

Technical Brief - UL Marine Listed, Battery Switch Testing

Underwriters Laboratory (UL) is the leading independent organization responsible for setting safety standards and testing electrical components and equipment for potential hazards. If an appliance or device has a UL listing, it means it has been tested against UL standards that apply to a particular industry or application, and it has passed. The tests are stringent and rigorous in order to assure that only safe and reliable products receive the UL listing.

A UL listing informs the consumer that the product has been suitably tested and found acceptable for the application for which it was intended. Further, it means that the device or component is 'listed' with UL so it can use the UL logo and claim conformance to the specification. A UL Listed product can be installed in the field without further UL testing and be assured of meeting the performance characteristics under which it was tested and Listed by UL.

UL does not have power of law in the U.S.-you are free to buy and install non-UL-listed devices. However, insurance policies sometimes contain clauses that limit their liability in case of a claim made in response to the failure of a non-UL-listed device.

UL Inspections of Manufacturing Facilities

In addition to the rigorous testing required to certify a product as UL Listed, regular UL inspections are required in order to maintain the UL listing. Carrying the UL listed mark requires four random inspections by a UL engineer at the manufacturing facility to ensure product design and component quality meet the requirements set forth in the UL file associated with the product. Any deviations in component size or material would be discovered and would be cause for a UL "Hold" to be placed on the product. This level of rigorous re-examination of product design ensures long-term product quality and performance.

UL Marine Mark



With a UL Marine Mark on your product, you can show consumers, retailers, surveyors, insurers, government agencies, regulatory authorities, and others that your product meets federal regulations and ABYC, NFPA and UL Safety Standards. Any reference to the UL standard without the official seal provides no assurances that all UL 1107 tests were conducted or even that those tests that were conducted were done so properly. A product that is only tested to UL specifications generally is tested to some of the UL criteria, but not all. Only an authentic UL Listed Mark on a product indicates that the required tests were performed at a UL authorized laboratory and witnessed by a UL engineer.

The UL Marine mark appears on products that have been evaluated specifically for marine use. The UL Marine Mark signifies an extra level of safety beyond the traditional UL Mark. The U.S. Coast Guard has designated UL as an independent testing laboratory qualified to conduct evaluations on a wide array of marine products. Products bearing the UL Marine Mark have been evaluated to UL's published Marine Safety Standards and other applicable standards and codes. These requirements address hazards that can occur as a result of exposure to harsh marine environments such as vibration, shock (impact), exposure to volatile gasses such as from gasoline (ignition protection), water ingress, and salt-spray corrosion.

UL 1107 Electric Power Switch Testing Criteria

UL 1107 defines the specific testing criteria for electric power switches-this includes marine battery switches. UL 1107 requirements and tests include:

- Limits the spacing between exposed live parts to reduce the risk of short-circuits between terminals.
- Defines the temperature limits of all housings, knobs or other insulating materials during maximum current consumption.
- Defines the temperature limits of power terminals during maximum current consumption.
- Requires that one and only one switch undergo the entire series of rigorous tests in the standard.
- Requires the product to perform within temperature limits at 110% of rated continuous and intermittent current.
- Requires a vibration test be conducted for 12 hours in three axis planes while passing 110% of rated current and maintaining temperature limits.
- Requires a shock test be conducted with 5,000 vertical impacts of 10 g's, following that the product must pass 100% of rated current while maintaining temperature limits.
- Requires a cold and hot soak test at -40 Deg C and 60 Deg C where the product must be operable.
- Requires a drop test at a product temperature of -40 C from 3 feet above a plywood floor.
- Requires a dielectric strength test where 2,000 Volts DC must not be able to pass between open terminals or between terminals and mounting surfaces.

- Requires that an ignition protection test be conducted per UL 1500 to ensure gasoline fume environments do not present a safety hazard. In order to pass UL 1107, a battery switch must also pass UL 1500 Ignition-Protection Test for Marine Products.
- Requires a cycling test while the product is under full current and voltage load for a minimum of 1,000 cycles.
- Requires that switch information be provided on the product such as maximum ratings, knob positions, and rear terminal identifications.