U.S. Department
of Transportation

**Research and
Special Programs
Administration**

NOV 20 1998

DOT-E 12004

EXPIRATION DATE: September 30, 2000

(FOR RENEWAL, SEE 49 CFR 107.109)

1. GRANTEE: Alfa SA, Portugal
U.S. Agent: AMTROL Inc., West Warwick, RI

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 4BA cylinder, except as specified herein, for the transportation in commerce of the materials authorized by this exemption. This exemption provides no relief from any Hazardous Materials Regulation 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 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 173.34(e)(9) as specified in paragraph 8.d. of this exemption; 173.304, 175.3, and portions of 178.35 and 178.51 in that a non-DOT specification packaging is authorized.

5. BASIS: This exemption is based on the application of Alfa SA, dated November 13, 1997 submitted in accordance with 49 CFR 107.105 and the public proceeding thereon.

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6. HAZARDOUS MATERIALS (49 CFR 172.101):

Proper Shipping Name/ Hazardous materials description	Hazard Class/ Division	Identi-fication Number	Packing Group
Trichlorofluoromethane R-11	2.2	UN1078	n/a
Dichlorodifluoromethane R-12	2.2	UN1028	n/a
Chlorodifluorobromoethane R12B1	2.2	UN1974	n/a
Chlorotrifluoromethane R-13	2.2	UN1022	n/a
Tetrafluoromethane R-14	2.2	UN1982	n/a
Bromotrifluoromethane R-13B1	2.2	UN1009	n/a
Dichlorofluoromethane R-21	2.2	UN1029	n/a
Chlorodifluoromethane R-22	2.2	UN1018	n/a
Trichlorotrifluoroethane R-113	2.2	UN1078	n/a
Dichlorotetrafluoroethane R-114	2.2	UN1958	n/a
Chloropentafluoroethane R-115	2.2	UN1020	n/a
Hexafluoroethane R-116	2.2	UN2193	n/a
Dichlorotrifluoroethane R-123	2.2	UN1078	n/a
Chlorotetrafluoroethane R-124	2.2	UN1021	n/a
Chlorotrifluoroethane R-133a	2.2	UN1983	n/a
1,1,2-Tetrafluoroethane R-134a	2.2	UN3159	n/a
Dichlorodifluoromethane and Difluoroethane R-500	2.2	UN2602	n/a
Chlorodifluoromethane and Chloropentafluoroethane R-502	2.2	UN1973	n/a
Chlorotrifluoromethane and Trifluoromethane R-503	2.2	UN2599	n/a
Hexafluoropropylene R-1216	2.2	UN1858	n/a
Refrigerant gases, n.o.s.	2.2	UN1078	n/a

7. PACKAGING(S) and SAFETY CONTROL MEASURES:

a. PACKAGING: Packaging prescribed is a non-DOT specification welded steel cylinder conforming with 49 CFR 178.35 and with DOT Specification 4BA (49 CFR 178.51) except as follows:

§178.35(a) Compliance.

Each cylinder must conform with this exemption in all details and with §178.35 and §178.51 unless otherwise noted herein.

§178.35(c) Duties of Inspector.

(1) * * *

(2) The inspector must verify compliance with the material specification requirement in this exemption by obtaining a certified chemical analysis of each heat of the specified steel (ladle analysis is acceptable). The certificate from the manufacturer, thereof, giving sufficient data to show compliance with the requirement is acceptable when verified by check analysis on one container from each lot.

(3) * * *

(4) * * *

§178.35(f) Markings.

(1) Marking of each cylinder must be in compliance with the requirements of §178.35(f) except as follows:

(i) The cylinder must be marked "DOT-E 12004-XXX", in lieu of "DOT-4BA" where XXX is the service pressure and may not exceed 400 psig.

(ii) * * *

(iii)* * *

(iv) * * *

(v) Date of first retest,

(vi) Date of last permissible refill.

(2) * * *

(3) * * *

(4) The above markings may be on the footring permanently attached to the cylinder.

