STANDARDS UPDATE NOTICE (SUN)
ISSUED: November 21, 2024

STANDARD INFORMATION

Standard: ANSI/CAN/UL 2272
Standard ID: Electrical Systems for Personal E-Mobility Devices [ANSI/CAN/UL 2272:2024 Ed.2]
Previous Standard ID: Electrical Systems for Personal E-Mobility Devices [ANSI/CAN/UL 2272:2016 Ed.1+R:25Feb2019]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **June 24, 2026**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

This standard contains Functional Safety requirements.

Overview of Changes:

- New requirements added for non-metallic materials
- New requirements added for battery pack compartments
- Charger requirements added
- New component cell requirements
- New requirements for post-test cycle for non-operational units
- New temperature test requirements
- New test (Post-discharge Charging determination Test) added
- New vibration test requirements
- New requirements for markings added
- New requirements for instructional manual added
- Added evaluation requirements of gaskets and seals

Specific details of new/revised requirements are found in table below

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.

STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
7	Info	**Non-Metallic Materials**
7.7		***New clause added;*** Gaskets and seals relied upon for safety shall be tested in accordance with one of the following: a) UL 157; b) The Gasket Tests in UL 62368-1 / CSA C22.2 No. 62368-1; or c) The Gasket Tests in UL 50E / CSA C22.2 No. 94.2.
7.8		***New clause added;*** Nonmetallic materials used for internal parts within the overall enclosure shall be rated V-2 minimum. Exception: Nonmetallic materials used for internal parts within the overall enclosure of PS2 circuits (power source class 2 requirements outlined in UL 62368-1 / CSA C22.2 No. 62368-1) shall comply with one of the following: a) Be mounted on minimum V-1 class material or VTM-1 class material; b) Be constructed of minimum V-2 class material, VTM-2 class material, or HF-2 class foamed material; c) Have a size of less than 1750 mm3 (0.11 in3); d) Have a mass of combustible material of less than 4 g (0.14 oz); e) Be separated by at least 13 mm (0.51 in) of air from electrical parts (other than insulated wires and cables) which under fault conditions are likely to produce a temperature that could cause ignition; or f) Be in a sealed enclosure of 0.06 m3 (2.12 ft3) or less, consisting totally of non-combustible material and having no ventilation openings
7.9		***New clause added;*** Internal parts of components shall comply with the flammability requirements of the component standard in accordance with Components, Section 2.
7.10		***New clause added;*** Small parts, and gaskets, that are not located near live parts and are located in a manner such that they cannot propagate flame from one area to another within the equipment, are not required to have a specific flame rating.

CLAUSE	VERDICT	COMMENT
7.11		***New clause added;*** Nonmetallic materials located outside the enclosure, and not used to complete the enclosure, are considered decorative parts. These parts do not have a specified flame rating.
7.12		***New clause added;*** Printed wiring board materials used for circuits or components at hazardous voltage or hazardous energy levels shall be rated V-1 minimum.
7.13		***New clause added;*** For the requirements outlined in 7.8 – 7.12, the flammability rating of the material shall be provided as part of the material rating or the flammability rating may be determined in accordance with UL 94 and CSA C22.2 No. 0.17.
9	Info	**Enclosures**
9.2	Info	**Battery compartments**
9.2.3		***New clause added*** To prevent user servicing such as cell replacement, the outer enclosure of the battery shall be designed such that it is not capable of being opened using simple tools, such as a screwdriver. The enclosure shall be ultrasonically welded or secured by equivalent means. Adhesives complying with the adhesive requirements of UL 746C, single use or tamper-proof screws are considered equivalent means. Exception: The requirement can be replaced by any easily detectable means for a new opening, for example a broken seal. The manufacturer shall remind users not to use a product with broken seals and shall be immediately forwarded for appropriate recycling.
9.2.4		***New clause added;*** To prevent user servicing such as cell replacement when the device enclosure serves as the outer enclosure of the battery, the device enclosure shall be designed such that it is not capable of being opened using common household tools, such as a flat blade or Philips head screwdriver. The enclosure shall be ultrasonically welded or secured by equivalent means. Adhesives complying with the adhesive requirements of UL 746C, or single use or tamper-proof screws, are considered equivalent means. See 47.12 and 48.4.
11	Info	**Chargers**
11.2		***New clause added;*** The connector provided with the charger for connecting to the personal e-mobility device/battery terminal for charging, shall be designed to prevent misalignment, reverse polarity, or electrical mismatch. Compliance is checked by inspection of the

