

RR-C-910D
December 11, 1980
SUPERSEDING
Fed. Spec. RR-C-910C
July 27, 1967

FEDERAL SPECIFICATION

CYLINDERS, COMPRESSED GAS.

DOT 4BA, DOT 4BW, and DOT 4E

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers new cylinders in accordance with the Department of Transportation specifications 4BA and 4BW for steel cylinders and 4E for aluminum cylinders. The cylinders are equipped with valves and valve protection caps or collars.

1.2 Classification. Classification of the cylinder shall be in accordance with the applicable specification sheet as specified (see 6.2 and 6.5).

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, for a part of this specification to the extent specified herein.

Federal Specifications.

PPP-B-601	- Boxes, Wood, Cleated-Plywood.
PPP-B-621	- Boxes, Wood, Nailed and Lock Corner.

Federal Standards.

FED-STD-101	- Preservation, Packaging, and Packing Materials Test Procedures.
FED-STD-123	- Marking for Domestic Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal specifications, standards and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

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(Single copies of this specification, other Federal specifications, standards and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston; New York; Philadelphia; Washington, DC; Atlanta; Chicago; Kansas City, MO; Fort Worth; Denver; San Francisco; Los Angeles; and Seattle, WA.

(Federal Government activities may obtain copies of Federal specifications, standards and commercial item descriptions and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specifications:

- | | |
|-------------|---|
| MIL-V-2 | - Valves, Cylinder Gas (for Compressed or Liquified Gases) General Specification for. |
| MIL-T-704 | - Treatment and Painting of Materiel. |
| MIL-C-17376 | - Caps and Flanges, Compressed-Gas Cylinder, General Specification for. |

Military Standards:

- | | |
|--------------|---|
| MIL-STD-101 | - Color Code for Pipelines and for Compressed Gas Cylinders. |
| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-129 | - Marking for Shipment and Storage. |
| MIL-STD-147 | - Palletized, Unit Loads. |
| MIL-STD-1186 | - Cushioning, Anchoring, Bracing, Blocking, and Waterproofing; with Appropriate Test Methods. |

Drawings:

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|--------------------------------|--|
| Bureau of Ships
810-1385867 | - Decalcomania for Navy Gas Cylinders. |
|--------------------------------|--|

Publications:

- | | |
|-----------|---|
| TM-38-250 | - Preparation of Hazardous Materials for Military Air Shipment. |
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(Copies of Military specifications, standards, drawings and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

Department of Transportation (DOT)

49 CFR 100-199-Transportation

(Application for copies should be addressed to the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.)

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2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated the issue in effect on date of invitation for bids or request for proposal shall apply.

National Motor Freight Traffic Association, Inc. Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 1616 P Street, N.W., Washington, D.C. 20036).

Uniform Classification Committee, Agent:

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606).

3. REQUIREMENTS

3.1 Description. Cylinders shall conform to DOT 4BA for welded or brazed steel cylinders or DOT 4BW for welded steel cylinders with electric-arc welded longitudinal seams, or cylinders shall conform to DOT 4E for welded aluminum; cylinders shall be as specified herein and as in the applicable specification sheet (see 6.5).

3.2 Construction. The cylinders shall be true to form and shall be stable when in the upright position in accordance with the applicable specification sheet. The cylinders shall not leak. The cylinder shall be capable of withstanding the drop test in accordance with FED-STD-101, drop test method 5007, level A. The cylinder service pressure and capacity shall be in accordance with the classification number specified from the applicable specification sheet (see 6.5).

3.3 Cylinder processing. Cylinders shall be visibly free of loose scale, slag, and other solids and shall show no evidence of moisture, oil and other contaminants. Rust bloom or particulate matter (approximately 1.0 to 1.5 grams) generated subsequent to inspection as a result of handling and shipping is acceptable.

3.3.1 Cylinder cleaning. The cylinder shall be flushed or vacuumed visually free of loose particulate matter before valving. Grease and oil contaminating the internal or the external surface must be removed prior to closure or external painting. Chemicals that will react with the cylinder or the proposed cylinder content shall not be used.

3.3.2 Cylinder drying. Cylinders tested hydrostatically and/or cylinders internally flushed for cleaning purposes shall be immediately dried by use of hot filtered air or nitrogen with a dew point of less than 30° F. When specified (see 6.2) the cylinders shall be valved closed or plugged and sealed while hot to reduce the effects of atmospheric moisture on the internal surfaces.

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3.5 Closure. Each welded cylinder shall be fitted with a neck flange and a valve protection cap in accordance with MIL-C-17376 for general service. When specified (see 6.2), a valve spud and a valve protection collar shall be supplied for liquified petroleum gas cylinders. Valve inlet threads and valve shall be in accordance with MIL-V-2. When specified (see 6.2), the cylinder shall be sealed with a plug to assure preservation of its internal surfaces.

