



U.S. Department of Transportation  
**Pipeline and Hazardous Materials  
Safety Administration**

1200 New Jersey Ave, SE  
Washington, D.C. 20590

AUG 2 2010

Mr. Mark Tisher  
Crane Division  
Naval Surface Warfare Center  
Energy Power & Interconnect Technologies Division  
300 Highway 361, Bldg. 3235 GSX  
Crane, IN 47522-5001

Ref. No.: 10-0135

Dear Mr. Tisher:

This responds to your June 10, 2010 letter and subsequent conversation with a member of my staff requesting clarification of the requirements in the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to design-type testing of lithium ion batteries. Specifically, you ask if a device containing a lithium battery composed of either four or seven modules must be tested in accordance with the UN Manual of Tests and Criteria when the cells and the modules are of a type proven to meet each of the appropriate tests in accordance with the UN Manual of Tests and Criteria.

In your letter, you state the two configuration of the battery in the device differ only in the number of battery modules contained within the battery. Specifically, one battery contains four modules and the other contains seven. Each battery module containing 446.1 grams of lithium consists of 43 DD cells connected in series. The cells contained in the module, and the module are both of a type proven to meet each of the applicable tests described in Section 38.3 of the UN Manual of Tests and Criteria. The modules remain electrically isolated during transport and the battery modules can only be connected after a deliberate sequence expected to occur after transportation has ended.

Provided no electrical connections exist between the modules, the configurations described in your letter would constitute individual batteries contained in equipment and would not require additional testing.

I hope this answers your inquiry. If you have further questions, please do not hesitate to contact this office.

Sincerely,

Charles E. Betts  
Chief, Standards Development  
Office of Hazardous Materials Standards



DEPARTMENT OF THE NAVY  
CRANE DIVISION  
NAVAL SURFACE WARFARE CENTER  
300 HIGHWAY 361  
CRANE INDIANA 47522-5001

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Lithium Batteries  
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IN REPLY REFER TO:

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Ser GXS/10031  
10 Jun 10

Bldg 3235  
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From: Commander, Naval Surface Warfare Center, Crane Division  
To: U.S. Department Of Transportation, PHMSA Office of Hazardous Materials Standards,  
Attn: PHH-10, East Building, 1200 New Jersey Avenue, SE, Washington, DC  
20590-0001

Subj: REQUEST FOR INTERPRETATION OF LITHIUM BATTERY

Ref: (a) UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and  
Criteria

1. The US Navy is currently developing an application using a lithium primary battery and is seeking an interpretation of whether the device with the lithium battery installed in the equipment can be shipped under an existing approval or if a new approval is required and therefore additional testing in accordance with reference (a).
2. There are two battery configurations differing only in the number of battery modules. One configuration uses four of the modules and the other uses seven of them. The battery module manufacturer is also the cell manufacturer, and the cell has been tested and passed testing in accordance with reference (a). The manufacturer of the battery module has obtained approval to ship the battery module by similarity to another of its products that has also been tested and passed in accordance with reference (a). For the battery module construction, the cells are semi potted and attached to a non-conductive baseplate. The electrical connection is made through a rigidly mounted connector and insulating material covers the entire outer surface to protect from external shorting. In addition, every cell has an integral electrical fuse to protect from short circuits and an integral diode. The battery modules contain 446.1 grams of lithium and are shipped as Class 9 material.
3. For transportation of the device, the battery housing would be an aluminum cylinder. The battery module baseplates are bolted to an aluminum plate which is circumferentially bolted to the inside of the battery housing to prevent movement. The battery housing has endplates installed with one of the endplates incorporating a burst disk that operates at 190 PSI. The battery modules are individually wired to an electronics circuit card. The battery modules are electrically isolated during transport and the battery modules would only be electrically connected after a deliberate sequence of multiple events that would only be expected to occur during deployment.
4. The outer packaging is a MK 714 MOD 1 Shipping Container (Drawing #6213165, NSN #8140-01-342-6883). It was POP tested in January 1997. The report number is DODPOPHM/USA/DOD/NADTR95011A. A copy of the report can be provided. It consists of welded, extruded aluminum base and cover assemblies. The cover is secured to the base by 16 over-center latches. Leakage integrity is provided by a rubber sealing gasket located along the

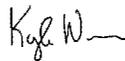
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base closure flange. Shock mitigation is provided by two welded cradles supported by elastomeric shock mounts. POP testing has certified similar sized devices up to a total gross weight of 559kg (1,233lbs), with a Haz/Class up to 1.1D. There are no external connections to the battery circuits once the device is assembled in the shipping configuration, therefore external shorting is not possible.

5. Please advise if it is acceptable to commercially ship this piece of equipment containing a lithium battery composed of up to seven battery modules as Class 9 Hazardous Material as currently tested, in accordance with reference (a), at the battery module level.

6. Crane Division, Naval Surface Warfare Center point of contact is Mr. Mark Tisher, Energy, Power & Interconnect Technologies Division, DSN 482-5912, or commercial 812-854-5912, or E-mail at mark.tisher@navy.mil.

Bldg. 3235 GSX



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By direction