

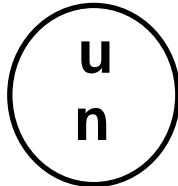
**DESIGN QUALIFICATION**

330 GALLON IBC Reusable Industrial Packaging Association (RIPA)
MAUSER STEEL CAGE-SCHÜTZ INNER RECEPTACLE
DATE OF REPORT: 9/30/2009

MAUSER® is required by 49CFR§178.800 to qualify retest to UN/DOT performance oriented packaging standards and tests. In accordance with 49CFR§178.801(c) (7) (iii) 330 gallon (1250L) packagings were tested to include 275 gallon (1041L) IBCs as long as markings are in accordance with these sections.

This report incorporates the following test reports:

REPORT #	TESTING FACILITY M#	TEST	ANALYST/WITNESS
09082501	M4895	Vibration	Darren Wickes/Chris Lind
09082502	M4895	Bottom Lift	Darren Wickes/Chris Lind
09082503	M4895	Stack	Darren Wickes/Chris Lind
09082504	M4895	Leakproofness	Darren Wickes/Chris Lind
09082605	M4895	Hydrostatic	Darren Wickes/Chris Lind
09082506	M4895	Drop	Darren Wickes/Chris Lind



31HA1/Y/08 09/USA/+CH 115-09/3700Kg/2038Kg/1250L/62Kg/70Kpa/08 09 08 09

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East Brunswick, NJ 08816
(732)353-7100
(732)353-7030 fax
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www.info.us@mausergroup.com

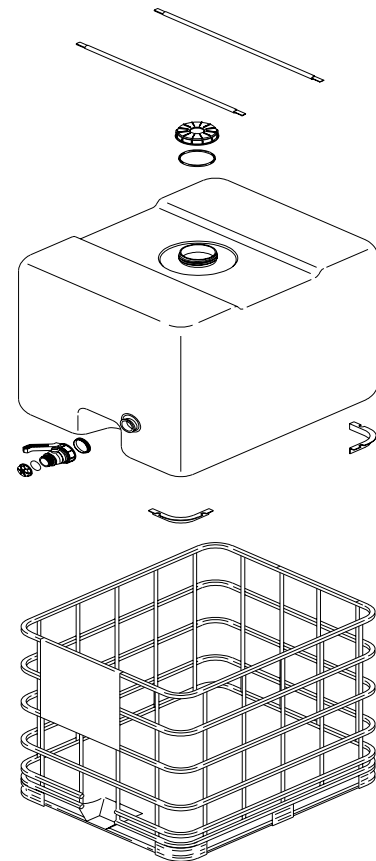
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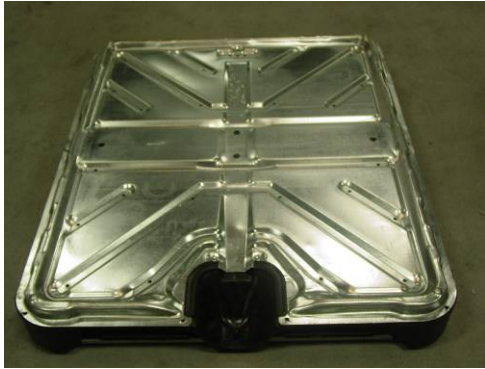
- 1) PRODUCT SPECIFICATIONS
 - a) PRODUCT CODE
 - b) TYPE
 - c) CLOSURES
 - d) ACCESSORIES
 - e) PHYSICAL CHARACTERISTICS
 - i) WEIGHT
 - ii) HEIGHT
 - iii) DIAMETER
 - iv) CAPACITY
 - f) MATERIAL OF MANUFACTURE
 - g) SPECIAL MARKINGS
 - h) UN MARKING
 - i) PRODUCT DRAWING
 - j) PRODUCT CLOSURE DRAWING
 - k) PICTURE AS ASSEMBLED AND TESTED
- 2) DROP TEST *49CFR§178.810*
- 3) HYDROSTATIC TEST *49CFR§178.814*
- 4) LEAKPROOFNESS TEST *49CFR§178.813*
- 5) STACKING TEST *49CFR§178.815*
- 6) VIBRATION STANDARD *49CFR§178.819*
- 7) BOTTOM LIFT *49 CFR§178.811*
- 8) INCORPORATED DATA SHEETS AND REPORTS
- 9) CLOSING INSTRUCTIONS
- 10)SIGNATURE PAGE
- 11) MANUFACTURING NUMBERS AND FACILITY ADDRESSES

SECTION 1
PRODUCT SPECIFICATIONS

PRODUCT CODE: UN31HA1 IBC PLASTIC

SPECIFICATION	DESCRIPTION	MANUFACTURER	SPECIFICATIONS
PRODUCT TYPE	SM330C*****	M4118	
IBC DESIGN TYPE	UN31HA1 IBC PLASTIC WITH COMPOSITE PALLET	MAUSER SCHÜTZ	Minimum Wall Thickness: 1.1 mm
PART NUMBER	SM330C*****	MAUSER/SCHUETZ	
MATERIAL	HDPE EXTRUSION GRADE		Melt Index: 4.5-6.5 Density 0.944-0.948
OVERALL DIMENSIONS:			
HEIGHT	1346 mm		
BASE	1003 mm		
DEPTH	1219 mm		
STEEL CAGE As tested	22.68 kg	MAUSER	TUBULAR STEEL WITH UPPER SUPPORT BARS AND FRONT STEEL PANEL
TARE WEIGHT COMPLETE as tested	62 kg		





