



U.S. Department
of Transportation

**Pipeline and
Hazardous Materials Safety
Administration**

NOV 9 2005

400 Seventh Street, S.W.
Washington, D.C. 20590

Mr. Eric Adair
Director, Training and Consulting Services
Currie Associates, Inc.
10 Hunter Brook Lane
Queensbury, New York 12804

Reference No. 05-0123

Dear Mr. Adair:

This is in response to your letter and e-mails concerning how to class and transport a prototype ultra capacitor that has no electrical charge when first shipped. You state that the device contains an aluminum electrode coated with carbon surrounded by 190-215 milliliters of a 1.0 Molar solution of tetraethylammonium tetrafluoroborate dissolved in acetonitrile. You also state the solution has a flash point of approximately 38 °F, and does not meet the criteria for a Division 6.1 (toxic) material. You ask whether the capacitor by itself or when installed in a power generation system is subject to the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180).

The devices, alone or assembled into a larger power generation system, are subject to the HMR. Under § 173.22, it is the shipper's responsibility to properly class a hazardous material. This office does not generally perform this function. However, based on the information provided and consultation with our scientific staff, it is our opinion that the electrolyte solution contained in the ultra capacitor device is a Class 3 (flammable).

When transported individually, the uncharged capacitors may be described as "Dangerous Goods in Machinery, 9, UN 3363" or "Dangerous Goods in Apparatus, 9, UN 3363," since the quantity of hazardous material contained in each capacitor does not exceed 0.5 liters (see § 173.222(c)(2)). A completed power generation system composed of individual ultra capacitors is considered a single item of equipment or single apparatus for purposes of the HMR. The power generation system must be classed and described based on the hazards that are present in the system's capacitors, as defined in 49 CFR Part 173. Therefore, the system may be described as "Flammable liquids, n.o.s. (acetonitrile), 3, UN 1993, PG II." If the power generation system is described as a "Dangerous Goods in Machinery" or "Dangerous Goods in Apparatus" and the aggregate content of hazardous material in the system exceeds 0.5 liters, the system may be transported only under the terms of an exemption. If a capacitor is shipped charged, either individually or in a power generation system, it would also have to be shipped under the terms of an exemption. The requirements for applying for an exemption are found in § 107.105.



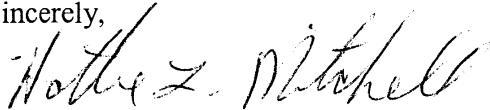
050123

173.222 (c)

You also ask if the ultra capacitors may be transported in accordance with § 172.102, Special Provision (SP) 136, which provides an exception from requirements in the HMR, with approval from the Associate Administrator for Hazardous Material Safety, for equipment, machinery, or apparatus that meets certain conditions. The capacitors do not qualify for the approval provision in SP 136 because the quantity of hazardous material contained in the capacitors exceeds that specified in § 173.4.

I hope this information is helpful.

Sincerely,

A handwritten signature in black ink that reads "Hattie L. Mitchell". The signature is written in a cursive style with a large, sweeping initial "H".

Hattie L. Mitchell, Chief
Regulatory Review and Reinvention
Office of Hazardous Materials Standards

Edmonson
§173.222(c)
Dangerous Goods in Equipment
05-0123

Gorsky, Susan <PHMSA>

From: Richard, Bob <PHMSA>
Sent: Thursday, May 19, 2005 10:41 AM
To: Gorsky, Susan <PHMSA>
Cc: Ke, Charles <PHMSA>; Billings, Delmer <PHMSA>; Mazzullo, Ed <PHMSA>
Subject: FW: Request for Clarification

Susan,

I would appreciate if you would assign the attached interpretation request to a DHM-10 staff member. The inquiry addresses the classification of an "ultra capacitor". An ultracapacitor is a device that has an extremely high electrical energy storage capacity and the ability to deliver bursts of high power and recharge rapidly from specific energy sources like a generator. An ultracapacitor is designed to take the place of a battery. I think we probably need to get a small group of people together (including someone from tech and approvals) to discuss how we want to respond and how the ultracapitors should be classified. The simple solution would be to classify them as Acetonitrile, UN 1648, Class 3, PG II. However, I agree that the regulations allow them to be classed as "Dangerous Goods in Equipment or Apparatus, UN 3363, Class 9. I don't agree with Mr. Adair that these should not be subject to the regulations when assembled in a "power generation" system. The comparison to automobile components or automobile exceptions is not appropriate. Even though SP 136 in the HMR includes an approval provision that provides authority to except the ultracapacitors from the requirements of the HMR, considering that the ultracapitors contain Acetonitrile and Tetraethyl ammonium tetrafluoroborate, I personally do not feel comfortable indicating that they are not subject to the regulations. Nevertheless I am certainly open to other views. The crux of the matter is that once the ultracapacitors are assembled into a unit the net quantity of hazmat exceeds the limited authorized for UN 3363 Dangerous Goods in Equipment entry in 173.222(c) and then the only alternative is to classify them as acetonitrile. This issue should be discussed amongst the appropriate staff to develop an agreed policy on how to classify the ultracapacitors mentioned in Mr. Adair's letter.

-----Original Message-----

From: Eric Adair [mailto:eric@currieassociates.com]
Sent: Wednesday, May 18, 2005 3:59 PM
To: Richard, Bob <PHMSA>
Cc: jack@currieassociates.com
Subject: Request for Clarification

Good Afternoon Bob,

Last week Jack and you had a telephone conversation regarding capacitors as "dangerous goods in apparatus" UN 3363. I've attached a letter requesting clarification on the system these capacitors are installed in, along with photos that show how the articles are installed. I would greatly appreciate it if you could look this over with whomever you deem appropriate and render a decision.

