

201265

13124-P

RSPA-02-13421-13

**tyco**

**Specialty Products**

H Broeckel  
600 N Broad Street  
Phillipsburg, NJ 08865 USA  
908-859-2151 X9868 (phone), 908-859-6921 (fax)  
harold.broeckel@mkg.com (e-mail)

**Mallinckrodt Baker**

**Date:** 9/17/02  
**Company:** RSPA  
**Attention:** Sherrie Nelson  
**Fax No.:** 202-366-3308  
**Subject:** Request for exemption  
**No. of Pages:** 29  
*(Including this page)*

DEPT. OF TRANSPORTATION  
02 NOV -7 PM 3:46

**MESSAGE:**

**Sherrie:** new exemption request (see attached).

*I discussed this request with Sandra Curetan & Ryan Posten.*

*There are 3 types of documents in the attachments:*

- Exemption request (2 pages)
- Snyder (SII) UN package report (4 pages)
- Entegris UN package report (authored by Ten-E labs); (22pages)

# Interoffice Memorandum

**tyco**

**Specialty Products**

**Mallinckrodt Baker**

**Mallinckrodt Baker, Inc.**  
222 Red School Lane  
Phillipsburg, NJ 08065

Tel: 908-859-2151 X9668  
Fax: 908-859-6921

Date: 9117102  
To: Associate Administrator for Hazardous Materials Safety  
Research and **Special** Programs Administration  
U.S. Dept. of Transportation  
400 7<sup>th</sup> Street SW  
Washington, DC 20590-0001  
Att: Exemption, DMH-31

Mallinckrodt Baker, Inc. would like to request an exemption to allow the continue shipment of ammonia solutions (UN2672) in appropriate intermediate bulk containers.

**Specifically, these** are 2 separate IBC's. One design type manufactured by Snyder Industries, Lincoln Nebraska **and** one manufactured by Entegris Inc, Chaska, Minnesota.

These IBC's have been used for over 6 years **and** have been successfully used to ship ammonia solutions. HM215-D restricts the use of IBC's for high vapor pressure liquids. Prior to this docket ammonia solutions (UN2672) were authorized for shipment in IBC's under 173.241(d)(A).

I understand this liquid was inadvertently overlooked when the above mentioned docket was issued and RSPA is busy changing the regulation to allow for an exception to this restriction. Compliance with this new restriction is required as of October 1, 2002.

After speaking with the exemptions/ approval group (both Ryan Posten & Sandra Curetan) it was recommended Mallinckrodt Baker, Inc. apply **for** an exemption.

As set forth in 49CFR 107.105 **Application for** Exemption, I submit the following information:

## 107.105(a)(2)

Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865  
[Harold.Broeckel@TycoHealthcare.com](mailto:Harold.Broeckel@TycoHealthcare.com)  
908-859-2151 x9668  
908-859-6921 (fax)

107.105(c)(1)

172.101 Ammonia solutions (UN2672), column 7 (special provision), IB3.  
Was authorized under 173.241(d)(A)

107.105(c)(2)

Mode of transportation: Highway.

107.105(c)(3)

A detailed description of the proposed exemption is found in the letter above.

107.105(c)(4)

Duration: until the regulations can be **changed** to once **again** permit the shipment of ammonia solutions (UN2672) in **IBC's**.

107.105(c)(5)

Mallinckrodt Baker, Inc. is seeking relief from the existing regulations considering ammonia solutions (UN2672) have been shipped safely **in IBC's** for over 6 years without incident. In speaking with Ryan Posten he indicated this **was** overlooked during the writing of **HM-215D** and it's being rectified. Unfortunately, this change will not be implemented soon enough so an exemption will be necessary until the change is implemented within the regulations.

107.105(c)(7)

Regulated material: Ammonia solutions, UN2672

107.105(c)(8)

A copy of the 3<sup>rd</sup> party certifications for these 2 vessels/ **IBC's** is attached. In addition to the larger versions of these vessels there are also smaller versions, Size ranges **are** as follows:

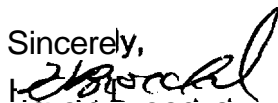
Snyder: 330gl (1249L) / 275gl (1041L) / 220gl (833L)

Entegris: 311gl (1080L) / 204gl (773L) / 126gl (480L)

All of the smaller versions are the same design as the 330gl tested **design** with the exception of a lesser height. 49CFR 178.801(c)(7)(iii) allows for this approval of smaller versions.

Mallinckrodt Baker, Inc., thanks you in advance, for your prompt attention to this exemption request.

Sincerely,



Senior Packaging Engineer

**D.O.T. TEST REPORT #02082701**

**DATED 8/27/02**

**DESIGN RE-QUALIFICATION**

**S.I.T.ULTRA-H.D. IBC (HEAVIER WEIGHT TANK) WITH 1 EACH 6" H.D. CAP AND 2 EACH 2" REPLACEABLE BUNGS WITH FILLNECK ISOLATION REMOVED, OR 3 EACH 2" REPLACEABLE BUNGS, OR 2 EACH REPLACEABLE BUNGS. WITH FILLNECK ISOLATION REMOVED. TANKS MOLDED WITH STANDARD DOGHOUSE AND 2" NPT DRILLED AND TAPPED TUBULATION FOR BOTTOM DRAIN VALVE OR WITH NO BOTTOM DRAIN VALVE TUBULATION OR DOGHOUSE.**

**PREVIOUS TEST REPORTS FOR THIS PRODUCT:**

**ORIGINAL DESIGN QUALIFICATION W/ISOLATED NECK - REPORT #95063001  
ANNUAL RE-QUALIFICATIONS W/ISOLATED NECK - REPORT # 96072502,  
AND REPORT # 97071702. DESIGN QUALIFICATION WITHOUT ISOLATED  
NECK - REPORT #97082701  
ANNUAL RE-QUALIFICATION REPORT #'s - 98082701 – 99082701 – 00082701 –  
01082701 - 02082701**

**PART NUMBERS OF CURRENT CONTAINERS COVERED BY THIS TEST REPORT:**

**66945, 67645, 67695, 67745, 67795, 67845, 67895, 68845, 68895, 68945, 68995, 69045,  
69095, 69445, 69495, 69545, 69595, 69645, 69645**

**D.O.T. TEST REPORT #02082701**  
**DATED 8/27/02**  
**DESIGN RE-QUALIFICATION**

**PREPARED BY: B.J.S.**

**GENERAL DESCRIPTION: S.I.I. 330 ULTRA H.D., STANDARD UNIT WITH DOG HOUSE STYLE BOTTOM DRAIN, WITH A ROTO MOLDED, LINEAR POLYETHYLENE STACKING FRAME AND STAINLESS STEEL TOP LIFT ASSEMBLES, TESTED TO CERTIFY BOTH THE TESTED VERSION AS WELL AS THE NO DOG MOUSE, DOMED BOTTOM STYLE AND THE 3 BUNG, NO FILL NECK STYLE.**

