Lithionics Battery

Are All Lithium Batteries Safe?

"Energy exists in two formats: it is either produced and consumed, or it is stored and consumed. We are in the Stored Energy business. We will produce Stored Energy Solutions that are superior in power, weight, and durability… but always with the priority of SAFETY. Our product engineering and marketing strategies shall always follow KAIZEN philosophies of continuous improvement. Lithionics Battery will set the standard for safety: Our batteries will NOT sacrifice safety for power. We comply with ALL International Standards for lithium safety set by the FAA, UN DOT, US PHMSA and IATA."

- Steven Tartaglia, Founder and CEO

Courtesy of: United Nations Department of Transportation (UN DOT) Regulations for Testing Lithium

Here's the Law:

US hazardous materials regulations (HMR) are based on the internationally recognized UN system for classification, identification, and ranking of hazardous materials

Batteries based on lithium chemistry are internationally known as Class 9 Hazardous Materials

These batteries must be tested according to UN guidelines

Class 9 materials must be shipped using proper documentation and packaging

General Awareness:

Hazardous materials are regulated anytime they are in commerce

Failure to comply with regulations can result in substantial civil and criminal fines/penalties

Each violation subject to $50,000 civil penalty

Criminal penalty up to $500,000 per violation and up to 10 years in prison

UN Manual of Tests and Criteria – "T Tests" Required for Lithium Ion Cells and Batteries

Test 1: Altitude Simulation	Test 5: External Short Circuit
Test 2: Thermal Test	Test 6: Impact
Test 3: Vibration	Test 7: Overcharge
Test 4: Shock	Test 8: Forced Discharge

Since 2010, all of Lithionics batteries have been tested and certified according to the UN DOT 38.3

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Are All Lithium Batteries Safe?, cont.

Not All Lithium Chemistries Are the Same

Lithium Ion – not all chemistries are alike; there is a trade-off between power and safety. Lithium Ion chemistries fall into two categories: Organic versus Inorganic electrolytes.

1. Organics: Lithium Ion Iron Phosphate (aka LiFePO4, LiFePO6, or LFP)

-Strength is lowered in favor of safety

-Failure Mode: They propagate smoke (no flame=no fire) and reach 428 degrees F

2. Inorganics: Lithium Polymers (aka LiPo), Lithium-metals, Ect.

-The strongest of lithium batteries

-Failure Mode: They propagate a flame and reach 1250 degrees F

Lithionics batteries are engineered strictly by using Lithium Ion Iron Phosphate cells. By doing so, Lithionics batteries can now safely replace lead-acid with a new technology that offers a stronger, lighter, longer lasting, environmentally superior and faster recharging solution. The chart below shows the benefit of using Lithium Ion Iron Phosphate compared to all other forms of lithium. Lithium Ion Iron Phosphate wins these: longest cycle life, shortest recharge time, longest shelf life, safety and environmentally friendly. This is our future, the future of stored energy.

Master Comparison	Lead Acid	NiCd	NiMH	Li - ion	LFP
Battery/pack specific energy, Wh/kg	30-50	45-80	60-120	120-200	110-190
Cycles	200-300	1500	300-500	200-1000	300-3000+
Charge time, hr	2-5	1	2-3	1-3	0.5 - 2
Self discharge/mo, %	5	20	30	5	1-2
Average operating Voltage	2	1.2	1.2	3.6	3.2
Relative battery/pack cost	1X	2X	2-3X	3-4X	2-4X
Relative safety	2	1	1	4	1.5
Relative environmental	3	4	2	2	1

Compare this to current battery chemistries. The world is more familiar with Ni-CAD, Nickel-Metal Hydride and more commonly Lead-acid. But these battery chemistries are all: inefficient, poor performers, much heavier, low initial cost but higher cost of ownership, environmental monsters, and do not represent our future!