National Fire Protection Association

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

WORKING DRAFT OF NEC CODE-MAKING PANEL 17 MEETING OUTPUT

CONTENT NOT FINAL – SUBJECT TO REVISION PRIOR TO LETTER BALLOT AND PUBLICATION OF FIRST DRAFT REPORT

Document: National Electrical Code®

Revision Cycle: A2025

Meeting Dates: January 24 – 26, 2024

Panel Activity: Input Stage

This is a working draft, prepared by NFPA staff, to record the output generated at the Code-Making Panel 17 First Draft Meeting. It includes draft copies of the First Revisions and any Global Revisions.

It is being made available to Panel members for the purpose of facilitating early review, particularly for those Panel members who may be seeking input from their respective organizations in preparation for the First Draft Ballot.

First Revision No. 8917-NFPA 70-2024 [Detail]

Article 427 Fixed Electric Heating Equipment for Pipelines~~and~~ , ~~Vessels~~and Other Applications ~~for Trace Heating~~

Part I. General

427.1 Scope.

This article covers electrically energized heating systems and the installation of these systems used with pipelines~~and~~ , vessels, and other applications for trace heating .

Informational Note: See IEEE 515-2017, *Standard for the Testing, Design, Installation and Maintenance of Electrical Resistance Trace Heating for Industrial Applications*, for further information.

Also see applicable sections of the IEEE 844/CSA 293 series of standards for alternate technologies for fixed electric heating equipment for pipelines and vessels.

Supplemental Information

File Name	Description	Approved
70_CMP17_FR8917_427_Title_Detail.docx		

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Wed Jan 24 12:48:03 EST 2024

Committee Statement

Committee Statement: The title and scope of the article were revised to reflect installations of trace heating aka “heat trace” beyond those used for just pipelines and vessels, for example, installations of heat trace for doors of commercial freezers and similar applications.

Response Message: FR-8917-NFPA 70-2024

Public Input No. 2204-NFPA 70-2023 [Section No. 427.1]

Article 427 Fixed Electric Heating Equipment for Pipelines ~~and,~~ Vessels and Other Applications for Trace Heating

Part I. General

427.1 Scope.

This article covers electrically energized heating systems and the installation of these systems used with pipelines ~~and,~~ vessels, and other applications for trace heating.

Informational Note: See IEEE 515-2017, *Standard for the Testing, Design, Installation and Maintenance of Electrical Resistance Trace Heating for Industrial Applications*, for further information.

Also see applicable sections of the IEEE 844/CSA 293 series of standards for alternate technologies for fixed electric heating equipment for pipelines and vessels.

First Revision No. 9047-NFPA 70-2024 [Detail]

424.2 Listing Requirements.

The following shall be listed:

(1) Electric baseboard heaters

(2) Heating cables

(3) Duct heaters

(4) Radiant heating systems

(5) Low-voltage fixed electric-space heating equipment

Informational note: See Article 424, Part X for requirements regarding low voltage fixed electric space-heating equipment.

~~**424.6 Listed Equipment.**~~

~~**Electric baseboard heaters, heating cables, duct heaters, and radiant heating systems shall be listed and labeled.**~~

~~**424.102 Listed Equipment.**~~

~~**Low-voltage fixed electric space-heating equipment shall be listed as a complete system.**~~

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Thu Jan 25 08:27:00 EST 2024

Committee Statement

Committee Statement: The requirements for listing previously found in 424.6 and 424.102 were relocated to 424.2, in accordance with 2.2.1 of the NEC Style Manual. An informational note was added to alert the user of the importance of installing low voltage fixed electric space-heating equipment as a complete system.

Response Message: FR-9047-NFPA 70-2024

Public Input No. 3733-NFPA 70-2023 [Section No. 424.6]

First Revision No. 9071-NFPA 70-2024 [Detail]

680.22(B) and 680.22(B)(1)

(B) Luminaires, Lighting Outlets, Festoon Lighting, and Ceiling-Suspended (Paddle) Fans.

(1) ~~New~~ Outdoor ~~Installation~~ Clearances.

In outdoor pool areas, luminaires, lighting outlets, festoon lighting, and ceiling-suspended (paddle) fans installed above the pool or the area extending 1.5 m (5 ft) horizontally from the inside walls of the pool shall be installed such that all parts are at a height not less than 3.7 m (12 ft) above the maximum water level of the pool.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 09:28:57 EST 2024

Committee Statement

Committee Statement: Festoon lighting is installed above pools very frequently. This defined term is added to the title, and the text revision makes it clear that festoon lighting is also subject to this distance requirement, and it enhances electrical safety from shock hazards in the swimming pool area. The installation height is clarified to indicate that all parts must be above the minimum height. Additionally, “New” and “Installation” were removed from the title of 680.22(B)(1) to align the requirements with the remainder of this Section. 680.22(B)(4) is also revised to add festoon lighting to the requirement, to correlate with adding it to 680.22(B)(1).

Response Message: FR-9071-NFPA 70-2024

Public Input No. 2394-NFPA 70-2023 [Section No. 680.22(B)(1)]

First Revision No. 9099-NFPA 70-2024 [Detail]

[Revisions to 680.24(D) and 680.24(F) as shown.]

(D) Grounding Terminals.

Grounding terminals shall comply with the following requirements, as applicable.

(1) Number of Grounding Terminals. Junction boxes, transformer and power-supply enclosures, and ~~ground-fault circuit-interrupter~~ GFCI enclosures connected to a conduit that extends directly to a forming shell or mounting bracket of a no-niche luminaire shall be provided with a number of grounding terminals that shall be no fewer than one more than the number of conduit entries.

(2) Connected to Panelboard Enclosure. The grounding terminals of a junction box, transformer enclosure, or other enclosure in the supply circuit to a wet-niche or no-niche luminaire and the field-wiring chamber of a dry-niche luminaire shall be connected to an equipment grounding conductor, which shall be directly connected to the panelboard enclosure.

~~**(F) Grounding.**~~

~~The grounding terminals of a junction box, transformer enclosure, or other enclosure in the supply circuit to a wet-niche or no-niche luminaire and the field-wiring chamber of a dry-niche luminaire shall be connected to the equipment grounding terminal of the panelboard. This terminal shall be directly connected to the panelboard enclosure.~~

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 10:51:54 EST 2024

Committee Statement

Committee Statement: The text of 680.24(D) was editorially revised for clarity. Section 2.1.2.9 of the NEC Style Manual permits the use of acronyms. The acronym GFCI is currently defined in Article 100.

Relocating 680.24(F) to 680.24(D)(2) to group these similar requirements together. Both 680.24(D) and (F) have requirements relating to grounding terminals, therefore this relocation will add clarity for Code users.

Response Message: FR-9099-NFPA 70-2024

Public Input No. 1652-NFPA 70-2023 [Section No. 680.24(D)]

Public Input No. 3211-NFPA 70-2023 [Section No. 680.24(D)]

Public Input No. 3212-NFPA 70-2023 [Section No. 680.24(F)]

Public Input No. 2082-NFPA 70-2023 [Section No. 680.24(F)]

First Revision No. 9101-NFPA 70-2024 [Detail]

680.24 Junction Boxes and Electrical Enclosures for Transformers or GFCIs.~~Ground-Fault Circuit Interrupter~~

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 10:54:28 EST 2024

Committee Statement

Committee Statement: The title of Section 680.24 Section was changed to use the acronym GFCI. The NEC Style Manual 2.2.1.9 permits the use of acronyms. The acronym, GFCI, is defined in Article 100.

Response Message: FR-9101-NFPA 70-2024

First Revision No. 9190-NFPA 70-2024 [Detail]

[Revise existing section 680.71 and create new section 680.75.]

680.71 Branch Circuit ~~Protection~~ .

Hydromassage bathtubs and their associated electrical components shall be on an individual branch circuit(s)~~and protected by a readily accessible GFCI. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 1.83 m (6 ft) measured horizontally of the inside walls of a hydromassage tub shall be GFCI protected~~ .

680.75 GFCI Protection.

(A) General. Hydromassage bathtubs and their associated electrical components shall be protected by a readily accessible GFCI.

(B) Receptacles. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 1.83 m (6 ft) measured horizontally of the inside walls of a hydromassage tub shall be GFCI protected.

Supplemental Information

File Name	Description	Approved
70_CMP17_Detail_FR9190_680.71.docx		

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 16:20:10 EST 2024

Committee Statement

Committee Statement: Section 680.71 was split into two separate sections, with 680.71 covering the requirement for an individual branch circuit and a new section 680.75 covering GFCI protection. New Section 680.75 was split into two subsections for clarity and ease of reading. These editorial revisions are non-technical in nature and are intended to satisfy section 3.5.1.2 of the NEC Style Manual.

Response Message: FR-9190-NFPA 70-2024

Public Input No. 2392-NFPA 70-2023 [Section No. 680.71]

Public Input No. 2393-NFPA 70-2023 [Section No. 680.71]

Revise existing section 680.71 and create new section 680.75.

680.71 Branch Circuit~~Protection~~.
Hydromassage bathtubs and their associated electrical components shall be on an individual branch circuit(s)~~ and protected by a readily accessible GFCI. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 1.83 m (6 ft) measured horizontally of the inside walls of a hydromassage tub shall be GFCI protected~~.

680.75 GFCI Protection.

(A) General.
Hydromassage bathtubs and their associated electrical components shall be protected by a readily accessible GFCI.

(B) Receptacles.
All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 1.83 m (6 ft) measured horizontally of the inside walls of a hydromassage tub shall be GFCI protected.

First Revision No. 9253-NFPA 70-2024 [Detail]

[Revisions to Section 680.26(B)(2) as shown.]

(2) Perimeter Surfaces.

The perimeter surface to be bonded shall be considered to extend for 900 mm (3 ft) horizontally beyond the inside walls of the pool while also at a height between 900 mm (3 ft) above and 600 mm (2 ft) below the maximum water level. The perimeter surface shall include unpaved surfaces, concrete, and other types of paving. Perimeter surfaces separated from the pool by a permanent wall or building 1.5 m (5 ft) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a), (B)(2)(b), (B)(2)(c), and (B)(2)(d). For conductive pool shells where bonding to perimeter surfaces is required, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four points uniformly spaced around the perimeter of the pool, or if the bonded perimeter surface does not surround the entire pool, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four uniformly spaced points along the bonded perimeter surface. For nonconductive pool shells, where bonding to the perimeter surfaces is required, bonding at four points shall not be required, and the perimeter bonding shall be attached to the 8 AWG copper equipotential bonding conductor and, if present, to any conductive support structure for the pool.

Informational Note: Because the perimeter surface can incorporate various types of materials at various locations and elevations above and below maximum water level, the perimeter surface required to be bonded might not surround the entire pool. The 8 AWG copper equipotential bonding conductor can encircle the entire pool to facilitate connection of bonded parts.

(a) *Conductive Paved Portions of Perimeter Surfaces.* Conductive paved portions of perimeter surfaces, including masonry pavers, if used, shall be bonded with unencapsulated structural reinforcing steel in accordance with 680.26(B)(1)(a), or with unencapsulated steel structural welded wire reinforcement (welded wire mesh, welded wire fabric), bonded together by steel tie wires or the equivalent. Steel welded wire reinforcement shall be fully embedded within the pavement unless the pavement will not allow for embedding. If the reinforcing steel is absent, or is encapsulated in a nonconductive compound, or embedding is not possible, unencapsulated welded wire steel reinforcement or a copper conductor grid shall be provided and shall be secured directly under the paving, and not more than 150 mm (6 in.) below finished grade.

Unencapsulated steel welded wire reinforcement that is not fully embedded in concrete, and copper grid regardless of location, where used for equipotential bonding, shall be listed for corrosion resistance and mechanical performance. This listing requirement shall become effective January 1, 2029 ~~2025~~ . The copper grid or unencapsulated steel welded wire

reinforcement shall also meet the following:

(1) Copper grid is constructed of 8 AWG solid bare copper and arranged in accordance with 680.26(B)(1)(b)(3).

(2) Steel welded wire reinforcement is minimum ASTM 6 × 6-W2.0 ×W2.0 or minimum No. 3 rebar constructed in a 300 mm (12 in.) grid.

(3) Copper grid and steel welded wire reinforcement follow the contour of the perimeter surface extending not less than 900 mm (3 ft) horizontally beyond the inside walls of the pool.

(4) Only listed splicing devices or exothermic welding are used.

Informational Note No. 1: Performance of the equipotential bonding system at the perimeter surface is improved as the distance between the bonding means and finished grade is minimized, either by embedding within, or by direct contact with the underside of, the finished pavement.

Informational Note No. 2: See ASTM A615/A615M, *Standard Specification for Deformed and Plain Carbon-SteelBars for Concrete Reinforcement;*A1064/A1064M, *Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete;*A1022/A1022M, *Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement;* A1060A/A1060M, *Standard Specification for Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete;*and ACI Standard ACI 318, *Building Code Requirements for Structural Concrete,* for examples of standards currently used in the listing of reinforcing steel bars and steel welded wire reinforcement.

(b) *Unpaved Portions of Perimeter Surfaces.*Unpaved portions of perimeter surfaces shall be bonded with any of the following methods:

(1) Copper conductor(s) shall meet the following:

a. At least one minimum 8 AWG bare solid copper conductor, including the 8 AWG copper equipotential bonding conductor if available.

b. The conductors follow the contour of the perimeter surface.

c. Only listed splicing devices or exothermic welding are used.

d. The conductor(s) is 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the pool.

e. The conductor(s) is under the unpaved portion of the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

f. Be installed only in perimeter surfaces not intended to have

direct access to swimmers in the pool.

(2) Copper grid or unencapsulated steel welded wire reinforcement used for equipotential bonding of unpaved portions of perimeter surfaces shall meet the following:

a. Be installed in accordance with 680.26(B)(2)(a).

b. Be located within unpaved surface(s) between 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

(c) *Nonconductive Perimeter Surfaces.* Equipotential bonding shall not be required for nonconductive portions of perimeter surfaces that are separated from earth or raised on nonconducting supports, and it shall not be required for any perimeter surface that is electrically separated from the pool structure and raised on nonconductive supports above an equipotentially bonded surface.

Informational Note: Nonconductive materials include, but are not limited to, wood, plastic, wood-plasticcomposites, fiberglass, and fiberglass composites.

(d) *Interconnection of Bonded Portions of Perimeter Surfaces.* All surfaces where equipotential bonding is required shall be interconnected using listed splicing devices or exothermic welding. Where copper wire is used for this purpose, it shall be solid copper, not smaller than 8 AWG. The conductor shall be permitted to encircle the pool to facilitate bonding connections to portions of the perimeter covered in 680.26(B)(2)(a)and (B)(2)(b) that are not contiguous.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Fri Jan 26 12:38:07 EST 2024

Committee Statement

Committee Statement: The requirements for listing in 680.26(B)(2)(a) were revised to extend the effective date to January 1, 2029, to allow adequate time for the development of product safety standards that could be used for the different options in this requirement and for products listed to these requirements to become available.

Response Message: FR-9253-NFPA 70-2024

First Revision No. 9257-NFPA 70-2024 [Detail]

[Revisions to Section 680.26(B)(2) as shown.]

(2) Perimeter Surfaces.

The perimeter surface to be bonded shall be considered to extend for 900 mm (3 ft) horizontally beyond the inside walls of the pool while also at a height between 900 mm (3 ft) above and ~~600~~ 900 mm (~~2~~ 3 ft) below the maximum water level. The perimeter surface shall include unpaved surfaces, concrete, and other types of paving. Perimeter surfaces separated from the pool by a permanent wall or building 1.5 m (5 ft) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a), (B)(2)(b), (B)(2)(c), and (B)(2)(d). For conductive pool shells where bonding to perimeter surfaces is required, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four points uniformly spaced around the perimeter of the pool, or if the bonded perimeter surface does not surround the entire pool, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four uniformly spaced points along the bonded perimeter surface. For nonconductive pool shells, where bonding to the perimeter surfaces is required, bonding at four points shall not be required, and the perimeter bonding shall be attached to the 8 AWG copper equipotential bonding conductor and, if present, to any conductive support structure for the pool.

Informational Note: Because the perimeter surface can incorporate various types of materials at various locations and elevations above and below maximum water level, the perimeter surface required to be bonded might not surround the entire pool. The 8 AWG copper equipotential bonding conductor can encircle the entire pool to facilitate connection of bonded parts.

(a) *Conductive Paved Portions of Perimeter Surfaces.* Conductive paved portions of perimeter surfaces, including masonry pavers, if used, shall be bonded with unencapsulated structural reinforcing steel in accordance with 680.26(B)(1)(a), or with unencapsulated steel structural welded wire reinforcement (welded wire mesh, welded wire fabric), bonded together by steel tie wires or the equivalent. Steel welded wire reinforcement shall be fully embedded within the pavement unless the pavement will not allow for embedding. If the reinforcing steel is absent, or is encapsulated in a nonconductive compound, or embedding is not possible, unencapsulated welded wire steel reinforcement or a copper conductor grid shall be provided and shall be secured directly under the paving, and not more than 150 mm (6 in.) below finished grade.

Unencapsulated steel welded wire reinforcement that is not fully embedded in concrete, and copper grid regardless of location, where used for equipotential bonding, shall be listed for corrosion resistance and mechanical performance. This listing requirement shall become effective January 1, 2025. The copper grid or unencapsulated steel welded wire reinforcement shall also meet the

following:

(1) Copper grid is constructed of 8 AWG solid bare copper and arranged in accordance with 680.26(B)(1)(b)(3).

(2) Steel welded wire reinforcement is minimum ASTM 6 × 6-W2.0 ×W2.0 or minimum No. 3 rebar constructed in a 300 mm (12 in.) grid.

(3) Copper grid and steel welded wire reinforcement follow the contour of the perimeter surface extending not less than 900 mm (3 ft) horizontally beyond the inside walls of the pool.

(4) Only listed splicing devices or exothermic welding are used.

Informational Note No. 1: Performance of the equipotential bonding system at the perimeter surface is improved as the distance between the bonding means and finished grade is minimized, either by embedding within, or by direct contact with the underside of, the finished pavement.

Informational Note No. 2: See ASTM A615/A615M, *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement;*A1064/A1064M, *Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete;*A1022/A1022M, *Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement;* A1060A/A1060M, *Standard Specification for Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete;*and ACI Standard ACI 318, *Building Code Requirements for Structural Concrete,* for examples of standards currently used in the listing of reinforcing steel bars and steel welded wire reinforcement.

(b) *Unpaved Portions of Perimeter Surfaces.*Unpaved portions of perimeter surfaces shall be bonded with any of the following methods:

(1) Copper conductor(s) shall meet the following:

a. At least one minimum 8 AWG bare solid copper conductor, including the 8 AWG copper equipotential bonding conductor if available.

b. The conductors follow the contour of the perimeter surface.

c. Only listed splicing devices or exothermic welding are used.

d. The conductor(s) is 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the pool.

e. The conductor(s) is under the unpaved portion of the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

f. Be installed only in perimeter surfaces not intended to have

direct access to swimmers in the pool.

(2) Copper grid or unencapsulated steel welded wire reinforcement used for equipotential bonding of unpaved portions of perimeter surfaces shall meet the following:

a. Be installed in accordance with 680.26(B)(2)(a).

b. Be located within unpaved surface(s) between 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

(c) *Nonconductive Perimeter Surfaces.* Equipotential bonding shall not be required for nonconductive portions of perimeter surfaces that are separated from earth or raised on nonconducting supports, and it shall not be required for any perimeter surface that is electrically separated from the pool structure and raised on nonconductive supports above an equipotentially bonded surface.

Informational Note: Nonconductive materials include, but are not limited to, wood, plastic, wood-plastic composites, fiberglass, and fiberglass composites.