**TYPE OF I.B.C.: 31H1.**

**CONTAINER: ROTATIONALLY MOLDED FROM LINEAR POLYETHYLENE (EXXON TYPE LL 8661,942 DENSITY).**

**CONTAINER MINIMUM WALL THICKNESS: 0.200"**

**CONTAINER DIMENSIONS: 46" WIDE X 46" LONG X 70" TALL,**

**RATED CAPACITY:**

**DOG HOUSE, BOTTOM DRAIN VERSION: 330 GALLONS,  
NO BOTTOM DRAIN, DOMED BOTTOM VERSION: 330 GALLONS**

**NOMINAL OVERFLOW CAPACITY:**

**DOG HOUSE, BOTTOM DRAIN VERSION: 338.5 GALLONS .  
NO BOTTOM DRAIN, DOMED BOTTOM VERSION: 346 GALLONS.**

**TEST TANK CLOSURES :**

**INJECTION MOLDED, POLYETHYLENE, 6" CAP WITH 2" NPS CENTER AND A VITON GASKET.**

**INJECTION MOLDED, GLASS FILLED POLYPROPYLENE, 2" REPLACEABLE BUNGS.**

**OTHER TESTED CLOSURES:**

**INJECTION MOLDED POLYETHYLENE, 6" BLANK CAP.**

**EPDM GASKETS FOR GEM CAPS, BUNG PLUGS AND S.I.I. VACUUM VENTS.**

**EPDM O-RING SEALS FOR REPLACEABLE BUNGS.**

**TEST TANK SERVICE EQUIPMENT: INJECTION MOLDED, POLYETHYLENE, BUNG PLUGS. INJECTION MOLDED, POLYETHYLENE, S.I.I. VACUUM RELIEF VENTS, BOTH THE VITON AND THE EPDM TYPES.**

**INJECTION MOLDED, GLASS FILLED POLYPROPYLENE, 2" BOTTOM DRAIN VALVE.**

**NAME AND ADDRESS OF COMPANY SUPPLYING CERTIFICATION:**

**D.O.T. TEST REPORT #02082701**  
**DATED 8/27/02**  
**DESIGN RE-QUALIFICATION**

SNYDER INDUSTRIES, INC.  
4700 FREMONT STREET  
LINCOLN, NE 68504  
(402) 467-5221

**NAME AND ADDRESS OF MANUFACTURER:**

SNYDER INDUSTRIES, INC.  
4700 FREMONT STREET  
LINCOLN, NE 68504  
(402) 467-5221

**TEST RESULTS ;**

**VIBRATION:**

CONTAINER, S/N 0205364949 WAS LOADED WITH WATER AND SAND TO APPROXIMATE A SPECIFIC GRAVITY OF 1.90, A MINIMUM GROSS MASS OF 5660 LBS. THE CONTAINER WAS SHIPPED TO:

SIGNODE PACKAGING SYSTEMS  
3640 WEST LAKE AVENUE  
GLENVIEW, ILL 60025

ATTN: MR. MICHAEL FREEMAN, PACKAGING RESEARCH ENGINEER

THE CONTAINER WAS TESTED IN ACCORDANCE WITH C.F.R. 49, PART 178.819, PER THE SIGNODE TEST REPORT DATED 06/28/2002, THE CONTAINER PASSED THE VIBRATION TEST ON, 06/28/02

**BOTTOM LIFT: 28**

THIS TEST WAS PERFORMED BY BEN STAHL OF SNYDER INDUSTRIES, AT ADDRESS CITED ABOVE, IN ACCORDANCE WITH CFR 49, PART 178.811. THE TEST WEIGHT, 1.25 TIMES THE CONTAINER'S MINIMUM GROSS MASS, 5660 LBS. - 7075 LBS., WAS ACHIEVED BY ADDING ADDITIONAL LADING TO THE CONTAINER, S/N 0205364949. PASSED, 07/17/02.

**TOP LIFT:** THIS TEST WAS PERFORMED BY BEN STAHL OF SNYDER INDUSTRIES, AT ADDRESS CITED ABOVE, IN ACCORDANCE WITH CFR 49, PART 178.812. THE TEST WEIGHT WAS ACHIEVED BY ADDING STEEL LADING. TOTAL TEST WEIGHT OF CONTAINER, S/N 0202364949, WAS 2.0 TIMES THE MINIMUM GROSS MASS OF 5660 LBS. = 11320 LBS. TEST PASSED, 07/17/01

**STACKING:**

THIS TEST WAS PERFORMED BY BEN STAHL OF SNYDER INDUSTRIES, AT ADDRESS CITED ABOVE, IN ACCORDANCE WITH, C.P.R. 49, PART 178.811, IN A HEATED STACK ROOM FACILITY WITH A TEMPERATURE SETTING OF 104 DEGREES F. TEST TANK, S/N 0205364949, THE BOTTOM TANK IN THE STACK, WAS WEIGHTED TO 1.9 SPGR. BY ADDING SAND AND WATER TO ATTAIN A MINIMUM

**D.O.T. TEST REPORT #02082701**  
**DATED 8/27/02**  
**DESIGN RE-QUALIFICATION**

GROSS MASS OF 5660 LBS.. TWO ADDITIONAL LIKE CONTAINERS, WEIGHTED TO A COMBINED TOTAL WEIGHT OF 1.3 TIMES 5660 LBS. = 10,188 LBS., WERE STACKED ON TOP OF THE TEST TANK FOR A PERIOD OF 28 DAYS . TEST PASSED, 08/14/02.

**LEAKPROOFNESS:**

THIS TEST WAS PERFORMED BY BEN STAHL OF SNYDER INDUSTRIES, AT ADDRESS CITED ABOVE, IN ACCORDANCE WITH, C.F.R. 49, PART 178.813. AIR PRESSURE OF 3 PSIG. WAS APPLIED TO CONTAINER, S/N 0205364949 FOR A MINIMUM OF 3 MINUTES. TEST PASSED, 08/15/02.

**HYDROSTATIC PRESSURE:**

THIS TEST WAS PERFORMED BY BEN STAHL OF SNYDER INDUSTRIES, AT ADDRESS CITED ABOVE, IN ACCORDANCE WITH CFR 49, PART 178.814. CONTAINER, S/N 0205364949, WAS FILLED WITH WATER AND A HYDROSTATIC PRESSURE OF 62.0 PSIG. (428 KPA.), WAS APPLIED FOR A MINIMUM OF 10 MINUTES. PASSED, 08/15/02.

**DROP TEST:**

THIS TEST WAS PERFORMED BY BEN STAHL OF SNYDER INDUSTRIES, AT ADDRESS CITED ABOVE, IN ACCORDANCE WITH CFR 49, PART 178.810, TEST CONTAINER, S/N 0206366225, WAS FILLED WITH WINDSHIELD WASHER FLUID AND CONDITIONED TO 0 DEGREES F., THEN DROP TESTED FROM A HEIGHT THAT WAS DETERMINED BY THE FOLLOWING METHOD:

WATER, SPGR. = 1.0

WINDSHIELD WASHER FLUID, SPGR. = 0.945

TEST CONTAINER, RATED SPGR. = 1.90

CFR 49, PART 178.810, DROP HEIGHT FORMULA = 1.9 TIMES 1m. (3.3') = 6.27' (WATER FILLED).

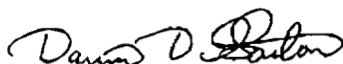
SPGR PERCENTAGE DIFFERENCE BETWEEN WATER AND WINDSHIELD WASHER FLUID = 1.0582

DROP HEIGHT FOR TEST CONTAINER (WINDSHIELD WASHER FLUID FILLED) = 6.27' TIMES 1.0582 = 6.6349' = 6' 8"

TEST PASSED, 08/23/02.

I HEREBY CERTIFY THAT THE TESTS AND RESULTS CITED ABOVE, ARE TRUE AND ACCURATE. QUESTIONS REGARDING THE ABOVE TEST INFORMATION, SHOULD BE DIRECTED TO DARWIN GARTON.

