

**UNITED NATIONS / DOT  
PERFORMANCE CERTIFICATION**



**4G PERIODIC RETEST**

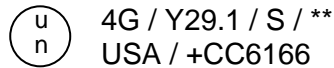
**6 x 2.5 Liter Plastic Bottle with 38mm Opening**

**Packaging with Two Case Sealing Mechanisms:**

**#1) Taped Top Flaps and Hot Melt Glued Bottom Flaps**

**#2) Taped Top Flaps and Taped Bottom Flaps**

**TEST REPORT #: 16-CA20058**



\*\*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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March 18, 2016

**TABLE OF CONTENTS**

**SECTION I: CERTIFICATION ..... 3**  
**SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS ..... 4**  
 COMPONENT INFORMATION ..... 5  
**SECTION III: TEST PROCEDURES AND RESULTS ..... 7**  
 DROP TESTS Option #1: Taped Top and Hot Melt Bottom ..... 7  
 DROP TESTS Option #2: Taped Top and Bottom ..... 8  
 STACKING & STACKING STABILITY TESTS Option #1: Taped Top and Hot Melt Bottom ..... 9  
 STACKING & STACKING STABILITY TESTS Option #2: Taped Top and Bottom ..... 10  
 PRESSURE DIFFERENTIAL TEST ..... 11  
 VIBRATION TEST Option #1: Taped Top and Hot Melt Bottom ..... 12  
 VIBRATION TEST Option #2: Taped Top and Bottom ..... 13  
 COBB WATER ABSORPTION TEST ..... 14  
**REGULATORY AND INDUSTRY STANDARD REFERENCES ..... 15**  
**SECTION IV: MATHEMATICAL CALCULATIONS ..... 16**

**NOTES AND COMMENTS**

PurePak Technology may use Identification +CC6166 for a 4 x 2.5 Liter Plastic Bottle Packaging or a 1 x 2.5 Liter Plastic Bottle Packaging provided they meet the requirements of 49 CFR; 178.601 (g)(1) Selective Testing Variation 1 and 49 CFR; 178.601 (g)(4) Selective Testing Variation 4.

**SECTION I: CERTIFICATION**

**Periodic Retest of the PurePak Technology Corporation**

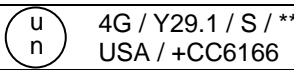
**6 x 2.5 Liter Plastic Bottle with 38mm Opening Packaging with Two Case Sealing Mechanisms:  
 #1) Taped Top Flaps and Hot Melt Glued Bottom Flaps**

**#2) Taped Top Flaps and Taped 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.

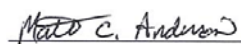
**SUMMARY OF PERFORMANCE TESTS**

UN / DOT TEST	CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Drop	178.603	1.9 m	Methanol/Water Solution	March 16, 2016	PASS
Stacking #1	178.606	725.7 Kg – 24 Hours	Water	March 17, 2016	PASS
Stacking #2	178.606	725.7 Kg – 24 Hours	Water	March 18, 2016	PASS
Pressure	173.27	300 kPa - 30 Minutes	Water	March 17, 2016	PASS
Vibration	178.608	4.0 Hz – 1 Hour	Water	March 16, 2016	PASS
Cobb	178.516	30 Minutes	---	March 11, 2016	PASS

<b>TEST REPORT NUMBERS:</b>	16-CA20058, 13-7199
<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>	29.1 Kg (64.1 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>	+CC6166
<b>PERIODIC RETEST DATE:</b>	March 18, 2018

