use non-GFI receptacles for portable pumps, dehumidifiers, and fans. Although these areas were finished as the code states, these areas pose a significant danger to occupants and should be GFI protected. If an area not suitable for habitable use is protected, all the more an area that is suitable for habitable use.
PANEL ACTION: Reject.
PANEL STATEMENT: Insufficient substantiation has been presented to extend the GFCI requirements to all finished basements at or below grade. Also, see panel action and statement on Proposal 2-40.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2863)

2- 47 - (210-8(a)(5)): Reject
SUBMITTER: Neil Vilders, Vilders Electric
RECOMMENDATION: None.
SUBSTANTIATION: In situations where the basement is finished - but the floor is either painted, partially painted and/or. The paint is coming up/off - there needs to be BFI protection. Some wording needs to be in place to safeguard against people getting shocked due to the concrete floor in "finished basements".
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter has made no recommendation in accordance with the requirements of Section 4-3.3 in the Regulations Governing Committee Projects.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4161)

2- 48 - (210-8(a)(5) Exception No. 3): Reject
SUBMITTER: Frederic P. Hartwell, Hartwell Electrical Services, Inc./Rep. Massachusetts Electrical Code Advisory Committee
RECOMMENDATION: Insert a new Exception No. 3 as follows:
Exception No. 3: A receptacle supplying a permanently installed fire alarm or burglar alarm system.
SUBSTANTIATION: The panel justified rejection of this proposal in the prior cycle by saying such receptacles were covered under Exception No. 1. In order to qualify under that exception, the receptacle would have to not be readily accessible. That would mean reachable without resort to climbing over obstacles or resorting to ladders or step stools or the like. Most receptacles installed in dwelling basements don't meet these criteria, and therefore don't qualify under the exception.
A single energized receptacle installed for this purpose doesn't present any shock hazard, and unplugging the system to access the receptacle for other purposes would be extremely unlikely given the service receptacle already required by Section 210-52(e) and the fact that unplugging the system would send it immediately into an audible trouble condition. Acceptance of this proposal would assist installers in meeting the performance requirements of the rewritten household fire warning chapter in the 1999 NFPA 72.
Note that system transformers can still be used under the provisions of this change. If the installer uses a single receptacle, a No. 6 fender washer placed under one of the cover mounting screws secures the transformer. Alternatively, a conventional duplex receptacle could be used if the connecting tabs on both sides were broken out, allowing only one of the two receptacles to be energized.
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter provided no substantiation that fire or burglar alarm systems have been a concern in tripping GFCIs. The panel notes that this requirement is not found in the rewrite of Chapter 8 of the 1999 National Fire Alarm Code.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:
AFFIRMATIVE: 12
COMMENT ON AFFIRMATIVE:
BROWN: An appliance, in this case the control panel for a fire alarm system, could be installed under Exception No. 2, thus meeting the submitter's concerns.

(Log #1455)

2- 49 - (210-8(a)(6)): Reject
SUBMITTER: Jeff J. Eilers, Bright Electric
RECOMMENDATION: None.
SUBSTANTIATION: If a kitchen counter and/or cabinets extend pass a dividing door way and/or desk is adjoining. At what point is the (code 210-8(a)(6)) to be GFCI or is the desk area at a different height (of counter) not consider kitchen?
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter has made no recommendation in accordance with the requirements of 4-3.3 of the Regulations Governing Committee Projects.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2286)

2- 50 - (210-8(a)(6)): Reject
SUBMITTER: Arthur A. Baron, Winthrop, MA
RECOMMENDATION: Revise text to read as follows:
"Kitchen counter receptacles that require GFIs be fed with GFIs in panel not be GFI receptacles."
SUBSTANTIATION: In the event that GFI receptacles in counter plug have to be replaced homeowner will replace with the much cheaper non-GFI receptacle.
PANEL ACTION: Reject.
PANEL STATEMENT: The Code does not specify the type of device used to provide the GFCI protection. GFCI receptacles have been in use for years with excellent success in the field. The NEC cannot anticipate all future code violations that might be created by a user.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2752)

2- 51 - (210-8(a)(6)): Reject
SUBMITTER: Joseph N. Fiorello, Sr., Fiorello Electric Inc.
RECOMMENDATION: Revise as follows:
(6) Kitchens. Where the receptacles are installed to serve the countertop surfaces. (Any outlet installed in adjacent areas within 6 ft of the kitchen sink.)
SUBSTANTIATION: While inspecting, I came across a kitchen with a window passage into an adjoining living room. The window sill was built large enough to accommodate an appliance and receptacles were installed on the living room side. This was not countertop space and was not in the kitchen, but GFI protection was needed. The window passage was directly in front of the sink 4 inches about the countertop.
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter has presented a specific construction instance that would be subject to interpretation by the Authority Having Jurisdiction. The panel intends this requirement to provide GFCI protection for receptacles that serve kitchen countertop surfaces, regardless of the location of the receptacle.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2856)

2- 52 - (210-8(a)(6) and (7)): Reject
SUBMITTER: Bill F. Neitzel, Madison, WI
RECOMMENDATION: Combine Sections 210-8(a)(6) and 210-8(a)(7) to read as follows:
(6) Kitchens and Wet Bar Areas. Where the receptacles are installed to serve the countertop surfaces. Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertops.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

SUBSTANTIATION: Wet bar areas offer the same hazards as kitchen countertops. Typically the same type of appliances are utilized, causing the same potential problems. Combining these articles will treat these areas similarly regarding GFCI protection.
PANEL ACTION: Reject.

PANEL STATEMENT: There is insufficient substantiation to show that wet bar sinks present the same potential hazard as kitchen countertops. Because of the wide and varying use and arrangement of wet bars, the panel believes that the 6-foot minimum is necessary.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #637)

2- 53 - (210-8(a)(7)): Accept in Principle in Part

Note: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 18 for information.

SUBMITTER: Jack Wells, Pass & Seymour/Legrand

RECOMMENDATION: Add the second sentence of Section 210-8(a)(7) to proposed new Article 420 as Section 420-4(e) titled Receptacles in Work Surfaces or Countertops.

420-4. Receptacle Mounting. Receptacles shall be mounted in boxes, or assemblies designed for the purpose, and such boxes or assemblies shall be securely fastened in place.

(a) Receptacles mounted in boxes that are set back of the wall surface, as permitted in Section 370-20, shall be installed so that the mounting yoke or strap of the receptacle is held rigidly at the surface of the wall.

(b) Receptacles mounted in boxes that are flush with the wall surface, or project therefrom shall be installed so that the mounting yoke or strap of the receptacle is held rigidly against the box or raised box cover.

(c) Receptacles Mounted on Covers. Receptacles mounted to and supported by a cover shall be held rigidly against the cover by more than one screw.

Exception: Receptacles shall be permitted to be mounted to and supported by a device assembly or box cover listed and identified for rigidly securing receptacles by a single screw or by other means.

(d) Position of Receptacle Faces. After installation, receptacle faces shall be flush with or project from faceplates of insulating material and shall project a minimum of 0.015 in. (0.381 mm) from metal faceplates.

(e) ~~7. Receptacles in Work Surfaces and Counter tops. Wet bar sinks. Where the receptacles are installed to serve the countertop surfaces and are located within 6 ft (1.83 m) of the outside edge of the wet bar sink. Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertops.~~

(f) Exposed Terminals. Receptacles shall be enclosed so that the live wiring terminals are not exposed to contact.

SUBSTANTIATION: This is a general installation requirement. It is more in line with the scope of proposed Article 420 than the scope of Article 210. Over many code cycles the general installation and construction requirements for receptacles, attachment plugs and cord connectors have been adopted in various sections of the code. The intent of this proposal is to locate the general installation requirements for receptacles and cord connectors to the new Article 420. New Article 420 covers requirements for installation, mounting grounding and non-interchangeability. This proposal brings the related requirements into a single Article thereby making it easier for the code user to locate them.

This proposal was developed by a Task Group of CMP 18 appointed by the chairman to consider separating 1999 NEC Article 410 into two articles, one covering fixtures and the other covering receptacles, attachment plugs and cord connectors. This Task Group was appointed in response to Proposal 18-55 for the revision of the 1996 NEC.

PANEL ACTION: Accept in Principle in Part.

Revise (e) of the proposal to read as follows:

"(e) Receptacles in Countertops and Similar Work Surfaces in Dwelling Units. Receptacles shall not be installed in a face-up position in countertops or similar work surfaces."

PANEL STATEMENT: The panel accepts the relocation of the material from Article 210 to Chapter 4. The panel does not accept the expansion of the requirement beyond dwelling units because the necessity has not been substantiated.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #638)

2- 54 - (210-8(a)(7)): Accept in Principle

SUBMITTER: Jack Wells, Pass & Seymour/Legrand

RECOMMENDATION: Relocate the second sentence of Section 210-8(a)(7) to proposed new Article 420 as Section 420-4(e) titled Receptacles in Work Surfaces or Countertops. Revise 210-8(a)(7) by deleting the second sentence.

210-8(a)(7) Wet bar sinks. Where the receptacles are installed to serve the countertop surfaces and are located within 6 ft (1.83 m) of the outside edge of the wet bar sink. ~~Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertops.~~

~~420-4(e)(a)7. Receptacles in Work Surfaces and Countertops. Wet~~

~~bar sinks. Where the receptacles are installed to serve the countertop surfaces and are located within 6 ft (1.83 m) of the outside edge of the wet bar sink. Receptacles outlets shall not be installed in a face-up position in the work surfaces or countertops.~~

SUBSTANTIATION: This is a general installation requirement. It is more in line with the scope of proposed Article 420 than the scope of Article 210. Over many Code cycles the general installation and construction requirements for receptacles, attachment plugs and cord connectors have been adopted in various sections of the code. The intent of this proposal is to locate the general installation requirements for receptacles and cord connectors to the new Article 420. New Article 420 covers requirements for installation, mounting, grounding and non-interchangeability. This proposal brings the related requirements into a single article thereby making it easier for the code user to locate them.

The Task Group recognizes that by moving this requirement, the application is expanded from receptacles mounted adjacent to wet bars to a general requirement wherever receptacles are mounted in work surfaces or countertops. The task group believes a safety hazard exists wherever receptacles are mounted face up because foreign materials are likely to enter the receptacle and come in contact with current carrying parts.

This proposal was developed by a Task Group of CMP 18 appointed by the chairman to consider separating 1999 NEC Article 410 into two articles, one covering fixtures and the other covering receptacles, attachment plugs and cord connectors. This Task Group was appointed in response to Proposal 18-55 for the revision of the 1996 NEC.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 2-53.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3866)

2- 55 - (210-8(a)(7)): Accept

SUBMITTER: J. Philip Simmons, Olympia, WA

RECOMMENDATION: Revise text to read as follows:

(7) Wet Bar Sinks. Where the receptacles are installed to serve the countertop surfaces and are located within 6 ft (1.83 m) of the outside edge of the wet bar sink. ~~Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertops.~~

SUBSTANTIATION: This is a companion proposal to one that intends to locate this requirement in Section 210-7 so it will apply to all dwelling unit receptacle outlets.

In reality, the orientation of the receptacle has nothing to do with whether GFCI protection should be required but its proximity to the wet bar sink.

PANEL ACTION: Accept.

PANEL STATEMENT: See panel actions and statements on Proposals 2-53 and 2-54.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #4462)

2- 56 - (210-8(a)(7)): Reject
SUBMITTER: Charles M. Williams, Stealth Electric
RECOMMENDATION: This article should be changed to include any sink area.
SUBSTANTIATION: Currently, break-room sinks, utility and laundry sinks are not covered. GFCI protection can only enhance safety.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-36.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #440)

2- 57 - (210-8(a)(8) (New)): Accept
Note: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 19 for information
SUBMITTER: Robert A. McCullough, Ocean County Construction Insp. Dept., NJ
RECOMMENDATION: Add new 210-8(a)(8) to read as follows:
(8) Boathouses.
SUBSTANTIATION: This proposal adds back to 210-8(a) the requirement for GFCI protection in residential boathouses that was removed in the 1996 edition and relocated to Article 555. A proposal has been submitted to CMP 19 (recognizing that the TCC has jurisdiction over scope requirements) that would remove single-family private residential docking facilities from the scope of Article 555. If this proposal is accepted, outlets installed in those locations would be exempt from the GFCI requirements. Since they would not be technically considered outdoor outlets on residential property, the requirement needs to be added here. Outlets in boathouses at other than single-family docking facilities would be required to have GFCI protection by Article 555 and this protection should be afforded to these areas at single-family facilities as well.
PANEL ACTION: Accept.
PANEL STATEMENT: The panel's action is contingent upon Code-Making Panel 19's acceptance of the proposal to change the scope of Article 555.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #1685)

2- 58 - (210-8(a)(8) (New)): Reject
SUBMITTER: Kevin M. Weigman, Northeast Wisconsin Technical College
RECOMMENDATION: Add a new Section 210-8(a)(8) to read as follows:
(8) Vanities with sinks located in bedrooms. Where receptacles are installed to serve countertop surfaces and are located within 6 ft (1.83 m) of the outside edge of the vanity sink. Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertop.
SUBSTANTIATION: It is becoming a common practice in homes to have a dressing table/vanity with a sink located in the master bedroom. The same electrical shock hazards would exist at the vanity with a sink located in the bedroom as a sink located in the bathroom.
PANEL ACTION: Reject.
PANEL STATEMENT: The definition of "bathroom" states that it is an "area including...". This provides the authority having jurisdiction the ability to determine if such sinks fall under the requirements of 210-8(a)(1).
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3811)

2- 59 - (210-8(a)(8) (New)): Reject
SUBMITTER: Douglas Hansen, Codecheck
RECOMMENDATION: Add a new item (8) to read:
"Laundry Rooms. Where the receptacles are intended to serve laundry countertop surfaces or accessories other than clothes washers."

SUBSTANTIATION: Appliances used around laundry sinks subject users to the same hazards as near kitchen or wet bar sinks.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-36.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #296)

2- 60 - (210-8(b)): Reject
SUBMITTER: Ronald Deering, City of Potage, MI
RECOMMENDATION: Revise 210-8(b) to read as follows:
(1) Bathrooms
(2) Rooftops
(3) Kitchens
Exception No. 1: Receptacles that are not readily accessible.
Exception No. 2: Receptacles that are dedicated to serving cord and plug connected appliances in accordance with Section 400-7(a)(6), (a)(8).
(4) Receptacles installed within 6 ft (1.83 m) of the outside edge of a sink or lavatory.
SUBSTANTIATION: Many receptacle locations which would fall under items (3) and (4), are accessible to employees and customers to be used on a regular basis.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statements on Proposals 2-29 and 2-36.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #387)

2- 61 - (210-8(b)): Reject
SUBMITTER: Mitchell R. Iles, City of Rogers Insp. Division, AR
RECOMMENDATION: Add GFCI receptacle to kitchen counter and within 6 ft of water source.
SUBSTANTIATION: In commercial occupancies, the protection for personnel need to be in kitchens and close to water sources. Lots of untrained or unsupervised personnel work around water. Most of it is on metal counters with no ground fault provided in schools with counters with sinks in them.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-36.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2029)

2- 62 - (210-8(b)): Reject
SUBMITTER: Michael L. Lenon, B&D Electric
RECOMMENDATION: Revise text to read:
"Other than Dwelling Units. All 125 volt single-phase 15 and 20-ampere receptacles installed in the location specified below shall have ground fault circuit interrupter protection for personnel (1) bathrooms (2) rooftops (3) all outside receptacles."
SUBSTANTIATION: Schools, offices, and churches, etc. have unprotected outside receptacles. All receptacles must have GFCI protection outside. This will save people from getting electrocuted and shocked.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-33.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 11
NEGATIVE: 1

EXPLANATION OF NEGATIVE:

MERICLE: I vote no on Panel Action. I agree with the submitter. Logic suggests that the hazards with respect to receptacles located outdoors are similar whether associated with dwelling units or other types of structures.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #2834)

2- 63 - (210-8(b)): Reject

SUBMITTER: Melvin K. Sanders, Ankeny, IA

RECOMMENDATION: Add a new bullet to include kitchens as (2) and renumber rooftops to (3), so it would read:

(b) Other than Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified below shall have ground-fault circuit-interrupter protection for personnel.

- (1) Bathrooms
- (2) Kitchens
- (3) Rooftops.

SUBSTANTIATION: It is recognized that areas where water and other liquids are used when food is prepared in kitchens of restaurants, school food services, institutional facilities and the like pose electrical shock hazards. At present it is necessary to rely upon the general "Wet Location" definition in Article 100, which does not always provide adequate guidance as to its applicability in these locations, and there is no specific ground-fault circuit interrupter protection required. In addition, not all food is prepared at a sink-counter-top arrangement such in a dwelling but generally takes place at metal counter- or tabletops scattered around the room which are electrically conductive under normal conditions. These tops may not be near the sink itself but still use pans and basins for part of the process. The normal high-speed activity associated with preparing hundreds and sometimes a thousand or more meals at a time create many opportunities for liquids to get into the electrical outlets and on the floor creating hazard currents paths.

Another problem is the provided receptacle outlets may be on differing phases so the shock exposure may involve line-to-line as well as line-to-neutral and line-to-equipment and neutral to equipment. Many procedures involve soaking vegetables and fruits in pans and basins, running and splashing water over some items, and allowing meats, fruits and vegetables to thaw with liquids standing on the working tops as well as accidental spillage on the floor until such time as it can be cleaned up.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statements on Proposals 2-29 and 2-36.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2911)

2- 64 - (210-8(b)): Reject

SUBMITTER: Donald A. Ganiere, Ottawa, IL

RECOMMENDATION: Revise text as follows:

(b) Other than Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified below shall have ground-fault circuit-interrupter protection for personnel.

- 1. Bathrooms
- 2. Rooftops
- 3. Outdoors

SUBSTANTIATION: The same type of equipment is used and the same hazards are present in nondwelling occupancies as in dwelling occupancies. If the use of non-GFCI protected outlets is not safe outdoors at dwelling units it is not safe at other occupancies either.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-33.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

MERICLE: See my Explanation of Negative on Proposal 2-62.

(Log #3131)

2- 65 - (210-8(b)): Reject

SUBMITTER: James O'Driscoll, Larry C. McCrae Inc.

RECOMMENDATION: Revise as follows:

GFCI Protection.

(b) Other than Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified below shall have ground-fault circuit-interrupter protection for personnel.

(1) Bathrooms

(2) Rooftops

(3) Outdoors. Where the receptacles are readily accessible to the public.

SUBSTANTIATION: Non-GFCI receptacles I have installed in these other than dwelling unit buildings are being used for a variety of purposes. Working in and out of these buildings I have not yet seen anyone injured, but there exists a lot of potential hazard. I have seen a landscaper use an electric hedge trimmer around a working lawn sprinkler system. Varieties of people are plugging in cordsets with skinned outer jackets. I even witnessed a plumbing contractor unstop a drain with his electric snake plugged into an outdoor receptacle with no GFCI protection. This is a personnel hazard which can be reduced by providing GFCI protection at these outlets. As an electrical contractor I recommend to building owners and maintenance personnel to install GFCI receptacles at all of these outdoor locations mentioned above.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-33.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

MERICLE: See my Explanation of Negative on Proposal 2-62.

(Log #3317)

2- 66 - (210-8(b)): Reject

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

RECOMMENDATION: Revise as follows:

(b) Other than dwelling units.

(1) Bathrooms

(2) Rooftops

Exception to (2)

(3) See index under Ground Fault Circuit Interrupters for other requirements.

SUBSTANTIATION: As written, 210-8(b) appears to tell us that in other than dwelling units GFCI protection is required only in bathrooms and rooftops, whereas there are several occupancies and/or situations that require this specific protection for personnel. Referencing the index by either a new (3) or a fine print note would direct one to these other required situations.

PANEL ACTION: Reject.

PANEL STATEMENT: There is insufficient substantiation to warrant including the additional text.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3842)

2- 67 - (210-8(b)): Reject

SUBMITTER: Thomas Anderson, Riviera Electric

RECOMMENDATION: Revise text to read as follows:

210.8(b). Other than dwelling units all 125 volt single phase 15- and 20-amp receptacle installed in the locations specified below shall have GFCI protection for personnel.

(1) Bathrooms

(2) Rooftops.

SUBSTANTIATION: Revised to include GFCIs to be used around break room sinks, wet bars and other locations where there are means to come in contact with water such as janitors, closets.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-36.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1873)

2- 68 - (210-8(b)(1)): Reject

SUBMITTER: Ric Thomson, Candler Hospital, Engr Dept.

RECOMMENDATION: Revise as follows:

(1) Bathrooms.

(a) Receptacles located within 6 ft of basin, tub, toilets or shower shall be GFI protected, not all receptacles.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

SUBSTANTIATION: Because of vague definition of a "bathroom", and no definition of "area," you could wind up with a whole room of GFI protected receptacles, especially in a hospital patient room, which is not a good idea, because of nuisance tripping and medical equipment.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has not provided sufficient substantiation to exclude the GFCI requirement for all bathroom receptacles other than those receptacles located within the six foot rule in other than dwelling units. GFCI receptacles in hospital patient rooms are covered by Section 517-21.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1932)

2- 69 - (210-8(b)(2)): Reject

SUBMITTER: Warren Kohm, Briner Electric

RECOMMENDATION: Revise as follows:

210-8. Ground-Fault Circuit-Interrupter Protection for Personnel.

(b) Other than Dwelling Units.

~~(2) Rooftops~~

SUBSTANTIATION: Ground-Fault Circuit-Interrupter Protection for Personnel is not required for other than dwelling units outside at grade level. The hazards requiring ground-fault protection are no greater on the roof than they are on the ground. If Ground-Fault Circuit-Interrupter Protection for Personnel is not required outside at grade level, then it should not be required on the roof.

PANEL ACTION: Reject.

PANEL STATEMENT: Insufficient substantiation has been provided to delete the requirement for GFCI protection of receptacles on rooftops. The submitter has not provided any information that indicates the original substantiation for this requirement is not valid.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #305)

2- 70 - (210-8(b)(3) (New)): Reject

SUBMITTER: James A. Popma, Engineering Design Assoc., Inc.

RECOMMENDATION: Insert the following wording after (2)

Rooftops:

(3) Countertop sinks. Where the receptacles are installed to serve the countertop surfaces and are located within 6 ft (1.83 m) of the outside edge of the sink.

SUBSTANTIATION: Personnel should have ground-fault protection near all countertop sinks, not just in dwelling units. Many local inspectors already require this.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-36.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #408)

2- 71 - (210-8(b)(3) (New)): Reject

SUBMITTER: Terry Clark, Hunter Brothers Electrical Corp.

RECOMMENDATION: I have found something that is not in the National Electrical Code, and I feel very strongly about it. Our company does quite a few schools. In the 1996 code book, page 70-57, 210-8(b) Ground Fault Circuit-Interrupter Protection for Personnel, Other than dwelling units this addition needs to be made:

(3) Any outlet within 6 ft of a sink located in a classroom or classroom laboratory, or home economics classroom shall be ground fault protected.

SUBSTANTIATION: I believe this is very important. It should be in effect from preschool to adult classrooms. Most of the engineers call for ground fault outlets in the drawings, but occasionally they do not. If any of the numerous inspectors do not

require it, there is the possibility of this getting overlooked. Please let me know if you concur.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-36.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1515)

2- 72 - (210-8(b)(3) (New)): Reject

SUBMITTER: Russel LeBlanc, Peterson School of Engineering / Rep. Helco Engineering, Inc.

RECOMMENDATION: Add the following text:

(3) Kitchens or wet bar sinks where receptacles are installed to serve the countertop surfaces, and are located within 6 ft of the outside edge of a sink.

SUBSTANTIATION: It is common practice to install kitchen areas in office spaces. Currently the NEC does not require GFCI protection for countertop receptacles in these kitchens, yet the same dangers exist here as in a dwelling unit kitchen. The 6 ft limit would provide greater protection, yet not be too restrictive.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-29.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1530)

2- 73 - (210-8(b)(3) (New)): Reject

SUBMITTER: Jeffrey G. Gholson, Hillsboro, OR

RECOMMENDATION: Add new paragraph 210-8(b)(3) to read as follows:

(3) Outdoor receptacles for ac units.

SUBSTANTIATION: Section 210-8(b)(2) requires plugs for rooftop air conditioning units be located within 25 feet, and GFI protected many times ac units are installed at ground level or on second floor balconies. For protection of personnel working on refrigeration and ac units (sometimes in rain) GFCI receptacles should be used.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-33.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1688)

2- 74 - (210-8(b)(3) (New)): Reject

SUBMITTER: Harold R. Endean, III, Township of Montville, NJ

RECOMMENDATION: Add a new section after (2) Rooftop. The new section would be:

(3) Garages and grade-level portions of unfinished accessory buildings used for storage or work areas.

SUBSTANTIATION: I feel that there should be ground fault protection in accessory buildings in commercial dwellings just like we have in residential buildings. The same safety issues are there just like in a residential home. People will be using regular receptacles outside and inside garages where maintenance of equipment could be going on. The same exceptions in 210-8(a)(2) can still be left in the new 210-8(b)(3) section. This new section will help to cover those buildings that fall between dwelling garages and commercial garages.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter relates the requirements to dwelling units, however, the submitter presents insufficient substantiation specific to nondwelling units. The original data that justified dwelling unit applications is not directly applicable to nondwelling unit applications.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #1819)

2- 75 - (210-8(b)(3) (New)): Reject
SUBMITTER: David G. Wilson, County of Eaton, MI
RECOMMENDATION: Add a new paragraph (3) to read as follows:
(3) Kitchens. Where the receptacles are installed to serve the countertop surfaces.
SUBSTANTIATION: Past CMPs have decided that all outlets serving the countertop surfaces in kitchens of dwelling units (with no exceptions) must be GFCI protected. The addition of GFCI protection in "other than dwelling units" would provide the same protection users are required to have in their homes.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-36.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2046)

2- 76 - (210-8(b)(3) (New)): Reject
SUBMITTER: Lucinda Mallalieu, Newell Electrical
RECOMMENDATION: Add new text to read:
210-8 Ground Fault Circuit Interrupter Protection for Personnel.
(b) Other than Dwelling Units.
(3) Outside.
SUBSTANTIATION: While many of the outside receptacles on buildings other than dwelling units are used for fixed appliances, such as vending machines, many are not. A lot of them are used for outdoor maintenance and landscape equipment. A majority of the time this equipment is used with extension cords. As we know, many electricity-related injuries, deaths, and fires involve the use of faulty extension cords.
Furthermore, when additions and renovations are made to the buildings, often the nearest outside receptacle is used for temporary construction power. In many areas labor codes require the use of GFCI receptacles for construction equipment.
I believe that GFCI receptacles should be required for receptacles outside buildings other than dwelling units for the safety of personnel using them in the course of their daily work.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-33.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 11
NEGATIVE: 1
EXPLANATION OF NEGATIVE:
MERICLE: See my Explanation of Negative on Proposal 2-62.

(Log #2469)

2- 77 - (210-8(b)(3) (New)): Reject
SUBMITTER: Andrew Schmid, Goldhorn Electrical Construction
RECOMMENDATION: Add new text to read as follows:
210-8 Ground Fault Circuit Interrupter Protection for Personnel
(b) Other Than Dwelling Units.
(1) Bathrooms
(2) Rooftops
(3) Outdoors — Receptacles installed outdoors and readily accessible or subject to use for maintenance personnel or seasonal maintenance equipment.
SUBSTANTIATION: A custodian at the industrial plant, in which I work, while using an electric snow blower to clear a walkway, received an electrical shock. Although not severe, it should have been easily preventable with (required) GFCI protection.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-33.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 11
NEGATIVE: 1
EXPLANATION OF NEGATIVE:
MERICLE: See my Explanation of Negative on Proposal 2-62.

(Log #2753)

2- 78 - (210-8(b)(3), (4), (5), (6), (7), and (8) (New)): Reject
SUBMITTER: Joseph N. Fiorello, Sr., Fiorello Electric Inc.
RECOMMENDATION: Add new text to read:
(3) Garages and also accessory buildings that have a floor located at or below grade level.
(4) Outdoors.
(5) Crawl Spaces. When the crawl space is at or below grade level.
(6) Basements.
(7) Kitchens. Where the receptacles are installed to serve the countertop surfaces and any outlet installed in adjacent areas within 6 ft of the sink.
(8) Wet Bar Sinks. Where the outlets are installed to serve the countertop surface and are located within 6 ft of the outside edge of the wet bar sink.
SUBSTANTIATION: It seems as though the code is saying it is not okay to be hurt or killed in a dwelling unit. Although if you are not in a dwelling unit it is okay to be hurt or killed. In todays efforts of safety on the job do not we owe protection to our workers and our families!
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter relates the requirement to dwelling units, however, the submitter has presented no substantiation specific to nondwelling units. Also, see panel statements on Proposals 2-33 and 2-60.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3224)

2- 79 - (210-8(b)(3) (New)): Reject
SUBMITTER: Mike Weitzel, City of Wenatchee, WA
RECOMMENDATION: Add the following text:
(3) Outdoors where readily accessible to the public.
SUBSTANTIATION: An electrical shock hazard exists in public places where earth, dirt, concrete, wet grass, etc. is all around and electrical power is used. Temporary wiring and carnivals are already included in the Code but parks .
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-33.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 11
NEGATIVE: 1
EXPLANATION OF NEGATIVE:
MERICLE: See my Explanation of Negative on Proposal 2-62.

(Log #4162)

2- 80 - (210-8(b)(3)): Reject
SUBMITTER: Frederic P. Hartwell, Hartwell Electrical Services, Inc./Rep. Massachusetts Electrical Code Advisory Committee
RECOMMENDATION: Add a third item to the list as follows:
(3) Outdoors, if installed as required by Section 210-63.
SUBSTANTIATION: This is a companion proposal to one offered to require HRAC service receptacles near this equipment if located outdoors. The hazards are comparable or even more severe as for similar exposures on rooftops. This is not a generic requirement for GFCI protection on all commercial and industrial outdoor receptacles; it only covers those that would be installed for the same purposes as now required for GFCI protection on rooftops at similar occupancies.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-33.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 11
NEGATIVE: 1
EXPLANATION OF NEGATIVE:
MERICLE: See my Explanation of Negative on Proposal 2-62.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #4400)

2- 81 - (210-8(b)(3) (New)): Reject

SUBMITTER: Monte R. Ewing, State of Wisconsin

RECOMMENDATION: Add new text to read as follows:

(3) Repair or storage areas of garages where located readily accessible at or below grade level.

SUBSTANTIATION: A similar requirement is found in Section 210-8(a)(2) and Section 511-10. The problem is 210-8(a)(2) only applies to dwelling unit related garages and 511-10 only applies to commercial garages where repairing or storing self propelled motor vehicles which utilize volatile flammable liquids. Neither of the existing Sections apply to repair or storage garages used for diesel fuel (combustible liquid) motor vehicles. The same hazard exists here as covered in the existing two sections, however, these types of occupancies were overlooked due to the Scope of Article 511. The State of Wisconsin has created a code to cover these occupancies and I feel this needs to be addressed in the National Electrical Code.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-74.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4405)

2- 82 - (210-8(b)(3) (New)): Reject

SUBMITTER: Leo F. Martin, Martin Electrical & Technical Training Services

RECOMMENDATION: Add a new subparagraph (3) and two Exceptions as follows:

"All general purpose 125 volt, single phase 15- or 20-ampere rated receptacles installed outdoors shall have GFCI protection for personnel.

Exception No. 1: Receptacle outlets not readily accessible.

Exception No. 2: Single receptacles of the NEMA L-5 15R or 20R type installed for a specific use. These receptacles shall also comply with Section 410.57.

SUBSTANTIATION: Section 210-8(a) requires GFCI protection for general purpose receptacle outlets installed outdoors-dwelling units. Section 305-6 requires GFCI protection for receptacle outlets installed or used for temporary wiring. Section 210-63 FPN references back to 210-8 which requires GFCI protection for these outlets if they are installed or located on rooftops or in crawl spaces if the crawl space is located at or below grade level.

I am aware that the GFCI requirements of 210-8 for dwelling unit arose because of the manner in which receptacles installed in locations listed in 210-8(a) were/are used. However, in other than dwelling units outdoor general purpose receptacle outlets are not required. If an outdoor receptacle outlet is installed in these locations for a specific use and GFCI protection would be a problem then Exception No. 2 could be applied. If an outdoor receptacle outlet is installed for general purpose use, this receptacle outlet would be used for temporary power or lighting the same or very similar conditions that necessitated the GFCI protection mandated in Sections 210-63 and 305-6 (temporary use of power or lighting during installation, maintenance, or repair of equipment or grounds) would be present during the use of this outdoor general purpose receptacle outlet(s) in other than dwelling units. The same substantiation used to include GFCI protection in Sections 210-63 and 305-6 would be applicable to this new subparagraph and Exceptions.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-33.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

MERICLE: See my Explanation of Negative on Proposal 2-62.

(Log #424)

2- 83 - (210-8(c) (New)): Reject

SUBMITTER: Tim Hughes/Craig Guest, Upper Bucks County Area Vocational Technical School

RECOMMENDATION: Add a new 210-8(c) to read as follows:

Laundry receptacles, as required by 210-52(f), shall have ground fault circuit interrupter protection for personnel.

SUBSTANTIATION: Laundry areas frequently contain a utility sink adjacent to laundry appliances. The presence of water in this area presents a potential shock hazard. The additional possibility of a malfunction in an appliance increases the potential for a shock hazard to be present. For this reason, the receptacle outlet required by Section 210-52(f) should be provided with ground fault circuit interrupter protection.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-36.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #451)

2- 84 - (210-11(b)): Accept

SUBMITTER: Technical Correlating Committee National Electrical Code

RECOMMENDATION: Replace the first sentence of Section 210-11(b) with the following sentence:

"Where the load is computed on a volt-ampere/square meter or square foot (~~0.93m²~~) basis, the wiring system up to and including the branch-circuit panelboard(s) shall be provided to serve not less than the calculated load."

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, i.e., show the SI units as the preferred and the inch-pound units immediately following in parenthesis. Specific values of measurement are not shown since they are not necessary in this section. The proposed revision of Table 220-3(a) includes both volt-ampere loads per square meter and per square foot.

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #679)

2- 85 - (210-11(b)): Reject

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Revise to read as follows:

(b) Load Evenly Proportioned Among Branch Circuits. ~~Where the load is computed on a volt-ampere per square foot (0.093 sq m) basis the~~ The wiring system up to and including the branch-circuit panelboard(s) shall be provided to serve not less than the ~~calculated~~ computed load. ~~Where the load is computed on a volt-ampere per square foot (0.093 sq m) basis or volt-ampere per circuit basis this~~ load shall be evenly proportioned insofar as practicable, among multioutlet branch circuits within the panelboard(s), ~~except the~~ branch circuit(s) required in (c) (3) below. Branch-circuit overcurrent devices and circuits need only be provided ~~installed to~~ serve the ~~connected~~ load for circuits installed.

SUBSTANTIATION: The requirement for an adequate wiring system to and including panelboards should not be limited to loads computed on a va/sq ft basis. Volt-ampere per circuit loads such as small appliance circuits, laundry circuits, and sign outlet circuits seem to be reasonable included with the va/sq ft computed load. It is impractical to require the load (in essence the square foot area) to be exactly the same for each circuit, and this is apparently not vigorously enforced. The bathroom branch circuit(s) is included in the va/sq ft computation and unless excluded would normally be the determinant as to how many sq feet could be served by each va/sq ft circuit. Likewise, any "extra" general lighting circuits which may serve a small sq ft area.

The requirement for branch-circuit overcurrent devices and circuits for connected loads is flawed; a branch circuit serving only general-use receptacles or small appliance circuit receptacles has no connected load, only computed load. Present wording indicates such circuits need not be installed, even though required by other Code rules.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter's assertion is incorrect. The small appliances, laundry circuits and sign outlet circuits are not included in the volt-ampere/square foot calculated load.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #2160)

2- 86 - (210-11(b)): Accept in Principle
SUBMITTER: Roland L. Comeau, Intermountain Power Service Corp.
RECOMMENDATION: Revise as follows:
Branch-circuit overcurrent devices and current devices and circuits shall only be required to need only be installed to serve the connected load.

SUBSTANTIATION: This is a permissive rule that should follow the rule in the NEC Section 90-5(b). The only difference here is using the phrase shall only be required instead of shall not be required. The intent of the rule is being followed.

The phrase "need only" is used no where else in the Code except in Appendix D, Example No. D3.

Also, 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 in Principle.

Revise the proposed wording to read as follows:

"Branch-circuit overcurrent devices and circuits shall only be required to be installed to serve the connected load."

PANEL STATEMENT: The revisions meet the intent of the submitter.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3817)

2- 87 - (210-11(c)(1)): Reject
SUBMITTER: Roy Smith, Riviera Electric
RECOMMENDATION: Move 210-11(c)(1) and combine it with 220-16(a) so you don't have to keep jumping from 220-16(a) to 210-11(c)(1).

SUBSTANTIATION: Combine them.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel's intent is keep the requirements for required branch circuits separate from the requirements for calculating loads, which is covered by the scope of Article 220.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4412)

2- 88 - (210-11(c)(1)): Accept in Principle
SUBMITTER: Joseph Andre, City of Bellevue, WA
RECOMMENDATION: Add the phrase "125 volt," between the words "more" and "20-ampere".

The revised text of the sentence will read:

"In addition to the number of branch circuits required by other parts of this section, two or more 125 volt, 20-ampere small appliance branch circuits shall be provided for all receptacle outlets specified by Section 210.52(b)."

SUBSTANTIATION: Foreign appliances are increasingly finding their way into homes in the United States, many of which operate at different voltages and frequencies than is the conventional standard. This revised wording will make it clear that any small appliance receptacles installed for other than 125 volt equipment will not meet the requirements of 210-11(c)(1).

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 2-153a.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2280)

2- 89 - (210-11(c)(2)): Reject
SUBMITTER: Micheal L. Talley, Star Service Co.
RECOMMENDATION: Delete text as follows:
In addition to the number of branch circuits required by other parts of this section, at least one additional 20-ampere branch circuit shall be provided to supply the laundry receptacle outlet(s) required by Section 210-52(f). This circuit shall have no other outlets.