SIGNED



DARWIN GARTON  
DESIGN ENGINEER



**DOT / UNITED NATIONS  
PERFORMANCE CERTIFICATION  
DESIGN QUALIFICATION**

**IBC CODE DESIGNATION: 31HH1  
FLUOROWARE  
1180 Litre PEHP IBC**

**REPORT #: 13482**

**UN CERTIFICATION NUMBER  
+AA1296**

**FLUOROWARE, INC.  
102 Jonathan Blvd. North  
Chaska, MN 55318**

**ATTN: Keith Gossen  
Barry Rauworth**

**March 15, 1995**





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**OBJECTIVE**

To certify the **FLUOROWARE 1180 Litre PEHP Composite Plastic IBC** to the performance requirements outlined in:

- Department of Transportation, Research & Special Programs Administration's Docket HM-181E Final Rule issued July 26, 1994; Subpart O
- Chapter 16 of the **United Nations Recommendations on the Transport of Dangerous Goods**; Eighth Revised Edition; Chapter 16; 16.5

PACKAGING CODE DESIGNATION	PACKING GROUP	SPECIFIC GRADES	TESTED PRESSURE
31H11 - Composite IBC with a Rigid Plastic Inner Receptacle, for Liquids	II Medium Danger Hazardous Materials	Not Exceeding 1.2	300 kPa

This package is also certified for shipment under the following International Regulatory Code. However, it is the responsibility of the end user to determine package authorization for use under this regulation:

- International Maritime Organization (IMO), International Maritime Dangerous Goods Code (IMDG), Amendment 27-95; Section 26.

**TEST SEQUENCE FOR CERTIFICATION TO UN 31H11 REQUIREMENTS**

The IBC design was subjected to the tests in the order presented below:

- Vibration Test
- Bottom Lift Test
- Leakproofness Test
- Hydrostatic Pressure Test\*
- Drop Tests\*

**Notes:**

- This IBC design is not intended to be lifted from the top
- This IBC design is not intended to be stacked when filled with product
- Another IBC sample of the same design type was used for the Drop Test
- In addition to the required test sample, Fluoroware submitted a second sample for the Internal Hydrostatic Pressure test and the Drop test (refer to Fluoroware's report #264-201-03 for specific information concerning the two samples)
- Samples were manufactured at an ISO certified location (Fluoroware, Inc. #: ISO 93/1736)

**TEST SAMPLE DESCRIPTION**

1180 LITRE COMPOSITE DRUM INSERT

**SHIPPING PLUG(S)**

**DESCRIPTION:**  
 2" Plastic Shipping Plug with 3/4" Center Plug to Thread into Drum Insert. (2 per container)

**MATERIAL:**  
 Polyethylene

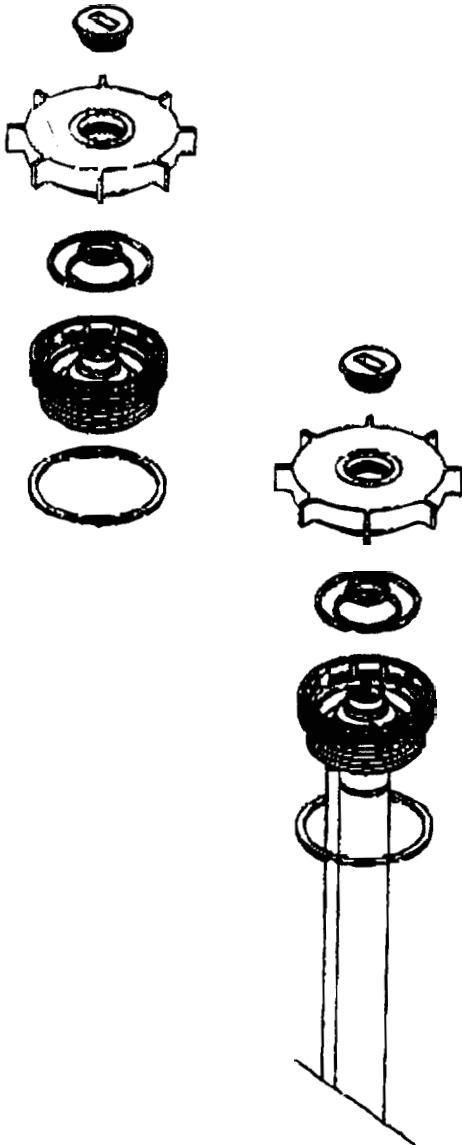
**SEAL MATERIAL:**  
 Radial Seal O-Ring

**APPLICATION TORQUE:**  
 Hand Tight

**OVERALL DIMENSIONS:**

- Height: Not Specified
- Diameter: Not Specified

**MANUFACTURER ID:**  
 153-266-XX



**DRUM INSERT(S)**

**DESCRIPTION:**  
 Drum Insert to Thread into 2" Buttress Opening (2 per container)

**MATERIAL:** \*

- Option #1: Teflon (PFA)
- Option #2: Polyethylene

**SEAL MATERIAL:**  
 230 Viton O-Ring or Equivalent

**APPLICATION TORQUE:**

- Teflon (PFA): 20 Ft.-Lbs.
- Polyethylene: 15 Ft.-Lbs.

**OVERALL DIMENSIONS:**

- Height: Not Specified
- Diameter: Not Specified

**MANUFACTURER ID:**  
 Fluoroware (DIT & DIP)

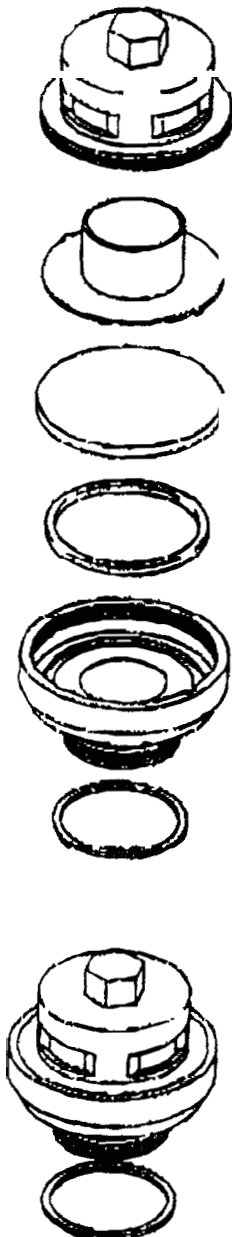
\*NOTE: The tested design contained (1) Teflon Drum Insert and (1) Polyethylene Drum Insert

