

**UNITED NATIONS / DOT
PERFORMANCE CERTIFICATION**




4G PERIODIC RETEST

4 x 1 Gallon Round Plastic Bottle Packaging Designs:

- 1) 38-400 Tamper Evident Closure & Shipper Taped Top and Bottom Flaps**
- 2) 38-400 Tamper Evident Closure & Shipper Taped Top and Hot Melt Glued Bottom Flaps**
- 3) 38-400 Closure & Shipper Taped Top and Bottom Flaps**
- 4) 38-400 Closure & Shipper Taped Top and Hot Melt Glued Bottom Flaps**

TEST REPORT #: 16-CA20099

 4G / Y21.9 / S / **
USA / +CC8078

**Insert the year packaging is manufactured

TESTING PERFORMED FOR:

PUREPAK TECHNOLOGY CORPORATION

324 South Bracken Lane Suite 3
Chandler, AZ 85224

ATTN: Mike Dodd

TESTING PERFORMED BY:

TEN-E PACKAGING SERVICES, INC.

326 North Corona Avenue
Ontario, CA 91764
Phone: 909-937-1260
Fax: 909-937-1262

May 27, 2016

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SECTION I: CERTIFICATION

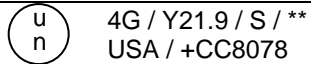
**Periodic Retest of the PurePak Technology Corporation
 4 x 1 Gallon Round Plastic Bottle Packaging Designs:**

- 1) 38-400 Tamper Evident Closure & Shipper Taped Top and Bottom Flaps
- 2) 38-400 Tamper Evident Closure & Shipper Taped Top and Hot Melt Glued Bottom Flaps
- 3) 38-400 Closure & Shipper Taped Top and Bottom Flaps
- 4) 38-400 Closure & Shipper Taped Top and Hot Melt Glued Bottom Flaps

TEN-E Packaging Services, Inc. is a current DOT UN Third-Party Certification Agency under §107.403 and certifies that the **PurePak Technology Corporation** packaging referenced above has passed the standards of the DEPARTMENT OF TRANSPORTATION'S TITLE 49 CFR; Performance Oriented Packaging Standards, Section 178. This package is also certified under IMDG, ICAO/IATA Regulations and the UN Recommendations on the Transport of Dangerous Goods. It is the responsibility of the end user to determine authorization for use under these regulations. The use of other packaging methods or components other than those documented in this report may render this certification invalid.

SUMMARY OF PERFORMANCE TESTS

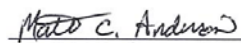
UN / DOT TEST	CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Drop	178.603	1.4 m	Methanol/Water Solution	May 25, 2016	PASS
Stacking 1 & 3	178.606	181.4 Kg – 24 Hours	Empty	May 26, 2016	PASS
Stacking 2 & 4	178.606	181.4 Kg – 24 Hours	Empty	May 27, 2016	PASS
Pressure	173.27	95 kPa - 30 Minutes	Water	May 25, 2016	PASS
Vibration	178.608	4.0 Hz – 1 Hour	Water	May 26, 2016	PASS
Cobb	178.516	30 Minutes	---	May 23, 2016	PASS

TEST REPORT NUMBER(S):	16-CA20099, 14-7068
UN MARKING: (CFR 49 – 178.503)	
PACKAGING IDENTIFICATION CODE:	4G - Fiberboard Box (178.516)
PERFORMANCE STANDARD:	Y (Packaging meets Packing Group II and III tests)
AUTHORIZED GROSS MASS:	21.9 Kg (48.2 Lbs.)
"S" DESIGNATION:	Denotes Inner Packagings
YEAR OF MANUFACTURE:	** Insert year the packaging is manufactured
STATE AUTHORIZING THE MARK	USA
PACKAGING CERTIFICATION AGENCY:	(+CC) TEN-E Packaging Services, Inc. (Ontario, CA CAA #2006030021)
THIRD PARTY PACKAGING IDENTIFICATION:	+CC8078
PERIODIC RETEST DATE:	May 27, 2018

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABILITY OR FIT FOR A PARTICULAR PURPOSE, ARE DISCLAIMED. In no event shall TEN-E Packaging Services, Inc. liability exceed the total amount paid by **PurePak Technology Corporation** for services rendered. In the event of future changes to the above referenced test standards, it is the responsibility of **PurePak Technology Corporation** 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.


