

Code Review

2018 Changes to International Codes

IRC -NEC-ELECTRICAL-SWIMMING POOL

W A R N I N G

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W A R N I N G



**FLORIDA
BUILDING
COMMISSION**
"Stronger Codes Through Science and Consensus"

Florida
dbpr
Department of Business and Professional Regulation



Building Codes and Standards

Residential Code (IRC)–(NEC)

RCCIWG, Electrical and Swimming Pool
Technical Advisory Committees (TACs)

2017 National Electrical Code – Residential –

Swimming Pool TAC/Electrical TAC

#	Change No.	Section	Change Summary b/t 2014 NEC and 2017 NEC	Change Summary b/t 2014 NEC- and 2017 NEC	Staff Comments								
1	FR4873	680.2 [E4201.2]	The revision clarifies this definition by adding "on or above the ground."	Same as change between 2014 NEC and 2017 NEC									
RCCIWG – Comment Impactful (Explain) <input type="checkbox"/>		TAC Action Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain): <input type="text"/>		Commission Action Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain): <input type="text"/>		<input type="checkbox"/> No Action Needed <input type="checkbox"/> Overlapping provisions	<table border="1"> <thead> <tr> <th>TAC</th> <th>Commission</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>	TAC	Commission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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2	SR4816	680.7 [E4205.9]	Revision for requirement for labeling of grounding and bonding of terminals	Same as change between 2014 NEC and 2017 NEC									
RCCIWG – Comment Impactful (Explain) <input type="checkbox"/>		TAC Action Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain): <input type="text"/>		Commission Action Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain): <input type="text"/>		<input type="checkbox"/> No Action Needed <input type="checkbox"/> Overlapping provisions	<table border="1"> <thead> <tr> <th>TAC</th> <th>Commission</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>	TAC	Commission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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3	SCR43	680.14(A) and (B) [E4202.2]	(a) Describes areas considered to be corrosive environments. (B) Describes conduit types that a corrosion resistant.	Same as change between 2014 NEC and 2017 NEC									

Rule 61G20-2.002 2. Technical amendments needed to accommodate the specific needs of this state include but are not limited to amendments to the Florida Building Code that provide for the following: a. Establish minimum life safety construction requirements to protect buildings and their occupants from fire, wind, flood, and storm surge using the latest technical research and engineering standards for buildings and materials products. b. Provide for flood protection provisions that are consistent with the latest flood protection requirements of the National Flood Insurance Program. c. Maintain eligibility for federal funding and discounts from the National Flood Insurance Program, the Federal Emergency Management Agency, and the United States Department of Housing and Urban Development. d. Provide for energy efficiency standards for buildings that meet or exceed the national energy standards as mandated by Title III of the Energy Conservation and Protection Act. e. Maintain coordination with the Florida Fire Prevention Code. f. Provide for the latest industry standards and design

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						<input type="checkbox"/> Overlapping provisions	<input type="checkbox"/>	<input type="checkbox"/>
4	SR4818	680.21(A)(1) [E4205.5]	Revisions to correlate with new Section 680.14.			Same as change between 2014 NEC and 2017 NEC		
Impactful (Explain) <input type="checkbox"/>		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		<input type="checkbox"/> No Action Needed	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/> Overlapping provisions	<input type="checkbox"/>	<input type="checkbox"/>
5	FR4856	680.22(A)(2) [E4203.1.1]	Editorial to clean up language for section to read smoother.			Same as change between 2014 NEC and 2017 NEC		
Impactful (Explain) <input type="checkbox"/>		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		<input type="checkbox"/> No Action Needed	<input type="checkbox"/>	<input type="checkbox"/>
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6	SR4819	680.22(B)(7) [E4203.4.7]	Revised for clarification of the meaning of “outdoor luminated lighting appliances”			Same as change between 2014 NEC and 2017 NEC		

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						<input type="checkbox"/> Overlapping provisions	<input type="checkbox"/>	<input type="checkbox"/>
7	FR4858	680.23(A)(3) [E4206.4]	Revisions to clarify that the GFCI protection shall be protection for personnel	Same as change between 2014 NEC and 2017 NEC				
Impactful (Explain) <input type="checkbox"/>		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		<input type="checkbox"/> No Action Needed	<input type="checkbox"/>	<input type="checkbox"/>
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8	FR4862 and SCR41	680.23(F)(1) [E4206.10.2]	Revised to address comments in balloting and for correlation and clarity. To clarify this definition by adding "on or above the ground"	Same as change between 2014 NEC and 2017 NEC				
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						<input type="checkbox"/> Overlapping provisions	<input type="checkbox"/>	<input type="checkbox"/>
9	SR4821	680.24(A)(1) [E4206.9.1]	Revision to add "labeled and identified" to swimming pool construction requirements to add certification mark on the product	Same as change between 2014 NEC and 2017 NEC				

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						<input type="checkbox"/> Overlapping provisions	<input type="checkbox"/>	<input type="checkbox"/>
10	SR4829	680.25(A) [E4205.6]	Adds a revision required due to the creation of 680.14.			Same as change between 2014 NEC and 2017 NEC		
RCCIWG – Comment		TAC Action		Commission Action			TAC	Commission
Impactful (Explain) <input type="checkbox"/>		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		<input type="checkbox"/> No Action Needed	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/> Overlapping provisions	<input type="checkbox"/>	<input type="checkbox"/>
11	FR4865	680.26(B)(2) [E4204.2]	Revised to clarify that the perimeter surface is considered an area rather than a physical object.			Same as change between 2014 NEC and 2017 NEC		
RCCIWG – Comment		TAC Action		Commission Action			TAC	Commission
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						<input type="checkbox"/> Overlapping provisions	<input type="checkbox"/>	<input type="checkbox"/>
12	FR4867	680.41 [E4208.4]	Revise single family to one family for clarity			Same as change between 2014 NEC and 2017 NEC		