**TEST SAMPLE DESCRIPTION**

**1180 LITRE COMPOSITE IBC WITH PE LINER**

**PRESSURE RELIEF DEVICE OPTION #1**

**OPTION #1**



**OPTION #2**



**DESCRIPTION:** Rupture Disk Housing to Thread into one of the Outside 2" Buttress Openings in Liner

**MATERIAL:**  
 Lower Housing: Polyethylene  
 Upper Housing: Polyethylene

**SEAL MATERIAL:** Viton Gasket or Equivalent

**APPLICATION TORQUE:** 15 Ft.-Lbs.

**RELIEF/RUPTURE PRESSURE:** 36-43 psi

**OVERALL DIMENSIONS:**  
 • Height: Not Specified  
 • Diameter: Not Specified

**MANUFACTURER ID:**  
 Fluoroware Drawing #: 605-427B (1322-062)

**PRESSURE RELIEF DEVICE OPTION #2**

**DESCRIPTION:** Pressure Relief Valve to Thread into a 3/4" Pipe Thread Opening of a 2" Buttress Threaded Closure.

**MATERIAL:** Teflon/Pock

**SEAL MATERIAL:** Viton Gasket

**APPLICATION TORQUE:** Not Specified.

**RELIEF/RUPTURE PRESSURE:** 40 psi

**OVERALL DIMENSIONS:** Not Specified

**MANUFACTURER ID:** Not Specified

**CLOSURE**

**DESCRIPTION:** 2" Buttress Closure with 3/4" center opening is used with Pressure Relief Device Option #2.

**MATERIAL:** Polyethylene

**SEAL MATERIAL:** Viton Gasket or Equivalent

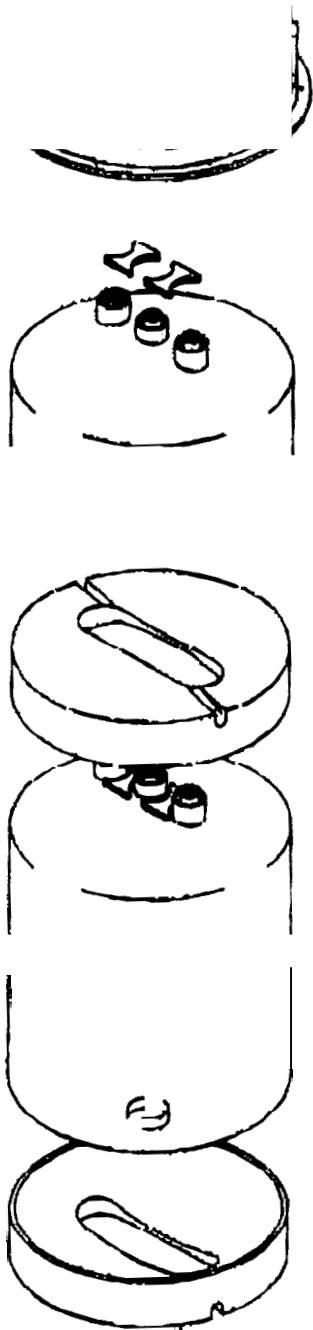
**APPLICATION TORQUE:** 15 Ft.-Lbs.

**OVERALL DIMENSIONS:** Not Specified

**MANUFACTURER ID:** Fluoroware

**TEST SAMPLE DESCRIPTION**

1120 LITRE COMPOSITE IRC WITH PE LINED



**FLANGES**

**DESCRIPTION:**  
 Grommet Flanges Placed in Overpack Openings

**MATERIAL:**  
 Viton - Black

**NUMBER PER CONTAINER:**  
 (3) Grommets per container. One per opening

**MANUFACTURER ID:**  
 1330-010

**TOP SPACER PADS**

**DESCRIPTION:**  
 Small Polyethylene Pads Placed on Top of Liner and Between Neck Openings

**MATERIAL:**  
 Polyethylene - Natural

**NUMBER PER CONTAINER:**  
 (2) Pads per container

**MANUFACTURER ID:**  
 Not Specified

**TOP & BOTTOM SHOCK PADS**

**DESCRIPTION:**  
 Plastic Molded Shock Absorbing Cushions placed between the liner and the overpack.

**MATERIAL:**

- Top Pad: Polyethylene - Natural
- Bottom Pad: Cross-Linked Polyethylene

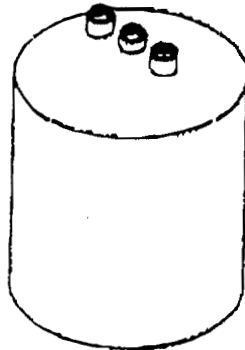
**NUMBER PER CONTAINER:**  
 4 (1) Cushion Placed on Top  
 • (1) Cushion Placed on Bottom

**MANUFACTURER ID:**  
 Not Specified

**TEST SAMPLE DESCRIPTION**

**1180 LITRE COMPOSITE IBC WITH PE LINER**

**LINER**



**DESCRIPTION:**  
 Rotationally Molding Rigid Plastic Liner with (3) 2" Threaded Openings

**MATERIAL:** Polyethylene

**PIGMENT:** Natural

**WALL THICKNESS:** .530" (Nominal)

**NOMINAL CAPACITY:**  
 1180 Litres (311.8 Gallons)

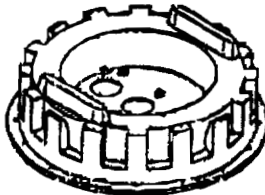
**OPENINGS:**  
 (3) 2" Buttress Threaded Openings in Top of Liner

**OVERALL DIMENSIONS:**

- Diameter: 41.50"
- Height: 70.25"

**MANUFACTURER ID:**  
 RM1200P-HP

**OVERPACK SHELL**



**DESCRIPTION:**  
 Two-piece Rotationally Molding Rigid Plastic Overpack to Contain Plastic Liner

**MATERIAL:** Linear Polyethylene

**PIGMENT:** Blue

**WALL THICKNESS:** .200" - .375"

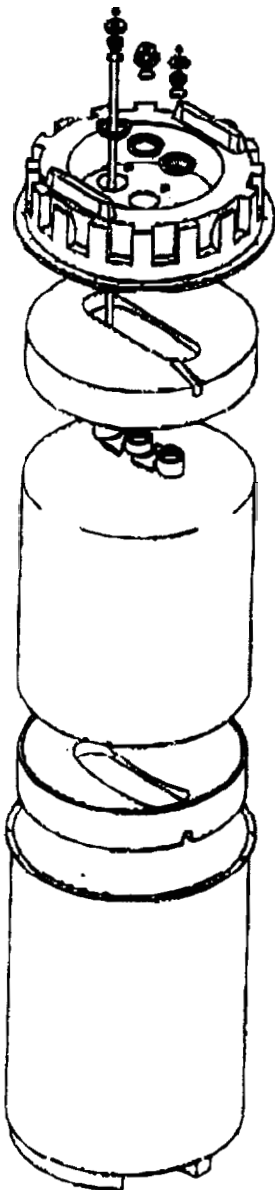
**OVERALL DIMENSIONS:**

- Height: 83"
- Diameter: 46"

**TARE WEIGHT:** Not Specified

**ASSEMBLY HARDWARE:**  
 (16) Stainless Steel Hex Bolt, Washer and Nut Assemblies to secure top half to body

**MANUFACTURER ID:**  
 1021-045





**TEST PROCEDURES AND RESULTS**

Testing was completed by TEN-E Packaging Services, Inc. on March 6, 1995

**EQUIPMENT**

Appendix I contains a complete list of equipment used to conduct this DOT/UN certification program

**QUALITY CONTROL AUDIT**

**CLOSURE(S)/DRUM INSERT(S)**

- Description/Material
- Pigment
- Tare Weight
- Markings
- Overall Dimensions
- Thread Dimensions
- Gasket Identification

**PRESSURE RELIEF DEVICE**

- Description/Material
- Pigment
- Tare Weight
- Markings
- Overall Dimensions
- Thread Dimensions
- Gasket Identification

**OVERPACK**

- Description/Material
- Pigment
- Tare Weight
- Markings
- Overall Dimensions
- Interior Components