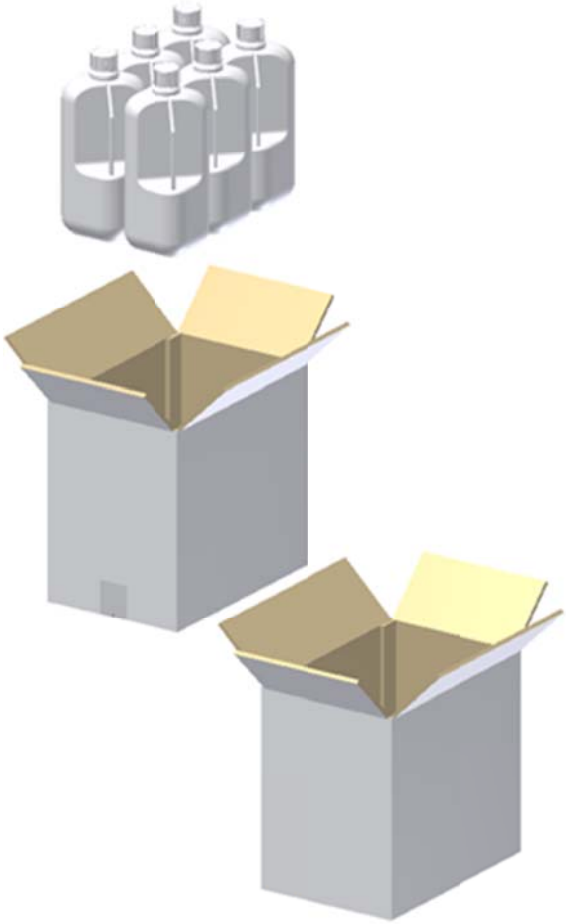
ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE OR FIT FOR A PARTICULAR PURPOSE, ARE DISCLAIMED. In no event shall TEN-E Packaging Services, Inc. liability exceed the total amount paid by **PurePak Technology Corporation** for services rendered. 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

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

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



**6 x 2.5 Liter Plastic Bottle with 38mm Opening Packaging**

ASSEMBLY DRAWING	TEST LEVELS	
	Certification Type:	Periodic Retest
	Packaging Code Designation:	4G
	Packing Group:	II
	Specific Gravity:	1.9
	Internal Pressure:	300kPa
	<b>TEST SAMPLE PREPARATION</b> (Refer to Section IV)	
	Overall Packaging Tare Weight:	1,936.0 Grams
	Fill Capacity (98% Maximum Capacity):	
	Methanol/Water Solution	2,297.0 Grams
	Water	2,390.3 Grams
	Package Test Weight:	
	Methanol/Water Solution	15.7 Kg      34.6 Lbs.
	Water	16.2 Kg      35.7 Lbs.
	Authorized Package Gross Mass:	29.1 Kg      64.1 Lbs.
	<b>CLOSING METHODS – INNER PACKAGING</b>	
	Application Torque:	50 In-Lbs
	Equipment:	Kaps All Torque Meter #W701
	<b>CLOSING METHODS – SHIPPER</b>	
	<b>Top Flaps:</b>	
	Manufacturer:	3M: St. Paul, MN
Type:	3M Scotch Tape (Supplied By Client)	
Width:	48 mm (2")	
Overlap:	2" Minimum	
Tape Pattern:	Center Seam	
Inner Flaps:	4-1/2" Width Gap	
Outer Flaps:	Meet	
<b>Bottom Flaps:</b>		
Manufacturer:	3M: St. Paul, MN	
Type:	Option #1) Hot Melt Adhesive (Prepared by Client) Option #2) 3M Scotch Tape (Supplied By Client)	
Width:	Option #1) 48 mm (2")	
Overlap:	Option #1) 2" Minimum	
Tape Pattern:	Option #1) Center Seam	
Inner Flaps:	4-1/2" 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 Company, Evansville, IN</b>		
<b>Description:</b>	38mm Threaded Closure	
<b>Quantity:</b>	6	
<b>Material:</b>	High Density Polyethylene	
<b>Tare Weight:</b>	10.43 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>	17	
<b>Liner:</b>		
<b>Description:</b>	Polyethylene Foam Liner	
<b>Tare Weight:</b>	0.68 Grams	
<b>Thickness:</b>	0.057"	
<b>Diameter:</b>	1.372"	
PLASTIC BOTTLE		DRAWING
<b>Manufacturer: Berry Plastic Corporation, Evansville, IN</b>		
<b>Description:</b>	2.5 Liter Plastic Bottle	
<b>Quantity:</b>	6	
<b>Material/Pigment:</b>	High Density Polyethylene / Natural	
<b>Method of Manufacture:</b>	Blow Molded	
<b>Tare Weight:</b>	209.0 Grams	
<b>Capacity:</b>		
• <b>Rated</b>	2.5 Liter	
• <b>Overflow</b>	2,439.0 Grams (82.4 Oz)	
<b>Overall Dimensions:</b>		
• <b>Height</b>	11.637" ± 0.080"	
• <b>Width</b>	5.03" ± 0.080"	
• <b>Depth</b>	5.03" ± 0.080"	
<b>Thread Dimensions:</b>		
• <b>T</b>	1.461" ± 0.015"	
• <b>E</b>	1.352" ± 0.015"	
• <b>Pitch</b>	0.1640"	
<b>Wall Thickness:</b>		
• <b>Minimum</b>	0.038"	
<b>Markings (QC Audit):</b>	8/15 HDPE DODD 1	

