



**RE: DOE Packaging Exchange**  
**Richard Gallego** to: lawrence.gelder  
Cc: "Gaye Nelson", "Harold Sims", rampac

02/19/2014 02:43 PM

History: This message has been replied to.

Typically Am-241 sources that had an expired special from cert or no special form cert. The DOT reduced the activity limit for Am-241 for 7A containers several times in the 80's, effectively forcing licenses to rent Type B containers to move or dispose of their sources. Siemens Gammasonics had a Am-241 marker that was 13 mCi or their special from cert for that source had expired. We used the 6M for those sources., and any others that had similar circumstances.

Thanks,

Rich

**From:** lawrence.gelder@srnl.doe.gov [mailto:lawrence.gelder@srnl.doe.gov]  
**Sent:** Wednesday, February 19, 2014 11:33 AM  
**To:** Richard Gallego  
**Cc:** 'Gaye Nelson'; Harold Sims; rampac@srs.gov  
**Subject:** RE: DOE Packaging Exchange

Puzzle solved ...

What did you ship in your 6M?

Thanks,  
Larry

-----  
**Lawrence F. Gelder** | **Savannah River National Laboratory** | Environmental Management Directorate, Docket Manager for the DOE Packaging Certification Program | Contractor to the U.S. DOE under Contract Number DE-AC09-08SR22470 | Voice: 803.819.8403 | Mobile: 803.761.3439 | Email: [lawrence.gelder@srnl.doe.gov](mailto:lawrence.gelder@srnl.doe.gov) | Savannah River Research Campus, 227 Gateway Drive, Rm 310, Aiken, SC 29803

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# FBF Nuclear Containers

PLANT LOCATION  
1201 Hilton Road  
Knoxville, Tn. 37921

DIRECT MAILING  
P.O. BOX 51026  
Knoxville, Tn. 37950

865-  
Telephone 423/584-1868  
Fax 423/584-4935

865

*net wt. =*

November 25, 1997

Mr. Richard Gallego  
Thomas Gray & Associates  
1205 W. Barkley Ave  
Orange, Ca. 92868

Subject: QA Documents on DOT 6M Container S/N 2033

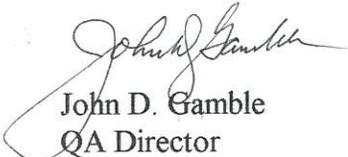
*USA / 0002 / B*

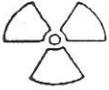
Dear Mr. Gallego,

Please find enclosed a copy of the QA Documents on the above subject container. We are in hopes this information will be of assistance in your use of the container.

If we can be of any assistance in the future please contact us.

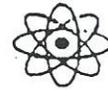
Sincerely,

  
John D. Gamble  
QA Director



# FBF Nuclear Containers

Middlebrook Industrial Park • 1201 Hilton Road  
Knoxville, Tennessee 37921



Nuclear Containers and Casks for  
Fuels & Radioactive Material  
Reactor Fuel Elements  
Waste Material  
Radioisotopes  
Radioactive Sources

TYPE A AND TYPE B CONTAINERS  
LSA AND WASTE CONTAINERS

FBF, INC.  
615/584-1868

Containers and Casks:  
Overpacks  
Refurbishing & Repair  
Drums  
2-R Tubes  
Cane Fiberboard Insulation  
Benelex Insulation  
Auratone Insulation  
Vermiculite Insulation  
Plywood Insulation  
DOT & NRC Specification

## FBF CERTIFICATE OF COMPLIANCE

Lead Products:  
Lead Pots  
Lead Shields  
Lead 2-R Liners  
Lead Brick  
Lead Boxes  
Lead Containers

CUSTOMER: Thomas Gray & Associates  
1205 W. Barkley Ave., Orange, Ca 92668

Polyethylene Containers for:  
Drum Liners (Rigid)  
Low Level Waste  
Leaking Metal Drums  
Polyethylene Drums

PURCHASE ORDER NUMBER: Verbal Phone order

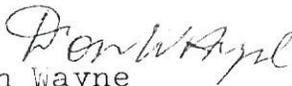
DRAWING NUMBER(S): N/A

SPECIFICATION: DOT 6M W/ 5 1/4" ID 2R X 27" IH W/ Plug Closure

SERIAL NUMBER(S): 2033

SHIPMENT NUMBER: N/A

This is to certify the item(s) described in the above purchase order was manufactured in strict accordance with the purchase order requirements and FBF's Quality Assurance Manual, Revision 9, dated August 25, 1989. FBF's Quality Assurance Manual conforms to the requirements of 10 CFR Part 71, Subpart H, "Quality Assurance Criteria for Shipping Containers for Radioactive Material" (omitting licensee responsibilities) and ANSI/ASME NQA-1, "Quality Assurance Program Requirements for Nuclear Facilities."

  
Don Wayne  
For FBF QA Manager

10-27-95  
Date

SERVING THE NUCLEAR INDUSTRY FOR OVER 38 YEARS  
SEND US YOUR PRINTS FOR QUOTATION

FBF NUCLEAR CONTAINERS  
SHOP TRAVELER

Page \_\_\_ of \_\_\_

Traveler No. 1401 Date 10-25-95 Customer Thomas Gray & Associates

Purchase Order No. Phone Verbal Product Description 1 ea DOT 6M W/5 1/4" X 27" IH 2R

Serial No. on Drum 2033 Inner Container 2033 Serial No. Sequence - to -

DOT Specification 6M Military Specification N/A

Drum Size (Gallon) \_\_\_\_\_ Quantity 1 Other N/A

Customer Drawing No. N/A

Customer Design Specification No. N/A

Customer Paint Specification No. N/A

Customer Procedures N/A

Special Customer Requirements N/A

DRUM LABELS

Labeling Stock: Material Stainless Steel Size/Gauge 5" X 15" 20 Ga

Label Content: DOT 6M Type B  
RADIOACTIVE MATERIAL  
10-63-95  
MSA/030 2/FB ( )  
THOMAS GRAY & ASSOCIATES  
ORANGE, CA 92668 S/A - - - FBF

Method: Printing \_\_\_\_\_ Etching \_\_\_\_\_ Die-Stamp X Size of Alpha/Numerics 1/2"

Method of Attaching Label Spot welding

APPLICABLE FBF PROCEDURES

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> 10.1 Rev. <u>2</u> Inprocess and Final Inspection  | <input type="checkbox"/> A1-1, P1 to P1, SMAW                     |
| <input type="checkbox"/> 10.2 Rev. ___ Visual Weld Inspection                          | <input type="checkbox"/> T1-1, P1 to P1, GTAW                     |
| <input checked="" type="checkbox"/> 13.1 Rev. <u>4</u> Handling, Storage, and Shipping | <input checked="" type="checkbox"/> TMSF 1-1, P1 to P1, GTAW/GMAW |
| <input type="checkbox"/> 14.1 Rev. ___ Inspection, Test, and Operating Status          | <input type="checkbox"/> T8-8, P8 to P8, GTAW                     |
| <input checked="" type="checkbox"/> 15.1 Rev. <u>2</u> Nonconformance Reporting        | <input type="checkbox"/> Other _____                              |

Traveler Completed by:

Approved by:

Robert Walker

Don Wayne

FBF Plant Manager

For FBF CEO/QA Manager



U.S. Department  
of Transportation  
  
Research and  
Special Programs  
Administration

400 Seventh Street S.W.  
Washington, D.C. 20590

**COMPETENT AUTHORITY CERTIFICATION**  
**FOR A TYPE B FISSILE**  
**RADIOACTIVE MATERIALS PACKAGE**  
**CERTIFICATE USA/0002/B( )F, REVISION 13**

This certifies that the radioactive materials package design described below has been approved by the Competent Authority of the United States as meeting the regulatory requirements for Type B packaging for fissile radioactive materials as prescribed in the International Atomic Energy Agency<sup>1</sup> and United States of America<sup>2</sup> regulations.