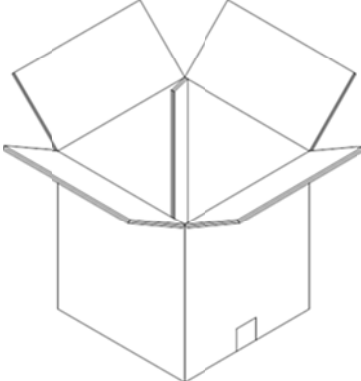

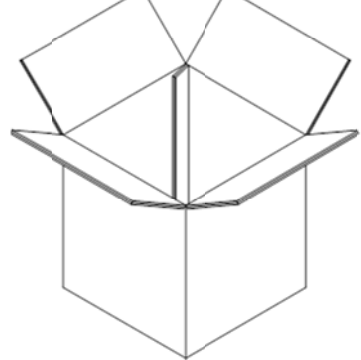
MANUFACTURER:

PurePak Technology Corporation
 324 South Bracken Lane
 Suite 3
 Chandler, AZ 85224


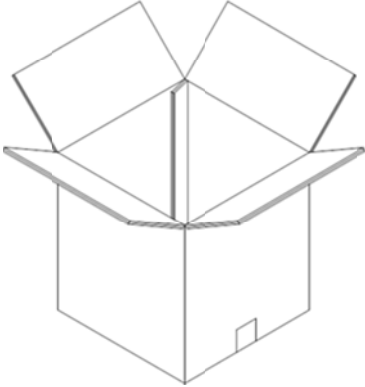

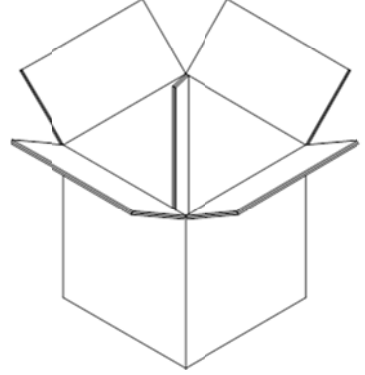

 Matt C. Anderson
 Project Manager
 TEN-E Packaging Services, Inc.

SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS

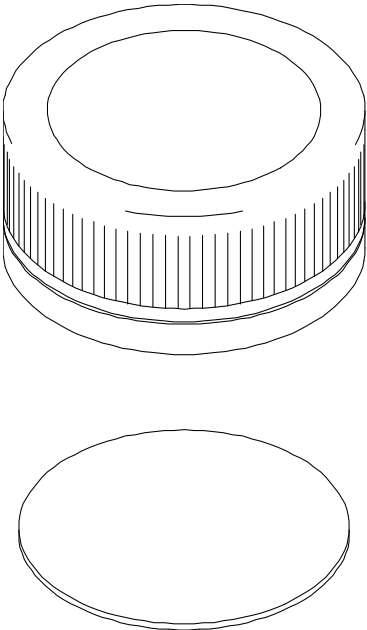
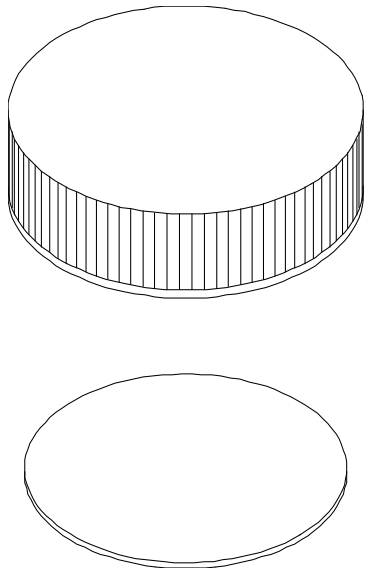
4 x 1 Gallon Round Plastic Bottle with 38-400 Tamper Evident Closure Packaging with Taped Top Flaps and Bottom Flaps or Hot Melt Glued Bottom Flaps

