



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

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

JAN 8 2003

DOT-E 11099  
(FOURTH REVISION)

EXPIRATION DATE: December 31, 2004

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: AMKO Service Company  
Dover, Ohio
2. PURPOSE AND LIMITATIONS:
  - a. This exemption authorizes the retest of DOT 3A and 3AA cylinders, used for the transportation in commerce of certain Division 2.1 and Division 2.2 gases, by means other than the hydrostatic retest method. The cylinders are retested by acoustic emission and ultrasonic examination (AE/UE) described in paragraph 7 below in place of the internal visual inspection and the hydrostatic retest. This exemption provides no relief from any Hazardous Materials Regulation (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 §§ 180.209(a), the introductory paragraph, the Table; §§ 180.205(c), (f), (g), and (i); §§ 173.302a(b) (2), (3), and (4), in that the AE and UE are performed in place of the hydrostatic test and the internal visual inspection.

**NOTE:** 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 AMKO Services dated May 31, 2002, submitted in accordance with § 107.109.

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6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Hazardous Materials Description			
Proper Shipping Name	Hazard Class/ Division	Identification Number	Packing Group
Division 2.1 gases authorized in DOT Specification 3A and 3AA cylinders.	2.1	As Appropriate	N/A
Division 2.2 gases authorized in DOT Specification 3A and 3AA cylinders.	2.2	As Appropriate	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a DOT 3A or DOT 3AA cylinder, mounted on a tube trailer vehicle chassis or a tube module equipped with a frame that is subjected to periodic retesting, reinspection and marking prescribed in §§ 180.205 and 180.209, except that each cylinder is examined by acoustic emission and ultrasonic (AE/UE) in lieu of hydrostatic pressure test and internal visual inspection. Each cylinder must have a nominal diameter of 9-5/8 inch and a minimum water capacity of 140 liters (36.9 U.S. gallons). The minimum wall thickness of DOT 3A cylinders may not be less than 0.280 inch and the minimum wall thickness of DOT 3AA cylinders may not be less than 0.225 inch. Each cylinder must be retested and marked in accordance with the procedures specified in the AMKO application for exemption on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA) and as prescribed in this exemption.

b. TESTING - Cylinders must be retested at least once every five (5) years.

(1) Acoustic Emission (AE) Equipment: The AE equipment must be in accordance with the specification described in the AMKO application on file with OHMEA and as prescribed in this exemption.

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(i) Power supply, signal cable, signal processor and couplant must meet all requirements of the American Society for Testing and Materials (ASTM), E 1419-96 Standard Test Method for Examination of Seamless, Gas-Filled, Pressure Vessels Using Acoustic Emission.

(ii) AE Sensors must meet all requirements of ASTM, E 1419-96 except the broad band sensor must have the frequency band of 20 KHz to 2.0 MHz.

(2) AE Calibration and Standardization: Calibration and AE equipment performance and test procedure must be in accordance with ASTM, E 1419-96 and the AMKO test method on file with OHMEA, except as specifically stated herein:

(i) System performance check described in ASTM E 1419-96 will be performed by pencil lead break or electronic pulsar on the cylinder surface at a minimum distance of 4-inch (10-cm) from the sensor. The AE signal for each sensor during performance check must have a sensitivity equal or greater than 70 dBV.

(ii) Each acoustic emission (AE) site on the cylindrical portion of each tube which produces five or more valid events within an 8 inch (203 mm) axial distance must be subjected to an ultrasonic examination (UE) as prescribed herein. Each AE site on tube ends (i.e. sections of the tube which lie outboard of the sensors) that produce five or more events which hit both sensors and have a 43dB or greater peak amplitude at the "first hit" sensor, must be subjected to UE.

(3) Ultrasonic Examination (UE) Equipment (Apparatus)  
The UE equipment must be accordance with the specification described in ASTM E 2333-02 "Examination of Seamless, Gas Filled, Steel Pressure Vessels, Using Angle Beam Ultrasonics".

(4) UE Standardization Ring With Reference Notches (Reference Ring) - The Standardization Ring must be prepared in accordance with specification described in ASTM E 2333-02. Notches must be made by EDM process.

One or more notches may be placed into a single reference ring. Each circumferential notch must have a depth of less than or equal to 25 percent of  $t_m$  or 0.068 inch (1.74 mm), a width of less than or equal to 0.020 inch (0.5 mm), and a length of 1 inch (25.4 mm).

(5) UE Standardization Procedure - The UE equipment must be standardized for each cylinder type by using the Standardization Ring and in accordance with procedure described in ASTM E 2333-02.