3.5 Tare weight. The tare weight of the cylinder shall be the weight of the cylinder with valve but excluding the valve protection cap. The weight shall be expressed in pounds and quarter pounds expressed in 4 ounce increments to the nearest quarter pound. The figures expressing pounds shall be separated from the figures expressing ounces by a dash (-).

3.6 Delivery date. Cylinders shall be delivered within 1 year of the test date.

3.7 Cylinder identification. Unless otherwise specified herein, markings shall be not less than 1/4 inch high, space permitting.

3.7.1 Standard markings. Standard markings (see 5.4) shall be plainly and permanently stamped on the shoulder of each cylinder starting near the neck as follows:

- (a) "DOT 4BA" or "DOT 4BW" or "DOT 4E" as applicable, followed by the service pressure in pounds per square inch. Marking shall be not less than 3/8 inch high. When specified (see 6.2) service pressure shall also be marked in kilokascals.
- (b) The serial number (see 6.3) as registered with the Bureau of Explosives shall be in characters not less than 3/8 inch high.
- (c) "US GOVT", Government symbol as registered with the Bureau of Explosives in characters not less than 3/8 inch high.
- (d) The inspector's official mark.
- (e) The date of test diametrically opposite the above markings.
- (f) The tare weight (see 3.4) in a position other than in sequence with serial number or test date. When specified (see 6.2) the tare weight shall also be marked in kilograms.
- (g) Manufacturer's mark near the date of test, preferably directly above it.
- (h) The water capacity of the cylinder in lbs preceded by the letters WC in a position other than in sequence with serial number or test date.

3.7.2 Additional markings.

- (a) Name of gas stenciled on the cylinder in accordance with MIL-STD-101.
- (b) When specified (see 6.2), two decalcomanias conforming to Drawing 810-1385867 shall be affixed diametrically on the sides of the cylinder, 90 degrees from the stenciled name of the gas.

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3.8 Treatment and painting. Cylinders shall be treated and painted in accordance with MIL-T-704, type C. A combination dioxidizing primer for metal treatment and prime coating modified for fast drying is acceptable. Cylinders shall be color coded and stenciled in accordance with MIL-STD-101.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Component and material inspection. The contractor is responsible for insuring that components and materials used are manufactured, examined, and tested in accordance with referenced specifications and standards.

4.2 Classification of inspections. The inspection requirements specified herein shall be classified as follows:

- (a) Quality conformance inspection (see 4.3).
- (b) Inspection of preparation for delivery (see 4.5).

4.3 Quality conformance inspection.

4.3.1 Lot. A lot shall consist of 200 cylinders or less in compliance with the applicable DOT specification in accordance with the Code of Federal Regulations and offered for delivery at the same time.

4.3.2 Sampling. Sampling for examination and test shall be in accordance with MIL-STD-105. Inspection level S-4 except that only one cylinder per lot shall be tested in accordance with 4.4.2.2.

4.3.3 Examination. Samples selected in accordance with 4.3.2 shall be examined as specified in 4.4.1. AQL shall be 2.5 percent defective.

4.3.4 Tests. Samples selected in accordance with 4.3.2 shall be tested in accordance with 4.4.2. AQL shall be 2.5 percent defective.

4.4 Inspection procedure.

4.4.1 Examination. The cylinders shall be examined as specified herein for the following defects:

- 101. Construction not as specified.
- 102. Dimensions and capacity not as specified.
- 103. Evidence of contamination.

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- 104. Delivery date not within 1 year of test date.
- 105. Identification not as specified.
- 106. Treatment, painting, and color coding not as specified.

4.4.2 Tests.

4.4.2.1 Leakage. Cylinders shall be tested for leakage. Cylinders with the valve installed in the neck, shall be charged to the indicated service pressure with oil-free air or nitrogen. The cylinder seams, valve, and neck shall be immersed in water, or shall be coated with leak indicating agent or detergent foam, and observed for bubble formation for 2 minutes. Any bubble formation shall constitute failure of the test. Leakage occurring around the valve stem may be corrected and the cylinder retested.

4.4.2.1.1 Retesting. Cylinders leaking at a seam may be repaired as specified in the applicable DOT specification and shall be retested as specified in 4.4.2.1. When a lot is rejected because of failure of testing in 4.4.2.1 each cylinder shall be tested as specified in 4.4.2.1.

4.4.2.2 Drop test. The cylinder full of water, shall be dropped vertically tilted 30 degrees from the longitudinal axis in accordance with FED-STD-101, Drop Test Method 5007, level A. Damage to the cylinder or flattening of the footing in an arc greater than one-fifth of its diameter, shall constitute failure of this test.