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						<input type="checkbox"/> Overlapping provisions		<input type="checkbox"/>	
13	SR4825	680.43(D)(2) [E4204.5]	Revision to add “labeled and identified” to swimming pool construction requirements to add certification mark on the product			Same as change between 2014 NEC and 2017 NEC			
Impactful (Explain) <input type="checkbox"/>		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		<input type="checkbox"/> No Action Needed		<input type="checkbox"/>	
						<input type="checkbox"/> Overlapping provisions		<input type="checkbox"/>	
14	FR4870	680.74 [E4209.5]	The revised text clarifies the intent of the requirement for bonding in the area around hydromassage bathtubs.			Same as change between 2014 NEC and 2017 NEC			
Impactful (Explain) <input type="checkbox"/>		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		Accommodate Florida Specific Need: YES (Select Criteria) <input type="checkbox"/> NO: <input type="checkbox"/> a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> Others (Explain):		<input type="checkbox"/> No Action Needed		<input type="checkbox"/>	
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The linked image cannot be displayed. The file may have been moved, renamed, or deleted. Verify that the link points to the correct file and location.

___First Revision No. 4873-NFPA 70-2015 [Definition: Storable Swimming, Wading, or Immersion Pools; ...]

Storable Swimming, Wading, or Immersion Pools; or Storable/Portable Spas and Hot Tubs.

These Swimming, wading, or immersion pools that are intended to be stored when not in use, constructed on or above the ground and are capable of holding water to a maximum depth of 1.0 m (42 in.), or a pool, spa, or hot tub constructed on or above the ground, with nonmetallic, molded polymeric walls or inflatable fabric walls regardless of dimension.

Submitter Information Verification

Submitter Full Name: CMP 17

Organization: [Not Specified]

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jan 15 14:15:15 EST 2015

Committee Statement

Committee Statement: The revision clarifies this definition by adding "on or above the ground" which is the basis for the requirements within this article.

Response Message:

Public Input No. 1310-NFPA 70-2014 [Definition: Storable Swimming, Wading, or Immersion Pools; ...]

Ballot Results

This item has passed ballot

x

10 Eligible Voters

0 Not Returned

10 Affirmative All

0 Affirmative with Comments

0 Negative with Comments

0 Abstention

X

Affirmative All

Blewitt, Thomas V.

Cook, Donald R.

Hamilton, III, E. P.

Hunter, Randal

Jhonson, Don W.

Krepps, Rachel E.

Querry, Dennis Michael

Sandberg, Chester L.

Schapp, Ronald F.

Yasenchak, Randy J.

Second Revision No. 4816-NFPA 70-2015 [Section No. 680.7]

680.7 Grounding and Bonding Terminals.

Grounding and bonding terminals shall be identified for use in wet and corrosive environments. Field-installed grounding and bonding connections in a damp, wet, or corrosive environment shall be composed of copper, copper alloy, or stainless steel. They shall be listed and labeled for direct burial use.

Committee Statement

Committee Statement: The requirements for grounding and bonding equipment in UL 467 do not at present have an option of a rating "wet or corrosive environments". Requirements in UL 467 for a rating of direct burial would mandate materials that have proven resistant to the corrosive environments around swimming pool equipment: stainless steel, copper and high copper content copper alloys. The text "or concrete encasement" is not necessary as the marking for the listed terminal would be "direct burial or DB". The text "and labeled" was added as this would mandate a certification (listing) mark on the product or its smallest unit container for small components such as wire connectors. The text "listed" alone would allow for listed units that would require the Inspection Authority to search in various databases of the certification agencies while conducting inspection in the field. This is inconvenient and sometimes difficult.

**Response
Message:**

Ground clamps listed and identified for use with rebar are typically listed for concrete encasement (not just direct burial if at all). These rebar ground clamps are used regularly for the equipotential bonding grid at swimming pool structures. By adding "or concrete-encasement" will enhance this requirement.

X

Affirmative with Comment

Cook, Donald R.

While always supportive of listing and generally supportive of labeling of listed products, it is obvious that many variables impact labeling of different products throughout the NEC. The CC approach to have a task group review this issue across the NEC is likely the best approach to ensure practical and uniform application of this concept.



Second Correlating Revision No. 43-NFPA 70-2016 [New Section after 680.13]

680.14 Corrosive Environment.

(A) General.

Areas where pool sanitation chemicals are stored, as well as areas with circulation pumps, automatic chlorinators, filters, open areas under decks adjacent to or abutting the pool structure, and similar locations shall be considered to be a corrosive environment. The air in such areas shall be considered to be laden with acid, chlorine, and bromine vapors, or any combination of acid, chlorine, or bromine vapors, and any liquids or condensation in those areas shall be considered to be laden with acids, chlorine, and bromine vapors, or any combination of acid, chlorine, or bromine vapors.

(B) Wiring Methods.

Wiring methods in the areas described in 680.14(A) shall be listed and identified for use in such areas. Rigid metal conduit, intermediate metal conduit, rigid polyvinyl chloride conduit, and reinforced thermosetting resin conduit shall be considered to be resistant to the corrosive environment specified in 680.14(A) .

