

PPP-D-1152B
 October 5, 1972
 SUPERSEDING
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 October 24, 1969

FEDERAL SPECIFICATION

DRUM SHIPPING: STEEL, 55-GALLON (24 AND 21 GAGE REINFORCED)

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 the requirements for new closed head 55-gallon steel drums (see 6.1 for intended use).

1.2 Classification. These closed head cylindrical steel drums with double seamed chimes, flat heads, integral chime reinforcement, and expanded sidewall consisting of a continuous series of parallel circumferential bands, shall be of the following types:

- Type I - 24 gage body, head, and bottom with 18 gage chime reinforcement.
- Type II - 21 gage body, 20 gage top and bottom, and 18 gage chime reinforcement.

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

- QQ-S-698 - Steel, Sheet and Strip, Low-Carbon.
- QQ-Z-325 - Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings.
- TT-E-485 - Enamel; Semi-Gloss, Rust-Inhibiting.
- VV-L-800 - Lubricating Oil Preservative Special.
- PPP-P-420 - Plugs and Flanges.

Federal Standards:

- Fed. Std. No. 101 - Preservation, Packaging, and Packing Materials: Test Procedures.
- Fed. Std. No. 123 - Marking for Domestic Shipment (Civil Agencies).
- Fed. Std. No. 595 - Color.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, 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 Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

- MIL-G-432 - Gaskets, Synthetic-Rubber (For Fuel and Lubricant Containers and Accessories).

Military Standards:

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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Laws and Regulations:

49CFR178.137 - Specifications 37D; Steel Drums.

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

3. REQUIREMENTS

3.1 Preproduction sample. Unless otherwise specified in the contract or purchase order (see 6.2), a preproduction sample shall be furnished for inspection and testing as specified in 4.5.

3.2 Materials. Materials used in the manufacture of the drums, if not specifically described herein, shall be of the best quality, of the lightest practicable weight and suitable for the purpose intended.

3.2.1 Steel. Sheets for bodies, heads, bottoms, and chime reinforcements shall be of the required U. S. Manufacturers' Standard gage, low-carbon, of commercial quality and shall conform to the requirements of QQ-S-698. Individual sheets shall be subject to the "Manufacturers' Standards" of the American Iron and Steel Institute covering variations and tolerances (see table I).

TABLE I. Thickness of steel

Gage No.	Drum Type	Nominal thickness (inches) 1/	Minimum thickness (inches) 1/
18	I & II - Chime Reinforcement	0.0478	0.0428
20	II - Heads top and bottom	.0359	.0329
21	II - Body	.0329	.0309
24	I - Top, bottom and body tag ring at closure	.0239	.0209

1/ Thickness shall be measured at any point on the sheet not less than 3/8 of an inch from an edge.

3.2.2 Seaming compound. Unless otherwise specified, seaming compound shall be of the commercial non-hardening type (see 6.2 and 6.3).

3.2.3 Closures. Plug and flange material shall comply with PPP-P-420, except that minimum zinc plating thickness is only applicable to other than threaded surfaces and the salt spray test shall be 32 hours in lieu of 96 hours as specified therein by reference to QQ-Z-325.

3.2.4 Gaskets. Materials for gaskets shall conform to the requirements of MIL-G-432.

3.2.5 Paint. The paint shall be enamel conforming to the requirements of types I, II, III or IV and olive drab color no. 24087 of Fed. Std. No. 595.

3.3 Design and construction. The body of the drum shall be a continuous series of parallel, geometrically similar, circumferential beads expanded in the sidewall in accordance with figure 1. The surface length of the steel in the axial direction shall not change more than one percent during the forming process.

3.3.1 Body seams. The body seams shall be electric welded. Defective seams that leak may be repaired by gas welding. Repairs by soldering shall not be acceptable.

3.3.2 Top and bottom seams. These seams shall be double seamed to the sidewall as shown in figure 1. The seaming compound shall be as specified in 3.2.2, and shall be applied sparingly in such a manner that no excessive compound remains on the inside or outside of the drum (see 6.3).

3.3.3 Chime reinforcements. The chime reinforcement shall be in accordance with figure 1. It shall be an integral part of the double seam resulting in a chime cross section containing eight layers of steel. The reinforcing band shall follow and support the knuckle radius of the top or bottom heads with the inside edge upturned so that it does not contact the adjacent portions of the top or bottom heads.

3.3.4 Dimensions. The dimensions of each type I or II drum shall be in accordance with the dimensions shown on figure 1. The heads shall have sufficient depth to allow 1/8 inch minimum clearance from the top of the chime over all fittings with the plugs, gaskets, and cap seals in place. The material thickness shall be in accordance with table I.