(6) UE Procedure - The UE of each cylinder must be in accordance with the ultrasonic examination described in ASTM E 2333-02.

(7) Rejection criteria - Rejection criteria as established during standardization for the cylinder retested under this exemption is a flaw with a maximum depth less than or equal to 25% of the minimum design wall thickness or any crack with a maximum depth of 0.068 inch (1.74 mm). When a cylinder is rejected, the retester must stamp a series of X's over the exemption or DOT specification number and marked test pressure, or stamp "CONDEMNED" on the shoulder, 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. Alternatively, at the direction of the owner, the retester may render the cylinder incapable of holding pressure.

c. Marking -

(1) The exterior of the trailer cabinet of the vehicle chassis to which the cylinders are affixed must be marked with letters at least 2 inches high on a contrasting background "DOT-E 11099".

(2) An exterior tube on each side of a tube module motor vehicle trailer must be marked with letters at least 2 inches high on a contrasting background "DOT-E 11099".

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(3) The current retest date must be marked on the rear bulkhead inside the trailer cabinet at approximately eye level above the withdrawal valve for tube trailers and on the bulkhead near the withdrawal valve for tube modules. In the event retest dates of cylinders differ in a trailer cluster, the retest date displayed will be that of the oldest retest date, meaning the date of the retest that must occur first.

d. Report - A report must be generated for each cylinder that is examined. The AE and UE reports must include the following:

- (1) AE and UE equipment, model and serial No.
- (2) Specification of the standard reference used to UE the cylinder. Standard reference (calibration ring) must be identified by serial number or other stamped identification marking.
- (3) Cylinder serial number and type.
- (4) Maximum allowable filling pressure.
- (5) Minimum prescribed sidewall.
- (6) Number of events at each location.
- (7) Pressure associated with each event.
- (8) Description of each AE event (amplitude, duration, energy, etc.)
- (9) Size of each defect measured (length and depth).
- (10) Type of each defect measured (crack, pitting, etc.)
- (11) Defect location relative to each sensor.
- (12) Defect angular location defined by clock direction (3, 5, or 9 O'clock)
- (13) Defect location relative to sidewall (interior, outer surface, inner surface).
- (14) AE and UE technicians' name and certification level
- (15) Test Date
- (16) Acceptance/rejection results.
- (17) The AE and UE reports must be on file at the test site, and made available to a DOT official when requested.

e. 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 AMKO responsible for compliance with DOT regulations including this exemption. Additionally, the project manager must ensure that each operator and senior review technologist maintain the required ASNT certification.

(2) The personnel responsible for performing cylinder retesting under this exemption must be qualified to an appropriate Level (Level I, II or III)- acoustic emission and ultrasonic examination (AE/UE) in accordance with the American Society for Nondestructive Testing (ASNT) Recommended Practice SNT-TC-1A-1996 depending upon the assigned responsibility as described below:

(i) 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(c) of this exemption. However, a person with Level I certification may perform a system startup, check calibration, and perform AE/UE 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 examination conducted under this exemption.

(ii) 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 AE/UE, 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(d) and annually verify that the AE/UE program is being operated in accordance with the requirements of this exemption.

f. 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 AMKO Service Company 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 AE/UE.

8. SPECIAL PROVISIONS:

a. 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.

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

c. Cylinders retested in accordance with paragraph 7.b. above may be charged to 110 percent of marked service pressure in accordance with § 173.302a(b)(2).

d. A statement of qualifications, for each "qualified tester" used under this exemption and information in support thereof, must be maintained by AMKO Service Company. The location of this statement, for each "qualified tester", must be identified to the Office of Hazardous Materials Exemptions and Approvals.

e. Motor carriers operating under the terms of this exemption must have a "Satisfactory" or "Conditional" safety rating as prescribed in 49 CFR Part 385.

f. A summary of the test results at each facility must be reported (on CD or paper) to the Associate Administrator for Hazardous Materials Safety annually to assess the effectiveness of the test program. The summary must include the total number of cylinders tested under this exemption grouped by type (e.g. 3AX, 3AAX), size and age. The summary must include the number of cylinders accepted or rejected. For any rejected cylinder, the defect causing the rejection must be fully characterized and profiled (i.e. stress corrosion cracking, general corrosion etc.) And the specific size of the defect should be determined (i.e. length, depth, width, area etc.).

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight and cargo vessel.
10. MODAL REQUIREMENTS: A current copy of this exemption must be carried aboard each cargo vessel or motor vehicle used to transport packages covered by this exemption.
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, 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.

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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.:



*fa* 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: MToughiry/ss/sln