(d) *Interconnection of Bonded Portions of Perimeter Surfaces.* All surfaces where equipotential bonding is required shall be interconnected using listed splicing devices or exothermic welding. Where copper wire is used for this purpose, it shall be solid copper, not smaller than 8 AWG. The conductor shall be permitted to encircle the pool to facilitate bonding connections to portions of the perimeter covered in 680.26(B)(2)(a)and (B)(2)(b) that are not contiguous.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Fri Jan 26 12:59:49 EST 2024

Committee Statement

Committee Statement: Revisions were made to change the height parameter in 680.26(B)(2) for the perimeter surface from 600 mm (2 ft) below maximum water level to 900 mm (3 ft) below maximum water level to more accurately address the reach range for a person using the pool.

Response Message: FR-9257-NFPA 70-2024

Public Input No. 1738-NFPA 70-2023 [Section No. 680.26(B)(2)]

First Revision No. 9259-NFPA 70-2024 [Detail]

[Revisions to Section 680.26(B)(2) as shown.]

(2) Perimeter Surfaces.

The perimeter surface to be bonded shall be considered to extend for 900 mm (3 ft) horizontally beyond the inside walls of the pool while also at a height between 900 mm (3 ft) above and 600 mm (2 ft) below the maximum water level. The perimeter surface shall include unpaved surfaces, concrete, and other types of paving. Perimeter surfaces separated from the pool by a permanent wall or building 1.5 m (5 ft) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a), (B)(2)(b), (B)(2)(c), and (B)(2)(d). For conductive pool shells where bonding to perimeter surfaces is required, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four points uniformly spaced around the perimeter of the pool, or if the bonded perimeter surface does not surround the entire pool, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four uniformly spaced points along the bonded perimeter surface. For nonconductive pool shells, where bonding to the perimeter surfaces is required, bonding at four points shall not be required, and the perimeter bonding shall be attached to the 8 AWG copper equipotential bonding conductor and, if present, to any conductive support structure for the pool.

Informational Note: Because the perimeter surface can incorporate various types of materials at various locations and elevations above and below maximum water level, the perimeter surface required to be bonded might not surround the entire pool. The 8 AWG copper equipotential bonding conductor can encircle the entire pool to facilitate connection of bonded parts.

(a) *Conductive Paved Portions of Perimeter Surfaces.* Conductive paved portions of perimeter surfaces, including masonry pavers, if used, shall be bonded with unencapsulated structural reinforcing steel in accordance with 680.26(B)(1)(a), or with unencapsulated steel structural welded wire reinforcement (welded wire mesh, welded wire fabric), bonded together by steel tie wires or the equivalent. Steel welded wire reinforcement shall be fully embedded within the pavement unless the pavement will not allow for embedding. If the reinforcing steel is absent, or is encapsulated in a nonconductive compound, or embedding is not possible, unencapsulated welded wire steel reinforcement or a copper conductor grid shall be provided and shall be secured directly under the paving, and not more than 150 mm (6 in.) below finished grade.

Unencapsulated steel welded wire reinforcement that is not fully embedded in concrete, and copper grid regardless of location, where used for equipotential bonding, shall be listed for corrosion resistance and mechanical performance. This listing requirement shall become effective January 1, 2025. The copper grid or unencapsulated steel welded wire

reinforcement shall also meet the following:

(1) Copper grid is constructed of 8 AWG solid bare copper and arranged in accordance with 680.26(B)(1)(b)(3).

(2) Steel welded wire reinforcement is minimum ASTM 6 × 6-W2.0 ×W2.0 or minimum No. 3 rebar constructed in a 300 mm (12 in.) grid.

(3) Copper grid and steel welded wire reinforcement follow the contour of the perimeter surface extending not less than 900 mm (3 ft) horizontally beyond the inside walls of the pool.

~~(4) Only listed splicing devices or exothermic welding are used.~~

Informational Note No. 1: Performance of the equipotential bonding system at the perimeter surface is improved as the distance between the bonding means and finished grade is minimized, either by embedding within, or by direct contact with the underside of, the finished pavement.

Informational Note No. 2: See ASTM A615/A615M, *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement;*A1064/A1064M, *Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete;*A1022/A1022M, *Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement;* A1060A/A1060M, *Standard Specification for Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete;*and ACI Standard ACI 318, *Building Code Requirements for Structural Concrete,* for examples of standards currently used in the listing of reinforcing steel bars and steel welded wire reinforcement.

(b) *Unpaved Portions of Perimeter Surfaces.*Unpaved portions of perimeter surfaces shall be bonded with any of the following methods:

(1) Copper conductor(s) shall meet the following:

a. At least one minimum 8 AWG bare solid copper conductor, including the 8 AWG copper equipotential bonding conductor if available.

b. The conductors follow the contour of the perimeter surface.

~~c. Only listed splicing devices or exothermic welding are used.~~

c~~d~~. The conductor(s) is 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the pool.

d~~e~~. The conductor(s) is under the unpaved portion of the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

e~~f~~. Be installed only in perimeter surfaces not intended to have

direct access to swimmers in the pool.

(2) Copper grid or unencapsulated steel welded wire reinforcement used for equipotential bonding of unpaved portions of perimeter surfaces shall meet the following:

a. Be installed in accordance with 680.26(B)(2)(a).

b. Be located within unpaved surface(s) between 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

(c) *Nonconductive Perimeter Surfaces.* Equipotential bonding shall not be required for nonconductive portions of perimeter surfaces that are separated from earth or raised on nonconducting supports, and it shall not be required for any perimeter surface that is electrically separated from the pool structure and raised on nonconductive supports above an equipotentially bonded surface.

Informational Note: Nonconductive materials include, but are not limited to, wood, plastic, wood-plastic composites, fiberglass, and fiberglass composites.

(d) *Interconnection of Bonded Portions of Perimeter Surfaces.* All surfaces where equipotential bonding is required shall be interconnected using listed splicing devices or exothermic welding. Where copper wire is used for this purpose, it shall be solid copper, not smaller than 8 AWG. The conductor shall be permitted to encircle the pool to facilitate bonding connections to portions of the perimeter covered in 680.26(B)(2)(a)and (B)(2)(b) that are not contiguous.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Fri Jan 26 13:14:43 EST 2024

Committee Statement

Committee Statement: The language regarding exothermic welding and listed splicing devices was removed because it is already covered in 680.2 and 250.8.
Response Message: FR-9259-NFPA 70-2024

First Revision No. 9260-NFPA 70-2024 [Detail]

[Revisions to Section 680.26(B)(2) as shown.]

(2) Perimeter Surfaces.

The perimeter surface to be bonded shall be considered to extend for 900 mm (3 ft) horizontally beyond the inside walls of the pool while also at a height between 900 mm (3 ft) above and 600 mm (2 ft) below the maximum water level. The perimeter surface shall include unpaved surfaces, concrete, and other types of paving. Perimeter surfaces separated from the pool by a permanent wall or building 1.5 m (5 ft) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a), (B)(2)(b), (B)(2)(c), and (B)(2)(d). For conductive pool shells where bonding to perimeter surfaces is required, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four points uniformly spaced around the perimeter of the pool, or if the bonded perimeter surface does not surround the entire pool, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four uniformly spaced points along the bonded perimeter surface. For nonconductive pool shells, where bonding to the perimeter surfaces is required, bonding at four points shall not be required, and the perimeter bonding shall be attached to the 8 AWG copper equipotential bonding conductor and, if present, to any conductive support structure for the pool.

Informational Note: Because the perimeter surface can incorporate various types of materials at various locations and elevations above and below maximum water level, the perimeter surface required to be bonded might not surround the entire pool. The 8 AWG copper equipotential bonding conductor can encircle the entire pool to facilitate connection of bonded parts.

(a) *Conductive Paved Portions of Perimeter Surfaces.* Conductive paved portions of perimeter surfaces, including masonry pavers, if used, shall be bonded with unencapsulated structural reinforcing steel in accordance with 680.26(B)(1)(a), or with unencapsulated steel structural welded wire reinforcement (welded wire mesh, welded wire fabric), bonded together by steel tie wires or the equivalent. Steel welded wire reinforcement shall be fully embedded within the pavement unless the pavement will not allow for embedding. If the reinforcing steel is absent, or is encapsulated in a nonconductive compound, or embedding is not possible, unencapsulated welded wire steel reinforcement or a copper conductor grid shall be provided and shall be secured directly under the paving, and not more than 150 mm (6 in.) below finished grade.

Unencapsulated steel welded wire reinforcement that is not fully embedded in concrete, and copper grid regardless of location, where used for equipotential bonding, shall be listed for corrosion resistance and mechanical performance. This listing requirement shall become effective January 1, 2025. The copper grid or unencapsulated steel welded wire reinforcement shall also meet the following:

(1) Copper grid is constructed of 8 AWG solid bare copper and arranged in accordance with 680.26(B)(1)(b)(3).

(2) Steel welded wire reinforcement is minimum ASTM 6 × 6-W2.0 ×W2.0 or minimum No. 3 rebar constructed in a 300 mm (12 in.) grid.

(3) Copper grid and steel welded wire reinforcement follow the contour of the perimeter surface extending not less than 900 mm (3 ft) horizontally beyond the inside walls of the pool.

(4) Only listed splicing devices or exothermic welding are used.

Informational Note No. 1: Performance of the equipotential bonding system at the perimeter surface is improved as the distance between the bonding means and finished grade is minimized, either by embedding within, or by direct contact with the underside of, the finished pavement.

Informational Note No. 2: See ASTM A615/A615M, *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement;*A1064/A1064M, *Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete;*A1022/A1022M, *Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement;* A1060A/A1060M, *Standard Specification for Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete;*and ACI Standard ACI 318, *Building Code Requirements for Structural Concrete,* for examples of standards currently used in the listing of reinforcing steel bars and steel welded wire reinforcement.

(b) *Unpaved Portions of Perimeter Surfaces.*Unpaved portions of perimeter surfaces shall be bonded with any of the following methods:

(1) Copper conductor(s) shall meet the following:

a. At least one minimum 8 AWG bare solid copper conductor, including the 8 AWG copper equipotential bonding conductor if available.

b. The conductors follow the contour of the perimeter surface.

c. Only listed splicing devices or exothermic welding are used.

d. The conductor(s) is 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the pool.

e. The conductor(s) is under the unpaved portion of the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

f. Be installed only in perimeter surfaces not intended to have direct access to swimmers in the pool.

(2) Copper grid or unencapsulated steel welded wire reinforcement used for equipotential bonding of unpaved portions of perimeter surfaces shall meet the following:

a. Be installed in accordance with 680.26(B)(2)(a).

b. Be located within unpaved surface(s) between 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

(c) *Nonconductive Perimeter Surfaces.* Equipotential bonding shall not be required for nonconductive portions of perimeter surfaces that are separated from earth or raised on nonconducting supports, and it shall not be required for any perimeter surface that is electrically separated from the pool structure and raised on nonconductive supports above an equipotentially bonded surface.

Informational Note: Nonconductive materials include, but are not limited to, wood, plastic, wood-plastic composites, fiberglass, and fiberglass composites.

~~(d) *Interconnection of Bonded Portions of Perimeter Surfaces. All surfaces where equipotential bonding is required shall be interconnected using listed splicing devices or exothermic welding. Where copper wire is used for this purpose, it shall be solid copper, not smaller than 8 AWG. The conductor shall be permitted to encircle the pool to facilitate bonding connections to portions of the perimeter covered in 680.26(B)(2)(a) and (B)(2)(b) that are not contiguous.*~~

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Fri Jan 26 13:19:50 EST 2024

Committee Statement

Committee Statement: Section 680.26(B)(2)(d) was deleted because all of the contained provisions are covered in 680.26(B) and referencing text was modified to accommodate this revision.

Response Message: FR-9260-NFPA 70-2024

First Revision No. 9267-NFPA 70-2024 [Detail]

[Revisions to Section 680.26(B)(5) as shown.]

(5) Metal Fittings and Metal Structures .

All metal fittings and metal structures within or attached to the pool ~~structure~~ or peri meter surface indicated in 680.26(B)(2) shall be bonded.

Exception: The following shall not be required to be bonded:

(1) Isolated parts that are not over 100 mm (4 in.) in any dimension and do not penetrate into the pool structure more than 25 mm (1 in.)

(2) Metallic pool cover anchors intended for insertion in a concrete or masonry deck surface, 25 mm (1 in.) or less in any dimension and 51 mm (2 in.) or less in length

(3) Metallic pool cover anchors intended for insertion in a wood or composite deck surface, 51 mm (2 in.) or less in any flange dimension and 51 mm (2 in.) or less in length

(4) Metal fittings and metal parts fixed to bulkheads constructed of nonconductive material within the pool, with no conductive connection to the pool or perimeter surface indicated in 680.26(B)(2) by the bulkhead and/or metal parts fixed to the bulkhead.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Fri Jan 26 13:52:29 EST 2024

Committee Statement

Committee Statement: In 680.26(B)(5), “Metal Structures” was added to the title “Metal Fittings” to address items such as bulkheads. Moveable bulkheads are common especially in large commercial and institutional pools. This clarifies that conductive bulkheads must be bonded. Exception 4 was added to provide relief for conductive components attached to nonconductive bulkheads. These are often constructed of nonconductive materials, with limited metal fittings and attachments such as handles or starting blocks. When isolated from the pool structure and other conductive parts, these present minimal risk of electric shock and are not required to be bonded.

Response Message: FR-9267-NFPA 70-2024

Public Input No. 770-NFPA 70-2023 [Section No. 680.26(B)(2)]

First Revision No. 8854-NFPA 70-2024 [Definition: Appliance.]

Appliance.

Utilization equipment, generally other than industrial, that is ~~fastened in place, stationary, or portable; is~~ normally built in a standardized size or type; and is installed or connected as a unit to perform one or more functions such as clothes washing, air-conditioning, food mixing, deep frying, and so forth. (CMP-17)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 09:04:11 EST 2024

Committee Statement

Committee Statement: The existing list items were removed to improve clarity as they could be viewed as all-inclusive and unintentionally omit other types of appliances.

Response Message: FR-8854-NFPA 70-2024

Public Input No. 4233-NFPA 70-2023 [Definition: Appliance.]

First Revision No. 9009-NFPA 70-2024 [Definition: Fixed (as applied to equipment).]

Fixed (as applied to equipment).

Equipment that is fastened or otherwise secured at a specific location. (~~680) (~~ CMP-17)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 16:29:22 EST 2024

Committee Statement

Committee Statement: The term “Fixed” is used in articles beyond Article 680, but still relates to CMP17 for many of its uses, therefore should remain under purview of CMP17, and not change to CMP 1.

Response Message: FR-9009-NFPA 70-2024

Public Input No. 4229-NFPA 70-2023 [Definition: Fixed (as applied to equipment).]

Public Input No. 2350-NFPA 70-2023 [Definition: Fixed (as applied to equipment).]

First Revision No. 8950-NFPA 70-2024 [Definition: Heating System.]

Heating System.

A complete system consisting of components such as heating elements, fastening devices, nonheating circuit wiring, leads, temperature controllers, safety signs, junction boxes, raceways, and fittings. (~~426) (~~ CMP-17)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:35:00 EST 2024

Committee Statement

Committee Statement: The term “heating system” is only used in Articles 426 and 427, both of which are under the purview of CMP 17. A first revision has been made to the definition to delete the reference to Article 426, in accordance with section 2.1.2.6.2 of the NEC Style Manual.

Response Message: FR-8950-NFPA 70-2024

First Revision No. 9010-NFPA 70-2024 [Definition: Low-Voltage Contact Limit.]

Low-Voltage Contact Limit.

A voltage not exceeding the following values:

(1) 15 volts (RMS) for sinusoidal ac

(2) 21.2 volts peak for nonsinusoidal ac

(3) 30 volts for continuous dc

(4) 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz

~~(680) (~~ CMP-17)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 16:33:24 EST 2024

Committee Statement

Committee Statement: The term “Low-Voltage Contact Limit” is used in articles beyond Article 680 but still relates to CMP17 for many of its uses. The reference to Article 680 is being removed, and should remain under purview of CMP17.

Response Message: FR-9010-NFPA 70-2024

Public Input No. 901-NFPA 70-2023 [Definition: Low-Voltage Contact Limit.]

First Revision No. 9012-NFPA 70-2024 [Definition: Pool, Permanently Installed Swimming, Wading, I...]

Pool, Permanently Installed Swimming, Wading, Immersion, and Therapeutic. (Permanently Installed Swimming, Wading, Immersion, and Therapeutic Pools)

Those that are permanently constructed or installed in the ground ~~or~~ , partially in the ground, ~~and all pools installed~~ above ground, inside of a building, or on a building, whether or not served by electrical circuits ~~of any nature~~ . (680) (CMP-17)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 16:40:53 EST 2024

Committee Statement

Committee Statement: These changes include “above ground”, and “pools on a building”, and are intended to clarify the pool types intended to be covered by this definition.

Response Message: FR-9012-NFPA 70-2024

Public Input No. 2510-NFPA 70-2023 [Definition: Pool, Permanently Installed Swimming, Wading, I...]

Public Input No. 1712-NFPA 70-2023 [Definition: Pool, Permanently Installed Swimming, Wading, I...]

Public Input No. 1678-NFPA 70-2023 [Definition: Pool, Permanently Installed Swimming, Wading, I...]

Public Input No. 3695-NFPA 70-2023 [Definition: Pool, Permanently Installed Swimming, Wading, I...]

Public Input No. 234-NFPA 70-2023 [Definition: Pool, Permanently Installed Swimming, Wading, I...]

First Revision No. 9014-NFPA 70-2024 [Definition: Pool, Storable; used for Swimming, Wading, or I...]

Pool, Storable; used for Swimming, Wading, or Immersion (Storable Immersion Pool). (Storable Pool)

Pools of any water depth installed entirely on or above the ground that are intended to be stored when not in use ~~and~~ or are designed for ease of relocation~~, regardless of water depth~~ . (680) (CMP-17)

Informational Note: A storable pool that is installed with a permanent deck around all or a portion of its perimeter is considered a permanently installed pool.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 16:46:45 EST 2024

Committee Statement

Committee Statement: The definition is being revised to add clarity, without changing the meaning. New informational note was added to indicate that a pool with permanent deck is to be treated as a permanently installed pool.

Response Message: FR-9014-NFPA 70-2024

Public Input No. 2205-NFPA 70-2023 [Definition: Pool, Storable; used for Swimming, Wading, or I...]

First Revision No. 9017-NFPA 70-2024 [Definition: Pool.]

Pool.

Manufactured or field-constructed equipment designed to contain water ~~on a permanent or semipermanent basis and used for~~ and intended for use by persons for swimming, wading, immersion, recreation or therapeutic purposes, but not including bodies of water incorporated as part of an industrial process, or lakes, lagoons, surf parks, or other natural and artificially-made bodies of water that may incorporate swimming and swimming areas . (680) (CMP-17)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 16:55:46 EST 2024

Committee Statement

Committee Statement: To aid the user and provide further clarification, additional specific installation types are referenced in the definition, and excluded from the definition, as well as an Informational Note, regarding what is considered a Pool and what is not considered a Pool.

"Permanent" and "Semi-Permanent" are removed from the definition as how long the pool is intended to remain is not relevant to the term Pool.

Additionally, "man-made bodies of water" is revised to "artificially-made bodies of water" since this is a defined term.

Response Message: FR-9017-NFPA 70-2024

Public Input No. 211-NFPA 70-2023 [Definition: Pool.]

Public Input No. 2862-NFPA 70-2023 [Definition: Pool.]

Public Input No. 295-NFPA 70-2023 [Definition: Pool.]

First Revision No. 9019-NFPA 70-2024 [Definition: Stationary (as applied to equipment).]

Stationary (as applied to equipment).

Equipment that is not moved from one place to another in normal use. (~~680) (~~ CMP-17)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 17:02:38 EST 2024

Committee Statement

Committee Statement: The term “Stationary (as applied to equipment)” is used in Article 680 and is also used in other articles. To make it applicable in a larger scope, the reference only to Article 680 is being removed. Since it is used extensively in Article 680, CMP17 reference is being retained.

Response Message: FR-9019-NFPA 70-2024

Public Input No. 2351-NFPA 70-2023 [Definition: Stationary (as applied to equipment).]

