

**UNITED NATIONS / DOT  
PERFORMANCE CERTIFICATION**



**4G PERIODIC RETEST**

**6 x 1 Liter Square Plastic Bottle Packaging with Two Neck  
Finish Options: #1) 38-439 Neck and #2) 45mm Neck**

**TEST REPORT #: 19-CA20083**

Ⓢ 4G / Y13.1 / S / \*\*  
n USA / +CC8458

\*\*Insert the year packaging is manufactured

**TESTING PERFORMED FOR:**

**PUREPAK TECHNOLOGY CORPORATION**

324 South Bracken Lane, Suite 3  
Chandler, AZ 85224

**ATTN: Michael Dodd**

**TESTING PERFORMED BY:**

**TEN-E PACKAGING SERVICES, INC.**

326 North Corona Avenue  
Ontario, CA 91764  
Phone: 909-937-1260  
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May 6, 2019

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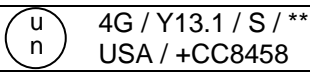
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**SECTION I: CERTIFICATION**

**Periodic Retest of the PurePak Technology Corporation  
 6 x 1 Liter Square Plastic Bottle Packaging with Two Neck Finish Options:  
 #1) 38-439 Neck and #2) 45mm Neck**

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	1.9 m	Methanol/Water Solution	May 6, 2019	PASS
Stacking	178.606	181.4 Kg – 24 Hours	Empty	May 3, 2019	PASS
Pressure	173.27	100 kPa - 30 Minutes	Water	May 6, 2019	PASS
Vibration	178.608	3.8 Hz – 1 Hour	Water	May 6, 2019	PASS
Cobb	178.516	30 Minutes	---	May 6, 2019	PASS
<b>TEST REPORT NUMBERS:</b>			19-CA20083, 17-CA20069		
<b>UN MARKING: (CFR 49 – 178.503)</b>					
<b>PACKAGING IDENTIFICATION CODE:</b>			4G - Fiberboard Box (178.516)		
<b>PERFORMANCE STANDARD:</b>			Y (Packaging meets Packing Group II and III tests)		
<b>AUTHORIZED GROSS MASS:</b>			13.1 Kg (28.8 Lbs.)		
<b>"S" DESIGNATION:</b>			Denotes Inner Packagings		
<b>YEAR OF MANUFACTURE:</b>			** Insert year the packaging is manufactured		
<b>STATE AUTHORIZING THE MARK:</b>			USA		
<b>PACKAGING CERTIFICATION AGENCY:</b>			(+CC) TEN-E Packaging Services, Inc. (Ontario, CA CAA #2006030021)		
<b>THIRD PARTY PACKAGING IDENTIFICATION:</b>			+CC8458		
<b>PERIODIC RETEST DATE:</b>			May 6, 2021		

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE 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:**

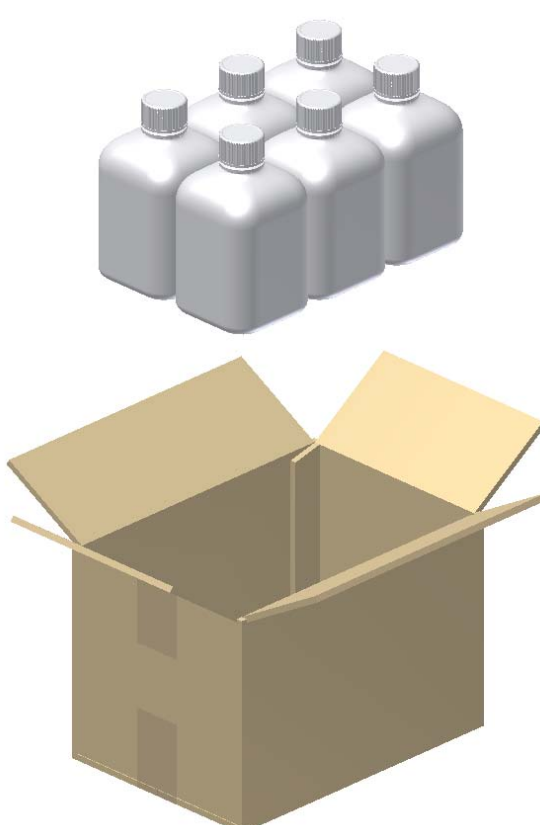
**PurePak Technology Corporation**  
 324 South Bracken Lane Suite 3  
 Chandler, AZ 85224



