ORNL Carbon Steel Open Head
55-Gallon Drum Specification

Press QC Check List **to see Check List only.**

Description	Stores Catalog Number	Packaging Filling Instructions	Plant
Drum, Carbon steel, open head, **55** gallon, 22 1/2 in. ID **UN 1A2/X 320/ S;** **UN 1A2/Y 1.4/100**, 1.5189 mm Nominal (16 gauge)	02-112-6400	ORNL-CHK-10 (for Hazmat use) or ORNL-PKG-05 (for Type A use)	ORNL (Also available at Y-12)

Mfg. Details Per: ORNL Packaging Specifications
No. 100-1A2-0006
Issue Date: April 15, 1994
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REVISIONS

(as of November 1, 2002)

DATE	REVISION NUMBER	REVISION (S) MADE
11/5/2002	-0006	**¶2.8** Added "See Attachment #1 …"; **QC Checklist** added closing instruction requirement (made item #5 and re-numbered remaining items); **¶7.0** removed "Cullman, Alabama" from Greif Brothers location; **¶9.0** reworded so closing instructions are included in each shipment.; **Appendix A-1** reworded first NOTE to "…DOE Headmark List…"

1.0 GENERAL DESCRIPTION

Open Head (OH) Carbon Steel drum with welded seams, *2 or 3* rolling hoops, steel body, steel head, conventional (with seams) construction. Steel gauge and specific variations as specified in Appendix A-1 for *55, 30, 15 or 16, 10, 5* gallon drum capacity.

1.1 United Nations Designation - UN 1A2 /X **/ S/ * [UN 1A2 /Y sg/ tp/ *]^{dm} [per 49 CFR, ¶178.503]

dm	**=**	**Drum dual marked for liquids, as well as solid material.**
1A2	**=**	**Open head steel drum.**
X	**=**	**Suitable for Packing Group I, II, and III materials; Y = PG II and III only.**
******	**=**	**Maximum allowable gross weight in kilograms for which the drum was tested .**
S	**=**	**Designation indicates packaging is for solid materials [or combination packaging].**
%	**=**	**The last two (2) digits of the calendar year in which the container was manufactured.**
sg	**=**	**Specific Gravity of material for which drum design type was tested.**
tp	**=**	**Hydrostatic test pressure (in kilopascals) for which drum design type was tested. [100 kPa = 14.7 psig; 250 kPa = 36.3 psig]**

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:

Inside diameter (in inches) [as specified in the Catalog Description for the referenced catalog number].

Drum dimensions to be in accordance with ANSI MH2-1997 Standards (American National Standards Institute) for Steel Drums and Pails *[does not apply to 15 and 5 gallon drums]*.

2.0 MATERIAL DETAIL

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 in conformance with TABLE, per Appendix A-1.

2.1 Drum Body:

Cold rolled steel, ASTM A 366 or equivalent. Top of body rolled to form 2 inch false wire--see Appendix A-1 for steel size for stated drum capacity.

2.2 Drum Head:

Cold rolled steel, ASTM A 366 or equivalent; see Appendix A-1 for steel size.

2.3 Drum Bottom:

Cold rolled steel, ASTM A 366 or equivalent; same steel as drum body.

2.4 Body Seams:

Welded (on-line, continuous welder).

2.5 Chimes:
Mechanically seamed; bottom chime triple seamed, *or* either double-seamed or double-seamed *and* welded, if the double seam drum meets UN test criteria as specified.

2.6 Gasket:
Closed-cell rubber, glued into lid--gasket material and size as necessary to meet UN performance tests. Gasket to have an operating range of -40EF to +158EF. Must be EPDM or approved equivalent.

2.7 Rolling Hoops:
Three (3) each separate rolling hoops formed into the drum body, with one not more than three (3) inches from top drum curl for 55-gallon capacity and larger. Two (each) rolling hoops for under 55-gallon capacity (5-gallon called beads). Rolling hoops to be in accordance with ANSI MH2-1997 Standards.

2.8 Closure:
Twelve (12) gauge bolt type locking ring, welded lugs, one lug threaded, with steel bolt. Locking ring painted, coated, or galvanized to prevent corrosion. See Appendix A-1 for minimum required bolt sizes. See Attachment #1 for DOE Headmark List for counterfeit bolts.

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.

2.9 Surface Preparation:
Surfaces shall be prepared to retard rust formation, or be sufficiently cleaned for application of interior and exterior coatings.

2.10 Interior Finish:
55 and 30 gal: Lined with Morton Series 46, 2/3 Epoxy, 1/3 Phenolic coating, 1 mil. [*or an equivalent material, after approval by ORNL Packaging Operations*]
5, 10, and 15 gal: Lined with clear phenolic coating, 1/10 mil, or equal, for rust prevention.