**SHIPPER (P369-5776-1) (Part #: 731195)**

**Manufacturer: PCA, Phoenix, AZ**

**Description:** Regular Slotted Container

**Material/Flute (Inner to Outer):** Double Wall Mottled White Corrugated Fiberboard; B/C-Flute

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

• **Specification** 42 / 26 / 35 / 26 / 42

**Combined Wt. of Facings:** 119.0

**Tare Weight:** 636.0 Grams

**DIMENSIONS**

	Specification Dimensions (Inside)	Measured Dimensions (Outside)
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
• <b>Length</b>	13.75"	14-1/4"
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• <b>Width</b>	9"	9-5/8"
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• <b>Height</b>	11.875"	13-1/8"
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**Board Caliper (Nominal):** 0.259"

**Manufacturer's Joint:** Inside Glued, 1-1/4" Lap

**Markings (QC Audit):**  4G/Y29.1/S/15  
USA+CC6166  
DOT-SP 14656 ART APPROVAL DATE: 01/14/15 13.75 X 9 X 11.875 ID 731195 4655

**BOX CERTIFICATE**

**(A) Corrugated Manufacturer:** -----

**(B) Structure:** Double Wall

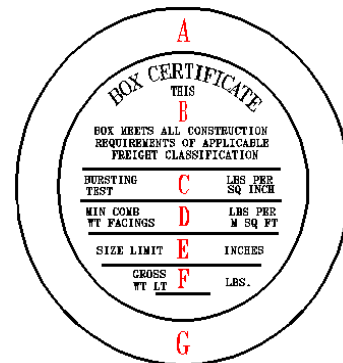
**(C) Bursting Test** 275 Lbs. Per Sq Inch

**(D) Min comb Wt Facings:** 110 Lbs. Per M Sq Ft

**(E) Size Limit:** 95"

**(F) Gross Wt Lt:** 100 Lbs.

**(G) Location:** -----









**SECTION III: TEST PROCEDURES AND RESULTS**

**DROP TESTS**

**Option #1: Taped Top and Hot Melt Bottom**

TEST INFORMATION	TEST CRITERIA
<b>TEST CONTENTS:</b> Methanol/Water Solution (0.961 SG) <b>SAMPLE PREPARATION:</b> Refer to Section II <b>CONDITIONING:</b> -18°C (0°F) Freezer #W201 <b>CONTENTS TEMP.:</b> -18.3°C (-1.0°F) <b>DROP HEIGHT:</b> 1.9 Meters (75.0") (Refer to Section IV) <b>TEST EQUIPMENT:</b> L.A.B. Accu Drop 160	<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.</li> </ul> <p>(§178.603)</p>