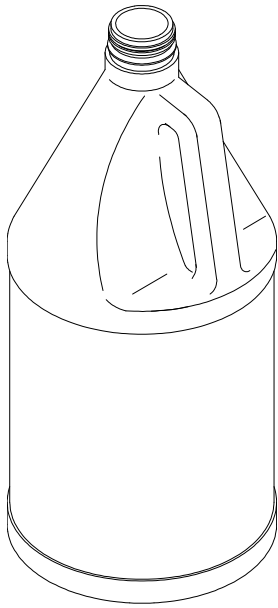
ASSEMBLY DRAWING	TEST LEVELS
	Certification Type: Periodic Retest
	Packaging Code Designation: 4G
	Packing Group: II
	Specific Gravity: 1.4
	Internal Pressure: 95 kPa
	TEST SAMPLE PREPARATION (Refer to Section IV)
	Overall Packaging Tare Weight: 1,256.0 Grams
	Fill Capacity (98% Maximum Capacity): Methanol/Water Solution 3,738.8 Grams Water 3,890.6 Grams
	Package Test Weight: Methanol/Water Solution 16.2 Kg 35.7 Lbs. Water 16.8 Kg 37.0 Lbs.
	Authorized Package Gross Mass: 23.0 Kg 50.7 Lbs.
	CLOSING METHODS – INNER PACKAGING
	Application Torque: 50 In-Lbs
	Equipment: Kaps All Electronic Torque Tester
	CLOSING METHODS – SHIPPER
	Top Flaps:
	Manufacturer: 3M St. Paul, MN
	Type: 3M #34508 Scotch Tape (Supplied by PurePak)
	Width: 48 mm (2")
	Overlap: 2" Minimum
	Tape Pattern: Center Seam
	Inner Flaps: Meet
	Outer Flaps: Meet
	Bottom Flaps:
Manufacturer: 3M St. Paul, MN	
Type: Tape: 3M #34508 Scotch Tape (Supplied by PurePak) or Hot Melt Glued: Prepared by PurePak	
Width: 48mm (2")	
Overlap: 2" Minimum	
Tape Pattern: Center Seam	
Inner Flaps: Meet	
Outer Flaps: Meet	

4 x 1 Gallon Round Plastic Bottle with 38-400 Standard Closure Packaging with Taped Top Flaps and Bottom Flaps or Hot Melt Glued Bottom Flaps

ASSEMBLY DRAWING	TEST LEVELS	
	Certification Type:	Periodic Retest
	Packaging Code Designation:	4G
	Packing Group:	II
	Specific Gravity:	1.4
	Internal Pressure:	95 kPa
	TEST SAMPLE PREPARATION (Refer to Section IV)	
	Overall Packaging Tare Weight:	1,248.0 Grams
	Fill Capacity (98% Maximum Capacity):	
	Methanol/Water Solution	3,738.8 Grams
	Water	3,890.6 Grams
	Package Test Weight:	
	Methanol/Water Solution	16.2 Kg 35.7 Lbs.
	Water	16.8 Kg 37.0 Lbs.
	Authorized Package Gross Mass:	23.0 Kg 50.7 Lbs.
	CLOSING METHODS – INNER PACKAGING	
	Application Torque:	50 In-Lbs
	Equipment:	Kaps All Electronic Torque Tester
	CLOSING METHODS – SHIPPER	
	Top Flaps:	
	Manufacturer:	3M St. Paul, MN
	Type:	3M #34508 Scotch Tape (Supplied by PurePak)
	Width:	48 mm (2")
	Overlap:	2" Minimum
	Tape Pattern:	Center Seam
	Inner Flaps:	Meet
	Outer Flaps:	Meet
	Bottom Flaps:	
	Manufacturer:	3M St. Paul, MN
Type:	Tape: 3M #34508 Scotch Tape (Supplied by PurePak) or Hot Melt Glued: Prepared by PurePak	
Width:	48 mm (2")	
Overlap:	2" Minimum	
Tape Pattern:	Center Seam	
Inner Flaps:	Meet	
Outer Flaps:	Meet	

