



UL 2560 AND EMERGENCY CALL SYSTEMS: EXPANDING THE STANDARDS FRAMEWORK





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Emergency call systems have been used for years in assisted living and long-term care facilities to provide a vital communications link between residents and healthcare professionals. These systems support efforts to provide effective medical care to residents when and where they need it, while offering greater independence to those who do not require continuous surveillance. As such, the use of emergency call systems has helped to safeguard the health and safety of residents and other vulnerable populations, improve resident quality of life, and contribute to efforts to control the cost of care.

While emergency call systems used in these non-acute care settings perform many of the same functions as nurse call systems found in hospitals, the unique characteristics of their intended operating environment require the use of call systems that have been specifically designed to work within that setting. Confusion exists among manufacturers and healthcare providers about the distinct requirements that are applicable to call systems operating in various environments, and specifically to those requirements that apply to emergency call systems. This confusion can potentially put patients at risk.

This UL white paper provides an overview of the safety standards applicable to call systems and discusses the requirements of UL 2560, the Standard for Safety of Emergency Call Systems for Assisted Living and Independent Living Facilities. The paper begins with a summary of the various types of call systems based on their respective use environments and offers a brief history of the origins of UL 2560. The white paper then outlines the key requirements of UL 2560, and delineates the differences between UL 2560 and UL 1069, the Standard for Safety of Hospital Signaling and Nurse Call Equipment. The paper concludes with a discussion of the advantages of obtaining system certification.





Types of Call Systems and Applicable Standards

Call systems are wired or wireless communications systems and devices designed to detect potential hazards to life, health or property, and to notify designated parties of the need for a priority response. Call systems typically consist of a central unit that receives signals from multiple transmitting devices, either installed in patient or resident rooms throughout a facility or worn by a patient or resident. The transmitting devices allow for two-way audio and/or visual communication between a patient or resident and a medical care professional or other authorized party.

Depending on their intended use environment, call systems are evaluated for their safety consistent with the technical requirements of the following product standards:

- UL 1069, the Standard for Safety of Hospital Signaling and Nurse Call Equipment—This Standard applies to nurse call systems and equipment found in hospitals and other acute care environments. The seventh edition of the standard, published in October 2007, incorporates specifications for wireless nurse call devices.
- UL 1637, the Standard for Safety of Home Health Care Signaling Equipment—This Standard applies to call systems and other types of signaling equipment typically used in residential settings, where healthcare personnel are not on premises.

- UL 2560, the Standard for Safety of Emergency Call Systems for Assisted Living and Independent Living Facilities—Introduced in 2011, this standard applies to emergency call systems used in assisted living facilities, independent adult living centers and other non-acute care settings that are within close proximity to healthcare providers.

Call systems may also be subject to important national safety codes, including the National Electric Code® (NEC, also known as NFPA 70), the Life Safety Code (NFPA 101) and the Health Care Facilities Code (NFPA 99).

Emergency call systems are a specific type of call system deployed in non-acute care settings, including nursing homes, assisted living facilities and independent adult living centers. Design and features found in emergency call systems vary from system to system, depending on the health and safety requirements of those being monitored, the anticipated skill level of those monitoring the system and the financial resources of a facility. In addition, emergency call systems are often designed to interface with fire alarm, security and other life safety systems, as well as with facility and staff management and recordkeeping systems.

In the past, most emergency call systems have relied on wired technology to support communications links between patients and healthcare professionals. However, in recent years, the integrity and reliability of wireless technology has dramatically improved and many emergency call systems available today

have integrated wireless communications capabilities. Wireless technology makes it possible to expand coverage of an existing emergency call system and can greatly simplify the installation of a new or upgraded emergency call system in an existing facility. An emergency call system with wireless capabilities also provides patients and residents with greater mobility without increased risk.

The Creation of UL 2560

The origin of UL 2560, can be traced back nearly 40 years to the original publication of UL 1069. First released in 1974, UL 1069 specifically details requirements for nurse call systems and other signaling equipment used in hospitals and other acute care facilities. Now in its seventh edition, UL 1069 has undergone numerous revisions during its lifetime to incorporate new requirements necessitated by the introduction of advanced technologies.