Matthew C. Anderson  
 Project Manager  
 TEN-E Packaging Services, Inc.  
 326 North Corona Avenue  
 Ontario, CA 91764

**SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS**

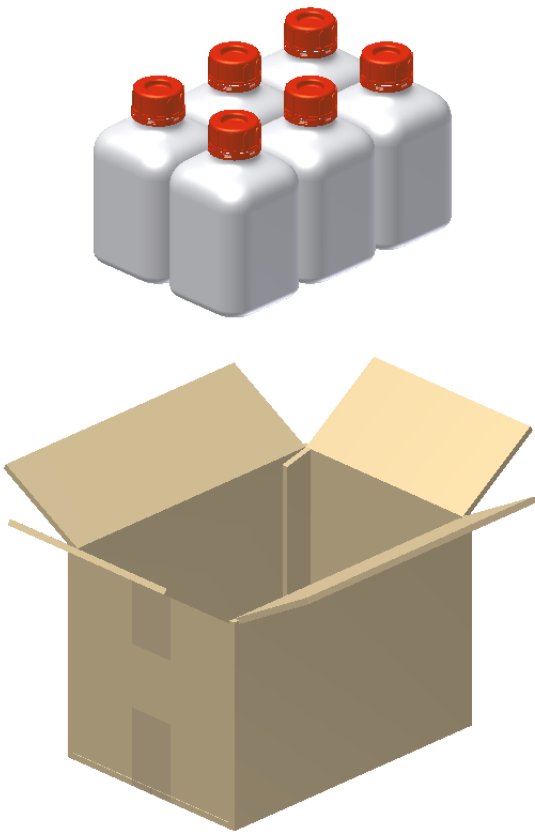
**6 x 1 Liter Square Plastic Bottle Packaging with 38-439 Neck Finish**

ASSEMBLY DRAWING	TEST LEVELS	
	Certification Type: Periodic Retest	
	Packaging Code Designation: 4G	
	Packing Group: II	
	Specific Gravity: 1.9	
	Internal Pressure: 100 kPa	
	<b>TEST SAMPLE PREPARATION</b> (Refer to Section IV)	
	Overall Packaging Tare Weight: 1,008.0 Grams	
	Fill Capacity (98% Maximum Capacity):	
	Methanol/Water Solution 1,052.5 Grams	
	Water 1,083.9 Grams	
	Package Test Weight:	
	Methanol/Water Solution 7.3 Kg 16.0 Lbs.	
	Water 7.5 Kg 16.5 Lbs.	
	Authorized Package Gross Mass: 13.3 Kg 29.3 Lbs.	
	<b>CLOSING METHODS – INNER PACKAGING</b>	
	Application Torque: 50 In-Lbs.	
	Equipment: Kaps All Electronic Torque Tester #W701	
	<b>CLOSING METHODS – SHIPPER</b>	
	<b>Top Flaps:</b>	
	Manufacturer: 3M, St. Paul, MN	
Type: 3M #34508 Pressure Sensitive Tape		
Width: 48 mm (2")		
Overlap: 2" Minimum		
Tape Pattern: Center Seam		
Inner Flaps: 4" Width Gap		
Outer Flaps: Meet		
<b>Bottom Flaps:</b>		
Manufacturer: 3M, St. Paul, MN		
Type: 3M #34508 Pressure Sensitive Tape		
Width: 48 mm (2")		
Overlap: 2" Minimum		
Tape Pattern: Center Seam		
Inner Flaps: 4" Width Gap		
Outer Flaps: Meet		

**For Packagings with an Established Gross Mass:**

If the gross mass calculation in this report exceeds the previously established gross mass, the manufacturer may elect to maintain the current gross mass marking (e.g. the gross mass rating of the UN marking on the packaging may be less than the calculated gross mass indicated in this report) or use the newly established gross mass. In no event shall the gross mass marking on the packaging exceed the gross mass to which the packaging was tested.