1. Package Identification - DOT Specification 6M.
2. Packaging Description - The packagings authorized by this certificate consist of steel drums, ranging in size from 10 to 110 gallons, which contain a sealed DOT Specification 2R (Appendix A) metal inner containment vessel, centered and supported within a removable head type metal outer drum by means of machined discs and rings of specified solid materials which provide thermal and impact protection. Packaging must comply with the provisions of 49 CFR 178.354 (Appendix B). Typical assembly detail for a DOT-6M is illustrated in Appendix C attached hereto.
3. Authorized Radioactive Contents -
  - a. General - The physical form of the contents is limited to solids for fissile materials and to solids or gases for non-fissile materials. Contents must not decompose at temperatures up to 121° C (250°F), and the radioactive decay heat must not exceed 10 watts.
  - b. Additional Requirements For Fissile Contents - Materials not in Special Form must be additionally contained within one or more sealed and leaktight metal cans or polyethylene bottles within the DOT Specification 2R inner containment vessel.
    - (i) Fissile Class I Packages. The following quantities of fissile radioactive material are authorized for Fissile Class I packages: 1.6 kilograms uranium-235; 0.9 kilograms of plutonium (See Note); 0.5 kilograms of uranium-233. The maximum ratio of hydrogen to fissile materials must not exceed three with all sources of hydrogen within the DOT Specification 2R containment vessel being considered.

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<sup>1</sup> "Safety Series No.6, Regulations for the Safe Transport of Radioactive Materials, 1967 Edition" published by the International Atomic Energy Agency (IAEA).

<sup>2</sup> Title 49, Code of Federal Regulations, Parts 100 - 199, United States of America.

**FOR INFORMATION ONLY**

CERTIFICATE USA/0002/B( )F, REVISION 13

(NOTE: Because of the 10-watt thermal decay heat limitation, the limit for plutonium-238 is only 0.02 kilograms).

(ii) Fissile Class II Packages and Fissile Class III Shipments. Quantities of fissile radioactive material as shown in the following table are authorized for Fissile Class II packages and Fissile Class III shipments. Where a maximum ratio of hydrogen to fissile material is specified in the table, only the hydrogen interspersed with the fissile material need be considered. For a Fissile Class II package, the minimum transport index to be assigned is shown in the following table. For a Fissile Class III shipments, the maximum number of similar packages per transport vehicle is shown. Each Fissile Class III shipment is also subject to 49 CFR 173.457. For a uranium-233 shipment, the maximum inside diameter of the inner containment vessel must not exceed 12 centimeters (4.75 inches). Where necessary, a tight fitting steel insert must be used to reduce a larger diameter inner containment vessel specified in 49 CFR 178.354-3(b) of this subchapter to the 12 centimeter (4.75 inches) limit.

TABLE 5—AUTHORIZED CONTENTS FOR SPECIFICATION 6M PACKAGES<sup>1</sup>

Uranium-233 <sup>5</sup>			Uranium-235 <sup>4, 7</sup>			Plutonium <sup>2, 3, 4</sup>			Fissile class II transport index	Fissile class III maximum number of packages per transport vehicle
Metal or alloy	Compounds		Metal or alloy	Compounds		Metal or alloy	Compounds			
<sup>a</sup> H/X=0	H/X=0	H/X ≤ 3	H/X=0	H/X=0	H/X ≤ 3	H/X=0	H/X=0	H/X ≤ 3		
3.6	4.4	2.9	7.2	7.6	5.3	3.1	4.1	3.4	0.1	1,250
<sup>6</sup> 4.2	5.2	3.5	8.7	9.6	6.4	3.4	4.5	4.1	0.2	625
<sup>6</sup> 5.2	6.8	4.5	11.2	13.9	8.3	4.2		4.5	0.5	250
			13.5	16.0	10.1	4.5			1.0	125
				26.0	16.1				5.0	25
				32.0	19.5				10.0	12

<sup>1</sup> Quantity in kilograms.  
<sup>2</sup> Minimum percentage of plutonium-240 is 5 weight percent.  
<sup>3</sup> 4.5 kilogram limitation of plutonium due to 10 watt decay heat limitation.  
<sup>4</sup> For a mixture of uranium-235 and plutonium an equal amount of uranium-235 may be substituted for any portion of plutonium authorized.  
<sup>5</sup> Maximum inside diameter of Specification 2R containment vessel not to exceed 12 centimeter (4.75 inch) (see par. (b)(2)(ii) of this section).  
<sup>6</sup> Granulated or powdered metal with any particle less than 8 millimeter (0.25 inch) in the smallest dimension is not authorized.  
<sup>7</sup> Maximum permitted uranium-235 enrichment is 93.5 percent.  
<sup>a</sup> H/X is the ratio of hydrogen to fissile atoms in the inner containment.

**FOR INFORMATION ONLY**

CERTIFICATE USA/0002/B( )F, REVISION 13

4. GENERAL CONDITIONS -

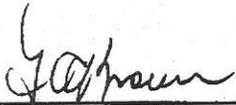
- a. Each user of this certificate must have in his possession a copy of this certificate.
- b. Each person offering for transportation the packages authorized by this certificate shall have in his possession quality control documentation demonstrating that the package was manufactured, maintained, and prepared for shipment in accordance with this certificate and 49 CFR 173.474 and 173.475 (Appendix D).
- c. Each user of this certificate, other than the original petitioner, shall register his identity in writing with the Office of Hazardous Materials Technology, (DHM-23), Research and Special Programs Administration, U.S. Department of Transportation, Washington, D.C. 20590-0001.
- d. This certificate does not relieve any consignor of carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.
- e. This certificate does not relieve any user from the requirements of the U.S. Nuclear Regulatory Commission related to the limitations for the transportation of plutonium by air (10 CFR 71.88).

5. Marking and Labeling - In addition to all other required marking and labeling, each package must bear the marking USA/0002/B( ) when the contents are non-fissile or USA/0002/B( )F when the contents are classed as fissile radioactive materials.

6. Expiration Date - This certificate expires on August 31, 1995.

This certificate is issued in accordance with the IAEA Regulations and Section 173.472 of Title 49 of the Code of Federal Regulations, in response to the January 12, 1994 petition by Transnuclear, Inc. of Hawthorne, New York, and in consideration of the associated information therein and on file in this Office.

Certified by:

  
\_\_\_\_\_  
George A. Brown, Chief  
Radioactive Materials Branch  
Office of Hazardous Materials  
Technology

FEB 17 1994

\_\_\_\_\_  
(DATE)

Revision 13 - Issued to extend the date of expiration.

**FOR INFORMATION ONLY**

§ 178.360 Specification 2R; inside containment vessel.

§ 178.360-1 General requirements.

(a) Each vessel must be made of stainless steel, malleable iron, or brass, or other material having equivalent physical strength and fire resistance.

(b) Each vessel must meet all of the applicable requirements of § 173.24 (c) and (d) of this subchapter. Letters and numerals at least 6 millimeters (¼-inch) in height are authorized for the marking of a vessel not exceeding 5 centimeters (2 inches) inside diameter.

[Amdt. 178-35, 39 FR 45245, Dec. 31, 1974. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

§ 178.360-2 Manufacture.

The ends of the vessel must be fitted with screw-type closures or flanges (see § 178.34-4), except that one or both ends of the vessel may be permanently closed by a welded or brazed plate. Welded or brazed side seams are authorized.

[Amdt. 178-35, 39 FR 45245, Dec. 31, 1974. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

§ 178.360-3 Dimensions.

(a) The inside diameter of the vessel may not exceed 30 centimeters (12 inches) exclusive of flanges for handling or fastening devices and must have wall thickness and length in accordance with the following:

Inside diameter maximum		Threaded closure		Wall thickness minimum—Flanged closure	Length maximum	
Inches	Centimeters	Inches	Millimeters		Inches	Centimeters
2	5	⅜	2.5	Not less than that prescribed for schedule 40 pipe.....	16	41
6	15	½	3.2	.....	72	183
12	30	¾	6.5	.....	72	183

(b) [Reserved]

[Amdt. 178-35, 39 FR 45245, Dec. 31, 1974. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

§ 178.360-4 Closure devices.

(a) Each closure device must be as follows:

(1) Screw-type cap or plug; number of threads per inch must not be less than United States standard pipe threads and must have sufficient length of thread to engage at least 5 threads when securely tightened. Pipe threads must be luted with an appropriate non-hardening compound which must be capable of withstanding up to 149° C. (300° F) without loss of efficiency. Tightening torque must be adequate to maintain leak tightness with the specific luting compound.

(2) An opening may be closed by a securely bolted flange and leak-tight gasket. Each flange must be welded or brazed to the body of the 2R vessel per (ANSI) Standard B16.5 or (AWWA) Standard C207-55, section 10. A torque wrench must be used in securing the flange with a corresponding torque of no more than twice the force necessary to seal the selected gasket. Gasket material must be capable of withstanding up to 149° C (300° F) without loss of efficiency. The flange, whether of ferrous or nonferrous metal, must be constructed from the same metal as the vessel and must meet the dimensional and fabrication specifications for welded construction as follows:

(i) Pipe flanges described in Tables 13, 14, 16, 17, 19, 20, 22, 23, 25 and 26 of ANSI B16.5.