While UL 1069 offers a clear set of requirements for the certification of call systems used in hospitals and acute care environments, it does not expressly address requirements for call systems designed for use in non-acute care settings. These environments have a need for reliable and cost-effective call systems that can monitor patients and residents. However, until recently, the absence of a product safety standard focused on the unique requirements of these environments required manufacturers to design their emergency call systems to meet the often more rigorous specifications for hospital-based systems, or to forego product safety certification altogether.



At the request of the National Electrical Manufacturers Association (NEMA), UL began a collaborative effort in 2005 with representatives from manufacturers, system users, regulators and testing laboratories to develop a new consensus standard to address the minimum performance requirements for emergency call systems used in non-acute care settings. After nearly seven years of work, the new standard, UL 2560, was published in September 2011.

As a result, call system manufacturers now have a standard that specifically addresses the design and performance of emergency call systems intended for use in non-acute care settings. Testing laboratories now have separate standards to test and certify call systems based on their intended use environment. And developers and operators of senior living communities can readily identify emergency call systems that have been specifically designed to meet their unique operating requirements.

Fundamental Components and Required Features of Emergency Call Systems

Because emergency call systems are intended for use in non-acute care settings, the fundamental system configuration required to obtain certification under UL 2560 is generally less complex than that required under UL 1069. However, at a minimum, emergency call systems certified to UL 2560 must include the following components:

- **Central notification station**—An emergency call system must have at least one central notification

station at a fixed location that receives all calls processed through the system. Additional and/or portable notification systems are permitted.

- **Call stations**—An emergency call system must have at least one permanently fixed emergency call station located in every resident room or living unit. Additional call stations in private or common resident areas are optional.
- **Back-up power**—An emergency call system must include a backup power supply so that system operation is maintained in the event of a power loss. A manufacturer must provide specific information regarding the anticipated length of system operation under battery power.

An emergency call system incorporating these components meets the definition of a fundamental system as defined by UL 2560. UL 2560 also includes requirements regarding the operation of specific features of an emergency call system. The most significant requirements in this area include:

- **Call indicators**—All emergency call stations and pendants must provide immediate feedback to confirm that an emergency call has been placed.
- **Origination reporting**—Emergency calls reported to the notification station must include information regarding the specific location from which the emergency call was placed.

- **Timing of call notification**—All emergency calls must be received by the notification station within 60 seconds of being initiated.
- **Call cancellation**—Emergency calls can only be cancelled from the specific emergency call device that initiated the call. Calls cannot be cancelled at the notification station, unless the notification station can distinguish between emergency and non-emergency calls and the system supports voice communication between the emergency call station and the notification station.
- **Use of pendants**—If included with an emergency call system, portable, wireless call transmitters, such as pendants or wrist bands, must comply with the performance requirements of the standard. However, these devices are not a substitute for the fixed emergency call station requirement noted above.
- **Low battery power**—Wireless transmitters must include a mechanism to report a low battery power condition at least seven days in advance of the anticipated loss of power. Manufacturers must also provide information regarding anticipated battery life under specific operating conditions.

Depending on their configuration, emergency call systems certified to UL 2560 must also incorporate self-testing mechanisms to provide accurate information about a system's