**6 x 1 Liter Square Plastic Bottle Packaging with 45mm Neck Finish**

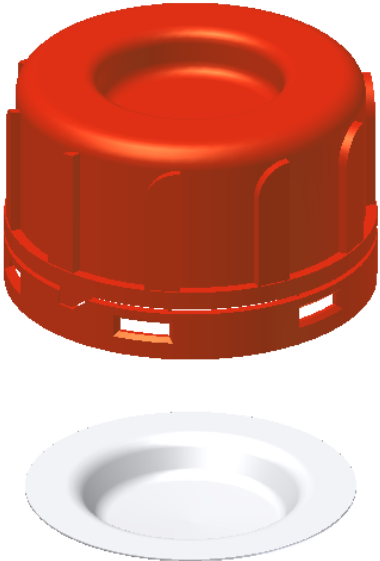

ASSEMBLY DRAWING	TEST LEVELS	
	Certification Type: Periodic Retest	
	Packaging Code Designation: 4G	
	Packing Group: II	
	Specific Gravity: 1.9	
	Internal Pressure: 100 kPa	
	<b>TEST SAMPLE PREPARATION</b> (Refer to Section IV)	
	Overall Packaging Tare Weight: 953.0 Grams	
	Fill Capacity (98% Maximum Capacity):	
	Methanol/Water Solution 1,053.4 Grams	
	Water 1,084.9 Grams	
	Package Test Weight:	
	Methanol/Water Solution 7.2 Kg 15.8 Lbs.	
	Water 7.4 Kg 16.3 Lbs.	
	Authorized Package Gross Mass: 13.3 Kg 29.3 Lbs.	
	<b>CLOSING METHODS – INNER PACKAGING</b>	
	Application Torque: 25 In-Lbs.	
	Equipment: Kaps All Electronic Torque Tester #W701	
	<b>CLOSING METHODS – SHIPPER</b>	
<b>Top Flaps:</b>		
Manufacturer: 3M, St. Paul, MN		
Type: 3M #34508 Pressure Sensitive Tape		
Width: 48 mm (2")		
Overlap: 2" Minimum		
Tape Pattern: Center Seam		
Inner Flaps: 4" Width Gap		
Outer Flaps: Meet		
<b>Bottom Flaps:</b>		
Manufacturer: 3M, St. Paul, MN		
Type: 3M #34508 Pressure Sensitive Tape		
Width: 48 mm (2")		
Overlap: 2" Minimum		
Tape Pattern: Choose One		
Inner Flaps: 4" Width Gap		
Outer Flaps: Meet		

**For Packagings with an Established Gross Mass:**

If the gross mass calculation in this report exceeds the previously established gross mass, the manufacturer may elect to maintain the current gross mass marking (e.g. the gross mass rating of the UN marking on the packaging may be less than the calculated gross mass indicated in this report) or use the newly established gross mass. In no event shall the gross mass marking on the packaging exceed the gross mass to which the packaging was tested.