CLAUSE	VERDICT	COMMENT
		connector design, and if necessary, the Protective Circuits and Safety Analysis requirements in Section 16.
17	Info	**Cells and Batteries**
17.7		***New clause added;*** Sodium nickel metal chloride cells shall comply with the requirements for sodium beta battery cells outlined in the Test Program for Sodium-Beta Battery Cells Annex in UL 1973.
17.8		***New clause added;*** Sodium Ion cells shall comply with the requirements of the Cell Test Program Annex in UL 1973.
17.10		***New clause added;*** Rechargeable batteries that provide power to other than the drivetrain unit shall comply with UL 2054 or UL 62133-2 / CSA C22.2 No. 62133-2 or UL 62133-1 / CSA C22.2 No. 62133-1.
22	Info	**Post Test Cycle**
22.1		***New clause added;*** Personal e-mobility devices that are operational after the following tests shall be subjected to a minimum of one cycle of charging and discharging or if not operational, subjected to an attempt to charge only in accordance with the manufacturer's specifications for at least 1 h to determine that there are no noncompliant results as outlined in Table 22.1 for that test: a) Electrical Tests – Overcharge, short circuit, overdischarge protection, imbalanced charging; b) Mechanical Tests – Vibration, shock, drop, crush; and c) Environmental Tests – Water exposure, and thermal cycling.
27	Info	**Temperature Test**
27.3		***New clause added;*** If the temperature protective device operates during the test in 27.2, repeat the test at maximum continuous charging temperature.
27.4		***New clause added;*** While still in the conditioning chamber, and after allowing temperatures to stabilize, the fully charged DUT shall then be discharged in accordance with the manufacturer's specifications representative of the maximum continuous electrical load representative of the maximum operating load conditions while monitoring voltage and current on cells until the DUT reaches its specified EODV. The method

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		of simulating the maximum continuous electrical load for discharging the batteries may vary according to the personal e-mobility device design and should be a method agreed upon by the manufacturer and organization testing the personal e-mobility device. The methods to simulate this loading can include the use of a dynamometer or other mechanical loading means, or manipulation of the electrical and electronic control circuit(s) to simulate loading on the motor. Factors to be considered when determining the maximum continuous electrical load during discharge include maximum weight of rider, maximum speed of movement, angle of movement and loads from auxiliary devices such as lights, audio, etc. that may be operating when the personal e-mobility device is moving. If there is a need to consider the surface impact to loading, concrete is to be used to represent typical outdoor operating surfaces. Temperatures shall be monitored on temperature sensitive safety critical components including cells, motors, etc. and on any user accessible surfaces. Exception No. 1: The DUT can be tested at an ambient temperature of 25 ±5 °C (77 ±9 °F). If tested at ambient temperatures during the test, the temperature measurement T shall not exceed: $$T_{max} + T_{amb} - T_{ma}$$ Where: T is the temperature of the given part measured under the prescribed test. Tmax is the maximum temperature specified for compliance with the test. Tamb is the ambient temperature during the test. Tma is the maximum ambient temperature permitted by the manufacturer's specified or 40 °C (104 °F), whichever is greater. Exception No. 2: If the design of the DUT and its controls result in worse case normal discharging conditions when testing at ambient (i.e. due to thermostats or other controls lowering the charge levels at elevated ambient), the test is to be conducted at ambient temperature of 25 ±5 °C (77 ±9 °F).
27.5		If the temperature protective device operates during the test in 27.4, repeat the test at maximum continuous discharging temperature.
28	Info	**Post-Discharge Charging Determination Test**
28.1		***New clause added;*** At the immediate conclusion of the Temperature Test in Section 27, the supplied charger is to be plugged into the DUT to determine whether the unit allows charging above the cell manufacturer's maximum specified cell surface temperature for charging. When the charger is plugged into the DUT, the charger and DUT electrical connection shall comply with 27.4 and 27.6. Measurement of the cells by bypassing the BMS may be required to make this determination.

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34	Info	**Vibration Test**
24.1		***New clause added;*** This test evaluates the DUT's ability to withstand vibration that may occur during its anticipated use. The test shall be performed in accordance with ISO 6469-1 without temperature conditioning, or to a test profile determined by the customer and verified to the personal e-mobility device application.
34.2		***New clause added;*** The DUT is to be securely mounted to a vibration test platform in a manner similar to how it is oriented during use. The DUT is to be subjected to a random vibration sequentially along three perpendicular axes.
34.3		***New clause added;*** The DUT shall be subjected to the vibration in each axis for 21 h if testing one sample, 15 h if testing two samples or 12 h if testing 3 samples. For each axis the frequency shall be varied from 5 Hz to 200 Hz with power spectral density (PSD) for the vertical (Z) axis, the longitudinal (X) axis, and the transverse (Y) axis as outlined in ISO 6469-1.
36	Info	**Input Test**
36.1		***New clause added;*** The input current of a product is to be measured with the unit operating while charging a fully discharged battery. The current input of the product shall not be more than 110 % of the rated current value for the DUT as assigned by the manufacturer and if an external charger is used, the measured input current shall not exceed the rated output current of the external charger.
	Info	**MARKINGS**
47	Info	**General**
47.5		***New clause added;*** All external terminals and connections shall be marked with the electrical ratings (output voltage, current or power) unless the terminals comply with the Limit Power Source Test in UL 62368-1 / CSA C22.2 No. 62368-1, Annex Q.1, or comply with the Low-Voltage, Limited-Energy Circuits table in UL 2849, and if applicable, polarity markings.
47.12		The following or equivalent marking shall be provided on the battery enclosure and/or device enclosure that serves as the outer enclosure of the battery: "WARNING – Risk of Fire and Electric Shock – Battery and/or battery components are not user replaceable."
	Info	**INSTRUCTIONS**

48	Info	**General**
		New clause added;
48.4		The following or equivalent marking shall be provided in the instructions: "WARNING: Risk of Fire and Electric Shock – Battery and/or battery components are not user replaceable."