(ii) For nominal pipe sizes, 6, 8, 10, and 12 inches, AWWA Standard C207-55, Table 1, class B, may be used in place of the tables prescribed by paragraph (a)(2)(i) of this section.

(iii) Sizes under 6 inches, nominal pipe size, the following table with the same configuration as illustrated in AWWA C207-55, Table 1, class B, may be used in place of paragraph (a)(2)(i) of this section.

**FOR INFORMATION ONLY**

APPENIX A

Nominal pipe size		Flange O.D.		Number of bolts	Bolt circle diameter		Diameter of bolts		Flange thickness	
Inches	Centimeters	Inches	Centimeters		Inches	Centimeters	Inches	Centimeters	Inches	Centimeters
2	5	6	15	4	4 3/4	11.8	1/2	1.2	3/8	1.6
2 1/2	6.2	7	17.5	4	5 1/2	13.8	1/2	.....	3/8	.....
3	7.5	7 1/2	18.8	4	6	15	1/2	.....	3/8	.....
3 1/2	8.8	8 1/2	21.3	8	7	17.5	1/2	.....	3/8	.....
4	10	9	22.5	8	7 1/2	18.8	1/2	.....	3/8	.....
5	12.6	10	25.4	8	8 1/2	21.3	1/2	.....	3/8	.....

(iv) Cast iron flanges prohibited.

(b) [Reserved]

[Amdt. 178-35, 39 FR 45245, Dec. 31, 1974;  
40 FR 2435, Jan. 13, 1975, as amended at 40  
FR 44327, Sept. 26, 1975. Redesignated by  
Amdt. 178-97, 56 FR 66284, Dec. 20, 1991]

**FOR INFORMATION ONLY**

APPENDIX B

§ 178.354 Specification 6M; metal packaging.

§ 178.354-1 General requirements.

(a) Each package must meet the applicable requirements of § 173.24 of this chapter.

(b) [Reserved]

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968. Re-designated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

§ 178.354-2 Rated capacity.

(a) Rated capacity as marked (see § 178.104-5). Not less than 10 gallons nor more than 110 gallons for the outer steel drum. Not less than 1.24 liters for the inner containment vessel.

(b) [Reserved]

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968. Re-designated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

§ 178.354-3 General construction requirements.

(a) The outer shell must be of straight-sided steel, with welded body seams, and may be either a single sheet of steel, or may be fabricated by welding together two appropriate lengths of drums, such as a DOT Specification 6C or 17C, with each length to contain 3 swedged or rolled rolling hoops as prescribed for either of these specifications. A removable head for a packaging of 210 liters (55 gallons) or larger volume must have one or more corrugations in the cover near the periphery. For a packaging exceeding 57 liters (15 gallons) volume, the head must be crowned (convexed), not extending beyond the level of the chime,

with a minimum convexity of 1 centimeter ( $\frac{3}{8}$ -inch).

(1) The maximum authorized gross weight, metal thickness, and minimum

end insulation thickness for the marked volume is as follows:

Marked capacity		Maximum authorized gross weight		Minimum thickness of uncoated sheets and heads (gauge)	Minimum thickness of end insulation Inches	Centimeters
Gallons not over	Liters	Pounds	Kilograms			
15.....	57	160	73	20	1.88	4.7
30.....	114	480	219	18	3.75	9.5
55.....	210	640	292	16	3.75	9.5
110.....	420	640	292	16	3.75	9.5

**FOR INFORMATION ONLY**

(2) Each drum must have at least four 1.2 centimeter (0.5-inch) diameter vents near the top, each covered with a weatherproof tape or fusible plug; or equivalent device. A layer of porous refractory fiber may be placed behind the pressure-relief vent holes.

(b) Inner containment vessel must conform to specification 2R or equivalent (cast iron or brass are prohibited), with maximum usable inside diameter of 13.3 centimeters (5.25 inches), minimum usable inside diameter of 10 centimeters (4 inches), and minimum height of 15 centimeters (6 inches).

(c) Inner containment vessel must be fixed within the outer shell by one of the following types of solid centering media, with the sides of the inner vessel protected by at least 9.5 centimeters (3.75 inches) of insulation media, and the ends with at least the thickness as prescribed in § 178.104-3(a)(1).

(1) Machined discs and rings made of solid industrial cane fiberboard having a density of at least 0.24 g/cc (15 pounds per cubic foot) fitted such that the radial clearances between the fiberboard, inner vessel, and shell do not exceed 6 millimeters (¼-inch); or

(2) Hardwood or plywood at least 1.2 centimeter (½-inch) thick, having a density of at least 0.45 g/cc (28 pounds per cubic foot). There must be no gap or direct heat path from the shell to the inner vessel.

(d) Any radiation shielding material used must be placed within the inner containment vessel or must be protected in all directions by at least the thickness of the thermal insulating

material prescribed in paragraph (a) of this section.

(e) For a packaging having an authorized gross weight in excess of 219 kg (480 pounds), a steel bearing plate, at least 6 millimeters (0.25-inch) thick or a plywood disc, at least 2.5 centimeters (1-inch) thick, and at least 25 centimeters (10 inches) in diameter must be provided at both ends and adjacent to the specification 2R inner containment vessel, to provide additional load-bearing surface against the insulation-centering medium.

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968, as amended by Amdt. 178-35, 39 FR 45246, Dec. 31, 1974; 40 FR 44327, Sept. 26, 1975. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

#### § 178.354-4 Closure.

(a) The outer drum closure must be at least 16-gauge bolt-type locking ring having at least a ⅝-inch steel bolt for drum sizes not over 15 gallons, or a 12-gauge bolted ring with drop-forged lugs, one of which is threaded, and a ⅝-inch steel bolt for drum sizes over 15 gallons. Each bolt must be provided with a lock nut or equivalent device.

(b) The closure device must have means for the attachment of a temper-proof lock wire and seal, or equivalent.

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

#### § 178.354-5 Markings.

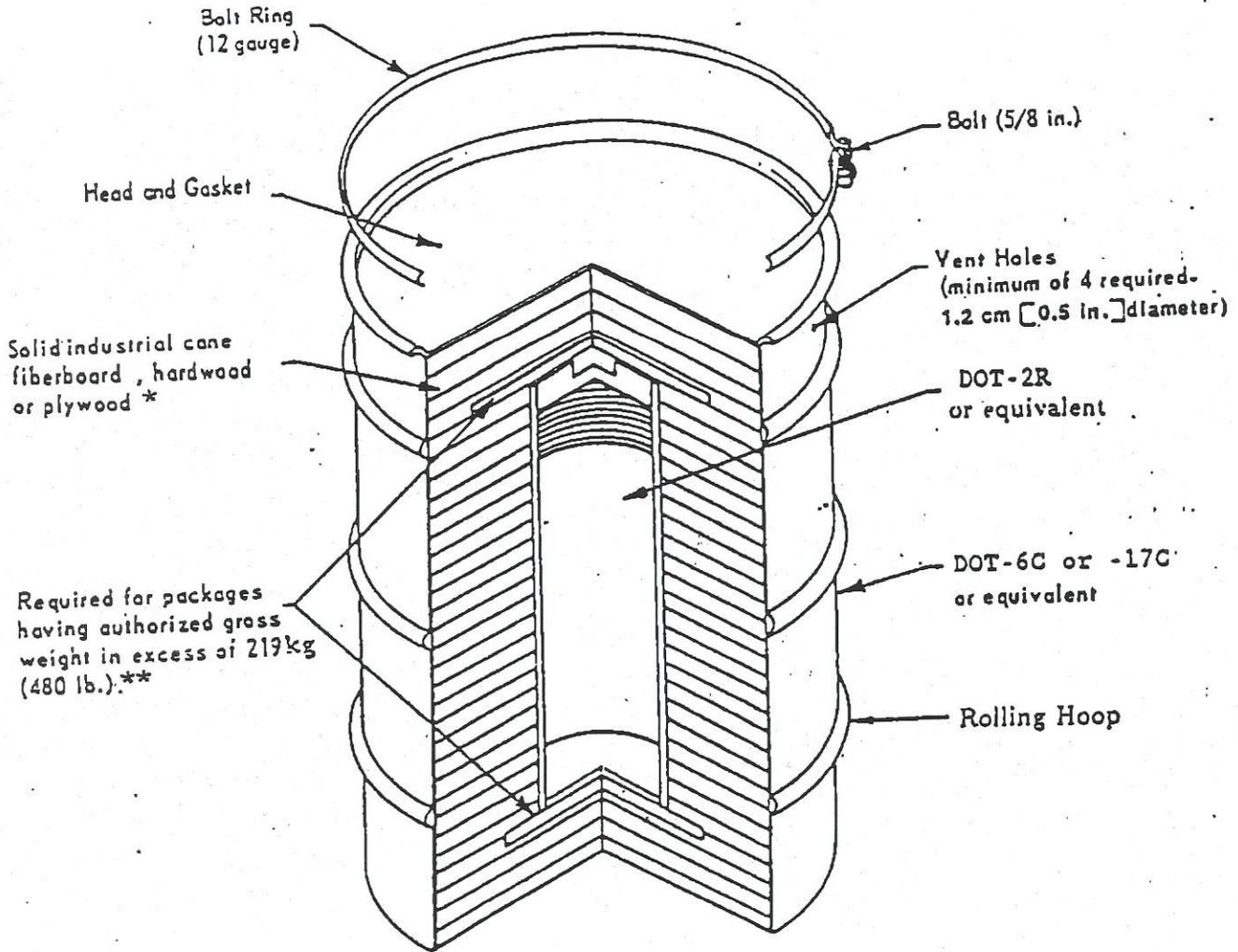
(a) Marking must be as prescribed in § 173.24 of this chapter.

