

April 19, 2012



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 15070  
(FIRST REVISION)

**EXPIRATION DATE: March 31, 2016**

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Carleton Technologies, Inc.  
Westminster, MD
  
2. PURPOSE AND LIMITATIONS:
  - a. This special permit authorizes the manufacture, marking, sale and use of non-DOT specification fully wrapped carbon-fiber reinforced brass lined cylinders for the transportation in commerce of the materials authorized by this special permit. The cylinder designs under this special permit are to be used solely for military applications. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein. The most recent revision supersedes all previous revisions.
  
  - b. The safety analyses performed in development of this special permit 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 §§ 173.302a(a)(1), 173.304a(a)(1), and 180.205(a) in that non-DOT

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specification cylinders are not authorized, except as prescribed herein.

5. BASIS: This special permit is based on the application of Carleton Technologies, Inc. dated April 3, 2012, submitted in accordance with § 107.109.
6. HAZARDOUS MATERIALS (49 CFR § 172.101):

<b>Hazardous Material Description</b>			
<b>Proper Shipping Name</b>	<b>Hazard Class/ Division</b>	<b>Identification Number</b>	<b>Packing Group</b>
Air, compressed	2.2	UN1002	N/A
Argon, compressed	2.2	UN1006	N/A
Carbon dioxide	2.2	UN1013	N/A
Compressed gas, n.o.s.	2.2	UN1956	N/A
Compressed gas, oxidizing, n.o.s.	2.2	UN3156	N/A
Helium, compressed	2.2	UN1046	N/A
Heptafluoropropane or Refrigerant gas R 227	2.2	UN3296	N/A
Hydrogen, compressed	2.1	UN1049	N/A
Liquefied gas, oxidizing, n.o.s.	2.2	UN3157	N/A
Methane, compressed or Natural gas, compressed (with high methane content)	2.1	UN1971	N/A
Nitrogen, compressed	2.2	UN1066	N/A
Nitrous oxide	2.2	UN1070	N/A
Oxygen, compressed	2.2	UN1072	N/A

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<b>Hazardous Material Description</b>			
<b>Proper Shipping Name</b>	<b>Proper Shipping Name</b>	<b>Proper Shipping Name</b>	<b>Proper Shipping Name</b>
Pentafluoroethane or Refrigerant gas R 125	2.2	UN3220	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Prescribed Packaging is a fully wrapped carbon-fiber reinforced brass lined cylinder manufactured and marked in conformance with the Basic Requirements for Fully Wrapped Carbon-Fiber Reinforced Aluminum Lined Cylinders (DOT-CFFC Fifth Revision, dated March 2007) except as follows:

## CFFC-1 Scope:

The cylinders shall be made of a seamless brass liner overwrapped with structural layers of filament wound carbon fiber and epoxy composite material.

## CFFC-2 Type, Size and Service Pressure:

Reference to seamless aluminum alloy liner shall be changed to seamless brass liner throughout the document. \* \* \*

The marked service pressure may not exceed 3000 psig at a reference temperature of 70°F (21.1°C).

\* \* \*

CFFC-3, 4, and 5 \* \* \*

## CFFC-6 Authorized Materials and Identification of Material:

(a) Liner: The Liner shall be a seamless cylinder made of cartridge brass, C26000.

(a) (i) \* \* \*

(a) (ii) The C26000 brass liner material composition

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must be within the limits prescribed herein:

Chemical Composition for the Brass Liner Material		
Element	Min %	Max %
Copper, Cu	68.5	71.5
Lead, Pb	-	0.07
Iron, Fe	-	0.05
Zinc, Zn	Remainder	
Copper + named elements	99.7% min	

(a) (iii) \* \* \*

(a) (iv) \* \* \*

(a) (v) The brass liners shall not be heat treated to enhance mechanical properties.

(a) (vi) The limits for the mechanical properties of C26000 brass liner prior to filament winding shall be as follows:

Minimum Mechanical Properties for the Brass Liner	
Yield strength (min)	22,000 psi
Ultimate tensile strength (min)	45,000 psi
Elongation (2" gauge)	30% min

(a) (vii) \* \* \*

(a) (viii) Physical tests to determine mechanical properties of the brass liner shall be per ASTM E8 and ASTM E18.

\* \* \*

CFFC-6(b), (c) and (d) \* \* \*

CFFC-7 \* \* \*

CFFC-8 Openings, Valves, and Pressure Relief Devices:

(a) (i) \* \* \*

(a) (ii) Threads must be clean cut or formed, even, without checks, and must be designed in compliance with the requirements of the Federal Standard FED-STD-

H28, Appendix A5.

(a) (iii) \* \* \*

(a) (iv) \* \* \*

CFFC-8(b) \* \* \*

CFFC-9 through 16 \* \* \*

b. TESTING - Cylinders must be reinspected and hydrostatically retested at least once every five years. Testing must be performed in accordance with DOT-CFFC-13 at 5/3 of the marked service pressure, 49 CFR §180.205 and the latest edition of CGA pamphlet C-6.2, "Guidelines for Visual Inspection and Re-qualification of Fiber Reinforced High Pressure Cylinders", except as specifically noted herein:

(1) Cylinders must be hydrostatically tested by the water jacket method suitable for the determination of the cylinder volumetric expansion for a minimum test time of one minute after the pressure has stabilized in the cylinder.