Public Input No. 4228-NFPA 70-2023 [Definition: Stationary (as applied to equipment).]

First Revision No. 8871-NFPA 70-2024 [Section No. 422.5]

422.5 GFCI Protection.

~~**(A)** General.~~

~~Appliances identified in~~

GFCI protection shall be provided in accordance with 422.5(A) through 422.5 (

~~1) through~~

C). Multiple GFCI devices shall be permitted but shall not be required.

(A)

~~(7) 150 volts or less to ground and 60 amperes or less, single- or 3-phase, shall be provided with Class A protection for personnel. Multiple Class A protective devices shall be permitted but shall not be required.~~

Circuit Rating .

The appliances indicated in 422.5(B) shall be GFCI protected if supplied by branch circuits that meet all the following conditions:

(1) Exceed the low-voltage contact limit, as defined in Article 100

(2) Do not exceed 150 volt to ground

(3) Do not exceed 60 amperes single-phase or 3-phase

(B) Appliances.

(1) Automotive vacuum machines

(2) Drinking water coolers and bottle fill stations

(3) Cord-and-plug-connected high-pressure spray washing machines

(4) Tire inflation machines

(5) Vending machines

(6) Sump pumps

(7) Dishwashers

Informational Note No.1 : ~~Section~~ See 210.8 ~~specifies requirements~~ for GFCI protection requirements for the branch-circuit outlet where the covered location warrants such protection.

~~(B~~

Informational Note No. 2: Electrically-cooled drinking water fountains are one type of drinking water cooler.

(C) Type and Location.

The GFCI shall be readily accessible, listed, and located in one or more of the following locations:

(1) Within the branch-circuit overcurrent protective device

(2) A device or outlet within the supply circuit

(3) An integral part of the attachment plug

(4) Within the supply cord not more than 300 mm (12 in.) from the attachment plug

(5) Factory installed within the appliance

Supplemental Information

File Name	Description	Approved
70_CMP17_FR8871_422.5.docx	Attached for revisions on Section 422.5 w track changes	
70_CMP17_FR8871_422.5.docx	For prod use	

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 10:14:39 EST 2024

Committee Statement

Committee Statement: This section is editorially revised by creating sub-divisions (A), (B) and (C), including a charging statement. The permission for multiple GFCI devices is now in the charging statement and Class A is revised to the defined term acronym GFCI.

First level sub-division (A) is retitled to “circuit rating” to more accurately describe the requirements that follow. This sub-division is also revised to base the appliance GFCI protection on the branch circuit rating and not the rating of the appliance. The voltage and rating thresholds are put into list item form for clarity. A reference to the low voltage contact limit, a defined term in Article 100, is added to clarify that GFCI protection is not required when the branch circuit voltage is below the defined thresholds.

First level sub-division (B) is created for clarity and includes the appliances that require GFCI protection. List item (1) is revised to “branch-circuit overcurrent protective device” to correlate with the defined term in Article 100. An informational note is added to provide guidance to industry that an electrically cooled drinking water fountain is a type of water cooler. The existing informational note is revised to comply with the NEC Style Manual, Section 2.1.10.

Insufficient technical substantiation has been submitted to expand the list. Additionally, representatives for both UL 101 Leakage Current for Utilization Equipment and UL 943 GFCIs, as well as other industry stakeholders, are engaged in ongoing discussions concerning GFCI protection and appliance compatibility.

A time frame for compatibility within these product standards has not been established.

CMP 2 has purview of the branch circuit requirements in 210.8(D) and CMP 17 has purview over the requirements in 422.5.

Existing sub-division (B) is changed to (C) for editorial purposes.

Response Message: FR-8871-NFPA 70-2024

Public Input No. 1677-NFPA 70-2023 [Section No. 422.5(A)]

Public Input No. 3205-NFPA 70-2023 [Section No. 422.5(A)]

Public Input No. 98-NFPA 70-2023 [Section No. 422.5(A)]

Public Input No. 91-NFPA 70-2023 [Section No. 422.5(A)]

422.5 GFCI Protection.

GFCI protection shall be provided in accordance with 422.5(A) through 422.5(C). Multiple GFCI devices shall be permitted but shall not be required.

(A) ~~General~~ Circuit Rating.
The ~~A~~appliances ~~identified~~ indicated in 422.5(B) ~~(A)(1) through (A)(7)~~ shall be GFCI protected if supplied by branch circuits that meet all the following conditions:~~150 volts or less to ground and 60 amperes or less, single- or 3-phase, shall be provided with Class A protection for personnel. Multiple Class A protective devices shall be permitted but shall not be required.~~

(1) Exceed the low-voltage contact limit, as defined in Article 100
(2) Do not exceed 150 volts to ground
(3) Do not exceed 60 amperes single-phase or 100 amperes 3-phase

(B) Appliances.

(1) Automotive vacuum machines

(2) Drinking water coolers and bottle fill stations

(3) Cord-and-plug-connected high-pressure spray washing machines

(4) Tire inflation machines

(5) Vending machines

(6) Sump pumps

(7) Dishwashers

Informational Note No. 1: ~~Section~~ See 210.8 ~~specifies requirements~~ for GFCI protection requirements for the branch-circuit outlet where the covered location warrants such protection.

Informational Note No.2: Electrically-cooled drinking water fountains are one type of drinking water cooler.

(~~B~~ C) Type and Location.
The GFCI shall be readily accessible, listed, and located in one or more of the following locations:

(1) Within the branch-circuit overcurrent protective device

(2) A device or outlet within the supply circuit

(3) An integral part of the attachment plug

(4) Within the supply cord not more than 300 mm (12 in.) from the attachment plug

(5) Factory installed within the appliance

Formatted: Font: Not Bold

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: List Paragraph, Right: 0.26", Space Before: 18.75 pt, After: 18.75 pt, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

Formatted: Font: Bold

Formatted: Font: (Default) Verdana, 8 pt, Bold, Font color: Custom Color(RGB(30,41,96))

Formatted: Right: 0.52", Space Before: 18.75 pt, After: 18.75 pt

First Revision No. 8837-NFPA 70-2024 [Section No. 422.6]

422.6~~–~~ 2 _ Listing Required.

All appliances supplied by 50 volts or higher shall be listed.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 08:27:35 EST 2024

Committee Statement

Committee Statement: Listing requirements are relocated to 422.2 to comply with the NEC Style Manual Section 2.2.1.

Response Message: FR-8837-NFPA 70-2024

Public Input No. 3730-NFPA 70-2023 [Section No. 422.6]

First Revision No. 8838-NFPA 70-2024 [Section No. 422.10(A)]

(A) Individual Branch Circuits.

Individual branch circuits supplying appliances shall comply with the following as applicable:

(1) The ampacities of branch-circuit conductors shall not be less than the marked rating of the appliance or the marked rating of an appliance having combined loads.

(2) The ampacities of branch-circuit conductors for motor-operated appliances not having a marked rating shall be in accordance with ~~Part II of~~ Article 430, Part II .

(3) The branch-circuit rating for an appliance that is a continuous load, other than a motor-operated appliance, shall not be less than 125 percent of the marked rating, or not less than 100 percent of the marked rating if the branch-circuit device and its assembly are listed for continuous loading at 100 percent of its rating.

(4) Branch circuits and branch-circuit conductors for household ranges and cooking appliances shall be permitted to be in accordance with Table 220.55 and shall be sized in accordance with 210.19(C).

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 08:31:48 EST 2024

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4.

Response Message: FR-8838-NFPA 70-2024

Public Input No. 2685-NFPA 70-2023 [Section No. 422.10(A)]

First Revision No. 8877-NFPA 70-2024 [Section No. 422.11(A)]

(A) Branch-Circuit Overcurrent Protection.

Branch circuits shall be protected in accordance with 240.4.

If a protective device rating is marked on an appliance, the branch-circuit overcurrent protective device rating shall not exceed the protective device rating marked on the appliance.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 10:41:22 EST 2024

Committee Statement

Committee Statement: The language at 422.11(A) is revised to “branch-circuit overcurrent protective device” to correlate with the defined term in Article 100.

Response Message: FR-8877-NFPA 70-2024

First Revision No. 8841-NFPA 70-2024 [Section No. 422.11(G)]

(G) Motor-Operated Appliances.

Motors of motor-operated appliances shall be provided with overload protection in accordance with ~~Part III of~~ Article 430, Part III . Hermetic refrigerant motor-compressors in air-conditioning or refrigerating equipment shall be provided with overload protection in accordance with ~~Part VI of~~ Article 440, Part VI . Where appliance overcurrent protective devices that are separate from the appliance are required, data for selection of these devices shall be marked on the appliance. The minimum marking shall be that specified in 430.7 and 440.4.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Wed Jan 24 08:39:24 EST 2024

Committee Statement

Committee Statement: The text is revised to comply with the NEC Style Manual Section 4.1.4.
Response Message: FR-8841-NFPA 70-2024

Public Input No. 2686-NFPA 70-2023 [Section No. 422.11(G)]

First Revision No. 8861-NFPA 70-2024 [Section No. 422.12]

422.12 Central Heating Equipment.

Central heating equipment other than fixed electric space-heating equipment shall be supplied by an individual branch circuit.

Exception No. 1: Auxiliary equipment, such as a pump, valve, humidifier, ~~or~~ electrostatic air cleaner, and similiar equipment directly associated with the heating equipment, shall be permitted to be connected to the same branch circuit.

Exception No. 2: Permanently connected air-conditioning equipment, the receptacle required by 210.63(C) and the lighting outlet required by 210.70(C) shall be permitted to be connected to the same branch circuit.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 09:23:38 EST 2024

Committee Statement

Committee Statement: CMP 17 reaffirms that the requirements for central heating equipment are necessary to be retained in this article in order to provide specific installation requirements to industry.

The permission to connect other loads to the central heating equipment individual branch circuit in Exception No. 2 was expanded to include the receptacle required in 210.63(A) and the lighting outlet required in 210.70(C) as these loads would not typically overload an individual branch circuit.

In order to not continually expand the list, Exception No.1 was revised to include “similar equipment” which will permit equipment such as germicidal irradiation luminaires to be connected to the branch circuit.

Response Message: FR-8861-NFPA 70-2024

Public Input No. 3467-NFPA 70-2023 [Section No. 422.12]

Public Input No. 4424-NFPA 70-2023 [Section No. 422.12]

Public Input No. 1292-NFPA 70-2023 [Section No. 422.12]

Public Input No. 4108-NFPA 70-2023 [Section No. 422.12]

First Revision No. 8856-NFPA 70-2024 [Section No. 422.13]

422.13 Storage-Type Water Heaters.

~~The branch-circuit overcurrent device and conductors for fixed~~ Fixed storage-type water heaters that have a capacity of 450 L (120 gal) or less shall ~~have an ampere rating of not less than 125 percent of the ampere rating of the water heater~~ be considered a continous load .

Informational Note: See 422.10 for branch-circuit rating and 422 .11(E) for overcurrent protection.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 09:06:34 EST 2024

Committee Statement

Committee Statement: This section was revised to clarify that the load is considered continuous. The text now applies to feeders, not just branch circuits, and recognizes 210.19, 210.20, 215.2 and 215.3 for conductor ampacity and overcurrent protective device rating.

Response Message: FR-8856-NFPA 70-2024

Public Input No. 1295-NFPA 70-2023 [Section No. 422.13]

Public Input No. 3266-NFPA 70-2023 [Section No. 422.13]

First Revision No. 8842-NFPA 70-2024 [Section No. 422.16(B)(1)]

(1) Electrically Operated In-Sink Waste Disposers.

Electrically operated in-sink waste disposers shall be permitted to be cord-and-plug-connected with a ~~flexible~~ power-supply cord identified as suitable in the installation instructions of the appliance manufacturer where all of the following conditions are met:

(1) The length of the power-supply cord is not less than 450 mm (18 in.) and not exceeding 900 mm (36 in.).

(2) Receptacles are located to protect against physical damage to the ~~flexible~~ power-supply cord.

(3) The receptacle is accessible.

(4) The ~~flexible~~ power-supply cord has an equipment grounding conductor and is terminated with a grounding-type attachment plug.

Exception: A listed appliance distinctly marked to identify it as protected by a system of double insulation shall not be required to be terminated with a grounding-type attachment plug.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 08:45:28 EST 2024

Committee Statement

Committee Statement: "Power-supply" is added to correlate with the existing defined term power-supply cord in Article 100.

Response Message: FR-8842-NFPA 70-2024

Public Input No. 2117-NFPA 70-2023 [Section No. 422.16(B)(1)]

First Revision No. 8844-NFPA 70-2024 [Section No. 422.16(B)(2)]

(2) Built-in Dishwashers and Trash Compactors.

Built-in dishwashers and trash compactors shall be permitted to be cord-and-plug-connected with a ~~flexible~~ power-supply cord identified as suitable for the purpose in the installation instructions of the appliance manufacturer where all of the following conditions are met:

(1) For a trash compactor, the length of the power-supply cord is not less than 0.9 m (3 ft) and not exceeding 1.2 m (4 ft) measured from the face of the attachment plug to the plane of the rear of the appliance.

(2) For a built-in dishwasher, the length of ~~the~~ the power-supply cord is not less than 0.9 m (3 ft) and not exceeding 2.0 m (6.5 ft) measured from the face of the attachment plug to the plane of the rear of the appliance.

(3) Receptacles are located to protect against physical damage to the ~~flexible~~ power-supply cord.

(4) The receptacle for a trash compactor is located in the space occupied by the appliance or adjacent thereto. If a flexible cord passes through an opening, it shall be protected against damage by a bushing, grommet, smoothed edge, or other approved means.

(5) The receptacle for a built-in dishwasher is located in the space adjacent to the space occupied by the dishwasher. If a ~~flexible~~ power-supply cord passes through an opening, it shall be protected against damage by a bushing, grommet, smoothed edge, or other approved means.

(6) The receptacle is accessible.

(7) The ~~flexible~~ power-supply cord has an equipment grounding conductor that is terminated with a grounding-type attachment plug.

Exception: A listed appliance distinctly marked to identify it as protected by a system of double insulation shall not be required to be terminated with a grounding-type attachment plug.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Wed Jan 24 08:47:48 EST 2024

Committee Statement

Committee Statement: "Power-supply" is added to correlate with the existing defined term power-supply cord in Article 100

Response Message: FR-8844-NFPA 70-2024

Public Input No. 2118-NFPA 70-2023 [Section No. 422.16(B)(2)]

First Revision No. 8847-NFPA 70-2024 [Section No. 422.16(B)(3)]

(3) Wall-Mounted Ovens and Counter-Mounted Cooking Units.

Wall-mounted ovens and counter-mounted cooking units complete with provisions for mounting and for making electrical connections shall be permitted to be permanently connected or cord-and-plug-connected with a ~~flexible~~ power-supply cord identified as suitable for the purpose in the installation instructions of the appliance manufacturer.

A separable connector or a plug and receptacle combination in the supply line to an oven or cooking unit shall be identified for the temperature of the space in which it is located.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 08:51:43 EST 2024

Committee Statement

Committee Statement: "Power-supply" is added to correlate with the existing defined term power-supply cord in Article 100.

Response Message: FR-8847-NFPA 70-2024

Public Input No. 2119-NFPA 70-2023 [Section No. 422.16(B)(3)]

First Revision No. 8849-NFPA 70-2024 [Section No. 422.16(B)(4)]

(4) Range Hoods and Microwave Oven/Range Hood Combinations.

Range hoods and over-the-range microwave ovens with integral range hoods shall be permitted to be cord-and-plug-connected with a ~~flexible~~ power-supply cord identified as suitable for use on range hoods in the installation instructions of the appliance manufacturer, where all of the following conditions are met:

(1) The length of the power-supply cord is not less than 450 mm (18 in.) and not exceeding 1.2 m (4 ft).

(2) Receptacles are located to protect against physical damage to the flexible cord.

(3) The receptacle is supplied by an individual branch circuit.

(4) The receptacle is accessible.

(5) The ~~flexible~~ power-supply cord has an equipment grounding conductor and is terminated with a grounding-type attachment plug.

Exception: A listed appliance distinctly marked to identify it as protected by a system of double insulation shall not be required to be terminated with a grounding-type attachment plug.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 08:53:23 EST 2024

Committee Statement

Committee Statement: "Power-supply" is added to correlate with the existing defined term power-supply cord in Article 100.

Response Message: FR-8849-NFPA 70-2024

First Revision No. 8852-NFPA 70-2024 [Section No. 422.18(B)]

(B) Location.

No ~~metal~~ parts of ceiling-suspended (paddle) fans in bathrooms and shower spaces shall be located within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. This zone is all-encompassing and shall include the space directly over the tub or shower stall.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 09:01:50 EST 2024

Committee Statement

Committee Statement: The reference to metal parts is removed to correlate with the requirements in 410.10(D)(1)

Response Message: FR-8852-NFPA 70-2024

Public Input No. 242-NFPA 70-2023 [Section No. 422.18(B)]

First Revision No. 8858-NFPA 70-2024 [Section No. 422.31]

422.31 Disconnection of Permanently Connected Appliances.

For appliances that do not have a disconnecting means in accordance with 422.33 or 422.34, a disconnecting means shall be provided in accordance with 422.31(A)~~,~~ or (B)~~, or (C)~~ .

(A) ~~Rated at Not over 300 Volt-Amperes or~~ **1/8** ~~Horsepower~~ Appliances of any Volt-Ampere Rating or Not Over 1/8 horsepower .

~~For permanently connected appliances rated over 300 volt-amperes, the branch-circuit switch or circuit breaker shall be permitted to serve as the disconnecting means where the switch or circuit breaker is within sight from the appliance or be capable of being locked in the open position in compliance with 110.25 .~~

For permanently connected appliances ~~rated at~~ of any volt-ampere rating or not over ~~300 volt-amperes or~~ ⅛ hp, the branch-circuit overcurrent protective device shall be permitted to serve as the disconnecting means where the switch or circuit breaker is within sight from the appliance or be ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25.

~~**(B)** Appliances Rated over 300 Volt-Amperes.~~

Informational Note: See 422.34 for appliances employing unit switches.

(C B) Motor-Operated Appliances Rated over ⅛ Horsepower.

The disconnecting means shall comply with 430.109 and 430.110. For permanently connected motor-operated appliances with motors rated over ⅛ hp, the disconnecting means shall be within sight from the appliance or be ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25.

Exception: If an appliance is provided with a unit switch that complies with 422.34(A), (B), or (C), the switch or circuit breaker serving as the other disconnecting means shall be permitted to be out of sight from the appliance.

Supplemental Information

File Name	Description	Approved
NEC_CMP17_FR-8858_422.31.docx		

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Wed Jan 24 09:13:20 EST 2024

Committee Statement

Committee Statement: The text concerning the term lockable is revised to comply with the NEC Style Manual Section 3.2.5.

Sections 422.31(A) and (B) are consolidated as the requirements were redundant.

The title of 422.31(A) is revised for clarity to address appliances of any volt-ampere or appliances not over 1/8 horsepower.

Additionally, the language in (A) is revised to “branch-circuit overcurrent protective device” to correlate with the defined term in Article 100.

Response Message: FR-8858-NFPA 70-2024

Public Input No. 1872-NFPA 70-2023 [Section No. 422.31]

Public Input No. 2527-NFPA 70-2023 [Section No. 422.31]

422.31 Disconnection of Permanently Connected Appliances.
For appliances that do not have a disconnecting means in accordance with 422.33 or 422.34, a disconnecting means shall be provided in accordance with 422.31(A)~~,~~ or 422.31(B)~~, or (C)~~.

(A) ~~Rated at Not over 300~~ Appliances of any Volt-~~Amperes~~Ampere Rating or Not Over 1⁄8 Horsepower.
For permanently connected appliances ~~rated at~~ of any volt-ampere rating or not over ~~300 volt-amperes or~~ 1⁄8 hp, the branch-circuit overcurrent protective device shall be permitted to serve as the disconnecting means where the switch or circuit breaker is within sight from the appliance or be ~~capable of being locked in the~~lockable open ~~position~~ in ~~compliance~~accordance with 110.25.

