Public Input No. 472-NFPA 99-2015 [Section No. 6.3.1]

6.3.1 Sources.

Each health care appliance requiring electrical line power for operation shall be supported by power sources that provide power adequate for each service.

6.3.1.1 Power/Utility Company.

(Reserved)

6.3.1.2 On-Site Generator Set.

(Reserved)

6.3.1.3 Electrical design professionals shall design the electrical service to patient care areas with the understanding that theEssential Power *Distribution System*has the same potential for outages, faults, and overloads asNormal Power *Distribution Systems*. For these reasons, neither the electrical design professional, nor the medical staff, should ever consider a 'Red Receptacles' to be immune from outages, faults, or overloads

Statement of Problem and Substantiation for Public Input

A necessary design and operational consideration that could be placed here or carried into an annex or handbook item.

Submitter Information Verification

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Submittal Date: Mon Jul 06 16:03:32 EDT 2015

Committee Statement

Resolution: In accordance with 1.2, "the purpose of this code is to provide minimum requirements for the installation, inspection, testing, maintenance, performance, and safe practices for facilities, material, equipment, and appliances, including other hazards associated with the primary hazards." No enforceable minimum requirements are established by PI # 472. Furthermore, per 6.4.2.2.6.2(C) and 6.5.2.2.4.2, receptacles supplied from the life safety and critical branches are not necessarily identified solely by red color.

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Public Input No. 447-NFPA 99-2015 [Section No. 6.3.2.2]

6.3.2.2 All Patient Care ~~Rooms.~~Areas

6.3.2.2.1*

Branch circuit wiring 600 V or less shall comply with the requirements in 6.3.2.2.1.1 through 6.3.2.2.1.4.

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(B)

When required, branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

6.3.2.2.1.2 Category 1 Spaces.

Category 1 spaces shall be served by circuits from a critical branch panel(s) served from a single automatic transfer switch and a minimum of one circuit served by the normal power distribution system or by a system originating from a second critical branch automatic transfer switch.

6.3.2.2.1.3 Access to Overcurrent Protective Devices.

(A)

Only authorized personnel shall have access to overcurrent protective devices serving Category 1 and Category 2 spaces.

(B)

Overcurrent protective devices serving Category 1 and Category 2 spaces shall not be permitted to be located in public access spaces.

(C)

Where used in locations such as in Category 1 spaces, isolated power panels shall be permitted in those locations.

6.3.2.2.1.4 Special-Purpose Outlets.

Branch circuits serving only special-purpose outlets or receptacles (e.g., portable X-ray receptacles) shall not be required to conform to the requirements of 6.3.2.2.1.2.

6.3.2.2.2

Grounding requirements shall comply with the requirements in 6.3.2.2.2.1 through 6.3.2.2.2.4.

6.3.2.2.2.1 Grounding Circuitry Integrity.

Grounding circuits and conductors in patient care spaces shall be installed in such a way that the continuity of other parts of those circuits cannot be interrupted nor the resistance raised above an acceptable level by the installation, removal, and replacement of any installed equipment, including power receptacles.

6.3.2.2.2.2 Reliability of Grounding.

The grounding conductor shall conform to *NFPA 70*, *National Electrical Code*.

6.3.2.2.2.3 Separate Grounding Conductor.

When existing construction does not have a separate grounding conductor, the continued use of the system shall be permitted, provided that it meets the performance requirements in 6.3.3.1.

6.3.2.2.2.4 Metal Receptacle Boxes.

Where metal receptacle boxes are used, the performance of the connection between the receptacle grounding terminal and the metal box shall be equivalent to the performance provided by copper wire no smaller than 12 AWG.

6.3.2.2.3* Grounding Interconnects.

In patient care spaces supplied by the normal distribution system and any branch of the essential electrical system, the grounding system of the normal distribution system and that of the essential electrical system shall be interconnected.

6.3.2.2.4 Protection Against Ground Faults.

6.3.2.2.4.1* Equipment Protection.

The main and downstream ground-fault protective devices (where required) shall be coordinated as required in 6.3.2.5.

6.3.2.2.4.2 Personnel Protection.

If used, ground-fault circuit interrupters (GFCIs) shall be listed.

6.3.2.2.5

Low-voltage wiring shall comply with either of the following:

(1) Fixed systems of 30 V (dc or ac rms) or less shall be permitted to be ungrounded, provided that the insulation between each ungrounded conductor and the primary circuit, which is supplied from a conventionally grounded distribution system, is the same protection as required for the primary voltage.

