Carbon Steel Drum Specification

Nuclear, Waste, and Site Services Division, WMO-DOC-35, Rev. 5

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1 PURPOSE

This document provides the procurement specifications for carbon steel drum packagings. The packagings must meet the requirements and standards for both 7A, Type A packagings and United Nations (UN) non-bulk performance-oriented packagings as defined in Title 49 Code of Federal Regulations (CFR), Parts 173 and 178. The steel drums will be used by the Argonne National Laboratory for the storage and transportation of solid and liquid hazardous and radioactive wastes.

2 DRUM DESIGN AND MANUFACTURING REQUIREMENTS

a. Each steel drum must be designed, fabricated, and tested in accordance with the applicable DOT performance packaging requirements and standards defined in 49 CFR Part 178, Subparts K, L, and M.

b. Each steel drum manufactured to the DOT specification and UN standard must be marked on a non-removable component of the packaging with the specification markings in accordance with 49 CFR §178.3 and §178.350.

c. Each steel drum must be capable of withstanding the free drop tests as specified in 49 CFR §173.465(c)(1) and (2) for packages containing fissile material.

d. All steel drum components and materials must be genuine, (not counterfeit) and comply with quality, test reporting, markings, and suitability for use requirements of the Purchase order.

e. Each packaging's material sources, certification, and identifications (i.e., lot numbers, heats) must be traceable. Material marking methods must not affect the integrity of the final product.

f. All manufacturing processes must be documented and controlled by written instructions, procedures, checklists, travelers, or other appropriate means.

g. The manufacturer must maintain engineering drawings for each drum packaging design including drum dimensions, materials of construction, surface coating specifications and manufacturing (e.g., forming and welding) details. Engineering drawings are considered a controlled document under the contract. Argonne National Laboratory must be notified by the manufacturer whenever there is a design element or packaging design type change requiring an engineering drawing revision and/or design qualification retesting.

h. All container welds must be clearly identified and appropriately annotated on the engineering drawings to indicate the size and type of weldment used in the container fabrication.

i. Each steel drum must be assigned and labeled with the Argonne National Laboratory purchase order number, release number, and item sequence number, or a serialized number specified by Argonne National Laboratory for the purpose of traceability. Labels must be legible and made of durable waterproof vinyl. Labels are to be applied to the side of drum at a location readily visible during normal use.

j. Drums must be palletized and secured with strapping or stretch wrap. Double or triple stacking of drums on a single pallet is prohibited for 30-gallon drums or greater.

k. Each drum must be manufactured with the following design features described in Table 2.1:

Table 2.1, Design Features	
Capacity and Packaging Specification Rating (Task Order Specific)	a. 5-Gallon, DOT 7A Type A, UN 1A2/X60/S, UN 1A2/Y1.8/150 b. 10-Gallon, DOT 7A Type A, UN 1A2/X120/S, UN 1A2/Y1.8/150 c. 30-Gallon, DOT 7A Type A, UN 1A2/X235/S, UN 1A2/Y1.5/150 d. 55-Gallon, DOT 7A Type A, UN 1A2/X430/S, UN 1A2/Y1.5/175 e. 85-Gallon, DOT 7A Type A, UN 1A2/X440/S
Material of Construction	ASTM A1008 (or equivalent) carbon steel
Lid Gasket	EPDM (Meets Type A conditions of –40°F to +158˚F (49 CFR §173.412 (c))
Rolling Hoops	The drum body must have a minimum of (2) formed rolling hoops for drums with a 10-gallon capacity or greater.
Bung Fittings. (Task Order Specific Option)	2" & 3/4" Rieke style or Tri-Sure style fitting with flange plug
Bung Gasket	EPDM (Meets Type A conditions of –40°F to +158˚F (49 CFR §173.412 (c))
Packaging Components and Materials	All components and materials used in the fabrication of the steel drum packaging must be the same design and material composition used during packaging design qualification testing. Once tested, the certifying organization must control the design and fabrication to maintain product function, performance, and dimensional specifications and tolerances.
Bolt and Nut Type	Zinc plated steel with a hex head. 5/8-inch x 4-inch long. Must meet ASTM A307. Manufacturer's markings must be indicated on the head per applicable standard.
Tamper Indicating Device (TID)	Each bolt must have nominal 5/16” hole drilled on center at a minimum of 1/2” from the tip of the threaded end to accommodate TID installation.
Exterior Coating	All exterior surfaces must be coated with a durable rust-inhibiting paint (or equivalent) (min. thickness per manufacture recommendation). Coverage must be uniform and free of runs, sage, streaks, blisters, cracks, or de-lamination.
Interior Coating (Task Order Specific Option)	All interior surfaces must be coated with a durable rust-inhibiting paint (or equivalent) (min. thickness per manufacture recommendation). Coverage must be uniform and free of runs, sage, streaks, blisters, cracks, or de-lamination.
Packing Group - Solids	Packing Group I
Packing Group - Liquids	Packing Group II
Specific Gravity	1.5 minimum
Minimum Hydrostatic Test Pressure	Hydrostatic pressure testing must be performed in accordance with 49 CFR §178.605 (minimum 100 kPa).