Committee Statement

Committee Revised to "and similar locations" to be more descriptive and clear. The use of "and/or" is to be **Statement:** avoided as indicated in Annex B of the NEC Style Manual. In (B) the change was made to comply with 90.5 of the NEC.

Committee Comment No. 4817-NFPA 70-2015 [New Section after 680.13]

The topic of suitability to physical damage should be separate text. The reference to specific wiring methods should be deleted from the Article. Wiring methods that have been specifically evaluated for the type of corrosive environment around swimming pool pumps and sanitation chemicals are not as yet readily available. A new Section 680.14 should be created to detail the corrosion resistance necessary of wiring methods needed in swimming pool installations.



Second Revision No. 4818-NFPA 70-2015 [Section No. 680.21(A)(1)]

(1) General.

Where branch circuits for pool-associated motors are subject to physical damage and/or installed in wet, damp, or corrosive environments, that portion of the branch circuit shall be installed in rigid metal conduit, intermediate metal conduit, rigid polyvinyl chloride conduit, reinforced thermosetting resin conduit, or Type MC cable, suitable for the conditions subject to Wiring methods installed in the corrosive environment described in 680.14 shall comply with 680.14(B) or shall be type MC cable listed and labeled for that location. Wiring methods installed in these locations shall contain an insulated copper equipment grounding conductor sized in accordance with Table 250.122 but not smaller than 12 AWG.

Where installed in dry, noncorrosive environments, branch circuits shall comply with the general requirements in Chapter 3 .

Committee Statement

Committee Statement: Wiring methods that have been specifically evaluated for the type of corrosive environment around swimming pool pumps and sanitation chemicals are not as yet readily available. Made revisions to correlate with new Section 680.14. The wiring methods have had acceptable field history in swimming pool installations. The First Draft text referencing resistance to physical damage is not necessary as it applies to all wiring methods.

Response Message:

Public Comment No. 732-NFPA 70-2015 [Section No. 680.21(A)(1)]

This Comment is intended to simplify the Panel's stated goal of simplifying the wiring methods permitted for branch circuits to pool associated motors. However, some serious oversights are corrected in this Comment. For example, all PVC conduit is not identified for protection against physical damage or for all corrosive environments. Only Schedule 80 is suitable for protection against physical damage. PVC conduit in Schedules 40 and 80 are suitable for some but not all corrosive conditions. The manufacturers can and will willingly provide the list of corrosive conditions the PVC conduit is suitable for. Type RTRC conduit is not permitted where subject to physical damage unless identified for such use. This is stated in 355.12(C) under "Uses Not Permitted." Where subject to physical damage unless identified for such use. The UL White Book indicates only RTRC conduit with a suffix "XW" is suitable for protection against physical damage. The term "identified" is defined in Article 100 and is recommended for use in this Section. It means recognized as suitable for the use. Manufacturers, product standards or the NEC in the XXX.10 and XXX.12 sections identify the Uses Permitted and Not Permitted. Furthermore, these wiring methods are required to be listed which provides information to the installer and inspector that the wiring method is suitable for the application.

Affirmative with Comment

Cook, Donald R.

While always supportive of listing and generally supportive of labeling of listed products, it is obvious that many variables impact labeling of different products throughout the NEC. The CC

approach to have a task group review this issue across the NEC is likely the best approach to ensure practical and uniform application of this concept.



First Revision No. 4856-NFPA 70-2015 [Section No. 680.22(A)(2)]

(2) Circulation and Sanitation System, Location.

Receptacles that provide power for water-pump motors or for other loads directly related to the circulation and sanitation system shall be located at least 3.0 m (10 ft) from the inside walls of the pool, or not less than 1.83 m (6 ft) from the inside walls of the pool if they meet all of the following conditions: ~~Consist of single~~ These receptacles shall have GFCI protection ~~Are and be~~ of the grounding type.

(1) ~~Consist of single receptacles~~

(2) ~~Are of the grounding type~~

(3) ~~Have GFCI protection~~

Committee Statement

Committee Statement: Locking type receptacles were previously required to reduce the likelihood of receptacles intended for the sanitation system water pumps being used for other appliances, such as radios and televisions. Receptacles of this configuration were not considered necessary if the receptacle was placed away from the pool a sufficient distance (10 ft.) to keep these appliances outside the reach of persons in the pool.

Recent updates to this section removed the requirement for a locking configuration if the receptacle was at least 6 ft. from the inside walls. This distance was considered sufficient based on the cord lengths of appliances likely to be used around the pool. Based on this analysis the existing text referencing 10 ft. can be removed. The limitation for a single receptacle for the sanitation system pump is also not required based on the same rationale for the 6 ft. limitation. Also the GFCI receptacle devices are usually in a duplex configuration.

This list format was no longer needed due to only two conditions being required, which have been compiled into one sentence.

