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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 20418
(FOURTH REVISION)

EXPIRATION DATE: 2019-06-30

(FOR RENEWAL, SEE 49 CFR 107.109)

1. GRANTEE: Cimarron Composites, LLC
Huntsville, AL
2. PURPOSE AND LIMITATIONS:
 - a. This special permit authorizes the manufacture, mark, sale and use of a non-DOT specification fully wrapped carbon fiber reinforced composite cylinder with a non-load sharing plastic liner for the purpose of transporting certain non-liquefied compressed gases in commerce. This cylinder meets all of the requirements of the ISO 11515 Standard. 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.
 - c. In accordance with 49 CFR 107.107(a) party status may not be granted to a manufacturing permit. These packaging may be used in accordance with 49 CFR 173.22a.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.

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4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 173.302(a) in that non-DOT specification cylinders are not authorized, except as specified herein.
5. BASIS: This special permit is based on the responses to the Pipeline and Hazardous Materials Safety Administration's (PHMSA) show cause letter issued under § 107.121 initiated on July 20, 2018.
6. HAZARDOUS MATERIALS (49 CFR 172.101):

Hazardous Material Description			
Proper Shipping Name	Hazard Class/ Division	Identification Number	Packing Group
Argon, compressed	2.2	UN1006	N/A
Helium, compressed	2.2	UN1046	N/A
Hydrogen, compressed	2.1	UN1049	N/A
Methane, compressed or Natural gas, compressed (<i>with high methane content</i>)	2.1	UN1971	N/A
Neon, compressed	2.2	UN1065	N/A
Nitrogen, compressed	2.2	UN1066	N/A
Air, compressed	2.2	UN1002	N/A
Ethane, compressed or Propane	2.1	UN1035	N/A

Note: See paragraph 7.d. for cylinder service limitations.

7. SAFETY CONTROL MEASURES:

- a. PACKAGING: Packaging prescribed is a non-DOT specification fully wrapped fiber reinforced composite cylinder with a non-load sharing polymer liner as described in Cimarron Composites, LLC's application, drawings (CC 30XXXX-01-130) and the additional information on file with the Office of Hazardous Materials Safety Approvals and Permits Division (OHMSAPD). Each cylinder must meet all the design and construction requirements for UN composite cylinders specified in § 178.71(1) and ISO Standard 11515

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(Gas Cylinders - Refillable composite reinforced tubes of water capacity between 450 L and 3,000 L - Design, construction and testing) and the following additional requirements:

(1) § 1 Scope - Composite tubes manufactured under this special permit are limited to a minimum water volume of 450 Liters and a maximum water volume of 3,000 Liters, and a working pressure up to 300 bar (4,350 psi).

(2) § 8.1 Type approval procedure, General requirements -

(i) A DOT Independent Inspection Agency (IIA), approved in writing by the Associate Administrator for Hazardous Materials Safety (AAHMS) must, in accordance with 49 CFR Part 107, Subpart I, review the results of the design qualification testing that was submitted in the application for special permit. The IIA must either verify that the cylinder design meets the requirements of the special permit based on the test results and other documentation submitted in the application for special permit, or the IIA may require additional testing and/or information from the manufacturer in order to verify the cylinder design meets all requirements of the special permit. Prior to cylinder production, the IIA's verification of the cylinder design must be submitted to and acknowledged in writing by the OHMSAPD.

(ii) Prior to any manufacture of cylinders under this special permit, an IIA, approved in writing by the AAHMS, must provide inspections and verifications of all batch testing and all new design qualification testing in accordance with the requirements of this special permit.

(3) § 8.2 Prototype tests - Cylinders that are manufactured for prototype testing must be representative of production units.

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(4) § 9 Batch inspection and testing -

(i) § 9.2.4 Liner batch inspection & testing, Criteria - The supplier's certification of the liner and liner boss properties may serve as verification of compliance with the design specifications.