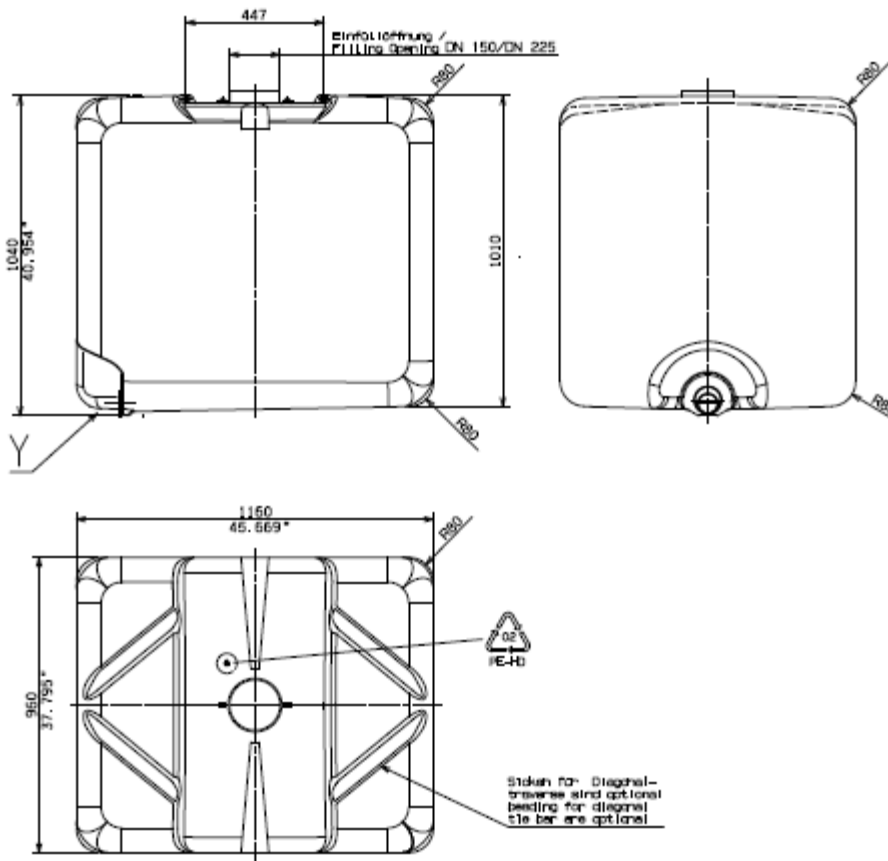
Picture of composite pallet



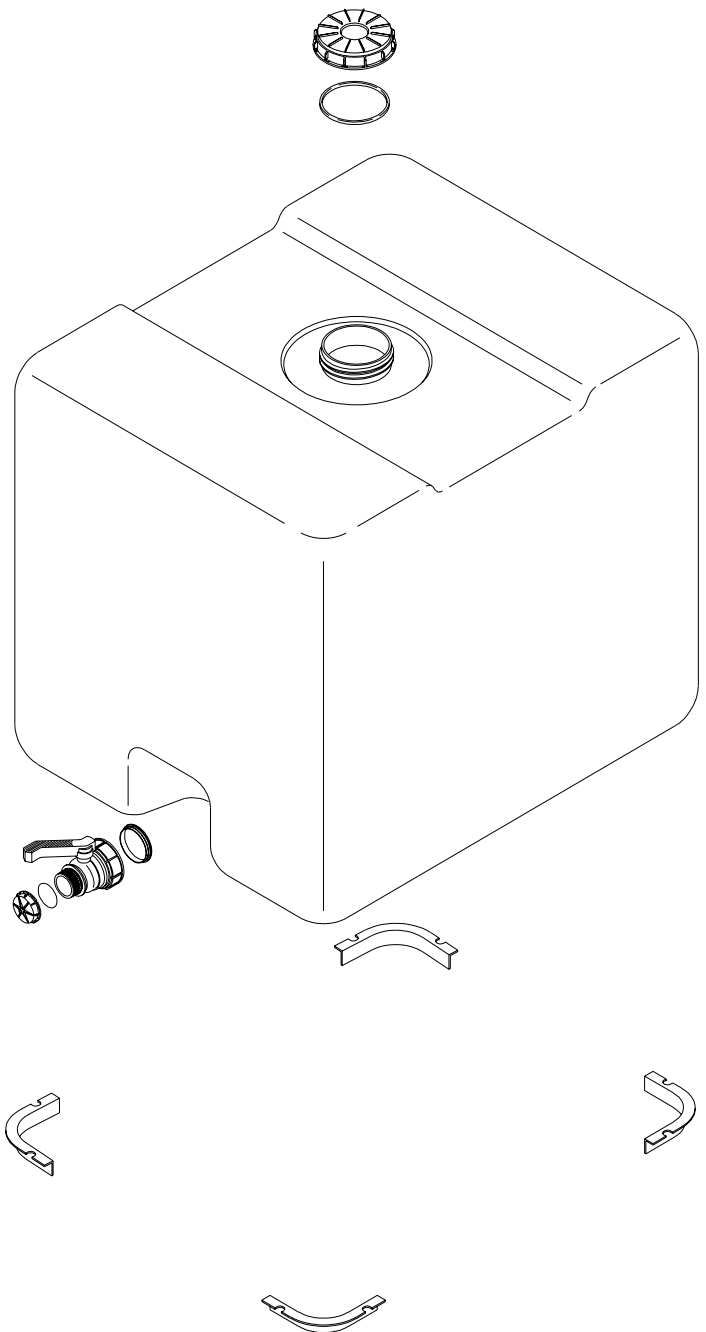
Picture of composite pallet and steel cage

INNER PLASTIC BOTTLE

Inner Plastic Bottle



Manufacturer	Schütz
Material	HDPE, Resin Type
Manufacturing Method	extrusion, blow molded
Minimum Thickness - Top	1.5 mm
Minimum Thickness - Bottom	1.5 mm
Minimum Thickness - Wall	1.5 mm
Closure Openings	
Fill	150 mm
Discharge	60 mm
Capacity (Nominal)	1250 liters
Capacity (Maximum)	1280 liters
Length	1143 mm
Width	940 mm
Height	1156 mm
Tare Weight	19 kg
Corner Protectors (4)	
Material	HDPE
Thickness	3 mm
Weight	1.2 kg



CAP

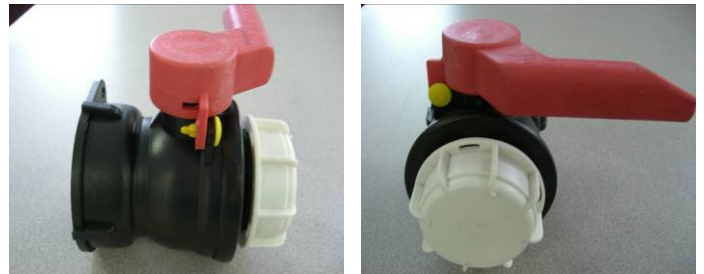
This closure is representative and, in accordance with 49 CFR 178.801(d), is not a part of the container design type.

