



Transportation of firmware-limited lithium-ion cells and batteries

Nothing in this guidance document supersedes any requirement or obligation outlined in the legislation. It does not amend, replace or override the [Transportation of Dangerous Goods Act, 1992](#) (TDG Act) or the [Transportation of Dangerous Goods Regulations](#) (TDG Regulations).

Anyone who handles, offers for transport, transports or imports dangerous goods is responsible for determining whether the Act and Regulations apply to their activities and for complying with all applicable requirements.

This document is meant to provide guidance on how to understand and carry out the requirements related to the transportation of firmware-limited capacity lithium-ion cells or batteries.

Purpose

The purpose of this document is to clarify how the TDG Regulations apply to lithium-ion cells and batteries whose energy capacity is limited by firmware and to explain the conditions under which firmware-limited capacity may be used to determine applicable transport requirements.

Background

New devices have recently emerged, which contain a lithium-ion cell or battery for which the capacity is temporarily limited by firmware, for the purposes of transportation. Upon deactivation of the firmware-imposed limitation, the cell or battery operates at its full nominal capacity.

Regulatory treatment of firmware-limited lithium-ion cells and batteries

Different regulatory requirements may apply to cells and batteries for which the energy capacity is modified by the activation of firmware. The firmware must be designed and constructed by the manufacturer as an integral component of the cell or battery. The cell or battery must meet the applicable test requirements set out in subsection 38.3 of Part III of the Manual of Tests and Criteria (incorporated by reference in the TDG Regulations). In general, the use of such firmware is an acceptable means to limit the energy capacity of a lithium-ion cell or battery for the purpose of identifying the appropriate transport requirements.

For example, consider a device containing a lithium-ion cell with a maximum energy capacity exceeding 20 Wh, but firmware is used to limit the cell's energy capacity to 20 Wh or less. In such a case, the device could likely be transported in accordance with the regulatory requirements applicable to a device containing a lithium-ion cell with an energy capacity of 20 Wh or less, provided that the firmware remains active during transport. Once a device has been activated and the battery operates at the higher Watt-hour rating, the transport requirements for that higher rating apply. If the device can be returned to the lower transport rating, this must be done before it is offered for transport under the requirements applicable to the lower rating.

Transport Canada considers firmware to be an inherent part of the cell or battery because it is integrated into and controls its operation. This differs from software that operates separately from the battery. As such, software is not considered an acceptable means of limiting the energy or capacity of a battery for transportation purposes.

Note that, while Transport Canada regulates the transportation of dangerous goods in Canada, any carrier may, at its discretion, refuse to transport them or impose requirements that are more restrictive than the applicable regulatory requirements.

Future regulatory updates

Transport Canada will continue to monitor international developments related to the use of firmware to limit the energy of lithium-ion batteries and intends to address relevant international updates through future amendments to the TDG Regulations, as appropriate.

Contact us

For any regulatory questions, please [contact us](#).