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NEC changes for electrical safety in swimming pools

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This is the time of year to inspect and maintain swimming pool equipment to make sure that life saving measures such as ground-fault circuit interrupter (GFCI) protection and all grounding and bonding systems are functioning properly. For new installations, the 2017 National Electrical Code® (NEC®) has been revised to improve pool safety.

Article 680 of the NEC contains the requirements for electrical installations associated with and in close proximity to swimming pools. New for the 2017 edition of the code is Section 680.4, which requires all electrical equipment installed in the water, walls, or decks of pools to follow the requirements found in Article 680. This section also requires equipment and products installed in the water, walls, or deck to be listed, which assists the authority having jurisdiction in determining the suitability of the equipment for a given installation. The listing requirement becomes especially helpful in areas that are included in 680.14, another new section that requires certain pool-related areas to be considered “corrosive environments” due to use and storage of pool sanitation chemicals. Equipment used in those areas must be able to withstand a corrosive environment, and the listing will help AHJs make that determination.

GFCI protection has also been expanded in the 2017 edition. Previously, certain receptacles that supplied power to the circulation and sanitation system could be located further than 10 feet from the inside wall of the pool and not require GFCI protection. For 2017, the 10-foot distance has been removed and now all receptacles supplying circulation and sanitation system equipment must be at least six feet from the inside wall of the pool and must be of the grounding type and GFCI protected. Another new section also requires GFCI protection for circuits above the low-voltage contact limit that supply gas-fired pool water heaters. GFCI protection is now essentially required for all receptacles that supply power above the low-voltage contact limit to equipment that handles pool water. This requirement is in addition to the GFCI protection required for 120V through 240V, single-phase pool pump motors.

Other GFCI requirements for pools remain unchanged in the current edition. GFCI protection still required for all underwater luminaires operating over the low-voltage contact limit and al and 20 ampere, 125-volt, single-phase receptacles located within 20 feet of a pool. Certain luminaires, lighting outlets, and paddle fans also require GFCI protection based on their loca relative to the inside wall of the pool and the maximum water level.

With all of this GFCI protection required for electrical equipment associated with swimming pools, chances of being shocked or electrocuted in a swimming pool have been reduced dramatically. However, it is important to note that GFCI devices require maintenance according to the manufacturer's instructions. Following the recommended maintenance schedule ensures that the GFCI protection functions when needed. Around swimming pools, the maintenance of GFCI devices is just as important as their installation.

The 2017 NEC has also taken steps to protect the integrity of the grounding and bonding systems associated with swimming pools. (Equipment grounding conductors provide the effective ground-fault current path in order to quickly operate fuses and circuit breakers during a fault; the bonding system simply connects conductive materials together so that they are electrically the same.) Recognizing that areas in and around pools are subject to severe corrosive conditions, the code now requires grounding and bonding terminals to be identified for use in wet and corrosive environments. During pool inspections I often found equipment grounding conductor terminals on circulation pump motor housings to be so corroded that there was no longer an effective connection, if there was a connection at all—a significant problem, since it provides an effective ground-fault current path to facilitate the operation of the circuit breaker or fuse. Likewise, the equipotential bonding system—a conductive grid within the pool shell and around the perimeter—is installed to equalize any voltage gradients in and around a pool, and it is equally important that these terminations retain their integrity. Differences in potential around a swimming pool due to broken connections can have tragic results.