(5) * * *

(6) * * *

§ 178.35(g) Inspectors Report "The material used was Type ASTM A-620 class 1" must be substituted for "The material used was Type 1 authorized in Table I of Spec. No. 4BA".

§178.51(a) Type, size and service pressure.

(1) Type. Cylinders must be of cylindrical shape, with integrally formed spherical or elliptical heads. Cylinder ends closed by spinning process are not authorized. Cylinders must be fabricated from ASTM A 620 class 1 deep drawing quality steel with seamless cylindrical shells with integrally formed heads, and joined by welding of one circumferential seam. Brazed joints for attachments when appropriate are authorized.

(2) Water capacity not to exceed 50 pounds.

(3) Service pressure: Not to exceed 400 pounds per square inch gauge.

§178.51(b) Steel.

The composition of the steel authorized is limited to ASTM SA 620 class 1 designation aluminum killed, deep drawing quality steel with carbon content not to exceed 0.10%. Certification of the chemical composition and

mechanical properties for each heat of steels used for production is required. The steel analysis must conform with the following:

Element	Weight %
Carbon	0.10 (max)
Manganese	0.50 (max)
Phosphorous	0.025 (max)
Sulphur	0.035 (max)
Aluminum	0.010 (min)

§ 178.51(d) Manufacture.

(1) Cylinder shells must be of seamless construction manufactured by the deep drawing method with integrally formed heads; dirt and scale to be removed as necessary to afford proper inspection; fissures or other defects that are likely to weaken the finished cylinder appreciably are not acceptable. Irregularities such as draw marks, scratches, pits, etc. should be held to a minimum. If the cylinder is not originally free of such defects or does not meet the finish requirements, the surface may be machined or otherwise treated to eliminate these defects. Metal removal for any purpose other than removal of isolated defects and threading must be done prior to the hydrostatic test. The thickness of the treated areas must be measured and may not be less than the minimum prescribed thickness. Cylinder end contour must be hemispherical or ellipsoidal (axis ratio of 2:1) with concave side to pressure. Shape, thickness, and strength of the cylinder bottom and side wall adjacent to the bottom must be such that failure during the cycle pressure test occurs in the sidewall of the cylinder.

(2) Welded joints must have strength equal to or greater than the minimum strength of the shell material in the finished cylinder.

<u>§ 178.51(f) Wall thickness</u>.

The minimum wall thickness shall be not less than 0.078 inches. The thickness of the top and bottom heads must be no less than the cylinder sidewall thickness. In any case the maximum stress in the cylinder wall at test pressure, calculated by the formula in §178.51(f)(2), may not be greater than 35,000 psi.

§ 178.51(q) Heat treatment.

Does not apply

§ 178.51(i) Hydrostatic test:

(1) * * *

(2) Each completed cylinder must be tested at an internal pressure of at least two times the rated service pressure, and must be held at that pressure for a minimum of 30 seconds.

(i) Cylinders that show excessive deformation and defects must be rejected.

(ii) Volumetric expansion measurement to compliment the test is required on one cylinder in each lot of 200. The cylinders in each lot must be of identical size, design, construction, material specification, finish, and quality.

(iii) Each cylinder in a lot must be tested for leaks by immersing the pressurized cylinder in a water bath. Other methods which are equivalent or better are permitted. If any cylinder leaks, or if there is evidence of distortion or defects while under test, that cylinder must be rejected.

(3) One cylinder selected at random from each lot of 200 or less successively produced, must be hydrostatically tested to burst. The observed pressure at burst must be at least 4 times the service pressure.

§ 178.51(j) Physical test.

(1) Determine yield strength, tensile strength, elongation, and Charpy impact energy at room temperature (70°F). Required on two specimens for tensile test and three specimens for Charpy impact test, taken from a qualification cylinder sidewall.

The cylinder must be from the first lot produced from each heat steel.

(2) * * *

(3) * *

(4) Flattening test.

One cylinder taken from the beginning of each production lot of 200 cylinders must be subjected to flattening test as follows:

(i) The flattening test must be made on a cylinder that has been tested at test pressure.

(ii) A ring taken from the cylinder may be flattened as an alternative to testing a complete cylinder. The test ring may not include weld or heat affected zone.