(ii) § 9.4 Overwrap materials - The supplier's certification of the fiber and resin matrix properties may serve as verification of compliance with the ISO 11515 Standard.

(iii) § 9.5.6 Composite tube, Batch inspection - A batch test shall be conducted on one cylinder out of 2 batches or one year of cylinder production, whichever comes first. A batch here is defined by the production quantity of up to 200 finished cylinders successively produced (plus finished cylinders required for destructive testing), of the same nominal diameter, thickness and design. The batch of finished cylinders may contain different batches of liners, fibers and matrix materials.

(iv) § 9.5.7 Batch testing criteria - The burst test may be conducted on the first unit of the batch. After reaching the minimum required burst pressure, and holding for 5 seconds, the cylinder shall have passed the test.

(5) § 10 Cylinder/tube marking - The marking must contain the following:

(i) The DOT special permit number followed by working pressure expressed in bar (psi). The marking may be on a label permanently attached to the outside of the cylinder.

(ii) A serial number and the manufacturer's identification number or a symbol as obtained from the Associate Administrator for Hazardous Materials Safety, located just below or immediately following the DOT marking. The serial number and the manufacturer's identification number may be placed on the boss provided the markings are accessible for inspection.

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(iii) The DOT Independent Inspector Agency (IIA) official mark must be placed near the serial number. The marking must contain the date (month and year) of the initial hydraulic proof pressure test for that cylinder.

(iv) The size of the letters and numbers used must be at least 0.64 cm (1/4 inch) high if space permits.

(v) The following are examples of an authorized format for marking:

DOT-SP AAAAA-YYYY

(Where AAAAA is the special permit number and YYYY is the working pressure)

CCCC MMI

(Where CCCC is the serial number and MMI is the manufacturer's mark or symbol)

DDD - MM/YY

(Where DDD is the inspector's mark and MM/YY is the month and year of the hydraulic proof pressure test).

Additional markings are permitted, provided the additional markings do not obscure the required marking and are not detrimental to the integrity of the cylinder. Provisions for marking of the required requalification dates and RIN information must be made near the cylinder markings.

b. ADDITIONAL REQUIREMENTS FOR EACH NEW DESIGN:

(1) High Velocity Impact Test - The cylinders must be tested in accordance with the ISO Standard 11119-3 (Gas Cylinders - Refillable composite gas cylinders and tubes - Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 L with non-load sharing metallic or non-metallic liners) with the exception that the cylinder must be impacted by a 12.7 millimeter (0.5 caliber) armor-piercing projectile, as described in Cimarron Composites, LLC's, Gun Fire Test, dated January 4, 2017 and on file with OHMSAPD.

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(2) Bon Fire Test - The cylinders must be tested in accordance with the ISO Standard 11515:2013 (Gas cylinders - Refillable composite reinforced tubes of water capacity between 450 L and 3 000 L - Design, construction and testing), as described in Cimarron Composites, LLC's, Fire resistance test, dated November 16, 2015 and on file with OHMSAPD.

c. Requalification - Each cylinder must be requalified once every 5 years by using one of the two methods described in this special permit. The Facility that performs requalification of these composite cylinders (tubes) must be a RIN holder for requalification of this type of composite cylinder (tubes) as described in § 180.205(b) or have a valid special permit for requalification of this type of composite cylinders/tubes using Modal Acoustic Emission (MAE) testing.

(1) Method 1 - Hydraulic Proof Pressure Testing and Visual Inspections. The requalification facility must hold a RIN for requalification performing hydraulic proof pressure testing and visual inspections and meet the following requirements:

(i) Knowledge, documentation, equipment and instrumentation for performing the external and internal visual inspection of cylinders manufactured in accordance with the provisions of DOT-SP 20148;

(ii) Knowledge, documentation and equipment for performing the proof-pressure testing of cylinders manufactured in accordance with the provisions of DOT-SP 20148;

(iii) Adequate facilities, handling equipment, and skills to ensure cylinders manufactured in accordance with the provisions of DOT-SP 20148 will not be subject to impact or other damage during disassembling and reassembling.