(2) A grounded low-voltage system shall be permitted, provided that load currents are not carried in the grounding conductors.

6.3.2.2.6 Receptacles.

6.3.2.2.6.1* Types of Receptacles.

(A)

Each power receptacle shall provide at least one separate, highly dependable grounding pole capable of maintaining low-contact resistance with its mating plug, despite electrical and mechanical abuse. The grounding terminal of each receptacle shall be connected to the reference grounding point by means of an insulated copper equipment grounding conductor.

(B)

Special receptacles, such as the following, shall be permitted:

(1) Four-pole units providing an extra pole for redundant grounding or ground continuity monitoring

(2) Locking-type receptacles

(3) Where required for reduction of electrical noise on the grounding circuit, receptacles in which the grounding terminals are purposely insulated from the receptacle yoke

(C)

All single, duplex, or quadruplex type receptacles, or any combination thereof, located at patent bed locations in Category 1 spaces shall be listed hospital grade.

6.3.2.2.6.2 Minimum Number of Receptacles.

The number of receptacles shall be determined by the intended use of the spaces in accordance with 6.3.2.2.6.2(A) through 6.3.2.2.6.2(F).

(A)

Receptacles for Patient Bed Locations in Category 2 Spaces. Each patient bed location shall be provided with a minimum of eight receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(B)

Receptacles for Patient Bed Locations in Category 1 Spaces. Each patient bed location shall be provided with a minimum of 14 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(C)

Receptacles for Operating Rooms. Operating rooms shall be provided with a minimum of 36 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(D)

Receptacles for Bathrooms or Toilets. Receptacles shall not be required in bathrooms or toilet rooms.

(E)

Receptacles for Special Rooms. Receptacles shall not be required in rooms where medical requirements mandate otherwise (e.g., certain psychiatric, pediatric, or hydrotherapy rooms).

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as

determined by the governing body, other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

6.3.2.2.6.3 Polarity of Receptacles.

Each receptacle shall be wired in accordance with *NFPA 70*, *National Electrical Code*, to ensure correct polarity.

6.3.2.2.6.4 Other Services Receptacles.

Receptacles provided for other services having different voltages, frequencies, or types on the same premises shall be of such design that attachment plugs and caps used in such receptacles cannot be connected to circuits of a different voltage, frequency, or type, but shall be interchangeable within each classification and rating required for two-wire, 125-V, single-phase ac service.

6.3.2.2.7 Special Grounding.

6.3.2.2.7.1* Use of Isolated Ground Receptacles.

(A)

An isolated ground receptacle, if used, shall not defeat the purposes of the safety features of the grounding systems detailed herein.

(B)

An isolated ground receptacle shall not be installed within a patient care vicinity.

6.3.2.2.7.2 Patient Equipment Grounding Point.

A patient equipment grounding point comprising one or more grounding terminals or jacks shall be permitted in an accessible location in the patient care vicinity.

6.3.2.2.7.3* Special Grounding in Patient Care Rooms.

In addition to the grounding required to meet the performance requirements of 6.3.3.1, additional grounding shall be permitted where special circumstances so dictate.

6.3.2.2.8 Wet Procedure Locations.

6.3.2.2.8.1*

Wet procedure locations shall be provided with special protection against electric shock.

6.3.2.2.8.2

This special protection shall be provided as follows:

(1) Power distribution system that inherently limits the possible ground-fault current due to a first fault to a low value, without interrupting the power supply

(2) Power distribution system in which the power supply is interrupted if the ground-fault current does, in fact, exceed the trip value of a Class A GFCI

6.3.2.2.8.3

Patient beds, toilets, bidets, and wash basins shall not be required to be considered wet procedure locations.

6.3.2.2.8.4*

Operating rooms shall be considered to be a wet procedure location, unless a risk assessment conducted by the health care governing body determines otherwise.

6.3.2.2.8.5

In existing construction, the requirements of 6.3.2.2.8.1 shall not be required when a written inspection procedure, acceptable to the authority having jurisdiction, is performed by a

designated individual at the hospital to indicate that equipment grounding conductors for 120-V, single-phase, 15-A and 20-A receptacles; equipment connected by cord and plug; and fixed electrical equipment are installed and maintained in accordance with *NFPA 70*, *National Electrical Code*, and the applicable performance requirements of this chapter.