(b) Marking on the outside of each package must be as follows: "DOT-6M Type B," "Radioactive Materials," or "Fissile Radioactive Materials," as appropriate; and the gauge of metal of the outer drum in the thinnest part, rated capacity of the outer drum in gallons, and year of manufacture (for example, 18-30-69). When the gauge of the metal in the drum wall differs from that in the head, both must be indicated with a slanting line between, and with the gauge of the body indicated first (e.g., 18/16-55-69 for 18-gauge body and 16-gauge head).

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

**FOR INFORMATION ONLY**

APPENDIX C  
TYPICAL ASSEMBLY  
DETAIL FOR DOT 6M



FOR INFORMATION ONLY Certificate No. USA/0002/B( )F, Rev.

FBF 2R OR INNER CONTAINER INSPECTION REPORT

Traveler No. 1401 Quantity 1 Page      of     

Customer: THOMAS GRAY & ASSOCIATES Purchase Order No.     

Size of 2R 5 1/4" Pipe or Tubing TUBING Schedule 10 Material C/S

Length 28 3/8" ID 5 1/4" OD 5 3/4" Wall Thickness 1/4" FBF P.O. No. 2698

Threads NPT YES Threads Gauged YES

Inspected By: Don Wayne Date 11/2/95 % of Units Inspected 100%

Bottom Plate Material C/S FBF P.O. No. 2730 Diameter 5 3/4" Thickness 1/4"

Bottom Plate Weld Prep Bevel 37 1/2° Other Criteria FULL PENETRATION WEL

Inspected By: Don Wayne Date 11/2/95 % of Units Inspected 100%

Weld of Plate to Pipe/Tube Inspected in Accordance With 10.2 Rev. 2

Welder ID L Filler Metal FBF P.O. No. 2878 Container IH 27 1/2" OH 28 3/8"

Inspected By: Don Wayne Date 11/2/95 % of Units Inspected 100%

Closure Cap      Plug YES Material C/S Size 5 1/4 x 1" FBF P.O. No. 2873

Threads NPT YES Threads Gauged YES Overall Height With Closure 28 3/8"

LACO With Teflon Sealant or Equivalent Applied to Closure Threads YES

Inspected By: Don Wayne Date 11/2/95 % of Units Inspected 100%

2R Container Label Die Stamped: 1/2 Inch YES 1/4 Inch N/A

"DOT 2R, SIN 2033 "FBF"  "DOT 2R, FISSILE RADIOACTIVE MATERIAL, FBF"

Serial Nos. Required YES Sequence 2033

Inspected By: Don Wayne Date 11/2/95 % of Units Inspected 100%

2R Container Painting:  All Threads Protected  Units Cleaned Per 13.1 Rev. 4

Number of Primer Coats 1-HEAVY Primer Color BROWN

Number of Finish Coats N/A Finish Color N/A Logo N/A

Inspected By: Don Wayne Date 11/2/95 % of Units Inspected 100%

2R Container Air Tested to 60 PSI in Accordance With 11.1 Rev.     

Inspected By:      Date      % of Units Inspected     

Comments:



**FBF NUCLEAR CONTAINERS  
1201 HILTON ROAD  
KNOXVILLE, TN. 37921  
PH. 615/584-1868  
FAX 615/584-4935**

**TO WHOM IT MAY CONCERN:**

**THE ITEMS SUPPLIED HEREIN DO NOT CONTAIN LEAD, CADMIUM, MERCURY OR  
HEXAVALENT CHROMIUM IN EXCESS OF THE 100 PPM REQUIREMENT SET BY  
CONEG.**



**DON WAYNE  
GENERAL MANAGER**

**FBF NUCLEAR CONTAINERS**  
1201 HILTON ROAD  
KNOXVILLE, TN. 37921  
PHONE (615) 584-1868  
FAX (615) 584-4935

**DOT-6M, INNER VESSEL AND INSULATION LOADING PROCEDURE (NOT TO BE  
CONFUSED WITH LOADING CONTENTS INTO INNER VESSEL).**

**PROCEDURE FOR LOADING CONTENTS OF A TYPICAL DOT-6M INTO DRUM.  
CONTENTS MAY VARY SLIGHTLY DEPENDING ON THE TYPE OF 2-R VESSEL AND  
THE SIZE OF THE DRUM.**

**LOAD SOLID CELOTEX RINGS INTO BOTTOM OF DRUM UNTIL AT LEAST  
MINIMUM THICKNESS REQUIRED PER 49 CFR 178.354-3(a),(1) IS ACHIEVED, PER  
CONTAINER SIZE. IF CONTAINER VOLUME IS SUCH THAT A "BEARING PLATE" IS  
REQUIRED, 49 CFR 178.354-3,(e), THE CELOTEX RING CONTAINING THE PLYWOOD  
INSERT MUST BE INSTALLED IN SUCH A MANNER AS THE PLYWOOD IS ON THE  
SIDE AS TO COME IN CONTACT WITH THE INNER VESSEL, I.E., PLYWOOD FACING  
UP ON BOTTOM OF CAVITY AND FACING DOWN ON TOP OF CAVITY.**