3.4 Closures. Each drum shall be provided with one 2-inch filler closure and one 3/4 inch vent closure (see 3.2.3), located diametrically opposite each other in the top head of the drum in accordance with figure 1.

3.4.1 Closure gaskets. Each closure shall be supplied with a new gasket conforming to the requirements of MIL-G-432 (see 3.2.4) which will not leak when subjected to tests specified in 4.6.

3.4.2 Closure flange reinforcement. Type I flanges (see PPP-P-420) when used in type I drums shall be supported and reinforced by electro galvanized steel tag rings that become an integral part of the flange-head seam.

3.4.3 Cap seals. When specified (see 6.2) closures shall have cap seals applied that effectively prevent removal of plugs without destroying the seal. The seal shall be processed the same color as specified for the drum and so constructed that the seals maybe applied by hand tools. The cap seals shall be suitable for the closure supplied and shall pass the specified tests (see 4.7.8).

3.5 Linings. Containers purchased incident to packaging a commodity that will have a detrimental effect on the raw internal drum material surfaces, or vice versa, shall be lined on all exposed internal surfaces with a lining material that will neither affect nor be affected by the commodity packaged. When drums are purchased empty, as a commodity, a suitable lining material (see 6.1) meeting the commodity compatability requirements of this paragraph shall be used, and in any case the drum manufacturer shall furnish a certificate of compliance with these requirements to the contracting officer or his designated representative.

3.6 Finish and protective coatings.

3.6.1 Finish. Prior to the application of the protective coating, the drum shall be processed in accordance with TT-C-490, type I or II. This may be accomplished when the drum is completely fabricated, partially fabricated, or with sheets of steel in the flat, provided the system results in a uniform deposit on the completed drum.

3.6.2 Protective coatings. Unless otherwise specified (see 6.2), each drum shall be coated with an enamel specified in 3.2.5, olive drab color no. 24087 of Fed. Std. No. 595. The final thickness of the coating (pretreatment and enamel) shall be a minimum of 0.8 mil thick (see 4.7.7).

3.7 Performance properties.

3.7.1 Hydrostatic test. The sample drums shall not leak when subjected to hydrostatic pressures of 15 psi for type I and 30 psi for type II and pressure held for 5 minutes without pressure drop when tested as specified in 4.7.2.

3.7.2 Leakage test. Each drum shall be subjected to a minimum internal air pressure of at least 7 psi for type I and 15 psi for type II without leakage (see 4.7.3).

3.8 Drum marking. Each drum bottom shall be marked by embossing in accordance with the marking requirements of Title 49 Code of Federal Regulations specification for DOT -37D. In addition to the DOT markings, each drum shall be embossed as follows: PPP-D-1152 Type (I or II, whichever the case maybe).

3.9 Capacity. The rated capacity of the drum is 55 gallons. The actual capacity shall not be less than 57.2 gallons nor greater than 57.75 gallons when tested as specified in 4.6.5.

3.10 Workmanship. Finished drums shall be clean and free from rust, loose slag, or dents. Drums which leak at flanges shall be rejected. Drums which leak at seams or chimes shall be rejected or repaired by welding and retested. Welds shall be free of burrs, splatter, cracks, or incomplete fusion. Spot welds, if used shall be free from flash or burn through. The use of solder to effect repairs shall not be permitted. Threaded area shall not have threads missing, stripped or fractured. Markings shall be complete and legible. When the drum is filled, there shall be no evidence of leaking.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities or services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in the inspection ~~where~~ such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Sampling for inspection and acceptance. Sampling for inspection and acceptance shall be performed in accordance with the provisions set forth in MIL-STD-105, except where otherwise indicated.

4.3 Component and material inspection. In accordance with 4.1, the supplier is responsible for insuring that components and materials used in the manufacture of the end item and procured under their own respective specifications or drawings have been inspected, tested, and accepted.

4.4 Classification of inspection. The inspection requirements specified herein are classified as follows:

- (1) Preproduction inspection and testing (see 4.5).
- (2) Quality conformance inspection and testing (see 4.6).

4.5 Preproduction inspection and testing. Unless otherwise specified in the contract or purchase order (see 6.2), two drums shall be submitted or made available for preproduction inspection and testing (see 3.1). They shall be inspected for all requirements of this specification applicable to the end product examinations and shall be tested as specified in 4.6.3.

