



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 16485

EXPIRATION DATE: October 31, 2017

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Entegris, Inc.
Billerica, MA
2. PURPOSE AND LIMITATION:
 - a. This special permit authorizes the transportation in commerce of adsorbed gases in cylinders conforming to Specifications DOT 3AA and DOT 3E. This special permit provides no relief from the Hazardous Materials Regulations (HMR) or the International Maritime Dangerous Goods (IMDG) Code other than as specifically stated herein. The most recent revision supersedes all previous revisions.
 - b. The safety analyses performed in the development of this special permit only considered the hazards and risks associated with the transportation in commerce.
 - c. No party status will be granted to this special permit.
 - d. This special permit serves as an "Approval" under Chapter 6.2, Section 6.2.1.1.2 and Chapter 7.9, Section 7.9.2 of the IMDG Code and as a "Competent Authority Approval" as defined in 49 CFR § 107.1.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180, and the IMDG Code.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 173.302c(a) in that DOT specification cylinders are not authorized for adsorbed gases and § 173.302c(i)(5) in that pressure relief devices are not authorized for adsorbed gases, except as specified herein; §§ 180.205(f) and 180.205(g) in that ultrasonic examination (UE) is performed in lieu of the

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specified internal visual examination and hydrostatic pressure test for the requalification of Specification DOT 3AA cylinders every 5 years.

5. BASIS: This special permit is based on the application of Entegris, Inc. dated May 19, 2015 submitted in accordance with § 107.105 and the public proceeding thereon.
6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Hazardous Materials Description			
Proper Shipping Name	Hazard Class/ Division	Identification Number	Hazard Zone
Adsorbed gas, flammable, n.o.s.	2.1	UN3510	N/A
Adsorbed gas, n.o.s.	2.2	UN3511	N/A
Adsorbed gas, toxic, n.o.s.	2.3	UN3512	A, B, C, & D
Adsorbed gas, oxidizing, n.o.s.	2.2	UN3513	N/A
Adsorbed gas, toxic, flammable, n.o.s.	2.3	UN3514	A, B, C, & D
Adsorbed gas, toxic, oxidizing, n.o.s.	2.3	UN3515	A, B, C, & D
Adsorbed gas, toxic, corrosive, n.o.s.	2.3	UN3516	A, B, C, & D
Adsorbed gas, toxic, flammable, corrosive, n.o.s.	2.3	UN3517	A, B, C, & D
Adsorbed gas, toxic, oxidizing, corrosive, n.o.s.	2.3	UN3518	A, B, C, & D
Boron trifluoride, adsorbed	2.3	UN3519	B
Chlorine, adsorbed	2.3	UN3520	B
Silicon tetrafluoride, adsorbed	2.3	UN3521	B
Arsine, adsorbed	2.3	UN3522	A

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Hazardous Materials Description			
Proper Shipping Name	Hazard Class/ Division	Identification Number	Hazard Zone
Germane, adsorbed*	2.3	UN3523	B
Phosphorous pentafluoride, adsorbed	2.3	UN3524	B
Phosphine, adsorbed	2.3	UN3525	A
Hydrogen selenide, adsorbed	2.3	UN3526	A

*Note: The filling of this gas must be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the cylinder.

7. SAFETY CONTROL MEASURES:

a. PACKAGING-

(1) Packaging prescribed is Specification DOT 3AA or 3E seamless steel cylinder with minimum service pressure of 1,800 psig. The cylinders must be designed and manufactured in accordance with the requirements of §§ 178.35, 178.37 and 178.42, as applicable. When conforming to the terms of this special permit, the cylinders need not comply with Packing Instruction P208 of the IMDG Code provided the general packing requirements in Section 4.1.6.1 are met.

(2) Each cylinder is filled with solid bead, pellet or tablet type microporous sorbent onto which the gas is adsorbed. The gas remains adsorbed during transportation in essentially a solid state.

