

**UNITED NATIONS / DOT
PERFORMANCE CERTIFICATION**

4G DESIGN QUALIFICATION

**4 x 1 Gallon Round Plastic Bottle Packaging
Designs:**

- 1) 38-400 Taper Evident Closure & Shipper Taped Top and Bottom Flaps
- 2) 38-400 Taper 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 #: 14-7068



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

**Insert the year packaging is manufactured

TESTING PERFORMED FOR:

PUREPAK TECHNOLOGY CORPORATION

324 South Bracken Lane
Suite3
Chandler, AZ 85244

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 27, 2014

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SECTION I: CERTIFICATION


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

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

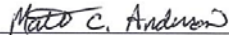
UN / DOT TEST	CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Drop (Variables 1 & 2)	178.603	1.3 m	Methanol/Water	May 23, 2014	PASS
Drop (Variables 3 & 4)	178.603	1.3 m	Methanol/Water	May 22, 2014	PASS
Stacking (Variables 1 & 2)	178.606	181.4 Kg – 24 Hours	Empty	May 27, 2014	PASS
Stacking (Variables 3 & 4)	178.606	181.4 Kg – 24 Hours	Empty	May 23, 2014	PASS
Pressure Tamper Evident	173.27	95 kPa - 30 Minutes	Water	May 27, 2014	PASS
Pressure Non Tamper Evident	173.27	95 kPa - 30 Minutes	Water	May 27, 2014	PASS
Vibration (Variables 1 & 2)	178.608	3.6 Hz – 1 Hour	Water	May 27, 2014	PASS
Vibration (Variables 3 & 4)	178.608	3.6 Hz – 1 Hour	Water	May 23, 2014	PASS
Cobb	178.516	30 Minutes	---	May 22, 2014	PASS

TEST REPORT NUMBER:	14-7068
UN MARKING: (CFR 49 – 178.503)	 4G / Y21.9 / S / ** USA / +CC8078
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 #2006030021)
THIRD PARTY PACKAGING IDENTIFICATION:	+CC8078
PERIODIC RETEST DATE:	May 27, 2016

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:

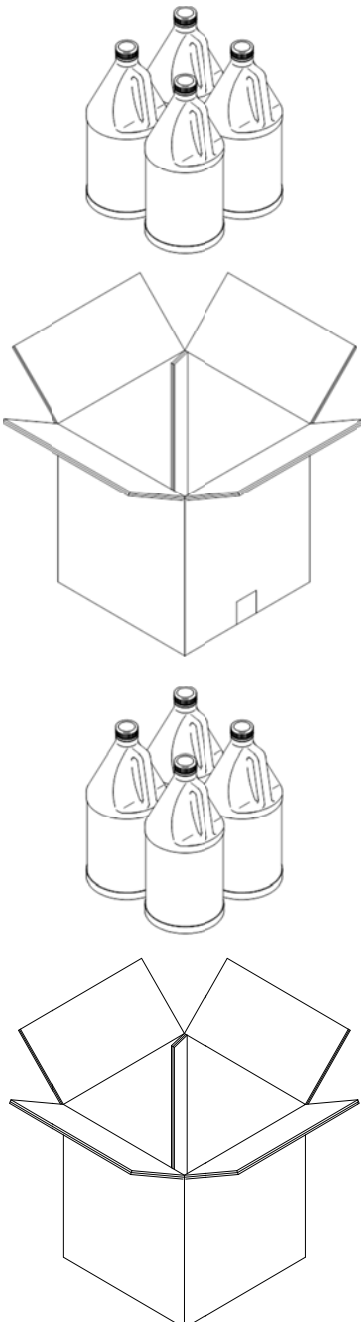
PurePak Technology Corporation
 324 South Bracken Lane Suite 3
 Chandler, AZ 85244


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

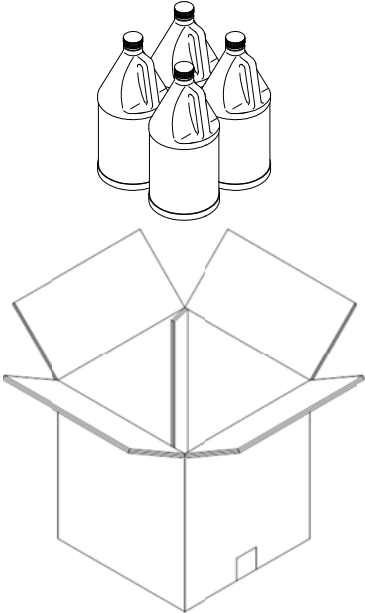
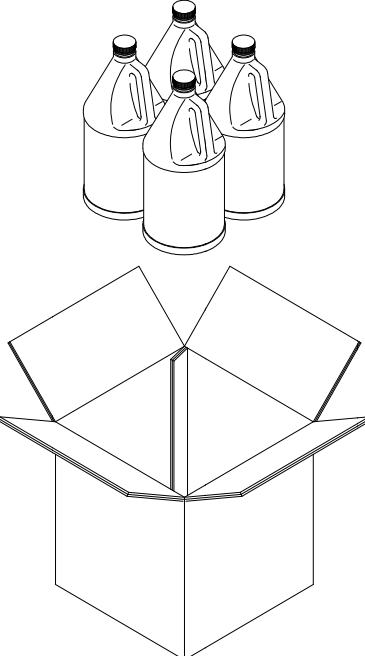
SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS

4 x 1 Gallon Round Plastic Bottle Packaging Designs:

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

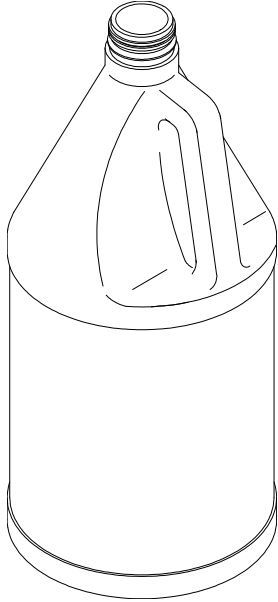
ASSEMBLY DRAWING	TEST LEVELS	
	Certification Type: Design Qualification	
	Packaging Code Designation: 4G	
	Packing Group: II	
	Specific Gravity: 1.3	
	Internal Pressure: 95 kPa	
	TEST SAMPLE PREPARATION (Refer to Section IV)	
	Overall Packaging Tare Weight: 1,244.0 Grams	
	Fill Capacity (98% Maximum Capacity):	
	Methanol/Water 3,826.3 Grams	
	Water 3,985.7 Grams	
	Package Test Weight:	
	Methanol/Water 16.5 Kg 36.3 Lbs	
	Water 17.1 Kg 37.6 Lbs	
	Authorized Package Gross 21.9 Kg 48.2 Lbs	
	Mass:	
	CLOSING METHODS – INNER PACKAGING	
	Application Torque: 50 In-Lbs	
	Equipment: Snap On Torque Wrench	
	CLOSING METHODS – SHIPPER	
	Top Flaps:	
Manufacturer: 3M: St. Paul, MN		
Type: 3M 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 Scotch Tape (Supplied by PurePak) Hot Melt Glued: Prepared by PurePak		
Width: 48 mm (2")		
Overlap: 2" Minimum		
Tape Pattern: Center Seam		
Inner Flaps: Meet		
Outer Flaps: Meet		
Refer to Appendix A for Manufacturer's Closure Instructions		

4 x 1 Gallon Round Plastic Bottle Packaging Designs:
3) 38-400 Closure & Shipper Taped Top and Bottom Flaps
4) 38-400 Closure & Shipper Taped Top and Hot Melt Glued Bottom Flaps

