

Report#: 090930



DESIGN QUALIFICATION

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

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





TABLE OF CONTENTS

- 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
	Туре
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	Viton	
Thickness	<u>3.51 mm</u>	
Weight	<u>0.0286 Kg</u>	
Tare Weight (valve)	<u>0.3765 kg</u>	
Attachment Method		
Сар		
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	1263 kg	
max. capacity+ Outage)	1203 KY	
Weight of Package as	1251 ka	
filled:	1551 Kg	

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

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



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





PICTURE AS ASSEMBLED AND TESTED (follows)





MAUSER

WALL THICKNESS CHECK: SCHÜTZ HDPE BOTTLE

Wall thickness	Form/No.1007.	1.3					
Shift: Maus	er Corp Lab (+CF	<u>H) I</u>	Date:	8/	21/2009		
Inspector:	Darren Wickes	Mat	erial:	Schuetz	HDPE Bottle	9	
Separate sketches	from above	Э					
discharge side	disc	harge side		C	lischarge side		
If values are b	elow (min.) nom After that a ne	inal values w measure	machine pa ment must l	rameters h be carried o	ave to be adj out.	justed.	
If this measurem	ent is in order, t	the new values	ue should be	entered in	n the field "co	De tost	
	Newsing	Schutz	20	EDA	20	Re-lesi	
Measuring points in mm	Nominal (min.)	Actual value	correction	Actual value	correction	Actual value	correction
	()						
top 1	15	27					
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						



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		
Α	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	TIMÉ	RESULT	ANALYST
1	8/26/2009	10	PASS	Darren Wickes/Chris Lind
		IVIIIN		

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 AMBIE	RATURE = 3700	
SAMPLE	START	STOP	RESULT	ANALYST
NUMBER	DATE	DATE		
Α	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
Α	10:25 AM	11:25 AM	Pass	Darren Wickes	8/25/2009





00:58:00	100-40 FM 8/25/2019
a >> wetter	
74 12 10 1 12 24 10 10 10	
	(a) (c) (d) (d)
thetae Ana	
Same (Section Control)	
	See geden Dates

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 –	Lift 1 –	Lift 1 –	Lift 1 –	Following the test there was no
Pass	Pass	Pass	Pass	leakage from the IBC or visible
Lift 2 –	Lift 2 –	Lift 2 –	Lift 2 –	damage to the IBC that would render it
Pass	Pass	Pass	Pass	unsafe for transportation.
				·



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

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 ftlbs.
b	Bulkdrum III (obsolete)	Santoprene	70 ftlbs.
С	SM 275/330	Natural Rubber	70 ftlbs.
d	SM 275/330	EPDM	70 ftlbs.
е	SM 275/330	Viton	70 ftlbs.
f	Schütz cap inner receptacle—remanufactured IBC	EPDM/Viton	70 ftlbs.
g	Buttress Plug in Schütz cap—remanufactured IBC	EPDM/Viton	20 ftlbs.
h	2" plug in Standard lid, vented and solid (obsolete)	Gasketless & polypropylene	12 ftlbs.
T	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 wrenched 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)	Darren Wickes	9-30-09	+CH
WITNESS (ES)	Pedro Guevara	9-30-09	M-4895
DIRECTOR, TECHNICAL & REGULATORY AFFAIRS	Justifu B. La	9-30-09	+CH

MAUSER[®] (M-4895) (+CH) 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	M-4232
Addison, IL 60101	Plastic Drums
(630)628-2000	
Anniston	
1800 Coleman Road	M-4119
Anniston, AL 36207	Composite IBC
(256) 831-8441	
Corporate Headquarters	
35C Cotters Lane	M-5445
E. Brunswick, NJ 08816	
(732) 353-7100	
Charlotte	
1209 Tar Heel Road	M-5123
Charlotte, NC 28208 USA	Plastic Drums
P:(704) 398-2325	
East Brunswick	
35 Cotters La	M-4895
East Brunswick, NJ 08816	Plastic Drums
(732) 651-9717	Corporate Test Facility
Hebron	
2340 Global Way	M-5697
Hebron, KY 41048	Composite IBC
(859) 534-5540	
Houston-Homestead	
4004 Homestead Road	M-4601
Houston, TX 77028	Steel Drums
(713)672-0580	Composite IBC
Mt. Vernon	
219 Commerce Drive	M-4118
Mt. Vernon, OH 43050	Composite IBC
(740) 397-1762	
Bancho Cucamonga	
Alicho Cucanionga 0440 Santa Anita Avonuo	M_4602
Pancho Cucamonga, CA 01730	M-4002 Plastic Drums
(000)090-7114	
Bomoovillo	
1000 Fast 107 th Stroot	M-4603
	Plastic Drums
(620)720-7700	
(030)/39-7700	
The Woodlands	
410 South Trade Center Parkway	M-4235
Conroe, TX 77385	Plastic Drums
(936)273-3800	
Woodbridge	
14 Convery Blvd.	M-4599
Woodbridge, NJ 07095	Steel Drums
(732)634-6000	