**COMPONENT INFORMATION**

CLOSURE (QIM-317-4937)		DRAWING
<b>Manufacturer: Rexam Plastic Packaging, Evansville, IN</b>		
<b>Description:</b>	38mm Threaded Closure	
<b>Quantity:</b>	6	
<b>Material:</b>	Polypropylene	
<b>Tare Weight:</b>	10.15 Grams	
<b>Overall Dimensions:</b>		
• <b>Height</b>	1.016" ± 0.015"	
• <b>Diameter</b>	1.701" ± 0.015"	
<b>Thread:</b>		
• <b>Type</b>	38mm	
• <b>Style</b>	439	
<b>Finish Dimensions:</b>		
• <b>T</b>	1.483" ± 0.007"	
• <b>E</b>	1.389" ± 0.007"	
<b>Markings (QC Audit):</b>	63A	
<b>Liner:</b>		
<b>Description:</b>	P.E. Foam Liner	
<b>Tare Weight:</b>	0.67 Grams	
<b>Thickness:</b>	0.052"	
<b>Diameter:</b>	1.387"	
PLASTIC BOTTLE (ZB38SQ1H)		DRAWING
<b>Manufacturer: PurePak Technology Corporation, Chandler, AZ</b>		
<b>Description:</b>	1 Liter Square Plastic Bottle	
<b>Quantity:</b>	6	
<b>Material:</b>	High Density Polyethylene	
<b>Method of Manufacture:</b>	Blow Molded	
<b>Tare Weight:</b>	85.0 Grams ± 4.25 Grams	
<b>Capacity:</b>		
• <b>Rated</b>	1 Liter	
• <b>Overflow</b>	1,106.0 Grams (37.3 Oz)	
<b>Overall Dimensions:</b>		
• <b>Height</b>	6.929" ± 0.070"	
• <b>Width</b>	4.010" ± 0.060"	
• <b>Depth</b>	4.010" ± 0.060"	
<b>Thread Dimensions:</b>		
• <b>T</b>	1.461" ± 0.010"	
• <b>E</b>	1.367" ± 0.010"	
<b>Wall Thickness:</b>		
• <b>Minimum</b>	0.028"	
<b>Markings (QC Audit):</b>	SPI "2" HDPE Recycling Symbol 2/15                      2	

CLOSURE (4.1451.99.2)		DRAWING
<b>Manufacturer: George Menshen GmbH, Finnertrop, Germany</b>		
<b>Description:</b>	45mm Tamper Evident Threaded Closure	
<b>Quantity:</b>	6	
<b>Material:</b>	High Density Polyethylene	
<b>Tare Weight:</b>	11.10 Grams	
<b>Overall Dimensions:</b>		
• <b>Height</b>	30.3mm	
• <b>Diameter</b>	2.003"	
<b>Thread:</b>		
• <b>Type</b>	45mm	
<b>Finish Dimensions:</b>		
• <b>T</b>	1.791"	
• <b>E</b>	1.680"	
<b>Markings (QC Audit):</b>	2817.1                      4                      PE-HD 02                                      6/17	
<b>Liner:</b>		
<b>Description:</b>	PTFE Plug	
<b>Tare Weight:</b>	0.92 Grams	
<b>Thickness:</b>	0.0094"	
<b>Diameter:</b>	45.0mm	
PLASTIC BOTTLE (ZB45SQ1H)		
<b>Manufacturer: PurePak Technology Corporation, Chandler, AZ</b>		
<b>Description:</b>	1 Liter Square Plastic Bottle	
<b>Quantity:</b>	6	
<b>Material:</b>	High Density Polyethylene	
<b>Method of Manufacture:</b>	Blow Molded	
<b>Tare Weight:</b>	85.0 Grams ± 4.25 Grams	
<b>Capacity:</b>		
• <b>Rated</b>	1 Liter	
• <b>Overflow</b>	1,107.0 Grams (37.4 Oz)	
<b>Overall Dimensions:</b>		
• <b>Height</b>	6.963" ± 0.060"	
• <b>Width</b>	3.972" ± 0.060"	
• <b>Depth</b>	3.972" ± 0.060"	
<b>Thread Dimensions:</b>		
• <b>T</b>	1.772" ± 0.010"	
• <b>E</b>	1.644" ± 0.010"	
<b>Wall Thickness:</b>		
• <b>Minimum</b>	0.033"	
<b>Markings (QC Audit):</b>	SPI "2" HDPE Recycling Symbol 2                                      2/15	