ASSEMBLY DRAWING	TEST LEVELS																											
	<table border="1"> <tr> <td>Certification Type:</td> <td colspan="2">Design Qualification</td> </tr> <tr> <td>Packaging Code Designation:</td> <td colspan="2">4G</td> </tr> <tr> <td>Packing Group:</td> <td colspan="2">II</td> </tr> <tr> <td>Specific Gravity:</td> <td colspan="2">1.3</td> </tr> <tr> <td>Internal Pressure:</td> <td colspan="2">95 kPa</td> </tr> </table>	Certification Type:	Design Qualification		Packaging Code Designation:	4G		Packing Group:	II		Specific Gravity:	1.3		Internal Pressure:	95 kPa													
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	<table border="1"> <tr> <th colspan="3">TEST SAMPLE PREPARATION (Refer to Section IV)</th> </tr> <tr> <td>Overall Packaging Tare Weight:</td> <td colspan="2">1,239.0 Grams</td> </tr> <tr> <td>Fill Capacity (98% Maximum Capacity):</td> <td colspan="2"></td> </tr> <tr> <td> Methanol/Water</td> <td>3,826.3 Grams</td> <td></td> </tr> <tr> <td> Water</td> <td>3,985.7 Grams</td> <td></td> </tr> <tr> <td>Package Test Weight:</td> <td colspan="2"></td> </tr> <tr> <td> Methanol/Water</td> <td>16.5 Kg</td> <td>36.3 Lbs</td> </tr> <tr> <td> Water</td> <td>17.1 Kg</td> <td>37.6 Lbs</td> </tr> <tr> <td>Authorized Package Gross Mass:</td> <td>21.9 Kg</td> <td>48.2 Lbs</td> </tr> </table>	TEST SAMPLE PREPARATION (Refer to Section IV)			Overall Packaging Tare Weight:	1,239.0 Grams		Fill Capacity (98% Maximum Capacity):			Methanol/Water	3,826.3 Grams		Water	3,985.7 Grams		Package Test Weight:			Methanol/Water	16.5 Kg	36.3 Lbs	Water	17.1 Kg	37.6 Lbs	Authorized Package Gross Mass:	21.9 Kg	48.2 Lbs
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	<th colspan="3">CLOSING METHODS – INNER PACKAGING</th>	CLOSING METHODS – INNER PACKAGING																										
	Application Torque:	50 In-Lbs																										
Equipment:	Snap On Torque Wrench																											
<th colspan="3">CLOSING METHODS – SHIPPER</th>	CLOSING METHODS – SHIPPER																											
<th colspan="3">Top Flaps:</th>	Top Flaps:																											
Manufacturer:	3M: St. Paul, MN																											
Type:	3M Scotch Tape (Supplied by PurePak)																											
Width:	48 mm (2")																											
Overlap:	2" Minimum																											
Tape Pattern:	Center Seam																											
Inner Flaps:	Meet																											
Outer Flaps:	Meet																											
<th colspan="3">Bottom Flaps:</th>	Bottom Flaps:																											
Manufacturer:	3M: St. Paul, MN																											
Type:	Tape: 3M Scotch Tape (Supplied by PurePak) Hot Melt Glued: Prepared by PurePak																											
Width:	48 mm (2")																											
Overlap:	2" Minimum																											
Tape Pattern:	Center Seam																											
Inner Flaps:	Meet																											
Outer Flaps:	Meet																											
Refer to Appendix A for Manufacturer's Closure Instructions																												

COMPONENT INFORMATION

CLOSURE		DRAWING
Manufacturer: Hoffer Plastics Corp.: South Elgin, IL (Dwg. #: CA 38-18)		
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):	47 HP	
Liner:		
Description:	P.E. Foam Liner	
Tare Weight:	0.38 Grams	
Thickness:	0.032"	
Diameter:	1.458"	
CLOSURE		DRAWING
Manufacturer: Berry Plastics Corporation: Evansville, IN (Dwg. #: 21015155-C)		
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):	NONE	
Liner:		
Description:	P.E. Foam Liner	
Tare Weight:	0.36 Grams	
Thickness:	0.028"	
Diameter:	1.468"	

PLASTIC BOTTLE		DRAWING
Manufacturer: Berry Plastics Corporation: Evansville, IN (Product Name: B38RD1HA)		
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 Gallon	
• Overflow	4,067.0 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 20 07 K C.K.S. 80859	

SHIPPER

Manufacturer: Packaging Corporation of America: 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

• **Measured** 34.7/24.1/36.3/24.3/34.6

Combined Wt. of Facings: 105.6

Tare Weight: 729 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):	0.266"	
Manufacturer's Joint:	Inside Glued, 1-3/8" Lap	
Markings (QC Audit):	NONE	







SECTION III: TEST PROCEDURES AND RESULTS

DROP TESTS

Variable #1

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.960 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. No rupture is permitted in packagings for materials in Class 1 which would permit spillage of loose explosive substances or articles from the outer packaging. (\$178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #201	
CONTENTS TEMP.:	-18.1°C (-0.6°F)	
DROP HEIGHT:	1.3 Meters (52") (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 or damage.	PASS: No leakage or damage.	PASS: No leakage or damage.
*Sample #4: Flat on Short Side	*Sample #5: Bottom Corner	**Sample #1: Top Corner
		
PASS: No leakage or damage.	PASS: No leakage. Deformation to shipper on impact.	PASS: 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

Variable #2

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.960 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. No rupture is permitted in packagings for materials in Class 1 which would permit spillage of loose explosive substances or articles from the outer packaging. (\$178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #201	
CONTENTS TEMP.:	-18.3°C (-1.0°F)	
DROP HEIGHT:	1.3 Meters (52") (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 or damage.	PASS: No leakage or damage.	PASS: No leakage or damage.
*Sample #15: Flat on Short Side	*Sample #16: Bottom Corner	**Sample #12: Top Corner
		
PASS: No leakage or damage.	PASS: No leakage. Deformation to shipper on impact.	PASS: 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