SUBSTANTIATION: With the loads now required for modern homes no other outlets should be allowed on the outlet required for the washer. There are too many electrical appliances available to be used in the laundry room and to eliminate overloads.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has not provided sufficient substantiation that the present laundry circuit rules are leading to hazards.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2872)

2- 90 - (210-11(c)(2)): Reject
SUBMITTER: Patrick R. Hooker, JCON Inc.
RECOMMENDATION: Add text to read as follows:

(2) Laundry Branch Circuits. In addition to the number of branch circuits required by other parts of this section, at least one additional 20-ampere branch circuit shall be provided to supply the laundry receptacle outlet(s) required by Section 210-52(f). This circuit shall have no other outlets. (Any additional receptacles in the laundry area shall have GFCI protection.)

SUBSTANTIATION: If a sink is located in the same area of the laundry room, a receptacle near this sink would now be protected by a GFCI circuit and therefore help protect against personal injury.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-36.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4413)

2- 91 - (210-11(c)(2) and (c)(3)): Accept in Principle
SUBMITTER: Joseph Andre, City of Bellevue, WA
RECOMMENDATION: Add the phrase "125 volt," in front 20-ampere in each of the referenced sections.
SUBSTANTIATION: Foreign appliances are increasingly finding their way into homes in the United States, many of which operate at different voltages and frequencies than is the conventional standard. This revised wording will make it clear that any small appliance receptacles installed for other than 125 volt equipment will not meet the requirements of 210-11(c)(2) or (c)(3).

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 2-153a.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #312)

2- 92 - (210-11(c)(3)): Reject
SUBMITTER: Victor V. Timpanaro, Rep. Municipal Electrical Inspectors Assoc. of NJ, Inc.
RECOMMENDATION: Revise 210-11(c)(3) to read as follows:
(3) Bathroom Branch Circuits. In addition to the number of branch circuits required by other parts of this section, at least one 20-amp branch circuit shall be provided to supply the bathroom receptacle outlet(s) in each bathroom.
SUBSTANTIATION: Today's dwelling units have several bathrooms that are used at the same time with hair dryers rated 1500-1758 VA @ 120 volts, they will draw 12-15 amps. Average family today shows both spouses work and use dryers at same time. Providing individual circuit for each bathroom serving basin area would prevent overloading of circuit and the possibility of homeowner using extension cord on second hair dryer supplied by a non-GFCI protected bedroom or hall receptacle outlet.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter did not provide sufficient technical substantiation to show that additional circuits are required. Additional circuits are not prohibited.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #2883)

2- 93 - (210-11(c)(3)): Reject
SUBMITTER: Joe Delallo, Jr., Bldg Dept. Ridgefield, CT
RECOMMENDATION: Add text to read as follows:

In addition to the number of a branch circuits required by other parts of this section, at least one 20 ampere branch circuit shall be provided for each bathroom to supply the bathroom receptacle outlets. Such circuits shall have no other outlets.

SUBSTANTIATION: If the same 20 amp branch circuit can be used for multiple bathrooms, the use of hair dryers, curling irons, etc. at the same time could cause a circuit fault. To clarify the code to require a separate 20 amp receptacle circuit for each bath room.
PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 2-92.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2957)

2- 94 - (210-11(c)(3)): Reject
SUBMITTER: Dick Murray, Randolph, MA
RECOMMENDATION: Revise as follows:

(3) Bathroom Branch Circuits. In addition to the number of branch circuits required by other parts of this section at least one 20-ampere branch circuit shall be provided to supply the bathroom receptacle outlet(s). ~~Such circuits shall have no other outlets.~~

~~Exception:~~ Where the 20-ampere circuit supplies a single bathroom, outlets for other equipment within the same bathroom shall be permitted to be supplied in accordance with Section 210-23(a).

SUBSTANTIATION: To eliminate the exception and clarify the requirement.
PANEL ACTION: Reject.

PANEL STATEMENT: The present exception is a clearly stated exception to the rule. Moving the exception into the main text reduces clarity.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3665)

2- 95 - (210-11(c)(3)): Reject
SUBMITTER: Gary A. Boughton, Bldg Dept., Town of Ridgefield, CT
RECOMMENDATION: Revise text to read as follows:

(3) Bathroom Branch Circuits. In addition to the number of branch circuits required by other parts of this section, at least one additional 20-ampere branch circuit shall be provided to supply the bathroom(s) receptacle outlet(s). Such circuits shall have no other outlets.

SUBSTANTIATION: Add (s) after the word bathroom to clarify that the circuit can be used to supply the receptacle outlets in more than one bathroom.

PANEL ACTION: Reject.

PANEL STATEMENT: The present text is clear that receptacle outlets in more than one bathroom can be supplied by this one 20 amp circuit.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #629)

2- 96 - (210-11(c)(3), Exception): Reject
SUBMITTER: Bob K. Middleton, State of Idaho
RECOMMENDATION: Revise as follows:

Outlets for other equipment within the same bathroom shall be permitted to be supplied in accordance with Section 210-23(a), but the lighting fixtures shall not be on the load side of the GFCI device.

SUBSTANTIATION: If the lighting is on the load side of the GFCI device and if it trips then you are in the dark.

PANEL ACTION: Reject.

PANEL STATEMENT: This is a design consideration, not a safety requirement.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2484)

2- 97 - (210-11(c)(3), Exception): Reject
SUBMITTER: James M. Imlah, City of Hillsboro, OR
RECOMMENDATION: Delete the following:

~~Exception: Where the 20 ampere circuit supplies a single bathroom, outlets for other equipment within the same bathroom shall be permitted to be supplied in accordance with Section 210-23(a).~~

SUBSTANTIATION: Please delete the exception! By allowing other equipment within the bathroom room to be connected to the receptacle 20-ampere circuit there may not be enough capacity to handle equipment that may be plugged in the receptacle. It is possible with a heat-fan, heat-fan-light, and an appliance like a hair dryer, curling iron or other types of appliance to cause the circuit to trip and in effect causing an overload condition. The overload condition can also cause heating effects that could cause looseness of connections and creating arcing problems on the line side of the receptacle. I have seen loading problems occur in some bathroom remodels in our local area. The heating effect on conductors is bad and can be compounded with some of the older type conductors found in remodels. Even with loading calculations as per NEC 210-23, there can still be circuit-overloading problems, when these type of appliances are used. I realize we are not to design or plan for future loads, but in this case we have to do something to stop overloading issues. Please keep the 20 amp circuit receptacle for the bathroom appliances and not allow other loads to be piggybacked on.

PANEL ACTION: Reject.

PANEL STATEMENT: The exception was added during the 1999 NEC Cycle to address proposals and comments from submitters indicating that some degree of balance on the 20 amp requirement is necessary. The panel maintains that same position.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4128)

2- 98 - (210-11(d) (New)): Reject
SUBMITTER: David T. Brender, Cooper Development Assn. Inc.
RECOMMENDATION: Add text to read as follows:

(d) Dwelling Garage and Outdoor Receptacles. Branch-circuit conductors shall not be smaller than 12 AWG to the garage receptacle outlet(s).

SUBSTANTIATION: The USA has experienced an increased usage of outdoor electrical appliances and the use of longer extension cords which, even when sized correctly, pose a risk of fire due to motor overheating and failing due to excessive voltage drop. As homes continue to be built larger and larger, as panelboards are located more often at the end of the house, with an increase in the number of electrical appliances in a typical home, and with appliances having increased power consumption, the risk of overloaded conductors has dramatically increased. Just as the minimum conductor size for bathrooms was increased due to the change in the type of appliances used on the bathroom circuit, the minimum conductor size for branch circuits should be increased to 12 AWG. The increase in minimum size will increase safety by reducing the risk of overloaded circuits and the need to rewire existing circuits. The increase to 12 AWG will also decrease the cable impedance, which will cause the overcurrent device to operate more quickly for long runs of cable found in larger dwellings. The overcurrent device ampacity is not intended to be changed by this proposal.

PANEL ACTION: Reject.

PANEL STATEMENT: No. 14 AWG is the Code recognized minimum branch circuit size copper conductor. The proposal does not provide sufficient substantiation to require a larger size for these outlets. Voltage drop is a design consideration that must be dealt with by the installer/designer for each installation.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4129)

2- 99 - (210-11(d) (New)): Reject
 SUBMITTER: David T. Brender, Cooper Development Assn. Inc.
 RECOMMENDATION: Add text to read as follows:
 (d) Dwelling Unit - Habitable Room Branch Circuits. Branch-circuit conductors shall not be smaller than 12 AWG.
 SUBSTANTIATION: As reported in the Eleventh Edition of "Fire in the United States 1987-1996," published by United States Fire Administration National Fire Data Center, fires caused by electrical distribution are the 4th most common cause of fire. The areas where fires most often occur are in the sleeping rooms, lounge areas (living rooms) and kitchens. 20 amp circuits are required in the kitchen, bathroom, and laundry room to address the risk of fire. As homes continue to be built larger and larger, as panelboards are located more often at the end of the house, with an increase in the number of electrical appliances in a typical home, and with appliances having increased power consumption and more stringent power quality demands, the risk of overloaded conductors and occurrence of unacceptable circuit voltage drops have dramatically increased. Recent research (International Telework Association and Council-report released October 27, 1999) indicates that 19.2 million people, or 10 percent of the U.S. workforce, now telecommute, supporting the growing residential use of the computers, printers, fax machines, copiers, etc. In fact, 55 percent of all U.S. households now have one or more computers (Parts Associates, Forum99, October 1999), and this is expected to grow further to 75-80 percent within the next 10 years. Just as the minimum conductor size for bathrooms was increased due to the change in the type of appliances used on the bathroom circuit, the minimum conductor size for all branch circuits should be increased to 12 AWG. The increase in minimum size will increase safety by reducing the risk of overloaded circuits and the need to rewire existing circuits to meet the needs of heavily loaded circuits and sensitive electronic equipment. The increase to 12 AWG will decrease the cable impedance which will cause the overcurrent device to operate more quickly for long runs of cable found in larger dwellings. The overcurrent device ampacity is not intended to be changed by this proposal.
 PANEL ACTION: Reject.
 PANEL STATEMENT: See panel statement on Proposal 2-98.
 NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
 VOTE ON PANEL ACTION:
 AFFIRMATIVE: 12

(Log #4130)

2- 100 - (210-11(d) (New)): Reject
 SUBMITTER: David T. Brender, Cooper Development Assn. Inc.
 RECOMMENDATION: Add text to read as follows:
 (d) Commercial Installations. Branch-circuit conductors shall not be smaller than 12 AWG.
 SUBSTANTIATION: The fine print notes let the user know to check the conductor's ampacity rating, temperature limit, and voltage drop. Ampacity rating and temperature limits are addressed in the NEC but are not generally applied. Voltage drop is only addressed through the fine print. As commercial installations continue with an increase in the quantity of electrical equipment and with equipment having increased power consumption and more stringent power quality demands, the risk of overloaded conductors and occurrence of unacceptable circuit voltage drops have dramatically increased. Just as the minimum conductor size for bathrooms was increased due to the change in the type of appliances used on the bathroom circuit, the minimum conductor size for all branch circuits in commercial installations should be increased to 12 AWG. The increase in minimum size will increase safety by reducing the risk of overloaded circuits and the need to rewire existing circuits to meet the needs of heavily loaded circuits, increased harmonic loads and sensitive electronic equipment. As reported in the Eleventh Edition of "Fire in the United States 1987-1996," published by United States Fire Administration National Fire Data Center, the leading causes of 1996 nonresidential structure fires in stores, offices, and basic industry are attributed to electrical distribution. The overcurrent device ampacity is not intended to be changed by this proposal.
 PANEL ACTION: Reject.
 PANEL STATEMENT: See panel statement on Proposal 2-98.
 NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
 VOTE ON PANEL ACTION:
 AFFIRMATIVE: 12

(Log #2032)

2- 101 - (210-12): Reject
 SUBMITTER: David A. Kerr, Jr., Friendsville, PA
 RECOMMENDATION: Delete.
 SUBSTANTIATION: These devices need real-world testing not Greek-alphabet testing. Only sprinklers put fires out.
 PANEL ACTION: Reject.
 PANEL STATEMENT: See panel statement on Proposal 2-106.
 NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
 VOTE ON PANEL ACTION:
 AFFIRMATIVE: 11
 NEGATIVE: 1
 EXPLANATION OF NEGATIVE:
 BROWN: This proposal should be accepted. See my comment on Proposal 2-106.

(Log #2744)

2- 102 - (210-12): Accept in Principle
 Note: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 17 for further consideration in Article 517. This will be considered as a public comment.
 SUBMITTER: A. Dan Chisholm, Healthcare Circuit News
 RECOMMENDATION: Revise as follows:
 (b) Dwelling Unit Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter(s). This requirement shall become effective January 1, 2002.
 (c) Limited Care Facility Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in limited care facility bedrooms shall be protected by an arc-fault circuit interrupter(s).
 SUBSTANTIATION: The 1999 National Electrical Code mandates the protection of the branch circuits that supply the receptacle outlets installed in dwelling unit bedrooms. I can agree that bedroom circuits need to be protected, but I cannot understand the restriction to "receptacle outlets." The objective of the 1999 code change was to increase the fire protection of bedrooms, and in that case all of the bedroom outlets should be protected. Here I note that the code defines an outlet as "A point on the wiring system at which current is taken to supply utilization equipment." Further, utilization equipment is code defined as "Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar outlets."
 I am proposing that the word "receptacle" be deleted from the present code language. This would then mandate protection, for example, of the permanently installed lighting fixture-outlets within a bedroom.
 With respect to my proposed new requirement for AFCI protection of the branch circuits associated with the bedrooms of Limited Care Facilities, I am convinced that these devices will serve a vital fire-protection function. As defined in 517-3, a Limited Care Facility is "A building or part thereof used on a 24-hour basis for the housing of four or more persons who are incapable of self-preservation because of age, physical limitation due to accident or illness, or mental limitations, such as mental retardation/developmental disability, mental illness, or chemical dependency". These facilities, with occupants who are incapable of self preservation, deserve the very finest of fire-mitigating technology. AFCIs, with their demonstrated capability of detecting arcing faults and interrupting these faults, represent such technology and should be mandated for the branch circuits supplying the bedroom outlets of these facilities.
 PANEL ACTION: Accept in Part.
 The panel accepts the deletion of "receptacle" in (b) of the proposal, and rejects the remainder of the proposal.
 PANEL STATEMENT: The limited care facility issue is outside the scope of Code-Making Panel 2 and recommends that the Technical Correlating Committee forward this item to Code-Making Panel 17 for action.
 NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
 VOTE ON PANEL ACTION:
 AFFIRMATIVE: 11
 NEGATIVE: 1
 EXPLANATION OF NEGATIVE:
 BROWN: This "Accepted in Part" proposal, in essence adding supposed AFCI protection for any permanently mounted lighting, should be rejected. During an emergency situation, or nuisance tripping of the AFCI device, one would want this type of area lighting to be available to rectify any problems

(Log #2847)

2- 103 - (210-12): Accept in Principle

Note: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 17 for further consideration in Article 517. This will be considered as a Public Comment.

SUBMITTER: Robert J. Clarey, Cutler-Hammer, Inc.

RECOMMENDATION: Revise text as follows:

(b) Dwelling Unit Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere ~~receptacle~~ outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter(s). This requirement shall become effective January 1, 2002.

(c) Dwelling Unit Living Areas. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in dwelling units living areas shall be protected by an arc-fault circuit interrupter(s).

FPN: A dwelling unit living area is any space, that can be normally occupied, other than bedrooms, bathrooms, toilet compartments, kitchens, closets, halls, storage, garage or utility spaces.

(d) Guest Rooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in guest rooms in hotels, motels, and similar occupancies shall be protected by an arc-fault circuit interrupter(s) in accordance with the requirements for dwelling units in 210-12(b) and 210-12(c).

(e) Limited Care Facility Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in limited care facility bedrooms shall be protected by an arc-fault circuit interrupter(s).

SUBSTANTIATION: The 1999 National Electrical Code mandates the protection of all branch circuits that supply receptacle outlets installed in dwelling unit bedrooms. This Code wording was influenced, in part, by Comments during the 1999 Code Cycle, such as Comment 2-65 (1). That Comment addresses the enhanced safety provided by AFCIs in sleeping and living areas; areas that were identified as being most prone to electrical fires as a result of low voltage arcing. The present proposal is aimed at broadening the protection of AFCIs to the branch circuits supplying all bedroom outlets in dwelling units, in guest rooms and in limited care facilities. It is also aimed at broadening the protection of AFCIs to the branch circuits of living areas in dwelling units and in guest rooms.

During the last Code Cycle, Comment 2-65 was Accepted in Principle, and the present Code text in 210-12 of the 1999 National Electrical Code reflects the Panel Action wording on Comment 2-65. The associated Panel Statement (1) reads:

"The Panel has limited the requirements to dwelling unit bedrooms to permit these new devices to be introduced into the public domain on a gradual basis.

The panel also notes that this does not prohibit their use in other circuits throughout dwelling units. An effective date of January 1, 2002 was established to allow industry to accommodate the new requirement and to allow a transition period".

The substantiation for the present proposal is as follows:

With respect to 210-12(b), the present restriction to bedroom receptacle outlets only partially satisfies the intended protection of the circuits supplying dwelling unit bedrooms. These rooms are also associated with lighting outlets, and the branch circuits supplying these lighting outlets should also be protected. The proposal, therefore, is to delete the word "receptacle" in order to provide AFCI protection to the circuits supplying all bedroom outlets.

With respect to 210-12(c), the proposal is to extend AFCI fire protection to the circuits supplying dwelling unit living areas. This change, in conjunction with 210-12(b), would provide AFCI protection to the circuits supplying outlets in all dwelling unit rooms with the exception of bathrooms, toilet compartments, kitchens, closets, halls, storage, garage or utility spaces.

With respect to 210-12(d), the intent is to extend the enhanced safety benefits of AFCIs in dwelling units to comparable occupancy locations (bedrooms and living areas) in the guest rooms (210-60) of hotels, motels and similar occupancies.

With respect to 210-12(e), the intent is to extend the enhanced safety benefits of AFCIs to the bedrooms of Limited Care Facilities as defined in 517-3. These facilities cater to persons who are incapable of self-preservation or who suffer from some form of mental limitation. These handicaps complicate the rapid exiting of buildings, and fire safety needs to be increased by the addition of AFCIs.

This overall Code proposal is justified on the basis of enhanced safety. The U.S. Consumer Product Safety Commission has published (2), for example, 1996 Residential Fire Loss Estimates.

CPSC provides estimates of the fires losses, in residential structures, for the total electrical distribution system. For 1996 the estimate is 41600 fires, 370 civilian deaths, 1430 civilian injuries, and \$682.5M in property losses. Many of these fires and much of this loss of life could have been prevented by AFCIs. But for AFCIs to be effective, it is necessary to provide arc fault detection and protection to as many dwelling-unit supply-circuits as possible. The Code proposal is also justified by the changes, since the last Code cycle, which demonstrate that industry has indeed accommodated to the new requirements.

First, in February 1999, Underwriters Laboratories published the first Edition of UL 1699 "Arc-Fault Circuit-Interrupters" (3). The branch/feeder AFCIs described in that document are substantially identical to the "AFCIs classified for mitigating the effects of arcing faults" that were available during the 1999 Code cycle, and that were previously described in a draft standard. The branch/feeder AFCIs described in UL 1699 protect the installed wiring, and also provide protection against line to neutral and line to ground arcing faults in the cords connected to the outlets. The existence of this standard, and of the associated branch/feeder products, indicates that the products have matured. Second, many circuit breaker manufacturers now offer combination circuit breakers and branch/feeder AFCIs. Thus AFCI devices are readily available. Third, manufacturers have gained hundreds of millions of operating-hours experience with AFCIs. The consumers have benefited from the enhanced arcing fault protection.

Further, consumers have not experienced "nuisance tripping" due to the false identification of circuit waveforms such as the inrush transients to motors, and the normally occurring arcing waveforms associated with devices such as thermostats, motors, and switches.

Fourth, AFCI manufacturers have made numerous AFCI presentations to fire inspectors, electrical inspectors, and other groups concerned with public safety. This has raised awareness of both the technology and the associated safety potential, and the overwhelming response has been both positive and enthusiastic.

Fifth, in 1999 the Consumer Product Safety Commission has made a brief report (4) entitled "Preventing Home Fires: Arc Fault Circuit Interrupters (AFCIs)". This report includes the statement, "Several years ago, a CPSC study identified arc fault detection as a promising new technology. Since then, CPSC electrical engineers have tested the new AFCIs on the market and found these products to be effective". Thus AFCIs have moved from the conceptual stage, as discussed in the 1995 UL Report for CPSC "Technology for Detecting and Monitoring Conditions that Could Cause Electrical Wiring System Fires" to the practical stage. In particular, AFCIs are available on the market and are effective.

In view of the positive changes that have occurred since the last cycle, and the continuing heavy toll in human lives, in human injury, and in property losses occasioned by electrical distribution fires, the Code Panel is urged to adopt this proposal. The objective is to optimize protection for dwelling unit bedrooms, for dwelling unit living area circuits, for the comparable guest rooms of hotels and motels, and for the bedrooms of limited care facilities.

References:

(1) National Electrical Code Committee Report on Comments, Comment 2-65, pages 99-100, 1998.

(2) "1996 Residential Fire Loss Estimates", U.S. Consumer Product Safety Commission Report, 1998.

(3) "Arc-Fault Circuit-Interrupters", Underwriters Laboratories Inc., UL 1699 Standard for Safety, First Edition, February 26, 1999.

(4) "Preventing Home Fires: AFCIs", Consumer Product Safety Review, Volume 4, #1, page 6, Summer 1999.

Note: Supporting material is available upon request at NFPA Headquarters.

PANEL ACTION: Accept in Part.

The panel accepts the deletion of the term "receptacle" in (b) of the proposal. The panel rejects the remainder of the proposal.

PANEL STATEMENT: The panel rejects the submitter's requested expansion of the AFCIs usage beyond the dwelling unit bedroom circuits.

The panel continues to support the introduction of this product, based on the data received and reviewed on this subject, but believes it is prudent to limit the requirement to bedrooms to gain further experience.

The limited care facility issue is outside the scope of Code-Making Panel 2 and recommends that the Technical Correlating Committee forward this item to Code-Making Panel 17 for action.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

BROWN: See my Explanation of Negative Vote on Proposal 2-102.

COMMENT ON AFFIRMATIVE:

MOORE: The EEI/ELP Group continues to support the introduction of this product, but questions the effectiveness due to the pickup level of the two types of AFIs. The parallel device is tested for a minimum pickup level of 75 amperes and the series device is tested for a minimum pickup of five amperes. The series device would require a five ampere load to be energized during operation. Most bedroom circuits would not have a load of that amplitude, especially while the occupant is asleep. Additional data and further product development is needed prior to extended usage.

NISSEN: The increased use of AFCIs as an effective means of reducing arcing-fault fires should be supported. The gaining of experience with these devices in all bedroom circuits is encouraged so that their usage can be expanded to other rooms and facilities that could benefit by the added protection which they would afford.

(Log #3010)

2- 104 - (210-12): Reject

SUBMITTER: Bernard A. Schwartz, Schwartz Fire Specialists/Rep. Nat'l Multi-Family Housing Council

RECOMMENDATION: Revise as follows:

(b) All branch circuits that supply 125-volt, single phase, 15- and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter(s). This requirement shall become effective January 1, 2002. For purposes of this section, the installation of an arc-fault circuit interrupter at the receptacle with all receptacles in the bedroom supplied through that protected receptacle shall be deemed compliant.

SUBSTANTIATION: The available fire data, as well as 30 years of investigating fires and 15 years with the Consumer Product Safety Commission indicates that statistically valid information regarding electrical fires and their causes is lacking and that the number of fires starting inside the walls, in straight runs of cable is insignificant. This belief is also supported by:

- a. Comments to Log #2276 in 1998 NEC comments
- b. Comments to Log #1820 in 1998 NEC comments
- c. Comments to Log #2525 in 1998 NEC comments
- d. Comments to Log #2524 in 1998 NEC comments
- e. CPSC report dated December 1987 "Residential Electrical Distribution System Fires."

The load center device provides a high level of fault protection for the wires in the wall and a lower level of protection for devices plugged into the receptacle. The receptacle device provides a high level of protection for devices plugged into the receptacle and a lower level of protection for the wiring in the wall. Since neither device is perfect, if one device is to be required, than both devices should be allowed to accumulate field experience to demonstrate which is most effective.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel actions and statements on Proposals 2-108 and 2-110. The panel does not agree that the data submitted for the 1999 NEC did not support the present AFCI requirement for branch circuit wiring.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3145)

2- 105 - (210-12): Reject

SUBMITTER: Brent Nurenberg, Pewamo, Mi

RECOMMENDATION: Delete this section.

SUBSTANTIATION: No accident data was ever presented that justified 210-12 in the NEC. Arc-fault interrupters are expensive, which will lead to wiring methods being altered, resulting in fewer circuits serving bedrooms. I have witnessed a series load arc-fault test which resulted in a fire, without the arc-fault interrupter opening the circuit.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-106.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

BROWN: Please read the substantiation submitted by the submitter. This proposal should be accepted. Also, see my comment on proposal 2-106

(Log #4348)

2- 106 - (210-12): Reject

SUBMITTER: Lawrence Brown, Nat'l Assn. of Home Builders

RECOMMENDATION: Delete Section 210-12 in its entirety.

SUBSTANTIATION: The acceptance of this requirement during the 1999 NEC development cycle was based on a CPSC study that was too limited in the scope of its analysis of losses in residential dwelling environments. Fire damage resulting from arc-fault causes is only a very small percentage of total residential property losses. The data should have included losses from all perils including other causes of fire losses (cooking, arson, etc.) and natural disaster-related damage from wind, earthquake, and flooding. The percentage and actual dollar losses from fires that originates in electrical wiring within the walls is substantially lower than originally perceived. Further, the data did not address the issue of whether the lack of a working smoke alarm contributed to the death.

Also missing is data that relates directly to the year the dwelling was built. This should be shown in relationship to the percentage of related electrical fires from all yearly periods. This directly relates to the wiring methods (open wiring, loom, cloth covered NM Cable) associated with each fire. This also relates to the edition of the building, fire and electrical codes in force at that time. Complete data would show that the Nonmetallic Sheathed Cable within the walls of buildings constructed to today's standards and codes is extremely low compared to the type of electrical wiring installed ten or twenty years ago. It would seem from the proposals submitted during the 1999 cycle that all of the electrical wiring materials manufactured, sold and installed today is defective. This is not true.

Another basic problem is that the technology used for the AFCI breaker will only detect an arc in the wiring up to, and possibly including the receptacle. The receptacle and any equipment plugged into the receptacle are unprotected by the breaker. The installation of an AFCI breaker seems to be only a partial fix to a very small percentage of all residential fires. With this requirement being applied only to bedrooms, the percentage is even smaller.

The cost-benefit to society of installing these breakers should also be considered. The committee was told these breakers would cost the same as a GFCI breaker. This is not true. The wholesale cost is approximately \$85.00. It may be that society ends up spending \$5.00 to save \$1.00. Society may be better served, and save more lives, if this money was spent to upgrade smoke alarms in all existing dwellings.

All told, there are many problems with this new requirement. Incomplete and inaccurate data should not be the basis for an NEC code change. Before complete and accurate data is analyzed, and the electrical manufacturing industry addresses all of the technical problems to produce a more complete device, this requirement should be removed from the NEC.

PANEL ACTION: Reject.

PANEL STATEMENT: AFCIs Listed to UL 1699 are available, and the standard addresses efficacy, unwanted (nuisance) operation and operation inhibition. Cost should not be an issue for the panel to resolve. The panel reviewed a large amount of data, heard presentations on various positions on AFCIs, and received public comment on the topic. Upon that review, the panel arrived at the requirements in the 1999 NEC and continues to support that established position.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

BROWN: This proposal should be accepted. Wrong. It was wrong for the Panel to accept this requirement during the 1999 NEC ROC. To have a better understanding of the many basic problems, you need to read the negative comments on the original proposal. These can be found on pages 111 through 116 of the 1998 Annual Meeting, National Electrical Code Committee Report on Proposals.

These comments, pointing out the fundamental problems with the device, still hold truth today. The standard by which they are developed and tested, the CPSC and other studies used by the proponents to force this product into the NEC are still of concern. Though, most important is the fact that this device will NOT solve the problems the manufacturer's stated was the real intent of pushing these devices into the marketplace through a mandate in the NEC.

It was the engineer from Underwriters Laboratories who showed the panel the basic technical problems with the device. It will not be able to detect all arcs that may produce a fire. Asked if the device will detect and trip all arcs between the breaker and the first outlet the answer was NO! The same held true for the area of the device,

the area from the device to the appliance, and of the appliance itself. Asked what percentage of arcs may be detected, and the answer is they do not know.

This could partly be caused by the inability for manufacturers to produce a product that solves all of the problems as shown in the UL study performed for CPSC. UL developed 14 test methods for the devices to pass to be reliable. These tests were developed based on identifiable causes of residential electrical wiring fires. The UL standard used to manufacture and test this product is only over a year old. It was rushed through development only to satisfy the needs of the manufacturers as it relates to their specific product. As it turns out, the devices can pass only 4 of the tests. Not the full 14 test methods needed for this product to protect residential occupancies as outlined in the UL-CPSC study. More to the point, the tests only use nonmetallic sheathed cable with a grounding conductor. Not the common single conductor concealed wiring method installed on older dwellings.

Another problem with the CPSC study is the inability of the data to accurately ascertain the specific area of origin of the electrical fire. The study also did not indicate the actual type of wiring method, or the age of the dwelling. If all of this information is known, it would better indicate where the real problem exists. It would be hard to believe that the nonmetallic sheathed cable - ROMEX - being installed today is the overwhelming cause of residential electrical fires. The CPSC study did reach the conclusion that further testing needed to be performed. So we now have a mandate for a product that is unreliable in its ability to protect.

The high cost of this product is also a concern. The manufacturers repeatedly stated at the ROC meeting that the cost of this product would be the same as a GFCI device. This is not true. The manufacturer's catalog lists the devices at around \$160.00 each. A check of the wholesale price was approximately \$95.00.

So now we have an unreliable product at a high price.

Then we have the manufacturers statements on losses due to concealed electrical wiring. Square-D in their product brochure states "CPSC estimates electrical equipment causes 155,100 or 34 percent of the 451,000 fires in residential structures." This is very misleading. Using current NFPA estimates based in the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS), the total residential fire losses due to all electrical causes is only 13.75 percent of the total residential fire losses. Now, using the same data, the losses due to electrical wiring within the walls is only 5.49 percent of the total residential fire losses. This is not the 34 percent insinuated by the manufacturers.

Now, we have an unreliable product, at a very high price compared to the losses it may save.

Using the NFPA data and the 1999 NEC requirements, if the devices were 100 percent reliable, consumers will spend \$240,000,000 to cover losses of only \$30,900,000. Well over seven (7) times the total losses. If this product is expanded to include all circuits in a dwelling, the public would spend over \$2,400,000,000 to prevent losses of \$253,600,000. This is approximately 9.5 times the actual loss. And, this is based on 100 percent effectiveness. As noted, above, UL cannot determine the effectiveness of the product. Even more disturbing is a recently published article by UL stating property losses of over \$1.5 billion. From the standpoint of cost-effective regulatory mandates, the requirement in the NEC for this product is unacceptable.

This whole situation reminds one of the mandates for CO detectors. All studies have shown the location for installation of the detector to be reliably effective cannot be determined. Furthermore, there are numerous problems with the technology and the manufacturing of the detector. Recalls and public announcements as to the problems are constant. It may be partly due to a rush by manufacturers to get the detectors into the marketplace.

The AFCI is also a product that is untested in relationship to the actual problem that may exist, or its ability to effectively control them. Until a more complete study of the actual causes of residential electrical fire is available, and a product can be developed to meet those needs, mandates for AFCIs should not be included in the NEC. Society should not be mandated to spend 10-20 times the amount of money that may be saved without a solid basis for the expense.

(Log #2881)

2- 107 - (210-12(a)): Reject

Note: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 3-124. This action will be considered by the Panel as a Public Comment.

SUBMITTER: Robert R. Kent, Electrical Contracting, Inc.

RECOMMENDATION: Remove the definition of arc-fault circuit interrupter from this section and put it in Article 100 DEFINITIONS.

SUBSTANTIATION: This definition should be in Article 100. As I understand, the thought behind the many changes in the '99 NEC was to make it more user friendly. This then would also be a step to help in that direction.

PANEL ACTION: Reject.

PANEL STATEMENT: Based on the NEC Style Manual 2.2.2.1, the definition of AFCI should not be included in Article 100, unless the term is used in more than one article.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3308)

2- 108 - (210-12(a) and (b)): Reject

SUBMITTER: Jack Wells, Pass & Seymour/Legrand

RECOMMENDATION: Revise to read as follows:

210-12. Arc-Fault Protection.

(a) Definition. An arc-fault circuit-interrupter is a device intended to provide protection from the effects of arc faults by recognizing characteristics unique to hazardous arcing and by functioning to deenergize the circuit when an arc fault is detected. An arc fault that occurs between the line and neutral or the line and ground conductors is a parallel arc fault. An arc fault that occurs in a single conductor, either line or neutral, is a series arc.

(b) Dwelling Unit Bedrooms. Arc-fault circuit-interrupter(s) shall provide protection for dwelling unit bedrooms as specified in either (1) or (2).

(1) All branch circuits that supply 125-volt single phase, 15 and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by arc-fault circuit-interrupter(s) installed in the panelboard at the origin of the branch circuit. The arc-fault circuit-interrupter shall provide arc fault protection for the branch circuit wiring.

(2) All 125-volt, single phase, 15- and 20-ampere receptacles in dwelling unit bedrooms shall be protected by a receptacle type combination arc-fault circuit-interrupter installed as the first receptacle in all branch circuits serving dwelling unit bedroom receptacles. The receptacle type combination arc-fault circuit-interrupter shall provide series arc fault protection for the branch wiring and the extension wiring on the line and load side of the receptacle and parallel arc fault protection for the branch circuit wiring and the extension wiring on the load side of the receptacle for all 125-volt single phase, 15- and 20-ampere receptacles in dwelling unit bedrooms.

SUBSTANTIATION:

° Section 210-12(b) in the 1999 NEC requires protection of only the circuit conductors between the final overcurrent device and the outlet. This section states that branch circuits dwelling unit bedroom receptacles shall be protected by arc-fault circuit-interrupters. Branch circuits are defined in Article 100 as "The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s)."

° Since the adoption of this requirement, two significant events have occurred.

1. UL 1699 covering AFCIs has been finalized and published. This standard establishes several different types of AFCIs that provide differing levels of arc fault protection for different types of arc faults.

2. A new type of receptacle arc-fault circuit-interrupter has been developed. This device is listed by UL as a combination arc-fault circuit-interrupter embodied in an outlet receptacle type device.

° As a consequence of these developments not contemplated by CMP 2 during the initial deliberation concerning AFCIs, the current requirement needs to be revised to recognize the various types of AFCIs.

° The addition of the definition of series and parallel arcs will assist users in understanding the type of arc fault that may occur and provide a basis for understanding of the application of various types of AFCIs.

° The following are definitions of permanently wired arc fault circuit-interrupters that appear in UL 1699:

Branch/Feeder Arc Fault Circuit Interrupter. A device intended to be installed at the origin of a branch circuit or feeder, such as a panelboard. It is intended to provide protection of the branch circuit wiring the feeder wiring, or both, against unwanted effects of arcing. This device also provides limited protection to branch circuit extension wiring. It may be a circuit-breaker type device or a device in its own enclosure mounted at or near a panelboard.

Outlet Circuit Arc-Fault Circuit-Interrupter - A device intended to be installed at a branch circuit outlet, such as at an outlet box. It is intended to provide protection of cord sets and power supply cords connected to it (when provided with receptacle outlets) against the unwanted effects of arcing. This device may provide feed through protection of the cord sets and power supply cords connected to downstream receptacles.

Combination Arc-Fault Circuit Interrupter - An AFCI which complies with the requirements for both branch/feeder and outlet circuit AFCIs. It is intended to protect downstream branch wiring and cord sets and power supply cords.

The following table is an excerpt from Table 50.2 in UL 1699. It shows the arc fault test requirements that permanently wired AFCIs are required to meet.

Tests	Branch Feeder AFCI	Combination AFCI	Outlet Circuit AFCI	
			w/Feed	w/o Feed
(a) Carbonized Path Arc Ignition NM-B Insulation Cut	X	X		
(b) Carbonized Path Arc Interruption Test SPT-2 Insulation Cut NM-B Insulation Cut	X X	X X	X	
(c) Carbonized Path Arc Clearing Time Test SPT-2 Insulation Cut		X	X	X
(d) Point Contact Arc Test SPT-W Insulation Cut NM-B Insulation Cut	X X	X X		X

It is important to recognize the type of arc fault each of these test represent in order to understand the level of protection provided by different types of AFCI.

The carbonized path arc ignition test (a) is test for detection of a series arc. This test represents an arc fault in a single conductor of a 3-conductor NM-B cable. The time to clear the arc fault is not specified. The cable used as test sample is wrapped with tape in the area where the arc occurs. The taped area is loosely wrapped with a cotton indicator. The AFCI must clear the fault before a cotton indicator ignites. In the case of a branch/feeder AFCI which may only detect parallel faults, this test is likely to be satisfactorily complied with because the series fault quickly develops into a parallel fault to the equipment grounding conductor. In the case of the combination and outlet circuit AFCI, the fault is detected as a series fault.

The carbonized path arc clearing time test (c) is also a test for detection of a series arc. However, this test represents an arc fault in a single conductor of a 2-conductor SPT-2 cord. The AFCI must clear the arc fault in 1 second or less. A branch/feeder AFCI is not required to provide protection for this type of fault.

Both the carbonized path arc interruption test (b) and the point contact arc test (d) are intended to detect parallel arcs. Although the arcing paths are created by a different methods for each test, both tests create a condition of arcing between two conductors of either a 3-conductor NM-B cable or a 2-conductor SPT-2 cord. In both tests the AFCI must clear the arc fault within 8 half cycles of arcing that occur within a period of 0.5 seconds.