Response Message:

Public Input No. 358-NFPA 70-2014 [Section No. 680.22(A)(2)]

The 2014 NEC removed the rule requiring a twist lock type receptacle for cord and plug connected swimming pool pump motors. It is good that now this can be addressed as it truly is, a receptacle for pump motors and other loads " directly related to the circulation and sanitation systems " of pools. The simple removal of the requirement for the locking configuration receptacle now makes this code section irrelevant. Case in point, article 680.21(B) requires the pool pump motor(s) to be GFCI protected and other code articles already require grounding type receptacles. The twist lock receptacle is the key to this entire code section making any relevance. This 2014 NEC code revision originated because of the 2008 NEC 6 ft. rule change which permitted the required general purpose receptacle to be located at the same point as the pool pump motor receptacle. The argument being one receptacle is twist lock while the other one mounted on the same post 6ft. from the inside walls of the pool is not. The locking configuration type receptacle was removed without considering the overall consequence. By keeping this code section focused on the intent of the rule itself, it becomes more about the circulation and sanitation issue as the code article implies rather than just location. If accepted there should not be a 10 ft. limitation on this locking configuration receptacle requirement. This code section is also not about a required general purpose receptacle. The language in the article 680.22(A)2 - CIRCULATION AND SANITATION SYSTEM, LOCATION (meaning not closer than 6 ft.) is specific rules for the receptacle installation, and should be regardless of

where the pool pump motor is located. A pool pump motor with a limited 36 inch maximum cord length per article 680.7 and 680.21(A)(5) connected to a standard blade type receptacle may vibrate from normal use and will dislodge creating arcing, ground fault nuisance tripping and unsanitary unhealthy conditions present. If contractors are concerned about these issues and others (perhaps cost) then they can hardwire the pump motor where permitted. The reason there are no health report status to submit is because the code article enforcement for the locking receptacle(s) has worked over the years. If this rule for no twist lock receptacle is to be left unchanged and unchallenged without regard to public safety then there could be un-sanitary health and safety issues to the public as time will show.

Public Input No. 4351-NFPA 70-2014 [Section No. 680.22(A)(2)]

The single receptacle requirement was relevant when these receptacles had a unique spacing and configuration requirement. The reason for removing the configuration requirement in the 2014 edition was that the unique spacing requirement went away. However, the single device rule was overlooked. There is no more reason to retain it than there is to continue (or resurrect) a special spacing or configuration rule. Note that this rule is not only unnecessary, it adds a degree of difficulty in that a conventional duplex GFCI receptacle cannot be used at this location.

Negative with Comment

Jhonson, Don W.

The Circulation and Sanitation System Equipment Location should be defined. Suggest Equipment shall be located not less than 1.83 m (6 ft) from the inside walls of the pool. The FR defines the receptacle location, this will permit the equipment using a 3-foot cord to be located within 3-feet of the pool wall.

Querry, Dennis Michael

Although the cord for the utilization equipment may only be 6ft in length the equipment could be placed at the edge of a pool within reach of someone inside the pool. The current 10ft requirement would keep the equipment out of reach by a person in the pool.



First Revision No. 4865-NFPA 70-2015 [Section No. 680.26(B)(2)]

(2) Perimeter Surfaces.

The perimeter surface to be bonded shall be considered to extend for 1 m (3 ft) horizontally beyond the inside walls of the pool and shall include unpaved surfaces, as well as poured concrete surfaces and other types of paving. Perimeter surfaces less than 1 m (3 ft) separated ~~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) or (2)(b) and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For nonconductive pool shells, bonding at four points shall not be required.

- (a) *Structural Reinforcing Steel.* Structural reinforcing steel shall be bonded in accordance with 680.26(B)(1)(a) .
- (b) *Alternate Means.* 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:
 - (1) At least one minimum 8 AWG bare solid copper conductor shall be provided.
 - (2) The conductors shall follow the contour of the perimeter surface.
 - (3) Only listed splices shall be permitted.
 - (4) The required conductor shall be 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the pool.
 - (5) The required conductor shall be secured within or under the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below the subgrade.

Committee Statement

Committee Statement: This revision is intended to clarify that the perimeter surface is considered an area rather than a physical object.

Response Message:

Public Input No. 1297-NFPA 70-2014 [Section No. 680.26(B)(2)]

As currently written, 3' is an absolute measurement (35" is a violation, 37" is also a violation). Obviously this isn't the intent, hence this editorial revision.



Second Revision No. 4819-NFPA 70-2015 [Section No. 680.22(B)(7)]

(7) Low-Voltage Gas-Fired Electronic Luminaires, Luminaires, Decorative Fireplaces, Fire Pits, and Similar Equipment.

Listed and labeled low-voltage gas-fired- ~~electronically-ignited luminaires and outdoor luminaire lighting appliances with luminaires, decorative fireplaces, fire pits, and similar equipment~~ using low-voltage ignitors that do not require grounding, ~~that do not exceed the low-voltage contact limit, and that~~ and are supplied by listed and labeled transformers or power supplies that comply with 680.23(A)(2) with outputs that do not exceed the low-voltage contact limit shall be permitted to be located less than 1.5 m (5 ft) from the inside walls of the pool. ~~Metallic luminaires and outdoor luminaire lighting appliances~~ equipment shall be bonded in accordance with the requirements in 680.26(B) . ~~Transformers or power supplies supplying these luminaires and outdoor luminaire lighting appliances~~ this type of equipment shall be installed in accordance with the requirements in 680.24 . ~~Metallic gas piping shall be bonded in accordance with the requirements in 250.104(B) and 680.26(B)(7) .~~

Committee Statement

Committee Statement: Clarification of the meaning of “outdoor luminated lighting appliances” is required. This type of equipment includes gas-fired fireplaces, fire pits and similar equipment. In addition, clarification is needed that it is the equipment power supply that is “low voltage.” The text “and labeled” was added to replicate similar changes made by the Panel.