Part Number:	DN150
Material:	150 mm, high density polyethylene cap.
Thread Style	Buttress
Height (mm)	44
Diameter (mm)	190
Gasket Material	EPDM
Gasket Thickness	6.35 mm
Closure Weight #1:	159 grams – Cap 10.4 grams - Gasket
Closing Method	6 Inch Cap -95 NM 2 Inch NPS – 27 NM



Discharge Valve and Cover –

Valve	Valve DN50
Manufacturer	<u>Schütz</u>
Style	<u>N/A</u>
Part Number	<u>N/A</u>
Material	<u>N/A</u>
Dimensions	
Length	<u>121 mm</u>
Inside Dia.	<u>70 mm</u>
Height	<u>89 mm</u>
Gasket Material	<u>Viton</u>
Thickness	<u>3.51 mm</u>
Weight	<u>0.0286 Kg</u>
Tare Weight (valve)	<u>0.3765 kg</u>
Attachment Method	
Cap	
Manufacturer:	Schütz
Part Number:	N/A
Material:	HDPE



Metal Cage and Pallet

Manufacturer	MAUSER® SM 13
Material	Galvanized Steel
Description	Tubular steel cage with two removable upper support bars, front and rear panels and front valve access
Tube Dimensions	.
Overall Dimensions (L x W x H)	1219 mm x 1003 mm x 1346 mm
Tare Weight	24.50 kg
Composite Pallet	4 – Way entry, 15.87 kg
Material	Zinc Plated steel, Steel plate to support the bottle, square steel tubes
Overall Dimensions (L x W x H)	1204 mm, 1000 mm, 1158 mm
Weld test	100 nm
Upper Support Bars (2)	
Material	Galvanized Steel
Dimensions	Length 1000 mm, Width 30 mm Thickness 0.9 mm
Tare Weight	1.0 kg (each)
Attachment Method	Machine Screw one at each end

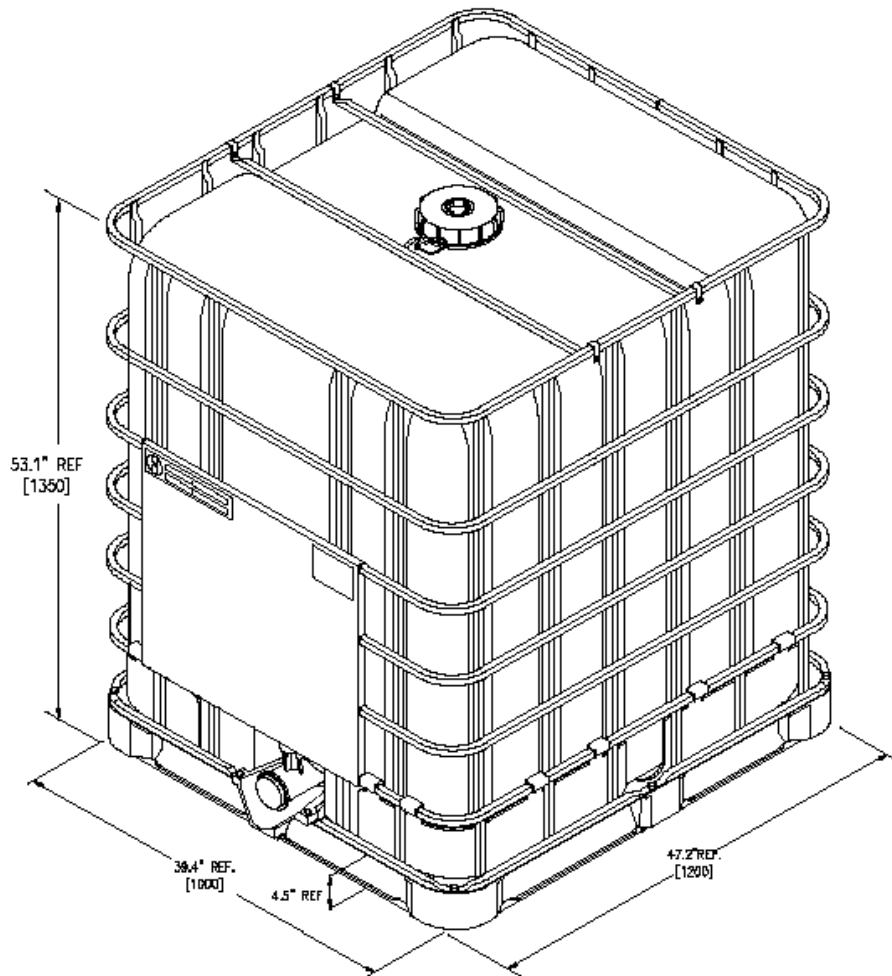
Additional Test Information

Test Contents:	Water and antifreeze.
Specific gravity	1.06
Package Tare Weight	62 kg
Net Fill Weight (98% of max. capacity+ Outage)	1263 kg
Weight of Package as filled:	1351 kg