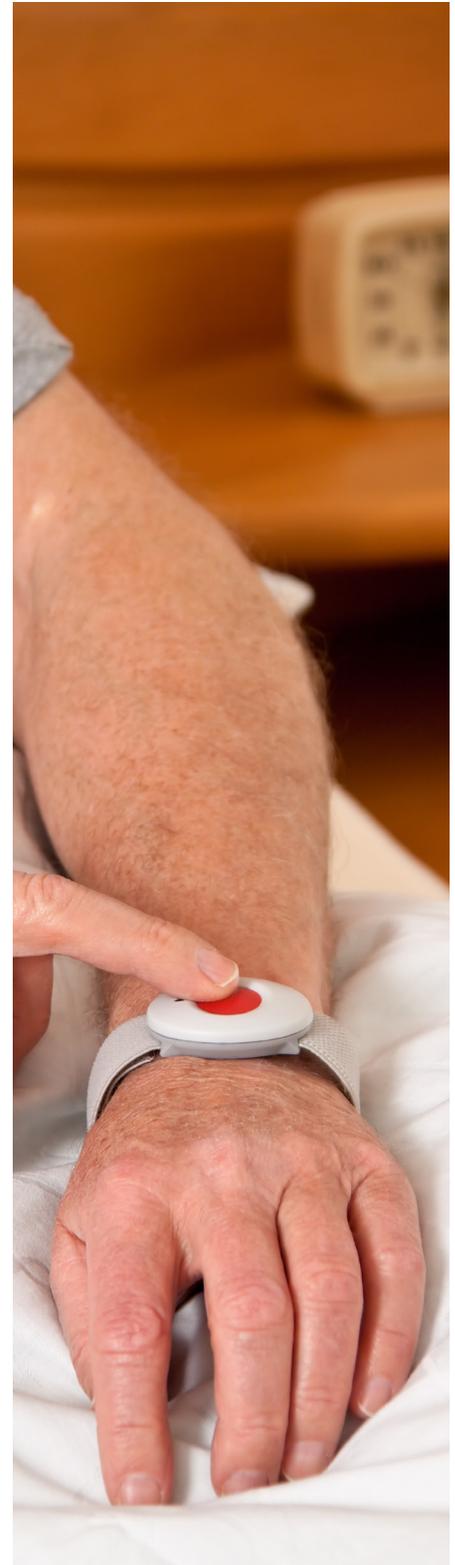
operating integrity. For example, systems incorporating microcontrollers must include a mechanism to identify and report any fault within 90 seconds of its occurrence. In addition, emergency call systems incorporating wireless technology must include a self-test and reporting mechanism to identify system faults that could prevent an emergency call from being placed. Call systems incorporating wireless technology must also be tested to demonstrate their immunity to electromagnetic interference.

Important Testing Differences Between UL 2560 and UL 1069

Although emergency call systems have a number of features and capabilities in common with nurse call systems used in hospitals, the type of care typically provided in non-acute care settings allows for greater flexibility in call system design and deployment. As such, many of the safety testing requirements prescribed in UL 2560 are more appropriate for their intended operating environment than those found in UL 1069. Some key variances between UL 2560 and UL 1069 include:

- **Maximum voltage**—UL 1069 incorporates maximum distribution voltages for equipment accessible to patients or healthcare providers. UL 2560 does not include maximum voltage requirements.
- **Code calls**—UL 1069 has detailed requirements regarding the system’s handling of code calls. UL 2560 has no requirements regarding code calls.

- **Call cancellation**—UL 1069 requires that calls on a portable nurse control station must be cancelled by an action separate from simply terminating communication. UL 2560 does not have this requirement.
- **“Orphan call” routing**—UL 1069 requires that call points monitored by a portable nurse control stations must also be monitored by a primary nurse control station to prevent the loss of calls due to a portable system fault or out-of-range condition. UL 2560 does not address this issue.
- **Fault condition signaling**—UL 1069 generally sets 90 seconds as the maximum elapsed time between the occurrence of a fault or other adverse condition, and fault restoration or the generation of a fault signal. UL 2560 sets different maximum times for fault restoration of the generation of a fault signal, depending on the origin of the fault or adverse condition, with maximum times as long as 24 hours in the case of wireless call initiation stations.
- **Oxygen safety**—UL 1069 includes requirements covering the safety of electrical equipment operating in oxygen-enriched environments. UL 2560 includes no such requirements.
- **Leakage current testing**—UL 1069 specifies leakage current testing under four separate conditions following humidity testing, with





specific maximum leakage currents for each condition. UL 2560 requires leakage current testing only between any exposed surface of any fixed or stationary equipment and earth ground.

- **Device endurance**—UL 1069 requires that all system devices be operational after being dropped 100 times from a height of four feet onto a concrete surface. UL 2560 reduces the number of drops required to 25 for devices intended only for use by patients and/or residents.
- **Clash**—UL 1069 specifies 10 seconds as the maximum time between the reinitiation of a call signal and its reception by a receiver, when the original signal has encountered interference from another call signal (clash). UL 2560 sets the maximum time at 60 seconds.
- **Markings and instructions**—UL 1069 is generally more stringent regarding required markings and installation and operation instructions, except for UL 2560-certified system devices powered directly from high voltage sources.

