

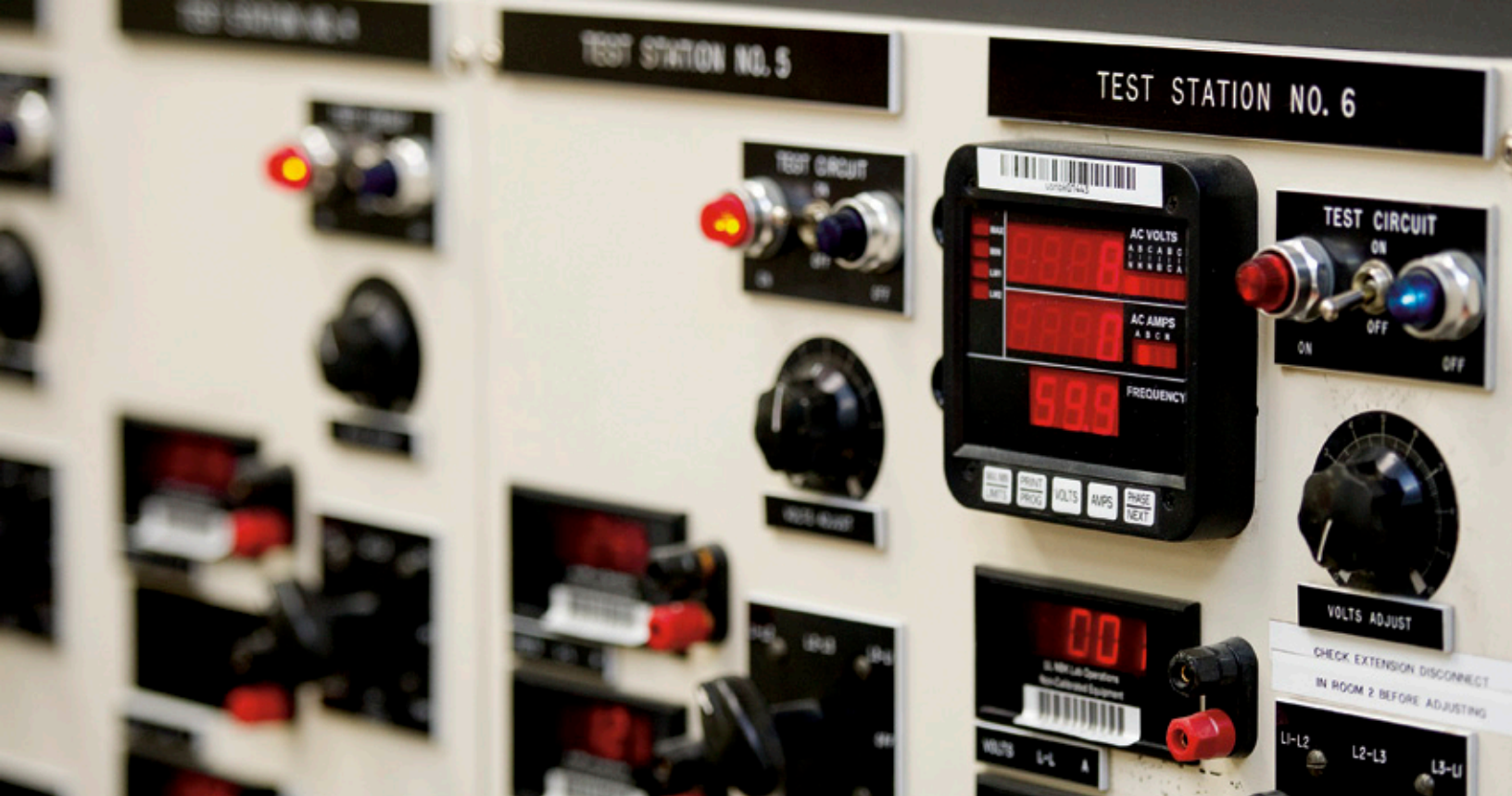


TEST BENCH
2 B

UL 1069 & UL 2560 COMPARISON

Performance requirements for nurse and emergency call systems





Nurse call or Emergency call systems have specific performance requirements so that they will function when needed. The different standards address the different locations and expected level of personnel and environmental considerations in these facilities.

UL publishes the standards for Emergency call systems in the US and supports the industry as new, innovative products are introduced to support advances in these systems.

EMERGENCY CALL SYSTEMS STANDARDS FOR THE U.S.

UL 1069 “Hospital Signaling and Nurse Call Equipment” — This standard applies to the traditional equipment found in the hospital environment. More and more, with wireless technologies, these systems also require interoperability and interference reliability testing to demonstrate they will continue to function in the noisy environments often found in acute care situations.

UL 2560 “Emergency Call Systems for Assisted Living and Independent Living Facilities” — Introduced in 2011, the UL 2560 standard was driven by industry to address the special environmental challenges outside of a hospital, but within close proximity to healthcare providers.

UL 1069 & UL 2560 COMPARISON

STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

CLAUSE 2, FUNDAMENTAL SYSTEM CONFIGURATION

2.6.1 – The fundamental operation of a nurse call system (NCS) shall include essential/required operation whose primary function is to provide notification and/or reset/cancellation of a staff-initiated or patient-initiated call signal to alert the staff. These operations include all of the following:

- a) Call annunciation at a nurse's station (audible and visual),
- b) Call annunciation at the dome light,
- c) Call-placed indicator on the patient station (visual),
- d) Zone annunciation (audible and visual), and
- e) Call reset/cancellation.

A NCS must contain devices that perform all of these fundamental operations.

2.1.1 – The minimum fundamental emergency call system (ECS) configuration shall consist of:

- a) Emergency call-initiation station with a call assurance indicator suitable for permanent installation in each resident living unit.
- b) Call notification station(s) that receive calls, one of which must be at a fixed location.
- c) Secondary (battery back-up) power supply.

UL 1069 – Requires a secondary power source in order to be used as an ECS.

UL 2560 – Typical applications will utilize pendants for residents, multiple call initiation stations in each living unit, and additional call initiation stations in common areas within the facility. Minimum configuration does not meet NCS (UL 1069) application.

MAXIMUM VOLTAGE

2.4.1 – The maximum distribution voltage available to equipment intended to be installed in areas accessible to a patient or persons touching a patient is not more than 30 volts AC (42.4 volts peak), 42.4 volts peak for nonsinusoidal AC, or 42.4 volts continuous DC. The maximum power available to low-voltage equipment intended to be installed in areas accessible to a patient or persons touching a patient, shall not be greater than 100 volt-amperes.

