Advanced Packaging
Technology Laboratories, Inc.
200 Larkin Drive ▪ Unit H ▪ Wheeling, Illinois 60090 ▪ ph: 847.520.4343 ▪ fx: 847.520.4365

laboratory report

Section 1

Re: Container MX 11 1250 DOT (UN)

Report Number: HM 12610
Date of Report: 6/3/2024
Date of Test: 5/23/2024

Test performed by: **Advanced Packaging Technology Laboratories, Inc.**
200 Larkin Drive, Unit H
Wheeling, IL 60090

Test conducted for: **Schuetz Container Systems**
200 Aspen Hill Road
North Branch, NJ 08876

Attention: Brian Minnich

Items tested: One (1) sample set of composite IBC's intended for the transport of hazardous liquids.

Container: 330 GAL/1250-liter HDPE rectangular receptacle inside steel frame work

Approximate Overall Dimensions on Pallet (O.D.): 47.75" L X 40" W X 53.25" H (Nestled Height: 52.5")

Nominal Tare Weight: 141.268 lbs.
Nominal Gross Weight: 4542.4 lbs.

Object of test: Design re-qualification testing to determine compliance with applicable sections of 49 CFR pertaining to the transport of dangerous goods – Packing Group II.

Findings: As submitted and tested, this package design was considered to comply with noted requirements.

un

31HA1 / Y / 06 24* / USA / +BR12410 / 3855 / 2060
Tare Weight: 64.07 kg

Marking is not to scale, for example purposes only. Marking must be in accordance with 178.3.
*indicates the month and last two digits of year of manufacture as per 178.703 (a) (1) (iv).

Expiration: This package certification expires 1 year from the date of this report.

Rafael Cameron
UN Senior Project Engineer

Charles Hernandez
UN/DOT Project Lead

Table of Contents

Section 2 - Package Description

IBC

Package Identification:	UN 31HA1
Manufacturer:	SCHUTZ, North Branch, NJ 08876
Tank Style:	Rectangular style container with rectangular tubular steel grid cage, bottom steel plate, corner protectors
Protector Material:	Black HDPE
Cage/Plate Material:	Galvanized steel
Palletized Base Material:	Galvanized steel
Manufacturing Method:	Frame: Welded and assembled with hardware Inner Receptacle: blow molded
Part Number:	Container MX 11 1250 DOT (UN)
Maker's Certification:	N/I

Overall Height	53.25	in (min)	1352.55	mm (min)
Nestled Stacking Height	52.5	in (min)	1352.55	mm (min)
Outer dimensions				
Length	47.75	in (min)	1212.85	mm (min)
Width	40	in (min)	1016	mm (min)
Height	53.25	in (min)	1352.55	mm (min)
Steel Framework Tare Weight	22680	grams	50	lbs.
Steel Palletized Base Tare Weight	16783.2	grams	37	lbs.
Hardware	119.8	grams	0.264	lbs.
Corner Protector Tare Weight	1180.8	grams	2.603	lbs.
Tubular style bracing bars	839.6	grams	1.85	lbs.

Quantity:	One (1)
Unique features:	None
Note:	• Unit was received with all components in place as a finished IBC • All item identifications are found in the drawing at the back of this report. Assembly is found in the drawings. The lab did not assemble this unit. • Four (4) corner protectors molded to protect the bottom corners of the inner receptacle (295.2 grams each) • Two (2) steel tubular style bars are used to secure the top of the container to steel frame.

