

January 19, 2017



U.S. Department
of Transportation

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

**Pipeline and Hazardous
Materials Safety Administration**

DOT-SP 8718
(SEVENTEENTH REVISION)

EXPIRATION DATE: 2020-12-31

(FOR RENEWAL, SEE 49 CFR 107.109)

1. GRANTEE: Structural Composites Industries LLC
Pomona, CA
2. PURPOSE AND LIMITATIONS:
 - a. This special permit authorizes the manufacture, marking, sale and use of a non-DOT specification fiber reinforced plastic (FRP) full wrapped composite (FC) cylinder conforming with DOT FRP-1 Standard, except as specified herein, for use as an equipment component aboard aircraft and marine craft for the transportation in commerce of certain Division 2.2 gases. 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) and § 173.304a(a)(1) in that non-DOT specification cylinders are not authorized, except as specified herein.

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5. BASIS: This special permit is based on the application of Structural Composites Industries LLC dated January 9, 2017, submitted in accordance with § 107.109.
6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Hazardous Materials Description			
Proper Shipping Name	Hazard Class/ Division	Identification Number	Packing Group
Air, compressed	2.2	UN1002	N/A
Bromotrifluoromethane or Refrigerant gas, R 13B1	2.2	UN1009	N/A
Carbon dioxide	2.2	UN1013	N/A
Compressed gas, 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 - Prescribed packaging is a non-DOT specification fiber reinforced plastic (FRP) full composite (FC) cylinder made in accordance with SCI's specification and SCI Special Reports on file with the Office of Hazardous Materials Safety Approvals and Permits Division (OHMSAPD), and conforming with DOT FRP-1 Standard, Revision 2 dated February 15, 1982 (§ 178.AA), except as follows:

§ 178.AA-2 *Type, size and service pressure.* Type 3FC cylinder consisting of resin impregnated continuous filament windings in both longitudinal and circumferential directions over a seamless aluminum liner; not over 150 pounds water capacity (4091 cubic inches); and service pressure at least 900 psi but not greater than 4500 psi.

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§ 178.AA-4 *Duties of Inspector*

* * *

(b) add an additional sentence which reads: In lieu of testing for filament material properties by the special permit holder, a certificate by the filament manufacturer is acceptable provided that the procurement document specifies strength and quality requirements and that the supplied material is certified to those requirements.

§ 178.AA-5 *Authorized material.*

(a) Aluminum liner must be 6351 or 6061 alloy and T6 temper. Aluminum 6351 alloy is not authorized for new construction.

(b) Filament material must be either commercial type-S fiberglass, or Kevlar 49 another Para-Aramid poly-paraphenylene terephthalamide (PPTA) fiber in compliance with proposed Society of Automotive Engineers aerospace materials specification Society of Automotive Engineers aerospace material specification SAE AMS 3901. Filaments must be tested in accordance with ASTM D-2343 (strand test) and ASTM D-3317 (denier test) and the strength and denier must be as follows:

(1) Strand strength - 450,000 psi minimum.

(2) Denier - not less than 90 percent of nominal value specified in AMS 3901.

* * * * *

§ 178.AA-7 *Wall thickness.*

(a) Thickness of liner must be in compliance with the design analysis report and must be such that after autofrettage, the compressive stress in the sidewall of the liner at zero pressure will not cause buckling of the liner. Liner thickness must

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be sufficient to pass the prescribed design qualification test in § 178.AA-18 of this special permit.

* * * * *

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

(a) Pressure relief devices and protection for valves and other connections must be in compliance 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) notwithstanding the requirement in CGA Pamphlet C-14.

§ 178.AA-12 *Destructive tests.*

* * *

(b) (1) Applies except that the rate of cycling may not exceed 10 cycles per minute.

§ 178.AA-13 *Acceptable results of test.*

(a) * * *

(b) * * *

(c) Cycling test.

(1) Each test cylinder must withstand at least 1,000 pressurization between approximately zero and service pressure followed by at least 30 pressurization between zero and test pressure without evidence of distortion or failure.

* * * * *

§ 178.AA-15 *Markings*

(a) * * *

(b) * * *

Add (6) Rejection elastic expansion (REE)

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marking in cubic centimeters. The REE for each design type cylinder is obtained as follows:

(i) Perform hydrostatic testing on a lot of cylinders and record elastic expansion (EE) of each cylinder.

(ii) Find the mean value of the EE for all cylinders tested in item 1.

(iii) Mark each cylinder with REE which is equal to 10% above the mean value obtained in item 2. The REE marking must follow the date of test.

(c) * * *

(d) (Added). Each cylinder must be marked "Must not be used after 15 years or 100 pressurization (including topping off) whichever comes first."

§ 178.AA-18 *Design qualification tests.*

(a) * * *

(b) * * *

(c) * * *

(d) Pressure cycling test. * * * Applies except that the rate of cycling may not exceed 10 cycles per minute.