Not required by UL 2560.

UL 1069 is more stringent. Products meeting UL 2560 would need to be assessed to this requirement for UL 1069 compliance.

PERFORMANCE: NORMAL OPERATION

17.10 — If less than 100 percent of calls are able to be displayed on a nurse master or central control unit annunciator, the system shall have a priority, retrieval, or alerting capability that displays high priority (emergency and code call) signals in lieu of or in addition to routine calls.

17.10 — If fewer than 100 percent of calls are able to be displayed on a call notification station, the system shall comply with each of the following:

- a) The system shall have a priority, retrieval, or alerting capability that displays high priority (emergency) signals in lieu of or in addition to routine calls.
- b) The priority shall be emergency calls (high priority), routine calls (medium priority), and trouble calls (low priority).
- c) The call notification station must be capable of displaying at least 10% of the possible calls that could be displayed.

With the exception of 17.10 (c) of UL 2560, essentially no difference between UL 1069 and UL 2560. Verification that the NCS meets the 10% capability needed for complementary certification.

17.11 — Pendant controls and nurse call switches extending remotely from signaling units or wall outlets shall be connected so that unintentional removal of the device from its socket is promptly indicated by a visual or audible signal at the nurse's station, or a restraining means shall be provided at the point of connection to prevent removal.

17.11 — Call cords and emergency call switches extending remotely from signaling units or wall outlets shall be connected so that unintentional removal of the device from its socket is promptly indicated by a visual and audible signal at the call notifications station, or a restraining means shall be provided at the point of connection to prevent removal.

Same requirement between UL 1069 and UL 2560. No action needed for complementary certification.

STANDARD UL 1069, SEVENTH EDITION

17.13 — There shall be no loss of routine call, emergency, or code call signals while a signaling unit is energized by a standby power source and is operated under normal and signaling conditions. See 43.1(n).

17.15 — Initiation of a code call signal shall result in energization of a distinctive audible signal and identified related light at the nurse master of a conventional nurse call system or the central annunciator panel of a centralized system. Silencing of the audible signal shall not result in de-energization of the related light. After the audible signal has been silenced, the light shall continue to be energized in either a steady state or flashing condition. These requirements also apply to an independent code call signaling circuit that is not connected to a conventional or centralized nurse call system.

Not required in UL 1069.

STANDARD UL 2560, FIRST EDITION

17.13 — There shall be no loss of emergency call signals while a signaling unit is energized by a secondary power source and is operated under normal and signaling conditions. See 44.1(k).

Not required in UL 2560

17.16 – When an audible indication or signal is required, such indication or signal shall be, at a minimum, 60 dBA at one meter. It shall not be possible for the user to reduce the loudness below this minimum except by silencing when silencing is permitted.

Exception: If the signal or indication is related to a trouble condition, the minimum level shall be 50 dBA at one meter

COMPLEMENTARY CERTIFICATION SUMMARY

No Code Calls provided under UL 2560. Only Emergency Calls as highest priority. Complementary system should be set up with means to decide mutually exclusive configuration.

No Code Calls provided under UL 2560. Only Emergency Calls as highest priority. Complementary system should be set up with means to decide mutually exclusive config.

UL 2560 requires an Audibility Test to verify sound outputs, where UL 1069 does not have any Audibility requirements.



UL 1069 & UL 2560 COMPARISON

STANDARD UL 1069, SEVENTH EDITION	STANDARD UL 2560, FIRST EDITION	COMPLEMENTARY CERTIFICATION SUMMARY
17.18 – Operation of a Nurse Call Station shall result in an audible as well as a visual indication at the Primary Nurse Control Station. The visual indication shall identify the source of the annunciation. The visual annunciation shall be maintained continuously, locked in by either the unit from which the annunciation originated or by the unit receiving the annunciation, until reset manually. The audible annunciation shall be of at least 3 seconds duration for a continuous annunciation and repeated at least every 10 seconds for a pulsing type annunciation.	17.17 Operation of a call initiation station or pendant shall cause a call assurance indication. The indication shall be audible and/or visual. It shall be configured in accordance with one of the following: a) An indication that persists until the station is reset. The indication shall be steady, flashing or pulsing. If pulsing, it shall pulse at least once every 10 seconds. b) A steady or flashing indication that persists for a minimum of three seconds starting when the call switch was pushed or call was placed. c) Switch position, provided the off-position is clearly identifiable.	Same requirement with slightly different wording. No action needed for certification between UL 1069 and UL 2560.
17.18.1 — Call cancellation shall be in accordance with 2.6.2 and 2.6.3. 2.6.2 — All calls may only be cancelled at the originating patient care area or room of origin. <i>Exception: Routine calls may be canceled remotely if audio communication has been established between the calling patient care area or room of origin and the remote location.</i> 2.6.3 — Where the nurse call system allows remote call cancellation only when the audio communication connection is established end-to-end and verified prior to hang-up, establishing the audio communication is considered to be a supplemental operation.	17.18 — An emergency call shall only be reset/ canceled at the call initiation station or pendant from which the emergency call was placed. <i>Exception No. 1: When the origin of an emergency call is identified not only by dwelling unit but also by the area within the dwelling unit, and when there is more than one call initiation station located within that area, that call shall be permitted to be reset/canceled from any one of the call initiation stations within that area.</i> <i>Exception No. 2: If the system provides for routine (non-emergency) calls, then routine calls shall be permitted to be reset/canceled from the call notification station provided two way voice communication has been established between the call initiation station and the call notification station.</i>	Same requirement with slightly different wording. No action needed for complementary certification between UL 1069 and UL 2560.
17.19 — Calls on a Portable Nurse Control Station must be cancelled by an action separate and unique from terminating communication.	Not required in UL 2560.	UL 1069 is more stringent with respect to portable emergency/ nurse call stations. Products meeting UL 2560 would need to be assessed to this requirement for UL 1069 compliance.
Not required in UL 1069.	17.20 — The signal resulting from activation of a call initiation station or pendant shall occur every time the call initiation station or pendant is activated whether or not there has been an intervening reset.	UL 2560 is more stringent. Products meeting UL 1069 would need to be assessed to this requirement for UL 2560 compliance.
17.17 — Every call point covered by a Portable Nurse Control Station must also be covered by a Primary Nurse Control Station. When a patient-placed call is incapable of being received at a Portable Nurse Control Station as a result of a fault or out-of-range condition of the Portable Nurse Control Station, a trouble annunciation and identification of the faulted device shall be visually and audibly indicated at the Primary Nurse Control Station, and the system shall reroute orphaned calls to a Primary Nurse Control Station.	Not required in UL 2560.	UL 1069 is more stringent with respect to portable emergency/ nurse call stations. Products meeting UL 2560 would need to be assessed to this requirement for UL 1069 compliance.

STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

ELECTRICAL SUPERVISION

18.1.2 – A trouble signal shall be distinguishable from all nurse call signals and shall be indicated by operation of a sounding appliance. It is not prohibited that the sounding appliance be common to several supervised circuits. A switch for silencing the sounding appliance shall be provided only if a visual trouble indicator is provided that remains activated or is simultaneously activated when the sounding appliance is silenced. The visual indicator shall maintain its display until the silencing switch is restored to its nonsilenced position. The audible trouble signal shall sound if the switch is in its silenced position and no trouble exists. A visual indication is not required if the audible signal is re-energized upon restoration of the fault.

18.1.2 – A trouble signal shall be distinguishable from all emergency call signals and shall be indicated by operation of a sounding appliance. It is not prohibited that the sounding appliance be common to several supervised circuits. A switch for silencing the sounding appliance shall be provided only if a visual trouble indicator is provided that remains activated or is simultaneously activated when the sounding appliance is silenced. The visual indicator shall maintain its display until the silencing switch is restored to its non-silenced position. The audible trouble signal shall sound if the switch is in its silenced position and no trouble exists. A visual indication is not required if the audible signal is re-energized upon restoration of the fault.

No differences between UL 1069 and UL 2560. Same requirements apply in each standard.

Exception: If the silence switch is a momentary contact type, the visual indication shall maintain its display until that trouble condition or fault is restored.

18.1.4 – The fuses in a code call circuit and a centralized system control unit shall be electrically supervised to indicate rupture of the fuse by an audible trouble signal if the rupture prevents intended operation of the unit.

Not required in UL 2560.

UL 2560 does not employ Code Call signaling, therefore not applicable to ECS.

49.1 – The maximum time from the occurrence of a fault or adverse condition in any communication path or equipment during annunciation or idle time, or the restoration of the fault or adverse condition to normal shall be 90 seconds.

18.1.9 – The maximum time from the occurrence of a fault or adverse condition in any communication path or equipment during annunciation or idle time, to the restoration of the fault or adverse condition to normal state or to generation of a trouble signal in a worst case loaded system shall be that specified by the manufacturer. In no case, however, shall that time be greater than that shown below.

UL 2560 has less stringent requirements for wireless supervision than UL 1069. If end-products are evaluated to UL 1069 requirements then no action required for UL 2560 certification.

49.1.1 – The occurrence of continuous radio-frequency noise for more than 90 seconds that prohibits normal communication shall generate a trouble condition.

- a) Wireless Call Initiation Station - 24 hours
- b) Hardwired Call Initiation Station - 90 seconds
- c) Wireless Device that affects multiple Call Initiation Stations - 60 minutes

Exception: 24 hours for a device that does not constitute a single point of failure (i.e. another device will automatically take over the function of the failed device).

49.1.2 – While the system is operating under the maximum specified loading, the time from initiating a call until it is displayed at a Primary Nurse Control Station shall not exceed 15 seconds. The time from the initiation of a trouble transmission until it is displayed at a Primary Nurse Control Station shall not exceed 90 seconds.

- d) Hardwired Device that affects multiple Call Initiation Stations - 90 seconds

49.3.2 – A Primary Nurse Control Station shall report and identify an inoperative transmitter in the system within 90 seconds.

STANDARD UL 1069, SEVENTH EDITION	STANDARD UL 2560, FIRST EDITION	COMPLEMENTARY CERTIFICATION SUMMARY
TEMPERATURE TEST (TABLE 22.1)		
<p>Similar additional options for compliance with the requirements for the Temperature Test are not currently in UL 1069.</p> <p>UL 1069 includes the following references to “reliable components.”</p> <p>17.12 – The visual indication required at a nurse master station or central control unit to identify the source of a patient call shall consist of any one of the following arrangements:</p> <p>c) A reliable lamp, such as a light emitting diode having a maximum predicted failure rate of 2.5 failures per million hours, or an incandescent lamp that withstands 100,000 cycles of operation (see Table 24.1).</p> <p>19.3.4 – Components, circuits, or both shall be determined to be reliable by any one of the following methods:</p> <p>(c) The individual component or each component of the circuit has a predicted failure rate of 2.5 or less failures per million hours as determined for a “Ground Fixed” (GF) environment by MILHDBK 217B, or equivalent.</p>	<p>In lieu of complying with these temperature limits, a reliable component shall be used. The reliability of the component may be based on derating or on reliability data recorded for the particular component. Suitable sources are:</p> <p>a) The capacitor derating parameters as specified in Table 22.2.</p> <p>b) The Military Handbook: Electronic Reliability Design Handbook, MIL-HDBK-338, and</p> <p>c) Component reliability data based on actual performance in a similar application, such that the failure rate is equal to or less than 2.5 failures per million hours of operation.</p>	<p>UL 1069 currently does not utilize these options in determining compliance with the Temperature Test and is considered more stringent than UL 2560. Products complying with UL 1069 meet the requirements of UL 2560.</p>



STANDARD UL 1069, SEVENTH EDITION

Not required in UL 1069.

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

**TABLE 22.2
CAPACITOR DERATING PARAMETERS
(SEE FOOTNOTE F OF TABLE 22.1)**

Type	Derating parameter	Derating level a
Mica, film, glass	Normal operating DC voltage	60 percent
	Temperature from maximum limit	10° C
Ceramic	Normal operating DC voltage	60 percent
	Temperature from maximum limit	10° C
Electrolytic Aluminum	Normal operating DC voltage	80 percent
	Temperature from maximum limit	20° C
Electrolytic Tantalum	Normal operating DC voltage	60 percent
	Temperature from maximum limit	20° C
Solid Tantalum	Normal operating DC voltage	60 percent
	Maximum operating temperature	85° C

* Percent of derated value to the rated normal operating DC voltage.

UL 2560 provides additional options, not currently addressed in UL 1069, for compliance with the temperature test. UL 1069 would be considered more stringent when the options in Table 22.2 of UL 2560 were followed in the assessment of a UL 2560 product.

