U.S. Department
of Transportation

**Research and
Special Programs
Administration**

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

JAN 19 2005

DOT-E 8391
(EIGHTH REVISION)

EXPIRATION DATE: December 31, 2006

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Structural Composites Industries
Pomona, CA
(Former Grantee: EFI Corporation)

2. PURPOSE AND LIMITATIONS:

a. This exemption authorizes the manufacture, mark, sale and use of a non-DOT specification fiber reinforced plastic (FRP) full composite cylinder as equipment components aboard aircraft and marine craft conforming with all regulations applicable to a DOT specification Type 3FC cylinder, except as specified herein, for the transportation in commerce of the materials authorized by this exemption. This exemption provides no relief from any Hazardous Materials Regulation (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 §§ 173.302a(a)(1) and 175.3 in that non-DOT specification cylinders are not authorized, except as specified herein.

5. BASIS: This exemption is based on the application of Structural Composites Industries dated January 6, 2005, submitted in accordance with § 107.109.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Hazardous Material Description			
Proper Shipping Name	**Hazard Class/ Division**	**Identi-fication Number**	**Packing Group**
Air, compressed	2.2	UN1002	N/A
Bromotrifluoromethane *or* Refrigerant gas, R 13B1	2.2	UN1009	N/A
Carbon dioxide, refrigerated liquid	2.2	UN2187	N/A
Compressed gases, n.o.s.	2.2	UN1956	N/A
Helium, compressed	2.2	UN1046	N/A
Nitrogen, compressed	2.2	UN1066	N/A
Oxygen, compressed	2.2	UN1072	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a non-DOT specification fiber reinforced plastic (FRP) full composite (FC) cylinder conforming with Acurex Report TR-80-19/AS and EFI's application dated September 9, 1987, on file with the Office of Hazardous Materials Exemptions & Approvals (OHMEA) and with DOT FRP-1 Standard Revision 2 dated February 15, 1987 (§ 178.AA) except as follows:

§ 178.AA-2 Type, size and service pressure.

(a) Type 3FC cylinder consisting of resin impregnated continuous filament windings in both longitudinal and circumferential directions over a seamless aluminum liner; not over 100 pounds water capacity; and service pressure at least 900 PSI but not greater than 4500 PSI.

(b) Filament material must be Kevlar 49 in compliance with proposed aerospace materials specification (AMS) 3901. Filament must be tested in accordance with ASTM D 2343-67 for strand strength, and ASTM D 3317-74 for denier. The strength and denier must be as follows:

(1) Strand strength - 400,000 PSI minimum.

(2) Denier must be at least 90 percent of the nominal value specified in AMS 3901. Denier of roving may be certified by the filament manufacturer.

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§ 178.AA-10 Pressure relief devices and protection for valves, relief devices, and other connections.

Pressure relief devices and protection for valves and other connections must conform with § 173.301(f), and § 173.301(h), except that the adequacy of the pressure relieving devices for each design must be verified in accordance with § 178.AA-18(g) not withstanding the requirement in CGA Pamphlet C-14.

§ 178.AA-13 Acceptable results of tests.

(a) thru (c) * * *

(d) Burst test.

(1) Burst pressure must be at least 3 times the service pressure and in no case less than the value necessary to meet the stress criteria of § 178.AA-7(b). Failure must initiate in the cylinder sidewall. Cylinders with marked service pressure not exceeding 2200 psi containing liquefied gas must remain in one piece. Actual burst pressure must be recorded.

§ 178.AA-18 Design qualification tests.

(1) * * *

(b) Applies, except that designs using 6351 liner previously qualified under this exemption may be qualified based on acceptable results of tests on the largest capacity (with the same diameter and service pressure rating) cylinder to represent tests for smaller sized cylinders

(with the same diameter and service pressure rating). In this case, mechanical properties of 6061 alloy must be the same (within plus or minus 2-1/2 percent of mechanical properties of 6351 alloy used).

(c) Applies, except that designs using 6351 liner previously qualified under this exemption may be qualified based on acceptable results of tests on the largest capacity (with the same diameter and service pressure rating) cylinder to represent tests for smaller sized cylinders (with the same diameter and service pressure rating). In this case, mechanical properties of 6061 alloy must be the same (within plus or minus 2-1/2 percent of mechanical proper ties of 6351 alloy used).

(d) * * *

(e) * * *

(2) Burst pressure must be at least 3 times the service pressure and in no case less than the value necessary to meet the stress criteria of § 178.AA-7(b). Failure must initiate in the sidewall. Cylinders marked with service pressure not exceeding 2200 psi containing liquefied gas must remain in one piece. Actual burst pressure must be recorded. Not required for designs using 6061-T6 alloy with mechanical properties within plus or minus 2-1/2 percent of mechanical properties of 6351 alloy previously used.

b. TESTING - Each cylinder must be reinspected and hydrostatically retested every three years in accordance with § 180.209 as prescribed for DOT 3HT cylinders, except that the rejection elastic expansion criteria does not apply, and permanent volumetric expansion must not exceed 5 percent of total volumetric expansion at test pressure. Retest dates must be applied on the epoxy coating in a permanent manner other than by stamping. Retest dates may be steel stamped on the outer exposed metallic surface of the cylinder neck as an alternate method. Reheat treatment or repair of rejected cylinders not authorized.

c. OPERATIONAL CONTROLS - Cylinders used in oxygen service must conform with § 173.302a(a)(5).

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.

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 modifications or changes are made to the package 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 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.

f. A cylinder is not authorized 15 years after the date of manufacture.

g. Cylinders are authorized only for use as equipment components aboard aircraft or marine craft specifically identified to the OHMEA.

h. Cylinder must be packaged in accordance with § 173.301(a)(9).

i. Cylinders subjected to action of fire must not be placed in service.

j. Acurex, former holder of this exemption, is responsible for compliance with the terms of DOT-E 8391 (Second Revision) and with the provisions of 49 CFR as related to those cylinders manufactured prior to May 6, 1985, and marked with this exemption number.

k. Acurex, former holder of this exemption, is not authorized to manufacture cylinders under this exemption after May 5, 1985.

l. Transportation of oxygen is only authorized when in accordance with § 172.102(c)(2) Special Provision A52 and §§ 175.85(h) and (i).

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo vessel, cargo aircraft only, and passenger-carrying aircraft (See paragraph 8(l for restrictions).

10. MODAL REQUIREMENTS: A current copy of this exemption must be carried aboard each cargo vessel or aircraft used to transport packages covered by this exemption. The shipper must furnish current 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:

- All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, Parts 171-180.
- Persons operating under the terms of this exemption must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
- 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 the exemption has expired or is otherwise no longer in effect.

12. REPORTING REQUIREMENTS: Shipments or operations conducted under this exemption 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 exemption must notify the Associate Administrator for Hazardous Materials Safety -- OHMEA, in writing, of any incident involving a package, shipment or operation conducted under terms of this exemption.

Issued in Washington, D.C.:

JAN 19 2005
(DATE)

b5 Robert A. McGuire
Associate Administrator for
Hazardous Materials Safety

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.

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

PO: KFW/sln