COMPONENT INFORMATION

CLOSURE (Drawing #: CA38-18 Rev B)		DRAWING
Manufacturer: Hoffer Plastics Corp., So. Elgin, IL		
Description:	38mm Tamper Evident Threaded Closure Drop-Lok	
Quantity:	4	
Material:	Polypropylene	
Tare Weight:	4.26 Grams	
Overall Dimensions:		
• Height	0.745" ± 0.015"	
• Diameter	1.590" ± 0.015"	
Thread:		
• Type	38mm	
• Style	400	
Finish Dimensions:		
• T	1.470" ± 0.010"	
• E	1.370" ± 0.010"	
• Thread	8 Threads Per Inch	
Markings (QC Audit):	45 HP	
Liner:		
Description:	P.E. Foam Liner	
Tare Weight:	0.38 Grams	
Thickness:	0.032"	
Diameter:	1.458"	
CLOSURE (Drawing #: 21015155-C)		DRAWING
Manufacturer: Berry Plastics Corporation, Evansville, IN		
Description:	38mm Standard Threaded Closure	
Quantity:	4	
Material:	Polypropylene	
Tare Weight:	3.34 Grams	
Overall Dimensions:		
• Height	0.457"	
• Diameter	1.598"	
Thread:		
• Type	38mm	
• Style	400	
Finish Dimensions:		
• T	1.486" ± 0.007"	
• E	1.390" ± 0.007"	
• Thread	6 Pitch	
Markings (QC Audit):	27	
Liner:		
Description:	P.E. Foam Liner	
Tare Weight:	0.36 Grams	
Thickness:	0.028"	
Diameter:	1.468"	

PLASTIC BOTTLE (100036)		DRAWING
Manufacturer: PurePak, Chandler, AZ		
Description:	1 Gallon Round Plastic Bottle	
Quantity:	4	
Material/Pigment:	High Density Polyethylene / Natural	
Method of Manufacture:	Blow Molded	
Tare Weight:	130 Grams ± 6 Grams	
Capacity:		
• Rated	1.0 Gallon	
• Overflow	3,970.0.0 Grams (1.0 Gallons)	
Overall Dimensions:		
• Height	12.350" ± 0.090"	
• Diameter	6.002" ± 0.080"	
Thread Dimensions:		
• T	1.459" ± 0.012"	
• E	1.363" ± 0.012"	
• Pitch	0.125"	
Wall Thickness:		
• Minimum	0.020"	
Markings (QC Audit):	SPI "2" HDPE Recycling Symbol 4 C168-1 BERRY PLASTICS M4609 A032114 08:51/4430 1/14	

SHIPPER (Part #: 733744)

Manufacturer: PCA, Phoenix, AZ

Description: Regular Slotted Container

Material/Flute (Inner to Outer): 51 ECT Double Wall Natural Kraft Corrugated Fiberboard; B/C-Flute

Basis Weight (Outer to Inner) Lbs./MSF:

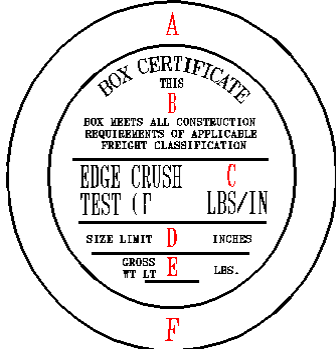
• **Specification** 35 / 23 / 35 /23 / 35

Tare Weight: 722.0 Grams

DIMENSIONS

	Specification Dimensions (Inside)	Measured Dimensions (Outside)
• Length	12.3125"	13-1/8"
• Width	12.3125"	12-7/8"
• Height	12.625"	13-7/8"
Board Caliper (Nominal):	0.235"	
Manufacturer's Joint:	Inside Glued, 1-3/8" Lap	
Markings (QC Audit):	<div style="display: flex; justify-content: space-between;"> <div style="text-align: left;"> <p>u n</p> <p>4G/Y21.9/S/16 USA/+CC8078</p> <p>HANDLE WITH CARE THIS SIDE UP 6664443 12.3125 X 12.3125 X 12.625 ID</p> </div> <div style="text-align: right;"> <p>733744 ARTWORK DATE 01/15/16</p> </div> </div>	

BOX CERTIFICATE

(A) Corrugated Manufacturer:	-----	
(B) Structure:	Double Wall	
(C) ECT:	51 Lbs. Per Sq. Inch	
(D) Size Limit:	105"	
(E) Gross Wt. Lt:	120 Lbs.	
(F) Location:	-----	







SECTION III: TEST PROCEDURES AND RESULTS

DROP TESTS

Variable #1

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.961 SG)	<ul style="list-style-type: none"> For packaging containing liquid, each packaging does not leak. There can be no damage to the outer packaging likely to adversely affect safety during transport. Inner receptacles, inner packagings or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner packaging. Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #W201	
CONTENTS TEMP.:	-18.6°C (-1.48°F)	
DROP HEIGHT:	1.4 Meters (56.0") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #1: Flat on Bottom	Sample #2: Flat on Top	*Sample #3: Flat on Long Side
		
PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.
*Sample #4: Flat on Short Side	*Sample #5: Bottom Corner	**Sample #1: Top Corner
		
PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.