**LINER**

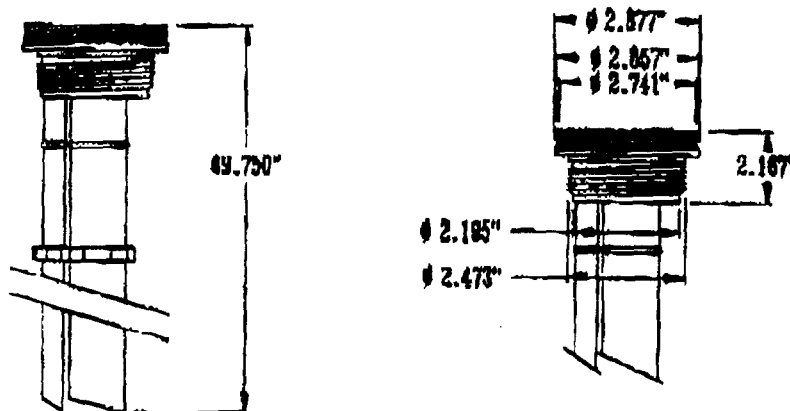
- Description/Material
- Pigment
- Tare Weight
- Overflow Capacity
- Thread Opening Dimensions

**QUALITY CONTROL AUDIT RESULTS**

**DRUM INSERT/DIP TUBE**

• Description:	2" Buttress Threaded Drum Insert with Dip Tube attached to D.I in center opening (2 inserts per container). Drum insert sealed with Plastic Shipping Plug	
• Material:	• (1) Teflon Insert	• (1) Polyethylene Insert
• Pigment:	Natural - both inserts	
• Tare Weight:	Drum Insert: 51.93 (w/3 O-Ring Gaskets)	Dip Tube: 1038 Grams
• Markings:	None	

Overall Dimensions

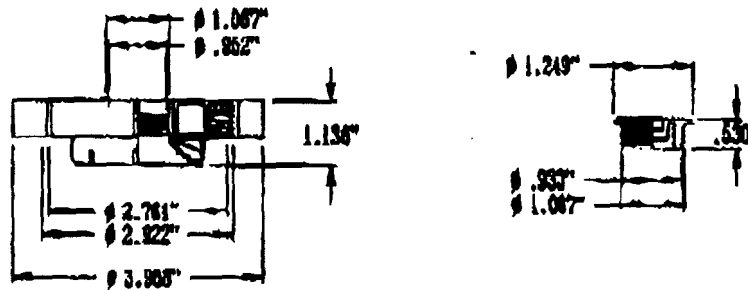


**DRUM INSERT GASKET**

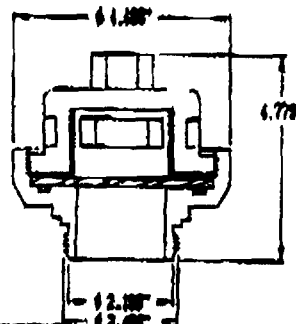
• Description/Material:	Viton- Gasket Placed between Drum Insert and Liner
• Tare Weight:	3.63 Grams
• Thickness:	.116"

**TEST PROCEDURES AND RESULTS**
**QUALITY CONTROL AUDIT RESULTS - Continued**

SHIPPING PLUG				
Closure	Description	Material/Pigment	Tare Weight	Markings
1	2" Buttress Threaded Overcap w/ 3/4" Plug (2 per container)	PE/Black	74 Grams	151-124-3
2	3/4" Non-vented NPT Plug (2 per container)	PE/Natural	4.72 Grams	49

**Overall Dimensions**

**PRESSURE RELIEF VALVE (Option #1)**

- Description: 2" Threaded Pressure Relief Valve with Rupture Disc Housing
- Pigment: Natural
- Tare Weight: 307 Grams
- Markings: None

**Overall Dimensions**

**GASKET**

- Description/Material: Viton
- Tare Weight: 4 Grams
- Thickness: .116"



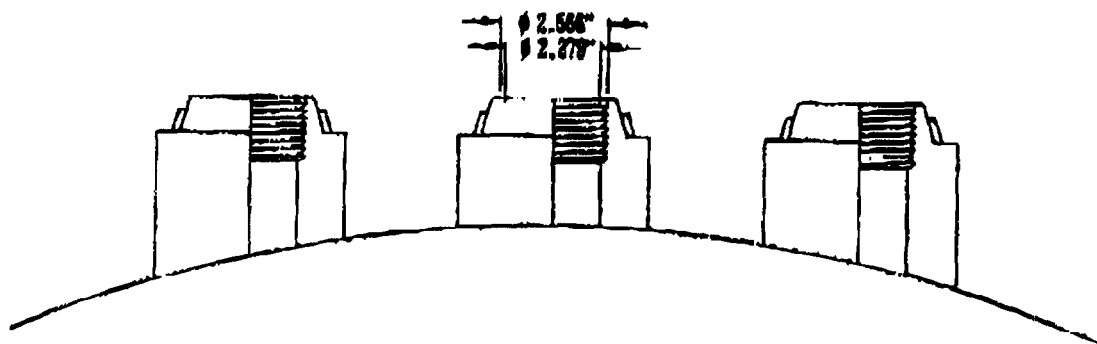
**TEST PROCEDURES AND RESULTS**

**QUALITY CONTROL AUDIT RESULTS - Continued**

**LINER**

- Description/Material: 1180 Liter PFA with (3) 2" Buttress Opening
- Tare Weight: 174 Lbs.
- Overflow Capacity: 318.5 Gallons 2657.5 Lbs
- 98% Overflow: 311.8 Gallons 2604.4 Lbs

**Opening Dimensions**

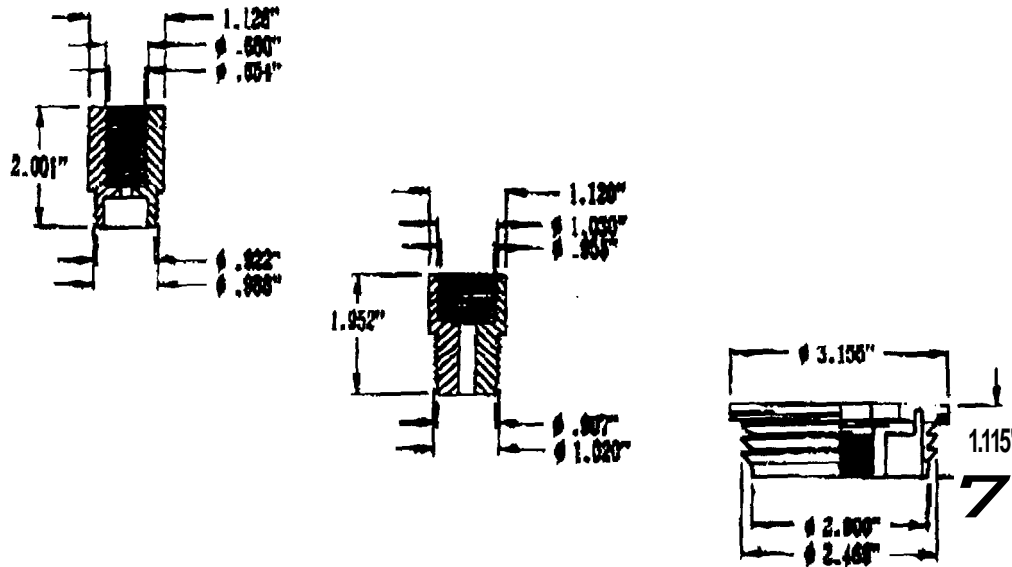


**INTERIOR COMPONENTS**

- Description/Material: **SPACERS:** (2) Plastic Spacers placed between openings on liner
- Tare Weight: 248 Grams
- Dimensions: 6.493" x 5.085" x .751"
- Description/Material: **FLANGES:** (3) Black Rubber Flanges placed in openings of overpack
- Tare Weight: 147 Grams
- Dimensions:
  - Outside Dia.: 6.117"
  - Inside Dia.: 4.663"
  - Height: .745"
- Description/Material: **CUSHIONING:** (1) Top and (1) Bottom Polyethylene Cushion placed between liner and overpack
- Tare Weight: 30 Lbs. (each)
- Dimensions:
  - Outside Diameter: 40-5/8"
  - Height: 8-1/2"