22.10 – To determine compliance with this test, a unit and related devices are to be connected to a supply circuit of rated voltage and frequency and operated under each of the following conditions:

- b) Normal Signaling, 20 Percent of Maximum Rated Load, Discharged Battery – 1 hour,

22.11 – For a signaling unit having provision for the connection of multiple patient stations, 20 percent of the total number of stations, but in no case less than three, are to be energized during the normal signaling condition. Prior to conducting this test, a rechargeable battery is to be discharged as described in 46.1(j) with 100 percent of the maximum rated load connected and with the main AC supply disconnected. During the abnormal signaling condition, all stations are to be actuated. It is not prohibited that the temperatures specified in Table 22.1 be exceeded, but there shall be no risk of fire or electric shock and the unit shall operate in its intended manner following the test. If an overcurrent protective device is employed, the loading specified in 22.10(c) is to be 110 percent of the protective device rating. For this test it is not prohibited that the overcurrent protective device be shunted.

22.12 — If the emergency call system has a power supply-battery charger combination, the test sequence is to be as follows:

- a) The power supply section is to be delivering maximum rated output power and the battery charger section is to be connected to a discharged battery, see 22.13, of the maximum capacity prescribed by the manufacturer.
- b) After operation for 1 hour, the temperature rises shall not exceed the values shown in the second column (Signaling Condition — Short Term Operation) of Table 22.1.
- c) The ECS is to be operated for a total of 48 hours of continuous operation with the load specified in 12.2.2.
- d) At the conclusion of the 48 hour period, the product is to be subjected to the Battery Charging Test, Section 12.3.

22.13 — With reference to 22.11 and 22.12, a discharged battery is one that has been:

- a) Fully charged, in a new condition, according to the manufacturer's instructions then
- b) Delivering the load specified in 12.2.2 for 24 hours with primary power disconnected.

UL 2560 considered more stringent and additional testing of UL 1069 end-product devices will be necessary for ECS Listing.

STANDARD UL 1069, SEVENTH EDITION	STANDARD UL 2560, FIRST EDITION	COMPLEMENTARY CERTIFICATION SUMMARY
SECONDARY POWER SUPPLY		
<p>12.1 – If the product incorporates a secondary power supply, such as a battery, the supply shall be of sufficient capacity to provide 10 percent of maximum rated power for the time specified in the manufacturer’s installation instructions.</p> <p>17.14 – Transfer of power from the main supply to standby shall not result in the loss of any call. This test is to be conducted while the unit is providing 10 percent of rated power.</p>	<p>12.1.1 – An emergency call system shall be equipped with secondary power, or terminals or leads for the connection of secondary power.</p> <p>12.1.2 – If a battery is employed as a secondary power supply, it shall be a rechargeable type of sufficient capacity to comply with the requirements of the Power Supply Supervision Test, Section 12.2.</p> <p>12.2.1 – An emergency call system shall be electrically supervised so that loss of AC power will result in an audible and visual trouble indication at the call notification station.</p> <p>12.2.2 – The capacity of the secondary power shall be sufficient to operate the system at 10% of its maximum signaling capacity for the time specified in the manufacturer’s installation instructions.</p> <p>12.2.4 – With secondary power connected, neither loss nor restoration of the primary voltage source shall cause the indication of an off-normal condition (other than the trouble indication required by 12.2.1) or other incorrect indication.</p> <p>12.2.5 – To determine compliance with the requirement of 12.2.4, the system is to be energized in the normal standby condition and the supply circuit interrupted for 1 minute and restored for 1 minute for a total of 10 cycles of interruption and restoration.</p> <p>12.2.6 – Following an extended power failure of 24 hours or more and subsequent restoration of power, secondary power shall, within 48 hours, be capable of providing the required standby power in accordance with 12.2.2.</p> <p>12.2.7 – Momentary power failures and subsequent power restorations shall not render the equipment inoperative for any of its functions.</p> <p>12.3.1 – The Battery Charging Test is to be conducted in conjunction with the Temperature Test, Section 22, on products that utilize batteries for secondary power.</p> <p>12.3.2 – At the conclusion of the 48-hour charging period (see 22.12(c)) during which the ECS is operating continuously with the AC input connected and with the load specified in 12.2.2 connected, the battery terminal voltage shall not be less than 95 percent of the value measured on a fully charged battery, in new condition, and connected to the load specified in 12.2.2.</p> <p>12.4.1 – With the AC source disconnected, the load specified in 12.2.2 is to remain connected to the output for the period specified in 12.2.2.</p> <p>12.4.2 – With the load specified in 12.2.2 still applied, battery terminal voltage shall be not less than 85 percent of the marked ratings of the output circuits.</p>	<p>UL 2560 is considered more stringent and UL 1069 compliant products will need to be tested.</p>

STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY
CERTIFICATION SUMMARY

ENDURANCE TEST

**TABLE 24.1
ENDURANCE TEST CYCLES**

TYPE OF DEVICE	NUMBER OF SIGNALING OPERATIONS*
Main control equipment	1,000,000
Nurse's console (one station)	100,000
Patients' stations	100,000
Emergency communication stations	100,000
Any emergency signaling device	30,000
Dome lights	6,000
Nurse-doctor communication stations	6,000
Any nonemergency supplementary stations	6,000
Reliable visual indicating lamp	100,000
Nurse locator station	100,000

* For solid-state switching devices, used within their rated voltage and current. It is not prohibited that the number of signaling operations be reduced to 50,000 cycles after the device has reached thermal equilibrium during the test.

**TABLE 24.1
ENDURANCE TEST CYCLES**

TYPE OF DEVICE	NUMBER OF SIGNALING OPERATIONS*
Main control equipment	1,000,000
Call Notifications station	100,000
Residents' stations	100,000
Emergency communication stations	100,000
Any emergency signaling device	30,000
Dome lights	6,000
Any nonemergency supplementary stations	6,000
Reliable light source	100,000

* For solid-state switching devices, used within their rated voltage and current. It is not prohibited that the number of signaling operations be reduced to 50,000 cycles after the device has reached thermal equilibrium during the test.

Testing considered the same with respect to functions. UL 1069 NCS utilizes additional functions to UL 2560 ECS, which may not have been assessed under UL 2560.



STANDARD UL 1069, SEVENTH EDITION

LEAKAGE CURRENT

28.1 — The leakage current of a signaling unit shall not exceed the values specified in Table 28.1 when measured under all of the following conditions after being subjected to the Humidity Test, Section 26. All grounding connections to the unit being tested are to be disconnected prior to making the measurement. See Figure 28.1.

- a) Between any exposed surface of any fixed or stationary equipment and earth ground.
- b) Between any exposed surface of any portable equipment that is not intended to be contacted by a patient and earth ground.
- c) Between any exposed surface of any stationary or portable equipment that cannot be placed in bed with a patient but would normally be contacted by a patient and earth ground.
- d) Between any current-carrying part of a remote control device that rests on a bed with the patient, such as a pendant control assembly, and earth ground.

