Article

UL 2524: Understanding the new safety and performance requirements

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Critical safety and performance requirements found in NFPA 1 and NFPA 1221 that are not addressed by system certification to UL 60950/UL 62368. Learn how UL 2524 tackles these requirements.

UL 2524 includes additional critical safety and performance requirements not found in UL 60950/UL 62368. These requirements were adopted to align with similar requirements that have been utilized for fire alarm systems and which the fire alarm industry has found beneficial.

Below, we've outlined the key requirements found in UL 2524. Requirements unique to UL 2524 which are not found in UL 60950/UL 62368, primarily fall into two categories: performance/functionality and construction.

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UL 2524
INCLUDES ADDITIONAL
CRITICAL **SAFETY**
AND **PERFORMANCE**
REQUIREMENTS
NOT FOUND IN
UL 60950/UL 62368

Performance/functionality requirements

- Monitoring for integrity of the indicated faults result in audible and visual trouble annunciation at the dedicated annunciator:
  - Loss of normal AC power*
  - Battery charger failure*
  - Loss of battery capacity (to 70% depletion)*
  - Donor antenna disconnection*
  - Active RF emitting device malfunction*
  - System component malfunction, other than passive RF component, which affects system performance*
  - Donor antenna malfunction**
- Additional aspects of the system to be monitored for integrity include:
  - Loss of secondary power
  - Single open and single ground faults on the communication pathway to the dedicated annunciator
- The system meets the requirement for redundant (two independent) power sources.
- Secondary power source tested to operate at 100% capacity for at least 12 hours.
- Capability of the system to be compatible with a fire alarm system to annunciate system supervisory signals for donor antenna malfunction, active RF emitting device failure, loss of battery capacity (to 70% depletion), loss of normal AC power, battery charger failure, and system component malfunction, other than passive RF component, which affects system performance.
- Maximum time domain interference delay (propagation delay).
- Radio enhancement systems supporting more than one channel or talk path have the capability to support two radios simultaneously transmitting on different talk paths or channels.
- The system is sufficiently modular to have the capability to support revised and/or additional system frequencies within the same frequency band of the bi-directional amplifier supplied to maintain radio system coverage as it was originally intended without the need to replace the system.
- All repeater, transmitter, receiver, signal booster components, external filters, and battery system components are contained in enclosures which comply with the requirements for a Type 4 or 4X enclosure.
- Batteries requiring venting are contained in enclosures complying with the requirements for a Type 3R enclosure.
- Manufacturer's published product installation instructions, which are referenced on the product marking by drawing number and issue number and/or revision level, delineate the compatible components forming the system.

* *= Visual and audible annunciation within 200 seconds of fault*
** *= Visual and audible annunciation within 24 hours of fault*

- In addition, the following performance tests similar to those performed on fire alarm systems are conducted where the efficacy of the product is confirmed:
  - Variable Voltage Operation Test – consistent with NFPA 72;
  - Variable Ambient Temperature and Humidity Tests – consistent with NFPA 72;
  - Component Temperatures Test – to assess component reliability; and
  - Externally induced supply line transient, internally induced transients, and field wiring transients.

Construction requirements

- All field-wiring connections shall be contained in either an enclosed field wiring compartment integral with the product or in a separate outlet box to which the product is to be mounted.
- Enclosure covers need to be constructed to provide access to fuses or any other over current-protective device which requires renewal or resetting, or when it is necessary to open the cover in connection with the normal operation (operation of a switch for testing or for silencing an audible signal appliance) of the unit.
- All subassemblies, modules, and printed-wiring boards are to be held in their intended place in the product by mechanical means.
- Products intended to be connected to the branch circuit supply are to be provided with a means for permanent connection to the branch-circuit supply. A product intended for permanent connection to the branch-circuit supply is to have provision for mechanically protecting the supply conductors.
- The location of a terminal box or compartment, in which branch-circuit connections to a permanently-wired product are to be made, is to be such that the connections can be readily inspected without disturbing the wiring or the product after the product has been installed as intended.
- A means of strain relief is to be provided for the field supply leads of a product to prevent any mechanical stress from being transmitted to internal connections. Inward movement of the leads provided with a ring-type strain relief or means determined to be the equivalent shall not damage internal connections or components, or result in a reduction of electrical spacings. Each lead used for field connections or an internal lead subjected to movement or handling during installation and servicing shall be capable of withstanding for 1 min a pull of 10 lbs. (4.54 kg) without any evidence of damage or of transmitting the stress to internal connections.
- Duplicate terminals or leads, or an equivalent arrangement, are to be provided for circuits of products intended to be connected to initiating-device circuits of a fire alarm control unit.
- Separation of power limited and non-power limited circuits. The installation document of the product is to completely detail cable entry routing of all conductors into the product.
- A wiring lead provided for field connection to a circuit with voltages exceeding 30 V rms or 42.4 V DC is not to be smaller than 18 AWG (0.82 mm2), and the insulation, when of rubber or thermoplastic, is to be minimum 0.30 in (0.76 mm) minimum average and 0.027 in (0.69 mm) minimum at any point.
- All external circuits intended to be connected to nonpower-limited wire are to contain either current-limiting or overcurrent protection to prevent fault currents in excess of the current rating for the gauge wire size permitted by the National Electrical Code, ANSI/NFPA 70, or as specified in the installation wiring diagram/instructions
- Construction requirements for end of line devices include insulating the leads of the device. Where the circuit in which the end-of-line device is to be connected is intended for connection by coaxial cable, the device is to be enclosed. The coaxial connections may be internal or external on the enclosure. The enclosure is to be provided with a means for mounting.
- A rechargeable storage-type battery is to be protected against excessive loading or charging current by a fuse or other overcurrent protective device. The mounting arrangement for the batteries is to permit access to the cells for testing and maintenance, or the product is to provide integral meters or readily accessible terminal facilities for the connection of meters for determining battery voltage and charging current.

Have questions about UL 2524? Contact regulatoryservices@ul.com for additional information.

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