An issue not directly addressed in the UL standard is series type arcing faults that may occur at loose binding screw terminals, push-in terminals, twist-on wire connectors and similar terminations in the fixed branch circuit wiring. An roc that occurs at this type of termination will appear to an AFCI as very similar to a series arc fault in a single conductor. The closest related case to a termination type of arc fault in the UL test table is the carbonized path arc clearing time test (c) which is used to detect a series arc in a single conductor of an SPT-cord. A combination AFCI and outlet circuit AFCI are subjected to this test but a branch/feeder AFCI is not. These two arcing conductors are closely related because an arc fault in single conductor occurring either in a cord, or at a terminal, occurs at a location where the arc cannot easily develop into a ground fault or into a parallel arc to another conductor. The ignition of combustible material in close proximity will likely occur by the time this type of series arc

progresses to a parallel arc or a ground fault. Consequently, the UL test that requires clearing the series arc fault in 1 second or less is critical in preventing the development of a fire hazard created by allowing the series arc to progress to either a parallel arc or a ground fault.

Detection of series type arc faults at terminations by the receptacle type combination AFCI is an important features that must not be overlooked when specifying an AFCI for arc fault protection. This proposal permits selection of a receptacle type combination AFCI that provide this type of series arc fault protection.

It is evident from the test table that the different types of AFCIs provide different levels and types of arc fault protection. For example, the branch/feeder AFCI is not required to provide series arc fault protection for SPT-2 cords although parallel arc fault protection for an SPT-2 cord must be provided. Likewise, a branch/feeder AFCI in UL 1699 states that this device provides only "limited protection" of branch circuit extension wiring such as extension cords ad power supply cords.

The levels of protection provided by different types of AFCIs must be considered when selecting a device to provide arc fault protection.

Section 210-12(b) in the 1999 NEC requires protection of the branch circuit conductors from the final overcurrent device to the outlet. This protection is most likely to be provided by the installation of the branch/feeder AFCI at the panelboard. Although the branch-feeder AFCI provides protection for the branch circuit conductors and "limited protection" for parallel arc faults in cords, the UL test program does not require this type of AFCI to protect against a series arc fault in a 2-conductor extension or power supply cord used to connect a load to the branch circuit.

There are many loads used in dwelling unit bedrooms and other rooms in a home that are cord connected to the branch circuit. Some of these loads such as clothes irons, space heaters, and multiple loads on extension cords can create a serious arcing hazard when connected to the branch circuit by a extension or power supply cord that has a damaged single conductor. The damaged single conductor in the cord used with these types of loads can easily develop into arc fault condition that must be cleared quickly before it becomes fire hazard.

One result of this proposal is to permit selection of an AFCI that provides protection for a series arc in a 2-conductor cord.

The arc fault tests in UL 16999 have been developed to demonstrate the ability of an AFCI to detect an arc fault on the downstream side of the AFCI. However, the nature of series arcs and the technology used in the design of the UL listed receptacle type combination AFCI results in the ability of this type of AFCI to clear series arc both on the upstream and downstream side of the AFCI. Thus, the receptacle type combination AFCI provides series arc fault protection for the fixed branch circuit wiring from the panelboard to the outlet as well as series and parallel arc fault protection on the load side of the AFCI for the fixed branch circuit wiring, extension cords and power supply cords.

This proposal provides the option of installing either a receptacle type combination AFCI or a branch/feeder AFCI. Both of these products offer effective arc fault protection. The NEC should be revised to permit the installation of either product.

PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-110.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 10
NEGATIVE: 2

EXPLANATION OF NEGATIVE:

MERICLE: I vote no on the Panel Action. There exists a wealth of testing data which attests to the effectiveness of these devices in helping to prevent fires.

NISSEN: The concept present in this proposal should be accepted. The submitter has not suggested expanding AFCIs beyond the bedroom branch circuits. The substantiation addresses an alternate method of protecting bedroom circuits with a combination type AFCI. See also my comment on Proposal 2-110.

(Log #2262)

2- 110 - (210-12(b)): Accept in Part

SUBMITTER: Steve Campolo, Leviton Manufacturing Co., Inc.

RECOMMENDATION: Revise text as follows:

210-12(b) Dwelling Unit Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by a Branch/Feeder arc-fault circuit interrupter(s). All 125-volt, single-phase, 15- and 20-ampere receptacles in dwelling unit bedrooms shall be protected by an Outlet/Circuit arc-fault circuit interrupter(s). ~~This requirement shall become effective January 1, 2002.~~

SUBSTANTIATION: Article 100 defines the branch circuit as "The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s)." Applying this definition to Section 210-12(b) of the NEC and the definitions of UL 1699 results in a requirement that provides arc fault protection only for the fixed wiring from the overcurrent device to the receptacle outlet. This indicates that branch circuit extensions may remain unprotected. Expanding the requirement to provide arc fault protection for the receptacles and the wiring extending from the receptacles (e.g., extension cords and power supply cords) greatly increases the level of safety afforded by AFCIs. In fact, it may be argued that exposed extension cords and power supply cords are subject to considerably greater abuse than fixed wiring and are more susceptible to abuse resulting in an arcing condition.

Underwriters Laboratories Inc. issued the first edition of UL 1699, UL Standard for Safety for Arc-Fault Circuit-Interrupters, on February 26, 1999. This standard defines different types of arc-fault circuit-interrupters. The definitions include the following:

A Branch/Feeder AFCI "...is intended to provide protection of the branch circuit wiring, feeder wiring, or both, against the unwanted effects of arcing. This device also provides limited protection to branch circuit extension wiring." Simply, a Branch/Feeder AFCI is not required to offer low current arcing fault protection for branch extensions.

An Outlet Circuit AFCI "...is intended to provide protection of cord sets and power-supply cords connected to it (when provided with receptacle outlets) against the unwanted effects of arcing."

UL has indicated that a coordinated system of protection should emerge where combinations of the various types of AFCIs are used to increase the likelihood of the greatest possible degree of overall protection. This perspective is reinforced by the definitions of various types of AFCIs contained in UL 1699, which explains several different types of AFCIs.

It is apparent that the UL standard considers arc fault protection is important for both the fixed wiring of the branch circuit and the branch circuit extension wiring (Power Supply and Extension Cords). Based on the AFCIs that are defined in UL 1699, a complete system of arc fault protection may be provided by installing a Branch/Feeder AFCI in the panelboard and an Outlet Circuit AFCI at the receptacle. The branch is protected as well as branch extensions.

Adopting the proposed revision to 210-12(b) will result in a system that provides complete arc fault protection for both the fixed wiring and the branch circuit extension conductors by requiring installation of a coordinated system of AFCIs.

PANEL ACTION: Accept in Part.

The panel accepts the deletion of the last sentence in the proposal, and rejects the remainder of the proposal.

PANEL STATEMENT: The panel rejects the expansion of AFCIs beyond the bedroom branch circuits at this time. The panel continues to support the introduction of AFCIs, but intends at this time to limit the requirement to bedroom branch circuits until further data can be obtained and evaluated.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 10

NEGATIVE: 2

EXPLANATION OF NEGATIVE:

NISSEN: The submitter has provided adequate substantiation for the need for both branch/feeder and outlet circuit AFCI protection I dwelling unit bedrooms, and that concept should be accepted.

PAULEY: NEMA supports the increase in protection that could be afforded by the addition of the outlet AFCI to Section 210-12. This addition would provide increased protection of cords and appliances connected to receptacle circuits and would enhance safety.

(Log #2102)

2- 109 - (210-12(b)): Reject

SUBMITTER: Chip Pudims, Hubbell Inc.

RECOMMENDATION: Revise text to read as follows:

Dwelling Unit Bedrooms.

(1) All branch circuits that supply 125-volt, single-phase, 15 and 20-ampere outlets installed in dwelling unit bedrooms shall be protected by a Branch/Feeder arc-fault circuit interrupter(s).

(2) All 125-volt, single-phase, 15 and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by an Outlet/Circuit arc-fault circuit interrupter(s).

Exception: A combination unit shall be permitted to provide both Branch/Feeder and Outlet/Circuit arc-fault protection required by (1) and (2) above.

SUBSTANTIATION: Existing Code requires arc-fault protection solely for branch-feeder circuits and does not require protection for extension or power-supply cords. Independent studies have cited extension wiring as potentially significant sources of residential electrical fires, that result from arc-faults. Extension and power-supply cords are more susceptible to abuse than branch circuit wiring and can be of far less robust construction; such as 18 AWG SPT flexible cord (i.e., zip cord). Additional requirements will provide a significant increase in the level of safety.

UL 1699 identifies different levels of protection for "branch/feeder" vs. "outlet" type arc-fault circuit-interrupters and "expects a coordinated system of protection". By definition UL recognizes Branch/Feeder AFCIs provide "limited" protection to extension wiring, while Outlet AFCIs are intended to protect "cord sets and power supply cords". Branch/Feeder AFCIs do not protect against series arcs in extension wiring and series arcs are likely to occur because they only require a single break in the wire. UL 1699 requires different levels of performance testing for each type of protection and allows for a "combination" AFCI if all elements of the coordinated system are met.

As of submittal of this proposal, Outlet AFCIs, Listed to UL 1699, are not available, but are being developed and will become available by the NEC effective date of January 1, 2002. In the interest of safety, NEC Section 90-4 specifically permits "new products, constructions, or materials that may not yet be available at the time the Code is adopted." In the interim, Section 90-4 allows the enforcement of previous adopted editions of the Code. The 1984 NEC Handbook rationalizes Section 90-4 because of the greater than 2 year time lag between proposal and adoption of the Code. This Code proposal provides for an increased degree of safety in dwelling unit bedrooms, due to the additional protection for extension and power-supply cords.

The submitter requests the opportunity to present this proposal and any advances in Outlet/Circuit AFCI technology, that may occur in the next few months, to the CMP at the January 2000 meeting.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 2-110.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 9

NEGATIVE: 3

EXPLANATION OF NEGATIVE:

MERICLE: See my Explanation of Negative Vote on Proposal 2-108.

NISSEN: See my Explanation of Negative Vote on Proposals 2-108 and 2-110.

PAULEY: See my Explanation of Negative Vote on Proposal 2-110.

(Log #2745)

2- 111 - (210-12(b)): Reject

SUBMITTER: George D. Gregory, Square D Company

RECOMMENDATION: Revise as follows:

(b) Dwelling Unit Bedrooms. All 15- and 20-ampere, 125-volt, single-phase branch circuits that supply bedrooms shall be protected by a branch/feeder arc-fault circuit interrupter(s). Bedroom receptacle outlet circuits shall additionally have outlet circuit arc-fault circuit interrupter protection.

SUBSTANTIATION: This proposal is intended to accomplish four items:

1. Delete the effective date of January 1, 2002 since it will be redundant with the 2002 edition of the NEC.
2. Add protection at the branch for all 15- and 20-ampere circuits feeding bedrooms, not only receptacle outlets. This will add for protection for lighting circuits.
3. Clarify that protection is "branch/feeder" protection in correlation with the product listing.
4. Add a requirement for specific "outlet circuit" protection of receptacle outlets.

Regarding item 2, AFCI protection of lighting circuits or other dedicated circuits is needed since numbers of residential fires are initiated in lighting circuits. In fact, arcing faults can occur in any circuit.

Regarding item 3, the name branch/feeder AFCI was assigned to the device intended to protect branch or feeder circuits under the new UL 1699, Standard for Safety for Arc-Fault Circuit Interrupters.

Regarding item 4, the new UL 1669 Standard also identifies an outlet circuit AFCI that will add protection specific to protection of receptacle loads. The proposer recognizes that protection at the branch will provide protection against arcing causes of fires in fixed wiring system and considerable protection against such causes in cords and appliances. Outlet circuit protection can enhance the degree of protection.

What's New

Since Section 210-12 was added in the 1999 NEC, three significant things have occurred:

- UL 1699, Underwriters Laboratories, Inc. Standard for Safety for Arc-Fault Circuit Interrupters, dated 2/26/99, was published.
- AFCI products of at least three major manufacturers have been continuously available commercially in circuit breaker form.
- Circuit breaker AFCIs of at least three manufacturers have been listed under UL 1699 as "Branch/Feeder AFCIs", intended for installation at branch circuits. Original products were classified by UL to an outline of investigation in the form of a proposed standard.

AFCIs have been installed in a number of homes since they were commercially introduced in 1997 as UL Classified products. There have been no reports of nuisance operation or fires of electrical origin in the homes in which they have been installed, to the knowledge of the proposer's employer. There have been testimonies of a number of users to their effectiveness in clearing hazardous circuit conditions and leading to corrections.

Electrical Fire Cause Reports

A report titled, "The U.S. Fire Problem Overview Report" dated March 1998 and published by NFPA discloses that there were 39,400 fires in residences caused by the electrical distribution system as an annual average in the period 1991-1995. [1] These fires are associated with 350 annual civilian deaths. Another 30,700 fires are caused by appliance operation in residences. Of these appliance-related fires, over 40 percent are from heat developed in electric dryers and are not from electrical causes directly. Of the remaining 60 percent, some portion of causes would be detected by the circuit breaker AFCI.

Of the 39,400 fires attributed to the distribution system, 36 percent are in fixed wiring, 18 percent are in cords and plugs, 11 percent are in switches or receptacle outlets, 11 percent are in lighting fixtures, according to the NFPA report. This data breakdown is corroborated by a report published in the January 1990 Fire Journal titled, "What Causes Wiring Fires in Residences" by Smith and McCoskrie of CPSC. [2] That report studied 149 fires in detail and found initial causes: 34 percent in fixed wiring, 19 percent in cords and plugs, 19 percent in switches and outlets, and 13 percent in lighting fixtures. In either set of data, over 60 percent of fires are from causes in the fixed wiring, switches, receptacle outlets and lighting fixtures that are part of the fixed electrical system of a residence.

In summarizing the above paragraphs, over 60 percent of fires attributed to the distribution system are in the fixed wiring system. Combining the distribution system and appliance related fires, over 35 percent of the total is in the fixed wiring system. This data

soundly supports the present NEC language that requires AFCI protection at the branch.

Dwelling Rooms Affected

Fires from electrical causes originate in every room in residences. The three areas of most frequent origin, according to the National Fire Institute Reporting System (NFIRs) database for all recent years, are kitchens, bedrooms and living areas. Following these areas in frequency of fire origin are the unimproved areas such as attics, basements and crawl spaces. A convenient, but somewhat dated, breakdown of supporting data appears on page 11 of "CPSC Residential Electrical Distribution System Fires" report dated December 1987 by Smith and McCoskrie. [3] A more recent corroboration appears in "The U.S. Fire Problem Overview Report." [1]

This proposer understands that AFCI protection is needed for nearly all circuits in residences and not just those to bedroom circuits. However, this proposal suggests that the NEC continue to hold with the Panel's intent to initiate this section with protection of one of the most vulnerable locations in a residence, the bedroom. This action will permit an orderly introduction of a new product to the industry. With testimonials of protection already received, we can expect that justification for protection in other areas of residences will naturally follow.

Arcing Faults Cause Fires

Electric arcs can and do occur in damaged or uninsulated conductors from line to neutral, line to ground or within a single broken or separated conductor in series with a load. Electric arcs operate at temperatures of between 5,000 and 15,000°F and expel small particles of molten or burning materials from the center. An arc is clearly capable of igniting nearby materials, including electrical insulation, if it persists. The AFCI removes the potential cause of ignition by opening the arcing circuit within the parameters of the standard, greatly reducing the probability of fire from an electric arc.

Higher current arcs are more likely to cause a fire because of the higher energy in the arc disturbance. Greater current will melt more of the conductor metal and therefore expel more molten particles. The volume of hot, ionized gas emitted increases proportionally with energy. The branch/feeder AFCI in circuit breaker form is specifically oriented toward detecting these higher current arcs above 75 amperes and line-to-ground arcs of current levels from 5 amperes and greater under UL 1699. Commercially available B/F AFCIs will detect line-to-ground arcs of 30 milliamperes and above.

Discussion may point out that fires can be started by series arcs at lower current values, such as 5 amperes and even below. Research done by UL during the development of the standard revealed fire causes at 5 amperes and above under repeatable conditions. Following that research, it was demonstrated that arcs could cause fires with lower current arcs down to 1 ampere and possibly below. However, conditions that allow arc initiation to cause fire for the lower current arcs are difficult to establish.

AFCI Product Standard

The UL 1699 Standard requires testing of the AFCI through a rigorous set of tests for arc detection ability, unwanted operation tests (to avoid nuisance operation), and operation inhibition tests. The operation inhibition tests assure that the AFCI will detect an arc even though it may be connected electrically in series or parallel with loads that might attenuate, mask or otherwise tend to hide the arc signal.

Prior to the development of the AFCI Standard and before products were offered commercially, Square D Company conducted research to learn what arcing conditions cause fires. A part of that research involved collection of evidence from fires to which municipal fire fighters were called. Other evidence was collected from homes of Square D employees. Some of that evidence is discussed in an article published in the November 1997 EC&M Magazine. [4] The research disclosed a number of occurrences involving either short circuit (line-to-neutral faults) or arcing ground faults. The results of this internal research guided our decisions regarding input to the development of UL 1699 and to the development of a product that will address the kind of occurrences we found in the field.

An AFCI must detect potentially hazardous arcing conditions and open to deenergize the hazard. It must also distinguish between normal energy and potentially hazardous energy. One method of distinguishing normal from hazardous conditions is by recognition of arcing characteristics in the electrical signal. A brief review of this approach is discussed in an IEEE paper titled "The Arc-Fault Circuit Interrupter: An Emerging Product." [5] This paper also clarifies that two primary methods of arc initiation are addressed in standardized testing. The first method is carbonized path arcing in which carbon tracking supports lower energy arcs and leads to pyrolyzation or

organic materials in the arc path. The second method is the short circuit such as might be caused by insulation damage.

Branch/Feeder and Outlet Circuit AFCIs

An AFCI intended for branch circuit application is called by UL 1699 a branch/feeder AFCI. The circuit breaker version is the only presently available form of the branch/feeder AFCI. The standard states that the branch/feeder AFCI "is intended to provide protection of the branch circuit wiring, feeder wiring, or both, against unwanted effects of arcing. This device also provides limited protection to branch circuit extension wiring." The branch/feeder AFCI provides full short circuit and ground-fault arc detection for all 2-wire cords and circuits as well as cords and circuits with a grounding conductor. However, it is not required to provide low-level series arc-fault protection that is desirable for 2-wire cords without a grounding conductor. It is therefore considered to provide limited protection of extension wiring.

The 2-wire protection does not seem so limited when we consider this fact from "The U.S. Home Product Report, 1992-1996 (Appliances and Equipment)" by Kimberly Rohr of NFPA. [6] On page 7, it clarifies that "The leading cause of cord and plug fires was short circuits and ground faults, which accounted for half or more of these fires, injuries and direct property damage. Fires caused by short circuits and ground faults also accounted for 38 percent of civilian fire deaths." The Branch/Feeder AFCIs are intended and tested for detecting these arcing short circuits and ground faults. That degree of protection extends to cords and plugs and appliances.

The UL 1699 Standard for AFCIs identifies an outlet circuit AFCI (outlet receptacle form) in addition to the branch/feeder AFCI (circuit breaker form). The two types are tested differently. Outlet circuit AFCIs are tested to detect low-level faults between 5 and 30 A such as might be found in series arcs. The branch/feeder AFCI is not tested for the low-level arcs in series with a load. On the other hand, the branch/feeder AFCI is tested with construction cable and wire in addition to cords. Outlet circuit AFCIs are not tested with building wire and cable. Having both devices in a circuit would provide protection for the greatest number of conditions. However, if one device were chosen, it must be the branch/feeder AFCI for the following reasons.

- The branch/feeder AFCI protects the fixed wiring system where the greatest numbers of fires from electrical causes originate.
- The branch/feeder AFCI provides good protection against effects of short-circuit and ground-fault arcing in extension and appliance wiring, though protection is considered limited because it is not required to detect series arcs at lower levels.
- The branch/feeder AFCI has been available for several years from three manufacturers and has exhibited good field experience.

Testimonials

1. An engineer employed by Underwriters Laboratories had circuit breaker AFCIs installed in a number of circuits in his house. When energized after installation, two of them tripped open. On the first, he unplugged all appliances connected to the circuit and then turned the AFCI on. He found a damaged lamp with line-to-ground arc that caused the AFCI to trip. On the second, he replaced the AFCI after unplugging all appliances and repeated attempts to energize it, unsuccessfully. The replacement AFCI also tripped open. After further examination of the circuit, he found a poor connection to an outlet receptacle to which the wire insulation had burnt back from the connection. After repairing it, the AFCI was energized successfully.

2. AFCI circuit breakers were installed in a number of houses in Florida near the Gulf coast in 1998. After installation, only two of these units tripped. In both cases, damage to conductor insulation was found to be the cause of low-level faults that were detected.

3. After AFCI circuit breakers were made commercially available, they were installed in a number of circuits in Square D plants. In one plant an appliance was pushed against its plug, damaging the plug. The AFCI tripped to protect the circuit. When the plug was examined afterward, it was found that the grounding pin connection had been twisted toward the line connection inside the plug housing and that arcing from line to ground had occurred. A second appliance had been jarred in the same situation. After a period of days the AFCI tripped again. No damage was apparent so the AFCI circuit breaker was turned on again to restore power. It was tripped again and was reset several times before the cause was located and corrected. The cause was an intermittent arc from line to ground within the second appliance. This second arcing condition was increasing in continuity as the arcing path became carbonized.

4. Since its commercial introduction, the AFCI circuit breaker has gained considerable respect. In the State of Vermont, an amendment to Section 210-12(b) was adopted to add branch AFCI

protection for outlet receptacles in both living areas and bedrooms. Their effective date is January 2001 rather than 2002.

References

[1] John R. Hall, Jr., The U.S. Fire Problem Overview Report, National Fire Protection Association, March 1998, pages 66-88 relating to causes of home fires.

[2] Linda E. Smith and Dennis McCoskrie, "What Causes Wiring Fires in Residences?" Fire Journal, January 1990.

[3] Linda Smith and Dennis McCoskrie, Residential Electrical Distribution System Fires, U.S. Consumer Product Safety Commission, December 1987, the executive summary and page 11.

[4] George D. Gregory, "Using Arc-Fault Circuit Interrupters to Reduce Residential Fires," EC&M Magazine, November 1997.

[5] George D. Gregory and Gary W. Scott, "The Arc-Fault Circuit Interrupter, An Emerging Product," IEEE Transactions on Industry Applications, September/October 1998, pp. 928-933.

[6] Kimberly Rohr, The U.S. Home Product Report, 1992-1996 (Appliances and Equipment), NFPA, February 1999, pages 4 through 9.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 2-110.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 10

NEGATIVE: 2

EXPLANATION OF NEGATIVE:

NISSEN: See my Explanation of Negative on Proposal 2-110.

PAULEY: See my Explanation of Negative Vote on Proposal 2-110.

(Log #2816)

2-112 - (210-12(b) and (c)): Accept in Part

SUBMITTER: Harvey E. Johnson, Estero, FL

RECOMMENDATION: Revise text as follows:

(b) Dwelling Unit Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter(s). This requirement shall become effective January 1, 2002.

(c) Dwelling Unit Living Areas. All branch circuits that supply 125-volt, single-phase 15- and 20-ampere outlets installed in dwelling unit living areas shall be protected by an arc-fault circuit interrupter(s).

FPN. A living area is any normally occupiable space in a residential occupancy, other than sleeping rooms or rooms that are intended for combination sleeping/living, bathrooms, toilet compartments, kitchens, closets, halls, storage or utility spaces and similar areas.

SUBSTANTIATION: During the past year I have visited many Electrical Shows and Inspector Meetings around the country. One technology that has created a great deal of interest is the Arc Fault Circuit Interrupter which has been demonstrated at many of these events by several manufacturers. The overwhelming response has been positive, and the most frequently asked question has been "Why does the Code only limit the technology to bedroom outlets?" In fact, most people consider that AFCIs should be used on all dwelling circuits.

At this time I am proposing that the circuits to all bedroom outlets be protected by AFCIs. It is difficult enough to explain to people why only bedrooms are protected without attempting to explain the further limitation to receptacle outlets. This can be resolved by removing the word "receptacle". AFCIs would then provide protection to all of the branch circuits which supply bedroom outlets, including the lighting outlets. Here I note that the AFCI protection is not limited solely to the branch circuit wiring, but AFCIs in the branch circuit also provide enhanced protection to the cords attached to the outlets.

With respect to my proposed application of AFCIs to the protection of branch circuit receptacles associated with living areas, I am responding to the question, raised at Electrical Shows and Inspector Meetings, "Why only bedrooms?" During the last Code cycle, the Code Making Panel was interested in the gradual introduction of the AFCI technology. However, during the past several years many manufacturers have introduced UL listed product, UL has issued a standard, there is increased customer awareness, and many devices have been installed. With this increased product availability and experience, I consider that the protection should be expanded. It is well recognized that bedroom and living areas are frequently associated with household electrical fires, and I therefore consider that both of these areas should be

protected without delay. This still falls well short of whole house protection.

I appreciate that the term "Living Areas" is not defined in the National Electrical Code. Here I am proposing that the NEC include, as a FPN, the definition adopted by the Vermont Code Making Authorities; namely "Any normally occupiable space in a residential occupancy, other than sleeping rooms or rooms that are intended for combination sleeping/living, bathrooms, toilet compartments, kitchens, closets, halls, storage or utility spaces and similar areas". Here I also note that Vermont has advanced the effective application date for Section 210-12(b) of the 1999 NEC from January 1, 2002 to January 1, 2001.

AFCIs at the branch circuit location, provide a significant safety enhancement that can impact the present tragic loss of human life, human injury and property damage. The devices are real, their protection is real, and their application is dependent on Code panel action.

PANEL ACTION: Accept in Part.

The panel accepts the deletion of "receptacle" in (b) of the proposal, and rejects the remainder of the proposal.

PANEL STATEMENT: See panel action and statement on Proposal 2-103.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

BROWN: See my Explanation of Negative Vote on Proposal 2-102.

COMMENT ON AFFIRMATIVE:

NISSEN: See my Comment on Affirmative on Proposal 2-103.

(Log #3687)

2- 113 - (210-12(b)): Accept in Part

SUBMITTER: Steve Campolo, Leviton Manufacturing Co., Inc.

RECOMMENDATION: Revise text to read as follows:

210.12(b) Dwelling Unit Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by a Branch/Feeder arc-fault circuit interrupter(s). All 125-volt, single-phase, 15- and 20-ampere receptacles in dwelling unit bedrooms shall be protected by an outlet/circuit arc-fault circuit interrupter(s). This requirement shall become effective January 1, 2002.

SUBSTANTIATION: Article 100 defines the branch circuit as "The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s)." Applying this definition to Section 210-12(b) of the NEC and the definitions of UL 1699 results in a requirement that provides arc fault protection only for the fixed wiring from the overcurrent device to the receptacle outlet. This indicates that branch circuit extensions may remain unprotected. Expanding the requirement to provide arc fault protection for the receptacles and the wiring extending from the receptacles (e.g., extension cords and power supply cords) greatly increases the level of safety afforded by AFCIs. In fact, it may be argued that exposed extension cords and power supply cords are subject to considerably greater abuse than fixed wiring and are more susceptible to abuse resulting in an arcing condition.

Underwriters Laboratories Inc. issued the first edition of UL 1699, UL Standard for Safety for Arc-Fault Circuit-Interrupters on February 26, 1999. This standard defines different types of arc-fault circuit-interrupters. The definitions include the following:

A Branch/Feeder AFCI "...is intended to provide protection of the branch circuit wiring feeder wiring, or both, against the unwanted effects of arcing. This device also provides limited protection to branch circuit extension wiring." Simply, a Branch/Feeder AFCI is not required to offer low current arcing fault protection for branch extensions.

An Outlet Circuit AFCI "...is intended to provide protection of cord sets and power-supply cords connected to it (when provided with receptacle outlets) against the unwanted effects of arcing."

UL has indicated that a coordinated system of protection should emerge where combinations of the various types of AFCIs are used to increase the likelihood of the greatest possible degree of overall protection. This perspective is reinforced by the definitions of various types of AFCIs contained in UL 1699, which explains several different types of AFCIs.

It is apparent that the UL standard considers arc fault protection is important for both the fixed wiring of the branch circuit and the branch circuit extension wiring (Power Supply and Extension Cords).

Based on the AFCIs that are defined in UL 1699, a complete system of arc fault protection may be provided by installing a Branch/Feeder AFCI in the panelboard and an Outlet Circuit AFCI at the receptacle. The branch is protected as well as branch extensions.

Adopting the proposed revision to 210-12(b) will result in a system that provides complete arc fault protection for both the fixed wiring and the branch circuit extension conductors by requiring installation of a coordinated system of AFCIs.

PANEL ACTION: Accept in Part.

The panel accepts the deletion of the last sentence in the proposal, and rejects the remainder of the proposal.

PANEL STATEMENT: See panel statement on Proposal 2-110.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 10

NEGATIVE: 2

EXPLANATION OF NEGATIVE:

NISSEN: The submitter has provided adequate substantiation of the need for both branch/feeder and outlet circuit AFCI protection in dwelling unit bedrooms, and that concept should be accepted.

PAULEY: See my Explanation of Negative Vote on Proposal 2-110 (Log #2262).

(Log #3803)

2- 114 - (210-12(b)): Reject

NOTE: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 17 for action. This will be considered as a public comment.

SUBMITTER: Thomas D. Mock, Consumer Electronics Mfrs Assn.

RECOMMENDATION: Revise paragraph 210.12(b) as follows:

(b) Dwelling Unit Bedrooms All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter(s). This requirement shall become effective January 1, 2002

(c) Dwelling Unit Living Areas All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in dwelling unit living areas shall be protected by an arc-fault circuit interrupter(s).

FPN A dwelling unit living area is any space, that can be normally occupied, other than bedrooms, bathrooms, toilet compartments, kitchens, closets, halls, storage, garage or utility spaces.

(d) Guest rooms All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in guest rooms in hotels, motels, and similar occupancies shall be protected by an arc-fault circuit interrupter(s) in accordance with the requirements for dwelling units in 210.12(b) and 210.12(c) .

(e) Limited Care Facility Bedrooms All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in limited care facility bedrooms shall be protected by an arc-fault circuit interrupter(s).

SUBSTANTIATION: 1. The submitter would like to respectfully disagree with the need for further field experience before mandating wider application of these devices. Research into the reliability of these devices was undertaken by the Consumer Products Safety Commission and reported in the Consumer Product Safety Review, Volume 4, Summer 1999. The results of this report can be summarized as follows;

"Problems in home wiring, like arcing and sparking, are associated with more than 40,000 home fires each year. These fires claim over 350 lives and injure 1,400 victims annually.

Several years ago, a CPSC study identified arc fault detection as a promising new technology. Since then, CPSC electrical engineers have tested the new AFCIs on the market and found these products to be effective.

You may want to consider adding AFCI protection for both new and existing homes. Older homes with ordinary circuit breakers especially may benefit from the added protection against the arcing faults that can occur in aging wiring systems."

Further delay in the proper implementation of these devices does not appear warranted.

2. The sentence: "This requirement shall become effective January 1, 2002." should be deleted since that is the nominally effective date for the 2002 NEC® anyway. There is no technical or product supply reason for extending the effective date due to adoption of this proposal.

3. The 1999 National Electrical Code mandates the protection of all branch circuits that supply receptacle outlets installed in dwelling unit bedrooms. This Code wording was influenced, in part, by Comments during the 1999 Code Cycle, such as Comment 2-65 (1).

That Comment addresses the enhanced safety provided by AFCIs in sleeping and living areas; areas that were identified as being most prone to electrical fires as a result of low voltage arcing. The present proposal is aimed at broadening the protection of AFCIs to the branch circuits supplying all bedroom outlets in dwelling units, in guest rooms and in limited care facilities. It is also aimed at broadening the protection of AFCIs to the branch circuits of living areas in dwelling units and in guest rooms.

The substantiation for the present proposal is as follows:

With respect to 210-12 (b), the present restriction to bedroom receptacle outlets only partially satisfies the intended protection of the circuits supplying dwelling unit bedrooms. These rooms are also associated with lighting outlets, and the branch circuits supplying these lighting outlets should also be protected. The proposal, therefore, is to delete the word "receptacle" in order to provide AFCI protection to the circuits supplying all bedroom outlets.

"The U.S. Fire Problem Overview Report, Leading Causes and Other Patterns And Trends" published by NFPA in May 1999, and hereafter referred to as the Overview Report, states,

"Electrical distribution equipment fires ranked second in property damage. Electrical distribution equipment includes: fixed wiring; transformers or associated overcurrent or disconnect equipment; meters or meter boxes; power switch gear or overcurrent protection devices; switches, receptacles or outlets; light fixtures, lamp holders, light fixtures, signs, or ballasts; cords or plugs; and lamps or light bulbs.

During the five year period from 1992 through 1996, electrical distribution equipment in the home caused an annual average of 39,100 structure fires, 360 civilian fire deaths, 1,480 civilian fire injuries and \$579.3 million in direct property damage.

Electrical distribution equipment fires involved ranked:

- Fifth in number of home structure fires;
- Fourth in home fire deaths;
- Seventh in home fire injuries; and
- Second in direct property damage.

A study done by the U.S. Consumer Product Safety Commission in the mid 1980's examined detailed information about electrical equipment residential fires in specific cities. They found that improper alterations contributed to 37 percent of the fires; improper initial installations factored in 20 percent of the incidents; deterioration due to aging system components contributed to 17 percent of the fires; improper use was a factor in 15 percent of the incidents; inadequate electrical capacity contributed to another 15 percent; faulty products were implicated in 11 percent, and contributing factors were unknown in 6 percent of the fires studied."

With respect to 210-12 (c), the proposal is to extend AFCI fire protection to the circuits supplying dwelling unit living areas. This change, in conjunction with 210-12(b), would provide AFCI protection to the circuits supplying outlets in all dwelling unit rooms with the exception of bathrooms, toilet compartments, kitchens, closets, halls, storage, garage or utility spaces.

The above referenced Overview Report also states that;

"One-third of the home civilian fire deaths resulted from fires that started in the living room, family room or den."

With respect to 210-12(d), the intent is to extend the enhanced safety benefits of AFCIs in dwelling units to comparable occupancy locations (bedrooms and living areas) in the guest rooms (210-60) of hotels, motels and similar occupancies.

With respect to 210-12(e), the intent is to extend the enhanced safety benefits of AFCIs to the bedrooms of Limited Care Facilities as defined in 517-3. These facilities cater to persons who may be incapable of self-preservation or may suffer from some physical or mental limitation which would hinder the rapid exiting of buildings in an emergency. Fire safety needs to be increased by the addition of AFCIs.

This overall Code proposal is justified on the basis of enhanced safety. According to the NFPA Overview Report, the data on structure fires in residential properties (based on 1992-1996 annual averages) shows totals of 448,700 fires, 3,765 civilian deaths, 20,520 civilian injuries and \$4,475.3 million in direct property damage. Many of these fires and much of this loss of life could have been prevented by AFCIs. But for AFCIs to be effective, it is necessary to provide arc fault detection and protection to as many dwelling-unit supply-circuits as possible.

The state of Vermont has recognized the value of AFCIs. THE VERMONT ELECTRICAL SAFETY RULES - 1999 (Effective Date: August 1, 1999) include the following:

NFPA 70, National Electrical Code, (1999 edition) To meet the needs of Vermont, NFPA 70 is amended as follows:

-delete and replace as follows - article 210-12(b)

210-12(b) Dwelling Unit living Area and Bedrooms. All branch

circuits that supply 125 volts, single phase, 15 and 20 ampere receptacle outlets installed in the dwelling unit living area and bedrooms shall be protected by an arc-fault circuit interrupter(s). (To achieve an orderly transition for compliance this Section shall take effect January 1, 2001).

In view of the positive changes that have occurred since the last cycle, and the continuing heavy toll in human lives, in human injury, and in property losses occasioned by electrical distribution fires, the Code Panel is urged to adopt these proposals. The objective is to optimize protection for dwelling unit bedrooms, for dwelling unit living area circuits, for the comparable guest rooms of hotels and motels, and for the bedrooms of limited care facilities.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-103.

The limited care facility issue is outside the Scope of Code-Making Panel 2 and the panel recommends that the Technical Correlating Committee forward this item to Code-Making Panel 17 for action.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

COMMENT ON AFFIRMATIVE:

NISSEN: See my Comment on Affirmative on Proposal 2-103.

(Log #4143)

2- 115 - (210-12(b) and (c)): Accept in Part
SUBMITTER: Philip M. Piqueira, General Electric Co.
RECOMMENDATION: Modify 210-12(b); Add 210-12(c); Add FPN:

(b) Dwelling Unit Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter(s). This requirement shall become effective January 1, 2002.

(c) Dwelling Unit Living Areas. All branch circuits that supply 125-volt, single phase, 15- and 20-ampere outlets installed in dwelling unit living areas shall be protected by an arc-fault interrupter(s).

FPN: A dwelling unit living area is any space, that can be normally occupied, other than bedrooms, bathrooms, toilet compartments, kitchens, closets, halls storage, garage or utility spaces.

SUBSTANTIATION: This proposal is intended to enhance the protection provided by arc-fault circuit interrupters as mandated by Section 210-12 of the 1999 National Electrical Code.

210-12(b). The present restriction of this article to bedroom receptacle outlets, while partially satisfying the intention of protecting circuits supplying bedrooms from low voltage arcing, creates a significant void in the protection of the entire bedroom. The deletion of receptacle from the present article would then enable all of the circuits, including those supplying lighting outlets to be protected.

210-12(c). The addition of dwelling unit living areas to this section of the National Electrical Code is a logical extension of the work which was begun during the 1999 code cycle. It is certainly naive to assume that only bedrooms are susceptible to the dangers of low voltage arcing and, consequently, this proposal would provide AFCI protection to all of the circuits supplying outlets in dwelling unit rooms.

