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

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

JUL 1 1 2001

DOT-E 12607

EXPIRATION DATE: June 15, 2002

(FOR RENEWAL, SEE 49 CFR § 107.109.)

1. GRANTEE: FIBA Technologies Inc.
Westboro, MA

2. PURPOSE AND LIMITATION:

a. This exemption authorizes the use of certain DOT Specification 3AL cylinders used for the transportation in commerce of the compressed gases described in paragraph 6 below, when retested by a 100% ultrasonic examination in lieu of the internal visual and the hydrostatic retest required in § 173.34(e). 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 §§ 173.34 (e)(1), (e)(3), (e)(4), (e)(8), (e)(14), (e)(15)(vi) in that the ultrasonic examination is performed in lieu of the specified internal visual examination and hydrostatic pressure test. This does not relieve the holder of this exemption from securing an approval for retesting cylinders from the Associate Administrator for Hazardous Materials Safety.

5. BASIS: This exemption is based on the application of FIBA Technologies dated December 29, 2000, and supplemental information dated March 14, and April 19, 2001, submitted in accordance with § 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	Identification Number	Packing Group
Liquefied or non-liquefied compressed gases, or mixtures of such compressed gases, classed as Division 2.1, (flammable gas) Division 2.2, (nonflammable gas) or Division 2.3, (gases which are Toxic by Inhalation (TIH)) which are authorized in the Hazardous Materials Regulations for transportation in DOT 3AL cylinders.	2.1, 2.2 or 2.3 as appropriate	As appropriate	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a DOT Specification 3AL cylinder manufactured from 6061 alloy aluminum that is subjected to periodic retesting, reinspection and marking prescribed in § 173.34(e), except that the cylinder is examined by an ultrasonic method in lieu of the hydrostatic pressure test and internal visual inspection. Each cylinder must be subjected to an external visual examination and retested and marked in accordance with the procedure described herein and FIBA's December 29, 2000 application for exemption and additional information dated March 14, and April 19, 2001, on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA). A cylinder that has been exposed to fire or to excessive heat may not be retested under the terms of this exemption.

b. Ultrasonic equipment. The ultrasonic examination (UT) equipment described in FIBA's application for exemption, on file with OHMEA, must be used and perform in accordance with the procedures delineated therein and as detailed in this exemption. The equipment will be a fully automated, pulse echo type, and incorporate multiple transducers, with interactive software. The transducers must be arranged so

that the ultrasonic beams are focused on a single location in the cylinder wall and exit at the same location. The ultrasonic pulses must enter into the cylinder wall in both longitudinal and circumferential directions to ensure 100 percent coverage of the cylinder wall. The equipment must incorporate continuous automatic monitoring of the transducer to cylinder wall acoustic coupling to assure 100 percent cylinder wall coverage during UT. The frequency used for this UT may not be less than 2 MH_z and greater than 10 MH_z. It must be capable of discerning and aborting the test when the ultrasonic data indicate a loss of acoustic coupling between the transducer assembly and the cylinder wall. This safety control measure must be an integral part of the test equipment design incorporating Lack-of-Expected-Response (L.E.R.) monitoring independent of operator actions. All defects must be detected and measured. The UT equipment must be capable of monitoring all acceptance/rejection criteria described in paragraph 7.d. of this exemption.

c. Equipment performance and test procedure. The ultrasonic equipment performance, test procedure, and rejection criteria must conform to FIBA's application except as specifically stated herein:

(1) Calibration Standards

(i) A cylinder used as a calibration standard must be within +/- 10% of the nominal diameter and minimum design wall thickness (t_m), similar surface finish and metallurgical condition as the cylinders under the test.

(ii) The calibration cylinders must include the following simulated defects:

(A) An artificial defect must be placed in the internal diameter (ID) for reduction in wall thickness (area corrosion). The artificial defect must be at least 0.70 square inch (in^2) and the remaining wall thickness must be at least the design minimum for cylinder being tested.

(B) The artificial defect for isolated pits in cylinders less than or equal to 4 inches in diameter must be an internal flat bottom hole (FBH) of 1/8 inch diameter and $1/3t_m$ in depth.

(C) The artificial defect for isolated pits in cylinders greater than 4 inches in diameter must be an internal FBH of 1/4 inch diameter and $1/3t_m$ in depth.

(D) The artificial defects for line corrosion must be four notches, consisting of two internal (one circumferential and one longitudinal) and two external (one circumferential and one longitudinal). These notches must be electro discharge machined (EDM), measuring 0.10 t_m in depth, 1 inch in length and less than or equal to 0.010 inch in width.