4.5 Inspection of preparation for delivery. An inspection shall be made to determine compliance with the requirements of Section 5. A sample unit shall be one shipping container fully prepared for delivery. Sampling shall be in accordance with MIL-STD-105. The inspection level shall be S-2 with an AQL of 4.0 expressed in terms of percent defective.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packing. No preservation or packaging of any kind shall be applied to any part of the cylinders.

5.2 Packing. Packing shall be level A or C, as specified, (see 6.2).

5.2.1 Level A.

5.2.1.1 Cylinders over 30 inches in length (not including valve). Cylinders segregated for size and type shall be packed in pallet loads in accordance with MIL-STD-147, load type IX. Strapping shall be zinc coated.

5.2.1.2 Cylinders under 30 inches in length (not including valve). As specified in the contract or order (see 6.2), cylinders shall be palletized as specified in 5.2.1.1, or shall be packed in close-fitting boxes conforming to PPP-B-601, overseas type, style I, or J, or PPP-B-621, class 2, style optional, up to the weight limitations of the container. Contents shall be blocked and cushioned in accordance with MIL-STD-1186.

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5.2.2 Commercial. The cylinders shall be packed in accordance with normal commercial practice. The complete pack shall be designed to protect the cylinders against damage during shipment, handling and storage, insure delivery at destination, provide for redistribution by the initial receiving activity and be acceptable by common carrier under the National Motor Freight Classification, Uniform Freight Classification, Title 49, Code of Federal Regulations and TM 38-250.

5.3 Marking.

5.3.1 Military agencies. Marking shall be in accordance with MIL-STD-129.

5.3.2 Civil agencies. Marking shall be in accordance with FED-STD-123.

6. NOTES

6.1 Intended use. Cylinders covered by this specification are intended for storage and transportation of low pressure (under 500 psi service pressure) liquified gases.

6.2 Ordering data. Purchasers shall select the preferred options permitted herein and include the following data in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Classification number shall include specification sheet letter, number, slash number, and the dash number (see 1.2).
- (c) When hot closure for preservation is required (see 3.3.2).
- (d) When valve spud and protection collar is required 3.4).
- (e) When a plug in lieu of a valve is required (see 3.4).
- (f) When service pressure shall be marked in Pascal (Newtons/ m^2 (see 3.7.1 (a))).
- (g) When tare weight shall be marked in kilograms (see 3.7.1 (f)).
- (h) When decalcomanias are required (see 3.7.2(b)).
- (i) Degree of packing required (see 5.2).
- (j) When cylinders under 30 inches in length will be packed in boxes (see 5.2.1.2).

6.3 Serial numbers. Cylinder serial numbers shall be prefixed by a two or three letter symbol designating the procuring agency and shall have a two letter suffix designating the contractor, to be furnished by the contracting officer. The serial numbers shall be assigned by the manufacturer. These numbers may be consecutive with the manufacturer's regular production numbers or of a series established specifically for customer cylinders. However, all cylinders for a given contract will be numbered consecutively and controls will be exercised to preclude duplication on future deliveries to the Government.

6.4 Certain provisions (see 3.7) of this specification are the subject of International Standardization Agreement QSTAG 357. When amendment, revision, or cancellation of this specification is proposed, the departmental custodians will inform their respective Departmental Standardization Offices that appropriate action may be taken respecting the international agreement concerned.

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6.5 Specification sheets. The following specification sheets provide detailed requirements and specific classification numbers for the cylinders covered by this general specification. The classification number include the letter, and number of this specification plus the slash number of the specification sheet and a dash number from table I of the specification sheet, (EX. C910/2-3) which may be used as a part number.

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| RR-C-910/1 | - Cylinder, Compressed Gas: DOT Specifications 4BA, 4BW and 4E for Refrigerants, Fire-extinguisher Agents, and Sterilizing Gases. |
| RR-C-910/2 | - Cylinder, Compressed Gas: DOT Specifications 4BA, 4BW, 4E and for Liquified Petroleum and Synthetic Gases. |

6.6 Supersession data. This specification supersedes RR-C-910C dated July 27, 1967. RR-C-910D coordinates the conversion of the following Military Standards to applicable specification sheets and subsequent cancellation:

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|---------|--------------|
| MS39228 | - RR-C-910/1 |
| MS39229 | - RR-C-910/2 |

6.7 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of the specification (see 3.1).

MILITARY INTEREST:**CIVIL AGENCY COORDINATING ACTIVITIES:****Custodians:**

Army - ME
Navy - SH
Air Force - 68

HEW - FDA
GSA - FSS
VA - DMS
NASA - NS

Review activities:

Air Force - 11
DLA - GS

Preparing activity:

Army - ME

User activities:

Army - CE
Navy - MS, YD, MC

Project 8120-0371

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See Section 2 of this specification to obtain extra copies and other documents referenced herein.

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