**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.	<b>PASS:</b> No leakage. Deformation to shipper 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**

**Option #2: Taped Top and Bottom**

TEST INFORMATION	TEST CRITERIA
<p><b>TEST CONTENTS:</b> Methanol/Water Solution (0.961 SG)</p> <p><b>SAMPLE PREPARATION:</b> Refer to Section II</p> <p><b>CONDITIONING:</b> -18°C (0°F) Freezer #W201</p> <p><b>CONTENTS TEMP.:</b> -18.3°C (-1.0°F)</p> <p><b>DROP HEIGHT:</b> 1.9 Meters (75.0") (Refer to Section IV)</p> <p><b>TEST EQUIPMENT:</b> L.A.B. Accu Drop 160</p>	<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.</li> </ul> <p>(§178.603)</p>

**DROP ORIENTATIONS AND TEST RESULTS**

Sample #12: Flat on Bottom	Sample #13: Flat on Top	*Sample #14: Flat on Long Side
		
<p><b>PASS:</b> No leakage or damage.</p>	<p><b>PASS:</b> No leakage or damage.</p>	<p><b>PASS:</b> No leakage or damage.</p>
*Sample #15: Flat on Short Side	*Sample #16: Bottom Corner	**Sample #12: Top Corner
		
<p><b>PASS:</b> No leakage or damage.</p>	<p><b>PASS:</b> No leakage. Deformation to shipper on impact.</p>	<p><b>PASS:</b> No leakage. Deformation to shipper on impact.</p>

\*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 & STACKING STABILITY TESTS**

**Option #1: Taped Top and Hot Melt Bottom**


TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>There must be no leakage of the filling substance from the inner receptacle, or inner packaging.</li> <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>	725.7 Kg (1600.0 Lbs) (Refer to Section IV)	
<b>TEST DURATION:</b>	24 Hours	
<b>TEST EQUIPMENT:</b>	L.A.B. 5250 Compression System	

**STACKING TEST SET-UP & RESULTS**

	Sample #	Maximum Deflection After 24 Hours	Results
	6	0.071"	<b>PASS</b>
	7	0.071"	<b>PASS</b>
	8	0.071"	<b>PASS</b>

**Comments/Observations:** Following the 24-hour stack test, there was no leakage of contents from the test samples and no damage likely to affect the performance of the packaging.

**STACKING STABILITY TEST SET-UP & RESULTS**

	Results	CRITERIA FOR PASSING THE TEST
	<b>PASS</b>	<ul style="list-style-type: none"> <li>In guided load tests, stacking stability must be assessed after test completion.</li> <li>Two filled packagings of the same type must be placed on the test sample.</li> <li>The stacked packages must maintain their position for one hour.</li> </ul> (§178.606)

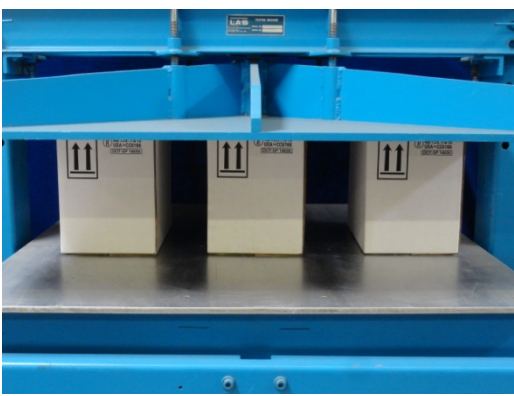
For stack stability, TEN-E places the filled samples one on top of the other. The bottom sample is rotated to the top until all three samples have been subjected to stacking stability for one hour each.