TABLE 28.1 MAXIMUM LEAKAGE CURRENT	
TEST*	MAXIMUM LEAKAGE CURRENT — MICROAMPERES (AC OR DC)
a	5,000
c	500
d	300
e	300

* Letter corresponds to applicable item of 28.1.

STANDARD UL 2560, FIRST EDITION

28.1 — The leakage current of a signaling unit shall not exceed 5000 microamperes (AC or DC) when measured between any exposed surface of any fixed or stationary equipment and earth ground after being subjected to the Humidity Test, Section 26. All grounding connections to the unit being tested are to be disconnected prior to making the measurement. See Figure 28.1.

COMPLEMENTARY
CERTIFICATION SUMMARY

UL 1069 considered more stringent. Therefore, for UL 2560 certification no action considered necessary.

If UL 2560 compliant, additional testing may be necessary for UL 1069 certification.



STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

TRANSIENT TEST: SUPPLY LINE TRANSIENTS — HIGH-VOLTAGE UNITS

Figure 29.1 Transient Surge Generator Circuit

29.2.3 — The transients produced are to be oscillatory and are to have an initial peak voltage of 6,000 volts. The rise time is to be less than 1/2 microsecond. Successive peaks of the transient are to decay to a value of not more than 60 percent of the value of the preceding peak.

29.2.3 — The transients produced are to be oscillatory and are to have an initial minimum peak voltage of 6,000 volts. The rise time is to be less than 1/2 microsecond. Successive peaks of the transient are to decay to a value of not more than 60 percent of the value of the preceding peak at a rate of 100 kilohertz until line voltage is attained. Each transient is to have a total duration of 20 microseconds and is to be applied at the peak of the 60 hertz waveform.

UL 2560 includes performance based description of the waveform, while UL 1069 describes a specific transient generator. Same requirement between UL 1069 and UL 2560. Therefore, no additional testing considered necessary.

STATIC DISCHARGE TEST

31.2 — Each type of signal initiating unit is to be mounted in the intended position on a 3/4 inch (19 mm) thick unpainted exterior grade plywood surface and connected to a source of supply in accordance with Table 16.1. When a unit is intended to be installed in a metal electrical junction box the box is to be connected to earth ground. An electrostatic discharge simulator is to be charged to 8,000 volts for a minimum of 2 seconds before each discharge. A simulator suitable for use is Electro-Metrics ESD-200 Electrostatic Discharge Control Unit and Model D-30 Probe Assembly.

31.2 — Each type of signal initiating unit is to be mounted in the intended position on a 3/4 inch (19 mm) thick unpainted exterior grade plywood surface and connected to a source of supply in accordance with Table 16.1. When a unit is intended to be installed in a metal electrical junction box the box is to be connected to earth ground. An electrostatic discharge simulator with a capacitive resistive network of 250 pF and 1.5 k-ohm, is to be charged to 8,000 volts for a minimum of 2 seconds before each discharge.

UL 2560 includes performance based description of the test, while UL 1069 describes specific static discharge equipment. Same requirements between UL 2560 and UL 1069, therefore no additional testing considered necessary.

DROP TEST

32.2 — Each of three samples is to be dropped 100 times from a height of 4 feet (1.2 m) onto an asbestos-filled concrete surface. The distance of the drop is to be measured from the asbestos tiled concrete surface to the bottom-most part of the device. Each sample of the device is to be positioned to impact on the weakest point that can be contacted in the drop. The device shall be operational following the test.

32.2 — Each of three samples is to be dropped 100 times from a height of 4 feet (1.2 m) onto a concrete surface. The distance of the drop is to be measured from the concrete surface to the bottom-most part of the device. Each sample of the device is to be positioned to impact on the weakest point that can be contacted in the drop. The device shall be operational following the test.

Exception: If the device is intended only for use by a resident, the number of times each sample is to be dropped is 25.

UL 1069 considered more stringent, therefore no additional testing considered necessary for a UL 2560 certification.

UL 2560 to UL 1069 may require additional testing due to the exception of UL 2560.

WATER SPRAY AND SUBMERSION TEST

38.1 A signaling unit intended for use within a shower stall shall withstand a water spray exposure without wetting of electrical parts. After the exposure, the unit shall comply with the leakage current requirements.

Submersion test is not required in UL 1069.

38.1.1 — A signaling unit intended for use within a shower stall shall withstand a water spray exposure without wetting of electrical parts. After the exposure, the unit shall comply with the leakage current requirements in 28.1, and shall not impair the intended operation per the manufacturers' instructions.

38.2.1 — A signaling unit intended for submersion within a body of water 4 feet (1.2 m) in depth shall withstand a water submersion exposure for 1 minute without wetting of electrical parts and shall not impair the intended operation of the device per the manufacturer's instructions.

UL 2560 considered more stringent since because UL 1069 does not require the performance evaluation after the test.

Additional testing will become necessary for UL1069 to UL 2560 assessment.

UL 1069 & UL 2560 COMPARISON

STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

OXYGEN-ENRICHED ENVIRONMENT TEST

40.1.1 – Products marked as indicated in 43.1(h) for use in an oxygen enriched environment as defined in the Health Care Facilities Code, ANSI/NFPA 99, shall comply with 40.1.2 - 40.1.3.

40.1.2 – Products marked as indicated in 43.1(h) shall be connected to the designated circuits of the specific models of patient stations and ancillary equipment, such as televisions, entertainment systems and lighting controls, identified in Instructions and Installation Drawings, Details, Section 46.

40.1.3 – In lieu of connecting to specific equipment required by 40.1.2, the products are permitted to be connected to the power source(s) identified in Table 40.1.

40.1.4 – While connected and energized as described in 40.1.2 and 40.1.3, the products shall meet the requirements of one of the following:

- a) The requirements in Oxygen-enriched atmosphere testing, Section 40.2;
- b) Ventilated to limit the oxygen concentration surrounding electrical components to below 23.5 percent by volume; or
- c) Have the following characteristics:
 - 1) All surface temperatures of the product are less than 300°C (573°F), except for less than 2-W hermetically sealed heating elements, such as light bulbs; and
 - 2) No switching or sparking points of electrical energy that fall to the right of the curves for the appropriate type of circuit for electrical equipment in oxygen-enriched environments described in the Health Care Facilities Code, ANSI/NFPA 99.

