

# Complete List of UN 38.3 Tests

Testing needed for lithium-ion battery and/or cells prior to transportation according to UN Manual Transport of Dangerous Goods

TEST NAME	DESCRIPTION	PASS CRITERIA	CELLS AND/OR BATTERIES
<b>T1: Altitude</b>	Simulate air transport under low-pressure conditions. The samples are subjected to 11.6 kPa or less for 6 hours or more at room temp.	No leakage, no venting, no rupture, no fire. Open circuit voltage (OCV) not less than 90% before testing.	Cells & Batteries are subjected to this test.
<b>T2: Thermal Test</b>	Simulates the rapid and extreme temperature changes during transport. 10 cycles of oscillating temperatures between -40C to 72C.	No leakage, no venting, no rupture, no fire. Open circuit voltage (OCV) not less than 90% before testing.	Cells & Batteries are subjected to this test.
<b>T3: Vibration Test</b>	Simulates vibration during transportation. Up to 8G from 7Hz to 200Hz	No leakage, no venting, no rupture, no fire. Open circuit voltage (OCV) not less than 90% before testing.	Cells & Batteries are subjected to this test.
<b>T4: Shock Test</b>	Simulates shock impacts during shipping. Subjected to total of 18 half-sine shock up to 150G in positive and negative direction and all 3 axes.	No leakage, no venting, no rupture, no fire. Open circuit voltage (OCV) not less than 90% before testing.	Cells & Batteries are subjected to this test.
<b>T5: Short Circuit Test</b>	Simulates short circuit experienced during transport. A short of less than 0.1 ohm is applied at 55C.	External case temperature shall not be above 170C. No fire, no rupture, and no disassembly within 6 hours after the test.	Cells & Batteries are subjected to this test.
<b>T6: Impact Test</b> (cylindrical cells => 18 mm diameter)	Simulates an impact during shipping. A 9.1 Kg bar is dropped onto the cell from 61 cm	External case temperature shall not be above 170C. No fire and no disassembly within 6 hours after the test.	Only Cells are subjected to this test.
<b>T6: Crush Test</b> (prismatic, pouch, coin/button and cylindrical cells < 18mm diameter)	Simulates crushing during shipping. Crush the cell at 1.5cm/s until force reaches 13+/- .78 kN or voltage drops by 100mV or cells deforms more than 50% of its original thickness.	External case temperature shall not be above 170C. No fire and no disassembly within 6 hours after the test.	Only Cells are subjected to this test.
<b>T7: Overcharge</b>	Simulates the ability for battery to withstand an overcharge condition during shipping. Overcharge the battery pack 2x max continuous charging current for 24 hours.	No fire, do disassembly within 7 days after the test.	Only Batteries are subjected to this test.
<b>T8: Forced Discharged</b>	Simulates incorrect installation. Cell is connected to 12V power supply and current limited to manufacturer's specified maximum discharge current.	No fire, no disassembly within 7 days after the test.	Only Cells are subjected to this test.