Inner Receptacle

Manufacturer:	SCHUTZ, North Branch, NJ 08876						
Part number:	Container MX 11 1250 DOT (UN)						
Style:	330-gallon plastic receptacle						
Manufacturing method:	Extrusion blow molded						
Material:	Opaque "Natural" HDPE						
Location:	Inside steel framework						
Discharge Type:	DN50 HPDE screw butterfly valve with induction foil seal						
Indicated Capacity	330	Gallons	1249.05	Liters			
98% of Maximum Capacity	329.985	Gallons	1248.993	Liters			
Maximum Capacity	336.72	Gallons	1274.485	Liters			
Dimensions:	Diameter	N/A	in	N/A	mm		
	Length	45	in	1143	mm		
	Width	38.5	in	977.9	mm		
	Height	46.375	in	1177.925	mm		
Thickness range:		Minimum	Maximum		Minimum	Maximum	
	Top	0.139	0.214	in	3.53	5.435	mm
	Bottom	0.091	0.103	in	2.311	2.616	mm
	Sides	0.13	0.149	in	3.302	3.784	mm
Gram weight:	22226.4 grams (49 lbs.)						
Quantity:	One (1)						
Orientation:	See closure instructions						
Resin manufacturer:	Proprietary						
Resin grade:	Proprietary						
Melt-flow index:	Proprietary	g/10 min					
Density:	Proprietary	g/cm^3					
Note:	Outlet nozzle spout (42.3 grams) is shipped with receptacle.						

6" Receptacle Closure

Manufacturer:	SCHUTZ, North Branch, NJ 08876				
Part number:	DN 150				
Style:	Twist type screw cap with 2" top screw type opening				
Closure material:	Red HDPE, Opaque "Natural" HDPE				
Closure gram weight:	215.3 grams				
O-Ring material:	EDPM (Ethylene propylene Dien Monomer) Synthetic Rubber				
O-Ring gram weight:	12.1 grams				
Dimensions:	Diameter	7.45	in	189.23	mm
	Height	1.65	in	41.91	mm
	Thickness (min)	0.155	in	3.937	mm
O-Ring dimensions:	Diameter	5.96	in	151.384	mm
	Thickness (min)	0.23	in	5.842	mm
Application torque:	75 ft. lbs.				
Quantity:	One (1)				
Equipment:	Torque Wrench (1503MFRMH-QR)				

2" plug

Manufacturer:	SCHUTZ, North Branch, NJ 08876				
Part Number:	G2				
Style:	2" threaded bung plug				
Closure Material:	Opaque "Natural" Polypropylene				
Closure Gram Weight	22.1 grams				
Dimensions:	Diameter	2.46	in	62.484	mm
	Height	1.04	in	26.416	mm
	Thickness (min)	0.114	in	2.895	mm
Application Torque:	20 ft. lbs.				
Quantity:	One (1)				
Equipment:	Torque Wrench (1503MFRMH-QR)				

Additional Test Information

Overall tare weight of package:	141.268	lbs.	64.06	kg.
Test contents:	Methanol / water solution			
Specific Gravity	0.95			
Test weight of package:	2807.803	lbs.	1273.38	kg.
Authorized package gross weight based on SG:	4542.4	lbs.		

Equipment used to prepare the packages for testing

☐ Tape dispenser- ULINE, 2" wide hand-held, #H-150

☐ Tape dispenser- ULINE, 3" wide hand-held, #H-1162

☐ Glue gun- 3M Industrial, Set @ 220° F, # 75S9

☐ Poly bag sealer- MEC roller style, Set @ 410° F, #ME-803HW

☐ Bander- ULINE H-540/ H-572 strapping tensioner

☒ Hand assembled

☒ Other: Torque Wrench (1503MFRMH-QR)

☒ Other: Toyota Forklift Truck, #30690

Customer or Filler's (End-User's) Assembly & Closure Instructions

1. Third party testing laboratory received the IBC welded and assembled.
2. Remove cap and plug from top of IBC.
3. Fill IBC to correct weight and levels.
4. Seal and secure IBC 6" opening closed with 6" HDPE twist type cap and torque the cap to 75ft/lbs. with Torque Wrench (1503MFRMH-QR).
5. Seal G2 twist type bung cap on top of 6" HDPE twist type cap. Torque G2 cap to 20 ft. /lbs. with Torque Wrench (1503MFRMH-QR).

Package Preparation – For All Testing

The packages were filled to a minimum of 98% full (see Section 4 for calculation).