40.2.1 – Two samples of each product shall be subjected to the following sequence of tests while connected as described in 40.1.2 and 40.1.3:

- a) Polymeric Materials Tests - Temperature test, Section 36.2;
- b) Overload Test, Section 23;
- c) Endurance Test, Section 24;
- d) Drop Test, Section 32;
- e) Endurance Test, Section 24, except the product is subjected to 100 cycles of operation while connected and energized in a chamber containing a 100 percent oxygen atmosphere. A single layer of cheesecloth is loosely draped over the entire unit.

Not Required under UL 2560.

UL 1069 considered more stringent because UL 2560 does not require this test.

Additional testing will be necessary for UL 2560 to UL 1069 assessment.

STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

WIRELESS DEVICES

49 General

49.1 — The time periods for processing and activation of annunciations in a worst case loaded system shall be as follows:

- Nurse-call and supervisory annunciations shall be displayed on a Primary Nurse Control Station.
- The maximum time from the occurrence of a fault or adverse condition in any communication path or equipment during annunciation or idle time, or the restoration of the fault or adverse condition to normal shall be 90 seconds.
- Cancellation of call and supervisory annunciation is acceptable to signal their restoration to normal.

49.1.1 — The occurrence of continuous radio-frequency noise for more than 90 seconds that prohibits normal communications shall generate a trouble annunciation.

49.1.2 — While the system is operating under the maximum specified loading, the time from initiating a call until it is displayed at a Primary Nurse Control Station shall not exceed 15 seconds. The time from the initiation of a trouble transmission until it is displayed at a Primary Nurse Control Station shall not exceed 90 seconds.

49.1.3 — An equipment failure that causes constant full-power transmission at any one frequency shall not cause failure of other system components or the failure of calls to reach a Primary Nurse Control Station.

49.1.4 — Calls from wireless transmitting devices must be identified at the annunciating devices by the room and/or bed of the device under the conditions specified by the vendor. Wireless systems must place a trouble call at the annunciating device when communication fails for any reason or upon being disabled by staff members.

40.1 General

40.1.1 — The maximum time from the occurrence of a fault or adverse condition in any communication path or equipment's during annunciation or idle time, to the restoration of the fault or adverse condition to normal state or to generation of a trouble signal in a worst case loaded system shall be that specified in 18.1.9.

40.1.2 — While the system is operating under the maximum specified loading, the time from initiating a call until it is displayed at a call notification station shall not exceed 60 seconds.

40.1.3 — An equipment failure that causes constant full-power transmission at any one frequency either shall not interfere with the intended operation of system or shall produce a trouble signal.

40.1.4 — Wireless devices must place or cause a trouble call at the Call Notification Station, when communication fails for any reason or upon being disabled by staff members. (See 18.1.2.)

UL 1069 considered more stringent and therefore for a UL 2560 complementary certification no action considered necessary.

For a UL 2560 system to comply with the UL 1069 requirements additional testing would be considered necessary.



UL 1069 & UL 2560 COMPARISON

STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

PRIMARY BATTERIES

49.2.1 — A primary battery is not prohibited from being used as the sole source of power for a low-power radio transmitter when all of the following conditions are met:

- a) The capacity of the primary battery shall be monitored for integrity. The battery shall be monitored while loaded by:
 - 1) Transmission of the transmitter or
 - 2) A load equivalent to the load imposed by transmission.
- b) A required battery trouble call shall be transmitted to the receiver for a minimum of 7 days before the battery capacity of the transmitter has depleted to a level insufficient to maintain proper non-call operation of the transmitter. It is acceptable for the battery trouble call at the Primary Nurse Control Station to be initially delayed up to 4 hours. The battery trouble annunciation shall be retransmitted at intervals not exceeding four hours until the battery is replaced.
- c) The battery of a transmitter shall be capable of operating the transmitter for a published manufacturer specified length of time of normal annunciating service before the battery depletion threshold specified in (b) is reached.
- d) Annunciation of the battery trouble call at the Primary Nurse Control Station shall be distinctly different from patient calls. It shall consist of an audible and visual annunciation that shall identify the affected transmitter by the room and/or bed of the device.
- e) It is acceptable for the audible battery trouble call of the Primary Nurse Control Station to be silenced when provided with an automatic feature to resound the annunciation at intervals not exceeding 4 hours.
- f) The battery trouble call shall persist at the Primary Nurse Control Station until the depleted battery has been replaced.
- g) Any mode of failure of a primary battery in a transmitter shall not affect any other transmitter.

50.1.5 — (Life test) During the course of the test, the battery voltage and current in standby is to be recorded periodically. Once a month, the call load shall be momentarily connected to the battery for 30 seconds and the call voltage recorded after 3 seconds.

50.1.6 — (Life Test) At the end of the test period, all batteries shall have sufficient capacity to operate the call signal for a minimum of 5 minutes, followed by 7 days of trouble signal. When, at the conclusion of the test period and after 5 minutes of the call condition, the battery voltage level is too high for the product to transmit a trouble condition, the call test period shall continue until the trouble signal level is obtained.

40.2.1 — A primary battery is not prohibited from being used as the sole source of power for a low-power radio transmitter when all of the following conditions are met:

- a) The capacity of the primary battery shall be monitored for integrity. The battery shall be monitored while loaded by:
 - 1) Transmission of the transmitter or
 - 2) A load equivalent to the load imposed by transmission.
- b) A required battery trouble call shall be transmitted to the receiver for a minimum of 7 days before the battery capacity of the transmitter has depleted to a level insufficient to maintain proper non-call operation of the transmitter. It is acceptable for the battery trouble call at the call notification station to be initially delayed up to 24 hours.
- c) The battery of a transmitter shall be capable of operating the transmitter in its normal supervisory mode and placing a single emergency call per day, each call remaining for 5 minutes before it is reset, for a published manufacturer specified length of time before the battery depletion threshold specified in (b) is reached.
- d) Annunciation of the battery trouble call at the call notification station shall be distinctly different from emergency calls. It shall consist of an audible and visual annunciation that shall identify the affected transmitter.
- e) It is acceptable for the audible battery trouble call of the call notification station to be silenced when provided with an automatic feature to resound the annunciation at intervals not exceeding 24 hours.
- f) The battery trouble call shall persist at the call notification station until the depleted battery has been replaced.

41.1.5 — (Life Test) During the course of the test, the battery voltage and current in standby is to be recorded periodically.

41.1.6 — (Life Test) At the end of the test period, all batteries shall have sufficient capacity to operate the call signal for a minimum 7 days of trouble signal. When, at the conclusion of the test period the battery voltage level is too high for the product to transmit a trouble condition, the call test period shall continue until the trouble signal level is obtained.

UL 1069 is considered more stringent so no additional testing would be deemed necessary for a UL 1069 system for UL 2560 complementary certification.