3 SUBMITTALS

a) Table 3-1, *Offer Data - Prior to Award*, lists items that must be provided to the Argonne National Laboratory by the Supplier prior to award of the subcontract.

Note: Prior to subcontract award or at any time during the period of performance, Argonne National Laboratory may elect to perform an on-site surveillance or a paper-based review to verify the Manufacturer's technical, quality control, production capabilities, and the Manufacturer's ability to provide containers in compliance with the definitive standards of this specification.

Table 3-1, Offer Data - Prior to Award

Item No.	Deliverable Description
1	Copy of the manufacturer's quality assurance (QA) program plan and a listing of approved manufacturing, fabrication, welding, and QA standard operating procedures (SOPs), checklists, travelers, and other applicable documents.
2	Engineering drawings for each drum packaging design including drum dimensions, materials of construction, surface coating specifications and manufacturing (e.g., forming and welding) details.

Note: A Manufacturer's offer may not be considered if the Offer Data required in this table is not provided.

b) Table 3-2, *Data to Supply Prior to Fabrication*, lists documentation required from the Supplier prior to the fabrication of the containers.

Table 3-2, Data to Supply Prior to Fabrication

Item No.	Deliverable Description
1	Manufacturer's welding, inspection, and testing procedures must be submitted to Argonne National Laboratory for review and approval prior to fabrication of containers.
2	Manufacturer's traceability certifications from the original supplies to the finished product.
3	Any revisions to previously submitted manufacturer's QA program plan.
4	Notification of changes to container design.

c) Table 3-3, *Data to Supply Prior to Delivery*, lists the documentation required from the Supplier along with each container shipment to Argonne National Laboratory.

Table 3-3, Data to Supply Prior to Delivery

Item No.	Deliverable Description
1	Certificate of Conformance (CoC) signed by the manufacturer's QA manager or designee certifying the following: Each drum meets all the applicable packaging requirements identified in 49 CFR §173.24, §173.24a, §173.403, §173.410, §173.412, §173.415, §173.461, §173.462, §173.465, §178.350, §178.500, §178.502, §178.503, §178.504, §178.600, §178.601, §178.602, §178.603, §178.604, §178.605, §178.606, §178.608. • All items are genuine (i.e., not counterfeit) and match the quality, test reports, markings, and/or fitness for use required by the Purchase/Contract Order as set forth.
2	Signed copy of the current packaging design qualification testing report.

Table 3-3, Data to Supply Prior to Delivery	
Item No.	**Deliverable Description**
3	Copy of the current manufacturer's container closure instructions.
Note: Nonconformance identified by the vendor during fabrication activities (programmatic or container-specific) must be submitted to Argonne National Laboratory for approval of corrective actions. Deviation requests (from approved specifications) must also be submitted for Argonne National Laboratory's approval prior to continued fabrication.	

4 QUALITY ASSURANCE

a. The manufacturer's QA program plan must meet or exceed the requirements defined in the regulatory standard, American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance-1, NQA 1:2008 and NQA-1a-2009 addendum.

b. Revisions to the manufacturer's QA program plan that occur during the contract period must be submitted to Argonne National Laboratory to verify an "approved" vendor status is maintained. Contract procurements will be placed on hold until Argonne National Laboratory verifies the implemented changes comply with the current contract.

c. Argonne National Laboratory must have the right of access to witness the manufacturing process involved in the fabrication of the requested containers on the manufacturer's premises.

d. Argonne National Laboratory must be notified a minimum of 10 business days in advance of the packaging shipments to allow, at Argonne National Laboratory's discretion, the opportunity to perform on-site source inspection and release for shipment.

e. All QA testing and inspections performed during manufacturing, fabrication, and finishing must be documented and provided to Argonne National Laboratory upon request.

f. The authorization for acceptance of packagings for payment by Argonne National Laboratory will be based on the satisfactory receipt of the documents listed in Table 3-3, verification of procured packagings meeting the purchase order requirements, and a defect-free receipt inspection.

g. The manufacturer must submit specification waiver requests to Argonne National Laboratory for approval prior to proceeding with proposed waivers to standards described in this specification or approved under the contract.

5 REFERENCES

- 49 CFR Part 173, *Shippers-General Requirements for Shipments and Packagings*
- 49 CFR Part 178, *Specifications for Packagings*
- Packaging Management Council (PMC), 55-Gallon Drum Specification PMC–D01 Revision 1, October 4, 2017
- DOE Order, DOE O 414.1D, *Quality Assurance*
- ASME NQA 1:2008, *Quality Assurance Requirements For Nuclear Facility Applications*

- ASME NAQ-1a-2009, Addendum to ASME NQA-1-2008
- ASTM A307, *Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength*

6 ABOUT THIS DOCUMENT

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7 SUMMARY OF CHANGES IN THIS VERSION

Added the word “or designee” to table 3-3, Item 1.