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: ECOBULK 330 gal. MX 330 UN

Report Number: HM 12674
Date of Report: 7/25/2024
Date of Test: 7/15/2024

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.): 47.5" L X 39.25" W X 53.25" H

Nominal Tare Weight: 151.389 lbs.
Nominal Gross Weight: 4549.8 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 / 07 24* / USA / +BR12469 / 3855 / 2063
Tare Weight: 68.67 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

www.advanced-labs.com
Advanced Packaging Technology Labs does not provide any warranty that the tested packaging will perform as designed during its end use. In no event will APTL's liability exceed the costs of the testing services provided. As a mutual protection for our clients and APTL, all reports are submitted as the confidential property of our clients and authorization for publication is reserved pending written approval. Samples will be disposed of 10 days after testing is completed unless other arrangements are agreed to in writing.

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/Black HDPE
Manufacturing Method:	Frame: Welded and assembled with hardware Inner Receptacle: blow molded
Part Number:	ECOBULK 330 gal. MX 330 UN
Maker's Certification:	31HA1/Y/06 24/USA/+AA6155/ 3855/2060/1250L/69KG/100 kPa Scheutz4

Overall Height	53.25	in (min)	1352.55	mm (min)
Nestled Stacking Height	N/A	in (min)	1352.55	mm (min)
Outer dimensions				
Length	47.5	in (min)	1206.5	mm (min)
Width	39.25	in (min)	996.95	mm (min)
Height	53.25	in (min)	1352.55	mm (min)
Steel Framework Tare Weight	24494.4	grams	54	lbs.
Steel Bottom Plastic Palletized Base Tare Weight	20412	grams	45	lbs.
Hardware	209.9	grams	0.462	lbs.
Corner Protector Tare Weight	1150.8	grams	2.537	lbs.
Tubular style bracing bars	827.6	grams	1.824	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 (287.7 grams each) molded to protect the bottom corners of the inner receptacle • Two (2) steel tubular style bars (413.8 grams each) 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	329.461	Gallons	1247.009	Liters			
Maximum Capacity	336.185	Gallons	1272.46	Liters			
Dimensions:	Diameter	N/A	in	N/A	mm		
	Length	44.75	in	1136.65	mm		
	Width	37.75	in	958.85	mm		
	Height	47	in	1193.8	mm		
Thickness range:		Minimum	Maximum		Minimum	Maximum	
	Top	0.164	0.217	in	4.165	5.511	mm
	Bottom	0.084	0.162	in	2.133	4.114	mm
	Sides	0.115	0.139	in	2.921	3.53	mm
Gram weight:	21319.2 grams (47 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:	215.2 grams				
O-Ring material:	EDPM (Ethylene propylene Dien Monomer) Synthetic Rubber				
O-Ring gram weight:	12.0 grams				
Dimensions:	Diameter	7.41	in	188.214	mm
	Height	1.68	in	42.672	mm
	Thickness (min)	0.154	in	3.911	mm
O-Ring dimensions:	Diameter	6.07	in	154.178	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	29.4 grams				
Dimensions:	Diameter	2.46	in	62.484	mm
	Height	1.24	in	31.496	mm
	Thickness (min)	0.124	in	3.149	mm
Application Torque:	20 ft. lbs.				
Quantity:	One (1)				
Equipment:	Torque Wrench (1503MFRMH-QR)				

Additional Test Information

Overall tare weight of package:	151.389	lbs.	68.65	kg.
Test contents:	Methanol / water solution			
Specific Gravity	0.95			
Test weight of package:	2816.26	lbs.	1277.21	kg.
Authorized package gross weight based on SG:	4549.8		lbs.	

Third-Party Laboratory Assembly and 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).

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

SCHUETZ
packaging update

PACKAGING CLOSURE INFORMATION
March 22, 2023

CLOSURE SPECIFICATIONS FOR TIGHT HEAD DRUMS

PLUGS MUST BE TORQUED TO THE FOLLOWING

2" NPS AND 2" BUTTRESS - 20 FT LBS.
Dip tubes - 20 ft lbs 3/4" NPT - 9 FT LBS
Note: Closures must have gaskets to seal

CLOSURE SPECIFICATIONS FOR OPEN HEAD DRUMS

CLOSE AND SECURE LID WITH LOCKING RING - ATTACH HOLDING PIN FOR HANDLE TO KEEP RING CLOSED.

PLUGS MUST BE TORQUED TO THE FOLLOWING :
2" NPS AND 2" BUTTRESS - 20 FT LBS
3/4" NPS - 9 FT LBS
note: closures must have gaskets to seal

CLOSURE SPECIFICATIONS FOR IBC'S

FILL PORT CAP MUST BE TORQUED TO THE FOLLOWING:

6" AND 9" FILL PORT CAP - 75 FT LBS

2" plug in 6" or 9" fill port cap must be torqued to *17 ft lbs*. (Schuetz does not recommend that you remove this plug. Filling should be done through the 6" or 9" opening)
*** 56 x 4 mm and 2" buttress plug - 20 ft lbs**

Dip tubes - 20 ft lbs

Old style valves and EVOH valves
VALVE NUT - 55 FT LBS
Note: caps, valves, and plugs must have gaskets to seal

New Style valves – the valves are molded on and can not be replaced.