Response Message:

Public Comment No. 947-NFPA 70-2015 [Section No. 680.22(B)(7)]

Clarification of the meaning of “outdoor luminated lighting appliances” is required. This type of equipment includes gas-fired fireplaces, fire pits and similar equipment. In addition, clarification is needed that it is the equipment power supply that is “low voltage.” The text “and labeled” was added to replicate similar changes made by the Panel.

Affirmative with Comment

Cook, Donald R.

While always supportive of listing and generally supportive of labeling of listed products, it is obvious that many variables impact labeling of different products throughout the NEC. The CC approach to have a task group review this issue across the NEC is likely the best approach to ensure practical and uniform application of this concept.

Hamilton, III, E. P.

This is a necessary addition to the Code which is intended to eliminate confusion as to how these devices are addressed.



First Revision No. 4858-NFPA 70-2015 [Section No. 680.23(A)(3)]

(3) GFCI Protection, Lamping, Relamping ,and Servicing.

~~A ground-fault Ground-fault circuit interrupter circuit-interrupter protection for personnel shall be installed in the branch circuit supplying luminaires operating at more voltages greater than the low-voltage low-voltage contact limit such that there is no shock hazard during relamping. The installation of the ground-fault circuit interrupter shall be such that there is no shock hazard with any likely fault-condition combination that involves a person in a conductive path from any ungrounded part of the branch circuit or the luminaire to ground .~~

Committee Statement

Committee Statement: The revisions clarify that the GFCI protection shall be protection for personnel. The addition of “servicing” will close the loophole around replacement of luminaires not technically “lamping” or “relamping”, or other types of lighting service. The intent is to get GFCI protection for personnel for all lights operating above the LVCL. The last sentence was deleted as this simply described the function of a properly installed GFCI.

Response Message:

Public Input No. 1471-NFPA 70-2014 [Section No. 680.23(A)(3)]

The National Electrical Code is not a design manual and the requirements in this section should require GFCI protection. The installer should decide how to provide the Ground-Fault Circuit-Interrupter protection for the installation. The GFCI protection in the feeder instead of in the branch circuit does not reduce the safety level of the ground fault protection for the circuit.



First Revision No. 4862-NFPA 70-2015 [Section No. 680.23(F)(1)]

(1) Wiring Methods.

Branch Where branch -circuit wiring on the supply side of enclosures and junction boxes connected to conduits run to wet-niche and no-niche luminaires, and the field wiring compartments of dry-niche luminaires, underwater luminaires are subject to physical damage and/or are installed in wet, damp, or corrosive environments, that portion of the branch circuit shall be installed using rigid metal conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, rigid polyvinyl chloride conduit, or reinforced thermosetting resin conduit suitable for the location . Where installed on buildings, electrical metallic tubing shall be permitted, and where installed within buildings, electrical nonmetallic tubing, Type MC cable, electrical metallic tubing, or Type AC cable shall be permitted. In all cases, an insulated in dry, noncorrosive environments, branch circuits shall comply with the general requirements in Chapter 3 . Wiring methods installed in wet, damp, or corrosive environments shall contain an insulated copper equipment grounding conductor sized in accordance with Table 250.122 , but not less than 12 AWG shall be required.

Exception: Where connecting to transformers for pool lights, liquidtight flexible metal conduit shall be permitted. The length shall not exceed 1.8 m (6 ft) for any one length or exceed 3.0 m (10 ft) in total length used.

Committee Statement

Committee Statement: This revised text requires restricted wiring methods only in areas where those harsh conditions are present. Chapter 3 wiring methods are otherwise acceptable. This adds clarity and consistency with other sections within 680.

Response Message:

Public Input No. 3767-NFPA 70-2014 [Section No. 680.23(F)]

The current restrictions in this section related to wiring methods seem to address concerns for two issues; protection from physical damage, and protection from environmental conditions associated with wet, damp, and corrosive conditions associated with pools, spas, hot tubs, etc. The other current text seems to describe portions of those circuits installed in areas not likely to encounter those conditions. Those conditions were likely identified and added one at a time over a span of time. This revision attempts to revise text in a way where the restricted wiring will only apply in areas where those conditions are present and otherwise permit the requirements in Chapter 3 to regulate the wiring.

Negative with Comment

Jhonson, Don W.

The continuous "conductor" equipment ground has been a main stay for safety insuring a maintained equipment ground wire from equipment to service. I agree with the permission of Chapter 3 wiring methods in dry, noncorrosive environments where including a covered, insulated or bare equipment grounding conductor. Allowing Chapter 3 wiring methods without the requirement of a separate conductor for equipment grounding from equipment to service diminishes the safety of the installation.



Second Correlating Revision No. 41-NFPA 70-2016 [Section No. 680.23(F)(1)]

(1) Wiring Methods.

Where branch-circuit wiring on the supply side of enclosures and junction boxes connected to conduits run to underwater luminaires are subject to physical damage and/or are installed in wet, damp, or corrosive environments as described in 680.14, the wiring method of that portion of the branch circuit shall be installed using rigid metal conduit, intermediate metal conduit, as required in 680.14(B) or shall be liquidtight flexible nonmetallic conduit, rigid polyvinyl chloride conduit, or reinforced thermosetting resin conduit suitable for the location. Where installed in dry, noncorrosive environments, branch circuits shall comply with the general requirements in Chapter 3. Wiring methods installed in wet, damp, or corrosive environments as described in 680.14 shall contain an insulated copper equipment grounding conductor sized in accordance with Table 250.122, but not less smaller than 12 AWG shall be required.