Thanks in advance for your efforts,

Best Regards,
Eric

5/19/2005

Eric C. Adair
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CURRIE ASSOCIATES, INC.
THE GLOBAL COMPLIANCE PROFESSIONALS

*Edmonson
§ 173.222 (c)
Dangerous Goods in Equipment
05-0123*

May 18, 2005

Mr. Robert Richard
Coordinator
Pipeline Hazardous Materials Safety Administration
International Standards Office
DHM-5
United States Department of Transportation
400 7th St. S.W.
Washington, D.C. 20590-0001

Dear Mr. Richard,

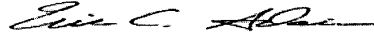
We are seeking clarification on behalf of one of our clients on the classification of a power generation system. This system employs the use of individual components called an "ultra capacitor" which is designed to take the place of a battery, wet non-spillable. Individual Ultra Capacitors are best described and classified in the Hazardous Materials Table as "Dangerous Goods in Apparatus, 9, UN3363. The ultra capacitor contains an aluminum electrode coated with carbon, surrounded by an electrolyte solution consisting of Acetylnitrile and Tetraethyl ammonium tetrafluoroborate.

The Ultra capacitors are assembled in an array within two buss bars, each array of ultra capacitors consists of 4 to 6 ultra capacitors, and each power generation system holds 4 arrays of the ultra capacitors. Enclosed with this letter are photographs depicting the individual ultra capacitors, the array of 4-6 capacitors within the buss bars and the assembly of ultra capacitor arrays within the power generation system. As you can see the components, when installed in the power generation system, are secured within the outer steel cabinet of the power generator, which is then secured to a wooden pallet and covered with a heavy fiberboard outer packaging. It must be noted that the capacitors, when initially shipped to the consumer do not contain any electrical charge.

As with some automobile components that are shipped as hazardous materials when transported individually but then are installed within an automobile and are no longer regulated, it is our opinion that this assembly, when installed within the power generation system and containing no electrical charge, poses no hazard while in transportation, and should therefore not be subject to the regulations. We would greatly appreciate your assistance in confirming our classification of this product, or with the proper

classification of this power generation system. Due to their low environmental impact, these alternate energy systems are in great demand and our client is imminently preparing to begin distribution of this equipment. In order to facilitate compliance and prevent undue delay in offering these systems for transportation we are respectfully requesting expeditious response from your office on this matter. Please do not hesitate to contact us if additional information is required and as always we appreciate your assistance in resolving this issue.

Sincerely,



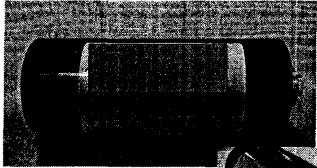
Eric C. Adair

Director

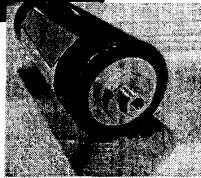
Training and Consulting Services

Prototype System with Ultracapacitors

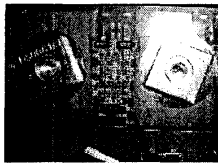
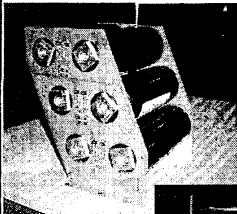
Ultracapacitor



•Ultracapacitors shipped
discharged from our vendor

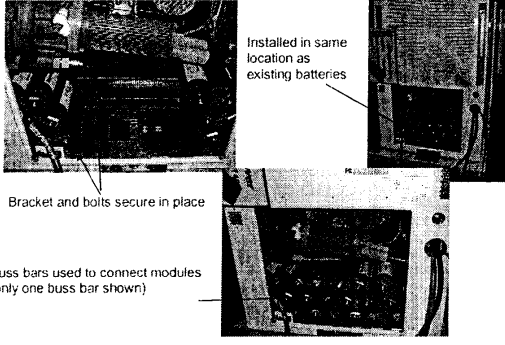


Assembled into Modules

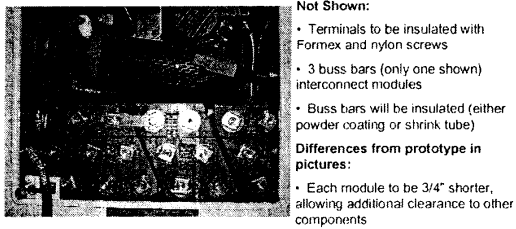


• 6 Caps per Module
• 4 modules installed per
system

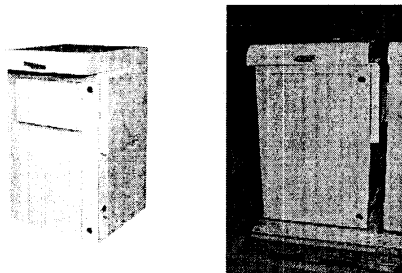
Installation



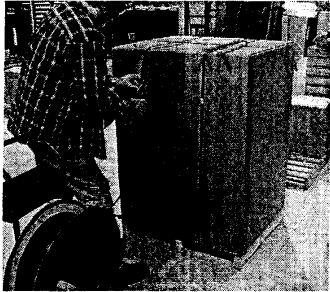
Product Intent - Differences from Prototype Shown



Unpackaged Product



Intended Packaging



- Capacitors discharged prior to shipping
- System bolted to pallet
- Corrugated outer packaging strapped in place
- Passes Rail Shock Test (30 g, 20-ms half sine pulse on each face)
- Passes Earthquake Test (using waveform to simulate highest risk earthquake zone)
