

ORNL Carbon Steel Tight Head 1-Gallon Drum Specification

Press  to see Check List only.

Description	Stores Catalog Number	Packaging Filling Instructions	Plant
Drum, Carbon steel, tight head, 1 gallon, 6 3/4 in. ID UN 1A1/X 1.5/250 , 0.6071 mm Nominal (24 gauge)	02-112-6110	ORNL-CHK-33	ORNL

Mfg. Details Per: ORNL Packaging Specifications
No. 106-1A1-0004
Issue Date: November 15, 1994
Revised Date: November 15, 2002

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Oak Ridge National Laboratory (ORNL)

Packaging Specifications

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REVISIONS

(as of November 1, 2002)

DATE	REVISION NUMBER	REVISION (S) MADE
11/15/2002	-0004	QC Checklist added closing instruction requirement (made item #4 and re-numbered remaining items); 19.0 reworded so closing instructions are included in each shipment.

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1.0 GENERAL DESCRIPTION

Tight Head (TH) Carbon Steel 1 and 5 gallon drum with welded seams, straight sided, 24 gauge steel body, steel head with standard 2-inch bung fittings, with metal handle attached to top head, inside with phenolic lining.

1.1 United Nations Designation - UN 1A1 /X sg/ tp/ * [per 49 CFR, ¶ 178.503]

1A1 Tight head steel drum.

X Suitable for Packing Group I, II, and III materials. [*one gallon drum*]

Y Suitable for Packaging Group II, and III materials. [*five gallon drum*]

sg Maximum specific gravity for which drum design type was tested .

tp Hydrostatic test pressure (in kilopascals) for which drum design type was tested.
[*250 kPa equivalent to 36.3 pounds per square in (psi) pressure - for PG I test.*]
[*100 kPa equivalent to 15 pounds per square in (psi) pressure - for PG II test.*]

* The last 2 digits of the calendar year in which the container was manufactured.

Specific UN Markings are specified in the Catalog Description for the referenced catalog number for each specific drum, which are the ORNL 'minimum' UN requirements.

1.2 Size:

1 gallon Inside Diameter – 6-3/4-inches Outside Height - 8-1/2 inches
5 gallon Inside Diameter – 11-3/4 inches Outside Height - 13-1/4 inches

1.3 Tare Weight:

1 gallon = 1.7 lbs.; 5 gallon = 4.7 lbs.

2.0 MATERIAL DETAILS

Drum construction must comply with Title 49, Code of Federal Regulations (49 CFR), &178.504 (latest edition) for steel drums, and the following minimum requirements. Manufacturer shall document appropriate quality control on incoming raw material. No significant changes to the manufacturing process or raw material is allowed without prior approval of the Company. Steel thickness dimensions/tolerances to be in conformance with TABLE, per [Appendix B](#).

2.1 Drum Body:

Cold rolled steel, 0.6071 mm Nominal, 0.5309 mm Minimum, (*24 gauge*).

2.2 Drum Head:

Cold rolled steel, same as drum body, as specified above.

2.3 Drum Bottom:

Cold rolled steel, same as drum body, as specified above.

2.4 Body Seams:

Welded (on-line, continuous welder)

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- 2.5 Chimes:**
Mechanically seamed.
- 2.6 Gasket:**
N/A
- 2.7 Rolling Hoops:**
None (nor top bead).
- 2.8 Handle:**
Steel rod, D-Style handle, attached to drum head with brazed plate.
- 2.9 Bung Closure:**
2-inch and ¾-inch standard bung fitting (Rieke or Tri-sure), with gasket; the ¾-inch bung is preferred, but optional, subsequent to availability.
- Manufacturer/supplier* must furnish ORNL, in writing, closure requirements, as performed for the UN design test; per 49 CFR, §178.2(c)(1). It must be identified on the closure instructions specifically as to the ORNL drum to which the instructions apply. Ref: [§9.0](#) for distribution.
- 2.10 Surface Preparation:**
Surfaces shall be prepared to retard rust formation, or be sufficiently cleaned for application of interior and exterior coatings.
- 2.11 Interior finish:**
Phenolic lining.
- 2.12 Exterior finish:**
Drum Body and Head painted SSCI (Steel Shipping Container Institute) all grey or all black.
- 2.13 Seaming Compound:**
Chimes must be sealed with a seaming compound, and applied in conformance to standard manufacturing quality procedures, to ensure no leakage/seepage.
- 2.14 Cleanliness:**
Finished drums must be free of rust, dirt, oil, solvents, metal shavings, foreign contaminants, and interior moisture.