**TEST PROCEDURES AND RESULTS**
**QUALITY CONTROL AUDIT RESULTS - Continued**

<b>PRESSURE RELIEF VALVE (Option #2)</b>				
Closure	Description	Material/Pigment	Tare Weight	Markings
1	Top piece of 3/4" NPT Threaded Vent Plug	Plastic/Brown	37.0 Grams	None
2	Bottom piece of 3/4" NPT Threaded Vent Plug w/Inner Seat	PE/White	45.1 Grams	None
3	2" Buttress Threaded Plug w/ 3/4" Plug Opening	PE/Natural	40 Grams	Fluoroware

**Overall Dimensions**

**CLOSURE GASKET(S)**

Gasket	Material	Tare Weight	Thickness
1	N/A	N/A	N/A
2	Black O-Ring (2)	Large: .62 Grams Small: .15 Grams	N/A
3	Viton	3.741 Grams	.115"

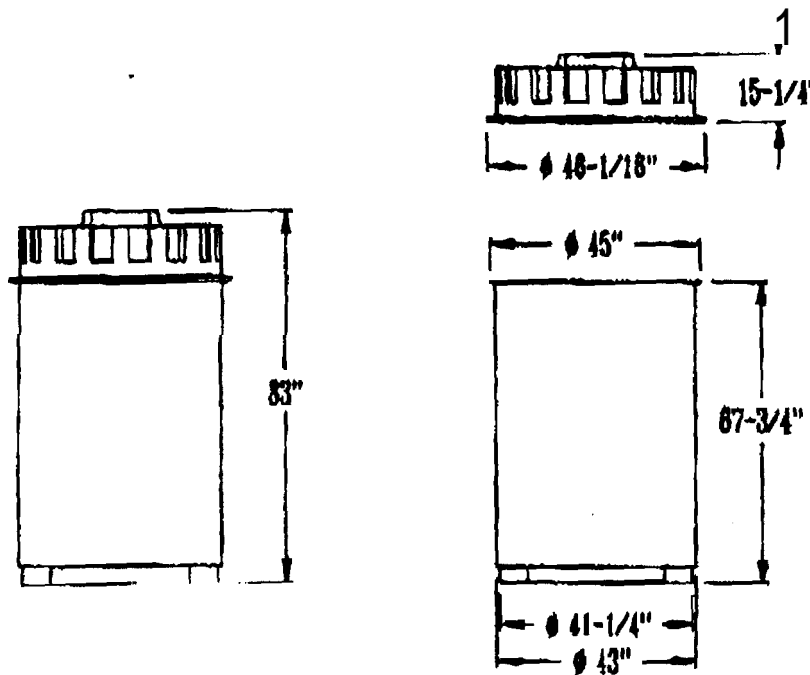
**TEST PROCEDURES AND RESULTS**

**QUALITY CONTROL AUDIT RESULTS - Continued**

**OVERPACK**

- Description: Rotationally Molded Two-piece Shell
- Material: Polyethylene
- Pigment: Blue
- Tare Weight: 103 Lbs.
- Markings:
  - ① 31FH1/Y/ /
  - ② USA/Fluoroware/+AA0728 0/2430

**Overall Dimensions**



**OVERPACK ASSEMBLY HARDWARE**

(16) Hex Nut, Washer, Spacer and Bracket assemblies to secure top piece of overpack to body of overpack

**PACKAGE WEIGHT INFORMATION**

• Overall Package Tare Weight:	177 Kg	(390.0 Lbs)
• Package Test Weight: (Sample #1)	1336.0 Kg	(2942.7 Lbs.)
• Package Test Weight: (Drop Samples)	1359.0 Kg	(2994.4 Lbs)
• Authorized Gross Weight: (based on 1.2 specific gravity)	1596.0 Kg*	(3515 Lbs.)

\*Fluoroware requested the UN marking to reflect 1590 Kg. Refer to Page 18.



**TEST PROCEDURES AND RESULTS - REPETITIVE SHOCK VIBRATION TESTS**

**SAMPLE SIZE:** \_\_\_\_\_

- 1 Sample

**CONDITIONING:** \_\_\_\_\_

- Ambient

**FILLING SUBSTANCE:** \_\_\_\_\_

- Water

**FILL CAPACITY:** \_\_\_\_\_

- 98% of Maximum Capacity
- 1163.9Kg (2563.7 Lbs.)

**IBC TEST WEIGHT:** \_\_\_\_\_

- 1336 Kg (2942.7 Lbs.)

**PLUG APPLICATION TORQUE:** \_\_\_\_\_

- PFA Inserts: 20 Ft.-Lbs.
- PE Inserts: 15 Ft.-Lbs.
- Shipping Plug: Hand Tight

**TABLE DISPLACEMENT:** \_\_\_\_\_

- 1"

**FREQUENCY:** \_\_\_\_\_

- 4.0 Hz

**TEST DURATION:** \_\_\_\_\_

- 1 Hour

**VIBRATION TEST EQUIPMENT:** \_\_\_\_\_

- LAB Model 6000 Transportation Simulator

**TEST STANDARD:** \_\_\_\_\_

- Department of Transportation's FM-181E Final Rule (July 26, 1994) - Section 178.819
- ASTM D999 - Standard Test Method for Vibration Testing of Shipping Containers-Method A1

REPETITIVE SHOCK VIBRATION TEST RESULTS		
Sample #	Results	Comments / Observations
1	Pass	No visual signs of damage and no leakage of contents. Sample in good condition

*Refer to Photo 1 in Appendix I for Repetitive Shock Vibration Test Set-Up*

**CONTAINER'S PERFORMANCE IN TEST**

An IBC passes the vibration test if there is no rupture or leakage.



**TEST PROCEDURES AND RESULTS - BOTTOM LIFT TEST**

- SIZE:** \_\_\_\_\_
- 1 Sample
- FILLING SUBSTANCE:** \_\_\_\_\_
- Water
- IBC TEST WEIGHT:** \_\_\_\_\_
- 1336 Kg (2942.7 Lbs.)
- CONDITIONING:** \_\_\_\_\_
- Ambient
- FILL CAPACITY:** \_\_\_\_\_
- 98% of Maximum Capacity
  - 1163.9 Kg (2563.7 Lbs.)
- PLUG APPLICATION TORQUE:** \_\_\_\_\_
- PFA Inserts: 20 Ft.-Lbs.
  - PE Inserts: 15 Ft.-Lbs.
  - Shipping Plug: Hand Tight

- PREPARATION FOR BOTTOM LIFT TEST:**
- IBC Package Test Weight: 1336 Kg (2942.7 Lbs.)
  - Dead Load Steel Weight Applied: 1816 Kg (4000 Lbs.)
  - Combined Gross Mass used for Required Loading: 3152 Kg (6942.7 Lbs.)\*\*

**\*DETERMINATION OF REQUIRED LOADING FOR BOTTOM LIFT TEST**

**Test Requirement:** The IBC must be loaded to 1.25 times its maximum permissible gross mass with the load being evenly distributed.

**Minimum Load Determination Calculation:**

\*1596 Kg (maximum permissible gross mass at 1.2 specific gravity) x 1.25 = 1995 Kg (4401 Lbs.)