**LOAD CELOTEX RINGS WITH CAVITY CUT- OUT INTO DRUM UNTIL A HEIGHT IS  
ACHIEVED ADEQUATE TO SUPPORT THE 2-R VESSEL.**

**LOAD 2-R VESSEL.**

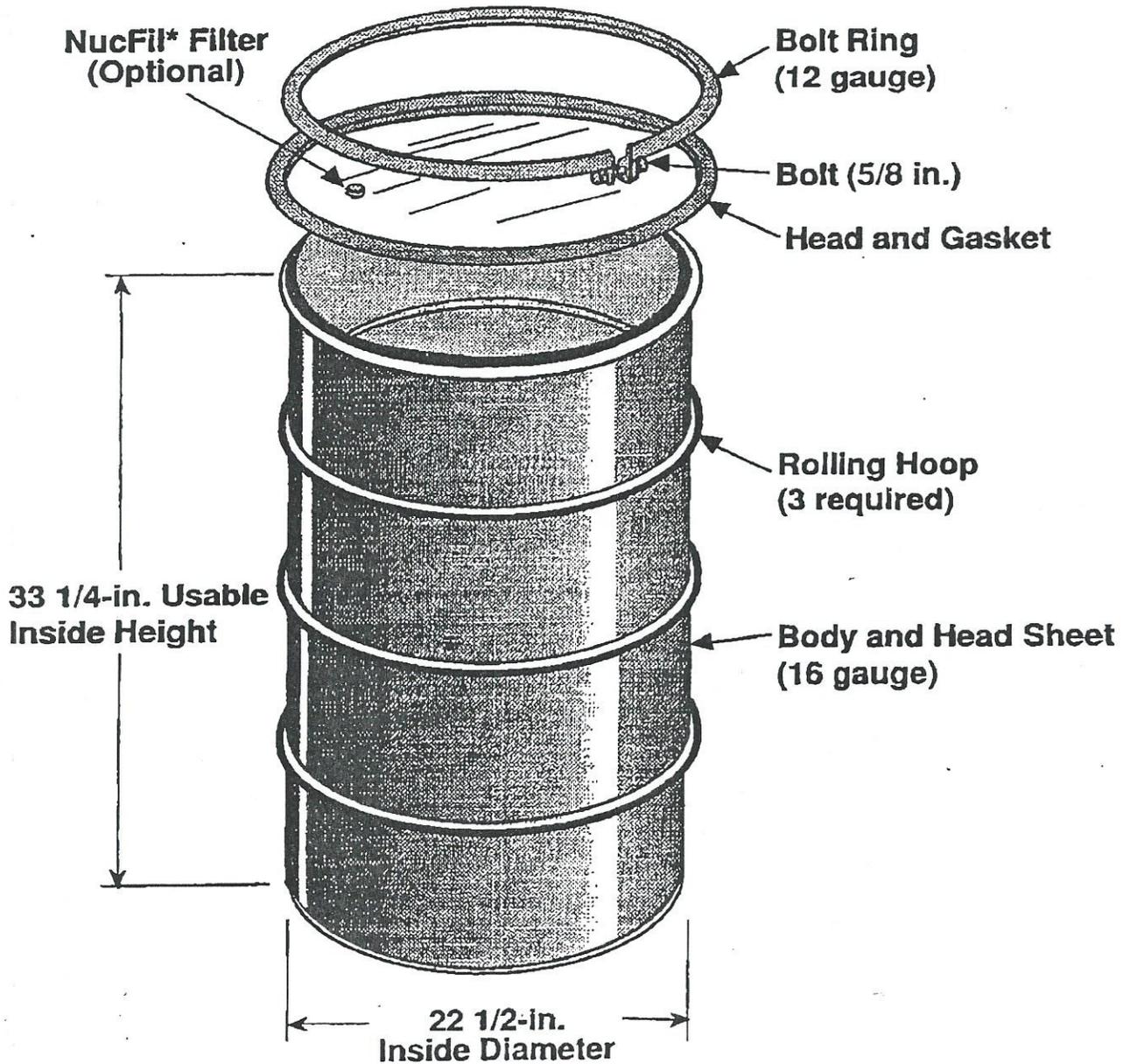
**LOAD REMAINING CELOTEX RINGS WITH CAVITY CUT-OUT WITH  
CONSIDERATION GIVEN TO A SLIGHTLY LARGER CENTER CUT BEING USED AT  
TOP OF CAVITY IF 2-R VESSEL IS FITTED WITH A CAP-TYPE CLOSURE**

**LOAD REMAINING CELOTEX RINGS. THE TOP MOST SHOULD HAVE "FINGER  
HOLES" TO ALLOW FOR REMOVAL TO GAIN ACCESS TO 2-R VESSEL.**

  
DENDAL HOLLOWOMON  
FBF ENGINEERING/Q.A. DIRECTOR

Figure 2-5. DOT-17C 55-Gallon Steel Drum.

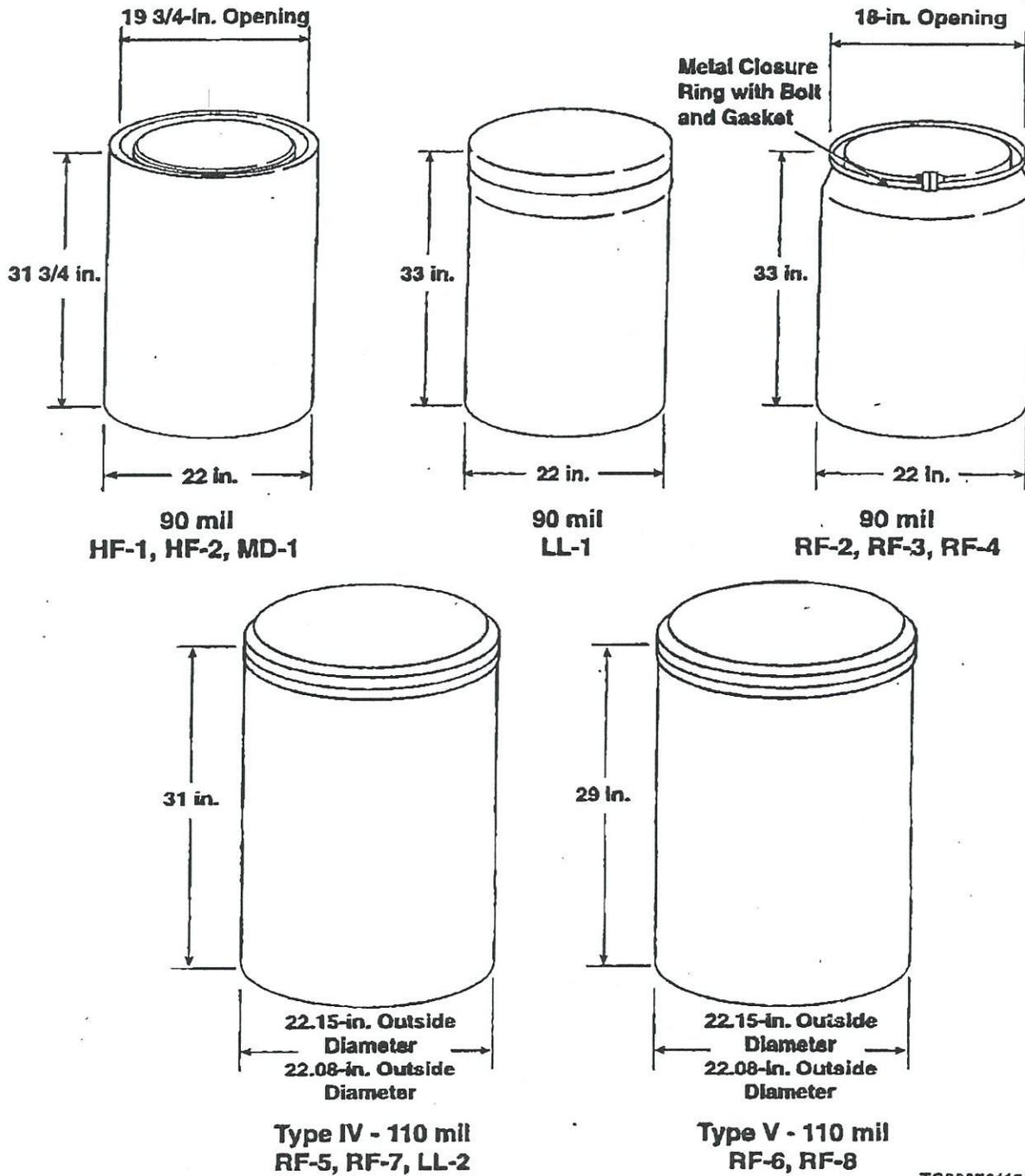
**DOT 7A Type A**  
**49 CFR 178.350**



\*NucFil is a trademark of Nuclear Filter Technology, Incorporated. 39102077.13FH

Figure 2-6. High-Density Polyethylene Liners for Use with DOT-17C 55-Gallon Steel Drums.