2.11 Exterior Finish:
Body painted SSCI (Steel Shipping Container Institute) Black, with White head (*unless specified differently elsewhere*).

2.12 Seaming Compound:
Bottom chime must be sealed with a seaming compound, and applied in conformance to standard manufacturing quality procedures, to ensure no leakage/seepage. Seaming compound is omitted for double seam/welded bottom chimes.

2.13 Cleanliness:
Finished drums must be free of rust, dirt, oil, solvents, metal shavings, foreign contaminates, 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; Packing Group I level for solids, Packing Group II level for liquids.

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(l) for the UN certification marked packaging. Periodic audit copies will be requested randomly on purchased UN packagings. Ref: ¶9.0.

3.2 Performance Tests:

The specified drums require the **U.S. 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/marking 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 the 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 listed 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 following page.

This checklist is to be reproduced for QC Inspections.

Receiver Inspection Quality Control (QC) Checklist for Incoming Steel Drums			
	QC Conformance	*Y/N*	*<<"**No's**" to be documented on form UCN-11457, with checklist*
1	Steel gauge size		Meets dimensions/tolerances per attached GAUGE TABLE, Appendix A-1.
2	Capacity		Drum is the capacity specified in the Order/Catalog Description.
3	Drum Surface		Clean, no significant scratching, dings or dents in drum; no significant corrosion, on exterior and interior surface of drum.
4	Locking rings, chimes		Bolted locking rings are painted steel, contain bolt size (minimum) specified in Appendix A-1, and show no significant rusting /corrosion.
			Bolted locking rings close tightly; not loose around drum lid.
5	Closing Instructions		Closing Instructions are included with each shipment per ¶2.8.
			Drums are able to be closed according to closing instructions.
6	Drum lids		Lids are painted WHITE; no significant rusting/corrosion or dents.
7	Gaskets in lids		Gaskets are securely glued into the drum lids.
8	Drum interior		Visually verify lined, including lids; Ref. ¶2.10 of this specification.
9	Drum exterior		Painted Black (SSCI {Steel Shipping Container Institute} standard), except lids, unless another color is specified elsewhere in the specific order.
10	Markings		Drums marked (as a minimum) with ORNL specified UN markings, per Catalog Description -- which include **BOTH** solid and liquid (dual) UN markings.
			Drums legibly marked (embossed) on drum bottom in accordance with required 49 CFR markings, and specified gross test weight. Permanent (embossed) markings are not required on bottoms of *5* and *10* gallon drums—required durable complete markings must be on bottom or side per 49 CFR, ¶178.503(a).
			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).
11	Side Markings		The required UN markings (including the specified dual UN marks) 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 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 noncompliance with Packaging Specifications is cause for rejection of the entire shipment.

5.0 MARKING

As a minimum, each drum shall be marked in accordance with 49 CFR, ¶178.3, 178.502 and 178.503 in a conspicuous location on exterior surface of the drum. Duplicate markings must be on drum sides, just below top drum curl, to be in compliance with ¶178.3(a)(5). Markings shall have a minimum letter height of 2 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).

Open Head Drums are to be UN dual marked (embossed) for both liquids and solid materials.

Additionally, drums are to be marked with the UN markings, including the specified dual 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:

55 gal	**=**	**CATN--6400**
30 gal	**=**	**CATN--6330**
15 gal	**=**	**CATN--6225 (Y-12 Only)**
10 gal OH	**=**	**CATN--6215**
5 gal OH	**=**	**CATN--6210**

6.0 INTENDED USE

Containers are intended for Packing Group II and III hazardous materials in liquid form and PG I in ***solid*** form. Maximum fill capacity of the drum shall not exceed the tested gross weight or density marked**.**

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:

- All-Pak, Inc., Columbus, Ohio
- General Steel Drum, Charlotte, North Carolina
- Greif Bros. Corp.
- Packaging for Industry, Knoxville, Tennessee
- Packaging Specialties, Cleveland, Ohio
- Skolnik Industries, Inc., Chicago, Illinois

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

Any Manufacturer that satisfactorily demonstrates to the Company the capability to furnish packaging in compliance with these Packaging Specifications, 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 PkgOps as coordinated with Oak Ridge facilities packaging operations.