(A)

The procedure shall include electrical continuity tests of all required equipment, grounding conductors, and their connections.

(B)

Fixed receptacles, equipment connected by cord and plug, and fixed electrical equipment shall be tested as follows:

(1) When first installed

(2) Where there is evidence of damage

(3) After any repairs

6.3.2.2.8.6

The use of an isolated power system (IPS) shall be permitted as a protective means capable of limiting ground-fault current without power interruption. When installed, such a power system shall conform to the requirements of 6.3.2.6.

6.3.2.2.8.7*

Operating rooms defined as wet procedure locations shall be protected by either isolated power or ground-fault circuit interrupters.

6.3.2.2.8.8

Where GFCI protection is used in an operating room, one of the following shall apply:

(1) Each receptacle shall be an individual GFCI device.

(2) Each receptacle shall be individually protected by a single GFCI device.

6.3.2.2.9 Isolated Power.

6.3.2.2.9.1

An isolated power system shall not be required to be installed in any patient care space, except as specified in 6.3.2.2.8.

6.3.2.2.9.2

The system shall be permitted to be installed where it conforms to the performance requirements specified in 6.3.2.6.

6.3.2.2.10 Essential Electrical Systems (EES).

6.3.2.2.10.1

Category 1 spaces shall be served only by a Type 1 EES.

6.3.2.2.10.2

Category 2 spaces shall be served by a Type 1 or Type 2 EES.

6.3.2.2.10.3

A Type I EES serving a Category 1 space shall be permitted to serve Category 2 spaces in the same facility.

6.3.2.2.10.4

Category 3 or Category 4 spaces shall not be required to be served by an EES.

6.3.2.2.11 Battery-Powered Lighting Units.

6.3.2.2.11.1

One or more battery-powered lighting units shall be provided within locations where deep sedation and general anesthesia is administered.

6.3.2.2.11.2

The lighting level of each unit shall be sufficient to terminate procedures intended to be performed within the operating room.

6.3.2.2.11.3

The sensor for units shall be wired to the branch circuit(s) serving general lighting within the room.

6.3.2.2.11.4

Units shall be capable of providing lighting for 1 ½ hours.

6.3.2.2.11.5

Units shall be tested monthly for 30 seconds, and annually for 30 minutes.

Statement of Problem and Substantiation for Public Input

Not all spaces for patient care are rooms. Pre-op or Post-op areas are an example.

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Committee Statement

Resolution: The proposed language is inconsistent with the terminology in 3.3.127 which defines patient care space. See action on PI 507 which is similar.

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Public Input No. 438-NFPA 99-2015 [Section No. 6.3.2.2.1.1]

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(B)

When required, branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

(C)

All branch circuits panels serving a patient bed location, either normal or critical power, shall have their ground buses connected together to assure equal ground potential at the bed location.

Statement of Problem and Substantiation for Public Input

This will make design and installation clear to avoid a voltage differential hazard., This concept with jointly prepared with Jim Harvey, University of Michigan Hospitals

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Committee Statement

Resolution: Section 6.3.2.2.3 and Article 517 of the NEC address this issue adequately. Adding this language here could add confusion.

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Public Input No. 441-NFPA 99-2015 [Section No. 6.3.2.2.1.1]

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(B)

~~When required, branch~~ Branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

Statement of Problem and Substantiation for Public Input

The "when required" language does not seem to correspond to the "it shall be permitted" language. This is an attempt to clarify; the committee may have a better suggestion.

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Committee Statement

Resolution: FR-7-NFPA 99-2015

Statement: The "when required" language does not seem to correspond to the "it shall be permitted" language. This is an attempt to clarify.

The separation of normal and EES circuits from each other, as required by NFPA 70 Article 700 and by NFPA 99, are clarified by these revisions to improve readability of the Code.

Public Input No. 474-NFPA 99-2015 [Section No. 6.3.2.2.1.1]

6.3.2.2.1.1* Circuits.

(A)

Branch circuits serving a given patient bed location shall be fed from not more than one normal branch-circuit distribution panel.

(A1)Branch circuits serving a given patient bed location shall be fed from not more than one essential branch-circuit distribution panel.

(A2) For reliability reasons inpatient bed locations should be served by an equal number of dedicated or shared, normal and essential power circuits. In locations such as ICU's the circuits should be dedicated circuits

(B)

When required, branch circuits serving a given patient bed location shall be permitted to be fed from more than one critical branch-circuit distribution panel.

