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DOT-E 12671

EXPIRATION DATE: May 31, 2003

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Carleton Technologies, Inc.  
Orchard Park, NY
2. PURPOSE AND LIMITATIONS:
  - a. This exemption authorizes the manufacture, mark, sale and use of non-DOT specification, refillable, toroidal shaped pressure vessels conforming with all regulations applicable to a DOT specification 39 cylinder, except as specified herein, for the transportation in commerce of Helium. This exemption provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein.
  - b. The safety analyses performed in development of this exemption only considered the hazards and risks associated with transportation in commerce. The safety analyses did not consider the hazards and risks associated with consumer use, use as a component of a transport vehicle or other device, or other uses not associated with transportation in commerce.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR §§ 173.302(a) and 175.3 in that the use of a non-DOT specification packaging is not authorized except as specified herein.
5. BASIS: This exemption is based on the application of Carleton Technologies, Inc. dated March 12, 2001, submitted in accordance with § 107.105 and the public proceeding thereon.

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6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Proper Shipping Name/ Hazardous Material Description	Hazard Class/ Division	Identi- fication Number	Packing Group
Helium, compressed	2.2	UN1046	N/A

**Note:** A missile gas storage system or component which contains a quantity of pyrotechnic materials must be classed and approved as provided for in § 173.56. If the pyrotechnic material augments the volume of the gas in the cylinder, or in any way enhances the performance of the compressed gas, the device must be tested in the same configuration as when shipped.

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a non-DOT specification, toroidal shaped, welded pressure vessel equipped with a pyrotechnic pressure relief device. Each pressure vessel must conform with Carleton Technologies application for exemption and with Carleton Technologies drawing B15140 dated September 30, 1991, on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA). Each pressure vessel must conform with the DOT Specification 39 (§§ 178.35 and 178.65), except as follows:

§ 178.35(e) *Safety devices.* Each pressure vessel must be equipped with a pressure relief device designed and prototype tested to vent at a pressure of 15,000 (+/- 2,000) psig.

§ 178.65(a) *Type, size, service pressure and test pressure.* Each pressure vessel must be a toroid of welded construction.

- (1) Maximum water capacity is 23 cubic inches nominal.
- (2) Maximum service pressure is 10,000 psig.
- (3) Minimum test pressure is 17,000 psig.

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§ 178.65(b) *Material.*

(1) Steel. Material must be aircraft quality, Carpenter Custom 455 steel.

(2) Does not apply.

§ 178.65(c) *Manufacture.*

(1) \* \* \*

(2), (3) N/A

(4) Welding procedures and operators must be qualified in accordance with MIL-STD-2219.

ADD: (5) Heat treatment. Each completed pressure vessel must be heat treated to provide the mechanical properties required in this exemption.

ADD: (6) The exterior of each finished pressure vessel must be subjected to a penetrant or magnetic particle inspection after heat treatment and application of test pressure. Evidence of discontinuities that may appreciably decrease the integrity of the pressure vessel shall be cause for rejection.

ADD: (7) All welds shall be subjected to 100 percent radiographic inspection and 100 percent magnetic particle inspection per MIL-I-6868. Evidence of discontinuities that may appreciably decrease the integrity of the pressure vessel shall be cause for rejection.

§ 178.65(d) *Wall thickness.* \* \* \*

(1), (2) N/A

ADD: (3) Calculation of the stress for toroids must be made in accordance with acceptable stress and strain formulas for pressure vessels.

§ 178.65(e) *Openings and Attachments.* Any openings on the pressure vessel must be of a design that will not reduce the integrity of the pressure vessel.

§ 178.65(f) *Pressure tests.*

(1) Each pressure vessel must be tested to an internal pressure of at least 17,000 psig and held for at least one minute and sufficiently longer to assure complete expansion. Evidence of leakage, visible distortion or other defect shall be cause for rejection.

(2) One pressure vessel out of each lot must be hydrostatically tested to destruction. The entire lot must be rejected if:

(i) A failure occurs at a gauge pressure less than 25,000 psig;

(ii) A failure initiates in a weld or heat affected zone thereof.

