

MAINTENANCE OF BATTERY-OPERATED EMERGENCY LIGHTS

Introduction

In order to meet both federal certification requirements and state licensure requirements, healthcare facilities must provide emergency lighting for all exits and designated portions of the exit access and exit discharge [see NFPA 101(00), Sections 18/19.2.9 and 7.9; MSFC (07), Sec. 1006]. “Designated portions of the exit access and exit discharge” include stairs, aisles (in rooms or spaces that require two or more means of egress), corridors, ramps, escalators and passageways. Emergency lighting outside the building must be provided to either a public way or a distance away from the building that is considered safe (typically defined as 50 ft away from the building), whichever is closest. A minimum of 90 minutes of illumination is required.

Emergency lighting can be supplied by storage batteries, unit equipment or an on-site generator. This guide is only intended to cover unit equipment (also known as battery-operated emergency lights) and EXIT signs provided with a battery-operated emergency illumination source.

Testing requirements

1. To help ensure their reliability, battery-operated emergency lights must undergo the following tests [see NFPA 101(00), Sec. 7.9.3]:
 - A 30-second monthly functional test, and
 - A 90-minute annual test.
2. By exception, self-testing/self-diagnostic, battery-operated emergency lighting equipment that automatically performs a test for not less than 30 seconds and a diagnostic routine not less than once every 30 days and indicates failures by a status indicator are exempt from the monthly functional test, *provided a monthly visual inspection is conducted*.
3. These requirements also apply to EXIT signs provided with a battery-operated emergency illumination source [see NFPA 101(00), Sec. 7.10.9.2].

Test methods

Manufacturers’ documentation should include instructions for proper maintenance and testing of their equipment. That said, there are several ways to perform the required tests:

1. Many battery-operated emergency lights and EXIT signs are equipped with a test switch or test button that simulates a power outage and activates the battery. The downside of using this method, however, is that, on older lighting units, the circuitry that’s supposed to interrupt the normal AC power can fail. In such cases, the use of the test switch or test button really only serves to test the lamps, but does not serve as a valid test of the batteries.
2. The *Electrical Code* allows flexible cord-and-plug connections for battery-operated emergency lights, provided the cord doesn’t exceed 3 feet in length. Testing of this kind of installation can be performed by simply unplugging the unit for the required amount of time. Obviously, care needs to be taken to ensure that the units are plugged in again immediately after the test, so as to avoid what’s called a “deep discharge” of the batteries (i.e. a discharge below 80% of the batteries’ initial rated voltage), which can be damaging to the life of the batteries.
3. Another option is to shut off the breaker controlling the normal AC power to the emergency lights and/or EXIT signs. While probably the most effective way to test both the lamps and batteries, the downside here is obvious – throwing the breaker will also cut power to everything else on that circuit.

While holding a test switch or test button for 30 seconds isn't much of a problem, holding it for 90 minutes is a completely different matter. This has led to inquiries about whether or not it's acceptable to install a switch at each individual light that can be used to interrupt the normal AC power for the required 90 minutes. The simple answer is **no**, installation of such a switch would be a violation of the *Electrical Code*. Some things to keep in mind include:

1. The *Electrical Code* requires that the branch circuit feeding unit equipment be the same circuit as that serving the normal lighting in the area *and that it be connected ahead of any local switches*. For example, units located in a corridor or stair enclosure must be connected to the branch circuit supplying the normal corridor or stair enclosure lighting ahead of, or on the line side of, any switches. If power is lost to the branch circuit for any reason, the batteries automatically take over and restore illumination to the corridor or stair enclosure.
2. It must be further noted that it is **not** acceptable to provide a separate branch circuit for unit equipment. This is because, in the example given above, failure of the normal corridor or stair enclosure branch circuit wouldn't necessarily affect the unit equipment, leaving the corridor or stair enclosure in darkness.
3. That leaves it up to facility personnel to devise a way to hold the test switch/button in the test position for the required 90-minute test period. It is recommended that the equipment manufacturer be contacted for guidance on acceptable ways to accomplish this without damaging the equipment.

Batteries

Like automobile batteries, which are continually discharged and recharged during normal vehicle operation, proper testing extends the life of batteries serving emergency lights or EXIT signs. Still, it must be remembered that these batteries have a limited service life. Because there are many factors that affect battery life (e.g. changing temperatures), it's not possible to set a hard and fast rule on how long a specific battery should last.

The two most commonly used battery types for emergency lighting are lead acid and nickel cadmium. While the equipment manufacturer would be the best source for information on battery life, a maintenance-free lead acid battery might be expected to have a service life somewhere between 5 – 10 years and a maintenance-free nickel cadmium battery an estimated service life of between 10 – 15 years.

It is important to note that some dimming of the lamps may occur during testing. However, the minimum lighting levels specified in the code [see NFPA 101(00), Sec. 7.9.2.1 or MSCFC(07), Sec. 1006.4] must be maintained for a minimum of 90 minutes.

DOCUMENT your tests and battery replacements

NFPA 101(00), Sec. 7.9.3 requires that written records of the testing of your battery-operated emergency lights and EXIT signs be kept for inspection by the AHJ.

It's important that at least two people in your facility know where your logs are kept to increase the likelihood that they can be readily provided if requested during an inspection. It is recommended that these logs be maintained for at least three years.

A sample test log has been developed for your use. The log can be used “as is” or serve as a guide that you can use to create your own log. A completed log is provided to serve as an example of how the log is expected to be filled out.

[Click Here for Sample Battery-Operated Emergency Lights Test Log](#)