\*\* The bottom lift test was conducted based on a specific gravity of 1.9 (2384 Kg gross weight)

- TEST PROCEDURE:**
- IBC must be raised and lowered twice by a lift truck for each possible direction of entry.
  - Forks must be centrally positioned and spaced at three-quarters of the dimension of the side of entry (unless points of entry are fixed).
  - Forks must penetrate to three-quarters of the direction of entry.

- TEST STANDARD:**
- Department of Transportation's HM-111 Final Rule (July 26, 1994) - Section 178.811
  - International Maritime Dangerous Goods Code (IMDG); Amendment 27; 26.5.9.1
  - UN Recommendations on the Transport of Dangerous Goods; 8th Revised Edition; 16.5.9.1

BOTTOM LIFT TEST RESULTS			
Fork Entry Direction	Lift 1	Lift 2	Comments / Observations
Front	Pass	Pass	
Back	Pass	Pass	

Refer to Photo 2 - Appendix I for Bottom Lift Test Set-up

**CRITERIA FOR PASSING THE TEST**

For all IBC design types designed to be lifted from the base, there may be no permanent deformation which renders the IBC unsafe for transportation. There can be no loss of contents.

**CRITERIA FOR PASSING THE TEST**

For all IBC design types intended to contain liquids or intended to contain solids that are loaded or discharged under pressure, there may be no leakage of air from the intermediate bulk container.

**LEAKPROOFNESS TEST RESULTS**

Sample #	Results	Comment / Observations
1	Pass	The IBC maintained the 20 kPa test pressure for 10 minutes with no leakage detected after coating the seams and joints with a soap water solution.

Refer to Photo 3 in Appendix I for Leakproofness Test Set-Up

- UN Recommendations on the Transport of Dangerous Goods, Bin Revised Edition, 16.5.9.4
- International Maritime Dangerous Goods Code (IMDG), Amendment 27, 26.5.9.4
- Department of Transportation's IM-18 IE Final Rule (July 26, 1994) - Section 178.813

**TEST STANDARD:**

- 10 Minutes

**TEST DURATION:**

- 20 kPa (2.9 psi)

**TEST PRESSURE:**

- Ambient

**CONDITIONING:**

- 1 Sample

**SAMPLE SIZE:**

**AREA OF IBC PRESSURIZATION:**

- Through one of the 2" openings

- Regulated Air Source
- Marshalltown G23606 0-60 psi 3/4" Gauge
- Marshalltown G16688 0-100 psi 5" Gauge
- 1/2 of 1% Accuracy

**PRESSURE TEST EQUIPMENT:**

- PFA Inserts: 20 Ft.-Lbs.
- PE Inserts: 15 Ft.-Lbs.
- Shipping Plug: Hand Tight

**PLUG APPLICATION TORQUE:**

**TEST PROCEDURES AND RESULTS - LEAKPROOFNESS TESTS**



**NOTE:**  
\*\* Fluoroware Inc. submitted (2) IBC samples from the same design for internal hydrostatic pressure testing. Refer to Fluoroware's report #264-201-03 for specific information on the two samples.

There may be no leakage and no permanent deformation which renders the intermediate bulk container unsafe for transportation.

Refer to Photo 4 in Appendix I for Hydrostatic Pressure Test Set-Up

Sample #	Serial #	Results	Comments/ Observations
940218013	2	Pass	deformation which would render it unsafe for transportation.
940218011	1	Pass	minutes without any signs of leakage or permanent deformation which would render it unsafe for transportation.

- TEST STANDARD:**
- UN Recommendations on the Transport of Dangerous Goods; 8th Revised Edition; 16.5.9.5
  - International Maritime Dangerous Goods Code (IMDG); Amendment 27; 26.5.9.5
  - Department of Transportation's HM-181B Final Rule (July 26, 1994) - Section 178.814

**AREA OF IBC PRESSURIZATION:**

- Fluoroware Adapter; 2" Opening to the outside

- PRESSURE TEST EQUIPMENT:**
- Regulated Water Source
  - Marshmallow G23606 0-60 psi 3/4" Gauge
  - Marshmallow G16688 0-100 psi 5" Gauge
  - 1/2 of 1% Accuracy

**TEST DURATION:**

- 10 Minutes

**PLUG APPLICATION TORQUE:**

- PFA Inserts: 20 Ft.-Lbs.
- PB Inserts: 15 Ft.-Lbs.
- Shipping Plug: Hand Tight

**TEST PRESSURE:**

- 300 kPa (43.6 psi)

**FILL CAPACITY:**

- Maximum Capacity

**CONDITIONING:**

- Ambient

**FILLING SUBSTANCE:**

- Water

**SAMPLE SIZE:**

- 2 Samples\*\*

**TEST PROCEDURES AND RESULTS - HYDROSTATIC PRESSURE TESTS**





**TEST PROCEDURES AND RESULTS - DROP TESTS**

**SAMPLE SIZE:**

- 2 Samples

**FILLING SUBSTANCE:**

- Methanol/Glycol/Water Solution

**IBC TEST WEIGHT:**

- 1356 Kg (2994.4 Lbs.)

**DROP ORIENTATION:**

- Flat on Bottom

**DROP TEST EQUIPMENT:**

- Quick Release Hook Mechanism

**DROP HEIGHT CALCULATION:**

- Packing Group II Materials  
 Specific Gravity Not Exceeding 1.2 (1.0m x 1.2)

**CONDITIONING:**

- -18°C (0°F)

**FILL CAPACITY:**

- 98% of Maximum Capacity
- 1182.4 Kg (2604.4 Lbs.)

**PLUG APPLICATION TORQUE:**

- PFA Inserts: 20 Ft.-Lbs.
- PE Inserts: 15 Ft.-Lbs.
- Shipping Plug: Hand Tight

**DROP HEIGHT:**

- 1.2m (46.3")

**TEST STANDARD:**

- Department of Transportation's HM-181E Final Rule (July 26,1994) - Section 178.810
- International Maritime Dangerous Goods Code (IMDG); Amendment 27; 26.5.9.6  
 UN Recommendations on the Transport of Dangerous Goods; 8th Revised Edition; 16.5.9.6

DROP TEST RESULTS**		
Sample #/ Serial #	Results	Comments/ Observations
1 940218011	Pass	No damage or leakage occurred Overpack and liner in good condition
2 940218013	Pass	Overpack and liner in good condition. Closure Flanges popped-off due to impact. No leakage

*Refer to Photo 5 in Appendix I for Hydrostatic Pressure Test Set-Up*

**CRITERIA FOR PASSING THE TEST**

For all IBC design types there may be no loss of contents. A slight discharge from a closure upon impact is not considered to be a failure of the intermediate bulk container provided that no further leakage occurs.

**NOTE:**

- \*\* Fluoroware Inc. submitted (2) IBC samples from the same design for the drop test. Refer to Fluoroware's report # 264-201-03 for specific information on the two samples.