(iv) Acknowledgment the requalifier understands the specific operational controls of DOT-SP 20148, paragraph 7.c.(4) that state "cylinder must be rejected if it is dropped or impacted during requalification."

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(v) Availability to document that during the requalification process, the structural integrity of frame design is not compromised and remains the equal to or greater than the requirements specified in DOT-SP20148, paragraph 7.d.(3).

(vi) Visual Inspections - The external and internal visual inspection must be in accordance with CGA pamphlet C-6.2 and with requalification facility standard operating procedure (SOP) for this type of composite overwrapped pressure vessels (COPVs) on file with the Approvals and Permits Division and

(vii) Hydraulic proof pressure test as described in CGA Pamphlet C.1 which the test pressure is equal to 1.5 times the marked working pressure and hold the pressure for a minimum of 3 minutes without a loss of pressure. The testing facility for proof pressure test must be equipped with protection system (e.g. water jacket well or concrete barrier) to avoid injury during requalification process.

(2) Method 2 - Modal Acoustic Emission (MAE) Testing and External Visual Inspection. The requalification facility must hold a RIN for requalification performing MAE and external visual inspection and must meet the following requirements:

(i) Holder of a special permit in performing MAE testing on composite cylinders (tubes).

(ii) MAE testing must be in accordance with the Modal acoustic emission (MAE) Examination Procedure for Requalification of Composite Overwrapped Pressure Vessels (Cylinders and tubes) posted on PHMSA website, and the additional SOP provided by the requalification facility on file with the Office of Hazardous Materials Safety Approvals and Permits Division (OHMSAPD).

(iii) External visual inspection must be in accordance with CGA pamphlet C-6.2 and additional

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SOP provided by the requalification facility on file with OHMSAPD.

(iv) Tubes with severe impact damage from rollover accident - For tubes that were subjected to severe impact damage from an event such as tube trailer collision or rollover accident, the pressurization of the MAE testing must be by hydraulic medium (e.g. water) rather than gaseous medium.

(3) Requalification Marking - date (month/year) must be permanently marked on the cylinder as specified in paragraph § 180.213. The marking of the RIN symbol on the cylinder certifies compliance with all of the terms and conditions of this special permit.

d. OPERATIONAL CONTROLS:

(1) Cylinders manufactured under this special permit are not authorized for use 15 years from the date of manufacture, except as specified under paragraph 8.a. of this special permit.

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

(3) When the cylinders or tubes manufactured under this special permit are permanently mounted inside of framing (e.g., tube trailer, MEGC or ISO Frame) for transportation in commerce, the framing design and testing must meet the following requirements:

(i) All requirements of § 173.301(i); and

(ii) ISO frame design must meet all requirements of ISO 1496-3 "Series 1 freight containers - Specification and testing - Part 3: Tank containers for liquids, gases and pressurized dry bulk". The design testing must be confirmed by a DOT certified Independent Inspection Agency (IIA) and be available to OHMSAPD upon request.

(4) When the cylinders or tubes manufactured under this special permit are permanently mounted inside of framing (e.g., ISO or tube trailer) for transportation in commerce, the cylinder/tube assembly must be

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equipped with a Fire Protection System (FPS), which meets the following criteria and the design must be submitted to and acknowledged in writing by OHMSAPD prior to first use:

(i) An FPS with pressure relief device (PRD) which includes sensors or pneumatic piping along the length of each tube to respond to a local or engulfed fire and release the internal pressure of each tube prior to rupture of any tube in the assembly. The FPS vent lines direct the released gas upwards and outside of the frame system. Standard Operating Procedures (SOP) for the FPS must include inspection of the entire FPS, all gauges, fittings, valves and vent system. The FPS design, test results and relevant SOPs must be submitted to the OHMSAPD before the deployment of the first production of the tube assembly; or

(ii) If the packaging (tube assembly) is not equipped with an FPS, each tube in the assembly must be insulated and one of the insulated tubes must be bonfire tested in accordance with procedure described in ISO Standard 11515 with the following acceptance criteria and the test results must be submitted and acknowledged in writing by OHMSAPD prior to first use:

The sample insulated tube, which is used for the bonfire-testing, must be exposed to an engulfed fire for a minimum of 20 minutes without rupturing.