Statement of Problem and Substantiation for Public Input

Two important end-use equipment reliability consideraions

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Committee Statement

Resolution: Since the critical branch are one of the three branches comprising the essential electrical system, the proposed requirement to limit EES branch circuits to being supplied from only one EES distribution panel would conflict with the existing requirement of 6.3.2.2.1.1(B). Life safety branches and equipment branches of EES serve essential functions that are not specific to an individual patient bed location. Further, 6.4.2.2.6.1 requires the life safety branch and critical branches be kept separate from the equipment branch of the EES (Type 1), as well as from normal branches. Similarly, 6.5.2.2.4.1 requires the life safety branch and equipment branches of the EES (Type 2) be kept separate from the critical branch of the EES (Type 1), as well as from normal branches. The proposed requirement for serving patient bed locations being served by more than one distribution panel (and consequently more than one circuit) is already addressed by 6.3.2.2.1.2.

Public Input No. 449-NFPA 99-2015 [Section No. 6.3.2.2.3]

6.3.2.2.3* Grounding Interconnects.

In patient care spaces supplied by the normal distribution system and any branch of the essential electrical system, the grounding system of the normal distribution system and that of the essential electrical system shall be ~~interconnected~~bonded.

Statement of Problem and Substantiation for Public Input

"Bonded" is the better word.

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Committee Statement

Resolution: It is recognized that the equipment grounding conductor also performs bonding. An NEC® Correlating Committee Task Group was formed in the 2005 NEC® cycle to address the concepts regarding grounding and bonding. No new information has been submitted that would cause this to be reversed.

Public Input No. 475-NFPA 99-2015 [Section No. 6.3.2.2.3]

6.3.2.2.3* Grounding Interconnects.

In patient care spaces supplied by the normal distribution system and any branch of the essential electrical system, the ~~grounding system~~ ground bar of the normal ~~distribution system~~ power panels and that of the essential electrical system shall be interconnected and bonded.

Statement of Problem and Substantiation for Public Input

This makes visualzing the necessary bonding easier by intending the actual grounding system component. See related proposal. .

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Submittal Date: Mon Jul 06 16:17:00 EDT 2015

Committee Statement

Resolution: It is recognized that the equipment grounding conductor also performs bonding. An NEC® Correlating Committee Task Group was formed in the 2005 NEC® cycle to address the concepts regarding grounding and bonding. No new information has been submitted that would cause this to be reversed.

Public Input No. 481-NFPA 99-2015 [Section No. 6.3.2.2.6.2]

6.3.2.2.6.2 Minimum Number of Receptacles.

The number of receptacles shall be determined by the intended use of the spaces in accordance with 6.3.2.2.6.2(A) through 6.3.2.2.6.2(F).

(A)

Receptacles for Patient Bed Locations in Category 2 Spaces. Each patient bed location shall be provided with a minimum of eight receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(B)

Receptacles for Patient Bed Locations in Category 1 Spaces. Each patient bed location shall be provided with a minimum of 14 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(B1) Receptacles in pediatric bed locations shall be tamperproof.

(B2) For reliability reasons, 50% of the patient care receptacles shall be served by the normal power systems and 50% from the essential service power system

(C)

Receptacles for Operating Rooms. Operating rooms shall be provided with a minimum of 36 receptacles. They shall be permitted to be of the locking or nonlocking type, single, duplex, or quadruplex type, or any combination of the three. All receptacles shall be listed hospital grade.

(C1) In facilities with two essential power throw-over switches, OR's should have two isolated power sources – one served from each throwover switch. For reliability reasons, 50% of the receptacles in the OR shall be served by each isolated power system

(D)

Receptacles for Bathrooms or Toilets. Receptacles shall not be required in bathrooms or toilet rooms.

(E)

Receptacles for Special Rooms. Receptacles shall not be required in rooms where medical requirements mandate otherwise (e.g., certain psychiatric, pediatric, or hydrotherapy rooms).

(F)

Designated Pediatric Locations. Receptacles that are located within the patient rooms, bathrooms, playrooms, and activity rooms of pediatric units or spaces with similar risk as determined by the governing body, other than nurseries, shall be listed tamper-resistant or shall employ a listed tamper-resistant cover.

Statement of Problem and Substantiation for Public Input

Clarifications of patient safety concepts

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Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as "hospital grade" in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

"SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord." [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt, 15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 484-NFPA 99-2015 [Section No. 6.3.2.2.6.3]

6.3.2.2.6.3 Polarity of Receptacles.

Each receptacle shall be wired in accordance with *NFPA 70*, *National Electrical Code*, to ensure correct polarity.