9.0 DISTRIBUTION OF UN PERFORMANCE TEST REPORTS (per ¶3.1) and CLOSURE INSTRUCTIONS (per ¶2.8)

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 each specific request, UN performance test documentation for 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

CARBON STEEL DRUM CONSTRUCTION VARIATIONS

OPEN HEAD (OH) DRUMS *[Fully Removable Heads]*								TIGHT HEAD DRUMS		
	ORNL No. 104-1A2-0006		*ORNL No. 100-1A2-0006*					*ORNL No. 101-1A1-0004*		
Construction	110 gallon	85 gallon	55 gallon	30 gallon	15/16 gallon	10 gallon	5 gallon	55 gallon	30 gallon	16 gallon
Nominal, mm ** Steel Thickness Minimum, mm *Drum gauge*	1.5189 .0598 in. 1.3538 .0533 in	1.5189 .0598 in. 1.3538 .0533 in.	1.5189 .0598 in. 1.3538 .0533 in.	1.2141 .0478 in 1.0871 .0428 in.	0.9119 .0359 in. 0.8230 .0324 in	0.9119 .0359 in. 0.8230 .0324 in	0.7595 .0299 in. 0.6833 .0269 in.	1.2141 .0478 in. 1.0871 .0428 in.	1.2141 .0478 in. 1.0871 .0428 in.	0.9119 .0359 in. 0.8230 .0324 in
	16 ga.	*16 ga.*	*16 ga.*	*18 ga.*	*20 ga.*	*20 ga.*	*22 ga.*	*18 ga.*	*18 ga.*	*20 ga.*
Head Thickness Same Tolerances•	1.5189 *16 ga.*	1.5189 *16 ga.*	1.5189 *16 ga.*	1.2141 *18 ga.*	0.9119 *20 ga.*	0.9119 *20 ga.*	0.7595 *22 ga.*	1.2141 *18 ga.*	1.2141 *18 ga.*	0.9119 *20 ga.*
Rolling Hoops	3 each	3 each	3 each	2 each	2 each	2 each	2 beads	2 each	2 each	2 each
Locking Ring –mm Nominal•	2.6568 *12 ga.*	2.6568 *12 ga.*	2.6568 *12 ga.*	2.6568 *12 ga.*	1.5189 *16 ga.*	1.5189 *16 ga.*	0.9119 *20 ga.*	----	----	----
Bolt Size *see note below	5/8 inch	5/8 inch	5/8 inch	5/8 inch	3/8 inch	5/16 inch	5/16 inch	----	----	----
Gaskets (glued in lid)	Required	Required	Required	Required	Required	Required	Required	----	----	----
Bung Openings	No	No	No	No	No	No	No	2 & ¾ inch	2 & ¾ inch	2 inch
Interior Lining [Ref: ¶2.10]	Clear Phenolic	Epoxy/ Phenolic	Epoxy/ Phenolic	Epoxy/ Phenolic	Clear Phenolic	Clear Phenolic	Clear Phenolic	Clear Phenolic	Clear Phenolic	Clear Phenolic

*NOTE: Counterfeit bolts, as stipulated on current DOE Headmark List (see Attachment #1), will not be accepted. Bolts are of foreign origin.

**NOTE: Steel thickness dimensions/minimum tolerances, in millimeters, are converted from the DOT Gauge Table, CFR 49, ¶173.24, pre-HM-181 docket. [inches x 25.4000 = millimeters; current CFR 49, ¶171.10(c)(2)]

•NOTE: Minimum gauge thickness tolerances, as shown above, apply (block 1).

ATTACHMENT #1

DOE Headmark List

ANY BOLT ON THIS LIST SHOULD BE TREATED AS DEFECTIVE WITHOUT FURTHER TESTING.

ALL GRADE 5 AND GRADE 8 FASTENERS OF FOREIGN ORIGIN WHICH DO NOT BEAR ANY MANUFACTURERS' HEADMARKS:

GRADE 5 GRADE 8

GRADE 5 FASTENERS WITH THE FOLLOWING MANUFACTURERS' HEADMARKS:

MARK	MANUFACTURER	MARK	MANUFACTURER
J	Jinn Her (TW)	KS	Kosaka Kogyo (JP)

GRADE 8 FASTENERS WITH THE FOLLOWING MANUFACTURES' HEADMARKS:

MARK	MANUFACTURER	MARK	MANUFACTURER
A	Asahi Mfg (JP)	KS	Kosaka Kogyo (JP)
NF	Nippon Fasteners (JP)	RT	Takai Ltd (JP)
H	Hinomoto Metal (JP)	FM	Fastener Co of Japan (JP)
M	Minamida Sleybo (JP)	KY	Kyoei Mfg (JP)
MS	Minato Kogyo (JP)	J	Jinn Her (TW)
Hollow Triangle	Infasca (CA TW JP YU) (Greater than 1/2 inch dia.)		
E	Dalai (JP)	UNV	Unytite (JP)

GRADE 8.2 FASTENERS WITH THE FOLLOWING HEADMARKS:

MARK	MANUFACTURER
KS	Kosaka Kogyo (JP)

GRADE A325 FASTENERS (BENNETT DENVER TARGET ONLY) WITH THE FOLLOWING HEADMARKS:

	MARK	MANUFACTURER
Type 1	A325 KS	Kosaka Kogyo (JP)
Type 2		
Type 3		

Key: CA-Canada, JP-Japan, TW-Taiwan, YU-Yugoslavia