



Dawn Michele Bellis
Secretary, Standards Council

4 April 2023*

To: Interested Parties

Subject:

Standards Council Decision (Final):	D#23-1
Standards Council Agenda Item:	SC#23-3-8
Date of Decision:	21 March 2023
TIA No. 1687 to NFPA 70®, <i>National Electrical Code</i> ®, 2023 Edition	

Dear Interested Parties:

At its meeting of March 20-21, 2023, the Standards Council considered an appeal on the above referenced matter. The Council's Final decision is now available and is attached herewith.

Sincerely,

A handwritten signature in black ink, reading "Dawn Michele Bellis", is positioned below the word "Sincerely,".

Dawn Michele Bellis
Secretary, NFPA Standards Council

cc: S. Everett, S. Gallagher, C. Duffy, J. Sargent
Members, NEC Code-Making Panel 17 (NEC-P17)
Members, NEC Correlating Committee (NEC-AAC)
Members, NFPA Standards Council (AAD-AAA)
Individuals Providing Appeal Commentary

*NOTE: Participants in NFPA's standards development process should know that limited review of this decision may be sought from the NFPA Board of Directors. For the rules describing the available review and the method for petitioning the Board for review, please consult section 1-7 of the Regulations Governing the Development of NFPA Standards and the NFPA Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council. Notice of the intent to file such a petition must be submitted to the Clerk of the Board of Directors within 15 calendar days of the publication date of this Decision.



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SUMMARY OF ACTION (for convenience only; not part of official decision): The Standards Council voted to uphold the appeals requesting Council to overturn the Code-Making Panel 17 ballot results and issue TIA No. 1687 to NFPA 70®, *National Electrical Code*®, 2023 Edition.

DECISION:

At its meeting of March 20-21, 2023, the Standards Council considered appeals from Frederic Hartwell, Hartwell Electrical Services, Inc., and Reuben Clark, Consolidated Manufacturing International. The appellants request that the Standards Council overturn the Code-Making Panel 17 (Panel 17) ballot results and issue TIA No. 1687 on the 2023 edition of NFPA 70®, *National Electrical Code*®. Specifically, the appellants request that the Standards Council issue TIA No. 1687, which seeks to revise the definition of “pool” and bonding requirements within Section 680.26.

As background, the TIA was balloted through Panel 17 and the NEC Correlating Committee (“CC”) in accordance with the *Regulations Governing the Development of NFPA Standards (Regs)* to determine whether the necessary three-fourths majority support was achieved on technical merit, emergency nature, and correlation for recommendation of issuance. The TIA achieved the necessary support of Panel 17 on technical merit, but failed to achieve the necessary support on emergency nature. This TIA did achieve the necessary support of the CC on correlation.

The technical debate over the minimum standard for reducing voltage gradients around the perimeter of a pool, can be documented back to the 2008 edition of the NEC. As brought forward in August of 2022, the Council recognized that new information had been identified which had not fully been considered by the responsible CMP which could have bearing on the issue at hand. Additionally noted specifically by Council was that the body of additional and/or new information required “timely analysis”.

As a result, the Council directed a balanced task group be established by NFPA staff to review the new and/or additional new data cited by the Appellant: namely, the the 2021 U.S. Coast Guard Report referenced during the hearing, the results of the most recent EPRI report, the case studies brought forward in TIA No. 1661 and any other new and existing reports referenced on this topic (see D#22-3 at www.nfpa.org/sc2022).

The Task Group was established with the charge to report back to Council: (1) its findings based on this data; (2) its recommendations, if any, as to the minimum safety standard within the NEC for reducing voltage gradient in the perimeter of a pool; (3) if a change to Article 680 is recommended, whether TIA No. 1661 would address the Task Group’s findings; and (4) any other findings or actions that the Task Group deems necessary based on its analysis. The proposed TIA at issue herein was developed by the balanced task group¹ and represents the supported text reflective of the task group’s position².

¹ The balanced task group established consisted of 10 total stakeholder participants: five of whom initially supported the single wire option and five of whom supported changes to currently issued requirements.