(3) A lot is defined as the quantity of pressure vessels fabricated from the same heat of steel, manufactured by the same process and heat treated in the same equipment under the same conditions of time, temperature and atmosphere and may not exceed a quantity of 200.

§ 178.65(g) *Flattening test.* One pressure vessel out of each lot must be subjected to a flattening test.

(1) Not applicable.

(2) A ring taken from a completed vessel or a coupon of the same material and shape and subjected to the same heat treatment as the pressure vessels may be flattened as an alternative to a test on the completed pressure vessel.

(3) (ADD) Flattening between flat plates is authorized.

(4) The pressure vessel or test ring may not crack when flattened so that their outer surfaces are not more than 10 times wall thickness apart.

(5) \* \* \*

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§ 178.65(i) *Markings.*

(1) \* \* \*

(2)(i) "DOT-E 12671" must replace the mark "DOT 39".

(2)(ii) The statement: Refill authorized only by Carleton Technologies. (See paragraph 7.c.(2))

\* \* \*

(2)(vi) Serial number (in lieu of lot number).

\* \* \*

(2)(viii) Not applicable.

\* \* \*

b. DESIGN QUALIFICATION TESTING - Each design must be qualified by subjecting a representative pressure vessel to a cycle test from zero to service pressure at a rate not to exceed 6 cycles per minute. The pressure vessel must withstand at least 1,000 cycles without distortion or defect.

c. OPERATIONAL CONTROLS -

(1) Pressure vessels must be shipped in strong outside packagings in accordance with § 173.301(k).

(2) Each pressure vessel may be refilled a maximum of five times. The pressure vessel must only be refilled by Carleton Technologies. Topping off is considered a refill. Carleton Technologies must maintain a record of refills by serial number.

8. SPECIAL PROVISIONS:

a. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this exemption for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this exemption.

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b. A person who is not a holder of this exemption, but receives a package covered by this exemption, may reoffer it for transportation provided no modification or change is made to the package or its contents and it is offered for transportation in conformance with this exemption and the HMR.

c. A current copy of this exemption must be maintained at each facility where the package is offered or reoffered for transportation.

d. Each packaging manufactured under the authority of this exemption must be either (1) marked with the name of the manufacturer and location (city and state) of the facility at which it is manufactured or (2) marked with a registration symbol designated by the Office of Hazardous Materials Exemptions and Approvals for a specific manufacturing facility.

e. A current copy of this exemption must be maintained at each facility where the package is manufactured under this exemption. It must be made available to a DOT representative upon request.

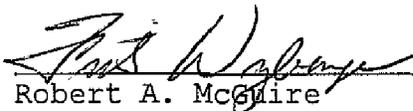
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, and cargo aircraft only.
10. MODAL REQUIREMENTS: A current copy of this exemption must be carried aboard each aircraft used to transport packages covered by this exemption. The shipper must furnish a copy of this exemption to the air carrier before or at the time the shipment is tendered.
11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this exemption 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 exemption and the Hazardous Materials Regulations, Parts 171-180.
  - 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 exemption must receive training on the requirements and conditions of this exemption in addition to the training required by §§ 172.700 through 172.704.

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

12. REPORTING REQUIREMENTS: The carrier is required to report any incident involving loss of packaging contents or packaging failure to the Associate Administrator for Hazardous Materials Safety (AAHMS) as soon as practicable. (Sections 171.15 and 171.16 apply to any activity undertaken under the authority of this exemption.) In addition, the holder(s) of this exemption must also inform the AAHMS, in writing, as soon as practicable of any incidents involving the package and shipments made under this exemption.

Issued in Washington, D.C.

  
\_\_\_\_\_  
Robert A. McGuire  
Associate Administrator for  
Hazardous Materials Safety

6/22/01  
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(DATE)

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

The original of this exemption is on file at the above office. Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

Copies of exemptions may be obtained from the AAHMS, U.S. Department of Transportation, 400 7th Street, S.W., Washington, DC 20590-0001, Attention: Records Center, 202-366-5046.

PO: CWF