**DOT 7A Type A**  
**49 CFR 178.350**



TG96070119.1

2.5 DOT-17C 55-GALLON STEEL DRUM, OPTIONAL PRESSURE RELIEF DEVICE AND/OR HIGH-DENSITY POLYETHYLENE LINER (DOCKETS: MLM; 89-13-7A, 01/90; 90-18-7A, 01/91; 94-37-7A, 08/94)

2.5.1 Package Description

Table 2.5-1. Authorized Configurations. (2 pages)

HF-1	Drum with vent clip, liner, bag and catalyst: a DOT-17C drum with a vent clip, with a 90-mil HDPE liner (vented or nonvented), that encloses a 4-mil polyethylene bag, that encloses the contents.
HF-2	Drum with liner: a DOT-17C (filtered or nonfiltered) drum with an HDPE liner (90-mil body, 110-mil head, vented or nonvented), that encloses the contents.
LL-1	Drum with liner: a DOT-17C (filtered or nonfiltered) drum with an HDPE liner (90-mil body, 110-mil head, vented or nonvented), that encloses the contents.
MD-1	Drum with liner: a DOT-17C (filtered or nonfiltered) drum with an HDPE liner (90-mil body, 110-mil head, vented or nonvented), that encloses the contents.
RF-1	Drum with polyethylene bag: a DOT-17C nonfiltered drum with an optional 4-mil polyethylene bag, that encloses the contents. For Form No. 1 materials, either the bag or sealing the lid gasket to the body seal interface with RTV adhesive is required.
RF-2	Filtered drum, liner with bag: a DOT-17C filtered (NucFil-014*) drum with a 90-mil HDPE liner, that encloses a 4-mil polyethylene bag, that encloses the contents.
RF-3	Drum with liner: a DOT-17C nonfiltered drum with an HDPE liner (90-mil body, 110-mil head, vented or nonvented), that encloses the contents.
RF-4	Filtered drum with vented liner and bag: a DOT-17C filtered (NucFil-014) drum with a vented HDPE 90-mil liner, that encloses a 10-mil plastic bag, that encloses the contents.
RF-5	Filtered drum, closed Type IV liner: a DOT-17C filtered (NucFil-014) drum with a Type IV HDPE 110-mil liner, that encloses a 10-mil plastic bag, that encloses the contents.
RF-6	Filtered drum, PVC bag with Type V liner: a DOT-17C filtered (NucFil-014) drum with a 10-mil plastic drum liner (polyethylene bag), that encloses a PVC glovebox bag, that encloses a Type V HDPE 110-mil liner, that encloses the contents.
RF-7	Filtered drum, vented liner with bag: a DOT-17C filtered (NucFil-014) drum with a vented Type IV HDPE 110-mil liner, that encloses a 10-mil plastic bag, that encloses the contents.

Table 2.5-1. Authorized Configurations. (2 pages)

RF-8	Filtered drum, PVC bag with Type V liner: a DOT-17C filtered (NucFil-014) drum with a 10-mil plastic drum liner (polyethylene bag), that encloses a PVC glovebox bag, that encloses a vented Type V HDPE 110-mil liner, that encloses the contents.
G-1	Filtered drum: a DOT-17C drum with catalyst packet and NucFil filter or vent clip--single packaging. Authorized only for use with Form No. 2 and 3 contents, see Section 2.5.2.1.
G-2	Drum (nonfiltered): a DOT-17C drum (nonfiltered)--single packaging. Authorized only for use with Form No. 2 and 3 contents, see Section 2.5.2.1.
LL-2	Filtered drum, open Type IV liner: a DOT-17C (or UN1A2 built to be equivalent to the DOT-17C) filtered (NucFil-013) drum with a Type IV HDPE 110-mil liner, that encloses a 3.5-mil plastic bag that encloses the contents.

\*NucFil is a trademark of Nuclear Filter Technology, Incorporated.

HDPE = high-density polyethylene.

PVC = polyvinyl chloride.

RTV = room temperature vulcanizing.

Table 2.5-2. Dimensions.

208-Liter (55-gallon) drum	Height		Diameter	
	cm	in.	cm	in.
Interior	84.46	33.25	56.51	22.50
Exterior	88.90	35.00	61.24	24.10

Table 2.5-3. Materials/Method of Construction. (2 pages)

Drums	DOT-17C (or UN1A2 built to be equivalent to the DOT-17C), steel or galvanized steel
Drum lid	Steel with 1.9-cm (0.750-in.) Rieke Bung fitting welded on (required on filtered configurations only)
Drum gasket	Closed cell Neoprene <sup>a</sup> meeting ASTM D1056 grade SCE-45, 30-40 durometer, shore-A Tubular styrene-butadiene Butadiene foam
<b>Pressure relief devices</b>	
Vent Clip	Stainless steel, 304, per Rockwell Hanford drawing H-2-28798
Filter	Nuclear Filter Technology, Incorporated Model NucFil-014 <sup>b</sup> or Model NucFil-013

Table 2.5-3. Materials/Method of Construction. (2 pages)

Liners	
HF-1, HF-2, MD-1	Per RHO-MA-222, Rev. 4 (RHO 1987) Open-head molded polyethylene liner with carbon black Snap-lock closure; use of adhesive bonding optional, but not required Vent hole (if used) is at the center of the head with approximately 1.9-cm (0.750-in.) diameter
LL-1	Open-head molded polyethylene liner without carbon black Vent hole (if used) is at the center of the head with approximately 1.9-cm (0.750-in.) diameter
RF-2, RF-3, RF-4	Per Rocky Flats Plant Standard No. SX-202 Open-head molded polyethylene liner with carbon black Bolted closure ring with gasket Vent hole (if used) is at the center of the head with approximately 1.9-cm (0.750-in.) diameter
RF-5, RF-6, RF-7, RF-8	Open-head, molded, polyethylene (density is 0.946 to 0.953 per ASTM-D-792 [ASTM 1986]) liner with 2.5% black (Type IV) or brown color (Type V) added, minimum 110-mil thick Vent hole (if used) is at the center with approximately 2.54-cm (1-in.) diameter
LL-2	Open-head, molded, polyethylene (density is 0.946 to 0.953 per ASTM-D-792 [ASTM 1986]) liner with 2.5% black (Type IV) added, minimum 110-mil thick. Vent hole is unplugged, and is at the center with approximately 2.54-cm (1-in.) diameter.

<sup>a</sup>Neoprene is a trademark of E. I. duPont de Nemours & Company.

<sup>b</sup>NucFil is a trademark of Nuclear Filter Technology, Incorporated.

ASTM = American Society for Testing and Materials.

### 2.5.2 Authorized Contents

The shipper must determine that the actual contents are closely simulated by the test contents. If they are not, testing/analysis must be conducted and documented to demonstrate DOT-7A compliance with the actual contents.

### 2.5.2.1 Physical Form

**2.5.2.1.1 Solids Only.** Three forms are authorized. Each shipper must determine the most appropriate form for his particular contents and comply with any special requirements.

- Material Form No. 1: Solids--any particle size.
- Material Form No. 2: Solids--large particle size only (e.g., sand, concrete, debris, soil, etc.).
- Material Form No. 3: Solids--objects with no significant dispersible or removable contamination. (For definition, see 49 CFR 173.443, Contamination control.)

### 2.5.2.1.2 Maximum Gross Weight

- Form No. 1 = 408 kg (900 lb)
- Form No. 2 = 454 kg (1,000 lb)
- Form No. 3 = 454 kg (1,000 lb).

**2.5.2.2 Chemical Form.** The shipper must evaluate and ensure chemical compatibility of the material to be shipped with the materials of the packaging in contact with the payload.

**2.5.2.3 Radiological.** The 1.2-m (4-ft) drop test caused deformation of the package resulting in a decrease in the distance from the exterior to the center of the package at the bottom chime of 6.35 cm (2.5) in. (approximate). The shipper must ensure that the radiation level at any surface would not increase by more than 20% (relative to the radiation level of the undamaged configuration) if such a deformation would occur.

### 2.5.3 Restrictions/Specifications

The lid-locking ring bolt shall be tightened to  $54 \pm 5$  Nm ( $40 \pm 4$  ft-lb) torque with tapping of ring during tightening. A jam nut shall also be used to prevent unintentional loosening during transport.

To prevent unintentional loosening, the NucFil filter (if used) shall be:

1. Installed and torqued to 13.6 Nm (10 ft-lb) and tack-welded; or
2. Secured by use of Loctite\* No. 262 (red) and torqued to 13.6 Nm (10 ft-lb); or
3. Torqued to 20.3 Nm (15 ft-lb).

---

\*Loctite is a trademark of Loctite Corporation.

The drum gasket material must have an operating range of  $-40\text{ }^{\circ}\text{C}$  to  $70\text{ }^{\circ}\text{C}$  ( $-40\text{ }^{\circ}\text{F}$  to  $+158\text{ }^{\circ}\text{F}$ ).

If a vented liner is used, a 10-mil (minimum thickness) polyethylene bag must be placed inside the liner to enclose the contents.

If an open Type IV liner is used, a 3.5-mil polyethylene bag may be placed inside the liner to enclose the contents. Any contents that are heavy, sharp objects should be enclosed by a plastic bag (e.g., glovebox bag) that has been enclosed by a secondary plastic bag.

For heavy, bulky materials (e.g., concrete chunks, motors, pumps, etc.), equipment or materials with sharp corners or protrusions, or material/containment geometries that could result in highly localized forces, the shipper must ensure that the contents are securely fastened/positioned within the package.

## 2.5.4 49 CFR 178.350 Regulatory Requirements

Table 2.5-4. Regulatory Compliance Assessment.