(5) When the cylinders or tubes manufactured under this special permit are mounted inside of an enclosed cabinet, the cabinet must be designed and tested to meet the Lower Flammability Limit of each gas or gas mixture and the Lower Flammability Limit must be calculated for the highest pressure and temperature to ensure the cabinet of the cylinder/tube assembly is equipped with proper ventilation to avoid a fire or explosion during transportation.

(6) Prior to use in Offshore Service under the terms of this special permit, additional information justifying such use must be submitted to and acknowledged in writing by the AAHMS.

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(7) Transportation of Division 2.1 (flammable gas) is not authorized aboard cargo vessel unless specifically authorized in the Hazardous Materials Table (§ 172.101).

(8) When transported by cargo vessel, the cylinders must be stowed on deck only and are prohibited from passenger ships (Stowage Category D).

(9) Cylinder (tube) that exhibits liner bulge - Liner bulge must be corrected as follows:

(i) Pressurize the tube to 10% of its marked working (service) pressure and hold for a minimum of 4 hours. Then depressurize the tube, perform an internal visual inspection and ensure no liner bulge is present.

(ii) If a liner bulge is still present after the first pressurization described above, take the following actions:

(A) Pressurize the tube to its marked working (service) pressure and hold for a minimum of 1 hour. Then depressurize the tube, perform an internal visual inspection and ensure no bulge is present in the liner;

(B) If a liner bulge is still present after the second pressurization as described above, the tube must be rejected;

(C) For a rejected tube, contact the tube manufacturer to obtain additional guidance in correcting the liner bulge prior to marking the tube.

8. SPECIAL PROVISIONS:

a. Service Life Extension Program:

(1) Cylinders manufactured under this special permit are authorized for a maximum service life of 15 years from the date of manufacture in accordance with the Cimarron Composites, LLC (CCL) service life extension program dated March 08, 2018 on file with the OHMSAPD. The service life extension program must be implemented for each design type that is intended for additional

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service life beyond 15 years to determine the additional years of service life. If cylinders are authorized for extended service life, the maximum service life of each cylinder under this special permit is 30 years from the date of manufacture.

(2) Under the service life extension program, the grantee must meet the following:

(i) All cylinders must be qualified by MAE as described in § 7.c of this special permit. All cylinders that fail to meet the requalification requirements must be condemned, removed from service and rendered incapable of retaining pressure.

(ii) Sample cylinders of each design type must randomly be recalled after they have been in service for 10 and 13 years. Cylinders recalled after 10 years shall be designated "Group A" and cylinders recalled after 13 years shall be designated "Group B". All recalled cylinders must be subjected to relevant design qualification testing as specified Section 8 of ISO 11515. Acceptance criteria shall be as defined in ISO 11515 except $P_b = 1.6P_h$ and the design life (y) must be greater than or equal to 20 years. In the case that some units from the initial minimum lot size are condemned, an additional 30 cylinders must be selected and subjected to the same design requalification as specified above (relevant sections 8 of ISO 11515). An Independent Inspection Agency must witness all testing.

(3) The complete test report including original test data must be submitted to the Associate Administrator for Hazardous Materials Safety for assessment within 30 days of completion. Failure to meet the acceptance criteria specified in this section shall result in the design being restricted to a maximum life of 15 years.

b. 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.

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- c. 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.
- d. 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.
- 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 by the Office of Hazardous Materials Safety Approval and Permits Division for a specific manufacturing facility.
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight and cargo vessel.
10. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each cargo vessel or motor vehicle used to transport packages covered by this special permit.
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

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

PO: Andrew Eckenrode