March 20, 2006

U.S. Department
of Transportation

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

**Pipeline and
Hazardous Materials
Safety Administration**

DOT-SP 10997
(FIFTH REVISION)

EXPIRATION: February 28, 2010

(FOR RENEWAL, SEE 49 CFR 107.109)

1. GRANTEE: HR Textron Inc.
Pacoima, California

2. PURPOSE AND LIMITATIONS:

a. This special permit authorizes the manufacture, marking and sale of non-DOT specification titanium alloy cylinders and spheres to be used for the transportation in commerce of nitrogen or nitrogen mixtures classed as Division 2.2 materials. This special permit provides no relief from any regulation other than as specifically stated herein.

b. The safety analyses performed in development of this special permit only considered the hazards and risks 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) in that a non-DOT specification cylinder is not authorized, except as specified herein.

5. BASIS: This special permit is based on the application of HR Textron Inc., dated February 23, 2006, submitted in accordance with § 107.109.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Proper Shipping Name Hazardous Materials Description	**Hazard Class or Division**	**Identification Number**
Nitrogen, compressed	2.2	UN1066
Rare gases and nitrogen mixtures, compressed	2.2	UN1981

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a non-DOT specification cylinder or sphere of 50 cubic inch maximum capacity, constructed of titanium alloy Ti-6Al-4V. Cylinders or spheres must be in conformance with HR Textron's Drawing X834120 on file with the Office of Hazardous Materials Special Permits and Approvals (OHMSPA). The cylinder or sphere conforms to the requirements of DOT Specification 3HT (§ 178.44) except as follows:

§ 178.35(a) Compliance.

Required in all details except as amended herein.

§ 178.44(a) Type, Size and Service pressure.

(1) Welded titanium spheres (two seamless hemispheres) or circumferentially welded cylinders not over 1.8 pounds water capacity.

(2) The maximum service pressure is 3,000 pounds per square inch gauge at 70°F.

§ 178.44(b) Authorized material.

Authorized material must be titanium alloy Ti-6Al-4V. Material must conform to SAE Aerospace Material Specification (ASM) ASM4928 titanium alloy bars, wire, forgings and rings 6A1-4V annealed. Check analysis must confirm to SAE ASM 2249,

§ 178.44(e) Welding or brazing.

Welding or brazing: All seams of the sphere or cylinder must be fusion welded with complete penetration of the joint. Openings in the packaging which are not integrally forged or machined must be provided with a fitting or boss of compatible titanium alloy attached to the sphere or cylinder by fusion welding.

§ 178.44(f) Wall Thickness.

Calculations for the cylinder or sphere must be made by the following equations:

Cylinder: $S = [P(1.3D^2+0.4d^2)]/(D^2-d^2)$
Sphere: $S = PD/4tE$

where
S = Wall stress in psi
P = Minimum test pressure for water jacket test
D = Outside diameter in inches
I = Inside diameter in inches
t = Minimum wall thickness in inches
E = 1.0 for welded and annealed spheres

§ 178.44(g) Heat treatment.

(a) The completed cylinder must be uniformly and properly heated prior to tests. Heat treatment of the cylinders of the authorized analysis must be as follows:

(1) All cylinders must be annealed at a temperature within the range 1300°F - 1450°F for not less than one hour.

(2) The cylinders must be heat treated in a protective atmosphere of argon, helium or vacuum.

(3) The cylinders must be furnace cooled 800°F minimum in the protective atmosphere prior to removal from the heat treat furnace.

(4) All cylinders must be inspected by the dye penetrant method to detect the presence of cracks. Any cylinder found to have a crack must be rejected and may not be requalified. Evidence of discontinuaties, which in the opinion of the Independent inspector may appreciably weaken or decrease the durability of the pressure vessel must be cause for rejection.

(5) Radiographic inspection of welds must be performed. Accept/reject criteria must be in accordance with x-ray standards for production and repair welds (NAVSHIPS 250-692-2), Bureau of Ships, Navy Department, Washington, D.C.

§ 178.44(l) Flattening Test.

The flattening test is not required.

§ 178.44(m) Physical Tests.

In using the “extension under load” method, the total strain (or “extension under load”) corresponding to the stress at which the 0.2 percent permanent strain occurs may be determined with sufficient accuracy by calculating the elastic extension of the gauge length under appropriate load and adding thereto 0.2 percent of the gage length. Elastic extension calculations must be based on an elastic modulus of 16,000,000. In the event of controversy, the entire stress-strain diagram must be plotted and the yield strength determined from the 0.2 percent offset.

§ 178.44(n) Magnetic Particle Inspection.

Not required.

§ 178.44(p) Acceptable results of tests.

(a) Not required.

(b) Physical tests.

(1) Elongation at least 10% minimum in gauge length not less than 2 inches. Reduction in area must be recorded.

(2) Ultimate tensile strength is 135,000 psi nominal; yield strength is 125,000 psi minimum.

(c) Burst pressure.

Minimum burst pressure must be 3.5 times service pressure.

(d) Cycling tests.

At least 20,000 cycles with the test cylinder showing no evidence of distortion or failure.

§ 178.44(q) Rejected cylinders.

The cylinders in a lot must be rejected if the lot qualification test cylinder fails any required test or inspection. A rejected lot may be used only if the cause of the failure is known and proper corrective action, which may include weld repair, is acceptable to the DOT-authorized inspector. The lot must pass all prescribed tests.

§ 178.44(r) Marking.

(a) * * *

(1) Applies, except that:

(i) Instead of DOT-3HT, each cylinder must be marked "DOT-SP 10997" followed by the service pressure.

(ii) Marking by low stress type method such as electro-chemical etching, vibropen or laser marking, which does not decrease the integrity of the pressure vessel, is authorized.

(2) and (3) * * *

(4) Rejection elastic expansion (REE) stamping is not required. Retest pressure prescribed in § 180.205 as applicable to DOT-3HT Specification cylinder.

§ 178.44(r)(3) Name plates.

Not required.

§ 178.44(s) Inspector's Report.

Inspector's report must be appropriately modified to reflect identification and conformance with this special permit. A copy of the inspector's report on the first lot of cylinders produced must be submitted to the Office of Hazardous Materials Special Permits and Approvals prior to initial shipment.

b. RETEST - Each cylinder must be reinspected and hydrostatically retested every 3 years in accordance with § 180.205 as prescribed for DOT-3HT cylinders except that elastic expansion measurement is not required.

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 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 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.

d. 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 Special Permits and Approvals for a specific manufacturing facility.

e. 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.

f. Cylinders are limited to use as part of aircraft emergency door actuation system or pneumatic services on missiles as described in HR Textron Inc.'s application.

g. Cylinders must be shipped in strong outside packagings in conformance with § 173.301(a)(9).

h. Cylinder service life may not exceed 24 years.

i. Packagings permanently marked 'DOT-E 10997', prior to October 1, 2007 may continue to be used under this special permit for the remaining service life of the packaging or until the special permit is no longer valid. Packagings marked on or after October 1, 2007 must be marked 'DOT-SP 10997'.

j. Shipping papers displaying 'DOT-E 10997' may continue to be used until October 1, 2007, provided the special permit remains valid.

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo aircraft only, and passenger-carrying aircraft.

10. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each 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:

- All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 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 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 Robert A. McGuire
Associate Administrator
for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Washington, D.C. 20590. Attention: PHH-31.

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: sln