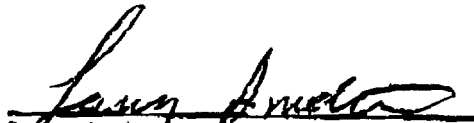
**DOT / UN PACKAGING CERTIFICATION  
DESIGN QUALIFICATION**

TEN-E PACKAGING SERVICES, INC. certifies that the previously described testing services have been performed in accordance with standard good laboratory practices and that the packaging tested has passed the standards of the DEPARTMENT OF TRANSPORTATION RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION'S DOCKET HM-181E; PERFORMANCE ORIENTED PACKAGING STANDARDS, SECTION 178, in accordance with CODE 31HH1, PACKING GROUP II, MEDIUM DANGER HAZARDOUS MATERIALS (specific gravity not exceeding 1.2, gross mass not to exceed 1590 Kg). THIS PACKAGE IS ALSO CERTIFIED FOR SHIPMENT UNDER IMDG REGULATIONS. However, it is the responsibility of the end user to determine authorization for use under these regulations. ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE OR FIT FOR A PARTICULAR PURPOSE, ARE DISCLAIMED. In no event shall TEN-E Packaging Services, Inc. liability exceed the total amount paid by Fluoroware, Inc. for services rendered.

In the event of future changes to the above referenced test standard, it is the responsibility of Fluoroware, Inc. to determine whether additional testing or updating of past testing is necessary to verify that the packaging we have tested remains in compliance with those standards.

**FLUOROWARE 1180 LITRE PE/PE COMPOSITE IBC PACKAGING  
(RM-1180 PEHP IBC)**

<b>UN MARKING:</b>	 31HH1/Y/**/USA/+AA1296/0/1590
<b>ADDITIONAL MARKINGS:</b>	1180/177/300/01 95/**
<b>TEST REPORT NUMBER :</b>	13482
<b>PACKAGING IDENTIFICATION CODE:</b>	31HH1
<b>AUTHORIZED PACKING GROUP (S):</b>	II (Y) & III (Z)
<b>MONTH &amp; YEAR OF MANUFACTURE:</b>	** (Insert Month & Year of Manufacture)
<b>STATE AUTHORIZING THE MARK:</b>	USA
<b>PACKAGING CERTIFICATION AGENCY:</b>	TEN-E Packaging Services, Inc. (+AA)
<b>STACK TEST LOAD:</b>	0 Kg (not intended to be stacked.)
<b>AUTHORIZED GROSS MASS:</b>	1590 Kg (3506 Lbs.)
<b>CAPACITY AT 20°C:</b>	1180 Litres (311.8 Gallons)
<b>TARE MASS:</b>	177 Kg (390 Lbs.)
<b>TEST (GAUGE) PRESSURE:</b>	300 kPa (43.6 psig)
<b>DATE OF LAST LEAKPROOFNESS TEST:</b>	01,1995
<b>DATE OF LAST INSPECTION:</b>	*** (Insert Month & Year of Last Inspection)
<b>PERIODIC RETEST DATE:</b>	March 6, 1996

  
Larry Anderson  
Manager, Technical Services

ID: 9088596921  
1681-8891

JT BAKER/PDS  
EAVM ENRHS INC

SEP 17 02 15:24 No. 002 P. 25  
(TUE) 9:17:02 14:11/ST.13:57/NO.4860050658 P. 19



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March 15, 1995  
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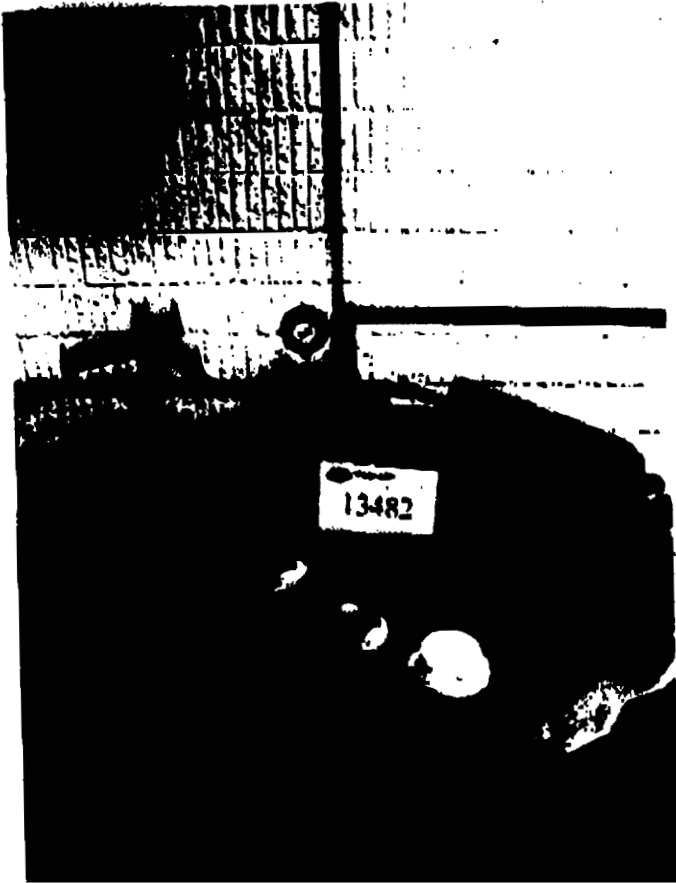
**Photo # 1 - Repetitive Shock Vibration Test Set-up.**

- Test Frequency: 4.0 Hz
- Duration: 1 Hour

**Photo # 2 - Bottom Lift Test Set-up.**

- Fork Entry Direction = Front & Back
- Gross Mass Lifted = 3152 Kg





**Photo # 3 - Leakproofness Test Set-up.**  
• Test Pressure = 20 kPa (2.9 psi)  
• Duration = 10 Minutes

**Photo # 4- Hydrostatic Pressure Test Set-up.**

- Test Pressure = 300 kPa (43.6 psi)
- Duration = 10 Minutes

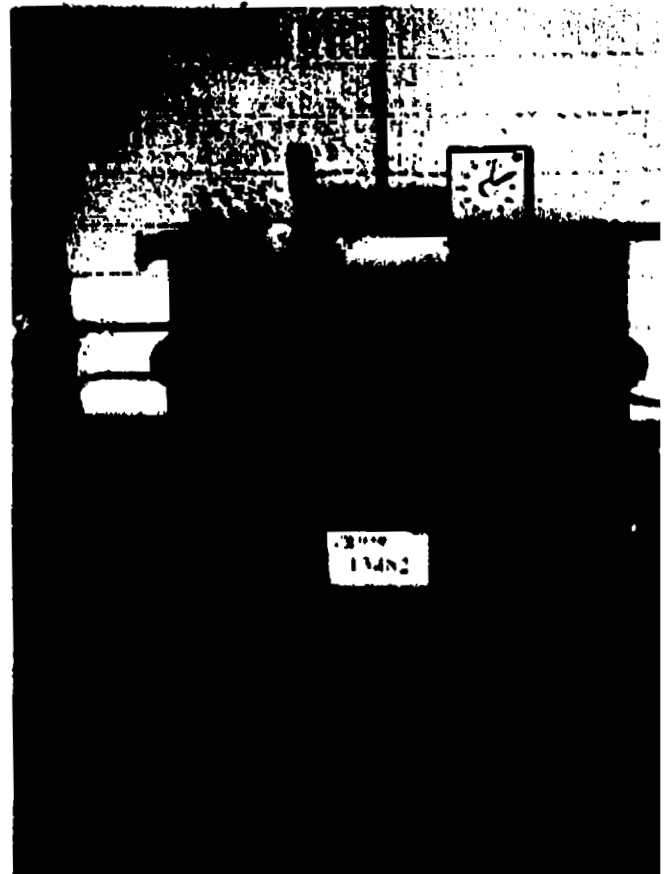




Photo # 5 - Flat on Bottom Drop Test Set-up.

- Drop Height = 1.2m (47.3')  
• Conditioning = -18°C (0°F)