(iii) The flattening test must be between 60 degrees included angle wedge shaped knife edges, rounded to a 0.5 inch radius.

(iv) When flattened fully, the outer surfaces of the test specimen cylinder shall be parallel and apart not more than 6 times the wall thickness.

(v) If the test cylinder or ring, when fully flattened, shows evidence of surface cracks the cylinders of the lot represented by the test must be rejected.

<u>§ 178.51(k) Elongation:</u>

Delete

<u>§ 178.51(m) Rejected cylinders</u>.

* * *

Add: (1) If the cause for rejection of a lot is determinable and can be rectified, the lot may be qualified by the following procedure:

(i) Identify and record the cause for rejection of the lot. Perform the procedures eliminating the cause. Repair of the defective welds is permitted. Brazed joints may not be repaired.

(ii) Four additional cylinders, randomly selected from the lot, must be burst tested. If any of the cylinders fail at a pressure below two times the test pressure, the entire lot must be rejected.

b. TESTING:

(1) At the end of 5 years from the manufacturing date, cylinders used in non-corrosive service must be subjected to visual examination of internal and external surfaces, as well as valve threads. Any cylinder showing evidence of corrosion or defects that can potentially effect cylinder integrity must be removed from service.

(2) Cylinders used in corrosive service must be retested in accordance with the requirements of 49 CFR 173.34(e) as specified for DOT 4BA cylinders. Cylinders used in recovered refrigerant service are herein defined by DOT as being in corrosive service.

(3) A cylinder must be condemned when it leaks, or when internal or external corrosion, denting, bulging, or evidence of rough usage exists to the extent that the cylinder is likely to be weakened appreciably, or when damaged by fire.

c. OPERATIONAL CONTROLS:

(1) The service life of these cylinders shall not exceed 10 years from the date of manufacture.

(2) Each cylinder must be marked with a warning label stating that it is illegal to refill the container after MM/YYYY; MM/YYYY being the month and the year of last permissible refill date corresponding to the requirement in the marking requirements in this exemption. The marking may be on a label, decal affixed to the surface of the packaging or by stenciling. The warning statement must be in English, legible, unobscured by other labels and attachments, and durable.

(3) Filling limits shall conform with the provisions of 49 CFR 173.304. Under no circumstances are these cylinders to be filled to a pressure exceeding the marked service pressure at 70°F.

(4) Before shipment, each charged cylinder must be tested for leaks by immersing fully in a water bath. Other methods for leak testing are authorized provided such testing is equivalent or better than the water bath test. Cylinders that show evidence of leakage may not be shipped.

8. SPECIAL PROVISIONS:

a. Reports:

(i) Prior to the initial shipment of cylinders made in compliance with this exemption, a report of test results specified in 178.51(i) and 178.51(j) of this exemption must be submitted to the OHMEA;

(ii) A copy of the Inspector's report for each of the first three lots produced must be submitted to the OHMEA; and

(iii) All test reports including certificates of material specification compliance must be retained indefinitely or as long as the cylinders are authorized, and must be made available to a DOT representative upon request.

b. In accordance with the provisions of Paragraph (b) of 49 CFR 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.

c. A current copy of this exemption and test procedures referenced therein must be maintained at each manufacturing facility at which the exemption cylinders are manufactured and must be made available to a DOT representative upon request.

d. 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 modifications or changes are made to the package and it is offered for transportation in conformance with this exemption and the HMR.

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

f. Prior to the initial shipment of cylinders made in compliance with this exemption, Alfa, SA must obtain an approval under 49 CFR 173.300b.

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

10. MODAL REQUIREMENTS: A copy of this exemption must be carried aboard each aircraft used to transport packages covered by this exemption. The shipper shall 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. Section 5101 et seq:

- All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, Parts 171-180.
- Registration required by 49 CFR 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in 49 CFR 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 49 CFR 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. (49 CFR 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.

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Issued at Washington, D.C.

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Alan I. Roberts
Associate Administrator
for Hazardous Materials Safety

(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.

The original of this exemption is on file at the above office. Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

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