

February 7, 2008



U.S. Department
of Transportation

East Building, PHH-30
1200 New Jersey Avenue, Southeast
Washington, D.C. 20590

**Pipeline and Hazardous
Materials Safety Administration**

DOT-SP 8556
(SIXTEENTH REVISION)

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: (See individual authorization letter)
2. PURPOSE AND LIMITATION:
 - a. This special permit authorizes the transportation in commerce of the materials listed in paragraph 6 below, in super-insulated non-DOT specification portable tanks. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein.
 - b. The safety analyses performed in development of this special permit only considered the hazards and risks associated with transportation in commerce.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR §§ 173.318 and 176.76(g)(1) in that a non-DOT specification packaging is not authorized except as specified herein.
5. BASIS: This special permit is based on the application of Air Products and Chemicals, Inc. dated January 8, 2004, submitted in accordance with § 107.109 and additional information dated January 2008.

February 7, 2008

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Hazardous Materials Description			
Proper Shipping Name	Hazard Class/ Division	Identification Number	Packing Group
Helium, refrigerated liquid (cryogenic liquid)	2.2	UN1963	N/A
Hydrogen, refrigerated liquid (cryogenic liquid)	2.1	UN1966	N/A
Nitrogen, refrigerated liquid (cryogenic liquid)	2.2	UN1977	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a non-DOT specification portable tank designed and constructed in accordance with Section VIII of the ASME Code and subparagraphs (1) or (2) of this paragraph. The portable tank is built with a SWAP body or is enclosed in an ISO type frame. The portable tank is vacuum-insulated with or without a supplemental liquid nitrogen shield. Design pressure is 6 psig for the liquid nitrogen tank, if provided. Design temperatures for the inner tank and any part, valve or fitting that may come in contact with liquid helium, liquid hydrogen or liquid nitrogen are -452°F, -423.5°F, and -320°F, respectively. Nominal water capacity of the liquid nitrogen tank is either 385 or 327 U.S. gallons. Tank material is SA 240 type 304, 304N or 304LN stainless steel for the inner tank and the nitrogen tank; and SA 36, ASTM A283 or equivalent carbon steel for the outer jacket.

February 7, 2008

Tank model number must match tank capacity, MAWP and inner vessel material as follows:

MODEL NUMBER	CAPACITY U.S. GALS	MAWP PSIG	INNER TANK MATERIAL
GCD4830 LHE TC 175 04	4830	202	SA240-304
GCD4830 LHE TC 175 04LN	4830	202	SA240-304
GCD4830 LHE TC 175 04N	4830	202	SA240-304
GCD11000 LHELHY TC 58 04	11000	58	SA240-304
GCD11000 LHELHY TC 64 04	11000	64	SA240-304
GCD11000 LHELHY TC 151 04	11000	151	SA240-304
GCD11000 LHELHY TC 161 04	11000	161	SA240-304
GCD11000 LHELHY TC 58 041N	11000	58	SA240-304LN
GCD11000 LHELHY TC 64 041N	11000	64	SA240-304LN
GCD11000 LHELHY TC 151 041N	11000	151	SA240-304LN
GCD11000 LHELHY TC 161 041N	11000	161	SA240-304LN
GCD11000 LHELHY TC 58 04N	11000	58	SA240-304N
GCD11000 LHELHY TC 64 04N	11000	64	SA240-304N
GCD11000 LHELHY TC 151 04N	11000	151	SA240-304N
GCD11000 LHELHY TC 161 04N	11000	161	SA240-304N
GCD53250 LHY TC 160 04N	14070	160	SA240-304N
GCD48028 LHY TC 160 04N	12690	160	SA240-304N

(1) Each portable tank in hydrogen, refrigerated liquid service, must conform to and must be equipped with special fire-abatement systems in accordance with Gardner Corporation's drawing numbers 7543 revised December 1973, 8727C Rev. E, 3177F dated September 30, 1981, 10536A, 10537B and 10538E dated September 19, 1980, and 21750D, 21751A, 21752A, 21753B, and 21754A, dated November 8, 2000, on file

February 7, 2008

with the Office of Hazardous Materials Special Permits and Approvals (OHMSPA). No new construction is authorized unless the portable tank design conforms with paragraph 7.(a).(2) of this special permit.

(2) New construction after December 31, 1988 must conform with § 178.338, except as follows: Corresponding drawings and calculations must be submitted to the OHMPSA prior to first shipment.

(a) Impact testing is not required for type 304, 304LN or 304N stainless steel except when such materials are used for tanks used in cryogenic helium service.

(b) Section 178.338-10 does not apply.