Variable #3

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.960 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. No rupture is permitted in packagings for materials in Class 1 which would permit spillage of loose explosive substances or articles from the outer packaging. (\$178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #201	
CONTENTS TEMP.:	-18.3°C (-1.0°F)	
DROP HEIGHT:	1.3 Meters (52") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #23: Flat on Bottom	Sample #24: Flat on Top	*Sample #25: Flat on Long Side
		
PASS: No leakage or damage.	PASS: No leakage or damage.	PASS: No leakage or damage.
*Sample #26: Flat on Short Side	*Sample #27: Bottom Corner	**Sample #23: Top Corner
		
PASS: No leakage or damage.	PASS: No leakage. Deformation to shipper on impact.	PASS: 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

Variable #4

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.960 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. No rupture is permitted in packagings for materials in Class 1 which would permit spillage of loose explosive substances or articles from the outer packaging. (\$178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #201	
CONTENTS TEMP.:	-18.3°C (-1.0°F)	
DROP HEIGHT:	1.3 Meters (52") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #34: Flat on Bottom	Sample #35: Flat on Top	*Sample #36: Flat on Long Side
		
PASS: No leakage or damage.	PASS: No leakage or damage.	PASS: No leakage or damage.
*Sample #37: Flat on Short Side	*Sample #38: Bottom Corner	**Sample #34: Top Corner
		
PASS: No leakage or damage.	PASS: No leakage. Deformation to shipper on impact.	PASS: 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.

STACKING TEST

Taped Top and Taped Bottom Flaps

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:	73°F / 50% RH Quality Room #202	
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 stack test there was no leakage or damage likely to result in failure of the packaging.			


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

STACKING TEST

Taped Top Flaps and Hot Melt Glued Bottom Flaps

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:	73°F / 50% RH Quality Room #202	
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
	17	0"	PASS
	18	0"	PASS
	19	0"	PASS
Comments/Observations			
Following the stack test there was no leakage or damage likely to result in failure of the packaging.			

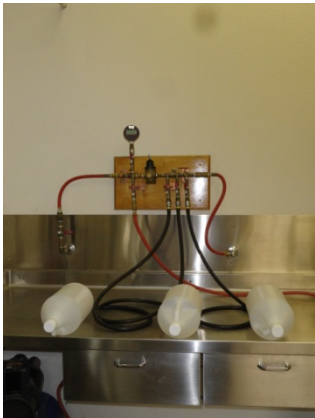
Stacking Stability: Not conducted; required only for guided load tests.

PRESSURE DIFFERENTIAL TEST

Taper 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	

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	

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>(§178.608)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	73°F / 50% RH Quality Room #202	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.6 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>(§178.608)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	73°F / 50% RH Quality Room #202	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.6 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
	20	PASS	No leakage or damage.
	21	PASS	
	22	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>(§178.608)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	73°F / 50% RH Quality Room #202	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.6 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
	31	PASS	No leakage or damage.
	32	PASS	
	33	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>(§178.608)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	73°F / 50% RH Quality Room #202	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.6 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
	42	PASS	No leakage or damage.
	43	PASS	
	44	PASS	

COBB WATER ABSORPTION TEST

TEST INFORMATION	TEST CRITERIA
<p>NUMBER OF SAMPLES: 5</p> <p>SAMPLE SIZE: 5" x 5" (Minimum)</p> <p>CONDITIONING: 73°F / 50% RH Quality Room #202</p> <p>WATER APPLIED: 100 mL / Sample</p> <p>TEST DURATION: 30 Minutes / Sample</p> <p>TEST EQUIPMENT: UWE Analytical Balance Gurley Cobb Water Absorption Fixtures</p>	<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)

COBB WATER ABSORPTION TEST RESULTS	
Sample #	Water Absorbed
1	145 g/m ²
2	148 g/m ²
3	124 g/m ²
4	143 g/m ²
5	150 g/m ²
AVERAGE:	142.0 g/m²
RESULT	PASS

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR ^①	UN ^②	IMDG ^③	ICAO ^④	IATA ^⑤
	October 2012 Edition	17 th Edition	2012 Edition	2013-2014 Edition	54th 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
	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.



TEN-E Packaging Services, Inc.