3.0 CONTAINER PERFORMANCE CRITERIA

Manufacturer shall successfully test and certify that containers meet or exceed the requirements of 49 CFR, &178.600 - 178.608, for the Packing Group I level.

- 3.1 Performance Test Documentation:**
Upon request, the manufacturer must be capable of providing copies of the performance test documentation for purchased packagings, as required by 49 CFR, &178.601(1) for the UN certification marked packaging. Periodic audit copies will be requested randomly on purchased UN packagings. Ref: [§9.0](#).

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3.2 Performance Tests:

The specified drums require the **US Department of Transportation** UN performance criteria for design qualification testing, periodic retesting, and production tests established in 49 CFR, &178.600 - 178.608.

NOTE TO SELLER: The UN test/marketing certifications must be made by the drum manufacturer or a Department of Transportation approved third party tester.

4.0 QUALITY ASSURANCE

The Seller shall assure, and be responsible, that the quality of the drums furnished under this document are of good quality, as pursuant to industry standard manufacturing practices for steel drums, including the materials/components used in the manufacturing of the stated steel drums.

The Seller shall meet the requirements stipulated in this document, and the specific requirements of the Catalog Description for the specific drum as specified in the purchase order.

4.1 Manufacturer's Certification:

By the act of placing the UN performance criteria markings on each drum purchased, the manufacturer acknowledges he has certified, and accepted responsibility, that the stated drum design meets or exceeds the U.S. Department of Transportation's UN performance requirements as stipulated in [§3.2](#) of this document and in accordance with markings prescribed in 49 CFR, &178.503.

In addition, this certification marking acknowledges that the drum manufacturer has complied with the specific standards for steel drums specifically noted in 49 CFR, &178.504.

4.2 Receiver Inspections:

The following inspections will be performed on the incoming drums by receiver to determine the drums meet quality standards and the requirements of this document. However, the receiver is not limited to the following inspections to determine quality and specification conformance. Conformance will be indicated by a Y or N in the "Y/N" column, and negative responses documented on the Nonconformance Report (NCR), *UCN 11457*, (items 3-21b), attached to the checklist, and submitted to ORNL's Packaging Operations (PkgOps) for necessary action.

NOTE: Checklist for this specification is on the following page.

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This checklist is to be reproduced for QC Inspections

Receiver Inspection Quality Control (QC) Check-list for Incoming Steel Drums:

QC Conformance	Y/N	<< "No's" to be documented on form UCN 11457, with checklist
1	Capacity	Drum is the capacity specified in the Order/Catalog Description.
2	Drum Surface	Clean, no significant scratching, dings, or dents in drum, no significant corrosion on exterior or interior surface of drum.
3	Bung Closures	Drum top contains a 2-inch bung closure opening. Closures contain gasket rings.
		Bung openings/closures are painted silver, or plated to prevent rust.
4	Closing Instructions	Closing instructions are included with each shipment per §2.9 .
		Drums are able to be closed according to closing instructions.
5	Drum heads	Drum heads are painted same color as drum body.
6	Drum exterior	Painted all GREY or all BLACK (SSCI standard)
7	Markings	Drums marked (as a minimum) with ORNL specified UN markings, per Catalog Description.
		The complete UN required markings are durably marked on either the bottom or the side of drum, per 49 CFR, &178.503.
		Markings include the manufacturer's identification -- company name or registered symbol (initials or M-number), or test agency code; after USA. Ref: 49 CFR, &178.503(a)(8).
8	Side Markings	The UN markings are durably and legibly marked on side.

Catalog Number _____

P.O. Number _____

Total Units Received _____

Inspection Method: Per ORNL PkgOps QC Inspection Plan

Sample Size _____ [Based on ANSI/ASQC Z1.4-1993]

NCR No. _____

Inspector/Date _____

Additional comments provided on back: ____ check if yes.

The above QC inspection check list shall be accomplished for each order based on random samples of incoming carbon steel drums, by QC personnel to determine manufacturer's conformance to these specified Packaging Specifications.

Shipments of carbon steel drums not meeting specified requirements will be returned to the seller for credit.

QC inspections resulting in non-compliance with the Packaging Specifications will be cause for rejection of the entire shipment.

