U.S. Department
of Transportation

**Research and
Special Programs
Administration**

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

DOT-E 9823 (EXTENSION)
SECOND REVISION October 23, 1991

In accordance with 49 CFR 107.105 of the Department of Transportation (DOT) Hazardous Materials Regulations DOT-E 9823 is hereby extended for the party(ies) listed below by changing the expiration date in paragraph 10 to February 28, 1997. This change is effective from the issue date of this extension. All other terms of the exemption remain unchanged.

This extension applies only to party(ies) listed below based on the application(s) received in accordance with 49 CFR 107.105. This extension constitutes a necessary part of this exemption and must be attached to it.

OCT 3 1995

Alan I. Roberts
Associate Administrator
for Hazardous Materials Safety

(DATE)

Dist: FHWA FRA FAA

EXEMPTION HOLDER	APPLICATION DATE
Carleton Technologies, Inc. Orchard Park, NY	September 21, 1995

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

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

OCT 23 1991

DOT-E 9823
(SECOND REVISION)

1. Carleton Technologies, Inc., Orchard Park, New York, is hereby granted an exemption from certain provisions of this Department's Hazardous Materials Regulations to offer for transportation in commerce the package prescribed herein of the hazardous material described in paragraph 3 below, subject to the limitations and special requirements specified herein. This exemption authorizes the use of a non-DOT specification, toroidal-shaped pressure vessel for transportation of helium, and provides no relief from any regulation other than as specifically stated.

2. BASIS. This exemption is based on the application of Carleton Technologies, Inc. dated October 21, 1991, submitted in accordance with 49 CFR 107.105 and supplemental letters dated September 11 and 30, 1991.

3. HAZARDOUS MATERIALS (Descriptor and class). Helium, classed as a nonflammable gas.

4. PROPER SHIPPING NAME (49 CFR 172.101). Helium.

5. REGULATION AFFECTED. 49 CFR 173.302(a)(4), 175.3, 178.65.

6. MODES OF TRANSPORTATION AUTHORIZED. Motor vehicle, rail freight and cargo-aircraft only.

7. SAFETY CONTROL MEASURES. Packaging prescribed is a non-DOT specification welded pressure vessel as described in the application on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA) and conforming with Carleton Technologies drawing B15140 dated September 30, 1991, and DOT Specification 39 (49 CFR 178.65) except as follows:

1. Section 178.65-2 Type, size, service pressure, and test pressure.

(a) Each pressure vessel must be a toroid of seamless or welded construction.

(b) Maximum size is 21 cubic inches nominal.

(c) Maximum service pressure is 10,000 psig.

(d) Minimum test pressure is 17,000 psig.

2. Section 178.65-5 Material.

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

(b) Does not apply.

3. Section 178.65-6 Manufacture.

(b) Paragraphs (b)(1) thru (b)(5) do not apply.

4. Section 178.65-7 Wall thickness.

(a) The wall thickness must be such that the wall stress of the finished pressure vessel does not exceed either of the following:

(1) The yield strength of the material at rated test pressure; or

(2) The ultimate strength of the material strength of the material at rated burst pressure.

(b) Calculation of stress must be made in accordance with acceptable stress and strain formulas for pressure vessels.

5. Section 178.65-8 Heat treatment.

(a) Each completed pressure vessel must be heat treated to provide the mechanical properties required in this exemption.

(b) 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 weaken or decrease the integrity of the pressure vessel shall be caused for rejection.

(c) All welds shall be subjected to 100 percent radiographic inspection and 100 percent magnetic particle inspection per MIL-I-6868.

6. Section 178.65-9 Openings and attachments.

(a) Any openings on the pressure vessel must be of a design that will not reduce the integrity of the pressure vessel.

7. Section 178.56-10 Safety devices.

Each pressure vessel must be equipped with safety devices of the frangible type rated and prototype tested for 15,000 (± 2000) psi.

8. Section 178.59-11 Pressure tests.

(a) Each pressure vessel must be tested to an internal pressure at least equal to test pressure 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.

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

(1) A failure occurs at a gauge pressure less than 2.5 times marked service pressure; or

(2) A failure initiates in a weld or heat affected zone thereof; or

(3) A failure is due to lack of weld joint integrity.

(c) 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.

9. Section 178.65-12 Flattening test.

(a) 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) * * *

(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.

10. Section 178.65-13 Rejected cylinders.

(c) Does not apply.

11. Section 178.65-14 Markings.

(b) * * *

(1) "DOT-E 9823" must replace the mark "DOT 39".

(2) Refill by manufacturer is authorized only (for cylinders conforming with paragraph 8.c. of this exemption). (Parenthetical expressions need not be marked on the pressure vessel).

(3) * * *

(4) * * *

(5) * * *

(6) Serial number in lieu of lot number

(7) Date of first fill in lieu of the date of manufacture for cylinders conforming with paragraph 8.c. below.

(8) Not applicable for cylinder conforming with paragraph 8.c. below.

8. SPECIAL PROVISIONS.

a. In accordance with the provisions of 49 CFR part 107, Appendix B to Subpart B, Paragraph 3, the shipper shall furnish a copy of this exemption to the motor carrier and air carrier before or at the time the shipment is tendered.

In addition, a copy of this exemption must be carried aboard each aircraft used to transport packages covered by this exemption.

b. Persons who receive packages covered by this exemption may reoffer them for transportation provided no modifications or changes are made to the packages, all terms of this exemption are complied with, and a current copy of this exemption is maintained at each facility from which such reoffering occurs.

c. For cylinder designed to be refilled, each design must be qualified by subjecting a representative pressure vessel to a pressure reversal (cycle) test from zero to service pressure at a rate not to exceed 6 cycles per minute. The cylinder must withstand at least 1,000 cycles without distortion or defect. Maximum number of refills is five. The cylinder may only be refilled by the manufacturer. Topping off is considered a refill. The manufacturer must maintain a record of refills by serial number.

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.

10. EXPIRATION DATE. September 30, 1993.

Issued at Washington, D.C.

Joseph T. Norning
for Alan I. Roberts
Associate Administrator
for Hazardous Materials Safety

OCT 23 1991
(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 Branch.

Dist: FAA, FRA, FHWA.