*Side and corner drops were conducted to impact the manufacturer's joint.







**Flat on bottom drop sample was also used for the top corner drop.

DROP TESTS

Variable #2

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.961 SG)	<ul style="list-style-type: none"> For packaging containing liquid, each packaging does not leak. There can be no damage to the outer packaging likely to adversely affect safety during transport. Inner receptacles, inner packagings or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner packaging. Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #W201	
CONTENTS TEMP.:	-18.4°C (-1.12°F)	
DROP HEIGHT:	1.4 Meters (56.0") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #12: Flat on Bottom	Sample #13: Flat on Top	*Sample #14: Flat on Long Side
		
PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.
*Sample #15: Flat on Short Side	*Sample #16: Bottom Corner	**Sample #12: Top Corner
		
PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.

*Side and corner drops were conducted to impact the manufacturer's joint.







**Flat on bottom drop sample was also used for the top corner drop.

DROP TESTS

Variable #3

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.961 SG)	<ul style="list-style-type: none"> For packaging containing liquid, each packaging does not leak. There can be no damage to the outer packaging likely to adversely affect safety during transport. Inner receptacles, inner packagings or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner packaging. Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #W201	
CONTENTS TEMP.:	-18.6°C (-1.48°F)	
DROP HEIGHT:	1.4 Meters (56.0") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #19: Flat on Bottom	Sample #20: Flat on Top	*Sample #21: Flat on Long Side
		
PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.
*Sample #22: Flat on Short Side	*Sample #23: Bottom Corner	**Sample #19: Top Corner
		
PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.

*Side and corner drops were conducted to impact the manufacturer's joint.







**Flat on bottom drop sample was also used for the top corner drop.

DROP TESTS

Variable #4

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.961 SG)	<ul style="list-style-type: none"> • For packaging containing liquid, each packaging does not leak. • There can be no damage to the outer packaging likely to adversely affect safety during transport. Inner receptacles, inner packagings or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner packaging. • Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #W201	
CONTENTS TEMP.:	-18.6°C (-1.48°F)	
DROP HEIGHT:	1.4 Meters (56.0") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #30: Flat on Bottom	Sample #31: Flat on Top	*Sample #32: Flat on Long Side
		
PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.
*Sample #33: Flat on Short Side	*Sample #34: Bottom Corner	**Sample #30: Top Corner
		
PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.	PASS: No leakage. Deformation to bottle on impact.

*Side and corner drops were conducted to impact the manufacturer's joint.

**Flat on bottom drop sample was also used for the top corner drop.

STACKING TEST

Variable #1 & #3

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty	<ul style="list-style-type: none"> There can be no deterioration that could adversely affect transport safety or any distortion liable to reduce the package's strength, cause instability in stacks of packages, or cause damage to inner packagings that is likely to reduce safety in transport. (§178.606)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST LOAD APPLIED:	181.4 Kg (400.0 Lbs.) (Refer to Section IV)	
TEST DURATION:	24 Hours	
TEST EQUIPMENT:	Dead Load Weights	

STACKING TEST SET-UP & RESULTS



Sample #	Maximum Deflection After 24 Hours	Results
6	0"	PASS
7	0"	PASS
8	0"	PASS

Comments/Observations: Following the 24-hour stack test, there was no damage likely to affect the performance of the packaging.


Stacking Stability: Not conducted; required only for guided load tests.

STACKING TEST

Variable #2 & #4

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty	<ul style="list-style-type: none"> There can be no deterioration that could adversely affect transport safety or any distortion liable to reduce the package's strength, cause instability in stacks of packages, or cause damage to inner packagings that is likely to reduce safety in transport. (§178.606)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST LOAD APPLIED:	181.4 Kg (400.0 Lbs.) (Refer to Section IV)	
TEST DURATION:	24 Hours	
TEST EQUIPMENT:	Dead Load Weights	

STACKING TEST SET-UP & RESULTS

	Sample #	Maximum Deflection After 24 Hours	Results
	13	0"	PASS
	14	0"	PASS
	15	0"	PASS
Comments/Observations: Following the 24-hour stack test, there was no damage likely to affect the performance of the packaging.			