During the 1999 code cycle, code panel #2, in responding to one of the AFCI proposals, stated that "The panel has limited the requirements to dwelling unit bedrooms to permit these new devices to be introduced into the public domain on a gradual basis...an effective date of January 1, 2002 was established to allow industry to accommodate the new requirement and to allow a transition period". It is important to note that his statement does question the need for arc-fault circuit interrupters but, instead, deals with limiting the use of these devices and extending the timing of implementation in order to allow industry to accommodate the introduction of this new technology more effectively.

However, since the introduction of this technology into the 1999 NEC, manufacturers have gained experience with hundreds of millions of hours of operating time with AFCIs. As a result of this experience, consumers have not only benefited from enhanced protection from arc faults, but have also not experienced nuisance tripping, a concern of some of the code panel members.

Further, the CPSC (Consumer Product Safety Commission) has stated the following on its web page, Preventing Home Fires: Arc Fault Circuit Interrupters

(<http://cpsc.gov/cpscpub/pubs/afci.html>): "...Several years ago, a CPSC study identified arc fault detection as a promising new technology. Since then, CPSC electrical engineers have tested the new AFCIs on the market and found these products to be effective."

The most recent report by the CPSC on residential fire losses has estimated that there were 41,600 fires (\$682 million in property damage) and 370 civilian deaths in 1996. Many of these fires and fatalities could have been prevented if arc fault circuit interrupters had protected those residences. Code Panel #2 can certainly play a valuable role in protecting the public if they act responsibly and adopt this proposal to expand AFCI protection.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Accept in Part.

The panel accepts the deletion of the word "receptacle" in (b) of the proposal, and rejects the remainder of the proposal.

PANEL STATEMENT: See panel statement on Proposal 2-103.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

BROWN: See my Explanation of Negative Vote on Proposal 2-102.

COMMENT ON AFFIRMATIVE:

NISSEN: See my Comment on Affirmative on Proposal 2-103.

(Log #4150)

2- 116 - (210-12(b)): Accept in Part

SUBMITTER: William Keezer, Bose Corp./Rep. Nat'l Systems Contractors Assn. (NSCA)

RECOMMENDATION: Revise paragraph 210-12(b) as follows:

(b) Dwelling Unit Living Areas and Bedrooms. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed in the dwelling unit living areas and bedrooms shall be protected by an arc-fault circuit interrupter(s). ~~This requirement shall become effective January 1, 2002.~~

SUBSTANTIATION: Problems:

1. The 1999 NEC Handbook states that: "Restricting the requirement to bedroom circuits reflects the desire to gain field experience in a limited application before mandating installation of devices in other unit circuits. Bedrooms contain readily ignitable cloth and cotton materials, and occupants may be sleeping when ignition occurs and not likely able to take protective action rapidly." There are three issues to be addressed here:

1.1 The submitter respectfully disagrees with the contention that bedroom occupants are uniquely vulnerable to the consequences of fire initiation. The NFPA Journal frequently cites fires originating in other occupancy areas where the occupant was asleep when the fire started. These occupancy areas are usually a family room, den, TV room, or other room where the occupant falls asleep in a comfortable chair or sofa while reading, drinking, smoking, or watching TV.

1.2 Sleep is not a necessary prerequisite for failure to notice the start of a fire, nor is observing the start of a fire a guarantee of survival. It is far better if the fire never starts due to appropriate branch circuit protection.

1.3 Fire deaths and injuries happen in rooms other than the place of fire origin more than 50 percent of the time. A bedroom occupant is not protected from the initiation of a fire by an arc fault permitted to occur in a nonbedroom location within the house.

2. The sentence: "This requirement shall become effective January 1, 2002." should be deleted since that is the nominally effective date for the 2002 NEC anyway. There is no technical or product supply reason for extending the effectivity date to adoption of this proposal.

Substantiation:

1. The State of Vermont has independently considered the issues of application inadequacy, product availability, product reliability and the improved life safety consequences of a revision such as the one proposed. The Vermont Electrical Safety Rules text replacement for 210-12(b) is fundamentally identical to this proposal and was adopted August 1999. The text of this document reads: "210-12(b) Dwelling Unit Living Area and Bedrooms. All branch circuits that supply 125 volts, single phase, 15 and 20 ampere receptacle outlets installed in the dwelling unit living area and bedrooms shall be protected by an arc-fault circuit interrupter(s). (To achieve an orderly transition for compliance this Section shall take effect January 1, 2001)." Note that the effective date for compliance with this more comprehensive requirement is one year earlier than that required in the 1999 NEC.

2. The substantiation for Proposal 2-128 (210-11-(New)) found on page #111 of the 1998 NEC Committee Report on Proposals

(Annual Meeting - Cincinnati Ohio) contends that a significant percentage of electrical fires occur in permanently installed wiring or wiring devices. Such a fire could originate in a bedroom wall, but might have been caused by a circuit passing through that wall to service a kitchen, bathroom, garage, or other space within the occupancy. The circuit could even be servicing an outdoor outlet on a bedroom's exterior wall. The concept that protecting a bedroom branch circuit protects the bedroom occupant is a fallacy under such conditions.

3. In May of 1999, the NFPA published a report titled: The U.S. Fire Problem Overview Report - Leading Causes and Other Patterns and Trends (Marty Ahrens, Fire Analysis and Research Division, NFPA). Page 50 of that report supports the submitter's concern about restricting sufficient protection to bedrooms. The report states that "Half of all fire victims were fatally injured when outside the room of origin" (Actually, 57.6 percent).

4. In the same NFPA report, it is stated on page 55 that electrical distribution equipment fires ranked: fifth in number of home structure fires; fourth in home fire deaths, seventh in home fire injuries; and second in direct property damage. Electrical distribution equipment includes (but is not limited to) fixed wiring, transformers or associated overcurrent or disconnect equipment, overcurrent protection devices, switches, receptacles or outlets, cords and plugs. A U.S. Consumer Product Safety Commission study done in the mid-80's determined that improper initial installations was a factor in about 20 percent of all electrical equipment residential fires. This data supports the concern addressed in 2. above. The CPSC found that electrical distribution equipment faults were not unique to any one location of a dwelling.

Clarification:

The submitter would have preferred to state: "All branch circuits" without qualification. Limiting the circuits to receptacle outlets does address protection from arc faults in appliances and extension cords, even if not all branch circuit wiring is protected. With this proposal, what is NOT protected is the following: 1) branch circuits for lighting, 2) permanently installed appliances such as dishwashers and garbage disposals, and 3) branch circuits for 240 volt circuits such as air conditioners, heat and hot water. It is felt that this proposal is not an unreasonable increase in the protection provided by the original 210-12(b), but is not as comprehensive as it ultimately should be. It is proposed as a possible interim step toward total adoption of AFCIs for residential branch circuits in a future Code cycle.

PANEL ACTION: Accept in Part.

The panel accepts the deletion of the last sentence of the proposal, and rejects the remainder of the proposal.

PANEL STATEMENT: See panel statement on Proposal 2-103.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

COMMENT ON AFFIRMATIVE:

NISSEN: See my Comment on Affirmative on Proposal 2-103.

(Log #1194)

2- 117 - (210-12(b) Exception No. 1 (New)): Reject

SUBMITTER: Charles G. Hendry, Hempstead, NY

RECOMMENDATION: Add new (b) Exception No. 1:

Exception No. 1: In addition to the required receptacle outlets, receptacles supplied by a dedicated circuit, (A/C units, electric heaters etc.) shall be exempt from AFCI protection.

SUBSTANTIATION: 1) This exception will take additional big loads off the bedroom AFCI breakers.

2) In our fire district area 2 1/2 square miles (120,000 people) we had 26 bedroom fires in the last 3 years, 3 electrical (2 extension cords, 1 receptacle), "none" in direct wired units in residential use.

PANEL ACTION: Reject.

PANEL STATEMENT: There is no substantiation to indicate that AFCIs should not protect all 15- and 20-amp, 125 volt bedroom outlet circuits.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1193)

2- 118 - (210-12(b)(1) (New)): Reject

SUBMITTER: Charles G. Hendry, Hempstead, NY

RECOMMENDATION: Add new (b) (1) to read as follows:

(1) 15 AMP Branch Circuits shall be limited to 12 receptacle outlets and

20 AMP Branch Circuits limited to 14 receptacle outlets.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

SUBSTANTIATION: 1) This will still allow up to three (3) bedrooms (average 4 receptacles a room) on the circuit but would limit all bedrooms and loads being installed on one (1) AFCI.

2) At a current cost of electricians price of \$75-90 per AFCI all bedrooms will end up on one (1) AFCI (some electricians are cheap).

PANEL ACTION: Reject.

PANEL STATEMENT: The number of outlets connected to an AFCI does not affect its ability to provide protection.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2453)

2- 119 - (210-12(c) (New)): Reject

SUBMITTER: William H. King, Jr., U.S. Consumer Product Safety Comm.

RECOMMENDATION: Add new paragraph to Section 210-12 as follows:

(c) Lighting and Appliance Branch Circuits. Each existing 125-volt, single-phase, 15- and 20-ampere lighting and appliance branch circuit shall be individually protected by an arc-fault circuit interrupter when the service equipment is replaced.

FPN: See Section 230-XX (Editorial note: Section 230-XX is a proposed new section, submitted separately to the CMP for Article 230, to compliment this proposed new paragraph (c) to Section 210-12. For information purposes, the proposed new Section 230-XX reads as follows: 230-XX. Replacement of Service Equipment in Dwelling Units. When service equipment in dwelling units is replaced, each existing 125-volt, single-phase, 15- and 20-ampere lighting and appliance branch circuit shall be individually protected by an arc-fault circuit interrupter.)

SUBSTANTIATION: According to a study conducted by the U.S. Consumer Product Safety Commission (CPSC), "Residential Electrical Distribution System Fires", Smith & McCoskrie, 1987, fires originating in branch circuit wiring predominately occurred in dwellings over 20 years old, with the highest rates of fires occurring in dwellings over 40 years old. Older dwellings are frequently upgraded with replacement service equipment to accommodate an increase in the service rating to supply additional appliance and equipment loads. However, often times, the existing lighting and appliance branch circuits in dwelling units are not replaced when the service is upgraded, due to the increased cost, and/or the inability to evaluate the remaining life expectancy of the branch circuit conductors. The branch circuit conductors are frequently located in concealed spaces surrounded with thermal insulation, and could be in a deteriorated condition at the time the service is upgraded. This proposal is intended to remedy this situation with the addition of arc-fault circuit interruption (AFCI) protection against fire hazard conditions for the existing branch circuit conductors.

PANEL ACTION: Reject.

PANEL STATEMENT: The proposal calls for a significant expansion of this device beyond the bedroom circuits. The panel does not intend to expand the code to require AFCIs in existing dwellings at this time.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

COMMENT ON AFFIRMATIVE:

NISSEN: See my Comment on Affirmative on Proposal 2-103.

(Log #2849)

2- 120 - (210-12(c) (New)): Reject

SUBMITTER: Donald M. King, Wilmington, DE

RECOMMENDATION: Add a new paragraph (c) to 210-12 to read as follows:

(c) Guest Rooms. All branch circuits supplying 125V single-phase 15- and 20- ampere receptacle outlets in guest rooms of hotels, motels, and similar occupancies shall be protected by an arc-fault circuit interrupter(s).

SUBSTANTIATION: Receptacle outlets and flexible cords that are installed behind furniture in guest rooms of hotels and motels are subject to the same risk of physical damage as those that are installed behind furniture in bedrooms of single family dwellings. Section 210-12(b) requires arc fault protection for branch circuits supplying receptacle outlets in bedrooms of single family dwellings. This added text would extend the same level of protection offered by this new technology to persons and property of similar occupancies.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-103.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

COMMENT ON AFFIRMATIVE:

NISSEN: See my Comment on Affirmative on Proposal 2-103.

(Log #1050)

2- 121 - (210-19): Accept

SUBMITTER: James M. Daly, BICC General

RECOMMENDATION: Revise 210-9 as follows:

210-19(c). Exception No. 2 - change "No. 10" to "10 AWG".

210-19(d) - change "No. 14" to "14 AWG".

210-19(d), Exception No. 2 - change "No. 14" to "14 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: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #392)

2- 122 - (210-19(a)): Reject

SUBMITTER: Glenn W. Zieseniss, Crown Point, IN

RECOMMENDATION: Add the following to the last sentence of the paragraph:

"and where adjustment or correction factors are applied, the ampacity of the conductor shall not be less than 100 percent of the noncontinuous load plus 100 percent of the continuous load."

SUBSTANTIATION: The existing text seems to imply that is a "stand alone" statement and other NEC sections, such as the first paragraph of 240-3 and 240-3(d), do not apply if the ampacity of the conductor was greater than or equal to 125 percent of the continuous load plus 100 percent of the noncontinuous load before applying any adjustment or correction factors. There is no text to indicate the minimum conductor ampacity required after any adjustment or correction factors are applied. It is possible for the calculated conductor ampacity to be less than 100 percent of the continuous and noncontinuous loads after adjustment and correction factors are applied.

PANEL ACTION: Reject.

PANEL STATEMENT: The last sentence of 210-19(a) establishes a minimum conductor size for the branch circuit that supplies any continuous loads. The first sentence of 210-19(a) provides the text that establishes the minimum conductor ampacity by stating that it shall not be less than the load to be served. Ampacities of conductors are determined from 310-15 and 210-19(a) FPN No.1 guides the user to that section.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #680)

2- 123 - (210-19(a)): Accept in Part

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Revise to read as follows:

(a) General. Branch-circuit conductors shall have an ampacity not less than the maximum computed load to be served. Where a branch circuit supplies continuous load(s) or any combination of continuous and noncontinuous loads, the minimum branch-circuit conductor size, before the application of any adjustment or correction factors, shall have an allowable ampacity ~~equal to or greater~~ not less than the noncontinuous load(s), plus 125 percent of the continuous load(s) or the ampacity specified for motor circuit conductors in Sections 430-22; 430-24; 430-25; and 440-34, whichever is greater.

Exception No. 1: The correction factors for temperatures below 26°C (78°F) shall be permitted in determining the initial conductor ampacity.

Exception No. 2: Where the assembly, including any integral the overcurrent device(s) is listed for operation at 100 percent of its rating, the ampacity of the branch-circuit conductors shall be permitted to be not less than the sum of the continuous load(s) plus the noncontinuous load(s), plus the ampacity specified for motor circuit conductors in Sections 430-22, 430-24, 430-25, and 440-34.

- FPN No. 1: No change.
FPN No. 2: See Part B of Article 430 for minimum rating of motor branch circuit conductors.
FPN No. 3: No change.
FPN No. 4: No change.

SUBSTANTIATION: The word "computed" clarifies that total connected load is not necessarily intended. Some loads such as general-use receptacles may be only computed load. "Not less than" is editorial and consistent with that phrase in the first sentence.

The proposal allows the 125 percent increase in ampacity for (phantom) continuous load to be applied to motor conductor ampacity or the 25 percent increase for motor conductor ampacity to apply to continuous load conductor ampacity; the largest value is to be used. The 25 percent ampacity increase for motor circuit conductors is not for a phantom load but for temporary motor overload and the general maximum rating for motor overload devices. Article 430 does not generally permit a 100 percent ampacity for motor circuit conductors whether or not operating for less than three hours. Section 430-24 does not reference a 125 percent ampacity for continuous load, but merely ampere rating of other loads.

Application of this section and those referenced in Articles 430 and 440 in the proposal for the same loads consisting of continuous and noncontinuous loads, including motors, can result in disparity between resulting minimum conductor sizes. Which articles have precedence?

Admittedly such disparities are not as likely for branch circuits as feeders due to consideration of overcurrent protection requirements, but they can occur, especially with combination-load equipment with supplementary overcurrent protection for various components and served by a branch circuit. The examples I have provided indicate such disparity.

Proposed Exception No. 1 is to allow for increased ampacity rating to be initially applied. While perhaps relatively minor and infrequently used it could be a critical allowance for some "borderline" ampacity ratings.

Exception No. 2 is revised to clarify that some assemblies such as unfused safety switches, transfer switches, and clock-operated switches are listed for continuous operation at 100 percent of rating. Present wording suggests the assemblies always contain overcurrent devices. Consideration for conductors which also supply a motor is added. If this proposal is accepted FPN No. 2 becomes superfluous.

The panel statement for Comment 1-174 in the 1998 ROC indicated motor loads continuing for three hours or more are not excluded from the definition of continuous load. Under that concept, conductors would have to have an ampacity of 125 percent of each motor rather than just the largest one, and if the motor operates for less than three hours no multiplier is required. Continuous load and continues duty are not the same in the context of the code.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Accept in Part.

The panel accepts the portion of the recommendation changing "equal to or greater" to "not less", and rejects the remainder of the recommendation.

PANEL STATEMENT: The rejected portions of the proposal are rejected based on the following:

- 1) The first sentence is accurate as written in the present code. Computed load would imply that conductors serving loads could have some additional computed factor applied. Article 220 provides the necessary information for determining the load in question.
2) The changes relative to motor circuit conductors are unnecessary. Section 210-2 clearly indicates that motor branch circuit conductors are sized in Article 430.
3) The proposed Exception No. 1 is unnecessary, since 310-15 already allows this to be applied to determine conductor ampacity.
4) The wording for "integral" overcurrent devices is unnecessary. The present requirement is for "listed assemblies" which covers the various arrangements of overcurrent devices.
5) FPN No. 2 is retained to provide correlation with 210-2.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2569)

2- 124 - (210-19(a)): Reject
SUBMITTER: Travis Lindsey, Bldg Dept., Clark County, NV
RECOMMENDATION: Revise as follows:

(a) Branch-circuit conductors shall have an ampacity not less than the load to be served and shall not be smaller than No. 12.
SUBSTANTIATION: In our jurisdiction we have rules limiting branch circuits to No. 12. We did this because there were problems with heating of conductors, overloaded circuits and tripping related to these conditions. Since enacting these regulations the number of problems have been reduced significantly.

Many times conductors have been applied incorrectly. Ambient temperature correction factors are not always considered. Most attics are hot enough for prolonged periods during the summer months that application of the correction factors would reduce the current carrying capacity of the No. 14 wire to a very small number. Increased heating occurs when these circuits are heavily loaded.

In cases such as single outlet appliance circuits serving refrigerators and similar loads, the circuits have been known to fatigue and deteriorate (oxidize and burn) at connection points, overcurrent devices and receptacles due to the high starting loads and the small wire size.

PANEL ACTION: Reject.
PANEL STATEMENT: The submitter has presented insufficient technical substantiation that No. 14AWG conductors are creating safety concerns. Many of the situations described in the submitter's substantiation, such as high temperature in attics, have been dealt with through various changes elsewhere in the NEC.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12
COMMENT ON AFFIRMATIVE:

BROWN: The actions by an Authority Having Jurisdiction arbitrarily deciding to change the requirements of the NEC without the benefit of specific fire loss data should not be the basis for a change in the NEC. The concerns of the submitter would be alleviated with proper installation inspection by a certified electrical inspector, and education of the installers through courses taught in their locality.

(Log #3156)

2- 125 - (210-19(a)): Reject
SUBMITTER: John Wyrick, Byron, MI
RECOMMENDATION: The second sentence of the exception should be deleted.

SUBSTANTIATION: The second sentence and the exception are inconsistent with each other. The tables in Article 310 give the safe allowable ampacity of conductors continuously. If their numbers are not correct, then change the tables. The second sentence is also very confusing when it comes to conductor derating.

PANEL ACTION: Reject.
PANEL STATEMENT: The text in Section 210-19(a) second sentence ensures proper conductor selection based upon the conductor sizes that are used for evaluating the devices where the conductor is connected. The same text was developed in Section 210-20(a) and works in conjunction with 210-19(a) to prevent overheating of the insulation at the termination point on the overcurrent protection device. The combination of proper sizing for both the conductor and the overcurrent protective device ensures that the overcurrent protection device operates as it was originally evaluated and listed.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4110)

2- 126 - (210-19(a)): Accept in Part
SUBMITTER: Truman C. Surbrook, Michigan State University
RECOMMENDATION: Revise the second sentence of the section as follows with the deletions and additions as indicated:

"Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum branch-circuit conductor size, before the application of any adjustment or correction factors, shall have an allowable ampacity

~~equal to or greater~~ not less than the noncontinuous load plus 125 percent of the continuous load."

SUBSTANTIATION: The phrase "before the application of any adjustment or correction factors" is particularly confusing to electricians making conductor ampacity selection when adjustment factors are being used. Some apply the adjustment factors to the allowable ampacity found in the appropriate table and then compare it with 100 percent of both continuous load and noncontinuous load, others compare the adjusted allowable ampacity to the sum of 100 percent of the noncontinuous load and 125 percent of the continuous load. By removing the confusing statement, it makes the section clear that the adjusted allowable ampacity of the conductor is not permitted to be less than the sum of 100 percent of the noncontinuous load plus 125 percent of the continuous load.

PANEL ACTION: Accept in Part.

The panel accepts the change of "equal to or greater" to "not less". The remainder of the proposal is rejected.

PANEL STATEMENT: See panel action on Proposal 2-123. The text recommended for deletion is necessary for proper application of the section. The second sentence of 210-19(a) establishes the minimum conductor size permitted for a circuit supplying any continuous loads. Actual conductor allowable ampacity (relative to the load current) is determined by applying 310-15, including the adjustment factors. This allows the allowable ampacity calculation to take advantage of higher temperature ratings on conductor insulation.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4131)

2- 127 - (210-19(a)): Reject

SUBMITTER: David T. Brender, Cooper Development Assn. Inc.

RECOMMENDATION: Revise text to read as follows:

(a) General. Branch-circuit conductors shall have an ampacity not less than the maximum load to be served and shall not be smaller than 12 AWG.

SUBSTANTIATION: The fine print notes let the user know to check the conductor's ampacity rating, temperature limit, and voltage drop. Ampacity rating and temperature limits are addressed in the NEC but are not generally applied. Voltage drop is only addressed through the fine print note. As homes continue to be built larger and larger, as panelboards are located more often at the end of the house, with an increase in the number of electrical appliances in a typical home, and with appliances having increased power consumption and more stringent power quality demands, the risk of overloaded conductors and occurrence of unacceptable circuit voltage drops have dramatically increased. Just as the minimum conductor size for bathrooms was increased due to the change in the type of appliances used on the bathroom circuit, the minimum conductor size for all branch circuits should be increased to 12 AWG. The increase in minimum size will increase safety by reducing the risk of overloaded circuits and the need to rewire existing circuits to meet the needs of heavily loaded circuits, increased harmonic loads and sensitive electronic equipment. As reported in the Eleventh Edition of "Fire in the United States 1987-1996," published by United States Fire Administration National Fire Data Center, the leading causes of 1996 nonresidential structure fires in stores, offices, and basic industry are attributed to electrical distribution. This same publication also states that electrical distribution is the 4th most common cause of fire. The areas where fires most often occur are in the sleeping rooms, lounge areas (living rooms) and kitchens. The overcurrent device ampacity is not intended to be changed by this proposal.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel does not agree that ampacity rating and temperature limits addressed in the NEC are not generally applied. Also, see panel statements on Proposals 2-98 and 2-124.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4351)

2- 128 - (210-19(a), FPN No. 4): Reject

SUBMITTER: R. Gerald Irvine, Suffern, NY

RECOMMENDATION: Change FPN No. 4 to a requirement by inserting "shall be" before "sized" and deleting all after "5 percent" in the first sentence.

SUBSTANTIATION: Voltage drop limitations are necessary for proper equipment operation and for conservation of energy by reducing excessive line losses. ASHRAE (IESNA 90.1R Energy Conservation in New Buildings) also contains voltage drop limitations.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel does not agree that the Fine Print Note should be made mandatory code language. The concern for a specific percentage voltage drop is a design consideration as are the energy conservation requirements. Voltage drop depends on conductor size, loading, and other factors.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1020)

2- 129 - (210-19(a), FPN No. 5 (New)): Reject

SUBMITTER: Charles W. Algood, A&A Electric Services Inc./Rep. L.U. 915 I.B.E.W.

RECOMMENDATION: Add FPN No. 5 to read as follows:

FPN No. 5: See Section 110-14(c) for temperature limitations of conductors.

SUBSTANTIATION: This UL Greenbook requirement is an essential factor in the selection of appropriate branch circuit conductors, especially at points of terminating the conductors, and the use of higher temperature rated conductors.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel agrees that 110-14(c) is an important section, but its application in conductor selection is a much broader application than just 210-19. Adding another Fine Print Note in this section would not improve the usability since 110-14 is a general requirement.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4111)

2- 130 - (210-19(a), Exception): Accept in Principle

SUBMITTER: Truman C. Surbrook, Michigan State University

RECOMMENDATION: Revise the Exception as follows:

"Where the assembly, including the overcurrent devices protecting the branch circuit(s), is listed for operation at 100 percent of its rating, the allowable ampacity of the branch circuit conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load, and not less than the rating of the overcurrent."

SUBSTANTIATION: The addition of the word "allowable" ampacity should make it clear that it is the ampacity under the prevailing conditions including the application of adjustment factors if they apply.

The rule for sizing conductors when the overcurrent device is listed for 100 percent operation and one that is not such listed can lead to widely different conductor sized for the same identical load. At least in the case where the overcurrent device is listed for 100 percent operation, the minimum allowable ampacity of the conductor should not be permitted to be less than the rating of the overcurrent device. The following example illustrates the point.

Example: If a branch circuit supplied a continuous load of 130 amperes and the overcurrent device and enclosure are listed for operation at 100 percent of its rating then the overcurrent device is permitted to be rated at 150 amperes. In this case the conductor is permitted to be sized based upon an allowable ampacity not less than 100 percent of the continuous load. If copper conductors are used with 75°C insulation and terminations, the maximum conductor size required would be AWG #1 which is listed in Table 310-16 as 130 amperes. If the overcurrent device had not been listed for 100 percent operation, the minimum overcurrent device rating for this load would have been 175 amperes and the minimum conductor size would have been AWG #2/0. This seems to be a wide difference in minimum conductor size for the same identical load

simply because one overcurrent device is rated for 100 percent operation and the other is not.

PANEL ACTION: Accept in Principle.

Revise the exception in the existing Code to read as follows:

"Exception: Where the assembly, including the overcurrent devices protecting the branch circuit(s), is listed for operation at 100 percent of its rating, the allowable ampacity of the branch circuit conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load. In no case shall the ampacity be less than the rating of the overcurrent device."

PANEL STATEMENT: The panel has accepted the submitter's recommendation relative to the use of "allowable" in the exception. The submitter's wording can be interpreted to be permissive relative to the minimum sizing compared to the overcurrent device. As such, the panel has revised the exception to accomplish the objective using clearer language.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3851)

2- 131 - (210-19(b) Exception No. 1): Reject
SUBMITTER: J. Philip Simmons, Olympia, WA

RECOMMENDATION: Revise as follows:

Exception No. 1: Tap conductors supplying electric ranges, wall-mounted electric ovens, and counter-mounted electric cooking units from a 50-ampere branch circuit shall have an ampacity of not less than 20 and shall be sufficient for the load to be serviced. The taps shall be longer than necessary for supplying power to the outlet for servicing the appliance within the same kitchen.

SUBSTANTIATION: Editorial. The term "servicing" has been fairly widely interpreted to include the supply whip that is provided by the appliance manufacturer. This change will make it clear that the tap is a branch circuit tap that terminates at the outlet for the appliance.

This revision brings the exception into compliance with the definition of "branch circuit" in Article. The branch circuit ends at the outlet and does not include the appliance whip. The appliance whip is supplied by the manufacturer of the listed appliance in accordance with the product safety standard. The added text "within the same kitchen" will prevent the tap from being made in one room and the appliances being in another. This will keep the taps to be not longer than necessary.

Finally, the conductors are protected from overload by being suitable for the load and from short-circuit by the overcurrent device on the line side.

PANEL ACTION: Reject.

PANEL STATEMENT: The text from Exception No. 1 entered the Code in the 1962 edition. At that time, the definition of branch circuit included all conductors up to the load. The objective of the exception was to allow a tap (including a factory supplied whip) from the cooking unit to the larger branch circuit. In 1971, the definition of branch circuit changed to be substantially what we have today. Although the branch circuit ends at the outlet, the language does provide guidance that the conductors extending to the cooking unit are not to be longer than necessary for servicing. If the whip is supplied with the appliance, it should be connected directly to the branch circuit junction box without another tap being installed. For appliances that are supplied with a factory installed terminal box, the exception allows a set of tap conductors to be field installed between the junction box for the branch circuit and the terminals of the appliance.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #681)

2- 132 - (210-19(c)): Reject
SUBMITTER: Dan Leaf, Palmdale, CA
RECOMMENDATION: Revise to read as follows:

Household Ranges and Cooking Appliances.

(1) Branch-circuit conductors supplying a household ranges, a wall-mounted ovens, a counter-mounted cooking units, and or other similar household cooking appliances, or more than one such appliance shall have an ampacity not less than the rating of the branch circuit and not less than the maximum demand load to be served. For ranges of Where the branch circuit supplies only a single appliance with a nameplate rating over 8-3/4 kW, or more, the minimum branch circuit rating shall be 40-amperes.

Exception No. 1: Tap conductors supplying electric ranges, wall

mounted ovens, and counter mounted cooking units from a 50-ampere branch circuit shall have an ampacity of not less than 20 and shall be sufficient for the loads served. The taps shall not be longer than necessary for servicing the appliance. The neutral conductor of a 3-wire, 120/240 volt branch circuit that supplies only a single appliance with a nameplate rating over 8-3/4 kW shall be permitted to have an ampacity less than the ungrounded conductors but not less than 70 percent of the branch-circuit rating, and shall not be smaller than No. 10.

Exception No. 2: The neutral conductor of a 3-wire branch circuit supplying a household electric range, a wall-mounted oven, or a counter-mounted cooking unit shall be permitted to be smaller than the ungrounded conductors where the maximum demand of a range of 8-3/4 kW or more rating has been computed according to Column A of Table 220-19, but shall have an ampacity of not less than 70 percent of the branch circuit rating and shall not be smaller than No. 10.

(2) Where one or more electric cooking appliances is supplied by a single branch circuit, tap conductors shall have an ampacity not less than the load to be served, but shall not be required to have an ampacity higher than the branch-circuit conductors, and shall not be smaller than the sizes specified in Table 210-24.

SUBSTANTIATION: Present wording is not clear whether it covers a branch circuit supplying a single appliance or more than one. "Similar" is proposed to differentiate other cooking appliances such as fry pans, cooking pots, small ovens, etc. "Maximum" load is not clear whether intended to be nameplate ratings or demand load of Table 220-19.

Present Exception No. 1 is not a true exception since this section relates to branch circuit conductors and the exception does not. The proposal incorporates it into the rule and clearly indicates it applies to one or more appliances. The proposed (2) covers tap conductors by reference to Table 210-24, which covers other than 50-ampere circuits. It also allows for the condition where "sufficient for the load" could result in tap conductors with higher ampacity than the branch-circuit conductors. For example, tap conductors for a 12kW range require a higher ampacity than the branch-circuit conductors which may be based on 8kW demand. This situation can also occur where more than one appliance is supplied by a single branch circuit permitted to have a demand factor but the tap conductors may not. Since O.C.P. is specifically indicated to exceed 15-amperes, No. 14 tap conductors would comply with "ampacity of not less than 20" as Table 310-16 indicates an ampacity of 20 or 25. Is that the intent?

The proposal limits the neutral size reduction to 120/240 volt systems since the neutral of a 3-wire 208Y/120 volt system carries approximately the same current as the ungrounded conductors.

Column C of Table 220-19 includes appliances up to 8-3/4 kW rating; the text of (c) and Exception No. 2 also include ranges of 8-3/4 kW which allows column A or C to be used. Subsection (c) requires a minimum branch-circuit rating of 40-amperes for 8-3/4 kW but column C allows a demand of 80 percent, or a 29-ampere ampacity at 240 volts. Ranges of 8-3/4 kW, singly, or with other appliances, results in a lower demand with use of column C rather than A. The proposal specifies over 8-3/4 kW. Note 2 for Table 220-19 states over 8-3/4 kW.

PANEL ACTION: Reject.

PANEL STATEMENT: The rejection of the proposal is based on the following:

- 1) The first sentence is clear that it applies to single or multiple cooking appliances by using language to indicate multiple units. The submitter speculates that there is confusion about what types of cooking equipment this is applicable to, but has presented no substantiation that the present text is a problem.
 - 2) The reference to "demand" load is not needed since Article 220 determines how the "load" is determined. Article 220 is clear relative to cooking equipment load calculations.
 - 3) The present reference to 8-3/4kW for a 40A circuit is the correct reference for a minimum circuit.
 - 4) Exception No. 1 is necessary for this section. See panel statement on Proposal 2-131.
 - 5) The revision to Exception No. 2 (proposed as Exception No. 1) is insufficiently substantiated. Although in a typically loaded 208Y/120V three wire circuit, the neutral carries approximately the same current when assuming single phase loads connected between phase and neutral, the loading for the cooking equipment is mostly across the phase conductors and the 70% permission has not been shown to be inadequate.
 - 6) The new recommendation (2) is unnecessary since Article 220 appropriately describes how to determine the load associated with the cooking circuits.
- Engineering data from a technical survey should be provided to substantiate the need for changes in load calculations.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3852)

2- 133 - (210-19(c) Exception No. 1): Accept in Principle
SUBMITTER: J. Philip Simmons, Olympia, WA
RECOMMENDATION: Revise text to read as follows:

(c) Other Loads. Branch-circuit conductors supplying loads other than cooking appliances as covered in (b) above and as listed in Section 210-2 shall have an ampacity sufficient for the loads served and shall not be smaller than No. 14.

Exception No. 1: Tap conductors for such loads shall have an ampacity not less than 15 for circuits rated less than 40 amperes and not less than 20 for circuits rated at 40 or 50 amperes and only where these tap conductors supply any of the following loads:

a. Individual lampholders or fixtures with taps extending not longer than 18 in. (457 mm) beyond any portion of the lampholder or fixture.

b. A fixture having tap conductors as provided in Section 410-67 shall be not smaller than the load served.

SUBSTANTIATION: No guidance is given in Section 410-67 for the minimum size of conductor required for the lighting fixture tap and should be specified here. The "tap" conductors in Section 410-67 are usually of the same size as the branch circuit conductors (not a smaller size as contemplated in Section 240-3) but have an insulation temperature rating higher than the insulation of the branch circuit conductors.

PANEL ACTION: Accept in Principle.

In the main paragraph of 210-19(d) Exception No. 1, revise the text to read:

"Tap conductors shall have an ampacity sufficient for the load served. In addition, they shall have an ampacity of not less than 15 for circuits rated less than 40 amperes and not less than 20 for circuits rated at 40 or 50 amperes and only where these tap conductors supply any of the following loads:"

PANEL STATEMENT: The panel notes that the revision is to Section 210-19(d) rather than 210-19(c). The revision to the main paragraph of Exception No. 1 will make it clear that the tap conductors must always have an ampacity sufficient for the load served. This meets the submitter's intent.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #682)

2- 134 - (210-19(d) Exception No. 1): Reject
SUBMITTER: Dan Leaf, Palmdale, CA
RECOMMENDATION: Revise to read as follows:

Exception No. 1: Tap conductors for such loads shall have an ampacity not less than 15 for circuits rated less than 40 amperes and not less than 20 not be smaller than No. 12 for circuits rated at 40 or 50-amperes and only where these tap conductors are the nonheating leads of utilization equipment covered in Articles 424, 426, 427, or supply any of the following loads:

a. No change

b. No change

c. No change

d. No change

e. ~~Nonheating leads of deicing and snow melting cables and mats.~~

SUBSTANTIATION: Editorial. The 15 ampere requirement is basically redundant since the No. 14 specified in the text will generally have an ampacity of 15 or higher. Since the exception relates to tap conductor ampacity it can be construed as modifying "ampacity sufficient for the load". Since the exception infers permitted overcurrent protection greater than 15 amperes, No. 14 conductors have an ampacity of 20 or 25 amperes per Table 310-16 and renders the ampacity requirements irrelevant. Fixture wires which may be used would be covered by the size requirements since Section 240-4 permits No. 14 for 30-ampere and under circuits and No. 12 for 40 and 50 ampere circuits.

Nonheating leads may be considered as tap conductors and if so this exception covers tap conductors supplying other tap conductors.

It appears reasonable to apply this exception to equipment covered in the articles noted; many of which utilized nonheating leads.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter's recommendation does not improve clarity or usability. The present reference to the tap conductor ampacity is accurate. In addition, the submitter has provided no substantiation to extend the allowance to other than de-icing and snow melting cables or mats.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4132)

2- 135 - (210-19(e) (New)): Reject

SUBMITTER: David T. Brender, Cooper Development Assn. Inc.
RECOMMENDATION: Add new text to read as follows:

(e) Habitable Room Branch Circuits. Branch-circuit conductors serving habitable room receptacle outlet(s) shall not be smaller than 12 AWG.

SUBSTANTIATION: As reported in the Eleventh Edition of "Fire in the United States 1987-1996," published by United States Fire Administration National Fire Data Center, fires caused by electrical distribution are the 4th most common cause of fire. The areas where fires most often occur are in the sleeping rooms, lounge areas (living rooms) and kitchens. 20 amp circuits are required in the kitchen, bathroom and laundry room to address the risk of fire. As homes continue to be built larger and larger, as panelboards are located more often at the end of the house, with an increase in the number of electrical appliances in a typical home, and with appliances having increased power consumption and more stringent power quality demands, the risk of overloaded conductors and occurrence of unacceptable circuit voltage drops have dramatically increased. Recent research (International Telework Association and Council-report release October 27, 1999) indicates that 19.2 million people, or 10 percent of the U.S. workforce, now telecommute, supporting the growing residential use of computers, printers, fax machines, copiers, etc. In fact, 55 percent of all U.S. households now have one or more computers (Parks Associates, Forum99, October 1999), and this is expected to grow further to 75-80 percent within the next years. Just as the minimum conductor size for bathrooms was increased due to the change in the type of appliances used on the bathroom circuit, the minimum conductor size for branch circuits should be increased to 12 AWG. The increase in minimum size will increase safety by reducing the risk of overloaded circuits and the need to rewire existing circuits to meet the needs of heavily loaded circuit and sensitive electronic equipment. The overcurrent device ampacity is not intended to be changed by this proposal.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statements on Proposals 2-98, 2-124, and 2-127.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #683)

2- 136 - (210-20(b) Exception No. 1): Accept

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Delete Exception No. 1.