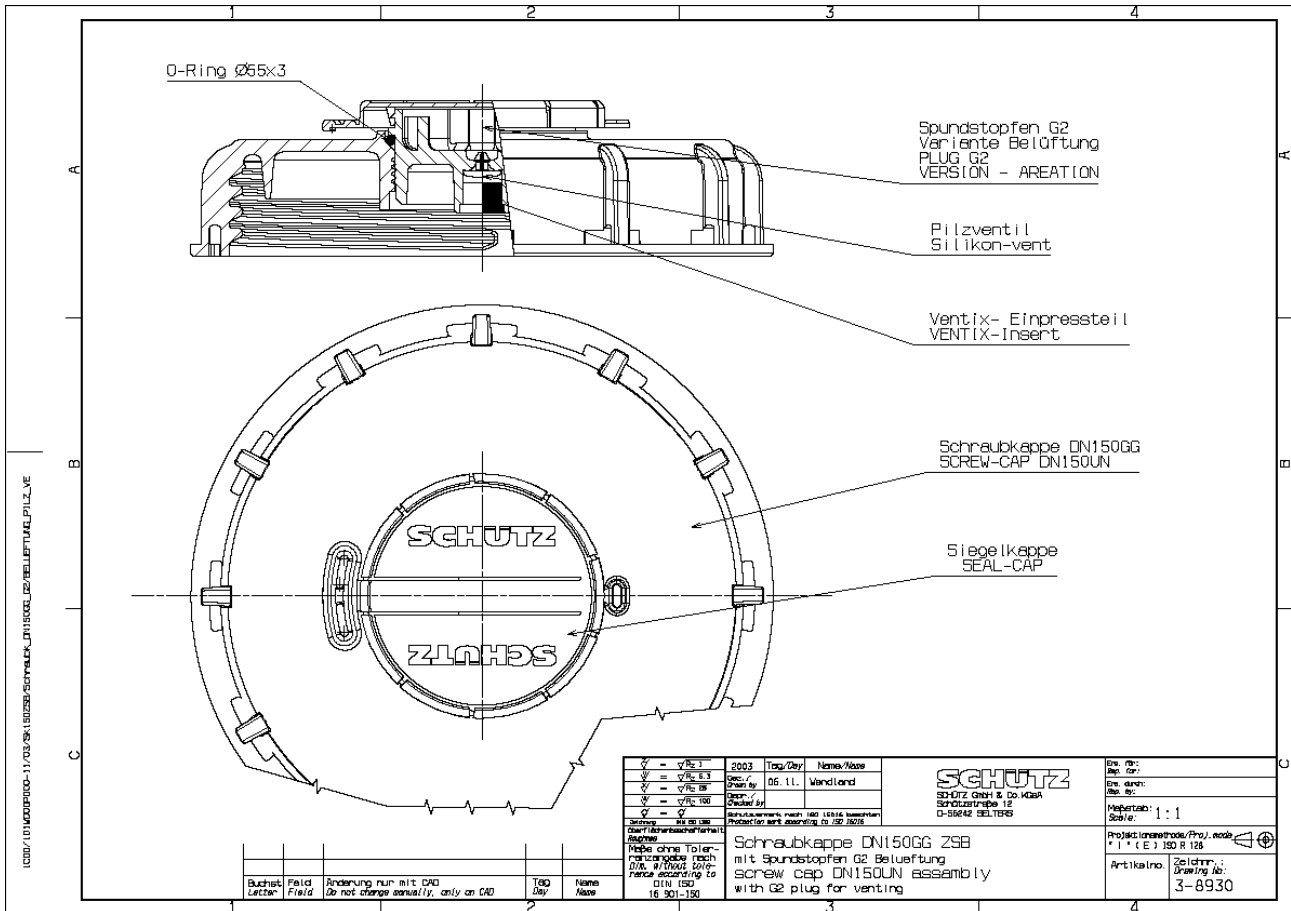
WEIGHT– BOTTLE ONLY(kg)	19 kg		
MATERIAL (NATURAL)	HDPE	RESIN MI: 4.5-6.5 DENSITY: 0.944-0.948	

UN MARKING: 31HA1/Y/08 09/USA/+CH 115-09/3700Kg/2038Kg/1250L/62Kg/70Kpa/08 09/08 09

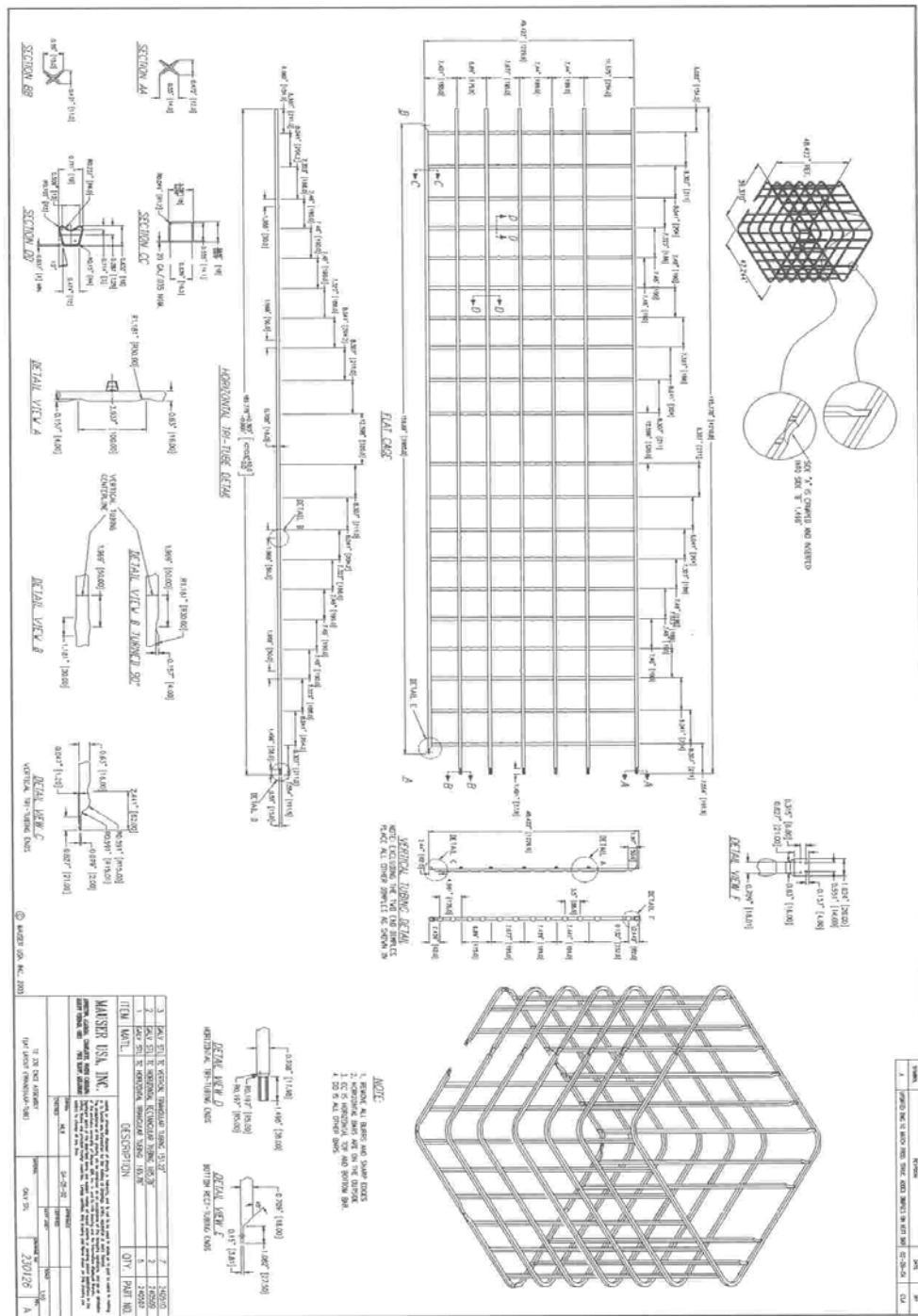
PRODUCT DRAWING:



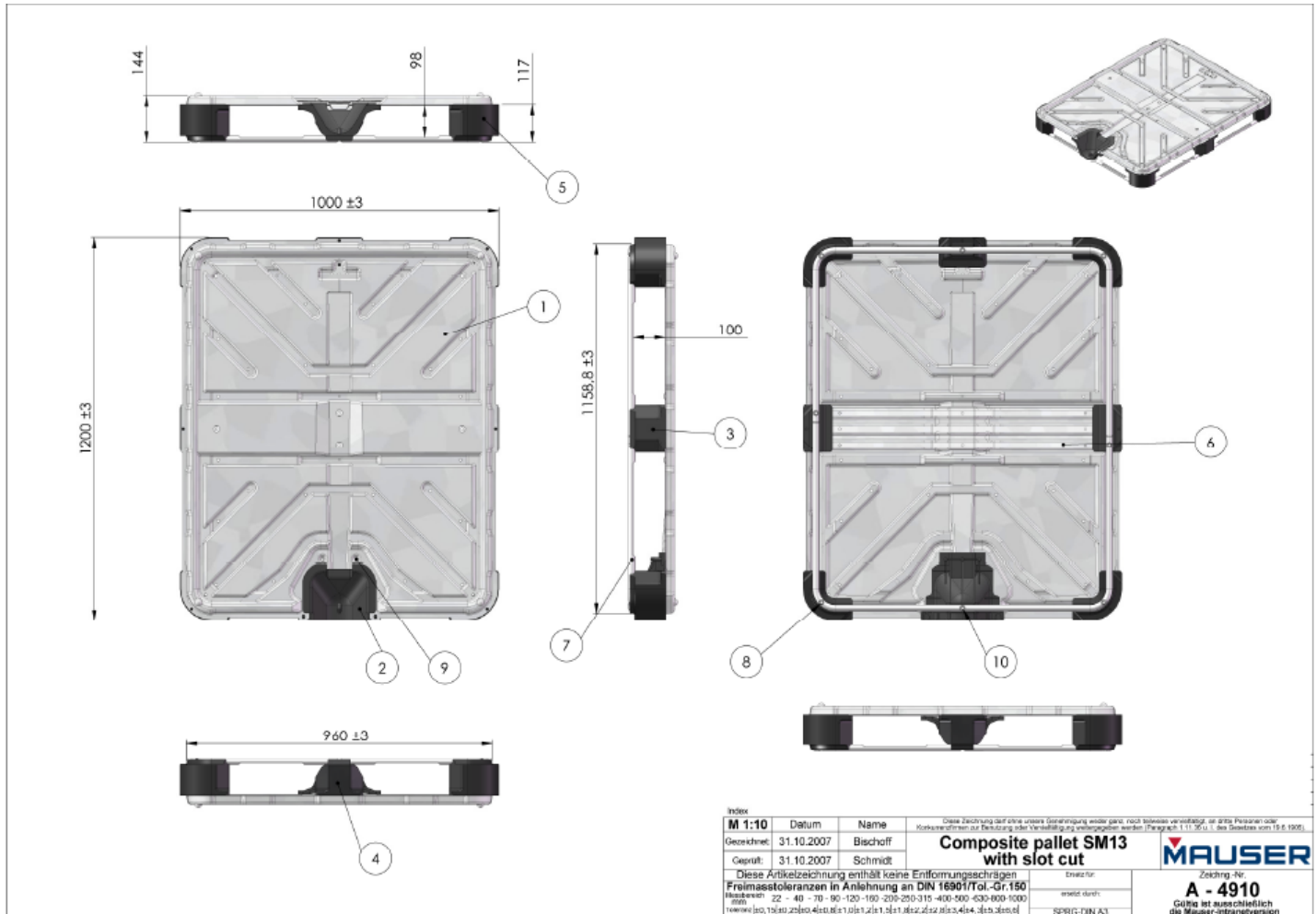
TYPICAL CLOSURE DRAWINGS:



This closure is representative and, in accordance with 49 CFR 178.801(d), is not a part of the container design type.



Cage Drawing



Index			Diese Zeichnung darf ohne unsere Genehmigung weder ganz, noch teilweise ververvielfältigt, an Dritte übertragen oder Kopierverfahren zur Bearbeitung oder Vervielfältigung unterzogen werden (Fragebuch 1.11.35/G. I. des Statutes vom 19.6.1995).	
M 1:10	Datum	Name	Composite pallet SM13 with slot cut	
Gezeichnet:	31.10.2007	Bischoff		
Geprüft:	31.10.2007	Schmidt		
Diese Artikelzeichnung enthält keine Einformungschrägen Freimaßtoleranzen in Anlehnung an DIN 16901/Tol.-Gr.150 Maßstab: 22 - 40 - 70 - 90 - 120 - 160 - 200-250-315 - 400-500 - 630-800-1000 www.mauser.com			Entwurf für erstellt durch SPRIG-DIN AG	Zeichnung-Nr. A - 4910 Gültig ist ausschließlich die Mauser-Interpretation