At the same time, UL 2560 accounts for several life safety concerns unique to non-acute care settings, resulting in

certain safety testing requirements that are distinct from those found in UL 1069. These requirements include additional testing in the following areas:

- **Back-up power testing**—A fundamental emergency call system configuration must incorporate a back-up power supply so that system operation is continuously maintained. UL 2560 includes a number of specific tests to assess the operation of back-up power systems. Back-up power for UL 1069 is optional and testing for back-up power is required only when back-up power is provided.
- **Call signals**—UL 2560 requires that signals originating from a call station or wireless pendant be sent every time the call station or pendant is activated, even if the call system has not been reset.
- **Audible indicators**—UL 2560 requires that all audible signals achieve at least a 60 decibel level. UL 1069 has no sound level requirements for audible signals.
- **Submersion testing**—UL 2560 specifies both water spray and submersion testing of system signaling units to assess operation following their use in a shower or bath. UL 1069 does not include a submersion test.

Do Nurse Call Systems Certified to UL 1069 Meet UL 2560 Requirements?

The potential market for emergency call systems used in non-acute care settings is significant. This opportunity may prompt manufacturers of nurse call systems certified to UL 1069 to consider certifying their current systems under UL 2560 as well. In the process, some manufacturers may mistakenly assume that, because the requirements of UL 1069 are more stringent in many areas, systems listed to UL 1069 will meet the requirements of UL 2560 without modification.

As previously noted, the specific limits for many of the testing requirements found in UL 2560 are less stringent than comparable requirements in UL 1069. However, the fundamental emergency call system configuration defined in UL 2560 requires an integrated back-up power supply, a component not featured in all UL 1069 certified systems. UL 2560 also includes testing requirements or testing thresholds not found in UL 1069, such as submersion testing and minimum sound level requirements for audible indicators.

Manufacturers of call systems currently certified to UL 1069 who are exploring the feasibility of achieving UL 2560 certification should consult with a competent testing laboratory. A thorough evaluation can help to



determine whether an existing call system meets the requirements of both standards. Of course, manufacturers seeking to obtain a dual certification for a new call system should engage experienced and knowledgeable engineers at the beginning of the product development process so that the development effort achieves the desired objectives as efficiently as possible.

The Benefits of UL 2560 Certification

The availability of UL 2560 offers a number of benefits to call system manufacturers, owners and operators of assisted living and independent living facilities, and the general public. For call system manufacturers, UL 2560 provides a product safety standard that expressly addresses the specific operational requirements of emergency call systems intended for use in non-acute care settings. As such, call system

manufacturers can confidently design and market cost effective emergency call systems incorporating only those features essential to the health and safety of patients and residents outside of a hospital setting. UL 2560 also provides manufacturers with greater flexibility in offering a range of optional features specifically designed for these operating environments.

For owners and operators of nursing homes and assisted living and independent living facilities, the availability of emergency call systems certified to UL 2560 can simplify the specification and purchasing process for a new or upgraded call system. Buyers can more easily identify call systems with features and capabilities compatible with their requirements and budget. Call systems certified to UL 2560 may also offer additional features not generally available with systems certified to UL 1069.

Perhaps the most important beneficiaries of emergency call systems certified to UL 2560 are patients and residents of adult living facilities. Because emergency call systems certified to UL 2560 have been designed to address the specific health and safety needs of a non-hospitalized population, patients and residents in these environments can enjoy greater mobility and independence without sacrificing immediate access to medical attention when and where they need it. Along with other advanced healthcare technologies, emergency call systems can provide a broader range of care options for an aging population, thereby contributing to efforts to reduce healthcare costs while also improving care and quality of life.



Conclusion

Call systems have rapidly evolved to better address the needs of a range of care environments, each with specific operating needs and concerns. UL 2560 was developed to address the specific requirements of adult living communities, including assisted living and independent living facilities, and its publication completes the standards framework for this important product category. Together with UL 1069, UL 2560 provides manufacturers with a set of distinct specifications for systems based on their intended use environment, allows buyers to make an informed evaluation in the selection and purchase of a call system that is best aligned with their needs, and contributes to efforts to improve patient care and quality of life.

For further information about UL 2560 and emergency call systems, contact UL's Life & Health Business Unit at 877.854.3577 or Medical.Inquiry@ul.com.