A UL 2560 certified system to a UL 1069 certification additional testing would be considered necessary.

STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

LOW-POWER RADIO-FREQUENCY SIGNALING

49.3.2 – A Primary Nurse Control Station shall report and identify an inoperative transmitter in the system within 90 seconds.

18.1.9 – The maximum time from the occurrence of a fault or adverse condition in any communication path or equipment during annunciation or idle time, to the restoration of the fault or adverse condition to normal state or to generation of a trouble signal in a worst case loaded system shall be that specified by the manufacturer. In no case, however, shall that time be greater than that shown below.

- a) Wireless Call Initiation Station - 24 hours
- c) Wireless Device that affects multiple Call Initiation Stations - 60 minutes

Exception: 24 hours for a device that does not constitute a single point of failure (i.e. another device will automatically take over the function of the failed device).

UL 1069 is considered more stringent than UL 2560. Therefore, no additional testing considered necessary for certification of a UL 1069 system for use as an ECS (UL 2560).

A UL 2560 system to a UL 1069 certification would require additional testing in accordance with UL 1069 requirements.

CLASH

49.5.3 – The clash rate relative to normal status transmissions for each specific signal shall not exceed the following values:

- a) 99.99 percent probability that the time between the initiation of a single call annunciation until it is received at the receiver does not exceed 10 seconds;
- b) 99.95 percent probability that the time between the initiation of a single supervisory signal until it is received at the receiver unit does not exceed 10 seconds.

40.5.3 – The clash rate relative to normal status transmissions for each specific signal shall not exceed the following values:

- a) 99.99 percent probability that the time between the initiation of a single call annunciation until it is received at the receiver does not exceed 60 seconds;
- b) 99.95 percent probability that the time between the initiation of a single supervisory signal until it is received at the receiver unit does not exceed 60 seconds.

UL 1069 is considered more stringent than UL 2560. Therefore, no additional testing considered necessary for certification of a UL 1069 system for use as an ECS (UL 2560).

A UL 2560 system to a UL 1069 certification would require additional testing in accordance with UL 1069 requirements.

Not required in UL 1069.

40.5.5 – The duty cycle per frequency channel of the transmission from a single activation shall not be more than 15 percent measured over a one-minute interval.

Exception: Portable call pendant transmitters, when manually activated, are exempt from this requirement.

For a UL 1069 certified portable end-product device to a UL 2560 complementary certification, additional testing would be deemed necessary, since UL 2560 is more stringent.




STANDARD UL 1069, SEVENTH EDITION	STANDARD UL 2560, FIRST EDITION	COMPLEMENTARY CERTIFICATION SUMMARY
MARKINGS AND INSTRUCTIONS AND INSTALLATION INSTRUCTIONS		
<p>43.1 – A signaling unit shall be plainly and permanently marked where the marking is readily visible after installation, with the following information. Except as indicated otherwise, the information shall appear directly on the unit or on a separate installation diagram referenced in the marking:</p> <p>c) Electrical rating in volts, amperes or watts, and frequency. (The marking shall be on the unit.) It is not prohibited that input ratings to low-voltage products be marked on the installation wiring diagram.</p>	<p>44.1 – A unit shall be plainly and permanently marked where the marking is readily visible after installation, with the following information. Except as indicated otherwise, the information shall appear directly on the unit or on a separate installation diagram referenced in the marking:</p> <p>c) For products directly powered from high voltage, electrical rating in volts, amperes or watts, and frequency. The marking shall be on the unit.</p>	<p>UL 2560 is considered more stringent for products directly powered from high voltage.</p>



STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

- h) Only a pendant control or call cord that has been investigated and found suitable for use in oxygen-enriched atmospheres, is permitted to have the following marked on the device: "Note - May Be Used by Patients Undergoing Oxygen Therapy - Hang On Hook (In Holder) When Not In Use."
- i) For a pendant control provided with connections to control circuits, such as radio, television, drapery hardware, and similar devices, the electrical ratings of these circuits. (Marked on the control.) In addition, the word "CAUTION" and the following or equivalent text shall be marked on the control: "Make periodic leakage current measurements of all pendant control/pillow speaker circuits to verify the values are appropriate for the installation location."
- 1) The signal word "CAUTION":
- i) Shall appear in black, upper-case letters in a sans serif font of Folio Medium, New Gothic Bold, Helvetica Bold, or equivalent fonts, on a yellow background;
 - ii) Shall be at least 50 percent larger than the remaining text of the marking, and be of a size that is sufficient to be seen from a distance and allowing a user/service person an adequate amount of time to take action to avoid the hazard specified in the marking after viewing the label;
 - iii) Is to appear in a separate, distinct area within the marking label.
- 2) The Safety Alert Symbol, , is to appear next to the signal word and is to be no smaller than the height of the signal word with the base of the triangle on the same horizontal line as the base of the signal word. The solid triangle portion (within the lines of the triangle, around the exclamation mark) shall be the same color as the signal word letters, and the exclamation mark shall be the same color as the signal word background.

Exception: The cautionary marking is not required to be included on the pendant control if it is included on or in all of the following locations:

- 1) *On the patient station to which the pendant control is connected.*
 - 2) *On the system control unit.*
 - 3) *In the installation manual.*
- k) Identification of high-voltage wires of a cable assembly containing both high- and low-voltage circuit connections. (It is not prohibited that the marking be included in the installation diagram.)

Not required by UL 2560

UL 1069 is considered more stringent because these marking requirements address aspects not covered by UL 2560.

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UL 1069 & UL 2560 COMPARISON

STANDARD UL 1069, SEVENTH EDITION

continued

- l) For a patient station incorporated as part of a prefabricated wall panel, the following or equivalent text: "The Compatibility Of The Patient Station And Faceplate With The Back Box Or The Acceptability Of Any Device Installed In The Side Compartment Has Not Been Investigated." (The marking shall be on the patient station.)
- o) For a patient station intended to be installed in a shower stall, or an equivalent location where water spray would be encountered, the words "SHOWER STATION." (The marking shall be on the station.)
- p) For a power supply and nurse master intended for use in a centralized system, the following or equivalent text: "For Use In A Centralized System." (The marking shall be on the power supply/nurse master.)

- j) For a device, such as a switch, intended for emergency service, the word "EMERGENCY" or an equivalent wording describing an emergency condition, such as "PULL FOR HELP." The marking shall be permanent, in a distinctive color (preferably red), and on the front of the device. Other type units shall be marked regarding their function.