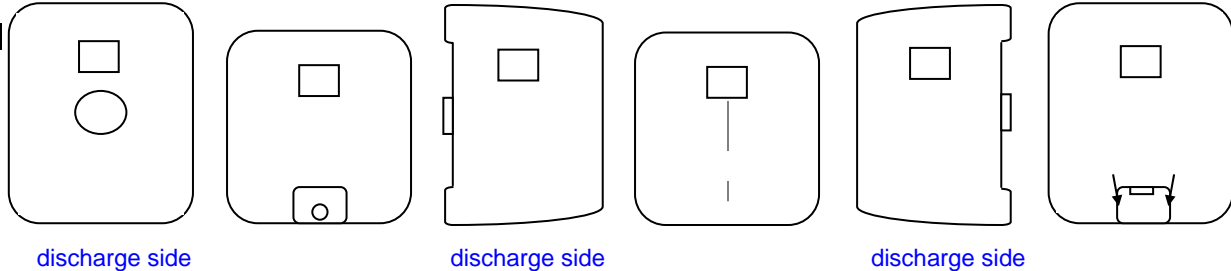
PICTURE AS ASSEMBLED AND TESTED (follows)



WALL THICKNESS CHECK: SCHÜTZ HDPE BOTTLE

Wall thickness Form/No.1007.1.3 _____
Control IBC
 Shift: Mauser Corp Lab (+CH) Date: 8/21/2009
 Inspector: Darren Wickes Material: Schuetz HDPE Bottle

Separate sketches from above



***If values are below (min.) nominal values machine parameters have to be adjusted.
After that a new measurement must be carried out.***

If this measurement is in order, the new value should be entered in the field "correction"

Integrity label #		Schütz	28	EBA	28	Re-test	
Measuring points in mm	Nominal (min.)	Actual value	correction	Actual value	correction	Actual value	correction
top 1	1.5	2.7					
top 2	1.5	2.6					
top 3	1.6	3.7					
top 4	1.6	2.2					
top 5	1.5	2.6					
top 6	1.5	2.2					
front 7	1.8	2.9					
right side 8	1.8	2.8					
rear 9	1.8	2.3					
left side 10	1.8	3.7					
front 11 (discharge)	2.3	4					
front 12 (discharge)	2.3	2.1					
bottom 13	1.8	2.5					
bottom 14	1.8	2.2					
bottom 15	1.8	1.9					
bottom 16	1.8	3.55					
bottom 17	1.8	6.5					
bottom 18	2.2	3.7					
bottom 19	1.8	2.59					
min. seam thickness 20	2.2	4.1					
min. wall thickness	1.5						
Weight 275 gallon (lbs)	36.5-37.4						
Weight 330 gallon (lbs)	41.5-42.4						

Note: "nominal" on this form refers to MAUSER specifications not the Schütz bottle as tested, for which specifications were not available to testers

**SECTION 2
DROP TEST (§178.810)**

Test Method: 49 CFR 178.810

Drop Height – 1.6 meters

Liquid Temp - -18°C

Drop Orientation – Approximate angle of 12 degrees towards the discharge valve.

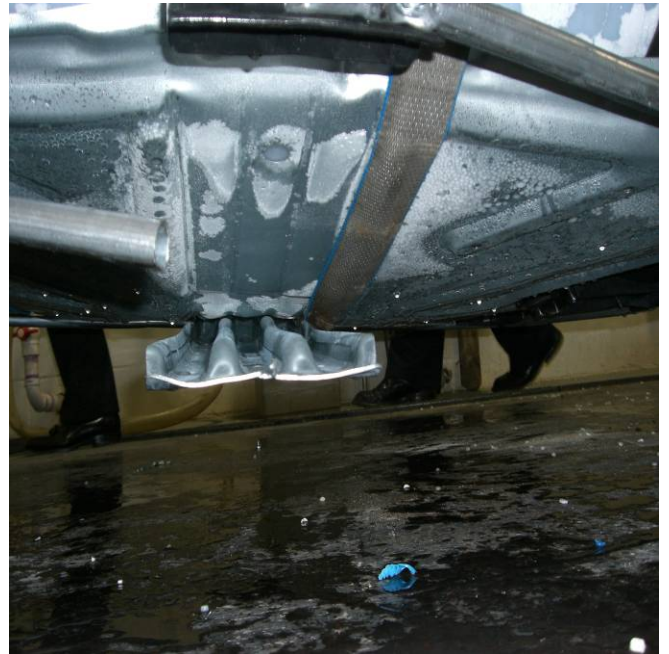
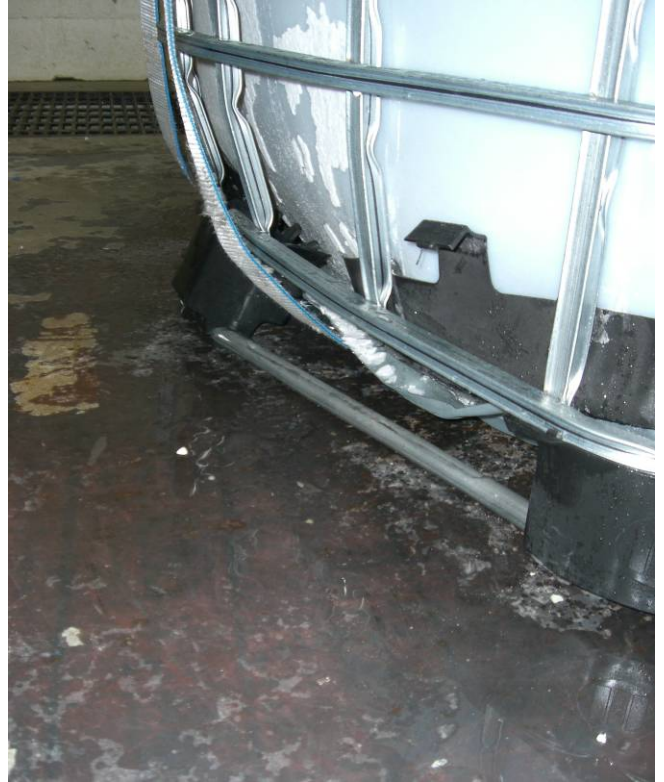
Testing was conducted to certify the package for PGII liquids with a specific gravity of up to 1.6.

