



U.S. Department
of Transportation
**Research and
Special Programs
Administration**

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

FEB 6 2001

Ref. No. 00-0335

Mr. Steve Leutbecher
Coleman Powermate, Inc.
P.O. Box 6001
Kearney, NE 68847

Dear Mr. Leutbecher:

This is in response to your November 28, 2000 letter regarding the classification and shipment of compressed hydrogen in a "Metal Hydride Storage System" under the Hazardous Materials Regulations (HMR; 49 CFR Parts-171-180).

You asked if your understanding is correct that a mixture of hydrogen and metal hydride must be shipped as a compressed gas, provided the mixture meets the definition of a compressed gas in § 173.115. The metal hydride is compatible with the hydrogen and the container. You also enclosed a letter stating that within the operating conditions projected for your fuel cell applications and the transport of hydrogen using "Ovonic Solid Hydrogen Storage Systems™," the "6061-T6" aluminum containers are expected to be compatible with hydrogen storage alloys.

In accordance with § 173.2a(a), a mixture of hydrogen (Division 2.1) and metal hydride (Division 4.1) must be classed according to the highest applicable hazard class and would be assigned to Division 2.1 (flammable gas). The description for a mixture containing hydrogen and metal hydride would be selected from the generic descriptions in the § 172.101 Hazardous Materials Table corresponding to the hazard class of the mixture. The technical name(s) of the hazardous material must be entered in association with the basic description. An appropriate generic shipping description for such a mixture would be "Compressed gas, flammable, n.o.s., (hydrogen, metal hydride), 2.1, UN 1954". A subsidiary hazard class, such as Division 4.1 (flammable solid), may be included in the description, but is not required (see §§ 172.202(a)(2) and 172.203(k)).

Non-bulk packaging authorizations are found in §§ 173.302 and 173.305. The DOT 3AL cylinder mentioned in your letter is authorized in § 173.302(a)(5) for the transportation of mercury free hydrogen. A cylinder charged with compressed gas must not contain gases or materials that are capable of combining chemically with each other or the cylinder material, and the requirements for filling limits must be satisfied. (See §§ 173.301(a) and 173.301(e)).

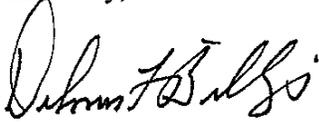


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The requirements in §§ 173.34 and 173.301, respectively, for the qualification, maintenance and use of cylinders, and the general requirements for compressed gases in cylinders also apply. In addition, the shipping paper, marking, labeling and emergency response information requirements in §§ 172.202, 172.301, 172.400, and 172.600, respectively, apply.

I hope this satisfies your inquiry. If we can be of further assistance, please contact us.

Sincerely,

A handwritten signature in cursive script, appearing to read "Delmer F. Billings".

Delmer F. Billings
Chief, Standards Development
Office of Hazardous Materials Standards



Engr'd M
§ 172.101
Classification

sleutbecher@powermate.com
00-0335

Coleman Powermate, Inc. 4970 Airport Road P.O. Box 6001 Kearney, NE 68847 308-236-4538 FAX 308-237-4219

November 28, 2000

Mr. Edward Mazzullo, Director
Office of Hazardous Materials Standards
U.S. Department of Transportation
400 7th St. SW
Washington, DC 20590

Re: Shipment of Compressed Hydrogen in a Metal Hydride Storage System

Dear Mr. Mazzullo:

Coleman Powermate, a subsidiary of Sunbeam Corporation, and Ballard Power Systems are engaged in a project to develop a portable fuel cell unit for the consumer market. This unit may employ a metal hydride storage system for the hydrogen fuel. Our interpretation of the applicable provisions of 49 CFR indicates that the shipment of compressed hydrogen in a metal hydride storage system can be carried out within existing regulations.

During a meeting to review the alternatives with James O'Steen, Charles Hockman and Ryan Posten of the Department, it was suggested that we request a written confirmation from your office. Please confirm that our interpretation of the applicable regulations, as outlined below, is correct.

According to 173.305, a mixture of a compressed gas and any other material must be shipped as a compressed gas. The mixture does meet the definition of a compressed gas in 173.115 and the metal hydride is compatible with the hydrogen and the container as specified in 173.301(a). Attached is a statement from the hydride supplier addressing the compatibility of the hydride and the container.

According to the table in 172.101, hydrogen as a compressed gas should be shipped as: Hydrogen, compressed, 2.1, UN1049, packaged according to 173.302 for non-bulk quantities and labeled as a 2.1. An alternative would be: Compressed gases, flammable, n.o.s. (hydrogen, metal hydride), 2.1, UN1954, packaged according to 173.302, 173.305 for non-bulk quantities and labeled as a 2.1 with a subsidiary hazard class 4.1.

The packaging would be a DOT Spec 3AL cylinder according to 173.302(a)(5), would be filled according to 173.301(e) and would be equipped with a relief valve pursuant to 173.34(d). All other applicable requirements of 173.34 and 173.301 would be met. In addition, the package would be marked and labeled, the shipment accompanied with shipping papers and emergency response information, and the shipment would be placarded in accordance with Part 172.

If you have any questions please contact me at 308-236-4538.
Thank you for your attention and prompt reply.

Sincerely,

Steve Leutbecher
EHS Manager

*_/ This request is limited to non-bulk ground transportation only. All citations refer to 49 CFR.

cc: James O'Steen, Director
Office of Hazardous Materials Technology
U. S. Department of Transportation

cc: Charles Hockman, Supervisor, Gen. Engr.
Office of Hazardous Materials Technology
U. S. Department of Transportation

cc: Ryan Posten, Exemptions Officer
Office of Hazardous Materials Exemptions and Approvals
U. S. Department of Transportation

cc: Jeff Grant, Codes & Standards Specialist
Ballard Power Systems