Regulatory requirements	Testing/analysis results
49 CFR 173.24, Standard requirements for all packages	Meets applicable requirements. See Appendix A, Table A-1.
49 CFR 173.411, General design requirements	Meets applicable requirements. See Appendix B, Table B-1.
49 CFR 173.412, Additional requirements for Type A packages	Meets applicable requirements. See Appendix C, Table C-1.
49 CFR 173.465, Type A packaging tests Water spray  Free drop  Corner drop Compression  Penetration	Meets applicable requirements.  <u>Pass.</u> This test was conducted and there was no inleakage of water. See Appendix D, Table D-1.a.  <u>Pass.</u> Multiple 4-ft drop tests have been conducted on a number of test units with successful results. The impact orientations included: Top - CG over corner on bolt Top - flat on top Bottom - CG over corner Bottom - flat on bottom Side - flat on bolt. See Appendix D, Tables D-10.a and D-10.b. Not required.  <u>Pass.</u> This test was conducted on a number of test units with successful results. See Appendix D, Table D-24.  <u>Pass.</u> Penetration bar was dropped on a number of test units impacting all potentially vulnerable features with no adverse effects on the packaging. The features impacted included the lid, the filter, the side, and the bottom center. See Appendix D, Table D-31.
49 CFR 178.608, Vibration standards [Applied to demonstrate compliance with 49 CFR 173.412 (e)]	Meets applicable requirements. See Appendix E, Table E-1.



## 2.5.6 Additional Information

Evaluation and testing of configurations HF-1, HF-2, LL-1, MD-1, RF-1, RF-2, and RF-3 took place at MLM and were documented in Edling 1987. Westinghouse Hanford performed testing and evaluation to qualify the vented liner versions of HF-2, LL-1, MD-1 and RF-3 and configuration RF-4 in January 1990 as part of Docket 89-13-7A. Configurations RF-5, RF-6, RF-7 and RF-8 were qualified based on evaluation and extension of test results in January 1991 as part of Docket 90-18-7A. Configuration on LL-2 was vibration and 1.2-m (4-ft) drop tested by Westinghouse Hanford in August 1994 as a part of Docket 94-37-7A. Complete evaluation reports are available upon request from one of the DOT-7A Program technical contacts listed in Section 1.1.2.

### 2.5.6.1 Primary Users

#### Site/Contact/Phone

Rocky Flats  
K. Lenarcic  
COMM/303-966-2377

#### Address

Rocky Flats Plant  
P.O. Box 464  
Golden, CO 80402-0464

Hanford  
T. Romano  
COMM/509-373-0310

Westinghouse Hanford Company  
P.O. Box 1970  
Richland, WA 99352

Lawrence-Livermore National  
Laboratory  
K. Hainebach  
COMM/510-422-4572

Lawrence-Livermore National  
Laboratory  
P.O. Box 808  
Livermore, CA 94550

MLM  
L. Lamsa  
COMM/513-865-4182

EG&G/Mound  
Mound Road  
Miamisburg, OH 45343

### 2.5.6.2 Suppliers

Liners: HF, MD - Meese Incorporated  
1745 Cragmont St.  
Madison, IN 47250  
812-273-1008

RF - K&M Plastic  
1601 Pratt Blvd.  
Elkgrove, IL 60007  
708-439-3311  
Plasti-Drum  
1225 Davies  
Lockport, IL 60441  
815-838-7210  
Russell Stanley Co.  
8 Ritter Ave.  
Woodbridge, NJ 07095  
201-634-6000



# FBF Nuclear Containers

Middlebrook Industrial Park • 1201 Hilton Road  
Knoxville, Tennessee 37921



FBF, INC.  
615/584-1868  
FAX 015/584-4935

TYPE A AND TYPE B CONTAINERS  
LEA AND WASTE CONTAINERS

Nuclear Containers and Casks for:  
Fissile & Radioactive Material  
Reactor Fuel Elements  
Waste Material  
Radioisotopes  
Radioactive Sources

Containers and Casks:  
Overpacks  
Refurbishing & Repair  
Drums  
Z-R Tubes  
Cane Fiberboard Insulation  
Benzoflex Insulation  
Auraflex Insulation  
Vermiculite Insulation  
Plywood Insulation  
DOT & NRC Specification

Lead Products:  
Lead Pits  
Lead Shields  
Lead Z-R Liners  
Lead Brick  
Lead Boxes  
Lead Containers

Polyethylene Containers for:  
Drum Liners (Rigid)  
Low Level Waste  
Leaking Metal Drums  
Polyethylene Drums

## DRUM CLOSURE INSTRUCTIONS

ON CLOSED HEAD DRUMS THE FITTINGS ARE REQUIRED TO HAVE THE GASKETS PROPERLY SEATED ON THE BUNG AND ON THE BUNG FLANGE. THE BUNG HAS TO BE TORQUED TO 15-20 FT. LBS. TO PROVIDE ADEQUATE SEAL ON THE GASKET.

ON OPEN HEAD DRUMS, IF THEY HAVE FITTINGS, THE SAME REQUIREMENTS APPLY. IF FOR ANY REASON IT BECOMES NECESSARY FOR YOUR PERSONNEL TO REMOVE THE COVER OR RING CLOSURE, THEN THE COVER AND COVER GASKET HAVE TO BE POSITIONED ON THE BODY CURL SO THAT AN UNINTERRUPTED SEAL IS ASSURED COMPLETELY AROUND THE FULL AREA OF THE COVER BY THE COVER GASKET. AFTER THE PROPER SEAL IS ACHIEVED BY THE COVER GASKET, THE RING CLOSURE MUST BE PROPERLY SEATED ON THE COVER AND THE OUTER EDGE OF THE BODY CURL SO THE BOLT CAN BE TORQUED TO THE FULL INTEGRITY OF THE RING CLOSURE, NOT TO EXCEED 40 FT. LBS.. THE LOCK NUT MUST BE POSITIONED AGAINST THE NON-THREADED LUG, BETWEEN THE TWO LUGS AND THEN TIGHTENED (IF SO EQUIPPED) AGAINST THE NON-THREADED LUG TO FORM A SECURED LOCK TO PREVENT THE BOLT FROM VIBERATING LOOSE.

THIS INSTRUCTION SHEET MUST BE PROPERLY DISPOSED OF PRIOR TO CLOSING DRUM.

*Dendal Hollomon*  
DENDAL HOLLOMON  
QUALITY ASSURANCE DIRECTOR

SERVING THE NUCLEAR INDUSTRY FOR OVER 38 YEARS  
SEND US YOUR PRINTS FOR QUOTATION

# BASCO

BARREL ACCESSORIES AND SUPPLY COMPANY

Post-It™ brand fax transmittal memo 7671 # of pages 1

To	Bob Currie	From	Jack Cooke
Co.	Astro Container	Co.	BASCO
Dept.		Phone #	
Fax #		Fax #	

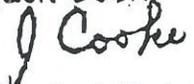
Bob Currie  
 Astro Container Co.  
 P O BOX 62046  
 Evandale OH. 45241

Dear Bob,

The drum gaskets currently manufactured for BASCO out of blends of Styrene - Butadiene Rubbers (SBR), Polyisoprene, and Neoprene will typically operate over the following recommended temperature ranges based on the principal polymers utilized:

	SBR	Neoprene	Polyisoprene
Upper Limit Continual Service	194 F	203 F	185 F
Lower Limit Continual Service	-40 F	-40 F	-60 F

Exact testing to determine upper operating limits on each one of our compounds has never been done. Higher temperature requirements compounds can be compounded if the need exists.

Sincerely,  
 Jack Cooke  
  
 Product Specialist

HARRIS/WELCO | 1051 YORK ROAD | KINGS MOUNTAIN, NC 28086-0069

Products for the Welding Industry

Certificate of Compliance

Nov 2, 1995

Attention: EDDIE  
Company Name: A-WELDERS  
Fax No: (423) 522-8414  
P.O. No:  
FROM: HOLLY

Quantity:  
0#

size: 1/8 X 36  
Heat/Lot No: 13209-T2

CHEMICAL COMPOSITION LIMITS

Alloy: 70S6  
Spec: AWS A5.18 ER70S6  
AMSE SFA 5.18

CARBON .07 - .15  
MANGANESE 1.40 - 1.85  
SULFUR .035  
NICKEL  
COLUMBIUM  
NB + TA  
COPPER  
COBALT  
IRON  
ALUMINUM  
LEAD  
BERYLLIUM  
ZIRCONIUM  
THORIA  
OXYGEN  
HYDROGEN  
STRONTIUM  
CADMIUM  
LITHIUM

SILICON .80 - 1.15  
PHOSPHORUS .025  
CHROMIUM  
MOLYBDENUM  
TANTALUM  
TITANIUM  
NITROGEN  
MAGNESIUM  
ZINC  
TIN  
SILVER  
VANADIUM  
TUNGSTEN  
BORON  
BISMUTH  
ANTIMONY  
ARSENIC  
REMAINDER  
OTHER

Single values are maximum unless otherwise specified.