Conditioning

The IBC was conditioned to at least -18 degrees C in accordance with 49 CFR 178.810(b)(3) & 178.810 (e). Composite IBC was conditioned for 24 hours to ensure content was at the required temperature of -18 degrees C. The drop was conducted in suitable amount of time upon removal from the conditioning chamber.

ORIENTATION §178.810	DATE	HEIGHT (meters)	RESULT	ANALYST
Diagonal on Valve SAMPLE B	8/21/2009	1.6	Pass	Darren Wickes/Chris Lind





IBC lifted from base for five minutes to insure safety of transport.

**SECTION 3
HYDROSTATIC TEST (§178.814)**

Test Duration: 10 minutes
 Test Temperature: Ambient
 Results: **Pass**

**TEST PRESSURE: 70 KPA
 WATER TEMPERATURE: 21° C**

SAMPLE	DATE	TIME	RESULT	ANALYST
A	8/26/2009	10 Min	Pass	Darren Wickes/Chris Lind

CLOSURE	DESCRIPTION	TORQUE (N-m)
DN150UN	150 mm SCREW CAP	95 NM
2 INCH NPS PLUG	2" NPS PLUG/SILICONE GASKET	27 NM

Note: torque is applied with steady even pressure on clean dry threads





Pass/Fail Criteria

A packaging passes the test if there is no leakage of water from the IBC and no permanent deformation that renders the IBC unsafe for transportation.

**SECTION 4
LEAKPROOFNESS TEST (§178.813)**

Test Duration: 10 minutes
 Test Pressure: 20.68 kPa
 Test Temperature: Ambient

TEST PRESSURE (§178.813): 20.68 kPa

SAMPLE	DATE	TIME	RESULT	ANALYST
1	8/26/2009	10 MIN	PASS	Darren Wickes/Chris Lind

CLOSURE	DESCRIPTION	TORQUE (N-m)
DN150UN	150 mm SCREW CAP	95 NM
2 INCH NPS PLUG	2" NPS PLUG/SILICONE GASKET	27 NM

Note: torque is applied with steady even pressure on clean dry threads



Leakproofness test of 330 Composite IBC. (actual test)



Soap over method applied to 330 IBC. Modified composite pallet used to insure all seams are tested for leaks. 330G IBC was leakproofness tested to 3.1 Psi. Required minimum is 2.9 Psi.

Pass/Fail Criteria

A packaging passes the test if there is no leakage of air from the IBC and no permanent deformation that renders the IBC unsafe for transportation.

**SECTION 5
STACKING TEST (§178.815)**

Test Method: 49 CFR 178.815
 Test Duration: 24 hours
 Test Temperature: Ambient

Stacking Test Weight – 3700 kg (see 49 CFR 178.815 for Calculation, raised for a safety factor)

The stacking test load was applied to the top of the package by loading the IBC with 3700 kg and the constant force was maintained for 24 hours.

TEST LOAD §178.815 AT AMBIENT TEMPERATURE = 3700

SAMPLE NUMBER	START DATE	STOP DATE	RESULT	ANALYST
A	8/25/2009	8/26/2009	PASS	Darren Wickes/Chris Lind



Pass/Fail Criteria -

No test sample may leak. There must be no leakage of the filling substance from the inner receptacle, or inner packaging. No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packaging's likely to reduce safety in transportation.

**SECTION 6
VIBRATION TEST (§178.819)**

Vibration Test

Test Method: 49 CFR 178.819 on a vertical vibration table.

Duration: 1 Hour

Frequency: 3.17 Hz

Test Temperature: Ambient

Results:

The IBC show no deformation to the Steel cage and steel supports No leakage was observed. The IBC passed the test.

Test Liquid: 18.33°C

SAMPLE	START TIME	STOP TIME	RESULT	ANALYST	DATE
A	10:25 AM	11:25 AM	Pass	Darren Wickes	8/25/2009



Pass/Fail Criteria -

A packaging passes the vibration test if there is no rupture or leakage from any of the packages. No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength.

Bottom Lift Test

Test Method: 49 CFR 178.811

Test Load: 2,554Kg

Number of Lifts: 8

Fork tine penetration:

Side 1 and 2: 35.5"

Side 3 and 4: 29.5"

Test Temperature: Ambient

Results: Pass

Side 1	Side 2	Side 3	Side 4	Comments/Observations
Lift 1 – Pass	Lift 1 – Pass	Lift 1 – Pass	Lift 1 – Pass	Following the test there was no leakage from the IBC or visible damage to the IBC that would render it unsafe for transportation.
Lift 2 – Pass	Lift 2 – Pass	Lift 2 – Pass	Lift 2 – Pass	



Bottom lift test documented on video. Available upon request.

**SECTION 7
INCORPORATED DATA SHEETS**

Section may be left blank

SECTION 8 CLOSING INSTRUCTIONS

NOTE TO RECIPIENT: YOU ARE REQUIRED TO PROVIDE THESE INSTRUCTIONS TO ANY AND ALL INDIVIDUALS RESPONSIBLE FOR CLOSING THESE DRUMS PRIOR TO SHIPMENT AND TO ANY PERSON TO WHOM THE PACKAGING (S) IS (ARE) TRANSFERRED

United States Department of Transportation regulations state that packaging manufacturers are required to notify each person to whom the packaging is transferred of all requirements not met at the time of transfer. This requirement is given in Title 49, Code of Federal Regulations (49 CFR), Part 178 Specifications for Packagings, § 178.2 (c). In addition this Paragraph requires the closing information to be provided to any person to whom this package is transferred who may need to close the packaging prior to re-shipment. Furthermore, it is the shipper's responsibility as set forth in §173.22(a)(4) to ensure that these closing instructions are carried out as described. In order to ensure the instructions are followed in a manner to result in safe transport of hazardous materials the shipper is obligated, as set forth in § 172.704(a)(4), namely - function specific training - to train his/her employees in the correct way to close the packaging for shipment. In order to fulfill this obligation the shipper often turns to the packaging manufacturer for this training since the manufacturer has designed, produced and tested the packaging to meet UN performance standards. MAUSER is prepared to provide this training in addition to supplying closing instructions. It has been the practice of MAUSER to send closing instructions attached to the shipping documents with each shipment of drums. Below is some specific information on closing MAUSER packagings.