4.5.1 Exceptions to preproduction inspection and testing. Preproduction examination and testing need not be repeated for new identical orders within one year after initial examination and tests providing the design, materials, and manufacturing processes have not been changed. A certified statement to this effect shall be furnished the procuring activity with a copy of the reports and drawings of the last tests made. The procuring activity shall have the right to require the preproduction examination and tests to be rerun at anytime when deemed necessary to prove conformance of the drums to the requirements of this specification.

4.6 Quality conformance inspection and testing. Inspection of the type I and II drums shall be in accordance with the listed defects in table II. A lot shall consist of all drums of one type on the same contract or purchase order, manufactured under the same conditions, and submitted for inspection at the same time and place.

4.6.1 End item visual inspection. Inspection of the end item shall be in accordance with the classification of defects and acceptable quality levels (AQLs) set forth below. The lot size shall be expressed in units of drums for the purpose of determining the sample size in accordance with MIL-STD-105. The sample unit for this inspection shall be one complete drum.

TABLE II. Classification of defects in accordance with MIL-STD-105

Examine	Defects	Classification	
		Major	Minor
Finish (exterior)	Wrong color.	X	
	Area of no paint "(This defect does not apply to the outside of the chime reinforcement ring when paint has been marked or scuffed by handling or rolling drum or chime reinforcement ring)".		X
	Paint runs on head affecting stenciling.		X
	Color separation (check paint runs).		X
	Enamel tacky.		X
	Paint blisters.		X
	Rust (more than four square inches total)		X
	Rust area covered by paint.		X
	Oil or other foreign matter under paint affecting adhesion.		X
	Dirt, grit, or foreign matter imbedded in enamel to an extent affecting serviceability.	X	
	Enamel checked, wrinkled, or scaled.		X
Material	Crack, hole, split, fracture, or open seam.	X	
	Crease or lap in steel (mill defect).		X
	Dent over 1/4-in. deep, splinter on exterior, sharp edge (on exterior), or side seam splinter at weld not trimmed.	X	
	Metal malformed affecting serviceability.	X	
	Gasket missing, not new, defective, wrong type, or has paint on a sealing surface.	X	
Construction and Workmanship	Any part of body seam not electric welded.	X	
	Seam reinforcement and repair welds not as specified.	X	

TABLE II. Classification of defects in accordance with MIL-STD-105 (cont'd)

Examine	Defects	Classification	
		Major	Minor
Plugs	Missing.	X	
	Hole, cracked, fractured, or malformed.	X	
	Wrong type.	X	
	Not enameled where required.		X
	Threads damaged or deformed.	X	
	Pitted, affecting serviceability.	X	
	Gasket seat not smooth.	X	
	Not electro zinc coated (where required).		X
	Not inserted wrench tight (try with finger).		X
	Evidence of less than three thread contact with threads of flange when screwed tight with the gasket in place.	X	
Flanges and gaskets seating surfaces	Hole, cracked, fractured, or malformed.	X	
	Threads damaged or deformed.	X	
	Wrong type.	X	
	Less than 3 threads.	X	
	Pitted on sealing area.	X	
Interior	Slivers or burrs (check at side seam weld).		X
	Foreign matter.		X
	Water or evidence of water in drum interior.		X
	Loose metal particles.		X
	Gasket seat of drum when unplated or uncoated not oiled.		X
	Not completely fogged with preservative oil, when required.		X
	Seam cement visible.		X
	Excess preservative oil (collects in pool).		X
	Evidence of rust on drum interior surface.	X	
	Not size specified (check visually); measure when in doubt).	X	
Linings	Missing.	X	
	Any area not coated.	X	

4.6.2 Dimensional inspection. Inspection of the end item to determine compliance with figure 1 and 3.3.5. Any dimension not within specified tolerance shall be classified as a defect.

4.6.3 Testing of the finished drums. Two sample drums shall be selected at random from each lot. One drum shall be tested as specified in 4.7.5, 4.7.4, 4.7.1 and in that sequence. One drum shall be tested as specified in 4.6.2. In addition, these drums shall meet the other test requirements specified in 4.6.

4.6.4 Acceptable quality levels and inspection levels. Subject to the provisions of MIL-STD-105, the AQLs and inspection levels shall be as follows:

	Major Defect	Total Defect
For defects under 4.6.1	1.5	6.5
For defects under 4.6.2		1.5
The inspection level shall be level II.		

