



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

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Washington, D.C. 20590

Mr. Richard L. Walters
BSS Packaging Engineer
Boeing Satellite Systems, Inc.
P.O. Box 92919
Los Angeles, CA 90009-2919

Ref. No.: 02-0096

Dear Mr. Walters:

This responds to your March 19, 2002 letter requesting clarification on the proper classification for pre-charged heat pipes under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). Specifically, you ask if your pre-charged heat pipes containing up to 260 grams of anhydrous ammonia when built without a reservoir and up to 400 grams of anhydrous ammonia with a reservoir may be shipped as Refrigerating Machines, 2.2, UN 2857, and, therefore, not subject to the HMR.

Under § 173.22, it is the shipper's responsibility to properly class and prepare a hazardous material for shipment. This Office does not perform that function. However, based on the information provided in your letter, it is the opinion of this Office that your pre-charged pipes do not meet the criteria of §§ 173.306(e) or 173.307(a)(4) for Refrigerating Machines, 2.2, UN2857 as listed in the § 172.101 Hazardous Materials Table (HMT). As specified in § 173.307(a)(4), "Refrigerating Machines, UN 2857" may contain non-flammable, non-toxic, liquefied gas or ammonia solution (UN 2672). Anhydrous ammonia (UN 1005) does not qualify under the § 173.307(a)(4) exception for refrigerating machines because it is a toxic gas. In addition, anhydrous ammonia is required to be shipped in authorized cylinders. Your pre-charged heat pipes are not authorized packagings under the HMR, and, may only be shipped under the terms of an exemption. Please refer to Part 107, Subpart B, § 107.105 for procedures for applying for an exemption.

As listed in the HMT, anhydrous ammonia is classed as a Division 2.2 material for domestic shipment and a Division 2.3 material, with a subsidiary Class 8 hazard for international shipment. In addition, ammonia solutions, depending on density and concentration, are classed as a Division 2.2 material for domestic shipment and a Division 2.3 material for international



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107.14(b)

shipment, or a Class 8 material. For materials that are poisonous by inhalation, the entry "Poison-Inhalation Hazard" or "Toxic-Inhalation Hazard" and the words "Zone A", "Zone B", "Zone C", or "Zone D" for gases or "Zone A" or "Zone B" for liquids, as appropriate, must be entered on the shipping papers. In addition, the words "Inhalation Hazard" must be marked on the packages.

I hope this answers your inquiry.

Sincerely,



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

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Booth
§ 107.14(b)
Applicability
02-0096

R S P A Office of Hazardous
Materials Standards (DHM-10)
U.S. Department of Transportation
400 Seventh Street, S W.
Washington, D C 20590 - 0001

19 March, 2002

Ref. Request for written interpretive assistance 49 CFR § 107.14(b)

Please provide clarification of classification of Heat Pipes manufactured by Boeing Satellite Systems, Inc.



Heat pipes manufactured by Boeing consist of sealed pre-charged tubing containing Anhydrous Ammonia. These heat pipes are permanently sealed by means of welded end caps, without valves or pressure relief devices. Heat pipes contain up to 260 grams of Anhydrous Ammonia when built without a reservoir and up to 400 grams of Anhydrous Ammonia with a reservoir.

Pre-charged heat pipes are similar to pre-charged tubing used in refrigeration machines and the application is the same as they are ultimately used to transfer heat within the satellites.

According to 49 CFR Sec. 173.307(a)(4), pre-charged tubing for Refrigerating Machines, containing 12 Kg. or less of a non-toxic, non-flammable gas, are not subject to the regulations.

As 49 CFR Sec. 172.101, Hazardous Materials Table, contains two listings for Anhydrous Ammonia, it is somewhat confusing as to whether the Heat Pipes can be shipped in accordance with the exception for refrigerating machines.

- 1) Would these Heat Pipes containing Ammonia, Anhydrous, 2.2, UN1005 be properly classed as Refrigerating Machines, 2.2, UN2857 and therefore, for domestic shipment only, be not subject to the requirements of 49 CFR?
- 2) If so, would they require "Inhalation Hazard" entry on shipping papers and on packages, in accordance with Special Provision 13?

Sincerely,

A handwritten signature in black ink, appearing to read 'R L Walters', written over a horizontal line.

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