Where installed in noncorrosive environments, branch circuits shall comply with the general requirements in Chapter 3.

Exception: Where connecting to transformers or power supplies for pool lights, liquidtight flexible metal conduit shall be permitted. The length shall not exceed 1.8 m (6 ft) for any one length or exceed 3.0 m (10 ft) in total length used.

Committee Statement

Committee Statement: The exception is revised to address comments in balloting and for correlation and clarity.

Committee Comment No. 4828-NFPA 70-2015 [Section No. 680.23(F)(1)]

A modification required due to the creation of 680.14.



Second Revision No. 4821-NFPA 70-2015 [Section No. 680.24(A)(1)]

(1) Construction.

The junction box shall be listed, labeled, and identified as a swimming pool junction box and shall comply with the following conditions:

- (1) Be equipped with threaded entries or hubs or a nonmetallic hub
- (2) Be comprised of copper, brass, suitable plastic, or other approved corrosion-resistant material
- (3) Be provided with electrical continuity between every connected metal conduit and the grounding terminals by means of copper, brass, or other approved corrosion-resistant metal that is integral with the box

Committee Statement

Committee Statement: The text “listed” alone would allow for listed units that would require the Inspection Authority to search in various databases of the certification agencies while conducting inspection in the field. This is inconvenient and sometimes difficult. The text “and labeled” was added as this would mandate a certification (listing) mark on the product. The additional text “and identified” accurately reflects the Definitions in Chapter 1. It is appropriate in this instance as there are Listed and Labeled equipment readily available that are not intended for swimming pool installations.

Response Message:

Public Comment No. 1303-NFPA 70-2015 [Section No. 680.24(A)(1)]

UL recognizes the Correlating Committee created a global First Correlating Revision (FCR) which directed that in all locations where the term “and labeled” was added after “listed” during the First Revision Stage, the words “and labeled” after “listed” be deleted, returning to previous text. UL understands that the Correlating Committee appointed a task group to address several issues involving the use of the terms “listed” and “labeled,” most importantly, to clarify and establish a distinction between the terms “listed” and “labeled” which are often used interchangeably. UL supports the need for this task group. However, UL does not expect the work of this task group to affect the 2017 NEC regarding the issue of “listed and labeled.” As such, UL is submitting comments to request that the words “and labeled” be added in various locations throughout the Code for the reasons expressed in the public inputs UL submitted on this issue. UL believes that these revisions will address an ongoing problem that should not wait until the 2020 NEC for resolution. Subsequent to the Public Input Code Panel Meetings, UL has discussed this issue with its Electrical Council whose membership includes many AHJs. The proposed revisions to the NEC received general support from the membership. This issue was also discussed at a NEMA – NRTLs Forum held on August 14, 2015 at NEMA Headquarters. UL reiterated its support for the proposed revisions. The NRTLs represented at the meeting voiced no objection to the proposals. The rationale for the revision was simple, to provide information to the AHJ regarding the suitability of equipment they encounter. The mark on the product is the manufacturer’s attestation that the product is in compliance with the appropriate standard. NRTL’s conduct factory surveillance of products, surveillance is one method to validate the manufacturer’s attestation. Should a product be found not to be compliant the manufacturer has the option of removing the mark and shipping the product without the mark, or holding the shipment and bringing the product into compliance. In either case the “Listing” is not impacted, as the “listing” is created at the completion of the “original” certification of the product and indicates the authorization but not the mandate to label

products. So the only true way an AHJ can determine whether the product he is seeing is compliant with the applicable standard is via a label on the product. Taking it one step further, listings change with time. It is quite possible that a “listing” has been withdrawn; however labeled product may still be available for sale. Should equipment that is labeled, but not listed, be deemed acceptable? Based on the NEC definitions, it is possible to have a product that meets the Article 100 definition of listed but the testing organization made the manufacture remove the label for a non-compliance issue. As for the concerns of products that are too small to be labeled, the definition of labeled is not limited to an actual label, it also includes symbols, or other identifying marks. The Safety Standards which define the listing requirements do not address labeling of products as defined by Article 100. As a general rule, NRTL’s do not consider a product as being listed unless it is also labeled. The UL White Book states that “Only those products bearing the appropriate UL Mark and the company’s name, trade name, trademark or other authorized identification should be considered as being covered by UL’s Certification, Listing, Classification and Follow-Up Service. The UL Mark provides evidence of listing or labeling, which may be required by installation codes or standards.” Again the requirements for the UL Mark are not a Safety Standard requirement, they are a UL requirement and the only way to show that a product is UL Certified (Listed); other NRTL’s have similar requirements.

Affirmative with Comment

Cook, Donald R.

While always supportive of listing and generally supportive of labeling of listed products, it is obvious that many variables impact labeling of different products throughout the NEC. The CC approach to have a task group review this issue across the NEC is likely the best approach to ensure practical and uniform application of this concept.



Second Revision No. 4829-NFPA 70-2015 [Section No. 680.25(1)]

(A) Feeders.

Where feeders are subject to physical damage and/or installed in wet, damp, or corrosive environments as described in 680.14 , the wiring method of that portion of the feeder shall be installed in rigid metal conduit, intermediate metal conduit, rigid polyvinyl chloride conduit, or reinforced thermosetting resin conduit, suitable for the conditions. Where installed in dry, noncorrosive environments, feeders shall comply with the general requirements in Chapter 3 as required in 680.14(B) or shall be liquidtight flexible nonmetallic conduit . Wiring methods installed in wet, damp, or corrosive environments as described in 680.14 shall contain an insulated copper equipment grounding conductor sized in accordance with Table 250.122 , but not less smaller than 12 AWG shall be required .