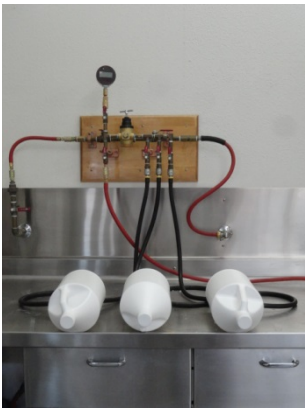
Stacking Stability: Not conducted; required only for guided load tests.

PRESSURE DIFFERENTIAL TEST

Tamper Evident Closure

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> Packaging for which retention of liquid is a basic function must be capable of withstanding the pressure requirements without leakage. (§173.27(c))
FILL CAPACITY:	Maximum Capacity	
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	95 kPa	
TEST DURATION:	30 Minutes	
AREA OF PRESSURIZATION:	Through the Bottom	
TEST EQUIPMENT:	Regulated Water Source Digital Pressure Gauge #: 605	

HYDROSTATIC PRESSURE TEST SET-UP AND RESULTS

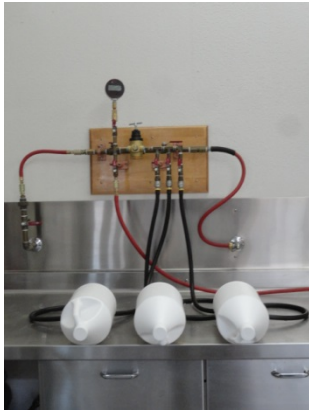
	Sample #	Results	Comments/Observations
	1	PASS	All three samples maintained the 95 kPa test pressure for 30 minutes without leakage.
	2	PASS	
	3	PASS	

PRESSURE DIFFERENTIAL TEST

Standard Closure

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> Packaging for which retention of liquid is a basic function must be capable of withstanding the pressure requirements without leakage. (§173.27(c))
FILL CAPACITY:	Maximum Capacity	
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	95 kPa	
TEST DURATION:	30 Minutes	
AREA OF PRESSURIZATION:	Through the Bottom	
TEST EQUIPMENT:	Regulated Water Source Digital Pressure Gauge #: 605	

HYDROSTATIC PRESSURE TEST SET-UP AND RESULTS


	Sample #	Results	Comments/Observations
	1	PASS	All three samples maintained the 95 kPa test pressure for 30 minutes without leakage.
	2	PASS	
	3	PASS	

VIBRATION TEST

Variable #1

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. 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. <p style="text-align: right;">(\$178.608)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	4.0 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Vibration System	

VIBRATION TEST SET-UP AND RESULTS


	Sample #	Results	Comments/Observations
	9	PASS	No leakage or damage.
	10	PASS	
	11	PASS	

VIBRATION TEST

Variable #2

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. 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. <p style="text-align: right;">(\$178.608)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	4.0 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Vibration System	

VIBRATION TEST SET-UP AND RESULTS


	Sample #	Results	Comments/Observations
	16	PASS	No leakage or damage.
	17	PASS	
	18	PASS	

VIBRATION TEST

Variable #3

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. 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. <p style="text-align: right;">(\$178.608)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	4.0 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Vibration System	

VIBRATION TEST SET-UP AND RESULTS


	Sample #	Results	Comments/Observations
	27	PASS	No leakage or damage.
	28	PASS	
	29	PASS	

VIBRATION TEST

Variable #4

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. 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. <p style="text-align: right;">(\$178.608)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	4.0 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Vibration System	

VIBRATION TEST SET-UP AND RESULTS

	Sample #	Results	Comments/Observations
	38	PASS	No leakage or damage.
	39	PASS	
	40	PASS	

COBB WATER ABSORPTION TEST

TEST INFORMATION		TEST CRITERIA
NUMBER OF SAMPLES:	5	<ul style="list-style-type: none"> An increase in mass greater than 155 g/m² over the 30 minute duration represents an unacceptable level of water resistance. (§178.516)
SAMPLE SIZE:	5" x 5" (Minimum)	
CONDITIONING:	73°F / 50% RH Quality Room #W202	
WATER APPLIED:	100 mL / Sample	
TEST DURATION:	30 Minutes / Sample	
TEST EQUIPMENT:	UWE Analytical Balance Gurley Cobb Water Absorption Fixtures	

COBB WATER ABSORPTION TEST RESULTS	
Sample #	Water Absorbed
1	117.0 g/m ²
2	120.0 g/m ²
3	130.0 g/m ²
4	113.0 g/m ²
5	109.0 g/m ²
AVERAGE:	117.8 g/m²
RESULT	PASS