**STACKING & STACKING STABILITY TESTS**

**Option #2: Taped Top and Bottom**


TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>There must be no leakage of the filling substance from the inner receptacle, or inner packaging.</li> <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>	725.7 Kg (1600.0 Lbs) (Refer to Section IV)	
<b>TEST DURATION:</b>	24 Hours	
<b>TEST EQUIPMENT:</b>	L.A.B. 5250 Compression System	

**STACKING TEST SET-UP & RESULTS**

	Sample #	Maximum Deflection After 24 Hours	Results
	17	0.077"	<b>PASS</b>
	18	0.077"	<b>PASS</b>
	19	0.077"	<b>PASS</b>

**Comments/Observations:** Following the 24-hour stack test, there was no leakage of contents from the test samples and no damage likely to affect the performance of the packaging.

**STACKING STABILITY TEST SET-UP & RESULTS**

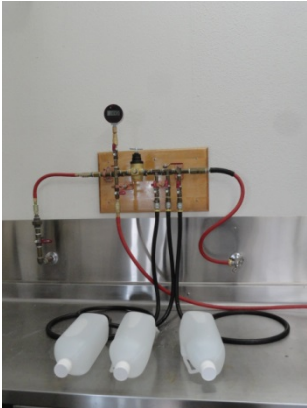
	Results	CRITERIA FOR PASSING THE TEST
	<b>PASS</b>	<ul style="list-style-type: none"> <li>In guided load tests, stacking stability must be assessed after test completion.</li> <li>Two filled packagings of the same type must be placed on the test sample.</li> <li>The stacked packages must maintain their position for one hour.</li> </ul> (§178.606)

For stack stability, TEN-E places the filled samples one on top of the other. The bottom sample is rotated to the top until all three samples have been subjected to stacking stability for one hour each.

**PRESSURE DIFFERENTIAL TEST**

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>	300 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 300 kPa test pressure for 30 minutes without leakage.
	2	PASS	
	3	PASS	

**VIBRATION TEST**

**Option #1: Taped Top and Hot Melt Bottom**

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>	4.0 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**

**Option #2: Taped Top and Bottom**

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>	4.0 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
	20	PASS	No leakage or damage.
	21	PASS	
	22	PASS	

**COBB WATER ABSORPTION TEST**

TEST INFORMATION		TEST CRITERIA
<b>NUMBER OF SAMPLES:</b>	5	<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>
<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	

COBB WATER ABSORPTION TEST RESULTS	
Sample #	Water Absorbed
1	100.0 g/m <sup>2</sup>
2	96.0 g/m <sup>2</sup>
3	100.0 g/m <sup>2</sup>
4	102.0 g/m <sup>2</sup>
5	96.0 g/m <sup>2</sup>
<b>AVERAGE:</b>	<b>98.8 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 2015 Edition	19 <sup>th</sup> Edition	2014 Edition	2015-2016 Edition	57th 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	4.1.1.4.1	4; 1.1.6	5.0.2.9
<b>Vibration:</b>	178.608	---	---	4; 1.1.1	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**

**INFORMATION USED FOR CALCULATIONS**

Overall Packaging Tare Weight (PTW):	1,936.0 Grams	
Overflow Capacity (OFC):		<u>Methanol/Water</u>
Methanol/Water	2,343.8 Grams	SG: 0.961
Water	2,439.0 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):	13.13 Inches	
Stack Test-# of Samples Tested Simultaneously:	3	

**98% OF OVERFLOW**

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>		
2,343.8	x	98% =	2,297.0 Grams	Methanol/Water
2,439.0	x	98% =	2,390.3 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>	
1,936	+	2,297.0	x	6	Methanol/Water
1,936	+	2,390.3	x	6	Water
Methanol/Water:		15.7	Kg	34.6	Lbs.
Water:		16.2	Kg	35.7	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>
1,936	+	1.9	x	2,390	x	6
		29.1	Kg	64.1	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	/	13.13	-1	=	8.0

**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>	
29.1	x	8.0	
		232.8 Kg	513.2 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	29.1	x	8.0
		698.4 Kg		1,539.7 Lbs.