Where installed in noncorrosive environments, feeders shall comply with the general requirements in Chapter 3 .

Committee Statement

Committee Statement: A modification required due to the creation of 680.14.

Response Message:

Public Comment No. 731-NFPA 70-2015 [Section No. 680.25(1)]

This Comment is intended to simplify the Panel's stated goal of simplifying the wiring methods permitted for feeders. However, some serious oversights are corrected in this Comment. For example, all PVC conduit is not identified for protection against physical damage or for all corrosive environments. Only Schedule 80 is suitable for protection against physical damage. PVC conduit in Schedules 40 and 80 are suitable for some but not all corrosive conditions. The manufacturers can and will willingly provide the list of corrosive conditions the PVC conduit is suitable for. Type RTRC conduit is not permitted where subject to physical damage unless identified for such use. This is stated in 355.12(C) under "Uses Not Permitted." Where subject to physical damage unless identified for such use. The UL White Book indicates only RTRC conduit with a suffix "XW" is suitable for protection against physical damage. The word "less" is replaced with "smaller" because "less" refers to quantity and "smaller" refers to the size which is the subject of the size of the equipment grounding conductor. The ending phrase "shall be required" is repetitive of the requirement earlier in the sentence as thus is shown being deleted.



First Revision No. 4867-NFPA 70-2015 [Section No. 680.41]

680.41 Emergency Switch for Spas and Hot Tubs.

A clearly labeled emergency shutoff or control switch for the purpose of stopping the motor(s) that provides power to the recirculation system and jet system shall be installed at a point readily accessible to the users and not less than 1.5 m (5 ft) away, adjacent to, and within sight of the spa or hot tub. This requirement shall not apply to single one -family dwellings.

Committee Statement

Committee Changing the word "single"-family to "one"-family will provide a consistent use of the **Statement:** defined term in Article 100

Response Message:

Public Input No. 352-NFPA 70-2014 [Section No. 680.41]

Changing the word "single"-family to "one"-family will provide a consistent use of the defined term in Article 100



Second Revision No. 4825-NFPA 70-2015 [Section No. 680.43(D)]

(D) Bonding.

The following parts shall be bonded together:

- (1) All metal fittings within or attached to the spa or hot tub structure.
- (2) Metal parts of electrical equipment associated with the spa or hot tub water circulating system, including pump motors, unless part of a listed, labeled, and identified self-contained spa or hot tub.
- (3) Metal raceway and metal piping that are within 1.5 m (5 ft) of the inside walls of the spa or hot tub and that are not separated from the spa or hot tub by a permanent barrier.
- (4) All metal surfaces that are within 1.5 m (5 ft) of the inside walls of the spa or hot tub and that are not separated from the spa or hot tub area by a permanent barrier.

Exception: Small conductive surfaces not likely to become energized, such as air and water jets and drain fittings, where not connected to metallic piping, towel bars, mirror frames, and similar nonelectrical equipment, shall not be required to be bonded.

- (5) Electrical devices and controls that are not associated with the spas or hot tubs and that are located less than 1.5 m (5 ft) from such units; otherwise, they shall be bonded to the spa or hot tub system.

Committee Statement

Committee Statement: The text “listed” alone would allow for listed units that would require the Inspection Authority to search in various databases of the certification agencies while conducting inspection in the field. This is inconvenient and sometimes difficult. The text “and labeled” was added as this would mandate a certification (listing) mark on the product. The additional text “and identified” accurately reflects the Definitions in Chapter 1. It is appropriate in this instance as there are Listed and Labeled equipment readily available that are not intended for spa installations.

Response Message:

Public Comment No. 1310-NFPA 70-2015 [Section No. 680.43(D)]

UL recognizes the Correlating Committee created a global First Correlating Revision (FCR) which directed that in all locations where the term “and labeled” was added after “listed” during the First Revision Stage, the words “and labeled” after “listed” be deleted, returning to previous text. UL understands that the Correlating Committee appointed a task group to address several issues involving the use of the terms “listed” and “labeled,” most importantly, to clarify and establish a distinction between the terms “listed” and “labeled” which are often used interchangeably. UL supports the need for this task group. However, UL does not expect the work of this task group to affect the 2017 NEC regarding the issue of “listed and labeled.” As such, UL is submitting comments to request that the words “and labeled” be added in various locations throughout the Code for the reasons expressed in the public inputs UL submitted on this issue. UL believes that these revisions will address an ongoing problem that should not wait until the 2020 NEC for resolution. Subsequent to the Public Input Code Panel Meetings, UL has discussed this issue with its Electrical Council whose membership includes many AHJs. The proposed revisions to the NEC received general support from the membership. This