Informational Note: See 422.34 for appliances employing unit switches.

~~**(B) Appliances Rated over 300 Volt-Amperes.**~~
~~For permanently connected appliances rated over 300 volt-amperes, the branch-circuit switch or circuit breaker shall be permitted to serve as the disconnecting means where the switch or circuit breaker is within sight from the appliance or be capable of being locked in the open position in compliance with 110.25.~~

~~Informational~~ ~~Note: See 422.34 for appliances employing unit switches.~~

Commented [SB1]: Move IN to (A)

(~~C~~B) Motor-Operated Appliances Rated over 1⁄8 Horsepower.
The disconnecting means shall comply with 430.109 and 430.110. For permanently connected motor-operated appliances with motors rated over 1⁄8 hp, the disconnecting means shall be within sight from the appliance or be ~~capable of being locked in the open position in compliance~~lockable open in accordance with 110.25.

Exception: If an appliance is provided with a unit switch that complies with 422.34(A), 422.34(B), or 422.34(C), the switch or circuit breaker serving as the other disconnecting means shall be permitted to be out of sight from the appliance.

First Revision No. 8941-NFPA 70-2024 [New Section after 424.1]

424.3 Reconditioned Equipment.

Reconditioned equipment shall comply with 424.3(A) and 424.3(B).

(A) **Permitted to be Installed.**

Reconditioned equipment shall be permitted to be installed, except as indicated in 424.3(B).

(B) **Not Permitted to be Installed.**

Reconditioned electric space-heating cables shall not be permitted to be installed.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:24:49 EST 2024

Committee Statement

Committee Statement: The requirements for installation of reconditioned equipment were added here, in accordance with 2.2.1 of the NEC Style Manual.

It is unlikely that equipment covered by 424.3(B) would be able to be acceptably reconditioned and installed. Additionally, CMP 17 is not aware of any options that exist today for listing or field evaluation of reconditioned equipment of this type.

Response Message: FR-8941-NFPA 70-2024

First Revision No. 8880-NFPA 70-2024 [Section No. 424.3]

424.~~3~~ 8 Other Articles.

Fixed electric space-heating equipment incorporating a hermetic refrigerant motor-compressor shall additionally comply with Table 424.~~3~~ 8 unless amended by this article.

Table 424.~~3 Other~~ 8 Other Articles

Equipment	Article
Air-conditioning and refrigerating equipment	440 (Parts I, II, III, IV, V, VI)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 10:48:23 EST 2024

Committee Statement

Committee Statement: The section and associated table were renumbered to 424.8, in accordance with section 2.2.1 of the NEC Style Manual.

Response Message: FR-8880-NFPA 70-2024

Public Input No. 3734-NFPA 70-2023 [Section No. 424.3]

First Revision No. 8886-NFPA 70-2024 [Section No. 424.19(A)(2)]

(2) Heater Containing a Motor(s) Rated over ⅛ Horsepower.

The disconnecting means required by 424.19 shall be permitted to serve as the required disconnecting means for both the motor controller(s) and heater under either of the following conditions:

(1) Where the disconnecting means is in sight from the motor controller(s) and the heater and complies with ~~Part IX of~~ Article 430, Part IX .

(2) Where a motor(s) of more than ⅛ hp and the heater are provided with a single unit switch that complies with 422.34(A), (B), (C), or (D), the disconnecting means shall be permitted to be out of sight from the motor controller.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 10:59:37 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 4.1.4 of the 2023 NEC Style Manual.

Response Message: FR-8886-NFPA 70-2024

Public Input No. 2697-NFPA 70-2023 [Section No. 424.19(A)(2)]

First Revision No. 8887-NFPA 70-2024 [Section No. 424.19(B)(1)]

(1) Without Motor or with Motor Not over ⅛ Horsepower.

For fixed electric space-heating equipment without a motor rated over ⅛ hp, the branch-circuit switch or circuit breaker shall be permitted to serve as the disconnecting means where the switch or circuit breaker is within sight from the heater or is ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:02:14 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 3.2.5.3 of the NEC Style Manual requirements for consistent application of terms as it relates to “lockable open”.

Response Message: FR-8887-NFPA 70-2024

Public Input No. 2528-NFPA 70-2023 [Section No. 424.19(B)(1)]

First Revision No. 8888-NFPA 70-2024 [Section No. 424.22(A)]

(A) Branch-Circuit Devices.

Electric space-heating equipment, other than motor-operated equipment required to have additional overcurrent protection by Article 430, Parts III and IV ~~of~~ or Article ~~430~~ ~~or~~ 440 , Parts III and VI ~~of Article~~ 440 , shall be permitted to be protected against overcurrent where supplied by one of the branch circuits in ~~Part II of~~ Article 210, Part II .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:04:15 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 4.1.4 of the NEC Style Manual.

Response Message: FR-8888-NFPA 70-2024

Public Input No. 2698-NFPA 70-2023 [Section No. 424.22(A)]

First Revision No. 8934-NFPA 70-2024 [Section No. 424.22(C)]

(C) Overcurrent Protective Devices.

The supplementary overcurrent protective devices for the subdivided loads specified in 424.22(B) shall meet all of the following conditions:

(1) Be factory-installed within or on the heater enclosure or supplied for use with the heater as a separate assembly by the heater manufacturer

(2) Be accessible

(3) Be suitable for branch-circuit protection

Where cartridge fuses are used to provide overcurrent protection for the subdivided loads, a single disconnecting means shall be permitted to be used as the disconnecting means for all of the subdivided loads.

Informational Note No. ~~1~~ 1 : See 240.10. ~~Informational Note No. 2: See 240.10~~ for supplementary overcurrent protection.

Informational Note No. ~~3~~ 2 : See 240.40 for disconnecting means for cartridge fuses in circuits of any voltage.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:13:45 EST 2024

Committee Statement

Committee Statement: Informational Note No.1 has been deleted as it was redundant to Note 2 and not needed. Informational Notes were renumbered to reflect this change.

Response Message: FR-8934-NFPA 70-2024

First Revision No. 8935-NFPA 70-2024 [Section No. 424.41(C)]

(C) Surfaces to Be Applied.

Heating cables shall be applied only to gypsum board, plaster lath, or other fire-resistant material. With metal lath or other electrically conductive surfaces, a coat of plaster or other means employed in accordance with the heating cable manufacturer's instructions shall be applied to completely separate the metal lath or conductive surface from the cable.

~~Informational Note: See 424.41(F) .~~

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:16:00 EST 2024

Committee Statement

Committee Statement: The informational note was deleted because a reference to 424.41(F) within 424.41(C) is not needed.

Response Message: FR-8935-NFPA 70-2024

First Revision No. 8891-NFPA 70-2024 [Section No. 424.44(E)]

(E) Ground-Fault Circuit-Interrupter (GFCI) Protection.

In addition to the requirements in 210.8, ~~ground-fault circuit-interrupter protection for personnel~~ GFCI protection shall be provided for cables installed in electrically heated floors of bathrooms, kitchens, and in hydromassage bathtub locations.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:07:51 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to use the acronym “GFCI” in accordance with section 2.1.2.9 of the NEC Style Manual.

Response Message: FR-8891-NFPA 70-2024

Public Input No. 99-NFPA 70-2023 [Section No. 424.44(E)]

First Revision No. 8892-NFPA 70-2024 [Section No. 424.45(E)]

(E) Ground-Fault Circuit-Interrupter (GFCI) Protection.

In addition to the requirements in 210.8, ~~ground-fault circuit-interrupter protection for personnel~~ GFCI protection shall be provided.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:10:49 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to use the acronym “GFCI” in accordance with section 2.1.2.9 of the NEC Style Manual.

Response Message: FR-8892-NFPA 70-2024

Public Input No. 100-NFPA 70-2023 [Section No. 424.45(E)]

First Revision No. 8895-NFPA 70-2024 [Section No. 424.47]

424.47 Label Provided by Manufacturer.

The manufacturers of electric space-heating cables shall provide ~~marking~~ labels that indicate that the space-heating installation incorporates electric space-heating cables~~ and instructions that the~~ . The labels shall be affixed to the enclosure of the panelboards where the branch circuit originates to ~~identify~~ indicate which branch circuits supply ~~the circuits to those~~ space-heating ~~installations.~~ cables. The label shall comply with 110.21(B).

Exception: If the electric space-heating cable installations are visible and distinguishable after installation, the installation of the labels shall not be required~~ to be provided and affixed to the panelboards~~ .

Supplemental Information

File Name	Description	Approved
NEC_CMP17_FR-8895_424.47.docx		

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:13:37 EST 2024

Committee Statement

Committee Statement: The term “panelboard” was used incorrectly in previous versions of this section. The panelboard is the busbar assembly, aka the “guts.” The intent of this requirement is for the label to be applied to the panelboard’s enclosure, not the panelboard itself.

Editorial revisions were made to add clarity. A portion of the existing text was rewritten as an exception, as the previous language provided an alternative to the general requirement. Additional reference to 110.21 was added to ensure that the label is appropriate for the intended environment.

Response Message: FR-8895-NFPA 70-2024

Public Input No. 235-NFPA 70-2023 [Section No. 424.47]

424.47 Label Provided by Manufacturer. [Move last line as Exception]

The manufacturers of electric space-heating cables shall provide ~~marking~~ labels that indicate that the space-heating installation incorporates electric space-heating cables. ~~and instructions that the~~The labels shall be affixed to the enclosure of the panelboards where the branch circuit originates to ~~identify~~ indicate which branch circuits supply ~~the circuits to those~~ space-heating ~~installations~~cables. The label shall comply with 110.21(B). ~~If the electric space-heating cable installations are visible and distinguishable after installation, the labels shall not be required to be provided and affixed to the panelboards.~~

Exception: If the electric space-heating cable installations are visible and distinguishable after installation, the labels shall not be required to be provided and affixed to the panelboards.

First Revision No. 8899-NFPA 70-2024 [Section No. 424.65]

424.65 Location of Disconnecting Means.

Duct heater controller equipment shall be accessible with the disconnecting means installed within sight from the controller or as permitted by 424.19~~(A)~~ .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:19:48 EST 2024

Committee Statement

Committee Statement: The duct heater may or may not have supplemental overcurrent protection, so 424.19(A) or (B) could apply.

Response Message: FR-8899-NFPA 70-2024

Public Input No. 3209-NFPA 70-2023 [Section No. 424.65]

First Revision No. 8902-NFPA 70-2024 [Section No. 424.80]

424.80 Scope.

The provisions in Part VIII of this article shall apply to boilers for operation at 600 volts, nominal, or less, in which heat is generated by the passage of current between electrodes through the liquid being heated.

Informational Note: See ~~Part V of~~ Article 495, Part V for over 1000 volts.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:22:50 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 4.1.4 of the NEC Style Manual.

Response Message: FR-8902-NFPA 70-2024

Public Input No. 2699-NFPA 70-2023 [Section No. 424.80]

First Revision No. 8904-NFPA 70-2024 [Section No. 424.99(B)(5)]

(5) Ground-Fault Circuit-Interrupter (GFCI) Protection.

In addition to the requirements in 210.8, branch circuits supplying the heating panel or heating panel sets shall have ~~ground-fault circuit-interrupter protection for personnel~~ GFCI protection .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:25:13 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to properly use the acronym “GFCI” in accordance with 2.1.2.9 of the NEC Style Manual. The phrase “for personnel” was removed, as it is included in the definition of GFCI in Article 100.

Response Message: FR-8904-NFPA 70-2024

First Revision No. 8905-NFPA 70-2024 [Section No. 425.3]

425.3 ~~.~~ 8 . Other ~~Articles~~ Requirements .

Fixed industrial process heating equipment incorporating a hermetic refrigerant motor-compressor shall additionally comply with Table 425.3 8 .

Table 425.3 ~~Other Articles~~ 8 Other Requirements

Equipment	Article
Motors, motor circuits, and controllers	430
Air-conditioning and refrigerating equipment	440 (Parts I through IV)

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:28:03 EST 2024

Committee Statement

Committee Statement: The section and associated table were renumbered to 425.8, in accordance with section 2.2.1 of the NEC Style Manual. Specific Parts of Article 430 were added to comply with section 4.1.4 of the NEC Style Manual. Revisions made to update title of 425.8 and Table 425.8 in accordance with the NEC Style Manual.

Response Message: FR-8905-NFPA 70-2024

Public Input No. 996-NFPA 70-2023 [Section No. 425.3]

Public Input No. 3738-NFPA 70-2023 [Section No. 425.3]

First Revision No. 8906-NFPA 70-2024 [Section No. 425.6]

425.6 ~~.~~ 2 . Listed ~~Equipment~~ Requirements .

Fixed industrial process heating equipment shall be listed.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:30:16 EST 2024

Committee Statement

Committee Statement: The listing requirements of this article were relocated to 425.2 to comply with section 2.2.1 of the NEC Style Manual.

Response Message: FR-8906-NFPA 70-2024

Public Input No. 3739-NFPA 70-2023 [Section No. 425.6]

First Revision No. 8907-NFPA 70-2024 [Section No. 425.19]

425.19 Disconnecting Means.

Means shall be provided to simultaneously disconnect the heater, motor controller(s), and supplementary overcurrent protective device(s) of all fixed industrial process heating equipment from all ungrounded conductors. Where heating equipment is supplied by more than one source, feeder, or branch circuit, the disconnecting means shall be grouped and identified as having multiple disconnecting means. Each disconnecting means shall simultaneously disconnect all ungrounded conductors that it controls. The disconnecting means specified in 425.19(A) and (B) shall have an ampere rating not less than 125 percent of the total load of the motors and the heaters and shall be ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25.

(A) Heating Equipment with Supplementary Overcurrent Protection.

The disconnecting means for fixed industrial process heating equipment with supplementary overcurrent protection shall be within sight from the supplementary overcurrent protective device(s), on the supply side of these devices, if fuses, and, in addition, shall comply with either 425.19(A)(1) or (A)(2).

(1) Heater Containing No Motor Rated over ⅛ Horsepower.

The disconnecting means specified in 425.19 or unit switches complying with 425.19(C) shall be permitted to serve as the required disconnecting means for both the motor controller(s) and heater under either of the following conditions:

(1) The disconnecting means provided is also within sight from the motor controller(s) and the heater.

(2) The disconnecting means is ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25.

(2) Heater Containing a Motor(s) Rated over ⅛ Horsepower.

The disconnecting means required by 425.19(A)(1) shall be permitted to serve as the required disconnecting means for both the motor controller(s) and heater under either of the following conditions:

(1) The disconnecting means is in sight from the motor controller(s) and the heater and complies with ~~Part IX of~~ Article 430, Part IX .

(2) Motor(s) of more than ⅛ hp and the heater are provided with disconnecting means. The disconnecting means shall be permitted to be out of sight from the motor controller and shall be ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25.

(B) Heating Equipment Without Supplementary Overcurrent Protection.

(1) Without Motor or with Motor Not over ⅛ Horsepower.

For fixed industrial process heating equipment without a motor rated over ⅛ hp, the branch-circuit switch or circuit breaker shall be permitted to serve as the disconnecting means where the switch or circuit breaker is within sight from the heater, shall be permitted to be out of sight from the motor controller, and shall be capable of being ~~locked in the~~ lockable open ~~position~~ in ~~compliance~~ accordance with 110.25.

(2) Over ⅛ Horsepower.

For motor-driven fixed industrial process heating equipment with a motor rated over ⅛ hp, a disconnecting means shall be located within sight from the motor controller or shall be permitted to be out of sight from the motor controller and shall be ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25.

(C) Unit Switch(es) as Disconnecting Means.

A unit switch(es) with a marked “off” position that is part of a fixed heater and disconnects all ungrounded conductors shall be permitted as the disconnecting means required by this article. The branch circuit switch or circuit breaker, where readily accessible for servicing of the fixed heater, shall be permitted as the other disconnecting means.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:34:38 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with sections 3.2.5.3 and 4.1.4 of the NEC Style Manual.

Response Message: FR-8907-NFPA 70-2024

Public Input No. 2532-NFPA 70-2023 [Section No. 425.19(B)]

Public Input No. 2531-NFPA 70-2023 [Section No. 425.19(A)(2)]

Public Input No. 2700-NFPA 70-2023 [Section No. 425.19(A)(2)]

Public Input No. 2529-NFPA 70-2023 [Section No. 425.19 [Excluding any Sub-Sections]]

Public Input No. 2530-NFPA 70-2023 [Section No. 425.19(A)(1)]

First Revision No. 8911-NFPA 70-2024 [Section No. 425.22(A)]

(A) Branch-Circuit Devices.

Fixed industrial process heating equipment, other than motor-operated equipment required to have additional overcurrent protection by Article 430, Parts III and IV ~~of Article 430~~ or ~~Part III of~~ Article 440, Part III, shall be permitted to be protected against overcurrent where supplied by one of the branch circuits in ~~Part II of~~ Article 210, Part II .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:42:20 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 4.1.4 of the NEC Style Manual.

Response Message: FR-8911-NFPA 70-2024

Public Input No. 2701-NFPA 70-2023 [Section No. 425.22(A)]

First Revision No. 8936-NFPA 70-2024 [Section No. 425.22(C)]

(C) Overcurrent Protective Devices.

The supplementary overcurrent protective devices for the subdivided loads specified in 425.22(B) shall comply with the following:

(1) Be factory installed within or on the heater enclosure or supplied for use with the heater as a separate assembly by the heater manufacturer

(2) Be accessible but not be required to be readily accessible

(3) Be suitable for branch-circuit protection

~~Informational Note No. 1: See 240.10 .~~
Where cartridge fuses are used to provide this overcurrent protection, a single disconnecting means shall be permitted to be used for the several subdivided loads.

Informational Note No. ~~2~~ 1 : See 240.10 for supplementary overcurrent protection.

Informational Note No. ~~3~~ 2 : See 240.40 for disconnecting means for cartridge fuses in circuits of any voltage.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:18:51 EST 2024

Committee Statement

Committee Statement: The permissive language of Informational Note 1 was relocated to comply with 2.1.10 of the NEC Style Manual. The remainder of Informational Note No 1 was deleted as it was redundant to Informational Note No 2. The remaining Informational Notes were renumbered to reflect the change.

Response Message: FR-8936-NFPA 70-2024

First Revision No. 8944-NFPA 70-2024 [New Section after 426.1]

426.3 Reconditioned Equipment.
Reconditioned equipment shall not be permitted to be installed.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Wed Jan 24 13:28:57 EST 2024

Committee Statement

Committee Statement: The requirements for reconditioned equipment were added here, in accordance with 2.2.1 of the NEC Style Manual.

It is unlikely that equipment covered by Article 426 would be able to be acceptably reconditioned and installed. Additionally, CMP 17 is not aware of any options that exist today for listing or field evaluation of reconditioned equipment of this type.

Response Message: FR-8944-NFPA 70-2024

First Revision No. 8912-NFPA 70-2024 [Section No. 426.3]

~~**426.3** Other Articles.~~

~~Cord-and-plug-connected fixed outdoor electric deicing and snow-melting equipment shall additionally comply with Table 426.3 .~~

~~Table 426.3 Other Articles~~

~~Equipment~~	~~Article~~
~~Appliances~~	~~422 (Parts I, II, III, IV, V)~~

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 11:45:48 EST 2024

Committee Statement

Committee Statement: Rather than move the referenced section, this section was deleted because reference to Article 422 is not needed as it applies regardless per 90.3.

Response Message: FR-8912-NFPA 70-2024

Public Input No. 987-NFPA 70-2023 [Section No. 426.3]

Public Input No. 3741-NFPA 70-2023 [Section No. 426.3]

First Revision No. 8913-NFPA 70-2024 [Section No. 426.50(A)]

(A) Disconnection.