SHIPPER		
<b>Manufacturer: Smurfit Kappa, Phoenix, AZ</b>		
<b>Description:</b>	Regular Slotted Container	
<b>Material/Flute (Inner to Outer):</b>	Double Wall Natural Kraft Corrugated Fiberboard; B/C-Flute	
<b>Basis Weight (Outer to Inner) Lbs./MSF:</b>		
• <b>Specification</b>	42 / 23 / 26 / 23 / 42	
<b>Combined Wt. Of Facings:</b>	110	
<b>Tare Weight:</b>	396.0 Grams	
DIMENSIONS		
	Specification Dimensions (Inside)	Measured Dimensions (Outside)
• <b>Length</b>	12"	12-1/2"
• <b>Width</b>	8-1/16"	8-3/4"
• <b>Height</b>	7-1/8"	8-3/8"
<b>Board Caliper (Nominal):</b>	0.261"	
<b>Manufacturer's Joint:</b>	Inside Glued, 1-3/8" Lap	
<b>Markings (QC Audit):</b>	(u) 4G/Y13.1/S/19 (n) USA/+CC8458 DOT-SP 14656 #641870 HANDLE WITH CARE ART WORK DATE 4-26-16 12 X 8 1/16 X 7-1/8 ID SOUND PACKAGING	
BOX CERTIFICATE		
<b>(A) Corrugated Manufacturer:</b>	SMURFIT KAPPA	
<b>(B) Structure:</b>	Double Wall	
<b>(C) Bursting Test</b>	275 Lbs. Per Sq. Inch	
<b>(D) Min comb Wt. Facings:</b>	133 Lbs. Per M Sq. Ft	
<b>(E) Size Limit:</b>	95"	
<b>(F) Gross Wt. Lt:</b>	900 Lbs.	
<b>(G) Location:</b>	PHOENIX, AZ	









**SECTION III: TEST PROCEDURES AND RESULTS**

**DROP TESTS 38-439 Neck Finish**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Methanol/Water Solution (0.971 SG)	<ul style="list-style-type: none"> <li>For packaging containing liquid, each packaging does not leak.</li> <li>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.</li> <li>Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (\$178.603)</li> </ul>
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	-18°C (0°F) Freezer #W201	
<b>CONTENTS TEMP.:</b>	-18.6°C (-1.48°F)	
<b>DROP HEIGHT:</b>	1.9 Meters (75.0") (Refer to Section IV)	
<b>TEST EQUIPMENT:</b>	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
		
<b>PASS:</b> No leakage or damage.	<b>PASS:</b> No leakage or damage.	<b>PASS:</b> No leakage or damage.
*Sample #4: Flat on Short Side	*Sample #5: Bottom Corner	**Sample #1: Top Corner
		
<b>PASS:</b> No leakage or damage.	<b>PASS:</b> No leakage. Deformation to shipper on impact corner.	<b>PASS:</b> No leakage. Deformation to shipper on impact corner.

\*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**

**45mm Neck Finish**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Methanol/Water Solution (0.971 SG)	<ul style="list-style-type: none"> <li>For packaging containing liquid, each packaging does not leak.</li> <li>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.</li> <li>Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)</li> </ul>
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	-18°C (0°F) Freezer #W201	
<b>CONTENTS TEMP.:</b>	-18.6°C (-1.48°F)	
<b>DROP HEIGHT:</b>	1.9 Meters (75.0") (Refer to Section IV)	
<b>TEST EQUIPMENT:</b>	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
		
<b>PASS:</b> No leakage or damage.	<b>PASS:</b> No leakage or damage.	<b>PASS:</b> No leakage or damage.
*Sample #15: Flat on Short Side	*Sample #16: Bottom Corner	**Sample #12: Top Corner
		
<b>PASS:</b> No leakage or damage.	<b>PASS:</b> No leakage. Deformation to shipper on impact corner.	<b>PASS:</b> No leakage. Deformation to shipper on impact corner.