² Task Group position established through informal vote: one member abstained, one member did not return ballot, the Chair did not vote, and all remaining votes were in support of the text proposed.

As evident from the Panel 17 ballots, the panel’s consensus was that the proposed TIA was technically substantiated. However, the Panel was unpersuaded—despite the Council’s specific finding in August that the new and/or additional information related to reducing voltage gradients around the perimeter of pools required timely analysis—that the submitted TIA met the threshold of “emergency” in accordance with the *Regulations Governing the Development of NFPA Standards*. The Standards Council disagrees. Finding an established record of incidents, testing, and solutions, the Council determined that the TIA exceeds the threshold of emergency nature as provided by the *NFPA Regulations*.

On appeal, the Council accords great respect and deference to the NFPA standards development process. In conducting its review, the Council will overturn the results of that process only where a clear and substantial basis for doing so is demonstrated.

The Council has reviewed the entire record concerning this matter and has considered all the arguments put forth in this appeal. In the view of the Council, the appeals present clear and substantial basis upon which to overturn the results yielded by the NFPA standards development process. Accordingly, the Council has voted to uphold the appeals. The effect of this action is that the NFPA 70, *National Electrical Code* will include the text of TIA No. 1687.

Council Members Michael Johnston and Rodger Reiswig recused themselves from the deliberations and vote on the appeal.



Tentative Interim Amendment

NFPA[®] 70[®]

National Electrical Code[®]

2023 Edition

Reference: Definition of Pool, and 680.26

TIA 23-9

(SC 23-3-8 / TIA Log #1687)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 70[®], *National Electrical Code*[®], 2023 edition. The TIA was processed by the NEC Code-Making Panel 17 and the NEC Correlating Committee, and was issued by the Standards Council on March 21, 2023, with an effective date of April 10, 2023.

1. *Revise the definition of “Pool” to read as follows:*

Pool. Manufactured or field-constructed equipment designed to contain water on a permanent or semipermanent basis and used by persons for swimming, wading, immersion, 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 man-made bodies of water that may incorporate swimming and swimming areas. (680) (CMP-17)

Informational Note: Natural and man-made bodies of water, which includes lakes, lagoons, surf parks, or other similar bodies of water, are addressed in Article 682.

2. *Revise section paragraph 680.26 to read as follows:*

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. ...

(1) Conductive Pool Shells. ...

(2) Perimeter Surfaces. The perimeter surface to be bonded shall be considered to extend for ~~4 m~~ 900 mm (3 ft) horizontally beyond the inside walls of the pool ~~and~~ 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).~~ ~~and~~ 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) Structural Reinforcing Steel. Structural reinforcing steel shall be bonded in accordance with 680.26(B)(1)(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 6x6-W2.0 x 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 Ring. Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, a copper conductor(s) shall be utilized where the following requirements are met meet the following:

(1)a. At least one minimum 8 AWG bare solid copper conductor, including the 8 AWG copper equipotential bonding conductor if available shall be provided.

(2)b. The conductors shall follow the contour of the perimeter surface.

(3)c. Only listed splicing devices or exothermic welding are used, shall be permitted.

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

(5)e. The required conductor(s) shall be secured within or is under the unpaved portion of the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below the subgrade finished grade.

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

~~(e2) Copper Grid. Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, eCopper grid or unencapsulated steel welded wire reinforcement used for equipotential bonding of unpaved portions of perimeter surfaces shall be utilized where the following requirements are met meet the following:~~

~~(1)a. The copper grid shall be constructed of 8 AWG solid bare copper and be arranged-Be installed in accordance with 680.26(B)(1)(b)(3)(B)(2)(a).~~

~~(2) The copper grid shall follow the contour of the perimeter surface extending 1 m (3 ft) horizontally beyond the inside walls of the pool.~~

~~(3) Only listed splicing devices or exothermic welding shall be permitted.~~

~~(4)b. The copper grid shall be secured-Be located within or under the deck or unpaved surface(s) between 100 mm to 150 mm (4 in. to 6 in.) below the subgrade 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.

Issue Date: March 21, 2023

Effective Date: April 10, 2023

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/docinfo)

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