All fixed outdoor deicing and snow-melting equipment shall be provided with a means for simultaneous disconnection from all ungrounded conductors. Where readily accessible to the user of the equipment, the branch-circuit switch or circuit breaker shall be permitted to serve as the disconnecting means. The disconnecting means shall be of the indicating type and be ~~capable of being locked in the open (off) position.~~ lockable open in accordance with 110.25.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Wed Jan 24 11:49:02 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 3.2.5.3 of the NEC Style Manual.
Response Message: FR-8913-NFPA 70-2024

First Revision No. 8914-NFPA 70-2024 [Section No. 426.51]

426.51 Controllers.

(A) Temperature Controller with "Off" Position.

Temperature-controlled switching devices that indicate an "off" position and that interrupt line current shall open all ungrounded conductors when the control device is in the "off" position. These devices shall not be permitted to serve as the disconnecting means unless they are ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25.

(B) Temperature Controller Without "Off" Position.

Temperature controlled switching devices that do not have an "off" position shall not be required to open all ungrounded conductors and shall not be permitted to serve as the disconnecting means.

(C) Remote Temperature Controller.

Remote controlled temperature-actuated devices shall not be required to meet the requirements of 426.51(A). These devices shall not be permitted to serve as the disconnecting means.

(D) Combined Switching Devices.

Switching devices consisting of combined temperature-actuated devices and manually controlled switches that serve both as the controller and the disconnecting means shall comply with all of the following conditions:

(1) Open all ungrounded conductors when manually placed in the "off" position

(2) Be so designed that the circuit cannot be energized automatically if the device has been manually placed in the "off" position

(3) Be ~~capable of being locked in the open position in compliance~~ lockable open in accordance with 110.25

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Wed Jan 24 11:51:32 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 3.2.5.3 of the NEC Style Manual.
Response Message: FR-8914-NFPA 70-2024

Public Input No. 2533-NFPA 70-2023 [Section No. 426.51]

First Revision No. 8951-NFPA 70-2024 [Section No. 426.54]

426.54 ~~Cord-and-Plug-Connected Deicing and Snow-Melting Equipment.~~

~~Cord-and-plug-connected~~

2 Listing Requirements.

Fixed outdoor deicing and snow-melting equipment shall be listed.

Supplemental Information

File Name	Description	Approved
NEC_CMP17_FR-8951_426.54.docx		

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:38:41 EST 2024

Committee Statement

Committee Statement: The requirements of 426.54 were relocated to 426.2 to comply with section 2.2.1 of the NEC Style Manual. Additionally, the listing requirements for this article have been expanded to cover all equipment within the article's scope, in addition to cord-and-plug-connected equipment, to ensure the products used are in compliance with applicable product safety standards.

Response Message: FR-8951-NFPA 70-2024

426.54 ~~Cord-and-Plug-Connected Deicing and Snow-Melting Equipment~~Listing Requirements. [Move to 426.2]

~~Cord-and-plug-connected~~Fixed outdoor deicing and snow-melting equipment shall be listed.

First Revision No. 8947-NFPA 70-2024 [New Section after 427.1]

427.3 Reconditioned Equipment.
Reconditioned equipment shall not be permitted to be installed.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Wed Jan 24 13:32:03 EST 2024

Committee Statement

Committee Statement: The requirements for reconditioned equipment were added here, in accordance with 2.2.1 of the NEC Style Manual.
Response Message: FR-8947-NFPA 70-2024

First Revision No. 8921-NFPA 70-2024 [Section No. 427.3]

~~**427.3** Other Articles.~~

~~Cord-connected pipe heating assemblies shall additionally comply with Table 427.3 .~~

~~Table 427.3 Other Articles~~

~~Equipment~~	~~Article~~
~~Appliances~~	~~422 (Parts I, II, III, IV, V)~~

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 12:55:28 EST 2024

Committee Statement

Committee Statement: This section was deleted because reference to Article 422 is not needed as it applies regardless. Rather than move the referenced section, this section was deleted because reference to Article 422 is not needed as it applies regardless per 90.3.

Response Message: FR-8921-NFPA 70-2024

Public Input No. 3743-NFPA 70-2023 [Section No. 427.3]

Public Input No. 988-NFPA 70-2023 [Section No. 427.3]

First Revision No. 8923-NFPA 70-2024 [Section No. 427.55(A)]

(A) Switch or Circuit Breaker.

Means shall be provided to simultaneously disconnect all fixed electric pipeline or vessel heating equipment from all ungrounded conductors. The branch-circuit switch or circuit breaker, where readily accessible to the user of the equipment, shall be permitted to serve as the disconnecting means. The disconnecting means shall be of the indicating type and ~~shall be capable of being locked in the open (off) position. The disconnecting means shall be installed~~ be lockable open in accordance with 110.25.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:00:55 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 3.2.5 of the NEC Style Manual.

Response Message: FR-8923-NFPA 70-2024

Public Input No. 2534-NFPA 70-2023 [Section No. 427.55(A)]

First Revision No. 8926-NFPA 70-2024 [Section No. 427.56(A)]

(A) Temperature Control with "Off" Position.

Temperature-controlled switching devices that indicate an "off" position and that interrupt line current shall open all ungrounded conductors when the control device is in this "off" position. These devices shall not be permitted to serve as the disconnecting means unless ~~capable of being locked in the open position.~~ they are lockable open in accordance with 110.25.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:05:36 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with section 3.2.5.3 of the NEC Style Manual.

Response Message: FR-8926-NFPA 70-2024

First Revision No. 8932-NFPA 70-2024 [Section No. 427.56(D)]

(D) Combined Switching Devices.

Switching devices consisting of combined temperature-actuated devices and manually controlled switches that serve both as the controllers and the disconnecting means shall comply with all the following conditions:

(1) Open all ungrounded conductors when manually placed in the “off” position

(2) Be designed so that the circuit cannot be energized automatically if the device has been manually placed in the “off” position

(3) Be ~~capable of being locked in the open position~~ lockable open in accordance with 110.25

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Wed Jan 24 13:10:01 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made to comply with Section 3.2.5.3 of the NEC Style Manual.

Response Message: FR-8932-NFPA 70-2024

First Revision No. 9045-NFPA 70-2024 [Section No. 680.5(B)]

(B) 150 Volts or Less to Ground.

Where required in this article, ground-fault protection of receptacles and outlets on branch circuits rated 150 volts or less to ground ~~and~~ , shall be provided with a Class A GFCI, under the following conditions:

(1) Branch circuits rated 60 amperes or less

~~,~~

(1) single-

~~or 3-phase, shall be provided with a Class A GFCI.~~

(1) phase, or

(2) Branch circuits rated 100 amperes or less three-phase

Exception: Receptacles and outlets that are part of listed equipment with ratings not exceeding the low-voltage contact limit that are supplied by listed transformers or power supplies that comply with 680.23(A)(2) shall not be required to be provided with ground-fault protection.

Informational Note: The high leg of a 120/240-volt 4-wire delta-connected system, and the two ungrounded phases of a corner-grounded delta system have a voltage to ground greater than 150 volts, exceeding the limit for a Class A GFCI.

Supplemental Information

File Name	Description	Approved
70_CMP17_FR9045_680.5_B_.docx	Uploaded for clarification	

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Thu Jan 25 08:15:04 EST 2024

Committee Statement

Committee Statement: Section 680.5(B) currently stipulates a 60-ampere threshold for equipment requiring ground-fault circuit interrupter (GFCI) protection. Commercially available three-phase GFCI devices now offer ratings up to 100 amperes. This revision reflects the availability of higher-rated GFCI devices and harmonizes the code with existing provisions, such as Section 210.8(B). Additionally, Section 680.5(B) was separated into a list (1) and (2) for improved usability.

Response Message: FR-9045-NFPA 70-2024

Public Input No. 4500-NFPA 70-2023 [Section No. 680.5(B)]

(B) 150 Volts or Less to Ground.

Where required in this article, ground-fault protection of receptacles and outlets on branch circuits rated 150 volts or less to ground ~~and 60 amperes or less, single- or 3-phase~~, shall be provided with a Class A GFCI, under the following conditions:~~.~~

(1) Branch circuits rated 60 amperes or less single-phase, or

(2) Branch circuits rated 100 amperes or less three-phase.

Exception: Receptacles and outlets that are part of listed equipment with ratings not exceeding the low-voltage contact limit that are supplied by listed transformers or power supplies that comply with 680.23(A)(2) shall not be required to be provided with ground-fault protection.

Informational Note: The high leg of a 120/240-volt 4-wire delta-connected system, and the two ungrounded phases of a corner-grounded delta system have a voltage to ground greater than 150 volts, exceeding the limit for a Class A GFCI.

Formatted: Font: (Default) Times New Roman, 12 pt, Ligatures: None

Formatted: List Paragraph, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

First Revision No. 9044-NFPA 70-2024 [Section No. 680.6]

680.~~6~~ 2 Listing Requirements.

All electrical equipment covered by this article shall be listed.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 08:13:31 EST 2024

Committee Statement

Committee Statement: To comply with the NEC style manual section 2.2.1, the requirement for Listing is being moved from 680.6 to 680.2.

Response Message: FR-9044-NFPA 70-2024

Public Input No. 2808-NFPA 70-2023 [Section No. 680.6]

Public Input No. 2807-NFPA 70-2023 [New Section after 680.1]

First Revision No. 9049-NFPA 70-2024 [Section No. 680.8]

680.8 Cord-and-Plug-Connected Equipment.

Fixed or stationary equipment, other than underwater luminaires, for a permanently installed pool shall be permitted to be connected with a flexible cord and plug to facilitate the removal or disconnection for ~~maintenance or repair~~ servicing .

(A) **Cord** Length.

For other than storable pools, the flexible cord shall not exceed 900 mm (3 ft) in length.

~~**(C)**~~

(B) Equipment ~~Grounding.~~

~~The flexible cord shall have a copper equipment grounding conductor sized in accordance with 250.122 but not smaller than 12 AWG. The cord shall terminate in a grounding-type attachment plug.~~

Construction.

The equipment grounding conductors shall be connected to a fixed metal part of the assembly. ~~The~~ Any removable metal part of the assembly shall be mounted on or bonded to the fixed metal part.

Supplemental Information

File Name	Description	Approved
NEC_CMP17_FR-9049_680.8.docx		

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 08:36:34 EST 2024

Committee Statement

Committee Statement: Existing section 680.7(B) has grounding and bonding requirements for cord and plug connections. Redundant language in existing section 680.8(B) is deleted. Title for (A) was clarified to better reflect the requirements in this item. Section 680.8 first level subdivision (C) was clarified, and the title revised, and renumbered as (B).

The words “maintenance or repair” were changed to “servicing” for clarification, as “servicing “ is a defined term and often encompasses maintenance and repair activities.

Response Message: FR-9049-NFPA 70-2024

Public Input No. 1944-NFPA 70-2023 [Section No. 680.8]

Public Input No. 1326-NFPA 70-2023 [Section No. 680.8 [Excluding any Sub-Sections]]

Public Input No. 2267-NFPA 70-2023 [Section No. 680.8(B)]

680.8 Cord-and-Plug-Connected Equipment.
Fixed or stationary equipment, other than underwater luminaires, for a permanently installed pool shall be permitted to be connected with a flexible cord and plug to facilitate the removal or disconnection for ~~maintenance or repair~~servicing.

(A) Cord Length.
For other than storable pools, the flexible cord shall not exceed 900 mm (3 ft) in length.

~~**(B) Equipment Grounding.**~~
~~The flexible cord shall have a copper equipment grounding conductor sized in accordance with 250.122 but not smaller than 12 AWG. The cord shall terminate in a grounding-type attachment plug.~~

(~~C~~B) Equipment Construction.
The equipment grounding conductors shall be connected to a fixed metal part of the assembly. ~~The~~Any removable metal part of the assembly shall be mounted on or bonded to the fixed metal part.

First Revision No. 9051-NFPA 70-2024 [Section No. 680.10(A)]

(A) Electric Pool Water Heaters.

(1) Resistance Elements. All electric pool water heaters incorporating resistive heating elements shall have the heating elements subdivided into loads not exceeding 48 amperes and protected at not over 60 amperes.

(2) Branch Circuit. The ampacity of the branch-circuit conductors and the ampere rating or setting of overcurrent protective devices shall be 125 percent of the total nameplate-rated load or greater.

Supplemental Information

File Name	Description	Approved
70_CMP17_FR9051_680.10_A_.docx	Uploaded to clarify revisions	
70_CMP17_FR9051_680.10_A.docx	For prod use	

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 08:45:55 EST 2024

Committee Statement

Committee Statement: Section 680.10(A) is being revised into a list item format to facilitate understanding for Code users, and in accordance with NEC Style Manual section 3.5.1.2. Additionally, “ampere” was added for clarity.

Response Message: FR-9051-NFPA 70-2024

Public Input No. 4464-NFPA 70-2023 [Section No. 680.10(A)]

680.10

(A) Electric Pool Water Heaters.

(1) Resistance Elements. All electric pool water heaters incorporating resistive heating elements shall have the heating elements subdivided into loads not exceeding 48 amperes and protected at not over 60 amperes.

(2) Branch Circuit. The ampacity of the branch-circuit conductors and the ampere rating or setting of overcurrent protective devices shall be 125 percent of the total nameplate-rated load or greater.

Formatted: Font: (Default) Times New Roman, 12 pt, Ligatures: None

Formatted: Font: (Default) Times New Roman, 12 pt, Ligatures: None

Formatted: Font: (Default) Times New Roman, 12 pt, Ligatures: None

Formatted: List Paragraph, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

First Revision No. 9150-NFPA 70-2024 [Section No. 680.10(B)]

(B) Electrically Powered Swimming Pool Heat Pumps and Chillers.

(1) Rating. Electrically powered swimming pool heat pumps and chillers using the circulating water system and providing heating, cooling, or both, shall be ~~listed and~~ rated for their intended use.

(2) Branch Circuit. The ampacity of the branch-circuit conductors and the ampere rating or setting of overcurrent protective devices shall be sized to comply with the nameplate.

Supplemental Information

File Name	Description	Approved
NEC_CMP17_FR-9150_680.10_B_.docx		

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 14:48:30 EST 2024

Committee Statement

Committee Statement: Section 680.10(B) is being revised into a list item format to facilitate understanding for Code users, and in accordance with NEC Style Manual section 3.5.1.2. Additionally, “ampere” was added for clarity and requirement for listing was removed as it is covered in 680.2.

Response Message: FR-9150-NFPA 70-2024

Public Input No. 4465-NFPA 70-2023 [Section No. 680.10(B)]

(B) Electrically Powered Swimming Pool Heat Pumps and Chillers. [Move text to (1) and (2)]

~~Electrically powered swimming pool heat pumps and chillers using the circulating water system and providing heating, cooling, or both, shall be listed and rated for their intended use. The ampacity of the branch-circuit conductors and the rating or setting of overcurrent protective devices shall be sized to comply with the nameplate.~~

(1) Rating.

Electrically powered swimming pool heat pumps and chillers using the circulating water system and providing heating, cooling, or both, shall be ~~listed and~~ rated for their intended use.

(2) Branch Circuit.

The ampacity of the branch-circuit conductors and the ampere rating or setting of overcurrent protective devices shall be sized to comply with the nameplate.

First Revision No. 9200-NFPA 70-2024 [Section No. 680.12(A)]

(A) Drainage.

Electrical equipment shall not be installed in rooms, vaults, or pits that do not have drainage that prevents water accumulation during normal operation or maintenance unless the equipment is rated and identified for submersion.

Informational Note No. 1 : Chemicals such as chlorine cause severe corrosive and deteriorating effects on electrical connections, equipment, and enclosures when stored and kept in the same vicinity. ~~Adequate ventilation of indoor spaces such as equipment and storage rooms is addressed by~~

Informational Note No. 2: See ANSI/APSP/ICC -11, *Standard for Water Quality in Public Pools and Spas*, for information regarding adequate ventilation of indoor spaces such as equipment and storage rooms, which can reduce the likelihood of the accumulation of corrosive vapors.

Supplemental Information

File Name	Description	Approved
NEC_CMP17_FR-9200_680.12_A_.docx		

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 16:48:12 EST 2024

Committee Statement

Committee Statement: The existing Informational Note in 680.12(A) was revised to two Informational Notes and editorial revisions made to comply with NEC Style Manual 2.1.10.3.

Response Message: FR-9200-NFPA 70-2024

(A) Drainage.
Electrical equipment shall not be installed in rooms, vaults, or pits that do not have drainage that prevents water accumulation during normal operation or maintenance unless the equipment is rated and identified for submersion.

Informational Note No. 1: Chemicals such as chlorine cause severe corrosive and deteriorating effects on electrical connections, equipment, and enclosures when stored and kept in the same vicinity. ~~Adequate ventilation of indoor spaces such as equipment and storage rooms is addressed by ANSI/APSP-11, *Standard for Water Quality in Public Pools and Spas*, and can reduce the likelihood of the accumulation of corrosive vapors.~~

Informational Note No. 2: ~~Adequate ventilation of indoor spaces such as equipment and storage rooms is addressed by~~See ANSI/APSP-11, *Standard for Water Quality in Public Pools and Spas*, for information regarding adequate ventilation of indoor spaces such as equipment and storage rooms, which can reduce the likelihood of the accumulation of corrosive vapors.

First Revision No. 9054-NFPA 70-2024 [Section No. 680.12(B)]

(B) Receptacles.

Receptacles shall meet the following requirements:

(1) At least one GFCI-protected 125-volt, 15- or 20-ampere receptacle

~~supplied from a general purpose branch circuit~~

(1) shall be located within an equipment room.

(2) All other receptacles within an equipment room, vault or pit shall be GFCI protected or SPGFCI protected, as applicable, under the following conditions:

(3) If supplied by branch circuits rated

~~150 volts~~

(1)

(a) 150 volts or less to ground

~~within an equipment room and any receptacles supplied by a branch circuit rated 150 volts or less to ground in a vault or pit shall be GFCI protected~~

(1)

(a) , 60 amperes or less single-phase or 100 amperes or less three-phase; or

(b) If supplied by branch circuits exceeding 150 volts to ground but not exceeding 480 volts phase-to-phase .

Supplemental Information

File Name	Description	Approved
70_CMP17_FR9054_680.12_B_.docx	For clarification to revisions	
70_CMP17_FR9054_680.12_B.docx	For prod use	

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Thu Jan 25 08:54:29 EST 2024

Committee Statement

Committee Statement: Commercially available three-phase GFCI devices now offer ratings up to 100 amperes, and single phase GFCI devices offer ratings up to 60 amperes. This revision also reflects the availability of higher-rated GFCI and SPGFCI devices up to 480V that can be applied to all receptacles within equipment room, vaults, or pits and harmonizes the code with existing provisions, such as Section 210.8(B).

The text was also separated into two subsections in accordance with NEC Style manual section 3.5.1.2.

Response Message: FR-9054-NFPA 70-2024

Public Input No. 4467-NFPA 70-2023 [Section No. 680.12(B)]

Public Input No. 1459-NFPA 70-2023 [Section No. 680.12(B)]

(B) Receptacles.

Receptacles shall meet the following requirements:

1) At least one GFCI-protected 125-volt, 15- or 20-ampere receptacle ~~supplied from a general purpose branch circuit~~ shall be located within an equipment room.
2) All other receptacles ~~supplied by branch circuits rated 150 volts or less to ground~~ within an equipment room, ~~and any receptacles supplied by a branch circuit rated 150 volts or less to ground in a~~ vault or pit shall be GFCI protected or SPGFCI protected, as applicable, under the following conditions:~~.~~
   a) If supplied by branch circuits rated 150 volts or less to ground, 60 amperes or less single-phase or 100 amperes or less three-phase; or
   b) If supplied by branch circuits exceeding 150 volts to ground but not exceeding 480 volts phase-to-phase.

Formatted: Font: (Default) Times New Roman, 12 pt, Ligatures: None

Formatted: Font: (Default) Times New Roman, 12 pt, Ligatures: None

Formatted: Font: (Default) Times New Roman, 12 pt, Ligatures: None

Formatted: List Paragraph, Outline numbered + Level: 2 + Numbering Style: a, b, c, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

Formatted: Font: (Default) Times New Roman, 12 pt, Ligatures: None

First Revision No. 9060-NFPA 70-2024 [Section No. 680.14(A)]

(A) Wiring Methods.