These closing instructions must be given to the individuals responsible for closing the packagings prior to shipment. Many companies use electronic copies as site specific work instructions and/or use laminated hard copies posted at the fill lines for reference by the fill line operators.

The following tables and text give examples of the parts and closing torque required to prepare the drum or IBC for shipment so that it is capable of meeting the performance standards indicated by the UN marking on the side or top of the packaging. **MAUSER stipulates that only parts that have been tested and certified by MAUSER be used to close the packagings for shipment.** Each closure is supplied with the proper gasket in accordance with the UN design type tests for the packaging supplied. In the case of removable head drums the lids, gaskets and locking rings are supplied as tested. In the case of Intermediate Bulk Containers, IBC's, the lid, gaskets, plugs, cages, pallets, valves and service equipment are supplied as tested.

Pictures of the plugs, lids and rings may be found on the website under products and services/accessories. If a specific closure is not listed on the website or your specific closure is not listed below, please contact MAUSER for assistance.

PRIOR TO CLOSING:

Inspect each closure to ensure that the closure has the proper gasket and that both closure and gasket are in good condition. Inspect the sealing surface for damage and make sure the threads and sealing surfaces are dry. Replace any defective gaskets, plugs or lids with new, defect free parts as listed in this design qualification. Use of components not listed in this design qualification voids the certification.

These procedures must be measurable and repeatable. Adjustable or torque indicating wrenches are recommended so that a reference of the settings is available. Further any tools used to close for shipment should be calibrated at least annually.

INTERMEDIATE BULK CONTAINERS

	IBC Type	Gasket Type	Torque
a	Bulkdrum II	Natural Rubber	70 ft.-lbs.
b	Bulkdrum III (obsolete)	Santoprene	70 ft.-lbs.
c	SM 275/330	Natural Rubber	70 ft.-lbs.
d	SM 275/330	EPDM	70 ft.-lbs.
e	SM 275/330	Viton	70 ft.-lbs.
f	Schütz cap inner receptacle—remanufactured IBC	EPDM/Viton	70 ft.-lbs.
g	Buttress Plug in Schütz cap—remanufactured IBC	EPDM/Viton	20 ft.-lbs.
h	2" plug in Standard lid, vented and solid (obsolete)	Gasketless & polypropylene	12 ft.-lbs.
i	2" plug in Standard lid, vented and solid	EPDM	20 ft.-lbs.

1. All UN 31HA1 and 31 HG1 Composite IBC's 49CFR § 178.707 (a) (5) that are supplied with lids, cages, pallets and service equipment must be **closed for shipment using only the components supplied and specified** in the design qualification tests for that IBC.
 - a. Place the lid with gasket in place on the top opening of the IBC.
 - b. Screw the lid by hand until the gasket is in contact with the sealing surface.
 - c. Using the lid adaptor and torque wrench tighten the lid to the recommended torque. Recommended torque is reached when the wrench releases or clicks.
 - d. Preset torque wrenches or adjustable torque wrenches are suitable for this procedure, adjustable wrenches are preferred. Either must be calibrated at least annually.

Closing Procedures for plugs and caps

The plug or cap is inserted into the appropriate opening and screwed down hand tight until the gasket is in contact with the sealing surface. A torque wrench capable of applying the proper torque to the fitting as specified by the closing instructions is then used to tighten the plug or cap until it reached the pre-set torque. The following are photographs of various torque wrenches MAUSER has found suitable to apply the required closing torque.

Date of Delivery of Closing Instructions: _____

Person to whom instructions were given: _____

Title of Person: _____

Company: _____

Address: _____

Signature: _____

Person delivering instructions: _____

Title of *supplier* representative: _____

Supplier location: _____

Signature of *Supplier* representative: _____

**SECTION 10
SIGNATURES**

Function	Signature	Date	Location (M#) ¹
PREPARER (S)	<i>Darren Wickes</i>	9-30-09	+CH
WITNESS (ES)	<i>Pedro Guenara</i>	9-30-09	M-4895
DIRECTOR, TECHNICAL & REGULATORY AFFAIRS	<i>Anthony B. Lopez</i>	9-30-09	+CH

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35 Cotters Lane
East Brunswick, NJ 08816
(732)353-7100
(732)353-7030 fax
www.mausergroup.com

**SECTION 11
MAUSER U.S. MANUFACTURING NUMBERS AND ADDRESSES**

Addison 1350 West Fullerton Road Addison, IL 60101 (630)628-2000	M-4232 Plastic Drums
Anniston 1800 Coleman Road Anniston, AL 36207 (256) 831-8441	M-4119 Composite IBC
Corporate Headquarters 35C Cotters Lane E. Brunswick, NJ 08816 (732) 353-7100	M-5445
Charlotte 1209 Tar Heel Road Charlotte, NC 28208 USA P:(704) 398-2325	M-5123 Plastic Drums
East Brunswick 35 Cotters La East Brunswick, NJ 08816 (732) 651-9717	M-4895 Plastic Drums Corporate Test Facility
Hebron 2340 Global Way Hebron, KY 41048 (859) 534-5540	M-5697 Composite IBC
Houston-Homestead 4004 Homestead Road Houston, TX 77028 (713)672-0580	M-4601 Steel Drums Composite IBC
Mt. Vernon 219 Commerce Drive Mt. Vernon, OH 43050 (740) 397-1762	M-4118 Composite IBC
Rancho Cucamonga 9449 Santa Anita Avenue Rancho Cucamonga, CA 91730 (909)980-7114	M-4602 Plastic Drums
Romeoville 1000 East 107th Street Lemont, IL 60439 (630)739-7700	M-4603 Plastic Drums
The Woodlands 410 South Trade Center Parkway Conroe, TX 77385 (936)273-3800	M-4235 Plastic Drums
Woodbridge 14 Convery Blvd. Woodbridge, NJ 07095 (732)634-6000	M-4599 Steel Drums