4.7 Test methods.

4.7.1 Drop test. The test sample shall be filled with water to 98 percent of its capacity, closed as for use and dropped from a height of 4 feet onto solid concrete, so as to strike diagonally on the bottom chime. The same drum shall then be suspended with the head containing the closures downward and dropped from a height of 4 feet onto solid concrete so that the part of the top chime which strikes the surface will be nearest the closure. Following the drop test, the drum shall be examined for leakage and utility characteristics to determine compliance with 3.7.2.

4.7.2 Hydrostatic pressure test. The test sample shall be tested in accordance with the hydraulic pressure technique of Method 5009 of Federal Test Method Std. No. 101 to determine compliance with 3.7.1.

4.7.2.1 Double seam and chime reinforcement inspection. After the drop and hydrostatic pressure tests, one of the tested drums shall have a "V" section cut from the chime so that the double seam and the chime reinforcement can be inspected to assure proper double seaming and chime fit. If this inspection of the "V" section is performed by the suppliers' quality control during the normal process of manufacturing, it need not be done for lot acceptance. Certification may be required if requested by government inspector.

4.7.2.2 Hydrostatic or drop test instruction. Should either drum fail under the hydrostatic or drop test, two additional drums for each test that failed shall be selected from the completed lot and subjected to the same test as the drum that failed. If neither of the retested drums leak, the completed lot shall be accepted. If either of the retested drums leak, the completed lot shall be rejected and corrective measures taken in the production line.

4.7.3 Leakage test. Each drum shall be tested with seams under water by interior air pressure and inspected for leaks in conformance with 3.3.2. This test need not be performed if accomplished during the normal manufacturing process. Equally efficient means of testing will be authorized upon demonstration and proof of satisfactory results to the purchasing agency.

4.7.4 Closure test. The inspector shall take a drum at random from the drum manufacture's production line and apply the following torque to the inserted plug: 3/4-inch size -- 15 foot pounds; 2-inch size -- 30 foot pounds. If flanges do not remain firmly anchored under these tests, it shall be a cause for rejection and production stopped until flange insertion die adjustment has been made that will assure satisfactory test results. If plug gaskets are damaged during torque tests, the plugs shall be removed and new gaskets applied before the drums are accepted for shipment.

4.7.5 Capacity test. The capacity of the drum shall be determined by the use of accurately calibrated measuring containers or by the use of a suitable flow meter or by the weight method, and whichever method is normally used by the manufacturer to prove capacity of the container.

4.7.6 Phosphate coating. The phosphate coating shall conform to the requirements and tests of TT-C-490.

4.7.7 Paint thickness. Paint thickness on drums and panels shall be measured by a suitable instrument which has been standardized on the same surface as that over which the paint finish has been applied (see 6.4).

4.7.8 Cap seal tests. When cap seals are required, a drum shall be selected and each cap seal shall withstand a minimum dry air test without leakage of 5 psi without the plug in place. The 2-inch opening shall first have a cap seal applied without the plug in place while the air pressure is inserted through the 3/4-inch opening. If this test is satisfactory, the 3/4-inch opening shall have a cap seal applied without the plug in place while the air pressure is inserted through the 2-inch opening.

NOTE: One of the drums selected for the hydrostatic test or the drop test may first be used for the cap seal tests.

4.8 Examination of the preparation for delivery. The preservation and marking shall be examined for conformance to the requirements of Section 5 of this specification.

5. PREPARATION FOR DELIVERY

5.1 Preservation. When specified, all unlined drums shall be fog sprayed with a minimum of 20 cc's and a maximum of 25 cc's of rust-preventive oil and dispensed through an accurate metering device. Preservative oil shall conform to VV-L-800, except that the machine gun test requirements are waived. The interior surfaces shall be completely wetted with the preservative oil when the fog has settled but there shall be no surplus oil collecting in pools or rings on the bottom. Fog spray shall be applied after drums have cooled to a temperature not to exceed 140°F. All air lines shall contain moisture traps to prevent introducing condensation into the drums. Closure plugs shall be inserted immediately after fog spray.

5.2 Packaging and packing. (Not applicable.)

5.3 Marking.

5.3.1 Military agencies. In addition to any marking specified in the contract or order, shipments shall be marked in accordance with the requirements of MIL-STD-129.

5.3.2 Civil agencies. In addition to any marking specified in the contract or order, shipments shall be in accordance with the requirements of Fed. Std. No. 123.

6. NOTES

6.1 Intended use. These drums are intended for use in shipments of non-regulated materials.

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

- a. Title, number, and date of this specification.
- b. Type drum required (see 1.2).
- c. When preproduction sample not required (see 3.1 and 4.5).
- d. Type and color of paint for drums required (see 3.2.5).
- e. Shipment markings required (see 5.3).
- f. Cap seals (see 3.4.3).
- g. Linings (see 3.5).
- h. Type of seaming compound (see 3.2.2).

