



Hoverboard Certification and Safety

1. How do lithium-ion batteries in hoverboards operate?

- Hoverboards use battery packs, much like those found in your laptop, called lithium-ion batteries. Lithium-ion battery packs use a chemical paste for power, which sits inside of the cell like toothpaste.
- Lithium-ion battery packs are powerful because they contain a lot of energy. Also, the chemicals inside is highly flammable. UL has years of research experience with batteries to understand why they may catch fire.
- Safe lithium-ion battery manufacturing processes start with the materials. Just one small change to the chemistry can be the difference between a cell that passes safety certification and one that does not.
- A battery pack contains multiple lithium-ion cells. Some battery packs have 6 or 12 individual cells; however, a hoverboard battery pack has either 20 or 24 individual cells. The battery pack is inserted into the components, which include a motor, control circuits, charger, heating elements, etc.

2. How does UL test hoverboards?

- The following are some of the tests UL conducts:
 - **Blunt Nail Test.** This test initiates fault conditions in a cell that may result in fire. The test demonstrates what could happen if a single cell fails due to a short circuit. By puncturing a thin sheet of plastic that separates the positive and negative battery chemistries, the chemical paste inside of the battery can heat up so quickly that the battery explodes. A properly-made battery would contain internal protection for the cell.
 - **Projectile Test.** For this test, if a cell fails and begins to overheat, the cell must be able to contain a heat reaction. A battery is placed in a wire screen, and then heated with a Bunsen burner. When the battery begins to react with the heat, it cannot penetrate the wire screen in order to pass the test.
 - **Drop Test.** This test determines how extreme force affects the overall safety of the product. Dropping any electronic device can damage internal components, in addition to the battery. If the outside of the hoverboard becomes cracked because it's dropped too many times resulting in a place where someone could put a finger through and touch the electrical parts the product would not pass. UL does similar drop tests on cell phones and tablets.
 - **Locked Rotor.** This test demonstrates what could happen if a motor malfunctions, stalls or is not allowed to rotate. The lack of rotation could be due to bad bearings or if something such as leaves or twigs are caught in the wheels of the board.
 - **Submersion Test.** This test determines if a product still functions after coming into contact with water. As this product is used outdoors, it may come into contact with puddles, snow or rain. This test is done by submerging the entire product in a tub of water. After it's submerged, technicians run a series of electrical tests to ensure the product's internal circuitry was not affected.



3. Does UL certify any hoverboards?

- Manufacturers have achieved certification for the UL Standard 2272. A complete list of certified hoverboards can be found at ul.com/hoverboards by entering the code FKIS into the product category.

4. What does UL 2272 cover?

- UL 2272 covers the electrical drive train system, including the battery, charger system and electrical wiring. The standards do not evaluate the performance or reliability of these devices due to human error.

5. How do I identify a certified hoverboard?

- First, always look for the UL Mark. The UL Mark means the product has passed rigorous safety standards and can offer peace of mind when using the device. Hoverboards have a holographic mark placed on the product, in addition to a mark placed on the box.

6. Are there any counterfeit issues I should be aware of?

- For information on counterfeit products and on batteries, see our documents on Anti-Counterfeiting Safety and Lithium-Ion Batteries.