(2) A maximum permanent expansion to total expansion ratio does not apply. The cylinder must be condemned if the elastic expansion exceeds the rejection elastic expansion (REE) as marked on the cylinder.

(3) Retest markings must be applied on a label securely affixed to the cylinder and over-coated with epoxy, near the original test date. Metal stamping of the composite surface is prohibited. Reheat treatment of rejected cylinders is not authorized.

(4) Cylinders with fiber damage (cuts, abrasions, etc.) that exceed Level 1 type damage as defined in CGA pamphlet C-6.2 and meet the following depth and length criteria are considered to have Level 2 damage:

(i) Depth - Damage that upon visual inspection is seen to penetrate the outer fiberglass layer but does not expose the carbon layer beneath, or that

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has a measured depth of greater than 0.005 inches (0.13mm) and less than 0.045 inches (1.14mm) for cylinders with an outside diameter greater than 7.5 inches (190.5mm) or less than 0.035 inches (0.89mm) for cylinders 7.5 inches (190.5mm) or less in outside diameter;

(ii) Length - Damage that has a maximum allowable length of:

Region	Direction of fiber damage	Maximum length of damage
Cylinder sidewall and domes	Transverse to fiber direction (longitudinal direction)	20% of the length of the straight sidewall section of the cylinder
Cylinder sidewall and domes	In the direction of the fiber (circumferential direction)	20% of the length of the straight sidewall section of the cylinder

(5) Cylinders with damage that meet the Level 2 criteria must be rejected. Retesters must contact the cylinder manufacturer in the event that damage is questionable based on this criteria. Repair of rejected cylinders is authorized for Level 2 type damage. Repairs must be made in accordance with CGA pamphlet C-6.2, prior to the hydrostatic pressure test. Repairs must be evaluated after the hydrostatic test.

(6) Cylinders that have direct fiber damage that penetrates through the outer fiberglass layer and into the carbon layer, or that have a measured damage depth of greater than the Level 2 maximum stated in (4) (i) above are considered to have Level 3 type damage. Cylinders that have damage with depth meeting Level 2, but with length exceeding the Level 2 maximum, are considered to have Level 3 type damage. Cylinders with Level 3 type damage are not authorized to be repaired, and must be condemned.

(7) A hydrostatic retest may be repeated as provided for in § 180.205(g), only two such retests are permitted. Pressurization prior to the official hydrostatic test for the purpose of a systems check must not exceed 85% of the required test pressure.

c. OPERATIONAL CONTROLS -

(1) Cylinders manufactured under this special permit are not authorized for use fifteen (15) years after the date of manufacture.

(2) Cylinders may not be used for underwater breathing purposes.

(3) Cylinders used in oxygen service must conform with § 173.302(b)(1) through (4). Cylinders used in nitrous oxide service must conform with § 173.304a(a) and meet the valve and cleaning requirements in § 173.302(b).

(4) A cylinder that has been subjected to fire may not be returned to service.

(5) Transportation of flammable gases is not authorized aboard passenger-carrying aircraft, or passenger vessel.

(6) Transportation of oxygen by aircraft must meet the pressure relief device and outer packaging requirements specified in § 173.302(f) and § 173.304(f) and are only authorized when in accordance with § 175.501.

(7) Cylinders must be packaged in accordance with § 173.301(a)(9).

8. SPECIAL PROVISIONS:

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

- b. A person who is not a holder of this special permit, but receives a package covered by this special permit, may reoffer it for transportation provided no modification or change is made to the package and it is offered for transportation in conformance with this special permit and the HMR.
- c. A current copy of this special permit must be maintained at each facility where the package is offered or reoffered for transportation.
- d. Each packaging manufactured under the authority of this special permit 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 Special Permits and Approvals for a specific manufacturing facility.
- e. A current copy of this special permit must be maintained at each facility where the packaging is manufactured under this special permit. It must be made available to a DOT representative upon request.
- f. The cylinders described in this special permit are authorized only for normal transportation as an article of commerce i.e., the movement of hazardous materials packages from consignor to consignee.
- g. Transportation of cylinders is only authorized in support of U.S. military operations.
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, Rail freight, Cargo vessel, Cargo-only aircraft, Passenger-carrying aircraft (see paragraphs 7.c.(5) and (6) for restrictions).
10. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each cargo vessel, aircraft or motor vehicle used to transport packages covered by this special permit. The shipper must furnish a copy of this special permit 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 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.
- 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

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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 Dr. Magdy El-Sibaie  
Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Material Safety Administration, U.S. Department of Transportation, East Building PHH-30, 1200 New Jersey Avenue, Southeast, Washington, D.C. 20590.

Copies of this special permit may be obtained by accessing the Hazardous Materials Safety Homepage at <http://www.phmsa.dot.gov/hazmat/regs/sp-a/special-permits/list> Photo reproductions and legible reductions of this special permit are permitted. Any alteration of this special permit is prohibited.

PO: RShafkey/kah