Package Panel Orientation – For All Test setups

Vibration Standard

Test Method: 49 CFR 178.819 using ASTM 999-08 (Method A1)

Test contents of inner containers:	Water			
Number of packages tested:	One (1)			
Weight of packages tested:	2807.803	lbs.		
Duration:	1 hour			
Frequency:	4.03	Hz	241.8	rpm

The packages were conditioned in accordance with 49 CFR 178.802 to 50% +/- 2% relative humidity at 23 °C +/- 2 °C for at least 24 hours. The samples were placed on the table and the steel shim (2" wide x 10" long by 1/16" thick, steel) was used (inserted a minimum of 4" under the test sample and along the full length of the IBC on all sides) to assist in adjusting the frequency.

Results

Package #	Pass / Fail	Description of Results
1	Pass	No visible damage or leakage. The IBC remained centered on the pallet. The pallet remained intact and all boards showed no signs of fatigue.

Pass/Fail Criteria

A packaging passes the vibration test if there is no rupture or leakage. The 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 contents of inner containers:	Water
Number of packages tested:	One (1)
Number of possible entry/lifting points:	Four (4)

The packages were conditioned in accordance with 49 CFR 178.802 to 50% +/- 2% relative humidity at 23 °C +/- 2 °C for at least 24 hours. The tested IBC was raised and lowered twice by a lift truck with the forks centrally positioned and spaced at three quarters of the dimension of the side of entry. The forks must penetrate to three quarters of the direction of entry. The test must be repeated from each possible direction of entry.

Bottom lift test weight:	5700.00	lbs.	2585.503	kg
Rounded up from required weight:	5677.50	lbs.	2575.297	kg

See Section 4 for Calculation

Results

Package #	Pass / Fail	Description of Results
1	Pass	No damage or leakage of contents. The package lifted clear of the ground without any IBC damage.

Stacking Test (Nestling Feature)

Test Method: 49 CFR 178.815

Free standing:	☒	Guided Load:	☐	
Packages tested:	One (1)	Test duration:	24	hours

The packages were conditioned in accordance with 49 CFR 178.802 to 50% +/- 2% relative humidity at 23 °C +/- 2 °C for at least 24 hours.

Stacking test weight:	8500.00	lbs.	3855.574	kg
Rounded up from:	8175.60	lbs.	3708.427	kg

See Section 4 for Calculation.

The stacking test load was applied to the top of the packages by loading the unit with the stacking test weight (above) and the weight was maintained for 24 hours.

Results

Package #	Pass / Fail	Description of Results
1	Pass	No damage or leakage of content. No change in appearance, looks like new.

Pass/Fail Criteria

No loss of contents and no permanent deformation which renders the corrugated intermediate bulk container unsafe for transportation, and no loss of content.

Drop Test
Test Method: 49 CFR 178.810

Test contents of inner containers:	Methanol / water solution	
Number of packages tested:	One (1)	
Drop height:	1.6	meters

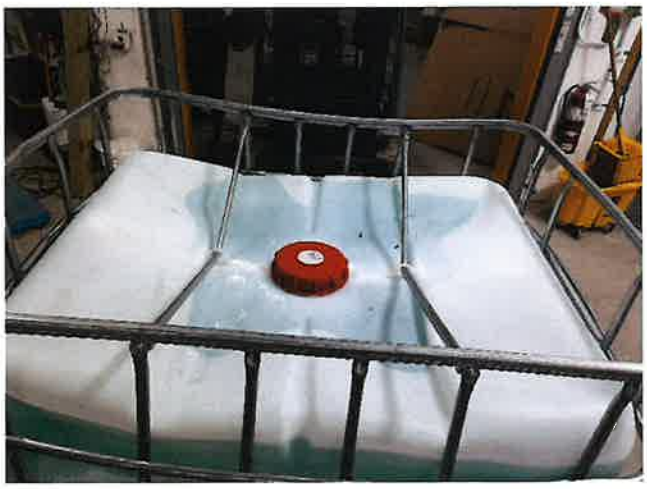
Testing was conducted to certify the package for Packing Group:	II	
Specific Gravity	1.6	
Weight of package as tested:	2807.803	lbs.