issue was also discussed at a NEMA – NRTLs Forum held on August 14, 2015 at NEMA Headquarters. UL reiterated its support for the proposed revisions. The NRTLs represented at the meeting voiced no objection to the proposals. The rationale for the revision was simple, to provide information to the AHJ regarding the suitability of equipment they encounter. The mark on the product is the manufacturer's attestation that the product is in compliance with the appropriate standard. NRTL's conduct factory surveillance of products, surveillance is one method to validate the manufacturer's attestation. Should a product be found not to be compliant the manufacturer has the option of removing the mark and shipping the product without the mark, or holding the shipment and bringing the product into compliance. In either case the "Listing" is not impacted, as the "listing" is created at the completion of the "original" certification of the product and indicates the authorization but not the mandate to label products. So the only true way an AHJ can determine whether the product he is seeing is compliant with the applicable standard is via a label on the product. Taking it one step further, listings change with time. It is quite possible that a "listing" has been withdrawn; however labeled product may still be available for sale. Should equipment that is labeled, but not listed, be deemed acceptable? Based on the NEC definitions, it is possible to have a product that meets the Article 100 definition of listed but the testing organization made the manufacture remove the label for a non-compliance issue. As for the concerns of products that are too small to be labeled, the definition of labeled is not limited to an actual label, it also includes symbols, or other identifying marks. The Safety Standards which define the listing requirements do not address labeling of products as defined by Article 100. As a general rule, NRTL's do not consider a product as being listed unless it is also labeled. The UL White Book states that "Only those products bearing the appropriate UL Mark and the company's name, trade name, trademark or other authorized identification should be considered as being covered by UL's Certification, Listing, Classification and Follow-Up Service. The UL Mark provides evidence of listing or labeling, which may be required by installation codes or standards." Again the requirements for the UL Mark are not a Safety Standard requirement, they are a UL requirement and the only way to show that a product is UL Certified (Listed); other NRTL's have similar requirements.

Affirmative with Comment

Cook, Donald R.

While always supportive of listing and generally supportive of labeling of listed products, it is obvious that many variables impact labeling of different products throughout the NEC. The CC approach to have a task group review this issue across the NEC is likely the best approach to ensure practical and uniform application of this concept.



First Revision No. 4870-NFPA 70-2015 [Section No. 680.74]

680.74 Bonding.

Both metal piping systems and grounded metal parts in contact with the circulating water shall be bonded together using a solid copper bonding jumper, insulated, covered, or bare, not smaller than 8 AWG. The bonding jumper shall be connected to the terminal on the circulating pump motor that is intended for this purpose. The bonding jumper shall not be required to be connected to a double insulated circulating pump motor. The 8 AWG or larger solid copper bonding jumper 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, service equipment, or any electrode. The 8 AWG or larger solid copper bonding jumper shall be long enough to terminate on a replacement non-double-insulated pump motor and shall be terminated to the equipment grounding conductor of the branch circuit of the motor when a double-insulated circulating pump motor is used.

(A) General.

The following parts shall be bonded together:

- (1) All metal fittings within or attached to the tub structure that are in contact with the circulating water
- (2) Metal parts of electrical equipment associated with the tub water circulating system, including pump and blower motors
- (3) Metal-sheathed cables and raceways and metal piping that are within 1.5 m (5 ft) of the inside walls of the tub and not separated from the tub by a permanent barrier
- (4) All exposed metal surfaces that are within 1.5 m (5 ft) of the inside walls of the tub and not separated from the tub area by a permanent barrier
- (5) Electrical devices and controls that are not associated with the hydromassage tubs and that are located within 1.5 m (5 ft) from such units

Exception No. 1: Small conductive surfaces not likely to become energized, such as air and water jets, supply valve assemblies, and drain fittings not connected to metallic piping, and towel bars, mirror frames, and similar nonelectrical equipment not connected to metal framing shall not be required to be bonded.

Exception No. 2: Double-insulated motors and blowers shall not be bonded.

(B)

Both metal piping systems and grounded metal parts in contact with the circulating water shall be 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 jumper(s) shall be connected to the terminal on the circulating pump motor that is intended for this purpose. The bonding jumper shall not be required to be connected to a double insulated circulating pump motor. The 8 AWG or larger solid copper bonding jumper 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, service equipment, or any electrode. The 8 AWG or larger solid copper In all installations a bonding jumper shall be 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.



Committee Statement

Committee Statement: The revised text clarifies the intent of the requirement for bonding in the area around hydromassage bathtubs.

Response Message:

Public Input No. 151-NFPA 70-2014 [Section No. 680.74]

The present text literally does not require the hot water and cold water metal pipes supplying the water to the tub, to be bonded since the hot and cold water supply pipes are generally NOT in contact with the circulating water. With the proposed new wording, the metal drain pipe and metal recirculating piping would also still be required to be bonded if it is in contact with the circulating water. This change should help clarify the intent without changing the requirement

Public Input No. 2129-NFPA 70-2014 [Section No. 680.74]

This change is to clarify the need not to bond small metal parts that is unlikely to become energized while water is circulating through a hydromassage bathtub. This change would only apply to bathtubs supplied by a non-metallic piping system. The rule in Article 680.74 is not about equipotential bonding as with pools, spas or hot tubs although even in Article 680.26(B)(5) there is an implied exception for small metal fittings. Often times the small metal parts such as drains, faucets, fitting, valves, and even manifolds have no where to make a bonding connection except on the fitting or coupling themselves. This is more likely to damage the part then to accomplish any attempt to bond it to the pump motor or equipment grounding conductor.

Negative with Comment

Cook, Donald R.

After review of proposed text, IAEL does not believe revised text clarifies the requirement for bonding around hydromassage bathtubs. Revision expands bonding requirement to devices and controls within 1.5 m (5 ft) with no substantiation for that change. Revision expands bonding requirement to exposed metal surfaces within 1.5 m (5 ft) with no substantiation. While current intent is not perfectly clear, proposed text does not help.