*** - Underline italic indicates the latest change to the instructions.**

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:	2816.26	lbs.		
Duration:	1 hour			
Frequency:	4.1	Hz	246	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 20" long by 1/16" thick, steel) was used (inserted a minimum of 10" 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:	5686.25	lbs.	2579.266	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:	8188.20	lbs.	3714.143	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:	2816.26	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 4549.8 lbs.
Required applied weight = 8188.2 lbs.

Actual superimposed weight	8500.00	lbs.	3854.875	kg	

Bottom Lift Test Weight

Load = 1.25 x Gross Mass
Required applied weight = 5686.25 lbs.

Actual applied load	5700.00	lbs.	2585.034	kg	

Section 4 - Calculations

Capacity

Capacity of IBC:	336.185	gallons	1272.46	liters

Weight of Test Package

Steel Framework:	21319.2	grams	21.319	kg	47	lbs.
Steel Base:	20412	grams	20.412	kg	45	lbs.
Inner Receptacle:	24494.4	grams	24.494	kg	54	lbs.
Closure and hardware:	2444.9	grams	2.444	kg	5.389	lbs.
Total:	68670.5	grams	68.67	kg	151.389	lbs.

Filled Test Package Weight

Weight of fill (100% full):	2664.871	lbs.	1208.558	kg
Weight of filled package:	2816.26	lbs.	1277.215	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)

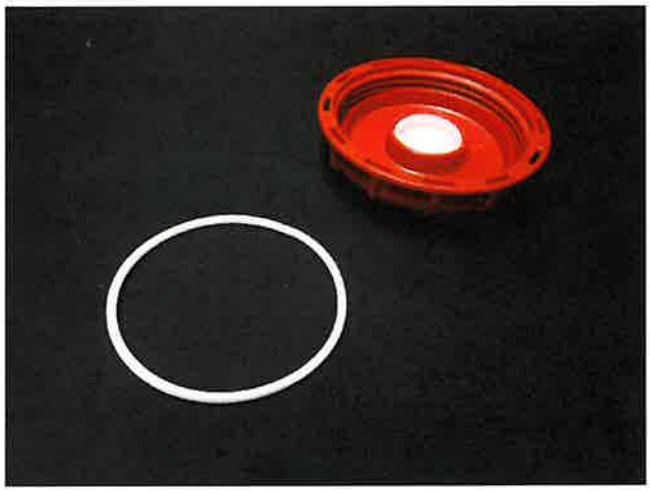
Marked Weight to Accommodate Actual Product

Weight of fill	4398.436	lbs.	1994.755	kg
Total tare weight	151.389	lbs.	68.657	kg
Weight of fill + Tare weight	4549.825	lbs.	2063.412	kg
Marked weight rounded down	4549.8	lbs.	2063	kg

Certified Weights

Certified actual product weight	4398.436	lbs.	1995.117	kg
Certified product weight + Tare weight	4549.825	lbs.	2063.787	kg
Certified gross weight (rounded down)	4549.8	lbs.	2063	kg