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

(d) Effective August 1, 2002, "DOT-SP 8556" must replace the mark "MC-338" on the nameplate specified in § 178.338-18(a).

b. TESTING - Each portable tank must be reinspected and retested once every five years in accordance with § 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:

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

If vacuum 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. OPERATIONAL CONTROLS -

(1) Each portable tank must be prepared and shipped as required in § 173.318, as applicable for the lading.

(2) Shipments by motor vehicle must conform with the following:

(a) The OWTT must be determined for each portable tank used in hydrogen service by the formula:

$$\text{OWTT} = 0.5 \times (\text{MRHT} - 24); \text{ for MRHT less than 72 hours.}$$

$$\text{OWTT} = \text{MRHT} - 48; \text{ for MRHT of 72 hours or more.}$$

(b) The provisions of § 177.840 apply to each portable tank used in hydrogen service.

(3) Shipments by cargo vessel must conform with the following:

(a) The package must conform with § 176.76(g). Portable tanks may be overstowed only if enclosed in ISO-type frames and otherwise suitably 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 special permit. Each portable tank in hydrogen service must be stowed in the open and located so as to prevent any accumulation of hydrogen.

(b) The legend "One Way Travel Time (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:

$$\text{OWTT} = \text{MRHT} - 24 \text{ hours.}$$

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

(i) At the start of each trip;

February 7, 2008

(ii) Immediately before and after any manual venting;

(iii) At least every 24 hours for tanks in helium service or every 12 hours for tanks in hydrogen service; and

(iv) At the destination point.

(d) The Coast Guard Captain of the Port must be notified of the hydrogen shipment at least 24 hours in advance.

(e) 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 unless the OWTT is determined based on the setting of the PCV.

(4) No person may transport 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.

(5) 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 remarked with the reduced holding time determined by this examination.

(6) Tanks made after July 31, 1987 may be equipped with pressure relief valves conforming with Gardner Cryogenics' drawing 128992B dated March 10, 1987.

8. SPECIAL PROVISIONS:

a. A person who is not a holder of this special permit who receives a package covered by this special permit may reoffer it for transportation provided no modifications or changes are made to the package and it is reoffered for transportation in conformance with this special permit and the HMR.

February 7, 2008

- b. Shippers using the packaging covered by this special permit must comply with all provisions of this special permit, and all other applicable requirements contained in 49 CFR Parts 171-180.
- c. MARKING - Each portable tank must be plainly marked on both sides near the middle, in letters at least two (2) inches high on a contrasting background, "DOT-SP 8556". Each portable tank used in hydrogen service must be marked "One-way travel time Hour" or "OWTT _____ Hours" in letters at least 2 inches high near the "DOT-SP 8556" marking. The proper OWTT must be determined using the formulas found in subparagraphs 7.c.2 or 7.c.3 of this paragraph.
- d. Transportation of Division 2.1 (flammable gases) are not authorized aboard cargo vessels unless specifically authorized in the Hazardous Materials Table (§ 172.101).
- e. Packagings permanently marked 'DOT-E 8556', prior to October 1, 2006 may continue to be used under this special permit for the remaining service life of the packaging or until the special permit is no longer valid. Packagings marked on or after October 1, 2006 must be marked 'DOT-SP 8556'.
- f. Shipping papers displaying 'DOT-E 8556' may continue to be used until October 1, 2006, provided the special permit remains valid.
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle and cargo vessel (see restriction in paragraph 8.d).
10. MODAL REQUIREMENT: A current copy of this special permit must be carried aboard each cargo vessel or motor vehicle used to transport packages covered by this special permit.
11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this special permit and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:
- o All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.

February 7, 2008

- o Persons operating under the terms of this special permit must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
- o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this special permit must receive training on the requirements and conditions of this special permit in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this special permit, including display of its number, when this special permit has expired or is otherwise no longer in effect.

Under Title VII of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)- 'The Hazardous Materials Safety and Security Reauthorization Act of 2005' (Pub. L. 109-59), 119 Stat. 1144 (August 10, 2005), amended the Federal hazardous materials transportation law by changing the term 'exemption' to 'special permit' and authorizes a special permit to be granted up to two years for new special permits and up to four years for renewals.

12. REPORTING REQUIREMENTS: Shipments or operations conducted under this special permit are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 - Immediate notice of certain hazardous materials incidents, and 171.16 - Detailed hazardous materials incident reports. In addition, the grantee(s) of this special permit must notify the Associate Administrator for Hazardous Materials Safety, in writing, of any incident involving a package, shipment or operation conducted under terms of this special permit.

Issued in Washington, D.C.:



for Theodore L. Willke
Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Washington, D.C. 20590. Attention: PHH-31.

Copies of this special permit may be obtained by accessing the Hazardous Materials Safety Homepage at http://hazmat.dot.gov/sp_app/special_permits/spec_perm_index.htm Photo reproductions and legible reductions of this special permit are permitted. Any alteration of this special permit is prohibited.

PO: PTO/kah