Conditioning
The packages were conditioned in accordance with 49 CFR 178.802 to -18 °C or lower for at least 24 hours. Drop testing was conducted within two (2) minutes after removing the test package from the conditioning chamber.

Results

Package #	Orientation	Results & Description
2	Bottom angled to corner no more than 5 degrees	Pass. Steel framework bowed outward on impact. Steel bags framework bowed outward. Container is able to be lifter through all 4 entry points. Top steel bracing bars bowed inward. Inner receptacle shows stress markings near all four (4) corner protectors. No leakage.

Pass/Fail Criteria
A package is considered to successfully pass the drop tests if no loss of contents is achieved. A slight discharge that stops flowing from a closure upon impact is not considered to be a failure of the intermediate bulk container if it stops.



Hydrostatic Pressure Test

Test Method: 49 CFR 178.814 10 minutes minimum duration.

Sample Number	Applied Pressure	Duration	Pass/Fail
IBC #1	100 kPa	30 min.	Pass

Pass/Fail Criteria

An IBC passes the hydrostatic test if for each test sample there is no leakage of liquid from the package.

Leakproofness Test

Test Method: 49 CFR 178.813 Duration determined by time necessary to check for leaks.

Sample Number	Applied Pressure	Duration	Pass/Fail
IBC #1	20 kPa	30 min.	Pass

Pass/Fail Criteria

No leakage

Stack Test Weight (Nestling Feature)

Load = 1.8 x N
N = combined maximum permissible gross mass of number of IBC's intended to be stacked.
S= Number of IBC's stacked on top. S=1
Where: N = S x 4542.4 lbs.
Required applied weight = 8175.6 lbs.

	Actual superimposed weight	8500.00	lbs.	3854.875	kg

Bottom Lift Test Weight

Load = 1.25 x Gross Mass
Required applied weight = 5677.5 lbs.

	Actual applied load	5700.00	lbs.	2585.034	kg

Section 4 - Calculations

Capacity

Capacity of IBC:	336.395	gallons	1273.255	liters

Weight of Test Package

Steel Framework:	22680	grams	22.68	kg	50	lbs.
Steel Base:	16783.2	grams	16.783	kg	37	lbs.
Inner Receptacle:	22226.4	grams	22.226	kg	49	lbs.
Closure and hardware:	2389.7	grams	2.389	kg	5.268	lbs.
Total:	64079.3	grams	64.079	kg	141.268	lbs.

Filled Test Package Weight

Weight of fill (100% full):	2666.535	lbs.	1209.312	kg
Weight of filled package:	2807.803	lbs.	1273.38	kg

Drop Test Height

Maximum specific gravity of certification:	1.6	
Packing group of certification:	II	
Drop height:	1.6	meters

Note: Drop Height was adjusted as per 178.810 (d) (3) (ii)

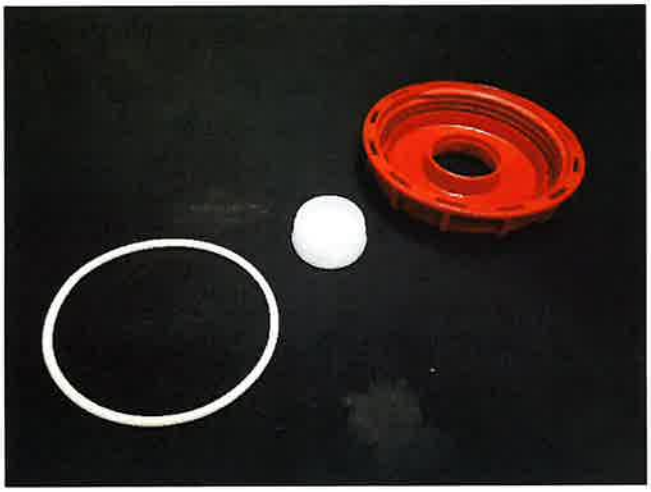
Marked Weight to Accommodate Actual Product

