U.S. Department
of Transportation

**Research and
Special Programs
Administration**

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

MAY 1 8 1992

DOT-E 10554

1. Cryotech Systems, Breinigsville, PA, is hereby granted an exemption from certain provisions of this Department's Hazardous Materials Regulations to manufacture, mark and sell the packaging described in paragraph 7 below for use in transporting the hazardous materials described in paragraph 3 below in commerce subject to the limitations and special requirements specified herein. This exemption authorizes the use of non-DOT specification, insulated portable tanks and provides no relief from any regulation other than as specifically stated.

2. BASIS. This exemption is based on the application of Cryotech Systems dated February 19, 1991, submitted in accordance with 49 CFR 107.103, and the public proceeding thereon.

3. HAZARDOUS MATERIALS (Descriptor and class). Refrigerated liquefied helium classed as a nonflammable gas; and refrigerated liquefied hydrogen classed as flammable gas.

4. PROPER SHIPPING NAME (49 CFR 172.101). Helium, refrigerated liquid (cryogenic liquid) or Hydrogen, refrigerated liquid (cryogenic liquid), as appropriate.

5. REGULATION AFFECTED. 49 CFR 172.203, 173.318, 173.320, 176.30, 176.76(h), 177.840, 178.338.

6. MODES OF TRANSPORTATION AUTHORIZED. Cargo vessel, rail and motor vehicle, except that shipments of hydrogen are not authorized by cargo vessel.

7. SAFETY CONTROL MEASURES. Packaging prescribed is a non-DOT specification portable tank designed and constructed in accordance with Section VIII of the ASME Code and subparagraph a. of this paragraph. The portable tank is enclosed in an ISO type frame. The portable tank is a vacuum-insulated with a supplemental liquid nitrogen shield. Design pressure is 80.1 PSIG (MAWP = 64 PSIG) for the inner tank, and 23.3 PSIG (MAWP = 6 PSIG) for the liquid nitrogen tank. Design temperature is -452 °F for the inner tank and any part, valve or fitting that may come in contact with the lading; and -320 °F, for the liquid nitrogen tank and any part, valve or fitting that may come in contact with liquid nitrogen. Nominal water capacity is 10,911 (U.S.) gallons for the inner tank and 385 gallons for the nitrogen tank. Tank material is SA 240 Type 304 stainless steel for the inner tank and the nitrogen tank; and SA 36 or equivalent carbon steel for the outer jacket.

a. Each portable tank must conform to Cryotech drawings cited below, and with additional drawings, calculations and specifications on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA).

Q275-A-55 Rev O dated May 9, 1987
Q275-L-22 Rev B dated September 6, 1987
Q275-A-03 Rev A dated May 2, 1988

b. In addition, each tank must conform with 49 CFR 178.338, except as follows:

(1) Impact testing is not required for stainless steels used for lading warmer than -425°F.

(2) § 178.338-10 does not apply.

(3) The portable tank need not conform with § 178.338-13(b) or (c). Lifting lugs, framework and any anchoring to the inner tank, the nitrogen tank or the tank jacket must conform with § 178.338-13(a). Portable tanks that meet the definition of "container" must meet the requirements of 49 CFR Parts 450 through 453, and each design must be qualified in accordance with 49 CFR 178.270-13(c).

(4) "DOT-E 10554" must replace the mark "MC 338".

8. SPECIAL PROVISIONS.

a. A copy of this exemption must be carried aboard each cargo vessel and motor vehicle used to transport packages covered by this exemption.

b. Each portable tank must be reinspected and retested once every 5 years in accordance with 49 CFR 173.32(e) as prescribed for DOT Specification 51 portable tanks. The test pressure of the inner tank shall be determined from the following formulas:

If there is no vacuum in the outer jacket during the test:

$$P_T = 1.25 \times [P_d + H^s + 14.7]$$

MAY 1 8 1992

If vacuum exists exists in the outer jacket during test:

$$P_T = 1.25 \times [P_d + H_s + 14.7] - 14.7$$

where:

P_T = Test pressure (psig)

P_d = Design pressure (maximum allowable working pressure) (psig)

H_s = Static head of liquid in inner tank (psig)

c. Each portable tank must be plainly marked "DOT-E 10554" on both sides near the middle, in letters at least two inches high on a contrasting background. Each portable tank must be marked "One-way travel time _____ Hours" or "OWTT _____ Hours" in letters at least 2 inches high near the "DOT-E 10554" marking. The proper OWTT must be determined using the formulas found in subparagraphs f. or g. of this paragraph.

d. Prior to initial shipment, impact test results on the inner tank material of tanks used in helium service and the holding time test results, must be submitted to the OHMEA.

e. Each portable tank must be prepared and shipped as required in 49 CFR 173.318, as applicable for the lading.

f. Shipments by motor vehicle must conform with the following:

(1) The OWTT must be determined for each portable tank by the formula:

OWTT = 0.5(MRHT - 24);for MRHT less than 72 hours;

or

OWTT = MRHT - 48; for MRHT of 72 or more hours.

(2) The provisions of 49 CFR 177.840 apply to each portable tank used in hydrogen service.

MAY 1 8 1992

g. Shipments by cargo vessel must conform with the following:

(1) The package and its stowage must conform with 49 CFR 176.76(h). Potable tanks may be overstowed only if enclosed in ISO-type frames and otherwise suitable protected. In all situations, the portable tanks must be stowed such that they are readily accessible and can be monitored in accordance with the provisions of this exemption.

(2) The legend "One-Way Travel Time _____ Hours" or "OWTT _____ Hours" must be marked on the shipping paper and on the dangerous cargo manifest immediately after the container description. The OWTT is determined by the formula:

OWTT = MRHT - 24 hours.

(3) A written record of the portable tank's pressure and ambient (outside) temperature at the following times must be prepared for each shipment.

(i) At the start of each trip;

(ii) Immediately before and after any manual venting;

(iii) At least every 12 hours; and

(iv) At the destination point.

(4) Any lading road relief (pressure control valve (PCV) set at a pressure lower than that prescribed for the (safety) pressure relief valve must be closed during transportation by cargo vessel, unless the OWTT is determined based on the setting of the PCV.

h. No person may transport or offer for transportation a charged portable tank unless the pressure of the lading is equal to or less than that used to determine the marked rated holding time and the OWTT is equal to or greater than the elapsed time between the start and termination of travel.

i. Offerors for transportation of hazardous materials specified in this exemption may use the packaging described in this exemption for the transportation of such hazardous materials so long as no modifications or changes are made to the packages, all terms of this exemptions are complied with, and a copy of the current exemption is maintained at each facility where such offering occurs.

j. The actual holding time for each tank must be determined after each shipment. If it is determined that the actual holding time is less than 90 percent of the MRHT of the tank, the tank may not be refilled until it is restored to its MRHT or the tank is re-marked with the holding time determined by this examination.

k. A copy of this exemption, in its current status, must be maintained at each manufacturing facility where such offering occurs.

l. Portable tanks may not be transported in container-on-flat car (COFC) or trailer-on-flat car (TOFC) service except under conditions approved by the Associate Administrator for Safety, Federal Railroad Administration.

9. REPORTING REQUIREMENTS. Any incident involving loss of packaging contents or packaging failure must be reported to the Associate Administrator for Hazardous Materials Safety as soon as practicable. The release of helium contents is not a reportable incident if the release is through a pressure controlling device set at 25 PSIG or less during shipments by motor vehicle. (49 CFR 171.15 and 171.16 apply to any activity undertaken under the authority of this exemption.)

10. EXPIRATION DATE. March 31, 1994.

Issued at Washington, D.C.:

MAY 1 8 1992

Alan I. Roberts
Associate Administrator
for Hazardous Materials Safety

(DATE)

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, U.S. Department of Transportation, Washington, D.C. 20590. Attention: Exemptions Program.

Dist: USCG, FHWA.