SUBSTANTIATION: Editorial. This is not a true exception to any requirement of Section 240-3 since subsection (e) of that section covers tap conductors of Section 210-19(d).

PANEL ACTION: Accept.

In addition to the submitter's recommendation, revise the main text of existing 210-20(b) to read as follows:

"(b) Conductor Protection. Conductors shall be protected in accordance with Section 240-3. Flexible cords and fixture wires shall be protected in accordance with 240-4."

Delete 210-20(b) Exception No. 1 and Exception No. 2.

PANEL STATEMENT: The panel has revised the main paragraph to provide reference to the applicable sections of Article 240. Since this guidance is now provided in the main paragraph, the exceptions are not necessary.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #2051)

2- 137 - (210-21): **Reject**
SUBMITTER: Joel A. Rencsok, Scottsdale, AZ
RECOMMENDATION: Revise section 210-21 to read as follows:
 Add the word (continuous) to the section 210-21(b) as shown in the revised wording below:
 210-21 Outlet devices. Outlet devices shall have an ampere rating that is not less than the load to be served and shall comply with (a) and (b).
 (a) Lampholders. Where connected to a branch circuit having a rating in excess of 20 amperes, lampholders shall be of the heavy-duty type. A heavy-duty lampholder shall have a rating of not less than 660 watts if of the admedium type and not less than 750 watts if of any other type.
 (b) Receptacles.

1. A single receptacle installed on an individual branch circuit shall have an ampere rating of not less than that of the branch circuit and comply with Table 210-21(b)(2).
 Exception No. 1: Where installed in accordance with Section 430-81(c).

Exception No. 2: A receptacle installed exclusively for the use of a cord- and plug-connected arc welder shall be permitted to have an ampere rating not less than the minimum branch-circuit conductor ampacity determined by Section 630-11(a) for arc welders.

FPN: See definition of Receptacle in Article 100.
 2. Where connected to a branch circuit supplying two or more receptacles or outlets, a receptacle shall not supply a total cord- and plug-connected continuous load in excess of the maximum specified in Table 210-21(b)(2).

Table 210-21(b)(2). Maximum Cord- and Plug-Connected Continuous Load to Receptacle

Circuit Rating (Amperes)	Receptacle Rating (Amperes)	Maximum Continuous Load (Amperes)
15 or 20	15	12
20	20	16
30	30	24

rest of section 210-21 to remain as is.....(3).....
SUBSTANTIATION: This change is necessary to provide consistency between this section and section 384-16(d), 210-20, 210-19 and other sections requiring the 80 percent rule. Portable appliances (such as microwave units and hair dryers) and relocatable power taps are UL tested for a maximum of 1800 watts on a 15 ampere branch circuit and operate as a non continuous load on these branch circuits without a problem.
 Panel 20 and Panel 2 have established a Study Task Group to bring some suggestions for a resolution of this issue.
 UL 498 tests receptacles at 150 percent of their rating so limiting the load on as now required by Table 210-21(b)(2) for noncontinuous load is unnecessary.
 See also Proposal 20-52 on page 668 of the 98 ROP.

Statement by panel: Quote "the substantiation does not justify the reduction in rating to 12 amperes and 16 amperes for appliances rated between 12 and 15 amperes and between 16 and 20 amperes respectively."

This Section as revised will make it mandatory for continuous loads only and not for noncontinuous loads.
 However, the branch circuit requirements remain the same as do the receptacle sizes.

PANEL ACTION: Reject.
PANEL STATEMENT: The panel has addressed the concept that the submitter has proposed in Proposal 2-143. The use of the term "continuous load" would allow the language to be applied to a wider range of appliances than what is presently being done in product listing. The approach taken in Proposal 2-143 addresses the issue, but limits the scope to a narrower range of products.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #CP208)

2- 137a - (210-21(b)): **Accept**
SUBMITTER: CMP 2
RECOMMENDATION: Add titles to 210-21(b) as follows:
 "(1) Single Receptacle on an Individual Branch Circuit. A single receptacle...
 (2) Total Cord- and Plug-Connected Load. Where connected to...
 (3) Receptacle Ratings. Where connected to...
 (4) Range Receptacle Rating. The ampere rating ...".
SUBSTANTIATION: To comply with the NEC Style Manual titles have been added.
PANEL ACTION: Accept.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #1746)

2- 138 - (210-21(b)): **Accept in Principle**
Note: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 18 for information.
SUBMITTER: Jamie McNamara, Hastings, MN
RECOMMENDATION: Revise to read as follows:
 210-21. Outlet Devices.
 (3) Where connected to a branch circuit supplying two or more receptacles or outlets, receptacle ratings shall conform to the values listed in Table 210-21(b)(3), or where larger than 50 amperes, the receptacle rating shall not be less than the branch-circuit rating.
Exception No. 1: Receptacles for one or more cord- and plug-connected arc welders shall be permitted to have ampere ratings not less than the minimum branch-circuit conductor ampacity permitted by Section 630-11(a) or (b) as applicable for ac transformer and dc rectifier arc welders, and Section 630-21(a) or (b) as applicable for motor-generator arc welders.

Exception No. 2: The ampere rating of a receptacles installed for electric discharge lighting shall be permitted to be based 410-30 (c)
SUBSTANTIATION: It is not clear when a receptacle is installed pertaining to 410-30 (c) "Receptacles and attachment plugs shall be permitted to be of lower ampere rating than the branch circuit but not less than 125 percent of the fixture full-load current". This conflicts with Table 210-21 (b) (3) the table for example requires 30 amp receptacles for 30 amp circuits for electric discharge lighting, regardless of the load on the receptacle.
PANEL ACTION: Accept in Principle.

Add a new Exception No. 2 to existing 210-21(b)(3) to read:
 "Exception No. 2: The ampere rating of a receptacle installed for electric discharge lighting shall be permitted to be based on 410-30(c)."
PANEL STATEMENT: The panel has accepted the submitter's recommendation, but has revised the wording to correct the grammatical inconsistencies.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3348)

2- 139 - (210-21(b)(2)): **Reject**
SUBMITTER: Paul Dobrowsky, Holley, NY
RECOMMENDATION: Revise to read as follows:
 Where connected to a branch circuit supplying two or more receptacles or outlets, a receptacle shall not supply a total cord- and plug-connected continuous load in excess of the maximum specified in Table 210-21(b)(2).
SUBSTANTIATION: Individual appliances, rated more than 80 percent that are not continuous loads do not pose a hazard when connected to branch circuits. This change will make this section consistent with Sections 210-19 and 210-20, and consistent with the loads on overcurrent devices, located in a panelboard, in accordance with Section 384-16(d).
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-137.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3765)

2- 140 - (Table 210-21(b) (2)): **Reject**
SUBMITTER: Julie I. Ayres, Assn. of Home Appliance Mfrs
RECOMMENDATION: Add underlined text in Table 210-21(b) (2):

Table 210.21(b)(2) Maximum Cord-Plug-Connected Load to Receptacle		
Circuit Rating Amperes	Receptacle Rating Amperes	Maximum <u>Continuous</u> Load Amperes
15 to 20	15	12
20	20	16
30	30	24

SUBSTANTIATION: A discrepancy exists in what is stated literally in Section 210-23(a) and Table 210-21(b) (2) in the National Electrical Code (NEC) and what occurs in field practice. Presently, many types of cord-connected appliances that are normally operated for periods of less than 3 hours employ attachment plugs utilized at 100 percent of the current rating of the plug. A Task Group comprised of members from code-making panel #2 and #20 met on 7/14/99 at Underwriters Laboratories Inc. in Northbrook, IL and developed examples of the diversity of products that utilize 100 percent of the current rating of the plug. These included intermittent duty products such as microwaves, power tools, personal care products, exercise machines, kitchen appliances, and lawn and garden equipment.

Evidence of problems stemming from excessive current do not exist with the above products. A review of manufacturers' complaint databases and the U.S. Consumer Product Safety Commission (CPSC) data shows no evidence of problems with cords on these appliances from excessive current draw.

The prevalence of these products has continued to increase in the marketplace with a continued decline in fire death rates. Data supplied by the National Fire Protection Association (NFPA)¹ states that the number of fire deaths for 1998 represents the lowest U.S. fire death toll in 20 years. This 2 year downward trend continued for consecutive years 1997 and 1998. The NFPA report indicates that home fire deaths fell by another 4.2 percent in 1998 bringing such rates to a new low.

Section 210-23(a) and Table 210-21(b) (2) in the NEC must be modified to clarify the discrepancies detailed above. Amending the code would be representative of current field practice and would not decrease the level of safety established by the NEC.

¹Press release dated 8/11/99 released from NFPA titled "NFPA Announces U.S. Fire Losses on Decline"

PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-137.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #CP201)

2- 142a - (210-23): **Accept**
SUBMITTER: CMP 2
RECOMMENDATION: Revise existing 210-23(a) to read as follows:

"a) 15- and 20-Ampere Branch Circuits. A 15- or 20-ampere branch circuit shall be permitted to supply lighting units or other utilization equipment, or a combination of both, and shall comply with (1) and (2).

Exception: The small appliance branch circuits, laundry branch circuits, and bathroom branch circuits required in a dwelling unit(s) by Sections 210-11(c) (1), (2), and (3) shall supply only the receptacle outlets specified in that section.

(1) Cord- and Plug-Connected Equipment. The rating of any one cord- and plug-connected utilization equipment shall not exceed 80 percent of the branch-circuit ampere rating unless listed and marked to inform the user of the necessity for providing an individual branch circuit.

(2) Utilization Equipment Fastened in Place. The total rating of utilization equipment fastened in place, other than lighting fixtures, shall not exceed 50 percent of the branch-circuit ampere rating where lighting units, cord- and plug-connected utilization equipment not fastened in place, or both, are also supplied."

SUBSTANTIATION: The panel has revised Section 210-23 to improve readability, and has integrated the language accepted on Proposal 2-143.

PANEL ACTION: Accept.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 11
NEGATIVE: 1
EXPLANATION OF NEGATIVE:

CARPENTER: Permitting marking cord- and plug-connected utilization equipment that exceeds 80 percent of the branch-circuit rating with a label that informs the user of the necessity of an individual branch circuit is expecting too much from the consumer. By merely informing the user by a tag that the equipment needs an individual branch circuit would be inviting code violations. A 15-ampere cord cap could be plugged into a 15-ampere receptacle on a 15- or 20-ampere branch circuit. If the plug fits, the user will connect it. It should not be assumed that just because there is a tag or label an individual branch circuit will be installed wherever one might use the appliance. This appears to be a condition that the listing process should address.

(Log #2052)

2- 141 - (210-23): **Reject**
SUBMITTER: Joel A. Rencsok, Scottsdale, AZ
RECOMMENDATION: Revise section 210-23(a) by adding (operating as a continuous load) to the second sentence to read as follows:

210-23. Permissible Loads. In no case shall the load exceed the branch-circuit ampere rating. An individual branch circuit shall be permitted to supply any load for which it is rated. A branch circuit supplying two or more outlets or receptacles shall supply only the loads specified according to its size as specified in (a) through (d) and as summarized in Section 210-24 and Table 210-24.

(a) 15- and 20-Ampere Branch Circuits. A 15- or 20-ampere branch circuit shall be permitted to supply lighting units or other utilization equipment, or a combination of both. The rating of any one cord- and plug-connected utilization equipment operating as a continuous load shall not exceed 80 percent of the branch-circuit ampere rating. The total rating of utilization equipment fastened in place, other than lighting fixtures, shall not exceed 50 percent of the branch-circuit ampere rating where lighting units, cord- and plug-connected utilization equipment not fastened in place, or both, are also supplied.

Exception: The small appliance branch circuits, laundry branch circuits, and bathroom branch circuits required in a dwelling unit(s) by Sections 210-11(c) (1), (2), and (3) shall supply only the receptacle outlets specified in that section.

(b)..... (c).....(d).....to remain as now written.

SUBSTANTIATION: This change is required if the change to section 210-21 is accepted so that both Sections correlate.

Substantiation for 210-21 as submitted:

This change is necessary to provide consistency between this section and section 384-16(d), 210-20, 210-19 and other sections requiring the 80 percent rule.

Portable appliances (such as microwave units and hair dryers) and relocatable power taps are UL tested for a maximum of 1800 watts on a 15 ampere branch circuit and operate as a non continuous load on these branch circuits without a problem.

Panel 20 and Panel 2 have established a Study Task Group to bring some suggestions for a resolution of this issue.

UL 498 tests receptacles at 150 percent of their rating so limiting the load on as now required by Table 210-21(b) (2) for noncontinuous load is unnecessary.

See also Proposal 20-52 on page 668 of the 98 ROP.

Statement by panel: Quote" the substantiation does not justify the reduction in rating to 12 amperes and 16 amperes for appliances rated between 12 and 15 amperes and between 16 and 20 amperes respectively."

This Section as revised will make it mandatory for continuous loads only and not for noncontinuous loads.

However, the branch circuit requirements remain the same as do the receptacle sizes.

PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-137.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

(Log #4380)

2- 142 - (210-23): **Reject**

SUBMITTER: Paul Dobrowsky, Holley, NY

RECOMMENDATION: Add a new sentence as follows:

"For the purposes of this section, utilization equipment held in place by piping or hose connections shall be considered to be fastened in place."

SUBSTANTIATION: Utilization equipment, such as waste disposals, swimming pool pumps, etc., that is held in place by piping or hose connections without the use of specific additional fasteners is being interpreted as not being fastened in place. Permissible loads and computation of loads on circuits are being compromised.

PANEL ACTION: **Reject.**

PANEL STATEMENT: The panel disagrees that all piping or hose connected equipment is considered to be fastened in place because some hoses used to connect blower or vacuum units can be flexible or movable.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

conditions and provides a means for addressing the safety of these products in their intended applications. Further work will need to be done to develop definitions for continuous and intermittent duty as applied to 15 amp and 20 amp cord and plug connected appliances so that product standards can specifically address the issues of branch circuit loading.

The work towards harmonization of the National Electrical Code and Canadian Electrical Code is also noted and it is suggested that the NEC TCC take action to include this issue as a topic for discussion within the harmonization effort.

(See table below)

PANEL ACTION: **Accept in Principle.**

PANEL STATEMENT: After much discussion, the panel has accepted this proposal in principle and encourages public comment. The panel acknowledges that the table submitted with the substantiation represents present practice for listing, does not cover all appliances, and recognizes that it also includes commercial appliances. The wording of the proposal has been intergrated with the revisions in Proposal 2-142a.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3249)

2- 143 - (210-23(a)): **Accept in Principle**

SUBMITTER: Henry Jenkins, N.C. Ellis Cannady Chapter, IAEI

RECOMMENDATION: Revise text to read as follows:

(a) 15- and 20-Ampere Branch Circuits. A 15- or 20-ampere branch circuit shall be permitted to supply lighting units or other utilization equipment, or a combination of both. The rating of any one cord- and plug-connected utilization equipment shall not exceed 80 percent of the branch-circuit ampere rating unless listed and marked to inform the user of the necessity for providing an individual branch circuit. The total rating of utilization equipment fastened in place other than lighting fixtures, shall not exceed 50 percent of the branch-circuit ampere rating where lighting units, cord- and plug-connected utilization equipment not fastened in place, or both, are also supplied.

Exception: The small appliance branch circuits, laundry branch circuits, and bathroom branch circuits required in a dwelling unit(s) by Sections 210.11(c)(1), (2), and (3) shall supply only the receptacle outlets specified in that section.

SUBSTANTIATION: The proposal addresses the issues raised by Mr. King in Proposal 20-52 NFPA 70-A98 ROP and fulfills the direction of CMP-20 in its disposition of Comments 20-9 and 20-42 through 71.

Presently, many types of cord-connected appliances employ attachment plugs utilized at 100 percent of the current rating of the plug as illustrated by the table. The table does not cover all appliances and is only provided to illustrate that the requirements applied take into account the types of appliances and their intended use. The proposal recognizes presently existing field

(Log #3349)

2- 144 - (210-23(a)): **Reject**

SUBMITTER: Paul Dobrowsky, Holley, NY

RECOMMENDATION: Revise to read as follows:

(a) 15- and 20-Ampere Branch Circuits. A 15- or 20-ampere branch circuit shall be permitted to supply lighting units or other utilization equipment, or a combination of both. The rating of any one cord- and plug-connected ~~utilization equipment~~ **continuous load** shall not exceed 80 percent of the branch-circuit ampere rating. The total rating of utilization equipment fastened in place, other than lighting fixtures, shall not exceed 50 percent of the branch-circuit ampere rating where lighting units, cord- and plug-connected utilization equipment not fastened in place, or both, are also supplied.

SUBSTANTIATION: Individual appliances, rated more than 80 percent that are not continuous loads do not pose a hazard when connected to branch circuits. This change will make this section consistent with Section 210-19 and 210-20, and consistent with the loads on overcurrent devices, located in a panelboard, in accordance with Section 384-16(d).

PANEL ACTION: **Reject.**

PANEL STATEMENT: See panel statement on Proposal 2-137.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

Appliance	Plug Rating			Duty	
	80%	100%	100% w ded. Receptacle	Intermittent	Continuous
20a, Cord and Plug Connected					
Air Compressor			X		X
Central Vacuum Cleaner			X		X
Vacuum Cleaner	X				X
Clothes Dryer			X		X
Heating Equipment	X	X			X
Exercise Equipment		X			X
Indoor/Outdoor Grill		X			X
Lawn and Garden Tools		X		X	
Microwave Ovens		X		X	
Hair Dryers		X		X	
Power Tools		X		X	
Washing Machines			X		X

(Log #3764)

2- 145 - (210-23(a)): Reject

SUBMITTER: Julie I. Ayres, Assn. of Home Appliance Mfrs
RECOMMENDATION: Revise text to read as follows:

(a) 15- and 20-Ampere Branch Circuits. A 15- or 20-ampere branch circuit shall be permitted to supply lighting units or other utilization equipment, or a combination of both. The rating of any one cord- and plug-connected utilization equipment operating under a continuous load shall not exceed 80 percent of the branch circuit ampere rating. The total rating of utilization equipment fastened in place, other than lighting fixtures, shall not exceed 50 percent of the branch-circuit ampere rating where lighting units, cord- and plug-connected utilization equipment not fastened in place, or both, are also supplied.

SUBSTANTIATION: A discrepancy exists in what is stated literally in Section 210-23(a) and Table 210-21(b)(2) in the National Electrical Code (NEC) and what occurs in field practice. Presently, many types of cord-connected appliances that are normally operated for periods of less than 3 hours employ attachment plugs utilized at 100 percent of the current rating of the plug. A Task Group comprised of members from code-making panel #2 and #20 met on 7/14/99 at Underwriters Laboratories Inc. in Northbrook, IL and developed examples of the diversity of products that utilize 100 percent of the current rating of the plug. These included intermittent duty products such as microwaves, power tools, personal care products, exercise machines, kitchen appliances, and lawn and garden equipment.

Evidence of problems stemming from excessive current do not exist with the above products. A review of manufacturers' complaint databases and the U.S. Consumer Product Safety Commission (CPSC) data shows no evidence of problems with cords on these appliances from excessive current draw.

The prevalence of these products has continued to increase in the marketplace with a continued decline in fire death rates. Data supplied by the National Fire Protection Association (NFPA)¹ states that the number of fire deaths for 1998 represents the lowest U.S. fire death toll in 20 years. This 2 year downward trend continued for consecutive years 1997 and 1998. The NFPA report indicates that home fire deaths fell by another 4.2 percent in 1998 bringing such rates to a new low.

Section 210-23(a) and Table 210-21(b)(2) in the NEC must be modified to clarify the discrepancies detailed above. Amending the code would be representative of current field practice and would not decrease the level of safety established by the NEC.

¹Press release dated 8/11/99 released from NFPA titled "NFPA Announces U.S. Fire Losses on Decline"

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-137.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3350)

2- 146 - (210-23(b)): Reject

SUBMITTER: Paul Dobrowsky, Holley, NY

RECOMMENDATION: Revise to read as follows:

(b) 30-Ampere Branch Circuits. A 30-ampere branch circuit shall be permitted to supply fixed lighting units with heavy-duty lampholders in other than a dwelling unit(s) or utilization equipment in any occupancy. A rating of any one cord- and plug-connected ~~utilization equipment~~ continuous load shall not exceed 80 percent of the branch-circuit ampere rating.

SUBSTANTIATION: Individual appliances, rated more than 80 percent that are not continuous loads do not pose a hazard when connected to branch circuits. This change will make this section consistent with Sections 210-19 and 210-20, and consistent with the loads on overcurrent devices, located in a panelboard, in accordance with Section 384-16(d).

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-137.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2571)

2- 147 - (Table 210-24): Reject

SUBMITTER: Travis Lindsey, Bldg Dept., Clark County, NV

RECOMMENDATION: Revise Table 210-24 to require No. 12 minimum conductor size for 15 amp branch circuits.

This proposed change is intended to coordinate with the proposed change in 210-19(a).

(a) Branch-Circuit conductors shall have an ampacity not less than the load to be served and shall not be smaller than No. 12.

SUBSTANTIATION: In our jurisdiction we have rules limiting branch circuits to No. 12. We did this because there were problems with heating of conductors, overloaded circuits and tripping related to these conditions. Since enacting these regulations the number of problems have been reduced significantly.

Many times conductors have been applied incorrectly. Ambient temperature correction factors are not always considered. Most attics are hot enough for prolonged periods during the summer months that application of the correction factors would reduce the current carrying capacity of the No. 14 wire to a very small number. Increased heating occurs when these circuits are heavily loaded.

In cases such as single outlet appliance circuits serving refrigerators and similar loads, the circuits have been known to fatigue and deteriorate (oxidize and burn) at connection points, overcurrent devices and receptacles due to the high starting loads and the small wire size.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-124.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1766)

2- 148 - (Table 210-24, FPN): Accept in Principle

SUBMITTER: Edward Olson, Pendleton, SC

RECOMMENDATION: Add a fine print note to read as follows:

(FPN): The gauges listed in Table 210-24 for tap conductors are minimum values. The ampacities of the tap must conform to Section 310-15 and the overcurrent protection of the tap must adhere to Section 240-21.

SUBSTANTIATION: I have witnessed several instances were technicians and engineers have to refer to Table 210-24 as a conductor size reference. Thus asserting that 14 AWG taps to receptacles and lampholders can be connected to 12 AWG branch circuits protected by a single 20 AMP overcurrent device located at the service entrance, utilizing nonmetallic-sheathed cable in a one/two family dwelling.

PANEL ACTION: Accept in Principle.

Revise the existing first paragraph of 210-24 to read as follows:

"The requirements for circuits that have two or more outlets or receptacles, other than the receptacle circuits of Sections 210-11(c)(1) and (2), are summarized in Table 210-24. This table provides only a summary of minimum requirements. See 210-19, 210-20 and 210-21 for the specific requirements applying to branch circuits".

PANEL STATEMENT: The first paragraph of 210-24 has been revised to make it clear that the table provides only a summary of requirements and that the user must consult 210-19, 20 and 21 to apply the rules.

Also, the panel has removed the words "as specifically provided for above" in the first paragraph since they provide no reference to what is "above".

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1487)

2- 149 - (210-25): Reject

SUBMITTER: Northeastern Regional Fire Code Dev. Committee

RECOMMENDATION: Revise to read:

210-25. Common Area Branch Circuits. Branch circuits in dwelling units shall supply only loads within that dwelling unit or loads associated only with that dwelling unit. Branch circuits required for the purpose of lighting, central alarm, signal, communications, or other needs for public or common areas of a

~~two family or~~ multifamily dwelling shall not be supplied from equipment that supplies an individual dwelling unit.
SUBSTANTIATION: The requirements of Section 210-25 provide an unnecessary burden on 2 family homes that contain common areas and are largely owner occupied. This section requires 2 family homes to install a separate meter and electric panel to serve as few as 3 smoke detectors and 1 light in the basement of a building where the dwelling units are one over the other and each dwelling unit has the required means of egress directly to outdoors. The cost of this separate service can be anywhere from \$500.00 to \$1,000.00.

Some electric utilities treat a separate "House Meter" as a commercial installation and often charge a minimum monthly fee of as much as \$20.00 where the actual usage is only pennies. In most two-family dwellings there are no, or very small, common areas, these circuits could be added to one of the dwelling units.

This requirement is not in the current CABO One- and Two-Family Code. For consistency with the CABO Code and should be eliminated in the NEC.

Appliances, devices, circuits or panels in the common area could be marked as to which panel controls them to eliminate any safety concerns.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel does not agree that two family dwellings should be excluded from the rule. The common area loads are not limited to smoke alarms and lights, but have also included water pumps, sprinkler pumps, common boilers, etc.

This requirement is not in the CABO document because the CABO document is based on a previous edition of the NEC. The One- and Two-Family Dwelling Unit Code should be revised to reflect the requirements contained in the NEC.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3683)

2- 150 - (210-26 (New)): Reject

SUBMITTER: Leonard F. Devine, Jr., W. Palm Beach County Bldg & Zoning, FL

RECOMMENDATION: Add new text to read as follows:

210.26 The maximum number of 120 volt outlets permitted per circuit in residential occupancies shall not exceed the provisions of Table 210.26.

Table 210.26 Maximum Number of Outlets													
Per Circuit for Residential Occupancies													
Lighting outlets	12	11	10	9	8	7	6	5	4	3	2	1	0
Duplex receptacle	0	0	1	1	2	2	3	3	4	4	5	5	6

SUBSTANTIATION: This new section and table would provide a greater degree of safety for residential occupancies. The homeowner would have a greater degree of flexibility using today's many appliances, computers, televisions, etc.

PANEL ACTION: Reject.

PANEL STATEMENT: The outlets provided for dwelling units by the requirements in Section 210-52 are intended to be convenience outlets and adding outlets does not necessarily add load. There is no intent to limit the number of convenience outlets on a general branch circuit in a dwelling unit.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3238)

2- 151 - (210-50): Reject

SUBMITTER: Edward J. Fox, Jr., Orange County Bldg Div., FL

RECOMMENDATION: 210-50: There shall be a minimum of two (2) duplex receptacles in each office, and classroom. They shall be separated by a reasonable distance to provide access from different areas of the room.

SUBSTANTIATION: By providing receptacles that would normally not be installed for offices, and classrooms, the citizens would not have to use extension cords, nor would they have to hire an electrician to come in and add receptacles after they have taken occupancy.

All offices have many electrical appliances and it would be safer if these had receptacles to plug into instead of extension cords.

By providing a better electrical system up front, the citizens are not impacted by additional cost later due to adding more receptacles and circuits to handle an ever-increasing demand.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter's proposed revision does not resolve the situation presented in the substantiation. The present code rule in 210-50(b) requires a receptacle where cord and plug connections are used. Adding a rule to provide two receptacles would not keep (or in some cases even minimize) the user from violating the Code and using an extension cord, since the final usage of the particular space is not known. For non-dwelling unit applications, proper planning and design must be used to provide adequate access to receptacle outlets. If the receptacles are not provided, then it would be necessary to have receptacles installed by a qualified person.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #684)

2- 152 - (210-50(a)): Accept in Part

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Revise to read as follows:

(a) Cord Pendants. A cord connector body that is ~~supported~~ supplied by a permanently installed ~~connected~~ cord pendant shall be considered a receptacle outlet.

SUBSTANTIATION: Editorial. Cord connector body seems to be the commonly used term. The distinction of limitation to a pendant infers other than pendants are not receptacles, such as may be permitted in Articles 305, 364, Sections 422-17(b), 422-22(a). Some code sections indicate receptacles and cord connectors are not the same, e.g., Sections 210-7(b)(c); Article 410 Part L, Sections 422-17(b); 422-22(a)(c); 305-4(d); 513-11(b); etc. If a permanently connected cord (where permitted) with cord connector body is not clearly designed as a receptacle many code requirements may not be deemed applicable, such as Sections 210-21(b)(1)(2)(3)(4); 220-13; 400-7(b); 410-56(a); 430-42(c); 430-81(c); 430-109, Exception No. 6; 440-55(b), etc.

PANEL ACTION: Accept in Part.

Revise the wording in existing Section 210-50(a) to read as follows:

"(a) Cord Pendants. A cord connector that is supplied by a permanently connected cord pendant shall be considered a receptacle outlet."

PANEL STATEMENT: The word "body" was rejected since the current terminology for this device is "cord connector," not "cord connector body." See UL's guide information for Attachment Plugs (AXGV) in Green (Electrical Construction Equipment) and White (General Information) Directories.

The panel accepted "supplied" as more appropriate since "supported" implies a physical attachment rather than an electrical connection.

The panel rejected the elimination of "pendant" in the sentence to make clear that "pendant" is the appropriate term as it applies here and in other parts of the Code. See Sections 370-23(h), 370-25(c), and 400-7.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2747)

2- 153 - (210-50(b)): Reject

SUBMITTER: Joseph N. Fiorello, Sr., Fiorello Electric Inc.

RECOMMENDATION: Revise as follows:

(b) Cord Connections. A receptacle outlet shall be installed wherever flexible cords with attachment plugs are used. Where flexible cords are permitted to be permanently connected, receptacles shall be permitted to be omitted for such cords. (Receptacles installed in the face down position shall be of the twist-lock type.)

SUBSTANTIATION: While inspecting a job that did utilize attachment plugs as permanent connections, the problem arose that when the cord reels supplying the required outlets were shaken the plugs pulled out from their connection. Also, I've encountered garage door openers that have shaken their attachment plug loose.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has not presented sufficient evidence that there is a problem with properly installed receptacles in a face-down position. The panel notes that changing to twist-lock receptacles would render many devices such as garage door openers

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

and cord reels unusable because they are supplied with standard attachment caps.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #CP202)

2- 153a - (210-52): Accept
SUBMITTER: CMP 2
RECOMMENDATION: Add a new first sentence to 210-52 to read as follows:
"This section provides requirements for 125-volt, 15- and 20-ampere receptacle outlets."
SUBSTANTIATION: The panel has added a new sentence to clarify that the required receptacles in Section 210-52 are to be 125-volt, 15- or 20-ampere configurations only.
PANEL ACTION: Accept.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2249)

2- 154 - (210-52): Reject
SUBMITTER: Dennis R. Scarfo, LDA Co.
RECOMMENDATION: I feel that all general purpose receptacles should be required to have the ground slot installed on top.
SUBSTANTIATION: Recently, I have become aware of this and I feel that it would be good practice and prevent a possible accident, if an object were to come in contact, possibly by dropping on the hot and neutral blades of a connected load. The ground slot installed on top would eliminate this possible danger.
PANEL ACTION: Reject.
PANEL STATEMENT: There is no evidence to support a required orientation of the ground slot for a receptacle outlet. The panel notes that receptacles have been installed with the ground pin up and down (as well as horizontally) for many years with no established trend of one orientation being better than the other.
Other arguments include ones stating that keeping the grounding slot in the lower position will keep the grounding pin of an attachment plug connected to the receptacle for as long as possible if the plug starts to disengage.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3351)

2- 155 - (210-52): Accept in Principle
SUBMITTER: Paul Dobrowsky, Holley, NY
RECOMMENDATION: Delete all occurrences "of (in) dwelling unit" within this section. Revise as follows:
(a) General Provisions. In every kitchen, family room, dining room, living room, parlor, library, den, sunroom, bedroom, recreation room, or similar room or area of dwelling units, receptacle outlets shall be installed in accordance with the general provisions specified in (1) through (3).
(b) Small Appliances. 1. In the kitchen, pantry, breakfast room, dining room, or similar area of a dwelling unit, the two or more 20-ampere small-appliance branch circuits required by Section 210-11(c)(1) shall serve all receptacle outlets covered by Sections 210-52(a) and (c) and receptacle outlets for refrigeration equipment.
(c) Countertops. In kitchens and dining rooms of dwelling units, receptacle outlets for counter spaces shall be installed in accordance with (1) through (5).
(d) Bathrooms. In dwelling units, At least one wall receptacle outlet shall be installed in bathrooms within 36 in. (914 mm) of the outside edge of each basin. The receptacle outlet shall be located on a wall that is adjacent to the basin location. See Section 210-8(a)(1).
(h) Hallways. In dwelling units, Hallways of 10 ft (3.05 m) or more in length shall have at least one receptacle.
SUBSTANTIATION: Section 210-60 requires that 210-52 be used for the installation requirements for receptacles in hotel and motel guest rooms. The phrase dwelling unit conflicts with this

requirement. The phrase dwelling unit would remain in the title of Section 210-52 to maintain the requirement to dwelling units.

PANEL ACTION: Accept in Principle.

Revise 210-60(a) to read as follows:

"(a) General. Guest rooms in hotels, motels and similar occupancies shall have receptacle outlets installed in accordance with 210-52(a) and 210-52(d). Guest rooms meeting the definition of a dwelling unit, shall have receptacle outlets installed using all of the applicable rules in 210-52."

PANEL STATEMENT: The panel has kept the term dwelling unit in 210-52, but has revised 210-60 to make it clear as to what provisions of 210-52 apply to guest rooms. This accomplishes the objective of the submitter to make it clear as to what portions of 210-52 apply.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

COMMENT ON AFFIRMATIVE:

BROWN: There is an inherent problem with trying to equate a "guest room" and a "dwelling unit". All definitions in the model building codes, and the documents of the NFPA family of codes and standards, including the NEC, reference a "dwelling unit" only to those occupancies in one- and two-family dwellings and multifamily dwellings. The definition of a "guest room" (and guest suite) is referenced only to those areas in hotel occupancies. In other words, a "guest room" cannot be a "dwelling unit". The last sentence of the revision should be changed to read: "Guest rooms shall have receptacle outlets installed using all of the applicable rules in Section 210-52." The intent of this requirement will not be changed.

(Log #2810)

2- 156 - (210-52(a), Exception (New)): Reject
SUBMITTER: Bud Swathwood, Bud Swathwood Consulting
RECOMMENDATION: Add an exception to read as follows:
Exception: A receptacle shall not be required in areas behind interior doors that will cover the receptacle when the door is open. These areas would include bedrooms, bathrooms, kitchens, etc.
SUBSTANTIATION: A problem we are having is the damaging of portable cords for lamps, sweepers etc., when doors are opened and these appliances are plugged into these outlets. There have been cases where people have tripped when walking into rooms and the cord is across the doorway after being plugged into these outlets.
PANEL ACTION: Reject.
PANEL STATEMENT: The panel continues to maintain the long standing position that these receptacles are required. Frequently, the receptacles in these locations are the only ones remaining available for plugging in portable appliances (such as vacuum cleaners, etc.) after the furniture is in place in the room.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #685)

2- 157 - (210-52(a)(1)): Accept in Principle
Note: The Technical Correlating Committee understands that the values in the panel action are as accepted in the action on Proposal 2-3.
SUBMITTER: Dan Leaf, Palmdale, CA
RECOMMENDATION: Revise to read as follows:
Spacing. Receptacles shall be installed so that no point along the floor line in any wall space is more than 6 ft (1.83 m) measured horizontally, from an a receptacle outlet in that space. Receptacle outlets shall, insofar as practicable, be spaced equal distances apart.
SUBSTANTIATION: The requirement proposed to be deleted is not needed and if enforced can cause problems. Basic spacing is covered by the first paragraph and normally results in compliance with equal spacing. If, for example, three receptacle outlets are installed one foot apart for a particular need such as supply for an entertainment center a strict enforcement of the rule would require the same spacing for all other receptacle outlets. I believe this equal spacing requirement is a holdover from previous code when a minimum number of receptacle outlets (two?) was required per room, and justified by in effect requiring two receptacle outlets to be installed on opposite walls, not the same wall.
PANEL ACTION: Accept in Principle.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

Revise existing Section 210-52(a)(1) to read as follows:

"(1) Spacing. Receptacles shall be installed so that no point along the floor line in any wall space is more than 6 ft (1.83 m), measured horizontally, from another receptacle outlet in that space."

PANEL STATEMENT: The panel has accepted the submitter's deletion of the second sentence and has revised the first sentence to make it clear that the spacing is from another receptacle outlet in the space.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #360)

2- 158 - (210-52(a)(1), Exception (New)): Reject

SUBMITTER: James Goshey, Spruce Electric

RECOMMENDATION: Add an exception to read as follows:

Exception: A wall space 2 ft or larger which would be completely covered by a door in an open position, shall not be required to have a receptacle located within.

SUBSTANTIATION: A receptacle located behind an open door invites many hazards. It seems to encourage the use of a fixture cord or extension cord across a walkway, possibly under a rug or carpet runner.

Note: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-156.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #428)

2- 159 - (210-52(a)(2)): Reject

SUBMITTER: Mike Forster, Toronto, OH

RECOMMENDATION: Receptacles should be 2 ft from every corner of the wall.

SUBSTANTIATION: Worded wrong and should say receptacles should start 2 ft from every corner on every 6 ft spacing.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter's recommendation is not clear. The receptacle spacing presently specifies, appropriately spaced receptacles around the wall to allow typical cord- and plug-connected devices to be used.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2428)

2- 160 - (210-52(a)(2)): Reject

SUBMITTER: Dennis Kaunzner, City of Sierra-Vista, AZ

RECOMMENDATION: Add a new Part D:

"Fireplace mantels shall have a receptacle."

SUBSTANTIATION: So many times a receptacle is needed for all the accessories that can be installed on a mantel.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has not presented any substantiation other than that associated with convenience. The panel notes that a receptacle installed for a mantel is not prohibited by the present code and could be specified by the designer/owner.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2284)

2- 161 - (210-52(a)(2) Exception No. 1 (New)): Reject

SUBMITTER: Terry L. Schneider, Regional Bldg Dept.

RECOMMENDATION: Add a new Section 210-52(a)(2)

Exception No. 1 to read:

"Outlets shall not be required to be installed in wall spaces located behind the swing of a door."

SUBSTANTIATION: Having requirements for outlets in these areas is not only impractical, but could lead to damaged cords, and personal hazards resulting from items utilizing these outlets.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-156.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #288)

2- 162 - (210-52(a)(2)(a)): Reject

SUBMITTER: J. Michael Scott, Three Forks, MT

RECOMMENDATION: Revise text to read:

(a) Any space ~~2 ft (610 mm)~~ 4 ft (2440 mm) or more in width (including space measured around corners) and unbroken along the floor line by doorways, fireplaces, and similar openings.