(3) The system is filled, operated and transported at sub-atmospheric pressures and is described as a sub-atmospheric gas delivery system (SDS). The gas must be removed from the SDS using the input of external

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energy, such as a steady vacuum. The maximum capacity of the cylinders is limited to that allowed in parent specification but in no case is it to exceed 150 liters (330 lbs. of water).

(4) The cylinders may be equipped with pressure relief devices as prescribed in § 173.301(f) for the hazardous material being transported in accordance with Compressed Gas Association Pamphlet S-1.1 as incorporated by reference (IBR) in § 171.7. The selection of the type, location and quantity of a pressure relief device for an adsorbed gas package is based on the name of the gas in the un-adsorbed state. For example the selection of a pressure relief device for "UN3519, Boron Trifluoride, adsorbed" would be based on the pressure relief device required for UN1008, Boron Trifluoride.

b. MARKING - Each cylinder must be marked "DOT-SP 16485" in addition to the specification marking as required in § 178.35(f).

c. REQUALIFICATION - Each cylinder must be requalified in accordance with the requirements of 49 CFR Part 180 except as follows:

(1) For Specification DOT 3AA cylinders ultrasonic examination is performed in lieu of the hydrostatic pressure test and internal visual examination in accordance with the appropriate special permit for ultrasonic examination (e.g., DOT-SP 14798 and DOT-SP 10922).

(2) For Specification DOT 3E cylinders, no requalification test is required.

d. OPERATIONAL CONTROLS -

(1) The pressure of each filled cylinder must be less than 101.3 kPa (14.7 psia) at 20 °C (68 °F) and must not exceed 300 kPa (43.5 psia) at 50 °C (122 °F).

(2) The internal pressure at 65 °C (149 °F) of the filled cylinder must not exceed the test pressure of the cylinder.

(3) The adsorbent material must be compatible with the cylinder and must not form harmful or dangerous compounds with the gas to be adsorbed. The gas in combination with the adsorbent material must not affect or weaken the cylinder or cause a dangerous reaction (e.g., a catalyzing reaction).

(4) The quality of the adsorbent material must be verified at the time of each fill to assure the pressure and chemical stability requirements of this permit are met each time an adsorbed gas package is offered for transport.

(5) The adsorbent material must not meet the definition of any other hazard class.

(6) Cylinders and closures containing toxic gases with an inhalation toxicity with LC₅₀ less than or equal to 200 ml/m³ (ppm) - Hazard Zone A material - must meet the following requirements:

(i) Valve outlets must be fitted with pressure retaining gas-tight plugs or caps having threads matching those of the valve outlets and in compliance with § 173.40.

(ii) Each valve must either be of the packless type with non-perforated diaphragm, or be of a type which prevents leakage through or past the packing and in compliance with § 173.40.

(iii) Each cylinder and closure must be tested for leakage after filling.

(iv) Each valve must be capable of withstanding the test pressure of the cylinder and be directly connected to the cylinder by a taper-thread.

(7) Valve outlets for cylinders containing pyrophoric gases must be fitted with gas-tight plugs or caps having threads matching those of the valve outlets.

(8) The filling procedure must be in accordance with Annex A of ISO 11513 (IBR, see § 171.7).

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(9) Only Entegris, Inc. or its agents authorized and trained by Entegris, Inc. may fill the cylinders. Only a grantee to this special permit may offer for transportation in commerce cylinders covered under the terms of this special permit.

(10) Each cylinder must remain in dedicated product service for its entire life.

8. SPECIAL PROVISIONS:

a. Under the terms of this special permit, the grantee may only offer hazardous materials (i.e., the grantee is not authorized as a carrier).

b. 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 or its contents and it is reoffered for transportation in conformance with this special permit, the HMR, and the IMDG Code.

c. A current copy of this special permit must be maintained at each facility where the package is offered or reoffered for transportation.

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.

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- 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 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

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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://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: RS