Wiring methods shall be suitable for use in corrosive environments. Rigid metal conduit, intermediate metal conduit, rigid polyvinyl chloride conduit, reinforced thermosetting resin conduit, ~~and~~ liquidtight flexible nonmetallic conduit, and liquidtight flexible metal conduit shall be considered suitable for use. Aluminum conduit and tubing shall not be permitted.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 09:08:20 EST 2024

Committee Statement

Committee Statement: Liquidtight flexible metal conduit (LFMC) is suitable for use in corrosive environments per UL 360. In addition, 680.21(A)(1) permits LFMC for flexible connections to pool motors.

Response Message: FR-9060-NFPA 70-2024

Public Input No. 2265-NFPA 70-2023 [Section No. 680.14(A)]

First Revision No. 9063-NFPA 70-2024 [Section No. 680.14(B)]

(B) Other Equipment.

Other equipment shall be ~~suitable~~ identified for use in corrosive environments or be installed in ~~identified~~ corrosion-resistant enclosures. Equipment listed for pool and spa use shall be ~~considered suitable for use~~ permitted .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 09:12:29 EST 2024

Committee Statement

Committee Statement: The word "suitable" is replaced with the defined term “identified" for clarity and editorially changed to add “permitted” instead of ”considered suitable for use.”

Response Message: FR-9063-NFPA 70-2024

Public Input No. 645-NFPA 70-2023 [Section No. 680.14(B)]

First Revision No. 9153-NFPA 70-2024 [Section No. 680.21(D)]

(D) Pool Pump Motor Replacement, Reconditioning, or Repair .

~~Where~~ If a pool pump motor ~~in 680.21(C)~~ is replaced, reconditioned, or repaired, the ~~replacement or repaired pump motor shall be provided with ground-fault protection complying with~~ outlet serving it shall comply with 680.5(~~B) or (~~ C)~~, as applicable~~ .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 14:59:47 EST 2024

Committee Statement

Committee Statement: The term “reconditioned” was added to the requirement, and the Title expanded, both for clarity. The word "where" was changed to "if" to comply with the NEC Style Manual. The language regarding "repair" was not changed to "servicing," because “servicing” is a broader term than "repairing."

Response Message: FR-9153-NFPA 70-2024

Public Input No. 1325-NFPA 70-2023 [Section No. 680.21(D)]

First Revision No. 9065-NFPA 70-2024 [Section No. 680.22(A)(4)]

(4) Ground-Fault Circuit-Interrupter (GFCI) and Special Purpose Ground-Fault Circuit-Interrupter (SPGFCI) Protection.

All receptacles ~~rated 125 volts through 250 volts, 60 amperes or less,~~ located within 6.0 m (20 ft) of the inside walls of a pool shall have GFCI protection complying with 680.5(B) or SPGFCI protection complying with 680.5(C), as applicable, under the following conditions:

(1) If supplied by branch circuits rated 150 volts or less to ground, 60 amperes or less single-phase or 100 amperes or less three-phase; or

(2) If supplied by branch circuits exceeding 150 volts to ground but not exceeding 480 volts phase-to-phase .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 09:20:07 EST 2024

Committee Statement

Committee Statement: Sections 680.22(A)(4) currently stipulates a 60-ampere threshold for equipment requiring ground-fault circuit interrupter (GFCI) protection. Commercially available three-phase GFCI devices now offer ratings up to 100 amperes. This revision reflects the availability of higher-rated GFCI devices and harmonizes the code with existing provisions, such as 210.8(B). Additionally, 680.22(A)(4) was separated into a list (A) and (B) for improved usability.

Response Message: FR-9065-NFPA 70-2024

Public Input No. 4511-NFPA 70-2023 [Section No. 680.22(A)(4)]

Public Input No. 2439-NFPA 70-2023 [Section No. 680.22(A)(4)]

First Revision No. 9067-NFPA 70-2024 [Section No. 680.22(A)(5)]

(5) Measurements.

In determining the dimensions in this section addressing receptacle spacings, the distance to be measured shall be the shortest path the power- supply cord ~~of an appliance~~ connected to the receptacle would follow without piercing a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 09:23:18 EST 2024

Committee Statement

Committee Statement: The word “Power-” is added to “supply cord”, and “of an appliance” is deleted, to correlate with the existing defined term “power-supply cord” in Article 100.

The existing requirements regarding doorways and window openings are unique to pool/spa applications, and are not being deleted. The proposed revision might, for example, encourage receptacles just inside of a door or window to be used as the required receptacle in 680.22(A) list item 1.

Response Message: FR-9067-NFPA 70-2024

Public Input No. 2241-NFPA 70-2023 [Section No. 680.22(A)(5)]

First Revision No. 9073-NFPA 70-2024 [Section No. 680.22(B)(2)]

(2) Indoor Clearances.

For installations in indoor pool areas, the clearances shall be the same as for outdoor areas in 680.22(B)(1) unless modified as provided in this paragraph. If the branch circuit supplying the equipment is protected by ~~a ground-fault circuit interrupter~~ GFCI , the following equipment shall be permitted at a height not less than 2.3 m (7 ft 6 in.) above the maximum pool water level:

(1) Totally enclosed luminaires

(2) Ceiling-suspended (paddle) fans identified for use beneath ceiling structures such as provided on porches or patios

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 09:33:05 EST 2024

Committee Statement

Committee Statement: Section 2.1.2.9 of the NEC Style Manual permits the use of acronyms. The acronym GFCI is defined in Article 100. An editorial revision was made for clarification to provide reference to 680.22(B)(1) for outdoor area clearances.

Response Message: FR-9073-NFPA 70-2024

Public Input No. 1648-NFPA 70-2023 [Section No. 680.22(B)(2)]

First Revision No. 9074-NFPA 70-2024 [Section No. 680.22(B)(3)]

(3) Existing Installations.

Existing luminaires and lighting outlets located less than 1.5 m (5 ft) measured horizontally from the inside walls of a pool shall be not less than 1.5 m (5 ft) above the surface of the maximum water level, shall be rigidly attached to the existing structure, and shall be protected by a ~~ground-fault circuit interrupter~~ GFCI .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 09:35:37 EST 2024

Committee Statement

Committee Statement: Section 2.1.2.9 of the NEC Style Manual permits the use of acronyms. The acronym GFCI is defined in Article 100.

Response Message: FR-9074-NFPA 70-2024

Public Input No. 1649-NFPA 70-2023 [Section No. 680.22(B)(3)]

First Revision No. 9084-NFPA 70-2024 [Section No. 680.23(A)(4)]

(4) Voltage Limitation.

~~No luminaires~~ Luminaires shall not be installed ~~for operation~~ on supply circuits ~~over~~ exceeding 150 volts between conductors.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 10:09:50 EST 2024

Committee Statement

Committee Statement: This is an editorial revision made to provide consistency with other requirements in the Code.

Response Message: FR-9084-NFPA 70-2024

Public Input No. 573-NFPA 70-2023 [Section No. 680.23(A)(4)]

First Revision No. 9086-NFPA 70-2024 [Section No. 680.23(B)(2)]

(2) Wiring Extending Directly to the Forming Shell.

Conduit shall be installed from the forming shell to a junction box or other enclosure conforming to the requirements in 680.24. Conduit shall be rigid metal, intermediate metal, liquidtight flexible nonmetallic, or rigid polyvinyl chloride conduit.

(a) *Metal Conduit.* Metal conduit shall be listed and shall be red brass or stainless steel.

Informational Note: See UL 6A, *Electrical Rigid Metal Conduit - Aluminum, Red Brass, and Stainless Steel*, for information on the listing criteria for red brass and stainless steel conduit.

(b) *Nonmetallic Conduit.* Where a nonmetallic conduit is used, an 8 AWG insulated solid or stranded copper bonding jumper shall be installed in this conduit unless a listed low-voltage lighting system not requiring grounding is used. The bonding jumper shall be terminated in the forming shell, junction box or transformer enclosure, or ~~ground-fault circuit-interrupter~~ GFCI enclosure. The termination of the 8 AWG bonding jumper in the forming shell shall be covered with, or encapsulated in, a listed potting compound to protect the connection from the possible deteriorating effect of pool water.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 10:12:13 EST 2024

Committee Statement

Committee Statement: Section 2.1.2.9 of the NEC Style Manual permits the use of acronyms. The acronym GFCI is defined in Article 100.

Response Message: FR-9086-NFPA 70-2024

Public Input No. 1647-NFPA 70-2023 [Section No. 680.23(B)(2)]

First Revision No. 9090-NFPA 70-2024 [Section No. 680.24(B) [Excluding any Sub-Sections]]

An enclosure for a transformer, ~~ground-fault circuit interrupter~~ GFCI , or a similar device connected to a conduit that extends directly to a forming shell or mounting bracket of a no-niche luminaire shall meet the requirements of this section.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 10:28:22 EST 2024

Committee Statement

Committee Statement: Section 2.1.2.9 of the NEC Style Manual permits the use of acronyms. The acronym GFCI is defined in Article 100.

Response Message: FR-9090-NFPA 70-2024

Public Input No. 1651-NFPA 70-2023 [Section No. 680.24(B) [Excluding any Sub-Sections]]

First Revision No. 9103-NFPA 70-2024 [Section No. 680.24(E)]

(E) Strain Relief.

The termination of a flexible cord of an underwater luminaire within a junction box, transformer or power-supply enclosure, ~~ground-fault circuit interrupter~~ GFCI enclosure , or other enclosure shall be provided with a strain relief.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 11:02:36 EST 2024

Committee Statement

Committee Statement: Section 2.1.2.9 of the NEC Style Manual permits the use of acronyms. The acronym GFCI is defined in Article 100. The word “enclosure” after GFCI was added for clarity, as this section relates to strain reliefs for enclosures.

Response Message: FR-9103-NFPA 70-2024

Public Input No. 1654-NFPA 70-2023 [Section No. 680.24(E)]

First Revision No. 9239-NFPA 70-2024 [Section No. 680.26]

[See attached Word document for revisions to 680. 26]

680. 26 Equipotential Bonding.

(A) Performance.

The equipotential bonding required by 680.26(B) and (C) to reduce voltage gradients in the pool area shall be installed for pools with or without associated electrical equipment related to the pool.

Informational Note No. 1: Some causes of voltage gradients originate outside the premises wiring system and are not within the scope of the *NEC*. Measures identified in Rule 097D2 of ANSI C2, *National Electrical Safety Code*, can also serve to address voltage gradients originating on the utility side of the service point.

Informational Note No. 2: By its nature, equipotential bonding of swimming pools and perimeter surfaces involves contact between various metallic materials and the earth. This can, in some cases, expose various specific metals to a corrosive environment, depending on factors such as the type and chemical content of the soil and the specific metal. Corrosive environments are also addressed in 680.14.

(B) Bonded Parts.

The parts specified in 680.26(B)(1) through (B)(7) shall be bonded together using solid copper conductors, insulated, covered, or bare, not smaller than 8 AWG or with rigid metal conduit of brass or other identified corrosion-resistant metal. Connections to bonded parts shall be made in accordance with 250.8. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to remote panelboards, service equipment, or electrodes.

(1) Conductive Pool Shells.

Bonding to conductive pool shells shall be provided as specified in 680.26(B)(1)(a) or (B)(1)(b). Cast-in-place concrete, pneumatically applied or sprayed concrete, and concrete block with painted or plastered coatings shall all be considered conductive materials due to water permeability and porosity. Reconstructed pool shells shall also meet the requirements of this section. Vinyl liners and fiberglass composite shells shall be considered to be nonconductive materials and not subject to these requirements.

(a) *Structural Reinforcing Steel.* Unencapsulated structural reinforcing steel shall be bonded together by steel tie wires or the equivalent. Where structural reinforcing steel is encapsulated in a nonconductive compound, a copper conductor grid shall be installed in accordance with 680.26(B)(1)(b).

(b) *Copper Conductor Grid.* A copper conductor grid shall be provided and shall comply with the following:

(3) Be constructed of minimum 8 AWG bare solid copper conductors bonded to each other at all points of crossing in accordance with 250.8 or other approved means

(4) Conform to the contour of the pool

(5) Be arranged in a 300 mm (12 in.) by 300 mm (12 in.) network of conductors in a uniformly spaced perpendicular grid pattern with a tolerance of 100 mm (4 in.)

(6) Be secured within or under the pool no more than 150 mm (6 in.) from the outer contour of the pool shell

(2) Perimeter Surfaces.

The perimeter surface to be bonded shall be considered to extend for 900 mm (3 ft) horizontally beyond the inside walls of the pool while also at a height between 900 mm (3 ft) above and 600 mm (2 ft) below the maximum water level. The perimeter surface shall include unpaved surfaces, concrete, and other types of paving. Perimeter surfaces separated from the pool by a permanent wall or building 1.5 m (5 ft) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a), (B)(2)(b), (B)(2)(c), and (B)(2)(d). For conductive pool shells where bonding to perimeter surfaces is required, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four points uniformly spaced around the perimeter of the pool, or if the bonded perimeter surface does not surround the entire pool, it shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four uniformly spaced points along the bonded perimeter surface. For nonconductive pool shells, where bonding to the perimeter surfaces is required, bonding at four points shall not be required, and the perimeter bonding shall be attached to the 8 AWG copper equipotential bonding conductor and, if present, to any conductive support structure for the pool.

Informational Note: Because the perimeter surface can incorporate various types of materials at various locations and elevations above and below maximum water level, the perimeter surface required to be bonded might not surround the entire pool. The 8 AWG copper equipotential bonding conductor can encircle the entire pool to facilitate connection of bonded parts.

(a) *Conductive Paved Portions of Perimeter Surfaces.* Conductive paved portions of perimeter surfaces, including masonry pavers, if used, shall be bonded with unencapsulated structural reinforcing steel in accordance with 680.26(B)(1)(a), or with unencapsulated steel structural welded wire reinforcement (welded wire mesh, welded wire fabric), bonded together by steel tie wires or the equivalent. Steel welded wire reinforcement shall be fully embedded within the pavement unless the pavement will not allow for embedding. If the reinforcing steel is absent, or is encapsulated in a nonconductive compound, or embedding is not possible, unencapsulated welded wire steel reinforcement or a copper conductor grid shall be provided and shall be secured directly under the paving, and not more than 150 mm (6 in.) below finished grade.

Unencapsulated steel welded wire reinforcement that is not fully embedded in concrete, and copper grid regardless of location, where used for equipotential bonding, shall be listed for corrosion resistance and mechanical performance. This listing requirement shall become effective January 1, 2025. The copper grid or unencapsulated steel welded wire reinforcement shall also meet the following:

(1) Copper grid is constructed of 8 AWG solid bare copper and arranged in accordance with 680.26(B)(1)(b)(3).

(2) Steel welded wire reinforcement is minimum ASTM 6 × 6-W2.0 × W2.0 or minimum No. 3 rebar constructed in a 300 mm (12 in.) grid.

(3) Copper grid and steel welded wire reinforcement follow the contour of the perimeter surface extending not less than 900 mm (3 ft) horizontally beyond the inside walls of the pool.

(4) Only listed splicing devices or exothermic welding are used.

Informational Note No. 1: Performance of the equipotential bonding system at the perimeter surface is improved as the distance between the bonding means and finished grade is minimized, either by embedding within, or by direct contact with the underside of, the finished pavement.

Informational Note No. 2: See ASTM A615/A615M, *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement;* A1064/A1064M, *Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete;* A1022/A1022M, *Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement;* A1060A/A1060M, *Standard Specification for Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete;* and ACI Standard ACI 318, *Building Code Requirements for Structural Concrete,* for examples of standards currently used in the listing of reinforcing steel bars and steel welded wire reinforcement.

(b) *Unpaved Portions of Perimeter Surfaces.* Unpaved portions of perimeter surfaces shall be bonded with any of the following methods:

(3) Copper conductor(s) shall meet the following:

(4) At least one minimum 8 AWG bare solid copper conductor, including the 8 AWG copper equipotential bonding conductor if available.

(5) The conductors follow the contour of the perimeter surface.

(6) Only listed splicing devices or exothermic welding are used.

(7) The conductor(s) is 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the pool.

(8) The conductor(s) is under the unpaved portion of the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

(9) Be installed only in perimeter surfaces not intended to have direct access to swimmers in the pool.

(10) Copper grid or unencapsulated steel welded wire reinforcement used for equipotential bonding of unpaved portions of perimeter surfaces shall meet the following:

(11) Be installed in accordance with 680.26(B)(2)(a) .

(12) Be located within unpaved surface(s) between 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

(m) *Nonconductive Perimeter Surfaces.* Equipotential bonding shall not be required for nonconductive portions of perimeter surfaces that are separated from earth or raised on nonconducting supports, and it shall not be required for any perimeter surface that is electrically separated from the pool structure and raised on nonconductive supports above an equipotentially bonded surface.

Informational Note: Nonconductive materials include, but are not limited to, wood, plastic, wood-plastic composites, fiberglass, and fiberglass composites.

(n) *Interconnection of Bonded Portions of Perimeter Surfaces.* All surfaces where equipotential bonding is required shall be interconnected using listed splicing devices or exothermic welding. Where copper wire is used for this purpose, it shall be solid copper, not smaller than 8 AWG. The conductor shall be permitted to encircle the pool to facilitate bonding connections to portions of the perimeter covered in 680.26(B)(2)(a) and (B)(2)(b) that are not contiguous.

(3) Metallic Components.

All metallic parts of the pool structure, including reinforcing metal not addressed in 680.26(B)(1)(a), shall be bonded. Where reinforcing steel is encapsulated with a nonconductive compound, the reinforcing steel shall not be required to be bonded.

(4) Underwater Lighting.

All metal forming shells and mounting brackets of no-niche luminaires shall be bonded.

Exception: Listed low-voltage lighting systems with nonmetallic forming shells shall not require bonding.

(5) Metal Fittings.

All metal fittings within or attached to the pool structure shall be bonded.

Exception: The following shall not be required to be bonded:

(1) Isolated parts that are not over 100 mm (4 in.) in any dimension and do not penetrate into the pool structure more than 25 mm (1 in.)

(2) Metallic pool cover anchors intended for insertion in a concrete or masonry deck surface, 25 mm (1 in.) or less in any dimension and 51 mm (2 in.) or less in length

(3) Metallic pool cover anchors intended for insertion in a wood or composite deck surface, 51 mm (2 in.) or less in any flange dimension and 51 mm (2 in.) or less in length

(6) Electrical Equipment.

Metal parts of the following electrical equipment shall be bonded:

(1) Electrically powered pool cover(s)

(2) Pool water circulation, treatment, heating, cooling, or dehumidification equipment

(3) Unless separated from the pool by a permanent barrier that prevents contact by a person, any other electrical equipment within 1.5 m (5 ft) measured horizontally from the inside wall of the pool, or 3.7 m (12 ft) measured vertically above the maximum water level of the pool, or as measured vertically above any observation stands, towers, or platforms, or any diving structures

Exception: Metal parts of listed equipment incorporating an approved system of double insulation shall not be bonded.

(a) *Double-Insulated Water Pump Motors.* Where a double-insulated water pump motor is installed under the provisions of this rule, a solid 8 AWG copper conductor of sufficient length to make a bonding connection to a replacement motor shall be extended from the swimming pool equipotential bonding means to an accessible point in the vicinity of the pool pump motor. Where there is no connection between the swimming pool equipotential bonding means and the equipment grounding system for the premises, this bonding conductor shall be connected to the equipment grounding conductor of the motor circuit.

(b) *Pool Water Heaters.* For pool water heaters rated at more than 50 amperes and having specific instructions regarding bonding and grounding, only those parts designated to be bonded shall be bonded and only those parts designated to be grounded shall be grounded.

(7) Fixed Metal Parts.