SUBSTANTIATION: The existing text requires a receptacle on unusable wall sections and wall sections between closets. This provision should be a design criteria, and not a code requirement.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel does not agree that the two foot wall space section is unusable space. These spaces have tables with lamps or other similar furniture that need access to a receptacle.

Also, this space serves to provide access to a convenience outlet that might otherwise be covered up by larger furniture and helps to eliminate the use of extension cords by persons attempting to locate a more permanent outlet in that space.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2429)

2- 163 - (210-52(a)(2)(a)): Reject

SUBMITTER: Dennis Kaunzner, City of Sierra-Vista, AZ

RECOMMENDATION: Revise text to read:

"Any space 2 ft or more in width and unbroken along the floor by doorways, ~~fireplaces~~ and similar openings."

SUBSTANTIATION: Fireplaces are not defined as to what part of the fireplace constitutes wall space. If it were just the fire box there is not a problem but if you take the width of the overall fireplace (say it's 6 ft) then take 6 ft on each side of the fireplace you wind up with 18 ft. If you include the fireplace as wall space then you cut down the gap between receptacles. Fireplaces should have a receptacle fairly close to incorporate mantels with lights, clocks, Xmas trimmings, etc. to eliminate extension cords.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel does not agree that the fireplace opening needs any different treatment than a doorway.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #CP207)

2- 163a - (210-52(b)): Accept

SUBMITTER: CMP 2

RECOMMENDATION: In 210-52(b) add titles as follows:

"(1) Receptacle Outlets Served. In the kitchen..."

(2) No Other Outlets. The two or more..."

(3) Kitchen Receptacle Requirements. Receptacles installed in..."

SUBSTANTIATION: The panel has added titles to comply with the NEC Style Manual.

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #289)

2- 164 - (210-52(b)(1)): Reject

SUBMITTER: J. Michael Scott, Three Forks, MT

RECOMMENDATION: Revise text to read:

(1) In the kitchen, pantry, breakfast room, dining room, or similar

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

area of a dwelling unit, the two or more 20 ampere small appliance branch circuits required by 210-11(c)(1) shall serve all receptacle outlets covered by Sections 210-52(a) and (c) and receptacle outlets for refrigeration equipment and may also supply the range hood fan.

SUBSTANTIATION: No reason why not.

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter has not presented any substantiation. The panel addressed the range hood issue during the 1996 NEC cycle and concluded that it was not appropriate for the range hood to be connected to the small appliance branch circuit. Depending on the configuration, the range hood can add significant load to the small appliance circuit.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #686)

2-165 - (210-52(b)(1) Exception No. 2): Reject

SUBMITTER: Dan Leaf, Palmdale, CA

RECOMMENDATION: Revise to read as follows:

Exception No. 2: ~~The receptacle outlet~~ A single receptacle for refrigeration equipment shall be permitted to be supplied from an individual branch circuit rated 15 amperes or greater.

SUBSTANTIATION: Editorial. An individual branch circuit (per definition) implies a single receptacle. The receptacle outlet (per definition) may contain several receptacles. A duplex receptacle at the edge of and above a countertop supplied by a small appliance circuit is not prohibited from supplying a refrigerator. The exception permits a 15 ampere circuit for such receptacle, with no load calculation required.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel has attempted to be reasonable with the exception and not require a single receptacle to be used.

The panel notes that the exception permits an additional circuit to supply the refrigerator. It is recognized that frequently the receptacle is indeed located behind the refrigerator making the single receptacle requirement overly burdensome. Should the outlet be close to or above the countertop, it would not count as the required countertop outlet by 210-52(c) and another outlet would be required to be installed and connected to the small appliance branch circuit.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #588)

2-166 - (210-52(b)(2) Exception No. 3 (New)): Reject

SUBMITTER: John Ziegler, Wentzel Electric

RECOMMENDATION: Add an exception to 210-52(b)(2) to read as follows:

Exception No. 3: A receptacle or direct wire for exhaust hood and light or microwave hood combination, shall be permitted on the small appliance branch circuit required in 210-52(b)(1).

SUBSTANTIATION: Problem. Exhaust hoods changed out to microwave hood combination overloads lighting circuit.

1) Microwave on counter would be on small appliance circuit anyway

2) Gas fired appliances have lights and small fans like hoods and are allowed

3) Referenced equipment should be on 3rd small appliance circuit (See additional submitted proposal)

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-164.

The panel does not agree that placing the microwave/range hood on the small appliance branch circuit resolves what is indicated in the substantiation. The panel notes any load placed on the lighting circuit (as noted in the substantiation) would have to comply with 210-23.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4163)

2-167 - (210-52(b)(2) Exception No. 3): Reject

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

RECOMMENDATION: Add a third Exception as follows:

Exception No. 3: Where receptacles are located to serve a kitchen counter top on a peninsula or an island that is also a fixed room divider between two rooms, and where one of those rooms is not included in Section 210-52(b)(1), and where those receptacles qualify by their location and are used to meet the requirements of Section 210-52(a) for that room, those receptacles shall be permitted to be connected to a small appliance branch circuit.

SUBSTANTIATION: Many times a peninsula is the divider between two rooms. If one of those rooms does not qualify for small-appliance branch-circuit supplied receptacles, then there is a possibility of multiple receptacle outlets at one location. This is definitely unintended and a real burden. Small appliance branch circuits are unlikely to be compromised by the very occasional small loads represented by such items as floor lamps.

It is difficult to imagine a scenario where what would probably be the load connected to no more than one duplex receptacle would unduly burden a small-appliance branch circuit, except in a case where such a load would be an even greater burden on the associated lighting circuit. What isn't difficult to imagine is the consternation of a homeowner looking at the side of the peninsula between the kitchen area and the living room area, and seeing a receptacle just below the counter and a perimeter receptacle two feet below that. This in particular after he or she just threatened to sue the electrician and the municipal inspector for requiring the nice cherry finish to be disrupted by a receptacle.

In the last cycle CMP 2 responsibly recognized that owners simply aren't willing to tolerate tombstone receptacle outlets on flat islands. Any inspector will also tell you they don't want the visual effect of the sides of peninsulas or islands disrupted. I can remember holding a certificate of occupancy for eleven months while I fought with the homeowner about just one receptacle outlet on the side of his island. The electrician had no problem, it was just another opening to him. Remember, on the literal text, you couldn't even split a duplex receptacle with the top half on a small-appliance circuit and the lower half on the lighting circuit, because both halves would still service the countertop and qualify for mandatory inclusion on the small appliance circuit. One receptacle is enough at any given portion of a peninsula. One receptacle required at a point two feet above another on the same peninsula is absurd and unlikely to be enforced.

PANEL ACTION: Reject.

PANEL STATEMENT: The receptacles in the adjacent room should not be permitted on the small appliance branch circuit. Some of the constructions encountered would fit well into the submitter's concept, but others may indeed place a burden on the small appliance branch circuit. Given the wide and varying constructions, it is prudent to keep the receptacles delineated between the two rooms.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4164)

2-168 - (210-52(b)(3)): Accept

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

RECOMMENDATION: Revise as follows:

3. Receptacles installed in a kitchen to serve countertop surfaces shall be supplied by ~~not less~~ no fewer than two small-appliance branch circuits, either or both of which shall also be permitted to supply receptacle outlets in the same kitchen and in other rooms specified in Section 210-52(b)(1). Additional small-appliance branch circuits shall be permitted to supply receptacle outlets in the kitchen and other rooms specified in Section 210-52(b)(1). No small-appliance branch circuit shall serve more than one kitchen.

SUBSTANTIATION: The Style Manual does not mandate that the code be written in violation of accepted principles of English grammar, contrary to popular opinion. That responsibility rests with the code making panels. When a number of items is countable, the term is "fewer" and when not, "less." For example, I might have less sand, but if that were the case, I probably would have fewer grains of sand. The terminology in the Style Manual about "not less than" is on a list, but the list is not an exclusive list. Furthermore, the example in the current style manual ("Shall have a clearance of not less than 5 cm...") is used correctly. See also Sections 280-24(a)(1) and 334-10(a) which use the words correctly.

PANEL ACTION: Accept.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4075)

2- 169 - (210-52(c)): Reject
SUBMITTER: Carol Roseman, San Francisco, CA
RECOMMENDATION: Add a new item and renumber.
"Wall Opening Counter Spaces. At least one receptacle outlet shall be installed at each wall opening counter space if the opening exceeds 4 ft."
SUBSTANTIATION: This proposal identifies an increasingly common architectural practice and applies an existing method of remedy.
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter's recommendation is not clear. "Wall opening counter space" is not a defined term.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2435)

2- 170 - (210-52(c)(4)): Reject
SUBMITTER: Dennis Kaunzner, City of Sierra-Vista, AZ
RECOMMENDATION: Revise text to read as follows:
"Countertop spaces separated by appliance garages, range tops, refrigerators, sinks shall be considered as separate countertop spaces in appliances."
SUBSTANTIATION: When appliance garages are used, it covers up a required receptacle allowing areas of the countertop without any receptacle.
PANEL ACTION: Reject.
PANEL STATEMENT: The panel does not agree that appliance garages generally split the countertops into separate spaces. However, the panel has addressed the issue of location of receptacle outlets in Proposal 2-172.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #1483)

2- 171 - (210-52(c)(5)): Accept
Note: The Technical Correlating Committee directs that the panel provide the appropriate metric values. This action will be considered by the Panel as a Public Comment.
SUBMITTER: Martha Montana, Montana Interior Design
RECOMMENDATION: Change 18 in. to 20 in.
SUBSTANTIATION: Kitchen cabinets are designed so the height of the base cabinet is 36 inches. The height of the top cabinets are 84 inches (7 feet) these top cabinets are 30 inches high this leaves 18 inches above the counter. However, I would like to install plug mold at the bottom of the cabinet in the 2 inch recess of the top cabinet that supports the bottom shelf. This would still all use of appliances with 24 inch cords, and allow for better mounting of under the cabinet appliances.
PANEL ACTION: Accept.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2422)

2- 172 - (210-52(c)(5)): Accept
SUBMITTER: Dennis Kaunzner, City of Sierra-Vista, AZ
RECOMMENDATION: Revise the last line of (5) to read:
"Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, or appliances occupying dedicated space shall not be considered as these required outlets."
SUBSTANTIATION: Although an appliance garage contains appliances that take up dedicated slack there seems to be confusion on the interpretation and the words appliance garage will help.
PANEL ACTION: Accept.
PANEL STATEMENT:

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3862)

2- 173 - (210-52(c)(5)): Accept
SUBMITTER: J. Philip Simmons, Olympia, WA
RECOMMENDATION: Revise text to read as follows:
(5) Receptacle Outlet Location. Receptacle outlets shall be located above, but not more than 18 in. (458 mm) above the countertop. ~~Receptacle outlets shall not be installed in a face up position in the work surfaces or countertops.~~ Receptacle outlets rendered not readily accessible by appliances fastened in place or appliances occupying dedicated space shall not be considered as these required outlets.
SUBSTANTIATION: This is a companion proposal to one that intends to locate this requirement in Section 210-7 so it will apply to all dwelling unit receptacle outlets.
PANEL ACTION: Accept.
The panel has accepted the deletion of the sentence.
PANEL STATEMENT: See panel action and statement on Proposal 2-53.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #423)

2- 174 - (210-52(c)(5), Exception): Reject
SUBMITTER: Larry N. Toyas, Toyas Brothers Electrical Contractors Inc./Rep. I.A.E.I.
RECOMMENDATION: Revise 210-52(c)(5) Exception to read as follows:
To comply with the conditions as specified in (a) or (b), receptacle outlets shall not be permitted to be mounted ~~not more than 12 in. (305 mm)~~ below the countertop.
SUBSTANTIATION: It was always apparent to me that a child could pull on a cord and get severely burned by an appliance that was plugged into an outlet below the countertop such as a coffee pot. When I asked about this code at a 1999 code seminar, I was told by the guest speaker that Colorado does not permit outlets below the countertop. Why are you allowing such a dangerous condition to exist. Please stop it before another child is hurt.
PANEL ACTION: Reject.
PANEL STATEMENT: The panel shares concerns relative to the access of a side-mounted receptacle to children and that's why the language minimizes the installation of receptacles on the side of countertops as much as possible with the present products and construction methods. Parents will have to be prudent in their use of side-mounted receptacles where small children are present as they are with many other hazards in the home. The primary requirement is that the receptacles be mounted above the countertops.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12
COMMENT ON AFFIRMATIVE:
BROWN: There will be a need for the committee to consider the installation requirements for these outlets in relationship to their use by the physically handicapped. Forthcoming actions being taken by the development committee on ANSI A117.1 as soon as they are available. Some of the concerns have already been addressed by the Technical Committee on Electric on NFPA 501, Standard on Manufactured Homes.

(Log #1484)

2- 175 - (210-52(c)(5), Exception): Accept in Principle
Note: The Technical Correlating Committee understands that the values in the panel action are as accepted in the action on Proposal 2-3.
SUBMITTER: Martha Montana, Montana Interior Design
RECOMMENDATION: Revise exception to read as follows:
Exception: To comply with the conditions as specified in (a) or (b), receptacle outlets shall be permitted to be mounted not more

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

than 12 in. (305 mm) below the countertop. Receptacles mounted below the countertop in accordance with this exception shall not be located where the receptacle countertop extends more than 6 in. (153 mm) beyond the edge of the countertop measured horizontally its support base.

SUBSTANTIATION: As the code text is now written, a receptacle cannot be located on the bottom of the countertop. I would like to be able to use plug mold located within 6 in. of the edge of the countertop even if the countertop extended more than 6 in. beyond the base of the cabinet.

PANEL ACTION: Accept in Principle.

Revise the second sentence of existing Section 210-52(c)(5)

Exception to read:

"Receptacles mounted below a countertop that extends more than 6 in. (153 mm) beyond its support base, shall be located so that they are not more than 6 in. (153 mm) from the outside edge of the countertop."

PANEL STATEMENT: The panel has revised the second sentence of the exception to provide specific guidance for receptacles mounted below an extended edge countertop. This wording would allow any method of locating these receptacles (including surface receptacles) provided they are within six inches of the outside edge of the countertop.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 9

NEGATIVE: 3

EXPLANATION OF NEGATIVE:

CARPENTER: There has been considerable opposition for allowing receptacle outlets located below countertops to serve countertop spaces. The Panel has provided for a way to allow for a receptacle outlet no more than 12 in. below the countertop when certain conditions are met. This does not totally eliminate the danger of cords being draped over the countertop but, at least, does keep the cord close to the base cabinet. This proposal would allow the draped cord to hang out away from the base cabinet, more susceptible to being caught and pulling the equipment off the surface. These countertop extensions of more than 6 in. are usually used as eating surfaces with chairs or bar stools being used or stored under the area which increases the danger of hooking the cord and causing damage.

NISSEN: I am voting negative based on the negative comments of Mr. Carpenter and Mr. Roche on the proposal's receptacle outlets. I agree that there is a potential hazard in permitting a cord to be connected to this revised location, that is, beneath the overhanging countertop.

ROCHE: Where a countertop extends more than 6 in. beyond its support base, that portion of the countertop is likely to be used as a location for seating. People will be seated on chairs or stools at that countertop, and beside them will be dangling cords plugged into receptacles that would be allowed to be installed by this change. It is a certainty that cords would be hit and devices moved or pulled off the countertop. Restricting that receptacle to be within 6 in. of the outside edge of the countertop does not improve the situation. That 6 in. is a space where there is likely to be significant arm and leg movement by someone seated at the countertop.

(Log #3251)

2-176 - (210-52(c)(5), Exception): Accept in Principle

SUBMITTER: Michael R. Fisher, Bluhm Electric Inc.

RECOMMENDATION: Revise text to read as follows:

Exception: To comply with the conditions as specified in (a) or (b), receptacle outlets shall be permitted to be mounted not more than 12 in. (305 mm) below countertop. Receptacles mounted below countertop in accordance with this exception shall ~~not be located where the countertop extends more than 6 in. (153 mm),~~ be located within 6 in. (153 mm) from where the countertop extends beyond its support base.

SUBSTANTIATION: Most countertops are extending beyond 6 in. from its support, so we are installing receptacles on sides of cabinets that are in the walkways of the kitchen so when the homeowner uses an appliance the cord end is in the walkway - but if installed under the countertop only the cord is along side, and less likely to be in the way. As long as the receptacle is 6 in. from the countertop, it does not matter how much the countertop extends beyond its support base.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action and statement on Proposal 2-175.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

NEGATIVE: 1

EXPLANATION OF NEGATIVE:

ROCHE: See my Explanation of Negative Vote on Proposal 2-175.

(Log #4076)

2-177 - (210-52(c)(5), Exception (b)): Reject

SUBMITTER: Carol Roseman, San Francisco, CA

RECOMMENDATION: Add text to read:

"On island, peninsula and wall opening countertops."

SUBSTANTIATION: This section of code must be revised to reference my proposed addition to Section 210-52(c).

PANEL ACTION: Reject.

PANEL STATEMENT: The submitter's recommendation is not clear. The term "wall opening countertop" is not defined.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1829)

2-178 - (210-52(c)(5)(a) and (b)): Reject

SUBMITTER: Kevin X. Smith, Apopka, FL

RECOMMENDATION: Revise to read as follows:

Receptacles shall be mounted below the countertops only in facilities built and designed for physically impaired persons.

SUBSTANTIATION: Section 210-52(c)(5)(b) does not take into consideration that small children are likely to pull or tug on cords plugged into receptacles. This could be a dangerous problem.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-174.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #8)

2-179 - (210-52(d)): Accept in Principle

NOTE: The following proposal consists of Comment 2-119 on Proposal 2-5 in the 1998 Annual Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 1999 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 2-5 was: Revise Articles 210, 215 and 220 as follows:

ARTICLE 210 - BRANCH CIRCUITS

A. General Provisions

210-1. Scope. **no changes**

210-2. Other Articles for Specific-Purpose Branch Circuits. **no changes**

210-3. Rating. **no changes**

210-4. Multi-wire Branch Circuits. **no changes**

210-5. Color Code for Branch Circuits. **no changes**

210-6. Branch Circuit Voltage Limitations. **no changes**

210-7. Receptacles and Cord Connectors. **no changes**

210-8. Ground-Fault Circuit-Interrupter Protection for Personnel.

no changes

210-9. Circuits Derived from Autotransformers. **no changes**

210-10. Ungrounded Conductors Tapped from Grounded Systems.

no changes

210-11. Branch Circuits Required. Branch circuits for lighting and for appliances, including motor-operated appliances, shall be provided to supply the loads computed in accordance with Section 220-3. In addition, branch circuits shall be provided for specific loads not covered by Section 220-3 where required elsewhere in this Code and for dwelling unit loads as specified in (c) below.

(a) Number of Branch Circuits. The minimum number of branch circuits shall be determined from the total computed load and the size or rating of the circuits used. In all installations, the number of circuits shall be sufficient to supply the load served. In no case shall the load on any circuit exceed the maximum specified by Section 220-4.

(b) Load Evenly Proportioned Among Branch Circuits. Where the load is computed on a volt-amperes-per-square foot (0.093-sq m) basis, the wiring system up to and including the branch-circuit

panelboard(s) shall be provided to serve not less than the calculated load. This load shall be evenly proportioned among multioutlet branch circuits within the panelboard(s). Branch-circuit overcurrent devices and circuits need only be installed to serve the connected load.

(c) Dwelling Units

(1) Small Appliance Branch Circuits. In addition to the number of branch circuits required by other parts of this section, two or more 20-ampere small appliance branch circuits shall be provided for all receptacle outlets specified by Section 210-52(b).

(2) Laundry Branch Circuits. In addition to the number of branch circuits required by other parts of this section, at least one additional 20-ampere branch circuit shall be provided to supply the laundry receptacle outlet(s) required by Section 210-52(f). This circuit shall have no other outlets.

(3) Bathroom Branch Circuits. In addition to the number of branch circuits required by other parts of this section, at least one 20-ampere branch circuit shall be provided to supply bathroom receptacle outlets. Such circuits shall have no other outlets. (FPN): See Examples 1(a), 1(b), 2(b), and 4(a), Chapter 9.

B. Branch-Circuit Ratings

210-19. Conductors - Minimum Ampacity and Size.

(a) General. Branch-circuit conductors shall have an ampacity not less than the maximum load to be served. Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum branch-circuit conductor size, without the application of any adjustment or correction factors, shall have an allowable ampacity equal to or greater than the noncontinuous load plus 125 percent of the continuous load. In addition, conductors of multioutlet branch circuits supplying receptacles for cord and plug-connected loads shall have an ampacity of not less than the rating of the branch circuit. Cable assemblies where the neutral conductor is smaller than the ungrounded conductors shall be so marked.

Exception: Where the assembly including the overcurrent devices protecting the branch circuit are listed for operation at 100 percent of their rating, neither the ampere rating of the overcurrent device nor the ampacity of the branch circuit conductors shall be less than the sum of the continuous load plus the noncontinuous load.

(FPN No. 1): See Section 310-15 for ampacity ratings of conductors.

(FPN No. 2): See Part B of Article 430 for minimum rating of motor branch-circuit conductors.

(FPN No. 3): See Section 310-10 for temperature limitation of conductors.

(FPN No. 4): Conductors for branch circuits as defined in Article 100, sized to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or combinations of such loads and where the maximum total voltage drop on both feeders and branch circuits to the farthest outlet does not exceed 5 percent, will provide reasonable efficiency of operation. See Section 215-2 for voltage drop on feeder conductors.

(b) Multioutlet Branch Circuits. Conductors of multioutlet branch circuits supplying receptacles for cord- and plug-connected portable loads shall have an ampacity of not less than the rating of the branch circuit.

(c) Household Ranges and Cooking Appliances. Branch-circuit conductors supplying household ranges, wall-mounted ovens, counter-mounted cooking units, and other household cooking appliances shall have an ampacity not less than the rating of the branch circuit and not less than the maximum load to be served. For ranges of 8 3/4 kW or more rating, the minimum branch-circuit rating shall be 40 amperes.

Exception No. 1: Tap conductors supplying electric ranges, wall-mounted electric ovens, and counter-mounted electric cooking units from a 50-ampere branch circuit shall have an ampacity of not less than 20 and shall be sufficient for the load to be served. The taps shall not be longer than necessary for servicing the appliance.

Exception No. 2: The neutral conductor of a 3-wire branch circuit supplying a household electric range, a wall-mounted oven, or a counter-mounted cooking unit shall be permitted to be smaller than the ungrounded conductors where the maximum demand of a range of 8 3/4 kW or more rating has been computed according to Column A of Table 220-19, but shall have an ampacity of not less than 70 percent of the branch-circuit rating and shall not be smaller than No. 10.

(d) Other Loads. Branch-circuit conductors supplying loads other than those specified in Section 210-2 and other than cooking

appliances as covered in (cb) above and as listed in Section 210-2 shall have an ampacity sufficient for the loads served and shall not be smaller than No. 14.

Exception No. 1: Tap conductors for such loads shall have an ampacity not less than 15 for circuits rated less than 40 amperes and not less than 20 for circuits rated at 40 or 50 amperes and only where these tap conductors supply any of the following loads:

a. Individual lampholders or fixtures with taps extending not longer than 18 in. (457 mm) beyond any portion of the lampholder or fixture.

b. A fixture having tap conductors as provided in Section 410-67.

c. Individual outlets, other than receptacle outlets, with taps not over 18 in. (457 mm) long.

d. Infrared lamp industrial heating appliances.

e. Nonheating leads of deicing and snow-melting cables and mats.

Exception No. 2: Fixture wires and cords as permitted in Section

240-4.

210-20. Overcurrent Protection.

Branch-circuit conductors and equipment shall be protected by overcurrent protective devices having a rating or setting complying with (a) through (d) below. ~~(not exceeding that specified in Section 240-3 for conductors, (2) not exceeding that specified in the applicable articles referenced in Section 240-2 for equipment, and (3) as provided for outlet devices in Section 210-21.~~

(a) Continuous and Noncontinuous Loads. Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the overcurrent device shall not be less than the noncontinuous load plus 125 percent of the continuous load.

Exception: Where the assembly including the overcurrent devices protecting the branch circuit are listed for operation at 100 percent of their rating, neither the ampere rating of the overcurrent device nor the ampacity of the branch circuit conductors shall be less than the sum of the continuous load plus the noncontinuous load.

(b) Conductor Protection. Conductors shall be protected in accordance with Section 240-3.

Exception No. 1: Tap conductors as permitted in Section 210-19(d)(e) shall be permitted to be protected by the branch-circuit overcurrent device.

Exception No. 2: Fixture wires and cords as permitted in Section 240-4.

~~(FPN): See Section 240-1 for the purpose of overcurrent protection and Sections 210-22 and 220-3 for continuous loads.~~

(c) Equipment. The rating or setting of the overcurrent protective device shall not exceed that specified in the applicable articles referenced in Section 240-2 for equipment.

(d) Outlet Devices. The rating or setting shall not exceed that specified in Section 210-21 for outlet devices.

210-21. Outlet Devices. - no changes

210-22. Maximum Loads.

The total load shall not exceed the rating of the branch circuit, and it shall not exceed the maximum loads specified in Sections 210-22(a) through (c) under the conditions specified therein.

~~(a) Motor Operated and Combination Loads. Where a circuit supplies only motor operated loads, Article 430 shall apply. Where a circuit supplies only air conditioning equipment, refrigerating equipment, or both, Article 440 shall apply. For circuits supplying loads consisting of motor operated utilization equipment that is fastened in place and that has a motor larger than 1/8 horsepower in combination with other loads, the total computed load shall be based on 125 percent of the largest motor load plus the sum of the other loads.~~

~~(b) Inductive Lighting Loads. For circuits supplying lighting units having ballasts, transformers, or autotransformers, the computed load shall be based on the total ampere ratings of such units and not on the total watts of the lamps.~~

~~(c) Other Loads. The rating of the branch circuit overcurrent device serving continuous loads, such as store lighting and similar loads, shall be not less than the noncontinuous load plus 125~~

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

~~percent of the continuous load. The minimum branch circuit conductor size, without the application of any adjustment or correction factors, shall have an allowable ampacity equal to or greater than the noncontinuous load plus 125 percent of the continuous load.~~

~~Exception: Circuits supplied by an assembly, together with its overcurrent devices, that is listed for continuous operation at 100 percent of its rating.~~

~~It shall be acceptable to apply demand factors for range loads in accordance with Table 220.19, including Note 4.~~

210-21. Outlet Devices. - no changes

210-23. Permissible Loads.

In no case shall the load exceed the branch-circuit ampere rating. An individual branch circuit shall be permitted to supply any load for which it is rated. A branch circuit supplying two or more outlets or receptacles shall supply only the loads specified according to its size in (a) through (d) below and summarized in Section 210-24 and Table 210-24.

(a) **15- and 20-Ampere Branch Circuits.** A 15- or 20-ampere branch circuit shall be permitted to supply lighting units, other utilization equipment, or a combination of both. The rating of any one cord- and plug-connected utilization equipment shall not exceed 80 percent of the branch-circuit ampere rating. The total rating of utilization equipment fastened in place shall not exceed 50 percent of the branch-circuit ampere rating where lighting units, cord- and plug-connected utilization equipment not fastened in place, or both, are also supplied.

~~Exception: The small appliance branch circuits, and the laundry branch circuits, and bathroom branch circuits required in a dwelling unit(s) by Sections 210-11(c)(1), (2), and (3) 220-4(b) and (c) shall supply only the receptacle outlets specified in that section.~~

(b) **30-Ampere Branch Circuits.** no changes

(c) **40- and 50-Ampere Branch Circuits.** no changes

210-24. Branch-Circuit Requirements - Summary. no changes

210-25. Common Area Branch Circuits. - no changes

C. Required Outlets

210-50. General. - no changes

210-52. Dwelling Unit Receptacle Outlets.

(a) **General Provisions.** - no changes

(b) **Small Appliances.**

(1) In the kitchen, pantry, breakfast room, dining room, or similar area of a dwelling unit, the two or more 20-ampere small appliance branch circuits required by Section 210-11(c)(1) 220-4(b) shall serve all receptacle outlets covered by Sections 210-52(a) and (c) and receptacle outlets for refrigeration equipment.

Exception No. 1: In addition to the required receptacles specified by Section 210-52, switched receptacles supplied from a general-purpose branch circuit as defined in Section 210-70(a), Exception No. 1 shall be permitted.

Exception No. 2: The receptacle outlet for refrigeration equipment shall be permitted to be supplied from an individual branch circuit rated 15 amperes or greater.

(2) The two or more small appliance branch circuits specified in (b)(1) above shall have no other outlets.

Exception No. 1: A receptacle installed solely for the electrical supply to and support of an electric clock in any of the rooms specified above.

Exception No. 2: Receptacles installed to provide power for supplemental equipment and lighting on gas-fired ranges, ovens, or counter-mounted cooking units.

(3) Receptacles installed in the kitchen to serve countertop surfaces shall be supplied by not less than two small appliance branch circuits, either or both of which shall also be permitted to supply receptacle outlets in the kitchen and other rooms specified in Section 210-52(b)(1). Additional small appliance branch circuits shall be permitted to supply receptacle outlets in the kitchen and other rooms specified in Section 210-52(b)(1).

(c) **Countertops.** no changes

(d) **Bathrooms.** In dwelling units, at least one wall receptacle outlet shall be installed in bathrooms adjacent to each basin location. ~~Bathroom receptacle outlets shall be supplied by at least one 20-ampere branch circuit. Such circuits shall have no other outlets.~~ See Section 210-8(a)(1).

Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertops in a bathroom basin location.

(e) **Outdoor Outlets.** no changes

(f) **Laundry Areas.** no changes

(g) **Basements and Garages.** no changes

(h) **Hallways.** no changes

210-60. Guest Rooms. no changes

210-62. Show Windows. no changes

210-63. Heating, Air-Conditioning, and Refrigeration Equipment Outlet. no changes

210-70. Lighting Outlets Required. no changes

ARTICLE 215 - FEEDERS

215-1. Scope.

This article covers the installation requirements, overcurrent protection requirements, and minimum size, and ampacity of conductors for feeders supplying branch-circuit loads as computed in accordance with Article 220.

Exception: Feeders for electrolytic cells as covered in Section 668-3(c), Exception Nos. 1 and 4.

215-2. Minimum Rating and Size.

(a) **General.** Feeder conductors shall have an ampacity not less than required to supply the load as computed in Parts B, C, and D of Article 220. The minimum feeder circuit conductor size, without the application of any adjustment or correction factors, shall have an allowable ampacity equal to or greater than the noncontinuous load plus 125 percent of the continuous load.

Exception: Where the assembly including the overcurrent devices protecting the feeder(s) are listed for operation at 100 percent of their rating, neither the ampere rating of the overcurrent device nor the ampacity of the feeder conductors shall be less than the sum of the continuous load plus the noncontinuous load.

Additional minimum sizes shall be as specified in (b), (c), and (d) below under the conditions stipulated.

Feeder conductors shall have an ampacity not less than required to supply the load as computed in Parts B, C, and D, of Article 220. The minimum sizes shall be as specified in (a) and (b) below under the conditions stipulated. Feeder conductors for a dwelling unit or a mobile home need not be larger than service-entrance conductors, Article 310, Note 3, Notes to Ampacity Tables of 0 to 2000 Volts, shall be permitted to be used for conductor size.

(b) **For Specified Circuits.** The ampacity of feeder conductors shall not be less than 30 amperes where the load supplied consists of any of the following number and types of circuits: (1) two or more 2-wire branch circuits supplied by a 2-wire feeder; (2) more than two 2-wire branch circuits supplied by a 3-wire feeder; (3) two or more 3-wire branch circuits supplied by a 3-wire feeder; or (4) two or more 4-wire branch circuits supplied by a 3-phase, 4-wire feeder.

(c) **Ampacity Relative to Service-Entrance Conductors.** The feeder conductor ampacity shall not be less than that of the service-entrance conductors where the feeder conductors carry the total load supplied by service-entrance conductors with an ampacity of 55 amperes or less.

(d) **Individual Dwelling Unit or Mobile Home Conductors.** Feeder conductors for individual dwelling units or mobile homes need not be larger than service-entrance conductors, Article 310, Note 3, Notes to Ampacity Tables of 0 to 2000 Volts, shall be permitted to be used for conductor size.

(FPN No. 1): See Examples 1 through 10 in Chapter 9.

(FPN No. 2): Conductors for feeders as defined in Article 100, sized to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or combinations of such loads, and where the maximum total voltage drop on both feeders and branch circuits to the farthest outlet does not exceed 5 percent, will provide reasonable efficiency of operation.

(FPN No. 3): See Section 210-19(a) for voltage drop for branch circuits.

215-3. Overcurrent Protection.

Feeders shall be protected against overcurrent in accordance with the provisions of Part A of Article 240. Where a feeder supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the overcurrent device shall not be less than the noncontinuous load plus 125 percent of the continuous load.

Exception: Where the assembly including the overcurrent devices protecting the feeder(s) are listed for operation at 100 percent of their rating, neither the ampere rating of the overcurrent device nor the ampacity of the feeder conductors shall be less than the sum of the continuous load plus the noncontinuous load.

215-4. Feeders with Common Neutral. no changes

215-5. **Diagrams of Feeders.** no changes
 215-6. **Feeder Conductor Grounding Means.** no changes
 215-7. **Ungrounded Conductors Tapped from Grounded Systems.** no changes
 215-8. **Means of Identifying Conductor with the Higher Voltage to Ground.** no changes
 215-9. **Ground-Fault Circuit-Interrupter Protection for Personnel.** no changes
 215-10. **Ground-Fault Protection of Equipment.** no changes
 215-11. **Circuits Derived from Autotransformers.** no changes
ARTICLE 220 – BRANCH-CIRCUIT, FEEDER, AND SERVICE CALCULATIONS

A. General

220-1. Scope.

This article provides requirements for determining the number of branch circuits required and for computing branch-circuit, feeder, and service loads.

Exception: Branch-circuit and feeder calculations for electrolytic cells as covered in Section 668-3(c), Exception Nos. 1 and 4.

220-2. Voltages. no changes

220-3. Computation of Branch Circuits Loads. Branch-circuit loads shall be computed as shown in (a) through (c) below.

(a) **Continuous and Noncontinuous Loads.** The branch circuit rating shall not be less than the noncontinuous load plus 125 percent of the continuous load. The minimum branch circuit conductor size without the application of any adjustment or correction factors, shall have an allowable ampacity equal to or greater than the noncontinuous load plus 125 percent of the continuous load.

Exception: Where the assembly, including overcurrent devices, is listed for continuous operation of 100 percent of its rating.

(a) **Lighting Load for Specified Listed Occupancies.** A unit load of not less than that specified in Table 220-3(ab) for occupancies specified listed therein shall constitute the minimum lighting load for each square foot (0.093 sq m) of floor area. The floor area for each floor shall be computed from the outside dimensions of the building, dwelling unit, or other area involved. For dwelling units, the computed floor area shall not include open porches, garages, or unused or unfinished spaces not adaptable for future use.

(FPN): The unit values herein are based on minimum load conditions and 100 percent power factor, and may not provide sufficient capacity for the installation contemplated.

(b) **Other Loads – All Occupancies.** In all occupancies, the minimum load for each outlet for general-use receptacles and outlets not used for general illumination shall be not less than that computed in (1) through (10) below, the following, the loads shown being based on nominal branch-circuit voltages.

Exception: The loads of outlets serving switchboards and switching frames in telephone exchanges shall be waived from the computations.

(1) **Specific appliances or loads.** An outlet for a specific appliance or other load not covered in (2) through (9) below except for a motor load shall be computed based on the ampere rating of appliance or load served.

(2) **Electric Dryers and household electric cooking appliances.** Load computations shall be permitted as specified given in Section 220-18 for electric dryers and Section 220-19 for electric ranges and other cooking appliances.

(3) **Motor loads.** Outlets for motor loads shall be computed in accordance with the requirements in Articles 430 Sections 430-22 and 430-24 and Article 440. (see Sections 430-22 and 430-24 and Article 440).

(4) **Recessed lighting fixtures.** An outlet supplying recessed lighting fixture(s) shall be computed based on the maximum volt-ampere rating of the equipment and lamps for which the fixture(s) is rated.

(5) **Heavy duty lampholders.** Outlets for heavy-duty lampholders shall be computed at a minimum of600 volt-amperes.

(6) **Track lighting.** Track lighting shall be computed based on Section 410-102. (see Section 410-102)

(7) **Sign and outline lighting.** Sign and outline lighting outlets shall be computed at 1200 volt-amperes for each required branch circuit specified in Section 600-5(a).

(8) **Show windows.** Show windows shall be computed per Section 220-12.

(9) **Fixed multioutlet assemblies.** Fixed multioutlet assemblies used in other than dwelling units or the guest rooms of hotels or motels shall be computed in accordance with (a) or (b) below.

(a) Where appliances are unlikely to be used simultaneously, each 5 ft (1.52 m) or fraction thereof of each separate and continuous length shall be considered as one outlet of not less than 180 volt-amperes.

(b) Where appliances are likely to be used simultaneously, each 1 ft (305 mm) or fraction thereof shall be considered as an outlet of not less than 180 volt-amperes.

(10) **Other outlets.***—Other outlets not covered in (1) through (9) above shall be computed based on 180 volt-amperes per outlet.

(a) For receptacle outlets, each single or each multiple receptacle on one strap shall be considered at not less than 180 volt-amperes.

(b) All general-use receptacle outlets of 20-ampere or less rating in one-family, two-family, and multi-family dwellings and in guest rooms of hotels and motels [except those connected to the receptacle circuits specified in Sections 210-11(c)(1) and (2)] shall be considered as outlets for general illumination, and are included in the general lighting load calculations of Section 220-3(a). No additional load calculations shall be required for such outlets.

(c)* This provision shall not be applicable to receptacle outlets connected to the circuits specified in Sections 210-11(c)(1) and (2), 220-4(b) and (c)

Exception No. 1: Where fixed multioutlet assemblies are employed, each 5 ft (1.52 m) or fraction thereof of each separate and continuous length shall be considered as one outlet of not less than 180-volt-amperes capacity unless appliances are likely to be used simultaneously. Where appliances are likely to be used simultaneously, each 1 ft (305 mm) or fraction thereof shall be considered as an outlet of not less than 180-volt-amperes. The requirements of this exception shall not apply to dwelling units or to the guest rooms of hotels or motels.

