



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

AUG 15 2017

Mr. Peter S. Ellenwood
Project Engineer
Paper Battery Company
165 Jordan Road
Troy, NY 12180

Reference No. 17-0037

Dear Mr. Ellenwood:

This letter is in response to your April 13, 2017, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to asymmetric capacitors. You explain that your company produces asymmetric capacitors that are classified as “UN3508, Capacitor, asymmetric, Class 9”; have energy storage capacity ratings of less than 20 watt hours (Wh) each; and have been successfully drop tested at heights of 1.2 meters or more. Specifically, you ask for the ground and air shipping requirements, such as documentation, labeling, marking, and packaging, for the capacitors described in your email.

- As prescribed in § 173.176, capacitors—including those containing an electrolyte that does not meet the definition of any hazard class or division as defined in Part 173 of the HMR—must conform to the following requirements:
 - When an asymmetric capacitor’s energy storage capacity is greater than 0.3 Wh, or when the energy storage capacity of each capacitor in a module is greater than 0.3 Wh, the capacitor or module must be protected against short circuit.
 - Capacitors containing an electrolyte that meets the definition of one or more hazard class or division as defined in Part 173 of the HMR, must be designed to withstand a 95 kPa (0.95 bar, 14 psi) pressure differential.
 - Capacitors must be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid that is released upon venting must be contained by the packaging or by the equipment in which a capacitor is installed.
 - Asymmetric capacitors manufactured after December 31, 2015, must be marked with the energy storage capacity in Wh.
- Capacitors must be packed in strong outer packagings. For transport by air, capacitors must be securely cushioned within the outer packagings. Capacitors installed in

equipment may be offered for transport unpackaged or on pallets, when the capacitors are afforded equivalent protection by the equipment in which they are contained.

- Capacitors containing an electrolyte not meeting the definition of any hazard class or division as defined in Part 173 of the HMR, including when configured in a module or when installed in equipment, are not subject to any other requirements of the HMR.
- Asymmetric capacitors containing an electrolyte that meets the definition of one or more hazard class or division as defined in Part 173 of the HMR, with an energy storage capacity of 20 Wh or less, including when configured in a module, are not subject to other provisions of the HMR when the capacitors are capable of withstanding a 1.2 meter (3.9 feet) drop test unpackaged onto a rigid, non-resilient, flat and horizontal surface without loss of contents.
- Asymmetric capacitors containing an electrolyte meeting the definition of one or more hazard class or division as defined in Part 173 of the HMR, that are not installed in equipment, and with an energy storage capacity of more than 20 Wh are subject to the requirements of the HMR.
- Capacitors installed in equipment and containing an electrolyte meeting the definition of one or more hazard class or division as defined in Part 173 of the HMR, are not subject to any other requirements of the HMR, provided the equipment is packaged in a strong outer packaging and in such a manner as to prevent accidental functioning of the capacitors during transport. Large, robust equipment containing capacitors may be offered for transport unpackaged or on pallets when the capacitors are afforded equivalent protection by the equipment in which they are contained.

It is the opinion of this Office that if the capacitors described in your email meet the requirements prescribed in § 173.176 (a) and (e), they are eligible for the exceptions from the documentation, labeling, and marking requirements of the HMR.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,



T. Glenn Foster
Chief, Regulatory Review and Reinvention Branch
Standards and Rulemaking Division

Stevens
§ 173.176
Packaging Specs
17-0037

Dodd, Alice (PHMSA)

From: INFOCNTR (PHMSA)
Sent: Thursday, April 13, 2017 4:39 PM
To: Hazmat Interps
Subject: FW: Request for formal letters of interpretation

Hi Shante/Alice,

Please submit this as a letter of interpretation. Mr. Ellenwood spoke with Eamonn.

Please let me know if you have any questions.

Thanks,
Jordan

From: Peter Ellenwood [mailto:pellenwood@paperbatteryco.com]
Sent: Thursday, April 13, 2017 4:32 PM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Subject: Request for formal letters of interpretation

Good afternoon.

Our company produces asymmetric capacitors which are classified for shipment as UN 3508, a Class 9 hazardous material. These products are UL certified under protocol UL 810 A. All of our products have capacities of less than 20 Wh and have successfully completed drop tests by UL and other independent laboratories from heights of 1.2 meter or more.

We believe that the contents of 49 CFR 173.176 and IATA Special Provision A 196 provide relief from the documentation, labeling, and marking requirements that would otherwise need to be met for shipping our products. We understand that 49 CFR 173.176 and IATA Special Provision A 196 spell out packaging and product requirements that must be met for our product to ship and are secure in the knowledge that we meet those requirements.

We are interested in formal letters of interpretation for the air and ground shipment of our capacitors in order to clear up any uncertainties on anyone's part that we ship our products according to the letter of the applicable regulations.

Please let me know if more information is required. Thank you for your consideration in this matter.

Best regards,

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Peter S. Ellenwood
Project Engineer
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165 Jordan Road
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518-269-9990

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