\*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**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Empty	<ul style="list-style-type: none"> <li>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.</li> </ul> (\$178.606)
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>TEST LOAD APPLIED:</b>	181.4 Kg (400.0 Lbs.) (Refer to Section IV)	
<b>TEST DURATION:</b>	24 Hours	
<b>TEST EQUIPMENT:</b>	Dead Load Weights	

**STACKING TEST SET-UP & RESULTS**

	Sample #	Maximum Deflection After 24 Hours	Results
	6	0"	<b>PASS</b>
7	0"	<b>PASS</b>	
8	0"	<b>PASS</b>	

**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**

**38-439 Neck Finish**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>• Packaging for which retention of liquid is a basic function must be capable of withstanding the pressure requirements without leakage. (§173.27(c))</li> </ul>
<b>FILL CAPACITY:</b>	Maximum Capacity	
<b>CLOSURE APPLICATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>TEST PRESSURE:</b>	100 kPa	
<b>TEST DURATION:</b>	30 Minutes	
<b>AREA OF PRESSURIZATION:</b>	Through the Bottom	
<b>TEST EQUIPMENT:</b>	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**

**45mm Neck Finish**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>• Packaging for which retention of liquid is a basic function must be capable of withstanding the pressure requirements without leakage. (§173.27(c))</li> </ul>
<b>FILL CAPACITY:</b>	Maximum Capacity	
<b>CLOSURE APPLICATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>TEST PRESSURE:</b>	100 kPa	
<b>TEST DURATION:</b>	30 Minutes	
<b>AREA OF PRESSURIZATION:</b>	Through the Bottom	
<b>TEST EQUIPMENT:</b>	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**

**38-439 Neck Finish**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>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.</li> <li>A packaging passes the vibration test if there is no rupture or leakage from any of the packages.</li> <li>No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength. (§178.608)</li> </ul>
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>TABLE DISPLACEMENT:</b>	1"	
<b>TEST FREQUENCY:</b>	3.8 Hz	
<b>TEST DURATION:</b>	1 Hour	
<b>TEST EQUIPMENT:</b>	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**

**45mm Neck Finish**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>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.</li> <li>A packaging passes the vibration test if there is no rupture or leakage from any of the packages.</li> <li>No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength. (§178.608)</li> </ul>
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>TABLE DISPLACEMENT:</b>	1"	
<b>TEST FREQUENCY:</b>	3.8 Hz	
<b>TEST DURATION:</b>	1 Hour	
<b>TEST EQUIPMENT:</b>	Vertical motion using L.A.B. Palletizer Vibration System	

**VIBRATION TEST SET-UP AND RESULTS**

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

**COBB WATER ABSORPTION TEST**

TEST INFORMATION	TEST CRITERIA
<b>NUMBER OF SAMPLES:</b> 5 <b>SAMPLE SIZE:</b> 5" x 5" (Minimum) <b>CONDITIONING:</b> 73°F / 50% RH Quality Room #W202 <b>WATER APPLIED:</b> 100 mL / Sample <b>TEST DURATION:</b> 30 Minutes / Sample <b>TEST EQUIPMENT:</b> UWE Analytical Balance Gurley Cobb Water Absorption Fixtures	<ul style="list-style-type: none"> <li>An increase in mass greater than 155 g/m<sup>2</sup> over the 30 minute duration represents an unacceptable level of water resistance. (§178.516)</li> </ul>

COBB WATER ABSORPTION TEST RESULTS	
Sample #	Water Absorbed
1	125.0 g/m <sup>2</sup>
2	114.0 g/m <sup>2</sup>
3	121.0 g/m <sup>2</sup>
4	124.0 g/m <sup>2</sup>
5	100.0 g/m <sup>2</sup>
<b>AVERAGE:</b>	<b>116.8 g/m<sup>2</sup></b>
<b>RESULT</b>	<b>PASS</b>