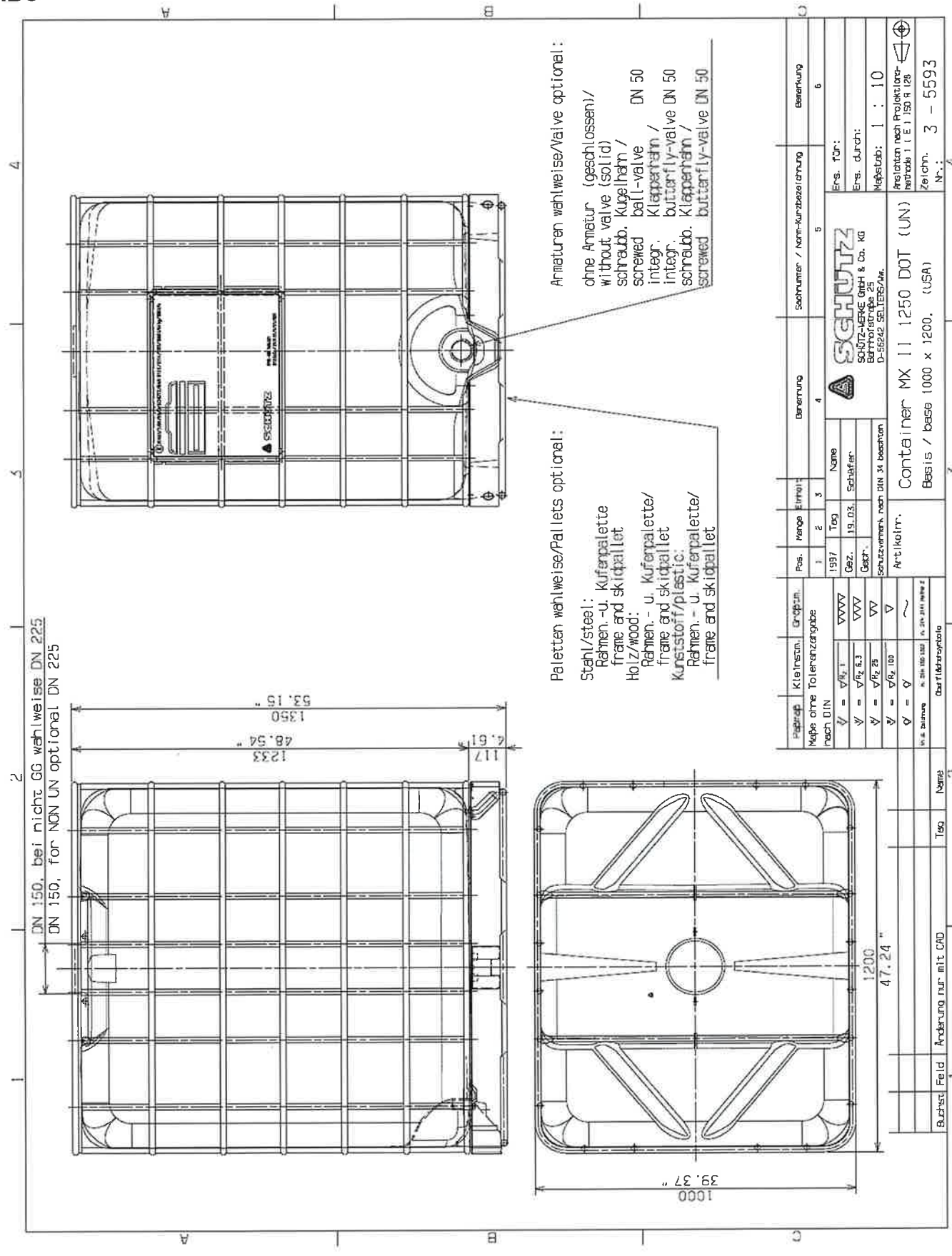
Weight of fill	4401.186	lbs.	1996.002	kg
Total tare weight	141.268	lbs.	64.067	kg
Weight of fill + Tare weight	4542.454	lbs.	2060.069	kg
Marked weight rounded down	4542.4	lbs.	2060	kg

