



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

400 Seventh St., S.W.
Washington, D.C. 20590
MAR 28 2003

DOT-E 7708
(TWELFTH REVISION)

EXPIRATION DATE: February 28, 2005

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: HTL/Kin-Tech Division
Pacific Scientific Company
Duarte, CA
2. PURPOSE AND LIMITATION:
 - a. This exemption authorizes the manufacture, mark, sale and use of non-DOT specification small, high pressure cylinders of welded construction conforming with all regulations applicable to a DOT Specification 3HT, except as specified herein, for the transportation in commerce of nitrogen, compressed, for military weapons systems. 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. The safety analyses did not consider the hazards and risks associated with use as a component of another device, or other uses not 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) and 175.3 in that a non-DOT specification packaging is not authorized, except as specified herein.
5. BASIS: This exemption is based on the application of Pacific Scientific Co. dated March 13, 2003, submitted in accordance with § 107.109.

6. HAZARDOUS MATERIALS (49 CFR 172.101):

Proper Shipping Name/ Hazardous Materials Description	Hazard Class/ Division	Identi- fication Number	Packing Group
Nitrogen Compressed	2.2	UN1066	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Prescribed packaging is a non-DOT specification girth welded steel cylinder in accordance with HTL design specifications on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA). The cylinder must be in full compliance with §§ 178.35 and 178.44 except as follows:

§ 178.35(e) *Pressure relief devices.*

(Added) Approval of the pressure relief device required by § 173.301(f) must be submitted to the OHMEA prior to initial shipment.

§ 178.35(f) *Markings.*

(1)

(i) Instead of DOT-3HT, cylinders must be marked DOT-E 7708 followed by the service pressure.

* * *

§ 178.44(a) *Type, size and service pressure.*

Cylinder may be circumferentially welded with two end fittings. Maximum volume is 25 cubic inches water capacity. Design drawings must be on file with the OHMEA prior to first shipment. Service pressure is 6,300 psig, maximum.

§ 178.44(b) *Authorized steel.*

Type ARMCO Nitronic 40 (21-6-9) austenitic stainless steel with the following composition is authorized with proper welding procedure.

CHEMICAL ANALYSIS

	<u>PERCENT</u>
Carbon	0.040 max.
Manganese	8.00/10.00
Phosphorus	0.060 max.
Sulfur	0.030 max.
Silicon	1.00 max.
Chromium	19.00/21.50
Nickel	5.50/7.50
Nitrogen	0.15/0.40

TYPICAL MECHANICAL PROPERTIES

<u>Condition</u>	<u>Ultimate Tensile (PSI)</u>	<u>Yield Strength (PSI)</u>	<u>Elongation Percent In 2 in.</u>
Annealed	112,000	68,000	44
20% Cold Reduction	150,000	120,000	18

§ 178.44(d) *Manufacture.*

* * *

(Added) Each cylinder must be subjected to a process treatment after welding and before stress relieving by hydrostatically pressurizing to at least 100 percent but not more than 110 percent of the test pressure, and maintained at this pressure for 3 minutes. The process treatment must be witnessed by the independent inspector.

§ 178.44(e) *Welding or Brazing.*

Welding as prescribed in § 178.44(a) of this exemption, is authorized. All pressure welds must be 100 percent radiographed after hydrostatic test.

§ 178.44(f) *Wall thickness.*

(1) Minimum wall thickness for any cylinder must be 0.078 inch. The minimum wall thickness must be such that the wall stress at the minimum specified test pressure may not exceed 120,000 psi.

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§ 178.44(g) *Heat Treatment.*

The half cylinders may be stress relieved or annealed for forming. Welded cylinders must be stress relieved at a temperature of $900^{\circ}\text{F} \pm 25^{\circ}$ for one hour. Stress relieving to be done after process treatment, and before hydrostatic test.

§ 178.44(j) *Cycling test.*

(1) (Added). Results of design qualification testing per § 178.44(p) of this exemption must be submitted to the OHMEA prior to initial shipment.

(2) Cycle test on each lot is not required.

(3) A lot is defined as a group of cylinders sequentially fabricated from the same heat of steel, manufactured by the same process, and stress relieved under the same conditions of time, temperature and atmosphere and must not exceed 200 cylinders.

§ 178.44(m) *Physical Tests.* - Not required.

§ 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-165-65. Inspection must be performed externally on the finished container after hydrostatic test. Evidence of discontinuities, which in the opinion of the independent inspector may appreciably weaken or decrease the durability of the cylinder, must be cause for rejection.

§ 178.44(p) *Acceptable results of tests.*

(1) Flattening required without cracking to six times the wall thickness of the cylinder.

(2) Physical tests: Not required.

(3) Burst pressure must be at least $4/3$ times the test pressure. Failure must be in the sidewall in a longitudinal direction. Actual burst pressure must be recorded.

(4) **Cycling:** The design must be qualified by cycling 3 cylinders from zero to service pressure to at least 50,000 pressurizations without evidence of distortion or failure.

§ 178.44(q) *Rejected cylinders.*

Repair of welded seams by welding prior to process treatment authorized; subsequent thereto cylinders must be heat treated and pass all prescribed tests.

§ 178.44(r) *Marking.*

(1) * * *

(2) Stamping of elastic expansion is not required.

(3) * * *

§ 178.44(s) *Inspectors Report.*

The inspector's report must be appropriately modified to reflect identification and compliance with this exemption.

b. TESTING - Each cylinder must be reinspected and hydrostatically retested every 3 years in accordance with § 180.205 as prescribed for DOT-3HT cylinders, except that the rejection elastic expansion criteria does not apply.

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 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.
- f. The cylinders are limited to military weapons systems use only.
- g. Cylinders must be shipped in strong outside packagings in conformance with § 173.301(a)(9).
- h. Cylinders are not authorized for use 15 years after the date of manufacture.
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo aircraft only, and passenger-carrying aircraft.
10. MODAL REQUIREMENTS: A current copy of this exemption must be carried aboard each aircraft 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:
- o All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
 - 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 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 the 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.:



for Robert A. McGuire
Associate Administrator for
Hazardous Materials Safety

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(DATE)

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: CWFreeman/alb