We certify that the items and/or materials listed above  
in accordance with all applicable purchase specifications  
having passed our inspections as noted.

*Holly Arnold*  
Certification Clerk

7-A385-01

# Gulf States Steel, Inc.

GADSDEN, AL 35904-1935

GSS ORDER NO. NUMBER 37211			ITEM 05			MFG 742			PURCHASE ORDER DATE 10 27 94			ACCOUNT NUMBER 56755010			PAGE NO. 1			INVOICE NUMBER 742-22555		
CHANGE ORDER NO. -17664						SHIPPED FROM ALA CITY						DATE SHIPPED 11 14 94			ROUTE/VEHICLE IDENTIFICATION OSBORN TRNP					

## CERTIFICATE OF TESTS

WE HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE GOVERNING SPECIFICATIONS AND BASED ON THE RESULTS OF SUCH INSPECTION AND TESTING HAS BEEN APPROVED FOR CONFORMANCE WITH THE SPECIFICATIONS.

C.F. BEARDEN, JR.  
MGR. TECHNOLOGY AND  
QUALITY - PLATE PRODUCTS

(\*SHIP TO" SAME AS "GOLD TO" UNLESS OTHERWISE INDICATED)

MATERIAL DESCRIPTION ATF CARBON ASME SA-36 DTD 07 01 92 ASTM A-36-93A MELTED & MFG IN USA TEST ID: 0435501													QUANTITY SHIPPED 45738				
.0000 X 96.0000 SHEARED EDGE X 240.0000 IN ITEM 7434079 5 PCS ITEM 7440721 2 PCS																	
H C 25MX MN 80/1.20 P 040MX S 050MX SI 40MX CU RPT NI RPT CR RPT MO RPT CB RPT V RPT AL RPT																	
R YLD 36000 MIN TEN 58/80000 %ELONG MIN 2 IN 23 DR 8 IN 20																	
I 1 TR PO BOX 50128 KNOXVILLE TN 37950 ATTN B TAYLOR 1 W/SHPMNT																	
TOTAL WT. 45.738# PCS 7																	

HEAT NUMBER	GRAIN	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Cb	V	Al	N	B	Ca	Ti
40721		.25	1.10	.006	.016	.054	0.04	0.03	0.03	.03	.003	.002	.001				

HEAT NUMBER	TEST OR PIECE IDENTITY NO.	YIELD KSI	TENSILE KSI	% ELONG		HARDNESS	BEND TEST	HEAT TREAT	YS/TS RATIO	% RED. AREA	GALV COATING	DROP WEIGHT TEAR TESTS					
				2"	8"							DIR	TEMP °F	1	2	AVG	
4079	X396402	42.0	70.0					AR	.60								
4079	X838102	38.0	72.0					AR	.52								
0721	W877601	42.0	73.0					AR	.57								
0721	W877602	40.0	73.0					AR	.54								

HEAT NUMBER	TEST OR PIECE IDENTITY NO.	HEAT TREAT	SIZE	DIR	TEMP °F	ENERGY				% SHEAR				MILS LATERAL EXPANSION				
						1	2	3	AVG	1	2	3	AVG	1	2	3	AVG	

1" CLOSURE PLUG

# COPPERWELD

SHELBY DIVISION

SHELBY, OHIO 44875-1471

Telephone 419/342-1200

TELEX: 402048 FAX: 419/342-1473

MATERIAL TEST REPORT

SHELBY ORDER

020062

CUSTOMER ORDER

WILLIAMS & CO INC  
901 PENNSYLVANIA AVE  
PITTSBURGH PA 15233  
ATTN: JIM DUPIN

SPECIFICATION

ASTM A513 L REV  
01 103

325269959001

FAX: (614) 439-2195

SIZE (O.D. & WALL) 1026 5.750 X .250	QUANTITY	PART NO.	SHIPPED	DATE 10/10/
--	----------	----------	---------	----------------

CONDITION UNANNEALED 50003136

HEAT NO.	CHEMICAL ANALYSIS													OTHER
	C	MN	P	S	SI	NI	CR	MO	CU	V	AL	OTHER		
942554	.24	.67	.008	.004	.010	.010	.030	.010	.010				.044	N. .0060

HEAT NO.	LOAD NO.	YIELD PSI	TENSILE PSI	ELONG. & RED. AREA		HARDNESS		IMPACT FT. LB.	MAGNIFIED
				%	%	HR	ROCKWELL		

HEAT NO.	JOINT HARDENABILITY EXPERIENCE IN TYPICAL SERVICE															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

HEAT NO.	WATER RATING				BLACK OXIDE RATING			
	A	B	C	D	A	B	C	D

5/4" TUBE

INSPECTION

5/4" TUBE

THIS TEST REPORT NOTARIZED WHEN REQUIRED SWORN AND SUBSCRIBED BEFORE ME

THIS DAY OF

Wallace E. McDougall

WALLACE E. MCDUGALL, Magistrate

MATERIAL PRODUCED TO THE SPECIFICATION(S) SHOWN ABOVE, NO ADDITIONAL SPECIFICATION(S) IS IMPLIED OR WARRANTED.

# Gulf States Steel, Inc.

GADSDEN, AL 36004-1035

32-C798-01

ORDER NO.	38105	ITEM	01	MFG	742
PURCHASE ORDER DATE				01 06 95	
PURCHASE ORDER NO.			SHIPPED FROM		
K-23869			ALA CITY		

## CERTIFICATE OF TESTS

ACCOUNT NUMBER	PAGE NO.	INVOICE NUMBER
56799010	1	742-608
DATE SHIPPED	ROUTE/VEHICLE IDENTIFICATION	
01 14 95	OSBORN TRMP	

WE HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE GOVERNING SPECIFICATIONS AND BASED ON THE RESULTS OF SUCH INSPECTION AND TESTING HAS BEEN APPROVED FOR CONFORMANCE WITH THE SPECIFICATIONS.

C. F. BEARDEN, JR.  
MGR. TECHNOLOGY AND  
QUALITY - PLATE PRODUCTS

### MATERIAL DESCRIPTION

PLATE CARBON ASTM A-36-93A ASME SA-36 DTD 07/01/92 MELTED & MFG IN USA  
CUST ID: 0412201

QUANTITY SHIPPED

2500 X 96.0000 SHEARED EDGE X 240.0000 IN  
WT 7441811 6 PCS

9804

CH C 25MX MN RPT P 040MX S 050MX SI 40MX CU RPT NI RPT CR RPT MO RPT CB RPT U RPT AL RPT  
MR YLD 36000 MIN TEN 58/80000 %ELONG MIN 2 IN 23 OR 8 IN 20  
TI 1 TR PD BOX 50128 KNOXVILLE TN 37930 ATTN B TAYLOR 1 W/SHIPMENT

TOTAL WT. 9,804# PCS 6

HEAT NUMBER	GRAIN	C	Mn	P	S	SI	Cu	NI	Cr	Mo	Cb	V	Al	N	B	Ca	Ti
441811		.15	0.96	.011	.015	.055	0.05	0.03	0.05	.02	.000	.000	.001				

HEAT NUMBER	TEST OR PIECE IDENTITY NO.	YIELD KSI	TENSILE KSI	% ELONG		HARDNESS	BEND TEST	HEAT TREAT	YS/TS RATIO	% RED. AREA	GALV COATING	DROP WEIGHT TESTS		TEAR TESTS	
				2"	8"							DIR	TEMP °F	1	2
441811	M161401	48.0	66.0					AR	.72						
441811	M161402	46.0	66.0					AR	.69						

HEAT NUMBER	TEST OR PIECE IDENTITY NO.	HEAT TREAT	SIZE	DIR	TEMP °F	ENERGY				% SHEAR				MILS LATERAL EXPANSION			
						1	2	3	AVG	1	2	3	AVG	1	2	3	
			1/4"														

1/4" BOTTOM PLATE

LAST PAGE

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