Flame retardant materials for portable electronics

Reduce fire risk and stay compliant with an FR label that meets UL94 VTM-0 standards for li-ion batteries

Lithium-ion (li-ion) batteries are commonly used in consumer electronics due to their efficiency in powering smaller, thinner electronic devices. But when exposed to high temperatures, li-ion batteries can pose a dangerous fire hazard, making consumer safety an important consideration in their construction.

As consumer demand for miniature and portable electronic devices grows, the electronics industry is cracking down with more serious flame retardant requirements for li-ion batteries. Battery makers, battery packers and brand owners are challenged with pushing battery performance to new heights while staying compliant with stricter flame-retardant regulations to keep consumers safe.

New flame-retardant label solutions needed

Brand reputation is highly important to brand owners – especially to the leading companies in the portable electronics market. For this reason, many large portable electronics brands have been proactive about preventing safety issues that could damage trust with consumers. Apple Inc. led the trend in 2011 by requiring flame-retardant labels on its iPhone 4 batteries. After the iPhone 4 launched with global success, other smartphone brands – including Samsung and HTC – developed their own suggestions for flame retardant batteries.

Last year, however, these voluntary FR standards gave way to a mandatory requirement when China's government issued the National Mandatory Standards for Li-ion Batteries: GB 31241-2014. Taking effect Aug. 1, 2015, the new standards order strict flame-retardant requirements for li-ion cells and batteries used in portable electronics.

Because many battery makers and packers are located in China, the national requirements have had an immediate impact on the industry, affecting both Chinese battery makers and brands that source batteries from China. They also carry strict rules for the use of label materials on flame-retardant batteries.

What is UL94 VTM-0?

Prior to the new national regulation, li-ion battery performance standards called only for the use of a VTM-1 or above grade flame-retardant (FR) label facestock under the Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances (UL94) – the globally accepted standard for flammability testing. UL94 uses the VTM test to measure flammability of materials that are thin or may distort, shrink or flex during ordinary vertical testing, classifying these materials with one of three ratings: VTM-2, VTM-1 or VTM-0, with VTM-0 being the most flame retardant. A label facestock earned a UL94 VTM-1 or above rating if it did not burn or ignite the test specimen.

China's new standard for FR batteries carries a mandatory requirement for the total pressure-sensitive adhesive (PSA) label construction to pass UL94 with a grade of VTM-1 or above. Because the previous UL 94 standard was not mandatory, and only the facestock was classified as UL 94 VTM-1 or above, li-ion battery makers and brands will need to hold their label material suppliers and converters to higher standards as well. PSA suppliers had no need to offer a true FR PSA label – until now.

A total FR label solution for batteries

The portable electronics industry continues to push boundaries and set trends with new products and technologies. To adapt to trends, stay compliant and keep consumers safe, many brand owners recognize that they must remain proactive and innovate beyond current industry regulations. That means finding and implementing flame-retardant labeling solutions that are safe, durable and well within China's mandatory standards for the industry. To help customers meet these challenges, Avery Dennison developed a total FR label construction that is certified UL94 VTM-0 for li-ion batteries.

Brand owners recognize that they must remain proactive and innovate beyond current industry regulations.

Avery Dennison's FR labels are formulated with:

- Extreme-temperature-resistant properties
- Only FR polyester (PET) printable, FR polyimide (PI) and FR aramid paper materials
- A high-performance topcoat and high-adhesion acrylic adhesive

This combination ensures labels can withstand extreme environments and extended exposure to heat without degrading or becoming illegible, providing Avery Dennison's customers with an FR label solution that is:

- Flame retardant, with improved resistance to extreme temperatures as high as 149 degrees Celsius
- Halogen-free, with no toxic fumes released if burning
- Drip-controlled – will not ignite nearby objects through melting drips
- Nonconductive, with excellent insulation performance
- Highly resistant to chemicals, solvents, scratches, scuffs and abrasions

Further, Avery Dennison's total FR PET label construction meets the UL94 classification of VTM-0, the most flame-retardant rating under UL94.

With a labeling solution that is UL94 VTM-0-rated for li-ion batteries, global battery makers, battery packers and brands can more easily meet increasing performance requirements and stricter FR standards for portable electronics. These FR solutions can also extend to applications in markets such as automotive and aviation, where extreme conditions require complete flame-retardant and heat-resistant label constructions that are both durable and safe. >

Contact Avery Dennison to learn more about our durable label portfolio and how we can meet your cost and performance requirements.

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