U.S. Department
of Transportation
**Research and
Special Programs
Administration**

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

JUN 1 3 2003

DOT-E 12691
(FIRST REVISION)

EXPIRATION DATE: May 31, 2005

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: TITEQ Corporation
Palmdale, CA

2. PURPOSE AND LIMITATIONS:

a. This exemption authorizes the manufacture, marking, sale and use of a non-DOT specification cylinder conforming with all regulations applicable to a DOT Specification 3HT cylinder, except as specified herein, for the transportation in commerce of the materials authorized by this exemption. This exemption provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein.

b. The safety analyses performed in development of this exemption 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)(2) and 175.3 in that a non-DOT specification cylinder is not authorized except as specified herein.

5. BASIS: This exemption is based on the application of TITEQ Corporation dated May 23, 2003, submitted in accordance with § 107.109.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Proper Shipping Name/ Hazardous Material Description	Hazard Class/ Division	Identi-fication Number	Packing Group
Argon, compressed	2.2	UN1006	N/A
Helium, compressed	2.2	UN1046	N/A
Nitrogen, compressed	2.2	UN1066	N/A
Oxygen, compressed	2.2	UN1072	N/A
Rare gases and oxygen mixtures, compressed	2.2	UN1980	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a non-DOT specification welded cylinder (sphere) conforming with TITEQ Drawing Number 102-03 dated January 30, 2001 on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA) and with DOT Specification 3HT (§§ 178.35 and 178.44) except as follows:

§ 178.35(f) Markings.

(1) * * *

(i) Each cylinder must be marked "DOT-E 12691" in lieu of "DOT 3HT", followed by the service pressure.

* * *

§ 178.44(a) Type, size, and service pressure. Welded sphere with a maximum volume of 320 cubic inches and a maximum service pressure of 5,000 psig.

§ 178.44(b) Authorized steel. The sphere must be constructed of 17-7PH stainless steel in accordance with UNS S17700. The steel analysis is as follows:

Carbon	0.08
Manganese	2.00
Phosphorous	0.045
Sulfur	0.030

Silicon	0.75
Chromium	16.0 - 18.8
Nickel	10.0 - 14.0
Molybdenum	2.00 - 3.00
Nitrogen	0.10
Copper	n/a
Other Elements	n/a

§ 178.44(e) Welding.

(1) Welding of the two spherical halves is authorized. Welding procedures and operation must be qualified in accordance with AMS-STD-2219 and AMS-STD-1595 and AMS-2681A.

(2) All welded joints must be 100% radiographically examined in accordance with ASTM-E-1442-95. Interpretation and acceptance of radiographs shall be in accordance with MIL-STD-2035, Class 1.

(3) All welded joints must be liquid penetrant inspected. Inspection and acceptance must be in accordance with ASTM-E-1417-99.

§ 178.44(f) Wall thickness.

(1) Minimum wall thickness must be such that the wall stress at minimum specified test pressure may not exceed 115,000 psi or 75 percent of the minimum tensile strength of the material as determined from the physical tests prescribed in § 178.44(m).

(2) Calculations must be made by the formula:

$S=PD/4tE$

Where:

S= Wall stress in psi;
P= Minimum test pressure prescribed for water jacket test;
D= Outside diameter in inches;
t= Minimum wall thickness in inches;
E= 1.00. Weld efficiency factor which must be applied in the girth weld area and heat zones. Zones must extend a distance of 6 times wall thickness from center weld;

(3) Does not apply.

§ 178.44(g) Heat treatment. The completed cylinders must be uniformly and properly heat treated in accordance with AMS-H-6875.

§ 178.44(k) Burst test. One sample cylinder taken at random from each lot of cylinders must be hydrostatically tested to at least the minimum required burst pressure and held for 5 minutes.

§ 178.44(l) Flattening test.

(1) One sample ring representative of the cylinder must accompany each lot. The sample ring must be from the same material and be subjected to the same heat treatment as the lot of cylinders. The sample ring may not include the heat affected zone or any weld.

(2) Flattening test must be performed on one representative sample ring per lot. Flattening between flat plates is authorized.

(3) If the sample ring cracks when subjected to the specified flattening test, the lot of cylinders represented by the test must be rejected (see § 178.44(q)).

§ 178.44(n) Magnetic particle inspection. Not required. Instead, each cylinder must be inspected using apparatus and procedures for liquid penetrant examination in accordance with ASTM-E-1417-99. Inspection must be performed externally on the finished cylinder after hydrostatic testing. Evidence of discontinuities, which may appreciably weaken or decrease the durability of the cylinder, must be cause for rejection.

§ 178.44(o) Leakage test. Does not apply.

§ 178.44(p) Acceptance results of tests.

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(1) Flattening: The sample ring must not crack when flattened so that outer surfaces are not more than fifteen times wall thickness apart.

* * *

§ 178.44(r) Marking.

(1) Cylinders must be marked by low stress type steel stamping or laser engraving methods in an area and to a depth which will insure that the wall thickness measured from the root to the interior surface is equal to or greater than the minimum prescribed wall thickness. Marking must be permanent and legible.

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b. TESTING - Each cylinder must be requalified in accordance with the requirements for DOT 3HT cylinders as specified in § 180.205.

c. OPERATIONAL CONTROLS -

(1) A copy of the Inspector's report required by § 178.35(g) for the first lot of cylinders must be submitted to the OHMEA prior to first shipment.

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

(3) Each cylinder is authorized for use under this exemption for no more than 24 years from the date of manufacture, or 4,380 cycles, which ever comes first. Cylinders must be removed from service at the end of the authorized life.

8. SPECIAL PROVISIONS:

a. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this exemption for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this exemption.

b. A person who is not a holder of this exemption, but receives a package covered by this exemption, 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 exemption and the HMR.

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

d. Each packaging manufactured under the authority of this exemption 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 Exemptions and Approvals for a specific manufacturing facility.

e. A current copy of this exemption must be maintained at each facility where the package is manufactured under this exemption. It must be made available to a DOT representative upon request.

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

10. MODAL REQUIREMENTS: A current copy of this exemption must be carried aboard each aircraft or motor vehicle used to transport packages covered by this exemption. The shipper must furnish a copy of this exemption 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 exemption and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:

- All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, Parts 171-180.
- Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this exemption must receive training on the requirements and conditions of this exemption in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this exemption, including display of its number, when this exemption has expired or is otherwise no longer in effect.

12. REPORTING REQUIREMENTS: The carrier is required to report any incident involving loss of packaging contents or packaging failure to the Associate Administrator for Hazardous Materials Safety (AAHMS) as soon as practicable. (Sections 171.15 and 171.16 apply to any activity undertaken under the authority of this exemption.) In addition, the holder(s) of this exemption must also inform the AAHMS, in

writing, as soon as practicable of any incidents involving the package and shipments made under this exemption.

Issued in Washington, D.C.

JUN 1 3 2003

(DATE)

Robert A. McGuire
for Associate Administrator for
Hazardous Materials Safety

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

Copies of this exemption may be obtained by accessing the Hazardous Materials Safety Homepage at http://hazmat.dot.gov/exemptions Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

PO: CWF/AM