March 20, 2025

U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

DOT-SP 21667
(SECOND REVISION)

EXPIRATION DATE: 2028-01-31

(FOR RENEWAL, SEE 49 CFR 107.109)

1. GRANTEE: Hanwha Cimarron LLC
Opelika, AL

2. PURPOSE AND LIMITATIONS:

a. This special permit authorizes the manufacture, mark, sale, and use of non-DOT specification fiber reinforced composite cylinders with non-load sharing plastic liners in compliance with UN/ISO11515: 2013, + A1:2018, Type 4 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 special permit. These packagings may be used in accordance with 49 CFR 173.22a.

3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.

4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 173.302(a) in that cylinders that do not meet the incorporated UN composite cylinder requirements are not authorized, except as specified herein.

5. BASIS: This special permit is based on the application of Hanwha Cimarron LLC dated January 25, 2025, submitted in accordance with § 107.105 and the public proceeding thereon.

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
Argon, *compressed*	2.2	UN1006	N/A
Ethane	2.1	UN1035	N/A
Helium, compressed	2.2	UN1046	N/A
Hydrogen, compressed	2.1	UN1049	N/A
Methane, compressed *or* Natural gas, compressed *(with high methane content)*	2.1	UN1971	N/A
Neon, compressed	2.2	UN1065	N/A
Nitrogen, compressed	2.2	UN1066	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING: Packaging prescribed is a non-DOT specification fully wrapped carbon fiber reinforced composite cylinder with non-load sharing plastic liner as described in Hanwha Cimarron LLC's application on file with the Office of Hazardous Materials Safety (OHMS). Each cylinder must meet the design and construction requirements for UN composite cylinders specified in § 178.71(l) and of ISO Standard 11515:2013 (Gas Cylinders – Refillable composite reinforced tubes of water capacity between 450L and 3,000L – Design, construction, and testing), + A1:2018, Type 4 Amendment except as follows:

(1) Scope: Cylinders manufactured under this special permit are limited to a maximum service pressure of 517 bar (7,500 psi), with a maximum capacity of 4,046 liters.

(2) Type Approval Procedure (General Requirements):

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

(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) Fire Resistance Test: Service equipment for the Fire Resistance Test must be in compliance with 49 CFR 178.71(d). Any combination of valve/PRD is allowed if the criteria of ISO 11515:2013 § 8.5.9.3b is met.

(4) High Velocity Impact Test: The cylinders shall be tested in accordance with the ISO Standard 11515:2018/ Amd.1:2018,8.5.19: One tube shall be filled to 2/3 of the test pressure, p_h, with air or nitrogen. The tube shall be positioned in such a way that the point of impact of the projectile shall be in the tube side wall at a nominal angle of 45° and such that the bullet would also exit through the tube side wall. Tube shall be impacted by a 7.62mm (0.3 caliber) armor-piercing projectile with a nominal speed of 850 m/s. The bullet shall be fired from a distance of no more than 45m. It is not necessary for the bullet to penetrate the tube side wall.

b. MARKING:

(1) Each cylinder must be permanently marked (other than by stamping) in the composite on the sidewall. The marking must be easily visible and must be protected from external damage due to the environment and handling.

(2) The marking must contain the following:

(i) DOT special permit number (DOT-SP 21667) followed by service pressure expressed in bar (psi).

(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 above.

(iii) The DOT inspector's official mark must be placed near the serial number. The marking must contain date the (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 21667-517 bar (7,500psi)
1234-MMI (or symbol)
II—MM/YY

(vi) Additional markings are permitted in the composite, provided the additional markings do not obscure the required marking and are not detrimental to the integrity of the cylinder.

(vii) Provisions for marking of the required requalification dates and RIN information must be made near the cylinder markings.

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 must hold a valid DOT RIN for requalification of this type of composite cylinder as described in § 180.205(b) or have a valid special permit for requalification of this type of composite cylinder 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 this special permit.

(ii) Knowledge, documentation, and equipment for performing the proof-pressure testing of cylinders manufactured in accordance with the provisions of this special permit.

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

(iv) Acknowledgment that the requalifier understands the specific operational control of paragraph 7.d.(10) of this special permit that states the "cylinder must be rejected if it drops from a height greater than 2 feet".

(v) Availability to document that during the requalification process, the structural integrity of frame design is not compromised and remains equal to or greater than the requirements specified in paragraph 7.d.(6) of this special permit.