All fixed metal parts, including, but not limited to, metal-sheathed cables and raceways, metal piping, metal awnings, metal fences, and metal door and window frames, shall be bonded where located no greater than either of the following:

(1) 1.5 m (5 ft) horizontally from the inside walls of the pool

(2) 3.7 m (12 ft) vertically above the maximum water level of the pool, observation stands, towers, or platforms, or any diving structures

Exception: Those separated from the pool by a permanent barrier that prevents contact by a person shall not be required to be bonded.

(C) Pool Water.

Where none of the bonded parts as specified in 680.26(B)(1) through (B)(7) are in direct connection with the pool water, the pool water shall be in direct contact with an approved corrosion-resistant conductive surface that exposes not less than 5800 mm^2 (9 $in.^2$) of surface area to the pool water at all times. The conductive surface shall be located where it is not exposed to physical damage or dislodgement during usual pool activities, and it shall be bonded in accordance with 680.26(B).

Supplemental Information

File Name	Description	Approved
70_CMP17_FR9239_680.26.docx	Proposed Revisions to 680.26	
70_CMP17_FR9239_680.26.docx	For prod use	

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Fri Jan 26 11:23:07 EST 2024

Committee Statement

Committee Statement: Revisions to this section include:

Informational Note 1 to 680.26(A) was revised to comply with 2.1.10 of the NEC Style Manual.

Informational Note 2 to 680.26(A) was deleted as it did not add clarity to the requirements. Corrosive environments are already addressed in 680.14, and performance requirements are already addressed in 680.26(A). Therefore, this language is not needed.

Section 680.26(B) was editorially revised into a list format for ease of reading, in accordance with 3.5.2 of the NEC Style Manual. New text was added to clarify that structural reinforcing steel and steel structural welded wire reinforcement are permitted options for bonding. These options were inferred but not explicitly stated.

Section 680.26(B) was revised by changing “panelboard” to “panelboard enclosure” for accuracy.

Multiple editorial changes were made to 680.26(B)(2) for clarification and readability; and redundant language, including 680.26(B)(2)(d), was eliminated. The word “conductor” was added to the phrase “copper grid” in multiple locations for consistency, as was adding the word “structural” to the phrase “reinforcing steel.”

An allowance for a copper conductor grid was added in 680.26(B)(2)(a)(2) because a copper conductor grid should be a permitted method of achieving the bonding contemplated in this section.

Response Message: FR-9239-NFPA 70-2024

Public Input No. 1737-NFPA 70-2023 [Section No. 680.26(B) [Excluding any Sub-Sections]]

Public Input No. 3253-NFPA 70-2023 [Section No. 680.26(A)]

Public Input No. 212-NFPA 70-2023 [Section No. 680.26(A)]

Public Input No. 1916-NFPA 70-2023 [Section No. 680.26(B)(2)]

Public Input No. 2083-NFPA 70-2023 [Section No. 680.26(B) [Excluding any Sub-Sections]]

Public Input No. 1624-NFPA 70-2023 [Global Input]

Public Input No. 213-NFPA 70-2023 [Section No. 680.26(B)(2)]

680.26 Equipotential Bonding.
(A) Performance.

The equipotential bonding required by 680.26(B) and (C) to reduce voltage gradients in the pool area shall be installed for pools with or without associated electrical equipment related to the pool.

Informational Note ~~No. 1~~: See ANSI C2, *National Electrical Safety Code,* Rule 097D2, for measures that address voltage gradients originating on the utility side of the service point. Some causes of voltage gradients originate outside the premises wiring system and are not within the scope of the *NEC*. ~~Measures identified in Rule 097D2 of ANSI C2, *National Electrical Safety Code*, can also serve to address voltage gradients originating on the utility side of the service point.~~

~~Informational Note No. 2: By its nature, equipotential bonding of swimming pools and perimeter surfaces involves contact between various metallic materials and the earth. This can, in some cases, expose various specific metals to a corrosive environment, depending on factors such as the type and chemical content of the soil and the specific metal. Corrosive environments are also addressed in 680.14.~~

(B) Bonded Parts.

The parts specified in 680.26(B)(1) through 680.26(B)(7) shall be bonded together using one or more of the following:

(1) solid copper conductors, insulated, covered, or bare, not smaller than 8 AWG which shall not be required to be extended or attached to remote panelboard enclosures, service equipment, or electrodes. The conductor is permitted to encircle the pool to facilitate bonding connections to portions of the perimeter covered in 680.26(B)(2)(a) and 680.26(B)(2)(b) that are not contiguous.
(2) ~~or with R~~rigid metal conduit of brass or other identified corrosion-resistant metal~~.~~
(3) Structural reinforcing steel
(4) Steel structural welded wire reinforcement (welded wire mesh, welded wire fabric

Connections to bonded parts shall be made in accordance with 250.8 and 680.7(C). ~~An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to remote panelboards, service equipment, or electrodes.~~

(1) Conductive Pool Shells.

Bonding to conductive pool shells shall be provided as specified in 680.26(B)(1)(a) or (B)(1)(b). Cast-in-place concrete, pneumatically applied or sprayed concrete, and concrete block with painted or plastered coatings shall all be considered conductive materials due to water permeability and porosity. Reconstructed pool shells shall also meet the requirements of this section. Vinyl liners and fiberglass composite shells shall be considered to be nonconductive materials and not subject to these requirements.

(a) *Structural Reinforcing Steel.* Unencapsulated structural reinforcing steel shall be bonded together by steel tie wires or the equivalent. Where structural reinforcing steel is encapsulated in a nonconductive compound, a copper conductor grid shall be installed in accordance with 680.26(B)(1)(b).

(b) *Copper Conductor Grid.* A copper conductor grid shall be provided and shall comply with the following:

(1) Be constructed of minimum 8 AWG bare solid copper conductors bonded to each other at all points of crossing in accordance with 250.8 or other approved means

(2) Conform to the contour of the pool

(3) Be arranged in a 300 mm (12 in.) by 300 mm (12 in.) network of conductors in a uniformly spaced perpendicular grid pattern with a tolerance of 100 mm (4 in.)

(4) Be secured within or under the pool no more than 150 mm (6 in.) from the outer contour of the pool shell

(2) Perimeter Surfaces.

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: List Paragraph, Indent: Left: 0.51", Right: 0.52", Space Before: 18.75 pt, After: 18.75 pt, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Right: 0.78", Space Before: 18.75 pt, After: 18.75 pt

Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a), 680.26(B)(2)(b), and 680.26(B)(2)(c). The perimeter surface shall include unpaved surfaces, concrete, masonry pavers and other types of paving. The perimeter surface to be bonded shall be considered to extend for 900 mm (3 ft) horizontally beyond the inside walls of the pool while also at a height between 900 mm (3 ft) above and 600 mm (2 ft) below the maximum water level. ~~The perimeter surface shall include unpaved surfaces, concrete, and other types of paving.~~ Perimeter surfaces separated from the pool by a permanent wall or building 1.5 m (5 ft) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. ~~Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a), (B)(2)(b), (B)(2)(c), and (B)(2)(d).~~

For conductive pool shells where bonding to perimeter surfaces is required, it shall be attached to the pool structural reinforcing steel or copper conductor grid at a minimum of four points uniformly spaced around the perimeter of the pool. ~~, or i~~If the bonded perimeter surface does not surround the entire pool, it shall be attached to the pool reinforcing structural steel or copper conductor grid at a minimum of four uniformly spaced points along the bonded perimeter surface.

For nonconductive pool shells, where bonding to the perimeter surfaces is required, bonding at four points shall not be required. ~~, and t~~ The perimeter bonding shall be attached to the 8 AWG copper equipotential bonding conductor and, if present, to any conductive support structure for the pool.

Informational Note: Because the perimeter surface can incorporate various types of materials at various locations and elevations above and below maximum water level, the perimeter surface required to be bonded might not surround the entire pool. The 8 AWG copper equipotential bonding conductor can encircle the entire pool to facilitate connection of bonded parts.

(a) *Conductive Paved Portions of Perimeter Surfaces.*

Conductive paved portions of perimeter surfaces~~, including masonry pavers, if used,~~ shall be bonded with one or more of the following:

(1) ~~u~~Unencapsulated structural reinforcing steel in accordance with 680.26(B)(1)(a)~~, or with~~
(2) A copper conductor grid
(3) ~~u~~Unencapsulated steel structural welded wire reinforcement ~~(welded wire mesh, welded wire fabric),~~ bonded together by steel tie wires or the equivalent~~, . Steel welded wire reinforcement shall be~~ and fully embedded within the pavement unless the pavement will not allow for embedding.

If ~~the~~ structural reinforcing steel is absent, or is encapsulated in a nonconductive compound, or embedding is not possible, unencapsulated welded wire steel reinforcement or a copper conductor grid shall be provided and shall be secured directly under the paving, and not more than 150 mm (6 in.) below finished grade.

Where ~~Unencapsulated steel welded wire reinforcement that is~~ not fully embedded in concrete, ~~and~~ copper conductor grid and unencapsulated steel structural welded wire ~~regardless of location, where~~ used for equipotential bonding, shall be listed for corrosion resistance and mechanical performance. This listing requirement shall become effective January 1, 2025. The copper conductor grid or unencapsulated steel structural welded wire reinforcement shall also meet the following:

(1) Copper conductor grid is constructed of 8 AWG solid bare copper and arranged in accordance with 680.26(B)(1)(b)(3).

(2) Structural steel welded wire reinforcement is minimum ASTM 6 × 6-W2.0 × W2.0 or minimum No. 3 rebar constructed in a 300 mm (12 in.) grid.

(3) Copper conductor grid and steel structural welded wire reinforcement shall follow the contour of the perimeter surface extending not less than 900 mm (3 ft) horizontally beyond the inside walls of the pool.

(4) Only listed splicing devices or exothermic welding are used.

Formatted: Indent: Left: 1.79", First line: 0", Right: 0.78", Space Before: 18.75 pt, After: 18.75 pt

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Indent: Left: 1.64", Hanging: 0.14"

Informational Note No. 1: Performance of the equipotential bonding system at the perimeter surface is improved as the distance between the bonding means and finished grade is minimized, either by embedding within, or by direct contact with the underside of, the finished pavement.

Informational Note No. 2: See ASTM A615/A615M, *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement;* A1064/A1064M, *Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete;* A1022/A1022M, *Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement;* A1060A/A1060M, *Standard Specification for Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete;* and ACI Standard ACI 318, *Building Code Requirements for Structural Concrete,* for examples of standards currently used in the listing of reinforcing steel bars and steel welded wire reinforcement.

(b) *Unpaved Portions of Perimeter Surfaces.* Unpaved portions of perimeter surfaces shall be bonded with any of the following methods:

(1) Copper conductor(s) shall meet the following:

a. At least one minimum 8 AWG bare solid copper conductor, including the 8 AWG copper equipotential bonding conductor if available.

b. The conductors follow the contour of the perimeter surface.

c. Only listed splicing devices or exothermic welding are used.

d. The conductor(s) is 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the pool.

e. The conductor(s) is under the unpaved portion of the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

f. Be installed only in perimeter surfaces not intended to have direct access to swimmers in the pool.

(2) Copper ~~conductor~~ grid or unencapsulated steel structural welded wire reinforcement used for equipotential bonding of unpaved portions of perimeter surfaces shall meet the following:

a. Be installed in accordance with 680.26(B)(2)(a).

b. Be located within unpaved surface(s) between 100 mm to 150 mm (4 in. to 6 in.) below finished grade.

(c) *Nonconductive Perimeter Surfaces.* Equipotential bonding shall not be required for nonconductive portions of perimeter surfaces that are separated from earth or raised on nonconducting supports.~~, and~~ Equipotential bonding ~~it~~ shall not be required for any perimeter surface that is electrically separated from the pool structure and raised on nonconductive supports above an equipotentially bonded surface.
Informational Note: Nonconductive materials include, but are not limited to, wood, plastic, wood-plastic composites, fiberglass, and fiberglass composites.

(d) *Interconnection of Bonded Portions of Perimeter Surfaces.* All surfaces where equipotential bonding is required shall be interconnected using listed splicing devices or exothermic welding. Where copper wire is used for this purpose, it shall be solid copper, not smaller

than 8 AWG. The conductor shall be permitted to encircle the pool to facilitate bonding connections to portions of the perimeter covered in 680.26(B)(2)(a) and (B)(2)(b) that are not contiguous.

(3) Metallic Components.

All metallic parts of the pool structure, including reinforcing metal not addressed in 680.26(B)(1)(a), shall be bonded. Where reinforcing steel is encapsulated with a nonconductive compound, the reinforcing steel shall not be required to be bonded.

(4) Underwater Lighting.

All metal forming shells and mounting brackets of no-niche luminaires shall be bonded.

Exception: Listed low-voltage lighting systems with nonmetallic forming shells shall not require bonding.

(5) Metal Fittings.

All metal fittings within or attached to the pool structure shall be bonded.

Exception: The following shall not be required to be bonded:

(1) Isolated parts that are not over 100 mm (4 in.) in any dimension and do not penetrate into the pool structure more than 25 mm (1 in.)

(2) Metallic pool cover anchors intended for insertion in a concrete or masonry deck surface, 25 mm (1 in.) or less in any dimension and 51 mm (2 in.) or less in length

(3) Metallic pool cover anchors intended for insertion in a wood or composite deck surface, 51 mm (2 in.) or less in any flange dimension and 51 mm (2 in.) or less in length

(6) Electrical Equipment.

Metal parts of the following electrical equipment shall be bonded:

(1) Electrically powered pool cover(s)

(2) Pool water circulation, treatment, heating, cooling, or dehumidification equipment

(3) Unless separated from the pool by a permanent barrier that prevents contact by a person, any other electrical equipment within 1.5 m (5 ft) measured horizontally from the inside wall of the pool, or 3.7 m (12 ft) measured vertically above the maximum water level of the pool, or as measured vertically above any observation stands, towers, or platforms, or any diving structures

Exception: Metal parts of listed equipment incorporating an approved system of double insulation shall not be bonded.

(a) *Double-Insulated Water Pump Motors.* Where a double-insulated water pump motor is installed under the provisions of this rule, a solid 8 AWG copper conductor of sufficient length to make a bonding connection to a replacement motor shall be extended from the swimming pool equipotential bonding means to an accessible point in the vicinity of the pool pump motor. Where there is no connection between the swimming pool equipotential bonding means and the equipment grounding system for the premises, this bonding conductor shall be connected to the equipment grounding conductor of the motor circuit.

(b) *Pool Water Heaters.* For pool water heaters rated at more than 50 amperes and having specific instructions regarding bonding and grounding, only those parts designated to be bonded shall be bonded and only those parts designated to be grounded shall be grounded.

(7) Fixed Metal Parts.

All fixed metal parts, including, but not limited to, metal-sheathed cables and raceways, metal piping, metal awnings, metal fences, and metal door and window frames, shall be bonded where located no greater than either of the following:

(1) 1.5 m (5 ft) horizontally from the inside walls of the pool

(2) 3.7 m (12 ft) vertically above the maximum water level of the pool, observation stands, towers, or platforms, or any diving structures

Exception: Those separated from the pool by a permanent barrier that prevents contact by a person shall not be required to be bonded.

(C) Pool Water.

Where none of the bonded parts as specified in 680.26(B)(1) through (B)(7) are in direct connection with the pool water, the pool water shall be in direct contact with an approved corrosion-resistant conductive surface that exposes not less than 5800 mm^2 (9 $in.^2$) of surface area to the pool water at all times. The conductive surface shall be located where it is not exposed to physical damage or dislodgement during usual pool activities, and it shall be bonded in accordance with 680.26(B).

First Revision No. 9129-NFPA 70-2024 [New Section after 680.28]

[New 680.29 Added]

680.29 Portable Signs.

A portable electric sign shall not be placed within a pool or within 1.5 m (5 ft) measured horizontally from the inside walls of a pool.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 13:24:55 EST 2024

Committee Statement

Committee Statement: Currently, 680.57(C)(2) in Part V Fountains contains a pool specific requirement, regarding Portable Signs. This is being added as new 680.29 in Part II of Article 680.

Response Message: FR-9129-NFPA 70-2024

Public Input No. 2468-NFPA 70-2023 [New Section after 680.28]

First Revision No. 9143-NFPA 70-2024 [Section No. 680.32]

680.32 Ground-Fault Circuit-Interrupter (GFCI) and Special Purpose Ground-Fault Circuit-Interrupter (SPGFCI) Protection.

All electrical equipment, including power-supply cords, used with storable pools shall have GFCI protection complying with 680.5(B) or SPGFCI protection complying with 680.5(C), as applicable.

All receptacles ~~rated 125 volts through 250 volts, 60 amperes or less,~~ located within 6.0 m (20 ft) of the inside walls of a storable pool, storable spa, or storable hot tub shall have GFCI protection complying with 680.5(B) or SPGFCI protection complying with 680.5(C), as applicable ~~.~~ if any of the following conditions exist:

(1) If supplied by branch circuits rated 150 volts or less to ground and 60 amperes or less single-phase

(2) If supplied by branch circuits rated 150 volts or less to ground and 100 amperes or less three-phase

(3) If supplied by branch circuits exceeding 150 volts to ground but not exceeding 480 volts phase-to-phase and 100 amperes or less

In determining these dimensions, the distance to be measured shall be the shortest path the supply cord of an appliance connected to the receptacle would follow without piercing a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 14:12:08 EST 2024

Committee Statement

Committee Statement: Section 680.32 currently stipulates a 60-ampere threshold for equipment requiring ground-fault circuit interrupter (GFCI) protection. Commercially available three-phase GFCI devices now offer ratings up to 100 amperes. This revision reflects the availability of higher-rated GFCI devices and harmonizes the code with existing provisions, such as 210.8(B). Additionally, 680.32 was separated into a list for improved usability.

Response Message: FR-9143-NFPA 70-2024

Public Input No. 2441-NFPA 70-2023 [Section No. 680.32]

Public Input No. 2518-NFPA 70-2023 [Section No. 680.32]

Public Input No. 4518-NFPA 70-2023 [Section No. 680.32]

Public Input No. 2440-NFPA 70-2023 [Section No. 680.32]

First Revision No. 9158-NFPA 70-2024 [Section No. 680.40]

680.40 General.

Electrical installations at spas and hot tubs shall comply with ~~the provisions of~~ Part I and Part IV of this article.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Thu Jan 25 15:03:58 EST 2024

Committee Statement

Committee Statement: The text is revised to comply with the NEC style manual Section 4.1.3.
Response Message: FR-9158-NFPA 70-2024

Public Input No. 1286-NFPA 70-2023 [Section No. 680.40]

First Revision No. 9160-NFPA 70-2024 [Section No. 680.43(A)(2)]

(2) Ground-Fault Circuit-Interrupter (GFCI) and Special Purpose Ground-Fault Circuit-Interrupter (SPGFCI) Protection for Receptacles, General.

All receptacles ~~rated 125 volts through 250 volts, 60 amperes or less,~~ located within 3.0 m (10 ft) of the inside walls of a spa or hot tub shall have GFCI protection complying with 680.5(B) or SPGFCI protection complying with 680.5(C), as applicable, if any of the following conditions exist:

(1) If supplied by branch circuits rated 150 volts or less to ground and 60 amperes or less single-phase .

(2) If supplied by branch circuits rated 150 volts or less to ground and 100 amperes or less three-phase.

(3) If supplied by branch circuits exceeding 150 volts to ground but not exceeding 480 volts phase-to-phase and 100 amperes or less.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 15:07:09 EST 2024

Committee Statement

Committee Statement: Section 680.43(A)(2) currently stipulates a 60-ampere threshold for equipment requiring ground-fault circuit interrupter (GFCI) protection. Commercially available three-phase GFCI devices now offer ratings up to 100 amperes. This revision reflects the availability of higher-rated GFCI devices and harmonizes the code with existing provisions, such as 210.8(B). Additionally, 680.43(A)(2) was separated into a list for improved usability.