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR ^①	UN ^②	IMDG ^③	ICAO ^④	IATA ^⑤
	October 2015 Edition	19 th Edition	2014 Edition	2015-2016 Edition	57th Edition
Drop:	178.603	6.1.5.3	6.1.5.3	6; 4.3	6.3.3
Stacking:	178.606	6.1.5.6	6.1.5.6	6; 4.6	6.3.6
Pressure:	173.27(c)	4.1.1.4.1	4.1.1.4.1	4; 1.1.6	5.0.2.9
Vibration:	178.608	---	---	4; 1.1.1	5.0.2.7
Cobb:	178.516(b)(1)	6.1.4.12.1	6.1.4.12.1	6; 3.1.11.1	6.2.12.2

- ① United States Department of Transportation Code of Federal Regulations (CFR) Title 49, Transportation, Parts 100-185
 ② The United Nations Recommendations on the Transport of Dangerous Goods – Model Regulations (UN – Orange Book)
 ③ International Maritime Dangerous Goods Code (IMDG)
 ④ Technical Instructions for the Safe Transport of Dangerous Good by Air (ICAO)
 ⑤ International Air Transport Association (IATA) Dangerous Goods Regulations

INDUSTRY STANDARD REFERENCES

Drop:	ASTM ^⑥ D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall
	ASTM ^⑥ D7790	Standard Test Method for the Preparation of Plastic Packagings Containing Liquids for United Nations (UN) Drop Testing
	ISO ^⑦ 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test by Dropping
Stacking:	ASTM ^⑥ D4577:	Standard Test Method for Compression Resistance of a Container Under Constant Load
	ISO ^⑦ 2234:	Packaging – Complete, Filled Transport Packages – Stacking Test using Static Load
Hydrostatic Pressure:	ASTM ^⑥ D7660:	Standard Guide for Conducting Internal Pressure Tests on United Nations (UN) Packagings
Vibration:	ASTM ^⑥ D999:	Standard Test Method for Vibration Testing of Shipping Containers
	ISO ^⑦ 2247:	Packaging – Complete, Filled Transport Packages – Vibration Test at Fixed Low Frequency
Cobb:	ISO ^⑦ 535:	Paper and Board – Determination of Water Absorption – Cobb Method

- ⑥ American Society for Testing and Materials (ASTM)
 ⑦ International Organization for Standardization (ISO)

EQUIPMENT

All inspection, measuring and test equipment that can affect product quality is calibrated and adjusted at prescribed intervals, or prior to use, and is traceable to NIST, using ANSI Z540 as an overall guide for calibration certification.

SECTION IV: MATHEMATICAL CALCULATIONS

Tamper Evident

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	1,256.0 Grams	
Overflow Capacity (OFC):		<u>Methanol/Water</u>
Methanol/Water	3,815.1 Grams	SG: 0.961
Water	3,970.0 Grams	
Number of Inner Packagings (# IP):	4	
Packing Group	II	
Product Specific Gravity (PSG):	1.400	
Packing Group Multiplication Factor (MF):	1.00	
Overall Height of one Package (OH):	13.88 Inches	
Stack Test-# of Samples Tested Simultaneously:	3	

98% OF OVERFLOW

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>		
3,815.1	x	98% =	3,738.8 Grams	Methanol/Water
3,970.0	x	98% =	3,890.6 Grams	Water

PACKAGE TEST WEIGHTS

Overall Pkg Tare Weight (PTW) + (98% Overflow Capacity (OFC) x # of Inner Pkg (# IP))

<u>PTW</u>	+	<u>(98% OFC)</u>	x	<u># IP)</u>	
1,256	+	3,738.8	x	4	Methanol/Water
1,256	+	3,890.6	x	4	Water
Methanol/Water:		16.2	Kg	35.7	Lbs.
Water:		16.8	Kg	37.0	Lbs.

AUTHORIZED PACKAGE GROSS MASS CALCULATION (APGM)

Overall Pkg Tare Weight (PTW) + (Product SG (PSG) x 98% Overflow (OFC) x # of Inner Pkg (# IP))

<u>PTW</u>	+	<u>(PSG)</u>	x	<u>98% OFC</u>	x	<u># IP)</u>
1,256	+	1.4	x	3,891	x	4
		23.0	Kg	50.7	Lbs.	