6.3 Seaming compound. The following seam compounds have been tested and have been found suitable for the purpose of this specification when used in accordance with the manufacturer's directions: U. S. Rubber Company - Royal M-6136; Dewey and Almy Chemical - Dared L-14 and L-14D - Division of W. R. Grace and Company; Elastomers and Chemical Corporation - 605.

6.4 The following companies that manufacture instruments for measuring paint thickness have been found to be satisfactory.

- a. Amico-Brenner Magnogages
American Instrument Company
Silver Spring, Maryland
- b. Elcometer
Gardner Laboratory, Inc.
Bethesda, Maryland
- c. G. E. Gage
General Electric Company
Schenectady, New York
- d. Lea Gage
Lea Manufacturing Company
Waterbury, Connecticut
- e. Micra Test
Nordsen Corporation
Amherst, Ohio

MILITARY CUSTODIANS:

Army - CL
Navy - SA
Air Force - 69

Review activities:

Army - MD, SM
Navy - YD, SH
Air Force - 82, 68

Preparing activity:

GSA-FSS

CIVIL AGENCY INTEREST:

GSA-FSS

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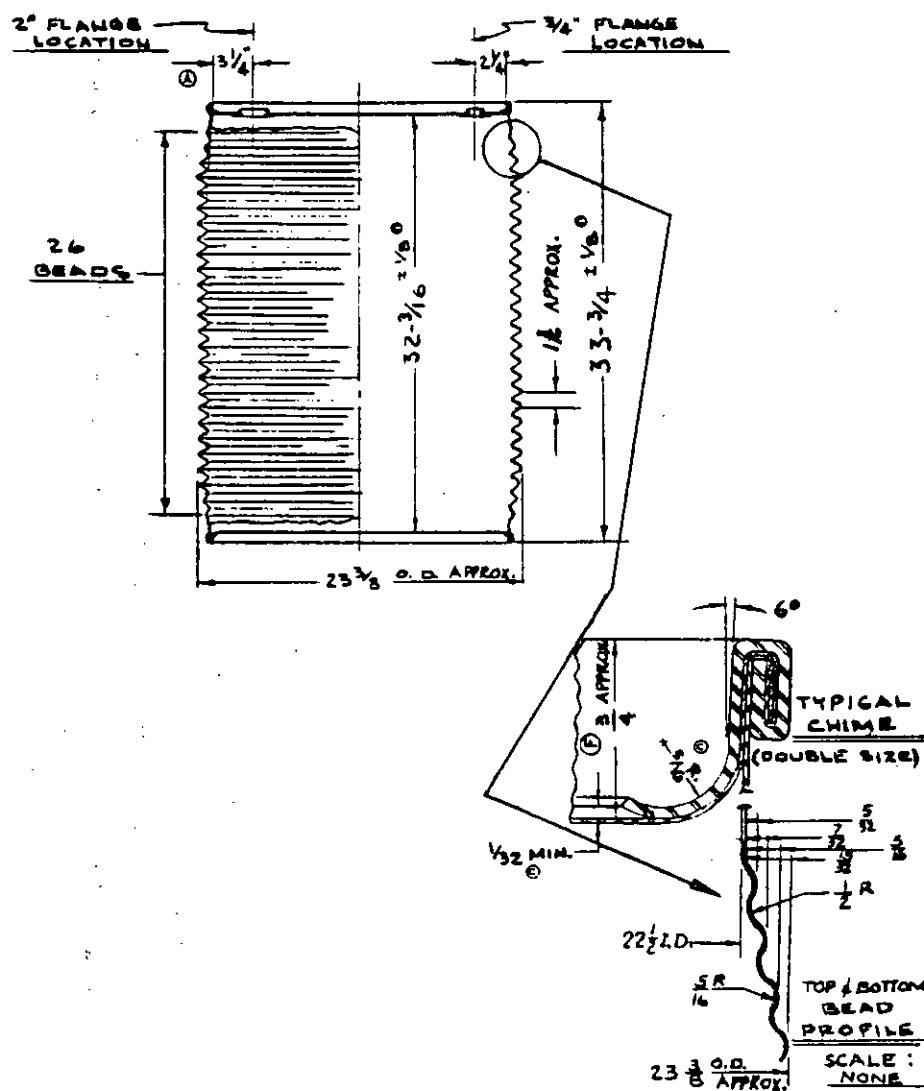


FIGURE 1

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. Price 10 cents each.