Exception No. 2: Table 220-19 shall be permitted for computing the load of household electric ranges.

Exception No. 3: A load of not less than 200-volt-amperes per linear-ft (305 mm) of show window, measured horizontally along its base, shall be permitted instead of the specified unit load per outlet.

Exception No. 4: The loads of outlets serving switchboards and switching frames in telephone exchanges shall be waived from the computations.

Exception No. 5: Section 220-18 shall be considered as a permitted method of computing the load for a household electric clothes dryer.

(c) Loads for Additions to Existing Installations. no changes

Table 220-3(a). General Lighting Loads by Occupancies (at the bottom of Table 220-3(a) - revise the * footnote as follows:)*See Section 220-3(b)(10) (b) All general-use receptacle outlets of 20-ampere or less rating in one-family, two-family, and multifamily dwellings and in guest rooms of hotels and motels [except those connected to the receptacle circuits specified in Sections 220-4(b) and (c)] shall be considered as outlets for general illumination, and no additional load calculations shall be required for such outlets.

220-4. Maximum Loads. The total load shall not exceed the rating of the branch circuit, and it shall not exceed the maximum loads specified in (a) through (c) below under the conditions specified therein.

(a) **Motor-Operated and Combination Loads.** Where a circuit supplies only motor-operated loads, Article 430 shall apply. Where a circuit supplies only air-conditioning equipment, refrigerating equipment, or both, Article 440 shall apply. For circuits supplying loads consisting of motor-operated utilization equipment that is fastened in place and that has a motor larger than 1/8 horsepower in combination with other loads, the total computed load shall be based on 125 percent of the largest motor load plus the sum of the other loads.

(b) **Inductive Lighting Loads.** For circuits supplying lighting units having ballasts, transformers, or autotransformers, the computed load shall be based on the total ampere ratings of such units and not on the total watts of the lamps.

(c) **Range Loads.** It shall be acceptable to apply demand factors for range loads in accordance with Table 220-19, including Note 4, 220-4. **Branch Circuits Required.**

Branch circuits for lighting and for appliances, including motor operated appliances, shall be provided to supply the loads computed in accordance with Section 220-3. In addition, branch circuits shall be provided for specific loads not covered by Section 220-3 where required elsewhere in this Code; for small-appliance loads as specified in (b) below; and for laundry loads as specified in (c) below.

(a) **Number of Branch Circuits.** The minimum number of branch circuits shall be determined from the total computed load and the size or rating of the circuits used. In all installations, the number of circuits shall be sufficient to supply the load served. In no case shall the load on any circuit exceed the maximum specified by Section 210-22.

(b) **Small Appliance Branch Circuits, Dwelling Unit.** In addition to the number of branch circuits determined in accordance with (a) above, two or more 20-ampere small-appliance branch circuits shall be provided for all receptacle outlets specified by Section 210-52 for the small-appliance loads.

(c) **Laundry Branch Circuits, Dwelling Unit.** In addition to the number of branch circuits determined in accordance with (a) and (b) above, at least one additional 20-ampere branch circuit shall be provided to supply the laundry receptacle outlet(s) required by Section 210-52(d). This circuit shall have no other outlets.

(d) **Load Evenly Proportioned Among Branch Circuits.** Where the load is computed on a volt-amperes per square foot (0.003 sq m) basis, the wiring system up to and including the branch circuit panelboard(s) shall be provided to serve not less than the calculated load. This load shall be evenly proportioned among multi-outlet branch circuits within the panelboard(s). Branch circuit overcurrent devices and circuits need only be installed to serve the connected load.

(FPN): See Examples 1(a), 1(b), 2(b) and 4(a), Chapter 9, B. Feeders and Services

220-10. General.

(a) **Ampacity and Computed Loads.** Feeder conductors shall have sufficient ampacity to supply the load served. In no case shall the computed load of a feeder shall not be less than the sum of the loads on the branch circuits supplied as determined by Part A of this article after any applicable demand factors permitted by Parts B, C, or D have been applied.

(FPN): See Examples 1 through 10, Chapter 9. See Section 220-4(b) 210-22(b) for maximum load in amperes permitted for lighting units operating at less than 100 percent power factor.

(b) **Continuous and Noncontinuous Loads.** Where a feeder supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the overcurrent device shall not be less than the noncontinuous load plus 125 percent of the continuous load. The minimum feeder circuit conductor size, without the application of any adjustment or correction factors, shall have an allowable ampacity equal to or greater than the noncontinuous load plus 125 percent of the continuous load.

Exception: Where the assembly including the overcurrent devices protecting the feeder(s) are listed for operation at 100 percent of their rating, neither the ampere rating of the overcurrent device nor the ampacity of the feeder conductors shall be less than the sum of the continuous load plus the noncontinuous load.

220-11. **General Lighting.** The demand factors specified listed in Table 220-11 shall apply to that portion of the total branch-circuit load computed for general illumination. They shall not be applied in determining the number of branch circuits for general illumination.

220-12. **Show-Window Lighting.** no changes

220-13. **Receptacle Loads - Nondwelling Units.** In other than dwelling units, receptacle loads computed at not more than 180 volt-amperes per outlet in accordance with Section 220-3(b) (10) 220-3(e)(7) and fixed multi-outlet assemblies computed in accordance with Section 220-3(b) (9) shall be permitted to be added to the lighting loads and made subject to the demand factors given in Table 220-11, or they shall be permitted to be made subject to the demand factors given in Table 220-13.

220-14. **Motors.** - no changes

220-15. **Fixed Electric Space Heating.** - no changes

220-16. **Small Appliance and Laundry Loads - Dwelling Unit.**

(a) **Small Appliance Circuit Load.** In each dwelling unit, the feeder load shall be computed at 1500 volt-amperes for each 2-wire small appliance branch circuit required by Section 210-11(c) (1) 220-4(b) for small appliances supplied by 15 or 20-ampere receptacles on 20-ampere branch circuits in the kitchen, pantry, dining room, and breakfast room. Where the load is subdivided through two or more feeders, the computed load for each shall include not less than 1500 volt-amperes for each 2-wire small appliance branch circuit for small appliances. These loads shall be

permitted to be included with the general lighting load and subjected to the demand factors provided permitted in Table 220-11. for the general lighting load.

(b) **Laundry Circuit Load.** A feeder load of not less than 1500 volt-amperes shall be included for each 2-wire laundry branch circuit installed as required by Section 210-11(c) (2) 220-4(e). This load shall be permitted to be included with the general lighting load and subjected to the demand factors provided in Table 220-11. It shall be permissible to include this load with the general lighting load and subject it to the demand factors provided in Section 220-11.

220-17. **Appliance Load - Dwelling Unit(s).** - no changes

220-18. **Electric Clothes Dryers - Dwelling Unit(s).** - no changes

220-19. **Electric Ranges and Other Cooking Appliances - Dwelling Unit(s).** - no changes

220-20. **Kitchen Equipment - Other than Dwelling Unit(s).** - no changes

220-21. **Noncoincident Loads.** - no changes

220-22. **Feeder Neutral Load.** - no changes

C. **Optional Calculations for Computing Feeder and Service Loads -** no changes

D. **Method for Computing Farm Loads** no changes

SUBMITTER: Robert H. Keis, Dover, DE

RECOMMENDATION: Remove the word "basin" in the following sentence.

Receptacle outlets shall not be installed in a face-up position in the work surfaces or countertops in a bathroom basin location.

SUBSTANTIATION: There is just as much chance for spillage on the work surfaces in a bathroom without a basin as there is a work surface with a basin. This corrected wording can be found in the present Section 210-52(c) (5) for kitchen sinks and in new proposal 2-216 concerning wet bar sinks. Section 550-8(f) (2) prohibits a faceup outlet in any countertop as does 551-41 (d). The only countertop you can put a face-up receptacle in is in a dwelling bathroom if it doesn't have a basin in it. This should not be considered new material as this section is in the process of a rewrite.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action on Proposal 2-53. This addresses the submitter's concern for bathroom work surfaces.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

2- 178a - (210-52(d)): Accept

SUBMITTER: CMP 2

RECOMMENDATION: Delete the last phrase "See section 210-8(a) (1)" from Section 210-52(d).

SUBSTANTIATION: The panel has eliminated the mandatory cross-reference to comply with the Style Manual.

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #CP209)

2- 180 - (210-52(d)): Reject

SUBMITTER: Dwayne A. Gunnels, Clio, MI

RECOMMENDATION: Delete the second sentence:

~~The receptacle outlet shall be located on a wall that is adjacent to the basin location.~~

SUBSTANTIATION: The interpretation of the word adjacent is not clear. Locating the receptacle within 36 in. of the edge of the basin is sufficient. Frequently a large mirror is covering the wall in front of the basin. This is not a practical location for the receptacle. It should be possible to install on any wall as long as it is within 36 in. of the basin.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel had many public comments on this issue during the last code cycle. The word "adjacent" is defined in the dictionary to mean "next to". The objective is to not allow the receptacle on the wall in front of the basin (behind the user) and still meet the 36 in. requirement. This was the noted concern from submitters during the last code cycle.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3052)

(Log #3192)

2- 181 - (210-52(d)): Reject
SUBMITTER: William J. Miner, Saginaw, MI
RECOMMENDATION: In the second line after the words "36 in." add the words measured horizontally so the section will read: "... shall be installed in bathrooms within 36 in. (914 mm) measured horizontally of the...".
SUBSTANTIATION: In cases of large mirrors or tile walls where it isn't practical to place a receptacle, a person should be able permitted to place the receptacle at any vertical point within 36 in. horizontally. The code isn't clear on whether the distance is horizontal vertical or shortest distance.
PANEL ACTION: Reject.
PANEL STATEMENT: The requirement is that the receptacle be within 36 in. The Code is clear as the distance is to be the shortest distance where no other requirement is applicable. This prohibits installing receptacles at heights where they are impractical and could impose potential hazards.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3252)

2- 182 - (210-52(d)): Reject
SUBMITTER: Michael R. Fisher, Bluhm Electric Inc.
RECOMMENDATION: Revise text to read as follows:
"Bathrooms. In dwelling units, at least one wall receptacle outlet shall be installed in bathrooms, within ~~36 in. (914 mm)~~ the countertop it serves. The receptacle outlet for a single hung sink shall be located on a wall adjacent to the basin location. See Section 210.8(a) (1).
Receptacle outlets shall not be installed in face up position in the work surfaces or countertops of bathroom basin location."
SUBSTANTIATION: Within 36 in. of basin, we now have longer countertops, so the receptacles then is placed on the mirror or to the shallow side of the basin. If placed in mirror surface it becomes a problem for mirror installer to cut the proper hole size, which means we need to use sparkings and becomes difficult to use a GFCI receptacle, also the receptacles when mirror is cleaned is being constantly sprayed, which can cause a safety issue inside receptacles, and when placed on close, side of sink, you are always dragging your cord over the basin - a potential safety hazard. There appears that most of the appliances used in the bathroom, they do not need to be within 3 in. of basin for use.
PANEL ACTION: Reject.
PANEL STATEMENT: The panel notes that the submitter's substantiation primarily concerns installation in a mirrored wall. If this is the desired location by the designer (or installer) there are many acceptable methods of installing the receptacle safely. The submitter's proposal would limit the number of alternatives available to meet the code requirement.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3864)

2- 183 - (210-52(d)): Accept
SUBMITTER: J. Philip Simmons, Olympia, WA
RECOMMENDATION: Delete the existing second paragraph of this Section as shown:
~~"Receptacle outlets shall not be installed in a face up position in the work surfaces or countertops in a bathroom basin location."~~
SUBSTANTIATION: This is a companion proposal to one that intends to locate this requirement in Section 210-7 so it will apply to all dwelling unit receptacle outlets.
PANEL ACTION: Accept.
PANEL STATEMENT: See panel action and statement on Proposal 2-53.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3926)

2- 184 - (210-52(d)): Reject
SUBMITTER: Charles J. Palmieri, Palmieri Assoc.
RECOMMENDATION: Add the following text to this section:
(d) Bathrooms. In dwelling units, at least one wall receptacle outlet shall be installed in bathrooms located above, but not more than 18 in. above the basin, and within 36 in. (914 mm) of the outside edge of each basin. The receptacle outlet shall be located on a wall that is adjacent to the basin location. See Section 210-8(a) (1).
SUBSTANTIATION: Section 210-52(c) Countertops (5) Receptacle Outlet Location is distinctive in locating outlets to serve a function be above the location to be served. In many other areas of the code both vertical and horizontal restrictions are established. Following that logic the same requirements for bathroom receptacles would be well served to be included in the 2002 Code.
PANEL ACTION: Reject.
PANEL STATEMENT: The requirements in Section 210-52(d) meet the intent of the panel for the receptacle location, and no more restrictive placement is warranted based on the substantiation provided by the submitter.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12
COMMENT ON AFFIRMATIVE:
BROWN: See my Comment on Affirmative on Proposal 2-174.

(Log #3945)

2- 185 - (210-52(d) (New)): Reject
SUBMITTER: Bill Voisinet, Laingsburg, MI
RECOMMENDATION: Add a new paragraph as follows:
(d) All open wall spaces not covered by the opening of a door.
SUBSTANTIATION: In rooms specified in 210-52(a) the spacing for receptacles should not be measured from the entrance of the room. The space behind the swing of the door is unusable space. In all cases of which I have experienced, no one has ever questioned measuring off the end of a door swing for the six foot rule.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-156. The panel notes that measuring from the end of the door swing does not meet the intent of the code.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4112)

2- 186 - (210-52(d)): Reject
SUBMITTER: Truman C. Surbrook, Michigan State University
RECOMMENDATION: Delete the last sentence of the section.
SUBSTANTIATION: The word "adjacent" is confusing to many inspectors and installers. Frequently it is easier to install the receptacle on an adjoining wall when a full length mirror in on the wall in front of the basin.
PANEL ACTION: Reject.
PANEL STATEMENT: The word "adjacent" is necessary to avoid placing the receptacle on the wall behind the user. See also the panel statement on Proposal 2-180.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4113)

2- 187 - (210-52(d)): Reject
SUBMITTER: Robert Fick, Michigan State University
RECOMMENDATION: Add the words measured horizontally after the 36 in. so the section will read as follows:
"...shall be installed in bathrooms within 36 in. (914 mm) measured horizontally of the outside edge of the basin."
SUBSTANTIATION: It is not specified how the measurement is to be made. The measurement needs to be horizontal because tile or a mirror is frequently installed in front of the basin making it difficult to locate the receptacle other than measured horizontally.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-181.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4366)

2- 188 - (210-52(d)): Reject
SUBMITTER: Ed Stubbs, City of Atlanta, GA
RECOMMENDATION: Revise text as follows:
210-52. Dwelling Unit Receptacle Outlets. (Add to text)
(d) Bathrooms. In dwelling units, at least one wall receptacle outlet shall be installed in bathrooms within 36 in. (914 mm) of the outside edge of each basin. The receptacle outlet shall be located on a wall that is adjacent to the basin location. (Adjacent in this code shall be located above the basin if the basin is mounted in a wall to wall basin top or cabinet supporting the basin.) See Section 210-8(a) (1).
(Add to text) Exception No. 1: If the basin has a base only, the receptacle outlet shall be no lower than 12 in. (____ mm) below the basin edge and shall include the maximum of 36 in. (914 mm) away from the basin edge.
(Add to text) Exception No. 2: If the basin has a cabinet support and basin top; and is separated from a side wall, the receptacle outlet shall be no lower than 12 in. (____ mm) below the basin edge and shall include the maximum of 36 in. (914 mm) away from the basin edge.
SUBSTANTIATION: Making the requirement of 36 in. from the basin edge allows the contractor/owner to place the receptacle in the baseboard of the adjacent wall since you didn't specify a height requirement. Most of your bathroom basins are 30 in. above the floor. If you don't specify a height, they have and will put the outlet in the baseboard and some have moved it in the base of the cabinet of the basin. Well, isn't that within 36 in. of the basin? What is the intent? The code forces the owners to have a receptacle in the bathroom, but allows them to put it out of reach close to the floor and then forces others to get an extension cord because the equipment cord is to short to dry your hair. Are we not defeating the intent? A direction is needed to remove the debate on the location of the outlet. As an Inspector I am forced to debate with homeowners on the outlet height. Now the next issue is "what is a powder room?"
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-184.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #534)

2- 189 - (210-52(e)): Reject
SUBMITTER: John M. Vargo, City of Lorain, OH
RECOMMENDATION: Revise as follows:
For a one-family dwelling, each unit of a two-family dwelling and each (dwelling unit in "row" housing) that is at grade level, etc.
SUBSTANTIATION: Dwelling units in "row" housing should be included in 210-52(e) as per the 1999 NEC Handbook Figure 210.28. The one-family dwelling in Figure 210.28 must be changed to dwelling unit because it is a definition contradiction.
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter's description of row housing is not clear. Each house would be a one-family dwelling (constructed in accordance with the definition to be separate buildings), and would require a receptacle in front and back. If the "row houses" were actually units of a multi-family dwelling (multiple units in a single building) the requirement for receptacles in front and back would not be applicable.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12
COMMENT ON AFFIRMATIVE:
BROWN: The substantiation of the submitter noting the problems in the definitions in the NEC is well founded. The Technical Correlating Committee should take action to revise existing definitions, and also include new definitions that would better relate the requirements of the NEC to those found in the model building codes, and the documents of the NFPA family of codes and standards. With jurisdictions now adopting a "single correlated set" of construction codes for the built environment, this will increasingly become an issue of importance.

(Log #2020)

2- 189a - (210-52(e)): Reject
SUBMITTER: Jerry Knoerr, Village of Greendale, Village of Mukwonago, WI
RECOMMENDATION: Add sentence that an outdoor outlet be provided within 3 ft of all patio doors that exit to the ground level.
SUBSTANTIATION: There are frequently no outlets for people to use on a patio.
PANEL ACTION: Reject.
PANEL STATEMENT: The submitter has not provided substantiation to change the basic rule that requires a receptacle in the front and back of the dwelling unit. The substantiation indicates that the submitter is concerned with a convenience issue that must be dealt with by the designer.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2506)

2- 190 - (210-52(e)): Reject
SUBMITTER: Angelo S. Sperlongo, City of Coral Springs, FL
RECOMMENDATION: Revise as follows:
For a one-family dwelling and each unit of a two-family dwelling that is at grade level, at least one receptacle outlet accessible at grade level and not more than 6 1/2 ft above grade shall be installed at the front and back of the dwelling, the receptacle shall be installed outside of any enclosure added to back of the dwelling.
SUBSTANTIATION: To prevent the use of extension cords being run through doors and windows to get outside an enclosure. Many times an inground pool is added to a dwelling with an enclosure. The receptacle that was originally installed at back of dwelling is not accessible to backyard. I have witnessed extension cords run across a pool to get outside the enclosure.
PANEL ACTION: Reject.
PANEL STATEMENT: The code language requires that the receptacle be "accessible at grade level". If the user has to go inside an "enclosure" to get to the receptacle, then it is not accessible at grade level. The panel cannot anticipate what alterations might be made to the structure at a later date that might change the application of the rule.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2754)

2- 191 - (210-52(e)): Reject
SUBMITTER: Joseph N. Fiorello, Sr., Fiorello Electric Inc.
RECOMMENDATION: Revise as follows:
(e) Outdoor Outlets. For a one-family dwelling, and each unit of a two-family dwelling that is at grade level, at least one.
(a) Receptacle outlet accessible at grade level and not more than 6 1/2 ft above grade shall be installed at to serve the front and back of the dwelling.
SUBSTANTIATION: The word at limits the installers options. As long as the outlet is located to serve the front and back such a definite location need not be given. If the intent of the code be one receptacle at each front and back the wording "at least one" "receptacle" should be deleted.
PANEL ACTION: Reject.
PANEL STATEMENT: The word "at" is used in this section to avoid the argument that a single receptacle installed on the side of the house serves both the front and back.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3159)

2- 192 - (210-52(e)): Reject
SUBMITTER: Richard Kownacki, Totowa, NJ
RECOMMENDATION: Add the following text:
Outdoor receptacle outlets shall not be installed less than 12 in. above finished grade.

SUBSTANTIATION: Currently, there is no minimum height requirement for outdoor receptacles. I have seen many receptacles installed only an inch or two above the ground, and some even lower. This close proximity to the ground virtually insures that water will enter the outlet box. Weatherproof receptacle covers are designed to prevent water from entering from above (rain), they do not effectively protect from water splashing upward from below, as from a heavy rain. Also, a few inches of wet snow can effectively place a receptacle under water.

Safety concerns: In dwelling units, receptacle replacement is commonly done by the homeowner or a handyman, usually, unqualified personnel. To replace a receptacle mounted in a box an inch off the ground and make wiring repairs, it is usually necessary to lie down on the ground. The ground is likely to be damp, there may or may not be any ground fault protection, and the circuit may or may not be energized. The hazards of these situations can be greatly reduced by establishing a minimum mounting height for outdoor receptacles. Twelve inches would seem to be a reasonable height.

PANEL ACTION: Reject.

PANEL STATEMENT: There are proper methods and materials that can be used to locate a receptacle in close proximity to the ground. The panel does not want to restrict the use of these materials. Listed wet location covers are evaluated for water splashing up from below.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4399)

2- 193 - (210-52(e)(1) (New)): Reject

SUBMITTER: Monte R. Ewing, State of Wisconsin

RECOMMENDATION: Add new text to read as follows:

(1) In multi-family dwellings at least one receptacle outlet accessible at grade level and not more than 6 ft 6 in. above grade shall be installed outdoors for each dwelling unit which is located at grade level and which has individual entrance/exit doors to grade.

SUBSTANTIATION: The same problem of people running cords through the exterior door exists for the grade level multi-family dwelling units as does the single- and two-family dwelling units (car heaters, radios, etc.). Keep in mind that there are lots of condominiums utilized as single family having to perform their own yard maintenance but the NEC does not require any exterior receptacles because these buildings are multi-family. The State of Wisconsin has had this requirement in their code for over three NEC code cycle now and I feel it needs to be addressed by the National Electrical Code.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel is not compelled by the limited substantiation that the rule should be applied to all dwelling units. In multi-family arrangements, issues associated with receptacle use only by the owner, and other abuses, can lead to other hazards.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1142)

2- 194 - (210-52(g) and 210-63): Reject

SUBMITTER: James A. Perkins, City of Rochester, NH

RECOMMENDATION: Revise 210-52(g) to read:

210-52(g) Basements and Garages. For a one-family dwelling, at least one receptacle outlet, in addition to any provided for laundry equipment, shall be installed in each basement and in each attached garage, and in each detached garage with electric power. See Sections 210-8(a)(2) and (a)(5). Where a portion of the basement is finished into a habitable room(s) the receptacle outlet required by this section shall be installed in the unfinished portion.

FPN: See Section 210-63 Requirement for installation of heating equipment service receptacle outlet in basements. Revise 210-63 to read:

210-63. Heating, Air-Conditioning, and Refrigeration Equipment Outlet. A 125-volt, single phase, 15- or 20-ampere-rated receptacle outlet shall be installed at an accessible location for the servicing of heating, air-conditioning, and refrigeration equipment on rooftops, in attics, basements and crawl spaces. The receptacle

shall be located on the same level and within 25 ft (7.62 m) of the heating, air-conditioning, and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the equipment disconnecting means.

Exception: Rooftop equipment on one- and two-family dwellings.

FPN: See Section 210-8 for ground-fault circuit-interrupter requirements.

SUBSTANTIATION: During my inspections of many large new homes, I have found many to be in excess from 50 ft to 75 ft from the boilers (heating equipment) to the nearest basement receptacle outlet. I do believe that a service outlet in the heating equipment area of the basement could possibly eliminate later servicing hazards. Also, in commercial areas.

PANEL ACTION: Reject.

PANEL STATEMENT: Since the present code already requires a receptacle in the basement, the addition of language to specify the distance serves little purpose. The panel does not see any hazard presented if the receptacle in the basement is 50 ft. away. In the 210-63 locations, the distance is specified because the receptacle's sole purpose was to provide power for servicing in attics, rooftops, and crawl spaces.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2432)

2- 195 - (210-52(g)): Reject

SUBMITTER: Dennis Kaunzner, City of Sierra-Vista, AZ

RECOMMENDATION: Revise text to read as follows:

"For a one-family dwelling, at least one receptacle outlet, in addition to any provided for laundry equipment, shall be installed in each basement and in each attached garage, and in each detached garage with electric power. Garage outlets shall be mounted 18 in. above the floor."

SUBSTANTIATION: With the numerous amounts of equipment using gas lawn mowers, 4 wheel buggies, motorcycles, etc. and the use of plug operated tools to work on these vehicles. The same reasons for receptacles in commercial garages should be applied to residential.

PANEL ACTION: Reject.

PANEL STATEMENT: There is no substantiation to require the 18 in. limitation. In commercial garages, the area up to 18 in. above the floor is considered to be a Class 1 Division 2 location. Garages in dwelling units are not classified areas.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3792)

2- 196 - (210-52(g)): Accept

SUBMITTER: John I. Williamson, Minnesota Board of Electricity

RECOMMENDATION: Modify the wording in the last sentence to read as follows:

"Where a portion of the basement is finished into one or more habitable rooms, each separate unfinished portion shall have a receptacle outlet installed in accordance with this section."

SUBSTANTIATION: Very often, basements that are finished into habitable rooms result in more than one discontinuous unfinished area. These unfinished areas may be widely separated at opposite ends of a basement. It does not create an undue hardship to require a receptacle outlet in each separate unfinished area. This new requirement, together with the requirement for GFCI protection, will help to increase life safety when portable tools and other cord- and plug-connected equipment is used in damp unfinished basement areas that may pose a higher risk of electric shock.

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3398)

2- 197 - (210-52(h)): Reject

SUBMITTER: Donald Kuntz, Denton Electric

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

RECOMMENDATION: Revise text to read as follows:

"In dwelling units, hallways and clothes closets of 10 ft or more in length shall have at least one receptacle outlet."

SUBSTANTIATION: Closets of this size could use an outlet for many of the same reasons a hallway does, mainly for vacuum.

PANEL ACTION: Reject.

PANEL STATEMENT: The desire to have a receptacle in a clothes closet is a design issue and should not be required in all installations.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1875)

2- 198 - (210-55 (New)): Reject

SUBMITTER: Ivan Susic, City of Willoughby Hills, OH

RECOMMENDATION: I propose the following new section to be added to the NEC under Article 210, Branch Circuits. (This is a direct quote from the International One- and Two-Family Dwelling Code 1998 - Section 316.)

Section 210.55 — Dwelling Unit Smoke Detectors.

210.71 Smoke detectors required. Smoke detectors shall be installed in each sleeping room, outside of each separate sleeping area in the immediate vicinity of the bedrooms and on each additional story of the dwelling, including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels, a smoke detector needs be installed only on the upper level, provided the lower level is less than one full story below the upper level, except that if there is a door between levels, then a detector is required on each level. All detectors shall be interconnected such that the actuation of one alarm will activate all the alarms in the individual unit and shall provide an alarm which will be audible in all sleeping areas. All detectors shall be approved and listed and shall be installed in accordance with the manufacturer's instructions.

210.55.1 Alterations, repairs and additions. When alterations, repairs or additions requiring a permit occur, or when one or more sleeping rooms are added or created in existing dwellings, the entire building shall be provided with smoke detectors located as required for new dwellings; the smoke detectors shall be interconnected and hard wired.

Exception: Detectors shall not be interconnected and hard wired where the alterations, repairs or additions do not result in the exposure of electrical wiring by the removal of interior wall and ceiling finishes.

210.55.2 Power source. In new construction, the required smoke detectors shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection. Smoke detectors shall be permitted to be battery operated when installed in existing buildings or in buildings without commercial power or in buildings that undergo alterations, repairs or additions regulated by Section 316.1.1.

SUBSTANTIATION: At the present time smoke detector installations are required by Building Codes, but such installations are generally done by electrical contractors. Often these electrical contractors are bidding on jobs only per minimum requirements of the NEC. They base their bids on these minimum requirements and seldom refer to any building codes. If a building contractor or other subcontractor does not include smoke detectors in their bid specifications, the electrical contractor does not include them in their bid and does not do such installations.

In larger communities where there are separate electrical and building inspectors, the electrical inspector inspects only those items required by the NEC. The building inspector inspects per building codes. This leaves the installation of smoke detectors in limbo. There is confusing as to which inspector must approve or disapprove installations. Even in communities where one inspector does all inspections, the inspector is left with a problem of who to cite for any violations regarding smoke detectors, the electrical contractor or the general contractor.

Smoke detectors are electrical installations not required by NEC but are required only under building codes. If a requirement mandating installation of smoke detectors were included in the NEC as well as the building codes it would remove the ambiguity and confusion of responsibility.

PANEL ACTION: Reject.

PANEL STATEMENT: The placement of smoke detectors is covered by NFPA 101, The Life Safety Code. The NEC does provide guidance on how to get power to the detector, but requirements for the detector locations are not under the scope of the NEC. See NEC Section 90-1.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

COMMENT ON AFFIRMATIVE:

BROWN: The submitter has submitted a proposal for the location and installation of smoke alarm devices, not one of the safety concerns of the electrical installation as found in the NEC. As noted by the submitter, the concerns for when smoke alarms are required are already outlined in the model building codes, and NFPA 101 - Life Safety Code. NFPA 72 - Fire Alarm Code, addresses the requirements of the installation of the smoke alarms when they are required. All things considered, if the electrician installs the electrical wiring and locates the alarm relative to the ceiling or wall in accordance with the instructions included with the listed smoke alarm, one need only be aware of which rooms require the installation of an alarm.

(Log #3236)

2- 199 - (210-60): Reject

SUBMITTER: Edward J. Fox, Jr., Orange County Bldg Div., FL

RECOMMENDATION: 210-60. Guest Rooms. Guestrooms in hotels, motels, and similar occupancies shall have receptacle outlets installed in accordance with Section 210-52. See Section 210-8(b)(1).

(b) Receptacle Placement. In applying the provisions of Section 210-52(a), the total number of receptacle outlets shall not be less than the minimum number that would comply with the provisions of that section by using 210-52(a)(1) guidelines only, excluding 210-52(a)(2) and (3).

SUBSTANTIATION: By excluding 210-52(a)(2) and (3) requirements, you are only measuring the total length of wall space in an area for a room whether it is including a door, movable panel, or short wall space. You are only concerned with the entire length of wall space.

I have seen many large hotel rooms that require far too many receptacles for hotel rooms due to doors, partitions, wall cut outs and configurations. When the furniture is fixed in place, basically the owners define the areas. When you have a fixed furniture layout, you know how and what uses the room is designed for, and you can design for that and not over design.

PANEL ACTION: Reject.

PANEL STATEMENT: Experience has shown that reducing the application of the rule would increase the use of extension cords in guest rooms.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2811)

2- 200 - (210-60, Exception (New)): Reject

SUBMITTER: Bud Swathwood, Bud Swathwood Consulting

RECOMMENDATION: Add an exception to read:

Exception: Where the bed is permanently fastened to the motel room wall a receptacle(s) shall not be required.

SUBSTANTIATION: Many motels are permanently fastening the bed headboard to the wall. It is almost impossible to plug a cord into the receptacle(s) that are in the area of the headboard. A person would have to lay down on the floor and reach under the bed to do so. With the requirement of having a "suitable cover" on the outlet further makes it difficult to use the outlet.

PANEL ACTION: Reject.

PANEL STATEMENT: A receptacle behind the bed is not required, but where installed, a "suitable guard" is required to protect the receptacle.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #CP204)

2- 201a - (210-60(a)): Accept

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

SUBMITTER: CMP 2
RECOMMENDATION: Delete "See Section 210-8(b)(1)." in the last sentence of the existing code.
SUBSTANTIATION: To comply with the NEC Style Manual.
PANEL ACTION: Accept.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #295)

2-201 - (210-60(a)): Reject
SUBMITTER: David Burger, Peninsula Engineering, Inc.
RECOMMENDATION: Revise 210-60(a) to read as follows:
Guest rooms in hotels, motels, and similar occupancies shall have receptacle outlets in accordance with Section 210-52. See Section 210-8(b)(1).
Exception: In multi-room suites, wall spaces 3 ft 0 in. or less in length, entry hall spaces and similar uninhabitable space shall not be used in figuring receptacles required.
SUBSTANTIATION: Following 210-52 to the letter on hotels and motels that have extended stay suites, results in an unjustifiably high receptacle count. These are not homes subject to moving and added furniture, all equipment needing power gets power as directed by the furniture layout. The engineer knows where power is needed in these facilities, in a house they don't.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-199.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2053)

2-202 - (210-60(b)): Reject
SUBMITTER: Joel A. Rencsok, Scottsdale, AZ
RECOMMENDATION: Add a new paragraph to Section 210-60(b) to read as follows:
(b) Receptacle Placement. In applying the provisions of Section 210-52(a), the total number of receptacle outlets shall not be less than the minimum number that would comply with the provisions of that section. These receptacle outlets shall be permitted to be located conveniently for permanent furniture layout. At least two receptacle outlets shall be readily accessible. Where receptacles are installed behind the bed, the receptacle shall be located to prevent the bed from contacting any attachment plug that may be installed, or the receptacle shall be provided with a suitable guard.
The two receptacles required to be readily accessible shall be located so that other room electrical equipment shall not utilize these outlets (such as TV's, lamps, and vibrating beds). One these receptacles shall be located adjacent to the telephone outlet, and the other readily accessible required receptacle shall be located within 5 ft (1.5 m) of the bed headboard.
SUBSTANTIATION: The location of these two receptacles are critical for the following reasons:
1. The business traveler now carries many different electronic devices-such as cell phone chargers, laptop computers with telephone connection requirements, portable printers, portable scanners, palm top organizers, and other electronic devices which require power to operate or to charge batteries.
2. Many physical disabled or medical impaired individuals traveling today require readily accessible power near the bed headboard to operate life support electrical equipment. Oxygen generators, respiratory breathing equipment, heart monitoring equipment, and other medical devices which require power to operate while the guest stays overnight or longer.
3. Power is also required to charge electrical wheel chairs.
4. Presently these people are checking into guest rooms with long extension cords and multiple plug aps to accommodate all these different devices.
PANEL ACTION: Reject.
PANEL STATEMENT: The present requirement that at least two of the receptacle outlets be readily accessible will provide for sufficient access by the occupant of the room.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3237)

2-203 - (210-60(b)): Reject

SUBMITTER: Edward J. Fox, Jr., Orange County Bldg Div., FL
RECOMMENDATION: 210-60(b) Receptacle Placement. In applying the provisions of Section 210-52(a), the total number of receptacle outlets shall not be less than the minimum number that would comply with the provisions of that section. These receptacle outlets shall be permitted to be located conveniently for permanent furniture layout. At least three receptacle outlets shall be readily accessible, with one located adjacent to each side of each bed in that room, and one located adjacent to a desk or like furniture.
SUBSTANTIATION: By requiring one receptacle outlet to be located adjacent to each side of each bed and one located adjacent to a desk, or a like furniture, there would be adequate receptacles to use for portable computers, sleep apnea equipment, and other small appliances used by people who travel a lot.
PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-202.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2423)

2-204 - (210-61 (New)): Reject
SUBMITTER: Dennis Kaunzner, City of Sierra-Vista, AZ
RECOMMENDATION: Add a Section 210-61 to read:
"All bathrooms are required to have at least one 120 volt receptacle - see Section 210-8(b)(1)."
SUBSTANTIATION: Bathrooms in other than dwelling units are being used for all sorts of uses such as hairstyling, shaving, portable heaters, floor cleaning equipment, etc. When there is no outlet in the bathroom a cord is run in through the door. When the door is metal it rubs the cord and energizes the door, creating a hazard of electric shock when the door gets opened while still touching the plumbing (sink). I've witnessed this problem in three instances. Two were in restaurant bathrooms where people traveling brought their own extension cord and ran it through the door creating this hazard. Although the owners of these bathrooms don't want people using their electricity it would still be cheaper than a lawsuit.
PANEL ACTION: Reject.
PANEL STATEMENT: Given the wide variety of nondwelling related bathrooms and their use, the decision to place a receptacle outlet in the bathroom is that of the designer and must be considered on a case-by-case basis.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3310)

2-205 - (210-61 (New)): Reject
SUBMITTER: Jack Wells, Pass & Seymour/Legrاند
RECOMMENDATION: Add a new section to read as follows:
210-61. Child Care. In child care areas such as day care centers, preschools, elementary schools and similar areas where children have access to receptacles, all 15- and 20 ampere, 125-volt receptacles shall be listed tamper resistant receptacles.
SUBSTANTIATION: Section 517-18(c) recognizes the hazard of children inserting conductive objects into receptacles in pediatric care areas. In the areas referred to in the proposal, children have ready access to receptacles and the same hazard exists. Adoption of the requirement for tamper resistant receptacles in pediatric care areas served to protect children from electrical shock. This same level of protection should be required wherever children are normally present for extended periods.
PANEL ACTION: Reject.
PANEL STATEMENT: Tamper resistant receptacles are not the real method by which such protection can be provided. There are tamper resistant covers or inserts available. Proper child supervision is also necessary.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #313)

2-206 - (210-63): Reject
SUBMITTER: Victor V. Timpanaro, Rep. Municipal Electrical Inspectors Assoc. of NJ, Inc.
RECOMMENDATION: Revise third sentence in 210-63 to read as follows:
The receptacle outlet shall not be connected to the line or load

side of the equipment disconnecting means when the branch circuit rating is greater than 20 amperes.

SUBSTANTIATION: This will prevent tap conductors from being installed on supply side of HVAC branch circuit conductors where their rating exceeds 20 amps. Since these are not feeder conductors, taps are not permitted here and the new language would prevent inspectors and installers from concluding that the receptacle outlet may be installed on the line side.

This language also would permit the receptacle outlet to be installed on line side of disconnecting means when conductors are rated 20 amperes or less, thereby having overcurrent protection by the branch circuit OCPD.

PANEL ACTION: Reject.