(vi) Visual Inspections: The external and internal visual inspection must be in accordance with CGA pamphlet C-6.2 or ISO 11623:2015(E); and with the requalification facility standard operating procedure (SOP) for this type of composite overwrapped pressure vessel (COPVs) on file with OHMS. Following the internal visual inspection, each cylinder must be leak tested in accordance with ISO 11623 Clause 10; and

(vii) Hydraulic proof pressure test as described in CGA Pamphlet C.1 in 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 a 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 the PHMSA website, and the additional SOP provided by the requalification facility on file with OHMS.

(iii) External visual inspection must be in accordance with CGA pamphlet C-6.2 and additional SOP provided by the requalification facility on file with OHMS.

(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 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 the terms conditions of this special permit.

d. OPERATIONAL CONTROLS:

(1) Cylinders manufactured under this special permit are authorized for a maximum service use of 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) Manifolding of cylinders must be in accordance with the requirements of § 173.301(g).

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

(5) Cylinders/Tubes are permanently mounted inside of framing that is designed, marked (approval plate) and approved in accordance with the requirements of 49 CFR Part 451 of International Convention for Safe Containers (CSC), ISO 1496-3:1995/Amd.1:2006 standard in accordance with the clauses below:

(i) ISO 1496-3:1995 Test No. 4 – External Restraint (longitudinal);

(ii) ISO 1496-3:1995 Test No. 5 – Internal Restraint (longitudinal);

(iii) ISO 1496-3:1995 Test No. 6 – Internal Restraint (lateral);

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

(v) All requirements of CGA C-29. Finite Element Analysis (FEA) shall demonstrate the ability of the frame assembly (FA) to meet all g-loading requirements of CGA C-29.

(6) Any semi-tractor used for the transport of tube trailer modules transporting the gases authorized under the terms of these special permits must be equipped with electronic roll stability control (RSC). The RSC system must be on and activated during transportation.

(7) All trailer modules, (COPV frame assembly and chassis) transporting the gases authorized under the terms of these special permits must be equipped with rigid body Static Rollover Threshold (SRT) of 0.375. The SRT calculation must be submitted to the Office of Hazardous Materials Safety (OHMS). The SRT calculation must account for susceptibility to rollover accident and the vehicle dynamics during transportation.

(8) The design and fabrication of the external piping and valves connecting the cylinders must be such that damage to a valve or to the piping does not result in discharge of the contents through piping, tubing, valve, or other components. Failure of one or more of these components, must result in no excess flow from a cylinder.

(9) The cylinder/tube assembly must be equipped with a Fire Protection System (FPS), which meets the following criteria, and the design must be submitted to and acknowledged in writing by OHMS 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 must 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 OHMS before the deployment of the first production of the tube assembly; or

(ii) If the packaging (tube assembly) is not equipped with an FPS, one of the 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 OHMS prior to first use:

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

(10) Cylinder (tube) handling: the cylinder must be rejected if it drops from a height greater than 2 feet during the manufacturing and/or prior to being mounted to the framing.

(11) Standard Operating Procedures (SOP's) that govern filling/discharging operations and incident reporting must be provided to the OHMS in advance of the first unit's deployment.

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

(13) Cylinder (tube) exhibiting liner bulging: Liner bulge must be fixed 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 exhibited.

(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 exhibited 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 the rejected tube, contact the tube manufacturer for obtaining additional guidance in fixing the liner bulge prior to completing the requalification process and placing the requalification marking such as re-test date and RIN.

8. SPECIAL PROVISIONS:

a. Service Life Extension Program:

(1) Cylinders manufactured under this special permit are authorized for the maximum service life of 15 years from the date of manufacture. The service life extension program must be implemented for each design type that is intended for additional 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 randomly recall a minimum of thirty (30) cylinders of each design type that 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 design requalification as specified. Sections 8.5.4, 8.5.5, and 8.5.7 of ISO 11515. Acceptance criteria shall be as defined in ISO 11515 except Pb=1.6Ph and the design life (y) must be greater than or equal to 20 years. All cylinders that fail to meet the requalification requirements must be condemned, removed from service, and rendered incapable of retaining pressure. 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 (Sections 8.5.4, 8.5.5, and 8.5.7 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 paragraph 8.a. 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.

c. A person who is not a holder of this special permit who 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 package is offered or reoffered for transportation.

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 for a specific manufacturing facility.

f. 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.

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:

- All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
- 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.
- 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 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-13, 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 https://www.phmsa.dot.gov/approvals-and-permits/hazmat/special-permits-search. Photo reproductions and legible reductions of this special permit are permitted. Any alteration of this special permit is prohibited.

PO: MT/MN