DROP HEIGHT

Calculation For Product Specific Gravities Exceeding 1.2
Product Specific Gravity (PSG) x Packing Group Multiplication Factor (MF)

<u>PSG</u>	x	<u>MF</u>		<u>Required Drop Height</u>	<u>Actual Drop Height</u>
1.4	x	1.00		55.1 Inches	56 Inches
		1.40	Meter		

Packing Group: II

STACKING TEST MINIMUM LOAD CALCULATIONS

Number of Packages in a 3m High Stack (118 / Overall Pkg Height (OH) - 1)

118 / Overall Height of one Pkg (OH) - 1

<u>(118)</u>	/	<u>OH)</u>	-1	=	<u># 3m HS</u>
118	/	13.88	-1	=	7.6

Stacking Test Load Calculation (Individual Package)

Authorized Pkg Gross Mass (APGM) x # of Pkg in a 3m High Stack (# 3m HS)

<u>APGM</u>	x	<u># 3m HS</u>	
23.0	x	7.6	
		174.8 Kg	385.4 Lbs.

Stacking Test Load Calculation

Samples x Authorized Pkg Gross Mass (APGM) x # of Pkg in a 3m High Stack (# 3m HS)

<u>Samples</u>	x	<u>(APGM</u>	x	<u># 3m HS)</u>
3	x	23	x	7.6
		524.4 Kg		1,156.1 Lbs.



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SECTION IV: MATHEMATICAL CALCULATIONS

Standard

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	1,248.0 Grams	
Overflow Capacity (OFC):		<u>Methanol/Water</u>
Methanol/Water	3,815.1 Grams	SG: 0.961
Water	3,970.0 Grams	
Number of Inner Packagings (# IP):	4	
Packing Group	II	
Product Specific Gravity (PSG):	1.400	
Packing Group Multiplication Factor (MF):	1.00	
Overall Height of one Package (OH):	13.88 Inches	
Stack Test-# of Samples Tested Simultaneously:	3	

98% OF OVERFLOW

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>		
3,815.1	x	98% =	3,738.8 Grams	Methanol/Water
3,970.0	x	98% =	3,890.6 Grams	Water

PACKAGE TEST WEIGHTS

Overall Pkg Tare Weight (PTW) + (98% Overflow Capacity (OFC) x # of Inner Pkg (# IP))

<u>PTW</u>	+	<u>(98% OFC)</u>	x	<u># IP)</u>	
1,248	+	3,738.8	x	4	Methanol/Water
1,248	+	3,890.6	x	4	Water
Methanol/Water:		16.2	Kg	35.7	Lbs.
Water:		16.8	Kg	37.0	Lbs.

AUTHORIZED PACKAGE GROSS MASS CALCULATION (APGM)

Overall Pkg Tare Weight (PTW) + (Product SG (PSG) x 98% Overflow (OFC) x # of Inner Pkg (# IP))

<u>PTW</u>	+	<u>(PSG)</u>	x	<u>98% OFC</u>	x	<u># IP)</u>
1,248	+	1.4	x	3,891	x	4
		23.0	Kg	50.7	Lbs.	

DROP HEIGHT

Calculation For Product Specific Gravities Exceeding 1.2
Product Specific Gravity (PSG) x Packing Group Multiplication Factor (MF)

<u>PSG</u>	x	<u>MF</u>		<u>Required Drop Height</u>	<u>Actual Drop Height</u>
1.4	x	1.00			
		1.40	Meter	55.1 Inches	56 Inches

Packing Group: II

STACKING TEST MINIMUM LOAD CALCULATIONS

Number of Packages in a 3m High Stack (118 / Overall Pkg Height (OH) -1)

118 / Overall Height of one Pkg (OH) - 1

<u>(118)</u>	/	<u>OH)</u>	-1	=	<u># 3m HS</u>
118	/	13.88	-1	=	7.6

Stacking Test Load Calculation (Individual Package)

Authorized Pkg Gross Mass (APGM) x # of Pkg in a 3m High Stack (# 3m HS)

<u>APGM</u>	x	<u># 3m HS</u>	
23.0	x	7.6	
		174.8 Kg	385.4 Lbs.

Stacking Test Load Calculation

Samples x Authorized Pkg Gross Mass (APGM) x # of Pkg in a 3m High Stack (# 3m HS)

<u>Samples</u>	x	<u>(APGM</u>	x	<u># 3m HS)</u>
3	x	23	x	7.6
		524.4 Kg		1,156.1 Lbs.