For safety reasons, whenever possible, the ground prong shall be in the up position (If receptacle is not fully inserted, and something falls, it hits the groung prong not neutral or hot)

Statement of Problem and Substantiation for Public Input

Safety recommendadtion that should be self-evident.

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Committee Statement

Resolution: FR-9-NFPA 99-2015

Statement: Many of the requirements of 6.3.2.2.6.2 relate to TYPES of receptacles rather than MINIMUM NUMBERS. This revision also removes redundant language from the final sentence of 6.3.2.2.6.2(A) for Category 1 spaces and relocates the similar requirement from Category 2 spaces and operating rooms in the final sentences of 6.3.2.2.6.2(B) and (C). References to receptacles being listed as "hospital grade" in those sections have been relocated for clarity to the code users. Similarly, 6.3.2.2.6.2(F) for tamper-resistant receptacles has been relocated to 6.3.2.2.6.1.

The requirements for Hospital Grade receptacles in UL Standard UL 498, Attachment Plugs and Receptacles, Supplement SD are inherently limited by their nature to 125- and 250-volt, 15- and 20-ampere, NONLOCKING-type receptacles and CANNOT be applied to receptacles of the locking type. The Scope of UL 498, Attachment Plugs and Receptacles, Supplement SD, reads:

"SD1.1 The requirements of this supplement cover Hospital Grade attachment plugs, cord connectors, and receptacles, intended for hospital use in other than hazardous locations in accordance with Article 517 of the National Electrical Code, ANSI/NFPA 70. THEY ARE APPLICABLE ONLY TO NONLOCKING-TYPE DEVICES OF THE 5-15, 6-15, 5-20, AND 6-20 CONFIGURATIONS. Receptacles shall be intended only for flush installation, and plugs and connectors shall be either of the straight type (flexible cord exits at the rear of the device) or angled type (cord exits at an angle to the major plug axis) intended for field assembly on flexible cord." [Emphasis added. NEMA Standard WD6 receptacle configuration designations "5-15, 6-15, 5-20, and 6-20" refer to the dimensional configurations for grounding-type, single-phase (i.e., 2-pole, 3-wire), 15- and 20-ampere, 125- and 250-volt, NONLOCKING-type receptacles.]

Consequently, the requirements must state that the REQUIRED receptacles are limited to 125-volt,

15- or 20-ampere, NONLOCKING-type receptacles that are listed Hospital Grade. The intent was to set requirements for the REQUIRED quantity of hospital grade receptacles and to permit separately that any other receptacles beyond those minimum numbers to be either of the nonlocking or locking type for design flexibility for specialized cord-and-plug-connected equipment.

Furthermore, inclusion of locking-type receptacles in 6.3.2.2.6.2(B) that inherently cannot be listed Hospital Grade represents a correlation conflict with the requirements of 6.3.2.2.6.1(C) that limit receptacles at patient bed locations in Category 1 to listed hospital grade.

Public Input No. 455-NFPA 99-2015 [Section No. D.1.2.9]

D.1.2.9 IEEE Publications.

IEEE, Three Park Avenue, 17th Floor, New York, NY 10016-5997.

ANSI/IEEE 493-2007, *Recommended Practice for the Design of Reliable Industrial and Commercial Power System*, 2007.

IEEE 602, *Recommended Practice for Electric Systems in Health Care Facilities,* 2007

3001.7 Recommended Practice for the Application of Communication and Signaling Systems used in Industrial and Commercial Power Systems

P3003.2 Recommended Practice for the System Grounding of Industrial and Commercial Power Systems (P)

3004.13 Recommended Practice for Overcurrent Coordination in Industrial and Commercial Power Systems

P3005.4 Recommended Practice for Improving the Reliability of Emergency and Stand-By Power Systems

P3006.2 Recommended Practice for Evaluating the Reliability of Existing Industrial and Commercial Power Systems (P)

3006.5 Recommended Practice for the Use of Probability Methods for Conducting a Reliability Analysis of Industrial and Commercial Power Systems

Statement of Problem and Substantiation for Public Input

These are the titles of the replacements for the IEEE Color Book series.

Submitter Information Verification

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Committee Statement

Resolution: See First Revision No. 102

Statement: Annex D referenced documents have been updated to show the most current editions.