(1) Cycling test at ambient temperature - Two representative cylinders must be cycle tested at ambient temperature as follows without showing evidence of distortion, deterioration or failure as follows: pressurize from zero to service pressure for 1,000 cycles, then pressurize from zero to test pressure for 30 cycles. After successfully passing this test, one cylinder must be pressurized to burst in accordance with (e) (1) of this section and the burst

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pressure recorded. The other must be cycled to failure from zero to service pressure and total number of cycles must be recorded.

(2) Environmental cycling test. * * *

(ii) Pressurize from zero to service pressure for 500 cycles at 140°F. or higher and 95% or greater relative humidity.

(iii) * * *

(iv) Then pressurize from zero to service pressure for 500 cycles at minus 60°F or lower.

* * * * *

(3) Thermal cycling test. * * *

(i) Cycle test, at ambient temperature, by performing 1,000 pressurization from zero to service pressure, and 30 pressurization from zero to test pressure.

* * * * *

b. REQUALIFICATION -

(1) Cylinders retested prior to July 1, 2006 must be retested within 36 months of the retest date marked on the cylinder. Cylinders retested after July 1, 2006 must be reinspected and hydrostatically retested at least once every five years. Each cylinder must be reinspected and hydrostatically retested in accordance with §§ 180.205 and 180.209 as prescribed for DOT 3HT cylinders. The hydrostatic test must be conducted in accordance with the procedures specified in § 180.205(g) except that the test pressure must be maintained for a minimum of 60 seconds and as much longer as may be necessary to ensure stable volumetric expansion. The elastic and total volumetric expansions must be determined. Reheat treatment or repair of rejected cylinders is not authorized.

(2) Retest dates must be stamped on the exposed

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metallic surface of the cylinder neck or marked on a label securely affixed to the cylinder and overcoated with epoxy near the original test date. Metal stamping of the composite surface is prohibited.

(3) When a hydrostatic retest is repeated as authorized by § 180.205(g) (5) only two such retests are permitted.

(4) A cylinder not marked with an REE must be condemned if the permanent volumetric expansion exceeds 5 percent of the total volumetric expansion at test pressure.

(5) A cylinder marked with an REE must be condemned if the elastic expansion exceeds the marked rejection elastic expansion.

(6) Each time a cylinder is retested, it must be visually inspected internally and externally in accordance with the terms of CGA Pamphlet C-6.1 and C-6.2. The cylinder must be approved, rejected, or condemned according to the criteria set forth in the applicable CGA pamphlet.

(7) Persons who perform inspection and testing of cylinders subject to this special permit must comply with § 180.205(b) and with all the terms and conditions of this special permit. The marking of the retester's symbol on the cylinders certifies compliance with all of the terms and conditions of this special permit.

c. OPERATIONAL CONTROLS -

(1) Cylinders are authorized only for use as equipment components aboard aircraft or marine craft specifically identified to the OHMSPA.

(2) Cylinder service life may not exceed 15 years from the date of manufacture as marked on the cylinder, or 100 pressurizations (including topping off), whichever comes first.

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

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(4) Cylinders must be packaged in accordance with § 173.301(a)(9). The pressure vessels transported under this special permit may include properly approved actuating cartridges (Division 1.4C or 1.4S) installed in the discharge outlet without changing the classification of Division 2.2, provided the aggregate quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per cylinder cartridge.

(5) Cylinders used in oxygen service must conform with § 173.302(b).

(6) Filling requirements are subject to all terms contained in § 173.302a for 3AL specification cylinders.

(7) Maximum filling density for carbon dioxide and bromotrifluoromethane gases, must be such that the pressure in the cylinder at 130 degrees F does not exceed 5/4 times the marked service pressure.

(8) Prior to the first shipment of cylinders made with a new Para-Aramid (PPTA) filament material, the design qualification tests required in FRP-1 Standard must be performed and successful test results must be submitted to and be on file with OHMSAPD.

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 packaging covered by this special permit, may reoffer it for transportation provided no modification or change is made to the packaging 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.

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- d. A current copy of this special permit must be maintained at each facility where the package is manufactured under this special permit. It must be made available to a DOT representative upon request.
- e. 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 for a specific manufacturing facility.
- f. Transportation of oxygen by aircraft is only authorized when in accordance with § 175.501.
- g. 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.
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo vessel, cargo aircraft only, and passenger-carrying aircraft.
10. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each cargo vessel and aircraft used to transport packages covered by this special permit. The shipper must furnish a current 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, 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.

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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 the 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 William Schoonover
Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Materials 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://hazmat.dot.gov/sp_app/special_permits/spec_perm_index.htm
Photo reproductions and legible reductions of this special permit

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are permitted. Any alteration of this special permit is prohibited.

PO: Andrew Eckenrode