(iii) A drawing representing the above defects and a certification statement signed by a person certified as a Level III operator (in UT) must be available for inspection for each calibrated cylinder at each site where testing is performed.

(2) Calibration of Equipment.

System calibration must be performed using the calibration standards referenced in section 7.c. of this exemption. The equipment may not allow testing of a cylinder unless the system has been properly calibrated. A signal used, during calibration, for detection of an isolated pit or a line corrosion must have a peak amplitude equal or greater than 80% of the A-Scan screen height.

(3) Test Procedure.

A written test procedure for performing UE of cylinder under the terms of this exemption must be at each facility performing ultrasonic examination. At a minimum, this procedure must:

(i) include a description of the test set-up; test parameters; transducer model number, frequency, and size; transducer assembly; couplant used; system calibration method and threshold gain used during the test; and other pertinent information such as additional gain used during the UE to confirm the defects.

(ii) require re-calibration of the test equipment when ultrasonic examination of 200 cylinders has been completed, or a time period of more than 4 hours has elapsed since equipment calibration, whichever occurs first. The equipment must be re-calibrated in accordance with paragraph 7.c.(2).

(iii) require that the rotational speed of a calibration piece must be such that all artificial defects are adequately detected, measured and recorded. The rotational speed of the cylinder under UE must not exceed the rotational speed used during the calibration.

(iv) be made available to a DOT official when requested. Any change to the written procedure must be submitted to OHMEA as soon as practicable.

d. Ultrasonic Examination Acceptance/Rejection Criteria.

The equipment calibration, set up for testing and test procedure must be such that any cylinder found with the following defects must be rejected:

(1) In any area 0.70 in^2 or larger, the remaining wall thickness is less than the design minimum wall thickness (t_m).

(2) In any area 0.060 in^2 or larger and smaller than 0.70 in^2, the remaining wall thickness is less than 90% of the design minimum wall thickness (t_m).

(3) An isolated pit which produces an amplitude signal crossing the reference threshold set in section 7.c.(1)(ii)(B) or 7.c.(1)(ii)(C) of this exemption.

(4) Flaws which produces an amplitude signal greater than the reference notches set in section 7.c.(1)(ii)(D) of this exemption.

e. Rejected cylinders. When a cylinder is rejected, the retester must stamp a series of X's over the DOT specification number and marked service pressure, or stamp "CONDEMNED" on the shoulder, top head, or neck using a steel stamp, and must notify the cylinder owner, in writing, that the cylinder is rejected and may not be filled with hazardous material for transportation in commerce.

(1) Alternatively, at the direction of the owner, the retester may render the cylinder incapable of holding pressure.

(2) If a condemned cylinder contains hazardous materials and the testing facility does not have the capability of safely removing the hazardous material, the retester must stamp the cylinder "CONDEMNED" and affix conspicuous labels on the cylinder(s) stating: "UE REJECTED DOT-E 12067. RETURNING TO ORIGIN FOR PROPER DISPOSITION".

The retester may only offer the condemned cylinders for transportation by motor vehicle operated by a private carrier to a facility, identified to, and acknowledged in writing with OHMEA, that is capable of safely removing the hazardous material. A current copy of this exemption must accompany each shipment of condemned cylinders transported for the disposal of hazardous material.

f. Marking. Each cylinder passing retest under the provisions of this exemption must be marked as prescribed in § 173.34(e)(7). In addition, each cylinder must be marked UE, in characters not less than 1/4 inch high at a location close to the retester's marking.

g. Report. A report must be generated for each cylinder that is examined. The ultrasonic examination (UE) report must include the following:

(1) UE equipment, model and serial No.
(2) Transducer specification, size, frequency and manufacturer.
(3) Specification of the calibration standard used to UE the cylinder. Calibration standards must be identified by serial number or other stamped identification marking.
(4) Cylinder serial no. and type.
(5) UE technicians' name and certification level
(6) Test Date

(7) Location and type of each defect on the cylinder (e.g. longitudinal line corrosion 5 inches from base).
(8) Dimensions (area, depth and remaining wall thickness) and brief description of each defect.
(9) Acceptance/rejection results.
(10) The UE report must be on file at the test site, and made available to a DOT official when requested.

h. Personnel Qualification. Each person who performs retesting or who evaluates or certifies retest results must meet the following requirements:

(1) Project Manager - is the senior manager of FIBA responsible for compliance with DOT regulations including this exemption.

