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DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

[Docket No. PHMSA-2016-0014; Notice No. 2016-05]

Hazardous Materials: ICAO Lithium Ion Battery Prohibition Safety Advisory Notice

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), DOT.

ACTION: Safety Advisory Notice.

SUMMARY: PHMSA is issuing this safety advisory notice to inform persons engaged in the transport of lithium batteries in commerce of recent actions taken by the International Civil Aviation Organization (ICAO) to enhance the safe transport of lithium batteries by air.

FOR FURTHER INFORMATION CONTACT: Kevin A. Leary, Standards and Rulemaking Division, Pipeline and Hazardous Materials Safety Administration, telephone: (202) 366-8553.

SUPPLEMENTARY INFORMATION:

This safety advisory notice is to inform persons engaged in the transport of lithium batteries in commerce of recent actions taken by the ICAO to enhance the safe transport of lithium batteries by air. According to the International Coordinating Council of Aerospace Industries Association (ICCAIA), Boeing, and other aircraft manufacturers, the fire suppression capabilities of an aircraft may be exceeded in a situation where heat and flames generated from thermal runaway in a single package of

lithium ion batteries spreads to adjacent packages, potentially leading to a catastrophic loss of the aircraft because of a fire that cannot be contained or suppressed.[1]

Testing by the Federal Aviation Administration's William J. Hughes Technical Center (FAA Tech Center) supports the ICCAIA's and aircraft manufacturers' assessments.[2] A fundamental concern highlighted by the FAA Tech Center's research is that the cargo compartment fire protection standards are not designed to address the unique hazards associated with the transport of lithium batteries. Safety concerns include:

- The potential for propagation of thermal runaway between cells or batteries in a package and between adjacent packages of batteries;
- The potential for uncontrolled lithium battery fires to overwhelm the capability of existing aircraft cargo fire protection systems, leading to a catastrophic failure of the airframe; and
- The potential for venting of combustible gases from lithium ion cells in thermal runaway, which could collect in an enclosed environment and cause an explosion even in the presence of a suppression agent.

Specifically, test data from the FAA Tech Center demonstrates that: (1) the ignition of the unburned flammable gases associated with a lithium cell or battery fire could lead to a catastrophic explosion; (2) the current design of the Halon 1301 fire suppression system in a Class C cargo compartment in passenger airplanes is incapable of preventing such an explosion; and (3) the ignition of a mixture of flammable gases

1 http://www.icao.int/safety/DangerousGoods/DGPWG15/DGPWG.15.WP.004.5.en.pdf
2 http://www.fire.tc.faa.gov

could produce an over pressure, which would dislodge pressure relief panels, allow leakage of Halon from the associated cargo compartment, and compromise the ability of fire suppression systems to function as intended. As a result, smoke and fire can spread to adjacent compartments and potentially compromise the entire aircraft.

Based on this information and in conjunction with recommendations developed at the ICAO Multidisciplinary Lithium Battery Transport Coordination Meeting(s), the ICAO amended the 2015-2016 edition of the Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI) concerning the transport of lithium ion cells and batteries. These amendments, effective April 1, 2016, include:

- A prohibition on the transport of lithium ion cells and batteries as cargo aboard passenger carrying aircraft (this prohibition applies to lithium cells and batteries (UN3480) not contained in or packed with equipment when transported as cargo and does not include batteries contained in personal electronic devices carried by passengers or crew);
- A requirement for lithium ion cells and batteries to be shipped at a state of charge of no more than 30 percent of their rated capacity on cargo aircraft (forbidden on passenger); and
- A limit on the number of packages of both lithium ion and lithium metal batteries that may be offered for transportation on cargo aircraft under current provisions for small cells and batteries to not more than one package per consignment or overpack.

Representatives from the FAA and PHMSA participate in meetings of the ICAO

Dangerous Goods Panel - the international body responsible for the ICAO TI. In consultation with the FAA and other relevant government agencies, PHMSA works to periodically harmonize the provisions of the domestic hazardous materials regulations (HMR; 49 C.F.R. §§ Parts 171-180) with international regulatory approaches, including the ICAO TI. In coordination with the FAA, PHMSA is considering additional actions, including appropriate amendments to the HMR to address these enhanced safety measures adopted by ICAO.

For additional information see:

- FAA SAFO 16001[3] issued on January 19, 2016.
- Addendum No. 3[4] to the Technical Instructions (2015/2016 Edition) issued on January 15, 2016.
- Addendum No. 4[5] to the Technical Instructions (2015/2016 Edition) issued on February 23, 2016.

Issued in Washington, D.C. on April 1, 2016.

William S. Schoonover,
Deputy Associate Administrator.
Pipeline and Hazardous Materials Safety Administration

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3 https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/media/2016/SAFO16001.pdf

4 http://www.icao.int/safety/DangerousGoods/AddendumCorrigendum%20to%20the%20Technical%20Instructions/Doc%209284-2015-2016.ADD-3.pdf

5 http://www.icao.int/safety/DangerousGoods/AddendumCorrigendum%20to%20the%20Technical%20Instructions/Doc%209284-2015-2016.ADD-4.en.pdf