Response Message: FR-9160-NFPA 70-2024

Public Input No. 4520-NFPA 70-2023 [Section No. 680.43(A)(2)]

Public Input No. 2442-NFPA 70-2023 [Section No. 680.43(A)(2)]

First Revision No. 9164-NFPA 70-2024 [Section No. 680.43(A)(3)]

(3) ~~Protection,~~ Spa or Hot Tub Supply Receptacle.

Receptacles that provide power for a spa or hot tub shall not exceed 150 volts to ground and shall be GFCI protected.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 15:19:44 EST 2024

Committee Statement

Committee Statement: The word “Protection” was removed from title of 680.43(A)(3) to better align the title with the requirements in the text.

Response Message: FR-9164-NFPA 70-2024

Public Input No. 4476-NFPA 70-2023 [Section No. 680.43(A)(3)]

First Revision No. 9165-NFPA 70-2024 [Section No. 680.43(F)]

(F)– - Equipment Grounding.

The following equipment shall be connected to the equipment grounding conductor:

(1) All electrical equipment located within 1.5 m (5 ft) of the inside wall of the spa or hot tub

(2) All electrical equipment associated with the circulating system of the spa or hot tub

Exception to (1) and (2): Electrical equipment listed for operation at the low-voltage contact limit or less and supplied by a transformer or power supply that complies with 680.23(A)(2) shall not be required to be connected to the equipment grounding conductor.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 15:21:27 EST 2024

Committee Statement

Committee Statement: The Title of 680.43(F) was revised to add “Equipment” to be more descriptive and remain concise.

Response Message: FR-9165-NFPA 70-2024

Public Input No. 2270-NFPA 70-2023 [Section No. 680.43(F)]

First Revision No. 9166-NFPA 70-2024 [Section No. 680.45(A)]

(A) Cord-and-Plug Connections.

~~To facilitate the removal or disconnection of the unit(s) for maintenance, storage, and repair, self~~ Self -contained portable packaged immersion pools with integral pumps and/or heaters, including circulation heaters, rated 120 volts and 20 amperes or less shall be permitted to be cord-and-plug-connected with a cord not shorter than 1.83 m (6 ft) and not longer than 4.6 m (15 ft) and shall be GFCI protected. The cord shall ground all non-current-carrying metal parts of the electrical equipment. If the GFCI is provided as an integral part of the cord assembly, it shall be located at the attachment plug or in the power-supply cord within 300 mm (12 in.) of the attachment plug.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 15:23:03 EST 2024

Committee Statement

Committee Statement: The text language regarding “To facilitate the removal of disconnection of the unit(s) for maintenance, storage, and repair” was removed. Deleting this text improves usability and does not change the requirement.

Response Message: FR-9166-NFPA 70-2024

Public Input No. 1328-NFPA 70-2023 [Section No. 680.45(A)]

First Revision No. 9247-NFPA 70-2024 [Section No. 680.45(C)]

[See attached Word Document for revisions to 680.45 (C)]

(C) Heaters.

Heaters used with permanently installed immersion pools shall comply with either 680.45(C)(1) or (C)(2).

(1) Permanently Installed Heaters.

A permanently installed heater, including immersion heaters, circulation heaters, and combination pump-heater units, built-in or permanently attached as an integral part of a permanently installed immersion pool, rated 120 volts or 250 volts, shall be identified for swimming pool and spa use; shall be grounded and bonded; and heaters supplied by branch circuits rated 150 volts or less to ground shall be provided with GFCI protection. Permanently installed immersion heaters, rated 120 volts and 20 amperes or less or 250 volts and 30 amperes or less, single phase, are permitted to be cord-and-plug-connected with a cord not shorter than 1.83 m (6 ft) and not longer than 4.6 m (15 ft), shall be GFCI protected, and shall be provided with means for grounding all non-current-carrying metal parts of the appliance. If the GFCI is provided as an integral part of the cord assembly, it shall be located at the attachment plug or in the power-supply cord within 300 mm (12 in.) of the attachment plug.

(2) Storable and Portable Heaters.

A cord-connected storable or portable heater, including immersion heaters, circulation heaters, and combination pump-heater units, used with, but not permanently installed or attached as an integral part of a permanently installed immersion pool, rated 120 volts and 20 amperes or less or 250 volts and 30 amperes or less, single phase, shall be identified for swimming pool and spa use; shall be cord-and-plug-connected with a cord not shorter than 1.83 m (6 ft) and not longer than 4.6 m (15 ft), heaters supplied by branch circuits rated 150 volts or less to ground shall be provided with Class A ground-fault circuit-interrupter protection, and shall be provided with means for grounding all non-current-carrying metal parts of the appliance. If the ground-fault circuit interrupter is provided as an integral part of the cord assembly, it shall be located at the attachment plug or in the power-supply cord within 300 mm (12 in.) of the attachment plug.

Supplemental Information

File Name	Description	Approved
70_CMP17_FR9247_680.45_C_.docx	Revisions to Section 680.45(C)	
70_CMP17_FR9247_680.45_C.docx	For prod use	

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Fri Jan 26 11:39:03 EST 2024

Committee Statement

Committee Statement: This section is restructured for clarity, usability and compliance with the NEC Style Manual, section 2.1.8.1.

Response Message: FR-9247-NFPA 70-2024

Public Input No. 1659-NFPA 70-2023 [Section No. 680.45(C)]

680.45(C)

(C) Heaters.

Heaters used with permanently installed immersion pools shall comply with either 680.45(C)(1) or 680.45(C)(2).

(1) Permanently Installed Heaters-Hard Wired.

A permanently installed heater rated 120 volts through 250 volts nominal~~,~~ ~~including immersion heaters, circulation heaters, and combination pump-heater units,~~ that is built-in or permanently attached as an integral part of a permanently installed immersion pool, ~~rated 120 volts or 250 volts,~~ shall ~~be~~ comply with all of the following:

(a) Bbe identified for swimming pool and spa use~~;~~
(b) ~~shall~~ Bbe grounded and bonded~~; and heaters supplied by branch circuits rated 150 volts or less to ground shall be provided with GFCI protection~~.
(c) HHave GFCI protection complying with 680.5(B) or SPGFCI protection complying with 680.5(C), as applicable.

(2) Permanently Installed Heaters-Cord and Plug Connected.
A Ppermanently installed immersion heater~~s,~~ rated nominal 120 volts ~~and~~, 20 amperes or less, or nominal 250 volts ~~and~~, 30 amperes or less, single phase, shall beare permitted to be cord-and-plug-connected and shall comply with all of the following:

(a) ~~with a~~ TThe cord shall not be shorter than 1.83 m (6 ft) and not longer than 4.6 m (15 ft)
(b) ~~,~~ IIf ~~shall be the~~ GFCI ~~,~~ is provided as an integral part of the cord assembly, it shall be located at the attachment plug or in the power-supply cord within 300 mm (12 in) of the attachment plug.
(c) Hhave GFCI protection complying with 680.5(B) or SPGFCI protection complying with 680.5(C), as applicable.
(d) Be provided with means for grounding all non-current-carrying metal parts of the immersion heater.~~protected, and shall be provided with means for grounding all non-current-carrying metal parts of the appliance. If the GFCI is provided as an integral part of the cord assembly, it shall be located at the attachment plug or in the power-supply cord within 300 mm (12 in.) of the attachment plug.~~

(~~2~~3) Storable and Portable Heaters.

A cord-connected storable or portable heater rated 120 volts nominal and 20 amperes or less, or 250 volts nominal and 30 amperes or less, single phase used with, but not permanently installed or attached as an integral part of a permanently installed ~~including~~ immersion poolheaters, ~~circulation heaters, and combination pump-heater units, used with, but not permanently installed or attached as an integral part of a permanently installed immersion pool, rated 120 volts and 20 amperes or less or 250 volts and 30 amperes or less, single phase,~~ shall comply with all of the following:

(a) ~~shall~~ Bbe identified for swimming pool and spa use~~;~~
(b) ~~shall~~ Bbe cord-and-plug-connected with a cord not shorter than 1.83 m (6 ft) and not longer than 4.6 m (15 ft)~~,~~
(c) Hhave GFCI protection complying with 680.5(B) or SPGFCI protection complying with 680.5(C) as applicable
(d) ~~heaters supplied by branch circuits rated 150 volts or less to ground shall be provided with Class A ground-fault circuit-interrupter protection, and shall be provided with means for grounding all non-current-carrying metal parts of the appliance.~~ If ~~the~~ ~~ground-fault circuit interrupter~~GFCI is provided as an integral part of the cord assembly, it shall be located at the attachment plug or in the power-supply cord within 300 mm (12 in.) of the attachment plug.

Formatted: List Paragraph, Indent: Left: 0.51", Right: 0.52", Space Before: 18.75 pt, After: 18.75 pt, Numbered + Level: 1 + Numbering Style: a, b, c, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

Formatted: Font: Bold

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: List Paragraph, Indent: Left: 0.51", Right: 1.04", Numbered + Level: 1 + Numbering Style: a, b, c, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

Formatted: List Paragraph, Indent: Left: 0.51", Right: 0.52", Space Before: 18.75 pt, Numbered + Level: 1 + Numbering Style: a, b, c, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

Formatted: Font: (Default) Verdana, 8 pt, Font color: Custom Color(RGB(30,41,96))

First Revision No. 9170-NFPA 70-2024 [Section No. 680.50(A)]

(A) Additional Requirements.

(1) Fountains that have water common to a pool shall also comply with ~~Part II of~~ Article 680, Part II .

(2) Fountains intended for recreational use by pedestrians, including splash pads, shall also comply with ~~the requirements in~~ 680.26.

(3) Part V does not apply to self-contained, portable fountains, which shall comply with Article 422 , Parts II and III ~~of Article 422~~ .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 15:40:34 EST 2024

Committee Statement

Committee Statement: Editorial revisions are made to comply with the NEC style manual 4.1.1.

Response Message: FR-9170-NFPA 70-2024

Public Input No. 2927-NFPA 70-2023 [Section No. 680.50(A)]

First Revision No. 9172-NFPA 70-2024 [Section No. 680.54(A)]

(A) – Equipment Grounding.

The following equipment shall be connected to an equipment grounding conductor:

(1) All electrical equipment located within the fountain or within 1.5 m (5 ft) of the inside wall of the fountain, other than listed low-voltage luminaires not requiring grounding

(2) All electrical equipment associated with the recirculating system of the fountain

(3) ~~Panelboards~~ Enclosures of panelboards that are not part of the service equipment and that supply any electrical equipment associated with the fountain

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 15:44:01 EST 2024

Committee Statement

Committee Statement: The Title of 680.54(A) was revised to add “Equipment” to be more descriptive and remain concise. Adding the words ‘enclosures of panelboards’ in 680.54(A)(3) makes the text technically correct.

Response Message: FR-9172-NFPA 70-2024

Public Input No. 2272-NFPA 70-2023 [Section No. 680.54(A)]

Public Input No. 2084-NFPA 70-2023 [Section No. 680.54(A)]

First Revision No. 9175-NFPA 70-2024 [Section No. 680.55]

680.~~55~~ ~~Methods of~~ 55 Equipment Grounding.

(A) Applied Provisions.

~~The provisions of~~ Equipment grounding shall comply with 680.7(A), 680.21(A), 680.23(B)(3), 680.23(F)(1) and (F)(2), and 680.24(F) ~~shall apply~~ .

(B) Supplied by a Flexible Cord.

Electrical equipment that is supplied by a flexible cord shall have all exposed non–current-carrying metal parts grounded by an insulated copper equipment grounding conductor that is an integral part of this cord. The equipment grounding conductor shall be connected to an equipment grounding terminal in the supply junction box, transformer enclosure, power supply enclosure, or other enclosure.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 15:51:19 EST 2024

Committee Statement

Committee Statement: The Title of 680.55 was revised to remove “Methods of” and add “Equipment” to be more descriptive and remain concise. Item (A) was editorially revised to improve usability.

Response Message: FR-9175-NFPA 70-2024

Public Input No. 2273-NFPA 70-2023 [Section No. 680.55]

First Revision No. 9178-NFPA 70-2024 [Section No. 680.56]

680.~~56~~ 56 Flexible Cord~~-and-Plug-~~ Connected Equipment.

(A) GFCI Protection.

All ~~electrical equipment, including power-supply cords,~~ cord-connected equipment shall be GFCI protected.

(B) Cord Type.

Flexible cord immersed in or exposed to water shall be of a type for extra-hard usage, as designated in Table 400.4, and shall be a listed type with a “W” suffix.

(C) Sealing.

The end of the flexible cord jacket and the flexible cord conductor termination within equipment shall be covered with, or encapsulated in, a suitable potting compound to prevent the entry of water into the equipment through the cord or its conductors. In addition, the ground connection within equipment shall be similarly treated to protect such connections from the deteriorating effect of water that may enter into the equipment.

(D) Terminations.

Connections with flexible cord shall be ~~permanent, except that grounding-type attachment plugs and receptacles shall be permitted~~ permitted. Cord and plug connections shall only be permitted if necessary to facilitate removal or disconnection for ~~maintenance~~ servicing , ~~repair,~~ or storage of fixed or stationary equipment not located in any water-containing part of a fountain.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 15:56:52 EST 2024

Committee Statement

Committee Statement: Editorial revisions were made in the title and requirements to clarify that this section applies to any flexible cord-connected equipment, not just those that are cord-and-plug-connected. The terms "maintenance" and "repair" were changed to "servicing" to better incorporate defined terms.

Response Message: FR-9178-NFPA 70-2024

Public Input No. 1327-NFPA 70-2023 [Section No. 680.56(D)]

First Revision No. 9134-NFPA 70-2024 [Section No. 680.57(C)(2)]

(2) Portable.

A portable electric sign shall not be placed within a ~~pool or~~ fountain or within 1.5 m (5 ft) measured horizontally from the inside walls of the fountain.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 13:32:44 EST 2024

Committee Statement

Committee Statement: The requirement was revised to remove “pool or” as this is now reflected in new Section 680.29. The requirement now applies only to fountains.

Response Message: FR-9134-NFPA 70-2024

Public Input No. 2467-NFPA 70-2023 [Section No. 680.57(C)(2)]

First Revision No. 9181-NFPA 70-2024 [Section No. 680.58]

680.58 Ground-Fault Circuit-Interrupter (GFCI) and Special Purpose Ground-Fault Circuit-Interrupter (SPGFCI) Protection for Adjacent Receptacle Outlets.

All receptacles ~~rated 125 volts through 250 volts, 60 amperes or less,~~ located within 6.0 m (20 ft) of a fountain edge shall have GFCI protection complying with 680.5(B) or SPGFCI protection complying with 680.5(C), as applicable, if any of the following conditions exist:

(1) If supplied by branch circuits rated 150 volts or less to ground, and 60 amperes or less single-phase .

(2) If supplied by branch circuits rated 150 volts or less to ground and 100 amperes or less three-phase.

(3) If supplied by branch circuits exceeding 150 volts to ground but not exceeding 480 volts phase-to-phase and 100 amperes or less.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 16:02:45 EST 2024

Committee Statement

Committee Statement: This revision reflects the availability of higher-rated GFCI and SPGFCI devices up to 480V that can be applied to all receptacles within 6.0 m of fountain edge, and harmonizes the code with existing provisions, such as 210.8(B). Section 680.58 currently stipulates a 60-ampere threshold for equipment requiring ground-fault circuit interrupter (GFCI) protection. Commercially available three-phase GFCI devices now offer ratings up to 100 amperes. Additionally, 680.58 was separated into a list for improved usability.

Response Message: FR-9181-NFPA 70-2024

Public Input No. 2443-NFPA 70-2023 [Section No. 680.58]

Public Input No. 4527-NFPA 70-2023 [Section No. 680.58]

First Revision No. 9182-NFPA 70-2024 [Section No. 680.60]

680.60 General.

The provisions of Part I and Part VI of this article shall apply to pools and tubs for therapeutic use in health care facilities, gymnasiums, athletic training rooms, and similar areas. Portable therapeutic appliances shall comply with Article 422 , Parts II and III ~~of Article 422~~ .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 16:06:32 EST 2024

Committee Statement

Committee Statement: The text was revised to comply with the NEC Style Manual 4.1.4.

Response Message: FR-9182-NFPA 70-2024

Public Input No. 2928-NFPA 70-2023 [Section No. 680.60]

First Revision No. 9183-NFPA 70-2024 [Section No. 680.62(A)(1)]

(1) Listed Units.

If so marked, a listed, labeled, and identified self-contained unit or a listed, labeled, and identified packaged equipment assembly that includes integral ~~ground-fault circuit-interrupter~~ GFCI protection for all electrical parts within the unit or assembly (pumps, air blowers, heaters, lights, controls, sanitizer generators, wiring, and so forth) shall be permitted without additional GFCI protection.

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 16:08:12 EST 2024

Committee Statement

Committee Statement: Section 2.1.2.9 of the NEC Style Manual permits the use of acronyms. The acronym GFCI is defined in Article 100.

Response Message: FR-9183-NFPA 70-2024

Public Input No. 1656-NFPA 70-2023 [Section No. 680.62(A)(1)]

First Revision No. 9184-NFPA 70-2024 [Section No. 680.62(A)(2)]

(2) Other Units.

A therapeutic tub or hydrotherapeutic tank rated 3 phase or rated over 250 volts or with a heater load of more than 50 amperes shall not require the supply to be protected by a ~~ground-fault circuit interrupter~~ GFCI .

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 16:09:55 EST 2024

Committee Statement

Committee Statement: Section 2.1.2.9 of the NEC Style Manual permits the use of acronyms. The acronym GFCI is defined in Article 100.

Response Message: FR-9184-NFPA 70-2024

Public Input No. 1657-NFPA 70-2023 [Section No. 680.62(A)(2)]

First Revision No. 9186-NFPA 70-2024 [Section No. 680.62(D)]

(D)– - Equipment Grounding.

The following fixed or stationary equipment shall be connected to the equipment grounding conductor:

(1) All electrical equipment located within 1.5 m (5 ft) of the inside wall of the tub

(2) All electrical equipment associated with the circulating system of the tub

Submitter Information Verification

Committee: NEC-P17

Submittal Date: Thu Jan 25 16:12:29 EST 2024

Committee Statement

Committee Statement: The Title of 680.62(D) was revised to add “Equipment” to be more descriptive and remain concise.

Response Message: FR-9186-NFPA 70-2024

Public Input No. 2274-NFPA 70-2023 [Section No. 680.62(D)]

First Revision No. 9192-NFPA 70-2024 [Section No. 680.74(B)]

(B) Bonding Conductor.

All metal parts required to be bonded by this section shall be bonded together using a solid copper bonding jumper, insulated, covered, or bare, not smaller than 8 AWG. The bonding jumper(s) shall be required for equipotential bonding in the area of the hydromassage bathtub and shall not be required to be extended or attached to any remote panelboard enclosure , service equipment, or any electrode. In all installations a bonding jumper long enough to terminate on a replacement non-double-insulated pump or blower motor shall be provided and shall be terminated to the equipment grounding conductor of the branch circuit of the motor when a double-insulated circulating pump or blower motor is used.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Thu Jan 25 16:24:19 EST 2024

Committee Statement

Committee Statement: Adding the word ‘enclosures’ makes the text technically correct.
Response Message: FR-9192-NFPA 70-2024

Public Input No. 2085-NFPA 70-2023 [Section No. 680.74(B)]

First Revision No. 9194-NFPA 70-2024 [Section No. 680.83]

680.83 Equipotential Bonding.

Lifts shall be bonded in accordance with 680.26(B)(5) and (B)(7) using solid copper conductors, insulated, covered, or bare, not smaller than 8 AWG. Connections to bonded parts shall be made in accordance with 250.8. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool lift area shall not be required to be extended or attached to remote panelboards enclosures , service equipment, or electrodes.

Submitter Information Verification

Committee: NEC-P17
Submittal Date: Thu Jan 25 16:26:34 EST 2024

Committee Statement

Committee Statement: Adding the word ‘enclosures’ makes the text technically correct.
Response Message: FR-9194-NFPA 70-2024

Public Input No. 2086-NFPA 70-2023 [Section No. 680.83]