PANEL STATEMENT: 210-19(d) already addresses the issue of concern stated by the submitter.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #398)

2- 207 - (210-63): Reject

SUBMITTER: Peter Garthwaite, Garthwaite & Green Inc.

RECOMMENDATION: Revise 210-63 to read as follows:

A 125 volt single-phase 15- or 20 ampere-rated receptacle outlet shall be installed at an accessible location for the servicing of heating, air conditioning, and refrigeration equipment on rooftops and in attics, cellars and crawl spaces.

SUBSTANTIATION: In New England (Maine) many old houses do not have any receptacles in the cellar. Thus servicing or repairing a heating system in the middle of a cold night and plugging a drop light into light adaptor is unsafe and takes time. In many new houses, the heating system is set off in a utility room in the cellar where the rest of the cellar is finished and separated thus there is not a receptacle within the area or within 25 ft.

PANEL ACTION: Reject.

PANEL STATEMENT: The cellar is considered to be a basement and is covered by 210-52(g), which requires at least one receptacle outlet.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1687)

2- 208 - (210-63): Reject

SUBMITTER: Harold R. Endean, III, Township of Montville, NJ

RECOMMENDATION: After the following words... "on rooftops and in attics and crawl spaces."

Then add: "and outside HVAC equipment." Ground fault protection is required when receptacle is outside as required by Section 210-8(a)(3).

SUBSTANTIATION: I feel there should be a receptacle within 25 feet of all HVAC equipment. Especially the air compressors that are located outside of a dwelling. Whenever a repairperson comes to fix the equipment there is never an outlet nearby. Then the person would open up a window and plug into a receptacle inside the house. Therefore the person could be outside working on an air compressor without the benefit of ground fault protection.

BOCA mechanical states that a receptacle must be located within 75 feet of an appliance. However, I feel that this is too far away. I believe that 25 feet would be a more safe distance for anyone working on HVAC equipment.

PANEL ACTION: Reject.

PANEL STATEMENT: 210-52(e) requires outside receptacles at the front and rear of dwellings that could be used for HVAC servicing.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1904)

2- 209 - (210-63): Reject

SUBMITTER: Michael L. Simmons, Simmons Electric Co.

RECOMMENDATION: Revise as follows:

"210-63. Heating, Air-Conditioning, and Refrigeration Equipment Outlet. A 125-

volt, single-phase, 15- or 20- ampere-rated receptacle outlet shall be installed at an accessible location for the servicing of heating, air-conditioning, and refrigeration equipment on rooftops and in attics and crawl spaces. The receptacle shall be located on the same level and within 25 feet (7.62m) of the heating, air-

conditioning, and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the equipment disconnecting means.

Exception: Rooftop equipment on one and two family dwellings.

FPN: See Section 210-8 for ground-fault circuit-interrupter requirements."

SUBSTANTIATION: Background: A very hazardous situation exists in the servicing of heating, air-conditioning, and refrigeration equipment. The current paragraph 210-63 requirements are not uniform in the safety protection provided for various applications. Paragraph 210-63 currently requires that a receptacle outlet be located near heating, air-conditioning, and refrigeration equipment; but the paragraph excludes coverage for all ground-level equipment and rooftop equipment in one and two family dwellings. HVAC (heating, ventilating, and air-conditioning) servicepeople, who are not necessarily required to be fully qualified electricians, usually service the equipment covered by paragraph 210-63.

Description of the Hazard: The most frequent need for an HVAC serviceworker to use a nearby receptacle outlet is for lighting; electrical power tools are a second need. Scheduled service calls are routine, but emergency service calls are also required on HVAC equipment at all hours of the day and night, including calls during wet weather or when the ground is wet after recent rain or snow. The vast majority of these calls are made for ground-level equipment at residences. Emergency calls are often made at night when lighting is required. It is normal practice for the serviceworker to plug into the nearest outlet they see during such service calls, but quite often there is not an outlet within sight. As a result, I have seen HVAC technicians plug into a non-GFI home outlet immediately inside the house, which was the nearest outlet available to the outside ground-level air-conditioner. Others will simply put jumpers inside the disconnect box to get power, putting themselves at risk to get the job done quickly. Connecting to a non-GFI outlet or using jumpers creates an immediate electrocution hazard if the ground is wet and there is a short in the equipment or extension cord.

These are clearly not acceptable servicing practices, but as a master electrician with experience in many states, I have seen them occur repeatedly, due either to ignorance of the seriousness of the hazard or due to the constant pressure on the serviceworker to accomplish the job efficiently and quickly. I do not know how many injuries/fatalities this causes nationwide every year.

Summary: The proposed deletions to paragraph 210-63 would have the effect of applying the same requirement to all equipment, regardless of the location of the equipment. The changes would thus extend safety protection uniformly to all equipment applications, including ground-level equipment, where the largest hazard exists. The cost would be the cost of an additional nearby outlet in those applications where none now exists. I believe this equipment cost is nominal compared to the increase in safety and the reduced medical cost and lost-wage cost from injuries/fatalities. An added benefit to this proposed change is that the nearby outlet will provide an additional convenience outlet to the homeowner or property maintenance personnel, who increasingly use outdoor electric appliances such as lawnmowers and weedcutters.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-208.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4165)

2- 210 - (210-63): Reject

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

RECOMMENDATION: Revise as follows:

"A 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed at an accessible location for servicing of heating, air conditioning, and refrigeration equipment located outdoors including on rooftops, and in attics and crawl spaces. The receptacle shall be located on the same level and within 25 ft (7.62 m) of the heating, air conditioning, and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the equipment disconnecting means."

SUBSTANTIATION: This change will ensure that the ground level HRAC equipment will be treated the same way as those on rooftops, attics, and crawl spaces. It corresponds to mechanical code requirements, and eliminates the need for service personnel to run cords out of windows, etc. in order to work on this equipment.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

PANEL ACTION: Reject.
PANEL STATEMENT: See panel statement on Proposal 2-208.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #687)

2- 211 - (210-63, Exception): Accept
SUBMITTER: Dan Leaf, Palmdale, CA
RECOMMENDATION: Revise to read as follows:
Exception: A receptacle outlet shall not be required for rooftop
roof-top equipment on one- and two-family dwellings.
SUBSTANTIATION: Editorial. The exception is an incomplete sentence and may not be clear to the average code user whether it applies to the requirement for a receptacle, the level and distance requirement or the connection point requirement, or all.
PANEL ACTION: Accept.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3863)

2- 212 - (210-63, Exception): Accept in Principle
SUBMITTER: J. Philip Simmons, Olympia, WA
RECOMMENDATION: Revise text to read as follows:
210.63. Heating, Air-Conditioning, and Refrigeration Equipment Outlet. A 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed at an accessible location for the servicing of heating, air-conditioning, and refrigeration equipment on rooftops and in attics and crawl spaces. The receptacle shall be located on the same level and within 25 ft (7.62 m) of the heating, air-conditioning, and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the equipment disconnecting means.
Exception: A receptacle outlet shall not be required for rooftop
on one- and two-family dwellings.
SUBSTANTIATION: Since the section contains several requirements, it is important that the exception be a complete sentence and clarify which of the requirements in the section the exception applies to.
PANEL ACTION: Accept in Principle.
PANEL STATEMENT: See panel statement on Proposal 2-211.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #2424)

2- 213 - (210-64 (New)): Reject
SUBMITTER: Dennis Kaunzner, City of Sierra-Vista, AZ
RECOMMENDATION: Add a Section 210-61 to read:
"At least one receptacle on the outside of all buildings - See 210-8(b)."
SUBSTANTIATION: Extension cords are run out through metal doors of buildings for maintenance, temporary signs, lighting, etc. causing the door to rub on the cord and energizing the door which can create a shock hazard.
PANEL ACTION: Reject.
PANEL STATEMENT: For other than dwelling units, the requirement for general use outdoor receptacle outlets is best left to the designer so that the needs of the building owner can be taken into account.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #4365)

2- 214 - (210-70): Reject
SUBMITTER: Ed Stubbs, City of Atlanta, GA
RECOMMENDATION: Revise text as follows:
210-70. Lighting Outlets Required. (Add to text)
(a) Dwelling Units
(1) Habitable Rooms
Exception No. 1: In other than kitchens and bathrooms, one or

more receptacles controlled by a wall switch shall be permitted in lieu of lighting outlets. (In every kitchen and bathroom there shall be one or more lighting fixture installed with the lighting outlet.)
Exception No. 2: (no change)

Exception No. 3: (add to text) In every clothes closet where a lighting outlet is installed and meets the requirements of 410-8, shall have a fixture installed with the lighting outlets.

FPN: (add to text) It is the intent to assure that improper fixtures not installed over a lighting outlet such as keyless fixtures or track lights.

SUBSTANTIATION: As an inspector, I have come across incidents where the contractor is forced to install the improper fixture or just doesn't install the proper fixture in the closet, kitchen or bathroom that is not listed and labeled or sometimes not bonded or even came with a bonding means. All these code requirements on grounding and bonding, listing and label, and proper clearances and we turn right around and don't require fixtures in for a final. You can just blank them off. Now we leave it up to the owner to supply the fixtures that may not be safe and possibly installed improperly. Where does that leave the contractor and the authority having jurisdiction? Can we say liable? Sometimes contractors can only do what they are told, so it becomes a no win situation and the owner gets BURNED. Lighting outlets only specify a box with no fixture. I know it is not the intent of the code to require installation of fixtures. The requirement is for areas that do not want receptacles in lieu of lighting outlets. If you didn't require this existing code, people would install cord and plug lamps in the closets that could start a fire, or in the kitchen and bathroom be subject to a shock hazard. How safe is a closet without a listed fixture installed before the final?

PANEL ACTION: Reject.
PANEL STATEMENT: The application of the rules in 210-70(a) is to only require a properly installed lighting outlet. Adding a requirement to install a luminaire will not resolve instances where the installer knowingly chooses to violate the proper rules.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

Note: The sequence no. 2-215 was not used.

(Log #3853)

2- 216 - (210-70(a)): Accept in Principle
SUBMITTER: J. Philip Simmons, Olympia, WA
RECOMMENDATION: Revise the existing third paragraph as follows:

"Where one or more lighting outlet(s) are installed for an interior stairways, there shall be a wall switch at each floor level to control the lighting outlet(s) where the stairway ~~difference~~ between floor levels has is six steps risers or more."

SUBSTANTIATION: Editorial, and to bring the usage of stairway risers into harmony with the building codes. The term "risers" is more precise than "steps" and is the preferable term. In addition, the building codes regulate the construction of stairs so the NEC term should agree.

The use of the term "riser" solves the issue as to whether or not the tread (floor surface) at the bottom of the stairs and tread (floor surface) at the top of the stairs is a step or not. The risers for the stairs can be more easily determined.

Accepting this proposal will provide for more uniform interpretation and application of the NEC and make it more "user-friendly".

PANEL ACTION: Accept in Principle.
PANEL STATEMENT: See panel action on Proposal 2-226a which meets the intent of the submitter.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #1514)

2- 217 - (210-70(a)(1)): Reject
SUBMITTER: Russel LeBlanc, Peterson School of Engineering
RECOMMENDATION: Revise text as follows:
At least one wall switch-controlled lighting outlet shall be installed

within 6 ft of at least one entrance to every habitable room and bathroom.

SUBSTANTIATION: If a room has multiple entrances it does not make sense to possibly have to walk all the way through the room in the dark to turn on the lights. This requirement would at least give someone the option of using an entrance with a switch.

PANEL ACTION: Reject.

PANEL STATEMENT: The location of switches for general lighting outlets is a design consideration that must be covered by the designer/installer for each unique situation. The panel notes that the submitter's recommendation would require the lighting outlet to be located at the point of entry and the substantiation deals with the location of the switch.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1828)

2- 218 - (210-70(a)(1)): Reject

SUBMITTER: Stephen A. Blydenburgh, Nassau, NY

RECOMMENDATION: Revise to read as follows:

(1) Habitable Rooms. At least one wall switch-controlled lighting outlet shall be installed at the point(s) of entry in every habitable room and bathroom.

SUBSTANTIATION: Section 210-70(a)(3) requires a lighting outlet containing a switch or controlled by a wall switch at the point of entry in rooms of occasional use for storage and that contain equipment. Would it not also be logical to have the same requirement for rooms that are used on a daily basis at times when there is little or no natural light.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-217.

The panel notes that the submitter's recommendation would require the lighting outlet to be located at the point of entry and the substantiation deals with the location of the switch.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4011)

2- 219 - (210-70(a)(1)): Reject

Note: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 9 for information. See panel action on Proposal 9-42.

SUBMITTER: Christopher Pharo, Rep. IBEW

RECOMMENDATION: This proposal is to add a sentence to the end of the section:

Article 210.70(a)(1) "...in every habitable room and bathroom. If a ceiling mounted outlet box is installed, it must be listed as suitable as the sole means of support for a ceiling suspended (paddle) fan."

SUBSTANTIATION: The average house today has 3 bedrooms, a kitchen, a family room, a dining room, and 1-1/2 bathrooms. The bedrooms usually comply with 210-70(a)(1) Exception No. 1. Bathrooms usually have a wall sconce above a mirror to meet compliance. The lighting outlet boxes in the kitchen, family room, and the dining room would most likely be the only areas affected by this code change. These three rooms would most likely have some sort of ceiling mounted outlet box.

This proposal would mandate that these three ceiling outlet boxes be listed and suitable as the sole means to support a ceiling suspended (paddle) fan. I do not feel that a \$20.00 increase in costs between the old outlet boxes and the new outlet boxes is enough to justify the refusal of this proposal.

Consider this true scenario. A homeowner buys a paddle fan at his local home improvement center and decides to replace the existing hanging fixture in his kitchen with the paddle fan complete with a light kit. Initially it looks good and it even works. Two weeks later when the homeowner was cooking dinner, the fan came down from ceiling. The fan was still attached to the junction box and still had some drywall around it. The romex cable kept the fan from hitting the table because it was probably stapled within 12 in. from the box. Luckily, no people were injured nor was there a fire. It is obvious that a real hazard does exist.

I urge that you do not reject this proposal for the sake of \$20.00 added to the price of a \$110,000.00 home. I am sure the homeowner would be more than willing to part with his \$20.00.

PANEL ACTION: Reject.

PANEL STATEMENT: The panel recommends that the Technical Correlating Committee refer this proposal to Code-Making Panel 9 for action.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4372)

2- 220 - (210-70(a)(1)): Reject

SUBMITTER: Joseph A. Hertel, Safety and Buildings Div., State of Wisconsin

RECOMMENDATION: Revise text to read as follows:

(1) Habitable Rooms. At least one wall switch-controlled lighting outlet shall be installed in every habitable room, kitchen, and bathroom.

SUBSTANTIATION: Many building codes do not recognize kitchens as habitable rooms. The addition of the word kitchen will clarify the intent of a wall switched lighting outlet in these rooms and correlate with the exception that requires a lighting outlet rather than a switched receptacle for kitchens and bathrooms.

PANEL ACTION: Reject.

PANEL STATEMENT: In reviewing the building codes, the panel does not find instances where kitchens are excluded from consideration as habitable rooms.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4454)

2- 221 - (210-70(a)(1)): Reject

SUBMITTER: David E. Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

RECOMMENDATION: Add new text to read as follows:

210.70(a)(1) Lighting Outlets Required, Habitable Rooms. At least one wall switch-controlled lighting outlet shall be installed in every habitable room and bathroom. Lighting outlets used to fulfill this requirement shall not have integral switching, or shall have integral switching disabled.

SUBSTANTIATION: The safety basis for the Section turns on the need to turn on a light to avoid stumbling or bumping into things. "Where are the bodies" does not really apply, because nobody is going to maintain records of the bumped shins cursed every evening, or even of the hips broken by people with osteoporosis who stumble and fall because there's no light. I have seen many instances where the people have inadvertently defeated the protection the light switch provides.

This proposal tries to maintain this protection. The part of the problem that we can reduce is related to the situation where a fixture came with a pull chain. This issue is especially common when paddle fans are used to replace existing light fixtures. Without independent wall switching, the fan is left on and the light turned off via its pull chain. Then the occupant leaves the room, perhaps turning the fan off at the wall switch, and, very commonly, forgetting to pull the chain on the light before leaving, to restore power to it. Subsequently, at night, someone returns, and has to grope their way to the fixture, after turning on the switch, and reach up for the light's pull chain, while not reaching up so high as to encounter the turning fan blades. This problem also occurs where a receptacle is employed to satisfy this section's requirement, in accordance with Exception No. 1. However, authorities having jurisdiction cannot do much about what homeowners do after final inspection.

PANEL ACTION: Reject.

PANEL STATEMENT: The requirements in 210-70(a)(1) cover the installation of the lighting outlet and not the luminaire itself.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1683)

2- 222 - (210-70(a)(1) Exception No. 1): Reject

SUBMITTER: Keith M. Whitesel, Whitesel Electric

RECOMMENDATION: Revise as follows:

In other than kitchens and bathrooms...

SUBSTANTIATION: Section 210-52(b)(1) Exception No. 1 clearly allows a switched receptacle in a kitchen.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

PANEL ACTION: Reject.

PANEL STATEMENT: The requirement in 210-52(b)(1) is applicable to areas other than kitchens including pantries, breakfast rooms, dining rooms, etc. This exception prevents the replacement of the required wall switch controlled lighting outlet in kitchens with a switched receptacle.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #9)

9-2 - (210-70(a)(1) Exception No. 2): Reject

NOTE: The following proposal consists of Comment 2-139 on Proposal 2-250 in the 1998 Annual Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 1999 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 2-250 was:

Add new last sentence to 210-70 (a) Exception No. 3:
"The off position of the occupancy sensor shall remove all voltage from the controlled outlets or the sensor must be permanently engraved stating full voltage is present in the off position."
SUBMITTER: Douglas D. Myron, Mytech Corp.
RECOMMENDATION: Comments to the requirement that occupancy sensors in the "off" position remove all voltage from the supplied outlet.

Mytech supports the Panel's response of "Reject."
SUBSTANTIATION: Background: Occupancy sensors are control devices that turn lights on automatically when a room is occupied, and turns them off when the room is not occupied. First generation occupancy sensors were large surface mounted, 2 wire devices that contained an air gap switch, disconnecting voltage from the load when turning off the lights. The obtrusive style and appearance hindered market acceptance.

To reduce the size, cost and improve esthetics, occupancy sensor manufacturers began to eliminate the air gap switch using two different design techniques. Both of these techniques allows current (<.5 milli amps) to flow when the switch is in the off position to keep sensor electronics working.

Design Technique #1:

A 3-wire technique is used that removes line voltage from the load in off state and continuously applies .5 milli amps into conduit or building ground.

Design Technique #2:

A 2-wire technique is used and does not require conduit, building ground or neutral. However, when in the off state, the sensor is still powered and will supply less than .5 milli amps to the load.

Industry Direction:

Control devices are becoming more prevalent in homes and commercial buildings. Devices that typically performed simple functions are being replaced with high tech, multifunction products. To properly apply these new technologies requires education, training and new trade practices to keep pace with them. Our industry has worked very hard to maintain the safety of our products and have worked with UL to improve testing methodologies.

Comments:

- Developing a practice of relying only on the light switch to disconnect loads from the branch circuit is hazardous and should be handled with caution. In many applications, the light switch is not located in the immediate working area. It should always be a standard operating practice to treat loads deactivated in this manner as if full line voltage was applied.

- With proper education and training, it is possible with common instruments to identify devices that do not remove line voltage from the load.

- Mytech recommends that during installation of our product or maintenance to the lighting load, trip the circuit breaker. This is not only a safety issue but damage to the sensor can result if either device is miswired.

- Our switches in the off state are limited to less than the "Let Go" current of .5 milli amps.

- Without proper training, maintaining loads controlled by a simple 3-way switch can be just as hazardous. Without a voltmeter, it can be difficult to determine if voltage is or is not present at a

load.

- Occupancy sensors are becoming small enough that adding legible labels to the front of the switch is not practical.

Conclusion:

Mytech supports the Panel's position of "Reject". This is a new technology and as our industry matures, so will its trade practices.

If the Panel has additional concerns or questions, I can bring them before the occupancy sensor committee of NEMA that meets every quarter.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action on Proposal 9-88a.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 11

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

(Log #10)

9-3 - (210-70(a)(1) Exception No. 2): Accept in Principle

NOTE: The following proposal consists of Comment 2-140 on Proposal 2-250 in the 1998 Annual Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 1999 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 2-250 was:
Add new last sentence to 210-70 (a) Exception No. 3:

"The off position of the occupancy sensor shall remove all voltage from the controlled outlets or the sensor must be permanently engraved stating full voltage is present in the off position."

SUBMITTER: Pass & Seymour/Legrand

RECOMMENDATION: We recommend the Panel accept in principle this proposal and replace the submitter's text with the following:

"An occupancy sensor that has a marked OFF position shall disconnect all ungrounded conductors when in the off position."

SUBSTANTIATION: The Panel, "Listed occupancy sensors in the "off" position are required to remove all voltage from the supplied outlet," is incorrect. There are several different listed occupancy sensors on the market that incorporate the equivalent of a standby condition when in the off position. These devices **do not** remove all voltage from the circuit when in the off position. There are UL product standards that recognize that certain types of control devices function in this manner. The suggested text in this comment directly reflects the requirement in the product standards which permits an "off" or equivalent marking only if the ungrounded conductors are disconnected. Accepting this text permits the listing organizations to determine the appropriate marking for this type of product.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action on Proposal 9-88a.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 11

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

(Log #11)

9-4 - (210-70(a)(1) Exception No. 2): Accept in Principle in Part

NOTE: The following proposal consists of Comment 2-141 on Proposal 2-250 in the 1998 Annual Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 1999 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 2-250 was:
Add new last sentence to 210-70 (a) Exception No. 3:

"The off position of the occupancy sensor shall remove all voltage from the controlled outlets or the sensor must be permanently engraved stating full voltage is present in the off position."

SUBMITTER: James T. Dollard, Jr., Local Union #98 IBEW

RECOMMENDATION: Accept Proposal 2-250.

SUBSTANTIATION: The Panel voted unanimously to reject this proposal on the assumption that as written in the Panel Statement: "Listed occupancy sensors in the "off" position are required to remove all voltage from the supplied outlet. Refer the product standards."

This is not true. Listed occupancy sensors in the "off" position are NOT required to remove all voltage from the supplied outlet.

The product standards do allow for .5 ma to flow in the situation as described in the proposal.

UL Field Engineers and one manufacturer have stated so in writing.

210-70(a) Exception No. 3 allows for these sensors in all dwellings.

The word OFF must mean the removal of all voltage. The fact that the amount of current flow available is below the "let go" level is not acceptable. A homeowner receiving a shock in this situation may not suffer from the amount of current flow through his/her body, but the resulting fall from a ladder could put them in the hospital or perhaps the grave.

NOTE: Supporting material is available for review at NFPA Headquarters.

PANEL ACTION: Accept in Principle in Part.

1. The panel accepts in principle that the "off" position disconnects ungrounded conductors.

2. The panel does not accept the engraving of the switch stating that full voltage is present in the off position.

PANEL STATEMENT: See panel action and statement on Proposal 9-88a. The panel refers the submitter to the current standards that do not require engraving. The panel would like to point out that if a switch is not marked with an off position, voltage often is present.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 11

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

(Log #12)

9-5 - (210-70(a)(1) Exception No. 2): Reject

NOTE: The following proposal consists of Comment 2-142 on Proposal 2-250 in the 1998 Annual Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 1999 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 2-250 was:

Add new last sentence to 210-70 (a) Exception No. 3:

"The off position of the occupancy sensor shall remove all voltage from the controlled outlets or the sensor must be permanently engraved stating full voltage is present in the off position."

SUBMITTER: Larry Miller, Nat'l Electrical Mfrs Assn. (NEMA)
RECOMMENDATION: NEMA supports continued rejection of the proposal.

SUBSTANTIATION: OSHA has established a "Tagout/Lockout" procedure to ensure worker safety during electrical equipment/machine installation, maintenance or service. While lockout of individual branch circuit breakers may not be feasible, individual breakers can be tagged to indicate that a particular branch circuit is being worked on.

It is also a widely accepted fact that in order to ensure that a device or piece of equipment is completely deenergized, the branch circuit breaker feeding the device or equipment must be turned off. Merely turning off a switch on the device or the equipment does not guarantee deenergization and is not a proper or safe means of performing electrical work.

If the worker involved in the cited incident had followed proper safety procedures and turned the appropriate circuit breaker "OFF", he would not have experienced a shock.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel action and statement on Proposal 9-88a.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 11

VOTE ON PANEL ACTION:

AFFIRMATIVE: 11

(Log #CP205)

2-226a - (210-70(a)(2)): Accept

SUBMITTER: CMP 2

RECOMMENDATION: Revise existing Section 210-70(a)(2) as follows:

"(2) Additional Locations. Additional lighting outlets shall be installed in accordance with a, b, and c.

a. At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power.

b. For dwelling units, attached garages, and detached garages with electric power, at least one wall switch-controlled lighting outlet shall be installed to provide illumination on the exterior side of outdoor entrances or exits with grade level access. A vehicle door in a garage shall not be considered as an outdoor entrance or exit.

c. Where one or more lighting outlet(s) are installed for interior stairways, there shall be a wall switch at each floor level, and landing level that includes an entry way, to control the lighting outlet(s) where the stairway between floor levels has six risers or

more.

Exception: In hallways, stairways, and at outdoor entrances, remote, central, or automatic control of lighting shall be permitted."

SUBSTANTIATION: This section has been rewritten to improve clarity, and has integrated the changes accepted in other proposals.

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1146)

2-223 - (210-70(a)(2)): Accept in Principle

SUBMITTER: Kenneth Higashi, Honolulu, HI

RECOMMENDATION: Revise text to read:

"Where lighting outlets installed in interior stairway, there shall be a switch at each floor-level entry or exit into the stairway to control the lighting outlet where the difference between floor-level entries or exits is six steps or more."

SUBSTANTIATION: There are many homes that have entries into a stairway that's between floor levels. Entering into a dark stairway and going to the floor level to turn the light on may cause tripping.

PANEL ACTION: Accept in Principle.

PANEL STATEMENT: See panel action on Proposal 2-226a which meets the intent of the submitter.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2021)

2-224 - (210-70(a)(2)): Reject

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

RECOMMENDATION: Add new text to read:

"The addition should be at a wall switch there shall be no more than 4 ft to the entrance of the stairway. In hallways the switch or switches shall be at the entrance of each end or each entrance of every hallway and shall be no more than _____ ft." Panel shall decide distance.

Also add that at all required exits a light switch controlling the interior lighting shall be provided.

SUBSTANTIATION: We are finding in a number of houses that they are combining the light switch with the hallway and stairs lighting so that people have to walk past open stairways without being able to turn on a light to see where they are going. They are saying that they have a switch at that level and therefore that is all the switching they need to control this area and the stairs.

PANEL ACTION: Reject.

PANEL STATEMENT: See panel statement on Proposal 2-217.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2813)

2-225 - (210-70(a)(2)): Reject

SUBMITTER: John E. Staires, Tulsa Code Seminars/Rep. Oklahoma Chapter IAEL

RECOMMENDATION: Remove the wording:

"and to provide illumination on the exterior side of outdoor entrances or exits with grade level access."

Insert the wording:

"and to provide illumination on the exterior side of outdoor means of egress to grade level."

SUBSTANTIATION: As presently written, this sentence of 210-70(a)(2) does not provide for the situation where a second story or higher dwelling unit balcony or other platform has a staircase provided to grade level. The wording of this sentence would not require illumination for either the outdoor exit, the balcony or the staircase. This is obviously a life safety issue, due to the danger of exiting the dwelling unit over the staircase in the dark during normal conditions, and especially during emergency conditions.

PANEL ACTION: Reject.

PANEL STATEMENT: The necessity for an additional requirement to add exterior stairway lighting should be based on the type of stairway and is a design consideration.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3216)

2- 226 - (210-70(a) (2)): Reject
SUBMITTER: Jerry Feagans, Electrical Insp. Section, City of St. Louis, MO
RECOMMENDATION: Last sentence will read:
Where lighting outlets are installed in interior stairway, there shall be an illuminated wall switch at each floor level to control the lighting outlet where the difference between floor levels is six steps or more.
SUBSTANTIATION: The NEC already requires a wall switch at each floor level with BOCA's requirement for illuminated switches. As the code enforcement agency, it would be beneficial for us if the NEC had the same requirement. The illuminated switch makes it easier for the tenant to locate them in the dark.
Note: Supporting material is available for review at NFPA Headquarters.
PANEL ACTION: Reject.
PANEL STATEMENT: An illuminated switch is not needed to accomplish the necessary safety objectives. Providing an illuminated switch is not prohibited and is the prerogative of the designer.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3773)

2- 227 - (210-70(a) (2)): Reject
SUBMITTER: Joe Zsebe, City of Cudahy, WI
RECOMMENDATION: Revise text to read as follows:
(2) Additional Locations. At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power; ~~and to provide illumination~~ illumination shall be provided on the exterior side of outdoor entrances or exits with grade level access. A vehicle door in a garage or service door of a detached garage shall not be considered as an outdoor entrance or exit.
SUBSTANTIATION: The use of the semi colon is not a strong enough degree of separation for the subject of the paragraph. If the code panel is not intending the exterior of detached garage entrance and exit doors to have illumination then, a new sentence is in order to return to the subject of the paragraph, i.e., dwelling unit requirements only. Some authorities having jurisdiction interpret the current language as requiring illumination at grade level entrance or exits at detached residential garages.
PANEL ACTION: Reject.
PANEL STATEMENT: The panel has clarified the requirement for detached garages in the action taken on Proposal 2-226a.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #3793)

2- 228 - (210-70(a) (2)): Reject
SUBMITTER: John I. Williamson, Minnesota Board of Electricity
RECOMMENDATION: Modify this section as follows:
"Additional Locations. At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power. At least one wall switch-controlled lighting outlet shall be installed to provide illumination on the exterior side of dwelling unit and attached garage outdoor entrances or exits with grade level access."
The remainder of the paragraph and the exception that follows remain unchanged.
SUBSTANTIATION: The previous sentence structure and wording has created confusion among authorities having jurisdiction. Some authorities having jurisdiction have interpreted this section to require a wall switch-controlled lighting outlet on the exterior side of entrances at detached garages.
PANEL ACTION: Reject.
PANEL STATEMENT: The panel has clarified the requirement for detached garages in the action taken on Proposal 2-226a.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

(Log #4166)

2- 229 - (210-70(a) (2)): Reject
SUBMITTER: Frederic P. Hartwell, Hartwell Electrical Services, Inc./Rep. Massachusetts Electrical Code Advisory Committee
RECOMMENDATION: Revise as follows:
(2) Additional Locations. At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power; and to provide illumination on the exterior side of outdoor entrances or exits with grade level access. A vehicle door in a garage shall not be considered as an outdoor entrance or exit. Where lighting outlets are installed in interior stairways connecting finished areas or areas with a second exit, there shall be a wall switch at each floor level to control the lighting outlet where the difference between floor levels is six steps or more.
SUBSTANTIATION: A three-way switch at the end of a stairway into an unfinished area without an exit has no basis in safety, only design, and as such is beyond the scope of the Code. Previous examples cited by the panel in rejecting this over the years, such as darkrooms or work areas, probably would constitute a connection to finished areas if they were extensive. Transient occupants of such spaces would not be turning the light off and leaving themselves in darkness. This allowance has been in place in Massachusetts since the advent of the sixstep rule, without incident.
PANEL ACTION: Reject.
PANEL STATEMENT: Work areas are not restricted to finished areas. Activities can occur in unfinished areas requiring switches at both levels.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #314)

2- 230 - (210-70(a) (3), 210-70(c)): Reject
SUBMITTER: Victor V. Timpanaro, Rep. Municipal Electrical Inspectors Assoc. of NJ, Inc.
RECOMMENDATION: Revise 210-70(a) (3) to read as follows:
(3) For attics, underfloor spaces, utility rooms and basements, at least one lighting outlet with fixture containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing.
SUBSTANTIATION: Many inspectors have argued that a lighting outlet is the junction box containing the branch circuit conductors and no switch may be inserted therein, while admitting that some fixtures may contain a switching means as an integral part. This language will help to clarify.
PANEL ACTION: Reject.
PANEL STATEMENT: Adding the text "with fixture" does not add clarity. The present requirement is that the outlet is to be controlled by a wall switch or that it contain some type of switching means, which could include the switching means in a fixture.
NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12
VOTE ON PANEL ACTION:
AFFIRMATIVE: 12

(Log #404)

2- 231 - (210-70(a) (3)): Reject
SUBMITTER: Amos D. Lowrance, Jr., City of Chattanooga, TN
RECOMMENDATION: Revise 210-70(a) (3) to read as follows:
(3) Storage or Equipment Spaces. For attics, underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring services. The control point for the lighting outlet required by this section shall be at the usual point of entry to these spaces. Additional lighting outlets may be permitted. The lighting outlet shall be provided at or near the equipment requiring services.
SUBSTANTIATION: As currently written, it is possible to have a single pole switch at the door and a pull chain on a lighting outlet controlled by the switch. When the service person pulls the chain on the outlet, then the switch no longer controls the lighting outlet.

NFPA 70 — May 2001 ROP — Copyright 2000, NFPA

PANEL ACTION: Reject.

PANEL STATEMENT: This recommendation would limit the control of the lighting outlet to a single location. There are instances where it may be preferred that the outlet be controlled from multiple points of entry, particularly in basements, utility rooms, and similar spaces.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2485)

2- 232 - (210-70(a)(3)): Reject

Note: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 18 for action in Article 410. This action will be considered by the Panel as a Public Comment.

SUBMITTER: James M. Imlah, City of Hillsboro, OR

RECOMMENDATION: Revise as follows:

(3) Storage or Equipment Spaces. For attics, underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing. At least one point of control shall be at the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing. Lighting required for attics or underfloor spaces shall have approved guards or be enclosed.

SUBSTANTIATION: Many times work being done in these areas are of limited area and the higher risk of fixture damage becomes apparent. The damage to a bulb in a fixture has created a shock potential to person(s) working in those areas. In attics the breaking of a bulb has been known to starting the burning of dry combustible materials in the area from hot glass and light elements falling within the area. In underfloor spaces the issue is the added potential of shock hazard from damp or wet ground with many grounded surfaces such as metallic ducts and metallic piping. Please consider lighting guards for fixtures in these locations for protection of persons and property.

PANEL ACTION: Reject.

PANEL STATEMENT: Section 210-70(a)(3) only covers the lighting outlet. The panel requests that the Technical Correlating Committee refer this proposal to Code-Making Panel 18 for action.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #4403)

2- 233 - (210-70(a)(4) (New)): Reject

SUBMITTER: Joseph Andre, City of Bellevue, WA

RECOMMENDATION: Add new section (a)(4) to read:

"For each of the following locations, a lighting fixture shall be installed to provide illumination: kitchens, bathrooms, hallways, stairways, attached garages, detached garages with electric power, and attics, underfloor spaces, utility rooms, and basements when a lighting outlet is required per 210.70(a)(3)."

SUBSTANTIATION: The current wording of Section 210-70(a), combined with the definition of a lighting outlet in Article 100, would permit a switch controlled receptacle or a box suitable for mounting a light fixture but with a blank cover to be installed in the locations identified in the proposed new text. It is improbable/impracticable to believe that a lamp would be installed in those locations, and a box without a fixture is also not the intent of this section. By mandating that there be illumination, the NEC would significantly reduce the hazard of tripping in an unlighted area.

The impact to the industry is minimal, as most installers recognize the intent and provide illumination in a completed installation.

PANEL ACTION: Reject.

PANEL STATEMENT: The requirement for illumination of habitable rooms is not within the purview of Article 210. The objective for habitable rooms is to provide a lighting outlet so that acceptable illumination can be provided.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #1684)

2- 234 - (210-70(c)): Accept

SUBMITTER: Keith M. Whitesel, Whitesel Electric

RECOMMENDATION: Change title from "Other Locations" to:

"Other Than Dwelling Units."

SUBSTANTIATION: Clarification that this section applies to these spaces since 210-70(a)(3) applies to dwelling units.

PANEL ACTION: Accept.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #3943)

2- 235 - (210-70(c)): Reject

SUBMITTER: Jim Crocker, Insp. Div, City of Chattanooga, TN

RECOMMENDATION: Revise text to read as follows:

210.70(c). Lighting Outlets Required. For attics and underfloor spaces containing equipment requiring servicing, such as heating, air conditioning, and refrigeration equipment. At least one lighting outlet ~~containing a switch~~ or controlled by a wall switch shall be installed at each entrance in such places. At least one point of control shall be at the usual points of entry to these places. ~~The A~~ lighting outlet shall be provided at ~~or near~~ the equipment requiring servicing, and as needed illuminate the path from the entrance to the equipment.

SUBSTANTIATION: In larger and newer homes and commercial buildings, there are often more than one entrance to attic spaces and in some, the roof changes may shadow the path to the equipment as I have seen more than once. One building had as many as eight attic entrances with walk boards between each.

PANEL ACTION: Reject.

PANEL STATEMENT: Although the designer can provide for a switching arrangement that covers more than one entry point, the objective of the code requirement is to require the switch at the usual point of entry. 210-70(c) only requires that the lighting outlets be installed, as the provision to provide illumination is not covered by this section.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12

(Log #2796)

2- 236 - (210-70(c)(3)): Reject

SUBMITTER: Phillip David Martin, City of Chattanooga,

TN/Rep. Public Works-Insp. Div, Chattanooga, TN

RECOMMENDATION: Revise as follows:

(c) Other Locations. For attic, above ceiling locations and underfloor spaces containing equipment requiring servicing such as heating, air-conditioning, refrigeration equipment, and sign transformers.

SUBSTANTIATION: Sign transformers are usually located above ceilings or attic spaces where the code may not require lighting.

PANEL ACTION: Reject.

PANEL STATEMENT: There are many types of electrical equipment, including transformers, junction boxes, etc. that do not fall under the provision of equipment requiring service. The objective of the requirement is to provide a lighting outlet for equipment that requires routine maintenance activities.

NUMBER OF PANEL MEMBERS ELIGIBLE TO VOTE: 12

VOTE ON PANEL ACTION:

AFFIRMATIVE: 12