(2) The personnel responsible for performing cylinder retesting under this exemption shall be qualified to an appropriate Level (Level I, II or III)- Ultrasonic Testing in accordance with the American Society for Nondestructive Testing (ASNT) Recommended Practice SNT-TC-1A depending upon the assigned responsibility as described below:

(A) As a minimum, a Level II Operator must perform system startup, calibrate the system, and review and certify the test results when a written acceptance and rejection criteria for cylinders have been provided by a Senior Review Technologist. Based upon written criteria, the Level II Operator may authorize cylinders that pass the retest to be marked in accordance with paragraph 7.f. of this exemption. However, a person with Level I certification may perform a system startup, check calibration, and perform ultrasonic testing under the direct guidance and supervision of a Senior Review Technologist or a Level II Operator, either of whom must be physically present at the test site so as to be able to observe testing conducted under this exemption.

(B) Senior Review Technologist (SRT) - is a person who reviews overall test results, provides supervisory training and technical guidance to operators, and reviews and verifies the retest results. A SRT must have a Level III Certification in UT, and a thorough understanding of the HMR pertaining to the re-qualification and reuse of the

DOT cylinders authorized under this exemption. The SRT must prepare and submit the reports required in paragraphs 7.h. and annually verify that the UE program is being operated in accordance with the requirements of this exemption.

i. OPERATIONAL CONTROLS.

(1) No person may perform inspection and testing of cylinders subject to this exemption unless:

(i) that person is an employee or agent of FIBA and has a current copy of this exemption at the location of such inspection and testing, and

(ii) complies with all the terms and conditions of this exemption.

(2) The marking of the retester's symbol on the cylinders certifies compliance with all of the terms and conditions of this exemption.

(3) Each facility approved by OHMEA to test cylinders under the terms of this exemption must have a resident operator with at least a Level II Certification in UT.

8. SPECIAL PROVISIONS:

a. During the initial use of the exemption, the test data, results, and additional technical information deemed pertinent in successful application of the retest procedure must be reported to OHMEA. The purpose of this information is to determine whether certain testing procedures and criteria require modification. In particular, special attention should be paid to evaluating and compiling information on cylinders rejected by the ultrasonic examination procedure. For these rejected cylinder, the defect causing the rejection must be fully characterized and profiled. That is, the specific type of defect should be identified (e.g. pit or general corrosion etc.) and the specific size of the defect should be determined (i.e. length, depth, width, diameter, area, etc.). Cylinder type, size, minimum design wall thickness, age, etc. of the rejected cylinder must be reported. The ultrasonic signal profile should be reported for any defect causing the cylinder to be rejected. These results must be summarized and reported to OHMEA on an annual basis. FIBA must submit to DOT an evaluation of the effectiveness of the ultrasonic testing program authorized by this exemption as part of any request to renew the exemption submitted in accordance with § 107.109.

b. The total number of cylinders tested and the number of cylinders rejected under this exemption must be reported to OHMEA. These results must be summarized and reported to DOT on an annual basis.

c. Offerors may use the cylinders specified and tested in accordance with the provisions of this exemption for the transportation in commerce of those hazardous materials specified herein, provided no modifications or changes are made to the cylinders, and all terms of this exemption are complied with.

d. Shippers using the cylinders covered by this exemption must comply with the provisions of this exemption, and all other applicable requirements contained in 49 CFR Parts 100-180.

e. Transportation of Division 2.1 (flammable gases) and Division 2.3 (gases which are poisonous by inhalation) are not authorized aboard cargo vessel or aircraft unless specifically authorized in the Hazardous Materials Table (§ 172.101).

f. Transportation of oxygen is only authorized by aircraft when in accordance with § 172.102(c)(2) Special Provision A52 and §§ 175.85(h) and (i).

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo vessel, cargo aircraft only and passenger-carrying aircraft, as currently authorized by the regulations for the hazardous materials being transported.

10. MODAL REQUIREMENTS: None, other than as required by the HMR.

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, 49 CFR 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 inform the AAHMS, in writing, of any incident involving the package and shipments made under the terms of this exemption.

Issued in Washington, D.C.:

JUL 1 1 2001
(DATE)

Robert A. McGuire
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.

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.

Copies of exemptions may be obtained from the AAHMS, U.S. Department of Transportation, 400 7th Street, S.W., Washington, DC 20590-0001, Attention: Records Center, 202-366-5046.

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