Section 5 - Drawings and Pictures of Packaging Components



Packaging - Specification
ECOBULK

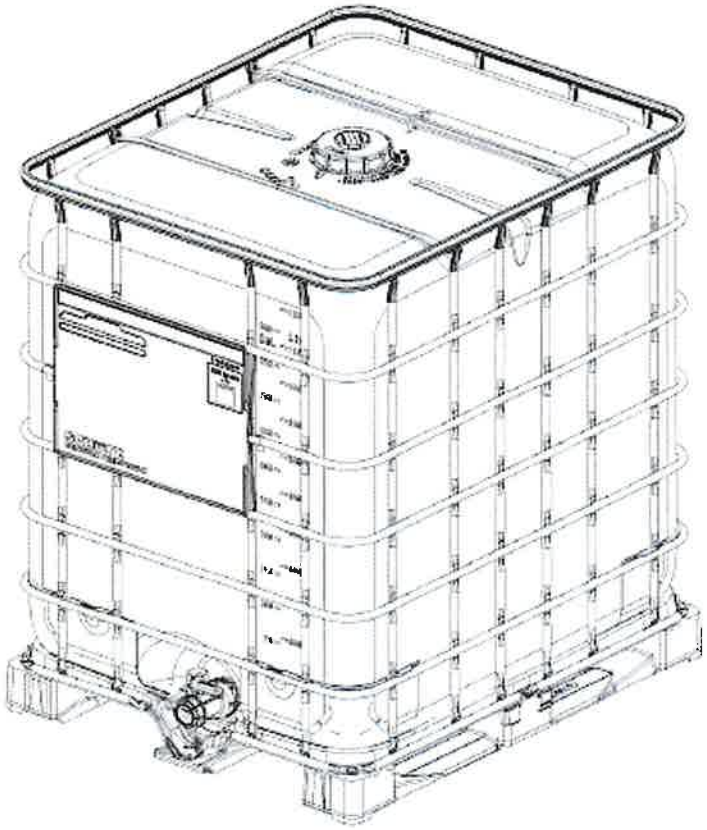
SCHÜTZ

Transportcontainer ECOBULK 330 gal.
MX330 UN Nat/6"R TP 2"Solid+T
int.Ball 50 VI NPS 3PCA/Plast skid
2-Plt XL:XL

Schuetz Container Systems Inc.
200 Aspen Hill Road
NORTH BRANCH NJ 08876
USA

Article-No. 889288

Date Jun 12, 2024
Page 1 / 4



These pictures are for illustration purposes only and do not necessarily correspond to the specified products.

Weights and measures

Nominal Capacity	1,250 l	330 gal US
Brimful Capacity	1,260 l	332.863 gal US
Length	1,200 mm	47.240 in
Width	1,000 mm	39.370 in
Height with pallet	1,350 mm	53.150 in
Weight total approx	70.2 kg	154.7 lbs US

Pallet

Pallet type	Plastic-skidpallet

Transportcontainer ECOBULK 330 gal.
MX330 UN Nat/6"R TP 2"Solid+T
int.Ball 50 VI NPS 3PCA/Plast skid
2-Plt XL:XL

Schuetz Container Systems Inc.
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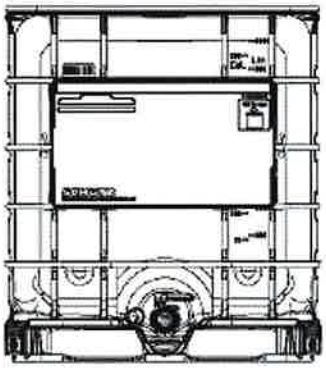
Article-No. 889288

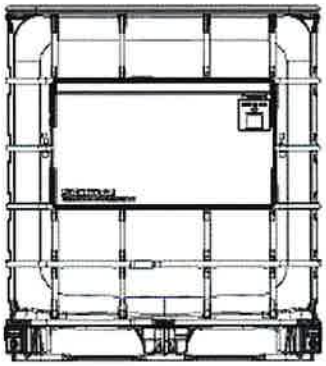
Date Jun 12, 2024

Opening height	min. 90mm, 4-way entry

Outer container

Grid	Steel, galvanized
Bottom plate	Steel, galvanized
Corner protector	black
Label plate	extra large - 8 field, with Schütz-Ticket
additional label plate	backside extra large - 8 field





Inner container

Rectangular blow molded tank of high density polyethylene

Container	PE-HD, natural

Filling opening

Screw cap	DN150 / 6", PE-HD, red
O-ring gasket	TPE
Sealing-cap	red

Packaging - Specification
ECOBULK

SCHÜTZ

Transportcontainer ECOBULK 330 gal.
MX330 UN Nat/6"R TP 2"Solid+T
int.Ball 50 VI NPS 3PCA/Plast skid
2-Plt XL:XL

Schuetz Container Systems Inc.
200 Aspen Hill Road
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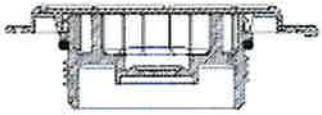
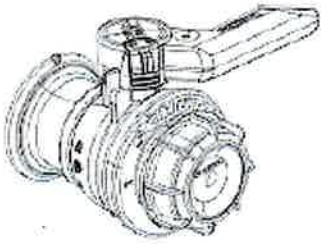
Page 3 / 4

Plug G2 Plug closed with Seal cap



Discharge opening

Outlet valve	ball-valve DN50/2", integrated
Case	PE-HD
Connection thread	2"NPS
Flap gasket / Ball gasket	FKM
Handle color	grey, Handle protection
Screw cap	PE-HD
Screw cap gasket	PE, foamed
Screw cap color	grey
Outlet nozzle	PE-HD



Features

UN-Marking
UN31HA1/Y/MM YY/USA/+AA6155/~3726/2045/1250L/68KG/100KPA SCHUETZ#

Heavy metals
Concentration level of heavy metals (Pb, Cd, Cr VI and Hg) in packaging does not exceed 100 ppm

Delivery
Ready for filling. The customer or filler is responsible for testing the material compatibility of the filling material with the packaging

This specification is manufactured and delivered in accordance with the current status of the SCHÜTZ "Quality Management Standard for Supplies of Packaging Materials", which you can view at the following link:
www.schuetz.net/qmstandard

The maximum filling temperature depends on the respective filling product (specific heat capacity), but must not

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