SECTION IV: MATHEMATICAL CALCULATIONS
Closure

Tamper Evident

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	1,244.0 Grams	
Overflow Capacity (OFC):		Methanol/Water SG
Methanol/Water	3,904.3 Grams	<u>SG: 0.960</u>
Water	4,067.0 Grams	
Number of Inner Packagings (# IP):	4	
Packing Group	II	
Product Specific Gravity (PSG):	1.300	
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>		
3,904.3	x	98% =	3,826.3 Grams	Methanol/Water
4,067.0	x	98% =	3,985.7 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>	
1,244	+	3,826.3	x	4	Methanol/Water
1,244	+	3,985.7	x	4	Water
Methanol/Water:		16.5	Kg	36.3	Lbs.
Water:		17.1	Kg	37.6	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>
1,244	+	1.3	x	3,986	x	4
		21.9	Kg	48.2	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
1.3	x	1.00		
		1.30	Meter	
			<u>Required Drop Height</u>	<u>Actual Drop Height</u>
			51.2 Inches	52 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	/	13.88	-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>	
21.9	x	7.6	
		166.5 Kg	367.1 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	21.9	x	7.6
		499.4 Kg		1,101.0 Lbs.

SECTION IV: MATHEMATICAL CALCULATIONS

Standard Closure

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	1,239.0 Grams	
Overflow Capacity (OFC):		Methanol/Water SG
Methanol/Water	3,904.3 Grams	SG: 0.960
Water	4,067.0 Grams	
Number of Inner Packagings (# IP):	4	
Packing Group	II	
Product Specific Gravity (PSG):	1.300	
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>		
3,904.3	x	98% =	3,826.3 Grams	Methanol/Water
4,067.0	x	98% =	3,985.7 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>	
1,239	+	3,826.3	x	4	Methanol/Water
1,239	+	3,985.7	x	4	Water
Methanol/Water:		16.5	Kg	36.3	Lbs.
Water:		17.1	Kg	37.6	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>
1,239	+	1.3	x	3,986	x	4
		21.9	Kg	48.2	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
1.3	x	1.00		
		1.30	Meter	
			<u>Required Drop Height</u>	<u>Actual Drop Height</u>
			51.2 Inches	52 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	/	13.88	-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>	
21.9	x	7.6	
		166.5 Kg	367.1 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	21.9	x	7.6
		499.4 Kg		1,101.0 Lbs.

APPENDIX A: MANUFACTURER'S CLOSURE INSTRUCTIONS

 PurePak Technology Corporation	PACKAGING ASSEMBLY INSTRUCTIONS One Gallon 130 gram bottle
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Package: One Gallon 130 gram bottle Issue Date: June 1, 2010 Rev: C Cert# +BV1367
4 x One Gallon 130 gram Plastic Bottle Packaging

NO. / CASE	LIST OF COMPONENTS	CONFIGURATION	SPEC / PART #
4	Hoffer 38-400 mm Tamper Evident Drop Lock Closure <u>or</u>	A & B	356808
4	Berry Plastics 38-400 Ribbed Closure	A & B	18440
4	130 gram Bottles with 38-400 T/E Neck Finish	A & B	732769
(1)	Regular 275# Doublewall RSC, preassembled	A & B	733744
(1) Roll	2' Clear Pressure Sensitive Tape (Scotch 3M Packaging Tape)	A & B	
Adhesive	H.B. Fuller Hot Melt Adhesive PHC-9200	A	

PACKAGING CONFIGURATIONS:	Case Sealing Method
Configuration A: 4 X 130 gram Bottles	Top: 2" Clear Pressure Sensitive Tape Bottom: Glued
Configuration B: 4 X 130 gram Bottles	Top: 2" Clear Pressure Sensitive Tape Bottom: 2" Clear Pressure Sensitive Tape

ASSEMBLY INSTRUCTIONS:
 Note: Refer to component list above. Examine all parts for defects. Once you have determined that this packaging is free from defects then follow these instructions for package assembly.

- Apply threaded closure to bottle with an application torque of 35 to 50 in/lbs using an appropriate closing tool.
- For Configuration A, place four (4) bottles into a pre-assembled carton with the bottle closures facing upward.
- Tape the tops closed with 2" pressure sensitive tape. Center the tape over the middle seam formed by the flaps being folded together. The length of the tape should be such that there is a 2" extension on each end.
- For Configuration B, fold in two opposite bottom flaps of carton. Then fold in the remaining two adjacent bottom flaps making sure that the exposed flaps display the Box Maker's Certificate or the Guarantee Stamp.
- Tape the bottom flaps closed with 2" pressure sensitive tape. Center the tape over the middle seam formed by the flaps being folded together. The length of the tape should be such that there is a 2" extension on each end.
- Then place four (4) bottles in the carton with the bottle closures facing upward.
- Tape the top flaps closed with 2" clear pressure sensitive tape. Center the tape over the middle seam formed by the flaps being folded together. The length of the tape should be such that there is a 2" extension on each end.
- Apply product labels and DOT hazard warning labels as required by work order instructions. Do not cover up any UN markings with labels or tape of any kind.

Configuration
A & B

4G/Y23.1/S/**
USA/+BV1367

** (Year of Manufacture)