## REGULATORY AND INDUSTRY STANDARD REFERENCES

### REGULATORY REFERENCES

TEST	49 CFR <sup>①</sup>	UN <sup>②</sup>	IMDG <sup>③</sup>	ICAO <sup>④</sup>	IATA <sup>⑤</sup>
	October 2018 Edition	20 <sup>th</sup> Edition	2018 Edition	2019-2020 Edition	60 <sup>th</sup> Edition
<b>Drop:</b>	178.603	6.1.5.3	6.1.5.3	6; 4.3	6.3.3
<b>Stacking:</b>	178.606	6.1.5.6	6.1.5.6	6; 4.6	6.3.6
<b>Pressure:</b>	173.27(c)	4.1.1.4.1	---	4; 1.1.6	5.0.2.9
<b>Vibration:</b>	178.608	---	---	4; 1.1.1 & 4; 1.1.4	5.0.2.7
<b>Cobb:</b>	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

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

**38mm**

**INFORMATION USED FOR CALCULATIONS**

Overall Packaging Tare Weight (PTW):	1,008.0 Grams	
Overflow Capacity (OFC):		<u>Methanol/Water</u>
Methanol/Water	1,073.9 Grams	SG: 0.971
Water	1,106.0 Grams	
Number of Inner Packagings (# IP):	6	
Packing Group	II	
Product Specific Gravity (PSG):	1.900	
Packing Group Multiplication Factor (MF):	1.00	
Overall Height of one Package (OH):	8.38 Inches	
Stack Test-# of Samples Tested Simultaneously:	1	

**98% OF OVERFLOW**

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>		
1,073.9	x	98% =	1,052.5 Grams	Methanol/Water
1,106.0	x	98% =	1,083.9 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>	
1,008	+	1,052.5	x	6	Methanol/Water
1,008	+	1,083.9	x	6	Water
Methanol/Water:		7.3	Kg	16.0	Lbs.
Water:		7.5	Kg	16.5	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>
1,008	+	1.9	x	1,084	x	6
		13.3	Kg	29.3	Lbs.	



### DROP HEIGHT

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

PSG	x	MF		Packing Group:	II
1.9	x	1.00		Required Drop Height	Actual Drop Height
		1.90	Meter	74.8 Inches	75 Inches

### 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

(118)	/	(OH)	-1	=	# 3m HS
118	/	8.38	-1	=	13.1

### Stacking Test Load Calculation (Individual Package)

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

APGM	x	# 3m HS	
13.3	x	13.1	
		174.3 Kg	384.3 Lbs.

**SECTION IV: MATHEMATICAL CALCULATIONS**

45mm

**INFORMATION USED FOR CALCULATIONS**

Overall Packaging Tare Weight (PTW):	953.0 Grams	
Overflow Capacity (OFC):		<u>Methanol/Water</u>
Methanol/Water	1,074.8 Grams	SG: 0.971
Water	1,107.0 Grams	
Number of Inner Packagings (# IP):	6	
Packing Group	II	
Product Specific Gravity (PSG):	1.900	
Packing Group Multiplication Factor (MF):	1.00	
Overall Height of one Package (OH):	8.38 Inches	
Stack Test-# of Samples Tested Simultaneously:	1	

**98% OF OVERFLOW**

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>		
1,074.8	x	98% =	1,053.4 Grams	Methanol/Water
1,107.0	x	98% =	1,084.9 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>	
953	+	1,053.4	x	6	Methanol/Water
953	+	1,084.9	x	6	Water
Methanol/Water:		7.2	Kg	15.8	Lbs.
Water:		7.4	Kg	16.3	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>
953	+	1.9	x	1,085	x	6
		13.3	Kg	29.3	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>		Packing Group: II
1.9	x	1.00		
		1.90	Meter	
			<u>Required Drop Height</u>	<u>Actual Drop Height</u>
			74.8 Inches	75 Inches

**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	/	8.38	-1	=	13.1

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>	
13.3	x	13.1	
			174.3 Kg
			384.3 Lbs.