Certified Weights

Certified actual product weight	4401.186	lbs.	1996.364	kg
Certified product weight + Tare weight	4542.454	lbs.	2060.443	kg
Certified gross weight (rounded down)	4542.4	lbs.	2060	kg

Section 5 - Drawings and Pictures of Packaging Components




Armaturen wahlweise/Valve optional:
ohne Armatur (geschlossen)/
without valve (solid)
schraubb. Kugelhahn /
screwed ball-valve DN 50
integr. Klappenhahn /
integr. butterfly-valve DN 50
schraubb. Klappenhahn /
screwed butterfly-valve DN 50
Paletten wahlweise/Pallets optional:
Stahl/steel:
Rahmen.-u. Kufenpalette
frame and skidpallet
Holz/wood:
Rahmen. - u. Kufenpalette/
frame and skidpallet
Kunststoff/plastic:
Rahmen. - u. Kufenpalette/
frame and skidpallet
DN 150, bei nicht GG wahlweise DN 225
DN 150, for NON UN optional DN 225
53.15 "
1350
48.54 "
1233
4.61
117
39.37 "
1000
47.24 "
1200
SCHÜTZ
SCHÜTZ-WERKE GmbH & Co. KG
Bahnhofstraße 25
D-56242 SELTERS/Ww.
Container MX 11 1250 DOT (UN)
Basis / base 1000 x 1200, (USA)
Ers. für:
Ers. durch:
Maßstab: 1 : 10
Zeichn. Nr.: 3 - 5593

Appendix A - Test Equipment and Instrumentation

Instrument or Equipment	Manufacturer	Model Number	Serial Number
Gram Scale	Mettler Toledo	PG4002-S	1122253714
Electronic Scale	American Scientific Products	TL-1600S	19538
Vibration Table	MTS	840	381A
Compression Tester	Tinius-Olsen	Electromatic	62560
Digital Micrometer	Mitutoyo	Digimatic	29376130
Mechanical Micrometer	Mitutoyo	MIC	LFM-1
Puncture Tester	TMI	A942	A942
Conditioning Chamber #2	Midwest Labs	922A	55455
Conditioning Chamber #6	Thermotron	SM-16C	23409
Conditioning Chamber #12	Thermotron	SM-16C	23408
Conditioning Chamber #16	Thermotron	SM-32C	42371
Drop Hook	Vestil	LM-HP	N/A
Fork Lift	Caterpillar	GC25K	AT 82C-90656
Fork Lift	Allis Chalbers	ACC40 PS	ALF111630

Calibration reports, certifications or additional information available upon request.

Appendix B - Definitions / Abbreviations / Conversions

Definitions

Proprietary – Customer was unable to obtain the required data or the MFG refused to provide this data due to trade secrets.

Types of Fiberboard: Single - wall **(SW)**, Double - wall **(DW)**, Triple - wall **(TW)**

Abbreviations

MD - Machine direction
CMD - Cross direction
N/A - Not applicable
N/T - Not tested
N/I - Not indicated
DNA - Does not apply
MSF – 1000 square feet
B/A – Board analysis

Conversions

1 gallon water = 8.344 lbs.
1 mm = 25.4 inches
1 kg. = 2.2046 lbs.
1 ounce = 28.349 grams
meters^3 = 0.028 ft^3
1 fl. Oz. = 29.573 cc
mils = inches / 0.001
1 meters = 39.369 inches
1 meters = 3.28 feet
1 lbs. = 453.6 grams
1 gal = 3.785 liters