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5.0 MARKING

As a minimum, each drum shall be marked in accordance with 49 CFR, &178.2, 178.3 and 178.503 in a conspicuous location on exterior surface of the drum. Markings shall have a minimum letter height of ½-inch. Markings must include the manufacturer's identification -- company name or registered symbol (initials or M-number), or test agency code, per 49 CFR, &178.503(a)(8).

Additionally, drums are to be marked on the side with the UN markings as stipulated in [§1.1](#) of this specification, and specifically stated in the Catalog Description.

The letters: CATN—(dash) plus the last four (4) numbers of the catalog number must be marked below the UN markings:

1 gallon = CATN--6110
5 gallon = CATN--6115

6.0 INTENDED USE

The one (1) gallon containers are intended for Packing Group I, II, and III, and five (5) gallon containers for Packaging Group II and III hazardous materials in liquid form. Maximum fill capacity of the drum shall not exceed the tested hydrostatic pressure or density marked on the drum.

7.0 SUGGESTED MANUFACTURERS

The following list of suggested manufacturers have demonstrated ability to comply to the requirements set forth in this document. However this list does not guarantee current or continued availability as a suggested manufacturer source:

- Packaging for Industry, Knoxville, Tennessee
- All-Pak, Inc., Columbus, Ohio

The Seller must advise the Company prior to any change in the current source (manufacturer) of packaging materials described in this Packaging Specification.

Any Manufacturer that satisfactorily demonstrates to the Company the capability to furnish packaging in compliance with this Packaging Specification, may be added to the above listing.

8.0 AUTHORIZED CHANGES

Changes/revisions in the requirements specified in this document will only be authorized by ORNL PkgsOps as coordinated with Oak Ridge facilities packaging operations.

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9.0 DISTRIBUTION OF UN PERFORMANCE TEST REPORTS (per [§3.1](#)) and CLOSURE INSTRUCTIONS (per [§2.9](#))

A) Closure instructions must be furnished with each order for each type/size package purchased by ORNL, directly to the Packaging Operations Manager at the address below.

B) Upon specific request, UN performance test documentation for each specified order/shipment will be submitted directly to the Packaging Operations Manager at the address below.

**Oak Ridge National Laboratory
Packaging Operations Manager
Bldg. 7001, MS 6288
P.O. Box 2008, 1 Bethel Valley Road
Oak Ridge, Tennessee 37831-6288**

APPENDIX B

Steel Gauge Tolerances For Steel Drum QC Evaluation

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The below table of metal gauge thickness dimensions, and tolerances is to be used when evaluating steel drums for compliance to the specified steel thickness (gauge) set forth in the ORNL Packaging Specifications for the purchase of steel drums at ORNL facilities.

This table is furnished, in that, the US DOT Hazardous Material Regulations (49 CFR) under the new UN Performance Packaging concept no longer specifies gauge thickness and tolerances for steel drums - only test criteria.

Oak Ridge National Laboratory, however, in the ORNL UN Hazardous Material Packaging Specifications, specifies specific steel thickness (gauges) for the UN steel drums to be purchased, as well as the required UN performance criteria. In addition, the past DOT gauge table is incorporated directly into the DOE "White Book" for the DOT 7A, Type A packaging.

GAUGE NUMBER	NOMINAL THICKNESS (Inches)	NOMINAL THICKNESS (Millimeters)	MINIMUM THICKNESS (Inches)	MINIMUM THICKNESS (Millimeters)
12	0.1046	2.6568	0.0946	2.4028
14	0.0747	1.8974	0.0677	1.7196
16	0.0598	1.5189	0.0533	1.3538
18	0.0478	1.2141	0.0428	1.0871
19	0.0418	1.0617	0.0378	0.9601
20	0.0359	0.9119	0.0324	0.8230
22	0.0299	0.7595	0.0269	0.6833
24	0.0239	0.6071	0.0209	0.5309
26	0.0179	0.4547	0.0159	0.4039
28	0.0149	0.3785	0.0129	0.3277

NOTES:

The above table of gauge values (in inches) were extracted from the past DOT specifications; 49 CFR, &173.24(a)(2) (pre-HM 181) for steel sheets; for the gauges as specified for DOT 17C, I7E, 17H, 37A, etc. steel drums.

Conversion to millimeters is: inches multiplied by 25.4000 mm/in = millimeters. [current 49 CFR, &171.10 (c)(2)]

Minimum Thickness for Reuse (reconditioning) is 1.1 millimeters (therefore, above 19 gauge steel).