46.4 c) – Pendant Control Circuits - Circuits not intended specifically for nurse call signaling shall be marked to show connection either to a specific device by name of manufacturer and model number or by an electrical rating in volts, amperes, or watts, and frequency in hertz. The word "CAUTION" and the following or equivalent marking shall be provided at the terminals: "CONNECT ONLY TO CLASS 2 CIRCUITS. MAKE PERIODIC LEAKAGE CURRENT MEASUREMENTS OF ALL PENDANT CONTROL/ PILLOW SPEAKER CIRCUITS TO VERIFY THE VALUES ARE APPROPRIATE FOR INSTALLATION LOCATION."

Not required by UL 1069.

STANDARD UL 2560, FIRST EDITION

continued

- h) For a device, such as a switch, intended for emergency service, the word "EMERGENCY" or an equivalent wording describing an emergency condition, such as "PULL FOR HELP." The marking shall be permanent, in a distinctive color, and on the front of the device. Other type units shall be marked regarding their function.

Exception: A pendant that places emergency calls only does not require this marking provided the means of activation is obvious.

47.4 d) – Call Cord Circuits shall be marked to show connection either to a specific device by name of manufacturer and model number or by an electrical rating in volts, amperes, or watts, and frequency in hertz.

47.9 – The installation instructions shall contain the following statements or the equivalent:

- a) "It is required that one of the call initiation stations assigned to each resident apartment should be permanently located in the bathroom of that apartment."
- b) "At least one of the call notification stations serving the property must be permanently attached or tethered at a fixed location."

A statement that replaces "call initiation station" and "call notification station" with the manufacturer's model numbers or designations is considered equivalent.

COMPLEMENTARY CERTIFICATION SUMMARY

continued

UL 1069 is considered more stringent because these marking requirements address aspects not covered by UL 2560.

UL 1069 is considered more stringent than UL 2560. No additional testing considered necessary for certification of a UL 1069 system for use as an ECS (UL 2560).

UL 1069 is considered more stringent than UL 2560. No additional testing considered necessary for certification of a UL 1069 system for use as an ECS (UL 2560).

UL 2560 is considered more stringent than UL 1069. No additional testing considered necessary for certification of a UL 2560 system for use as an NCS (UL 1069).

STANDARD UL 1069, SEVENTH EDITION

STANDARD UL 2560, FIRST EDITION

COMPLEMENTARY CERTIFICATION SUMMARY

47.10 – The following statement, or the equivalent, shall appear in the installation manual: “The emergency call system must not share its communication network with any other network or system. All devices connected directly to the wiring of a hardwired system, and all transmitters using the same frequency or channel and that are within range of a receiver of a wireless system, must be compatible with the emergency call system and evaluated for the intended purpose. Supplementary devices not evaluated for the intended purpose are permitted only if their connection to the network utilizes a compatible device evaluated for the purpose.”

CONSTRUCTION

6.2 – Each terminal provided for the connection of an external antenna shall be conductively connected to the supply circuit grounded conductor. The conductive connection shall have a maximum resistance of 5.2 meg-ohms, a minimum wattage rating of 1/2 watt, except for the construction described in 6.3, and shall be effective with the power switch in either the on or off position.

6.2 – Each terminal provided for the connection of an external uninsulated antenna shall be conductively connected to the supply circuit grounded conductor. The conductive connection shall have a maximum resistance of 5.2 meg-ohms, a minimum wattage rating of 1/2 watt, except for the construction described in 6.3, and shall be effective with the power switch in either the on or off position.

UL 1069 is considered more stringent when the antenna is uninsulated.

8.2.2.2 – Permits a minimum field wire size of 22 AWG for terminals for low voltage power limited circuits.

8.2.2.2 – Permits a minimum field wire size of 26 AWG for terminals for low voltage power limited circuits.

UL 1069 is considered more stringent than UL 2560. No additional testing considered necessary for certification of a UL 1069 system for use as an ECS (UL 2560).

8.3.3 – Permits a minimum wire gauge of 22 AWG for field wiring leads for low voltage power-limited circuits.

8.3.3 – Permits a minimum wire gauge of 24 AWG for field wiring leads for low voltage power-limited circuits.

8.4.3 – Permits a minimum of 22 AWG for interconnecting cable assemblies terminated in splice leads for low voltage power-limited circuits.

8.4.3 – Permits a minimum of 24 AWG for interconnecting cable assemblies for low voltage power-limited circuits.



STANDARD UL 1069, SEVENTH EDITION	STANDARD UL 2560, FIRST EDITION	COMPLEMENTARY CERTIFICATION SUMMARY
<p>11.6.1 – A receptacle or connector of the multiple pin type shall be suitable for the current and voltage to which it will be subjected, and it shall include a grounding pin or lug having a current-carrying capacity equivalent to the maximum size conductor employed in the connected cable assembly.</p> <p><i>Exception: The connecting plug leading to a pillow speaker is not required to have a grounding pin if the speaker is enclosed in an impact resistant nonmetallic enclosure.</i></p>	<p>11.6.1 – A receptacle or connector of the multiple pin type shall be suitable for the current and voltage to which it will be subjected, and it shall include a grounding pin or lug having a current-carrying capacity equivalent to the maximum size conductor employed in the connected cable assembly.</p> <p><i>Exception No. 1: The connecting plug leading to a pillow speaker/call cord is not required to have a grounding pin if the speaker is enclosed in an impact resistant nonmetallic enclosure.</i></p> <p><i>Exception No. 2: The connection plug leading to a non-resident contacted device is not required to have a ground pin.</i></p>	<p>UL 1069 is considered more stringent than UL 2560 because it does not include the second exception. No additional testing considered necessary for certification of a UL 1069 system for use as an ECS (UL 2560).</p>
<p>11.4.5 – A lamp employed for signaling an emergency condition shall be red or flashing white, or equivalent.</p> <p>11.7.4 – Control circuits not pertaining to the nurse call signaling system that extend into the patient care area through the nurse call pendant shall</p> <p>11.7.4 –comply with General isolation in 4.2; Circuit isolation - ancillary equipment, Section 34.3; Marking - General, Section 43; and Instructions and Installation Drawings - Details, Section 46.</p>	<p>Not required in UL 2560.</p>	<p>UL 1069 is considered more stringent than UL 2560. No additional testing considered necessary for certification of a UL 1069 system for use as an ECS (UL 2560).</p>
<p>Table 14.1 – minimum spacings are more stringent than that for UL 2560.</p>	<p>Table 14.1 – minimum spacings are less stringent than that for UL 1069.</p>	<p>UL 1069 is considered more stringent than UL 2560. No additional testing considered necessary for certification of a UL 1069 system for use as an ECS (UL 2560).</p>



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