UNITED NATIONS / DOT PERFORMANCE CERTIFICATION

4G DESIGN QUALIFICATION

6 x 2.5 Liter Plastic Bottle Variable Packaging

TEST REPORT #: 11-7117

un

4G / Y29.1 / S / **
USA / +CC6166

** Insert year the packaging is manufactured

TESTING PERFORMED FOR:

PUREPAK TECHNOLOGY CORPORATION
324 South Braken Lane Suite 3
Chandler, AZ 85224

ATTN: Mike Dodd

TESTING PERFORMED BY:

TEN-E Packaging Services, Inc.
1666 County Road 74
Newport, MN 55055
Phone: (651) 459-0671
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TEN-E Packaging Services, Inc.
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Ontario, CA 91764
Phone: (909) 937-1260
Fax: (909) 937-1262

August 12, 2011

TABLE OF CONTENTS

NOTES AND COMMENTS

6 x 2.5 Liter Plastic Bottle Variables Tested:
#1) 6 x 2.5 Liter Plastic Bottle with 45mm Opening And Taped Top and Bottom Flaps
#2) 6 x 2.5 Liter Plastic Bottle with 45mm Opening And Taped Top and Hot Melt Glued Bottom Flaps
#3) 6 x 2.5 Liter Plastic Bottle with 38mm Opening And Taped Top and Bottom Flaps
#4) 6 x 2.5 Liter Plastic Bottle with 38mm Opening And Taped Top and Hot Melt Glued Bottom Flaps

PurePak Technology may use Certification Number +CC6166 for a 4 x 2.5 Liter Plastic Bottle Variable Packaging & a 1 x 2.5 Liter Plastic Bottle Variable Packaging provided they meet 49 CFR; 178.601 (g)(1) Selective Testing Variation 1 and 49 CFR; 178.601 (g)(4) Selective Testing Variation 4.

SECTION I: CERTIFICATION

Design Qualification of the PurePak Technology Corporation
6 x 2.5 Liter Plastic Bottle Variable Packaging

TEN-E PACKAGING SERVICES, INC. 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 # 1	178.603	1.9m	Methanol / Water	July 15, 2011	PASS
Drop #2	178.603	1.9m	Methanol / Water	July 15, 2011	PASS
Drop #3	178.603	1.9m	Methanol / Water	July 19, 2011	PASS
Drop #4	178.603	1.9m	Methanol / Water	August 10, 2011	PASS
Stacking #1 & #3	178.606	249.4 Kg – 24 Hrs.	Empty	July 15, 2011	PASS
Stacking #2 & #4	178.606	249.4 Kg – 24 Hrs.	Empty	August 12, 2011	PASS
Pressure #1	173.27	300kPa – 30 Min.	Water	July 19, 2011	PASS
Pressure #2	173.27	300kPa – 30 Min.	Water	August 11, 2011	PASS
Vibration #1	178.608	3.6 Hz – 1 Hr.	Water	July 15, 2011	PASS
Vibration #2	178.608	3.7 Hz – 1 Hr.	Water	July 18, 2011	PASS
Vibration #3	178.608	3.7 Hz – 1 Hr.	Water	July 18, 2011	PASS
Vibration #4	178.608	3.7 Hz – 1 Hr.	Water	July 18, 2011	PASS
Cobb	178.516	30 minutes	---	August 11, 2011	PASS

TEST REPORT NUMBERS:	**11-7117,** 09-7150, 09-7229
UN MARKING: (CFR 49 - 178.503)	(un) 4G / Y29.1 / S / ** USA / +CC6166
PACKAGING IDENTIFICATION CODE:	4G - Fiberboard Box (178.516)
PERFORMANCE STANDARD:	Y (Packaging meets Packing Group II and III tests)
AUTHORIZED GROSS MASS:	29.1 Kg (64.1 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)
THIRD PARTY PACKAGE IDENTIFICATION:	+CC6166
PERIODIC RETEST DATE:	August 12, 2013

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 standard, 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:

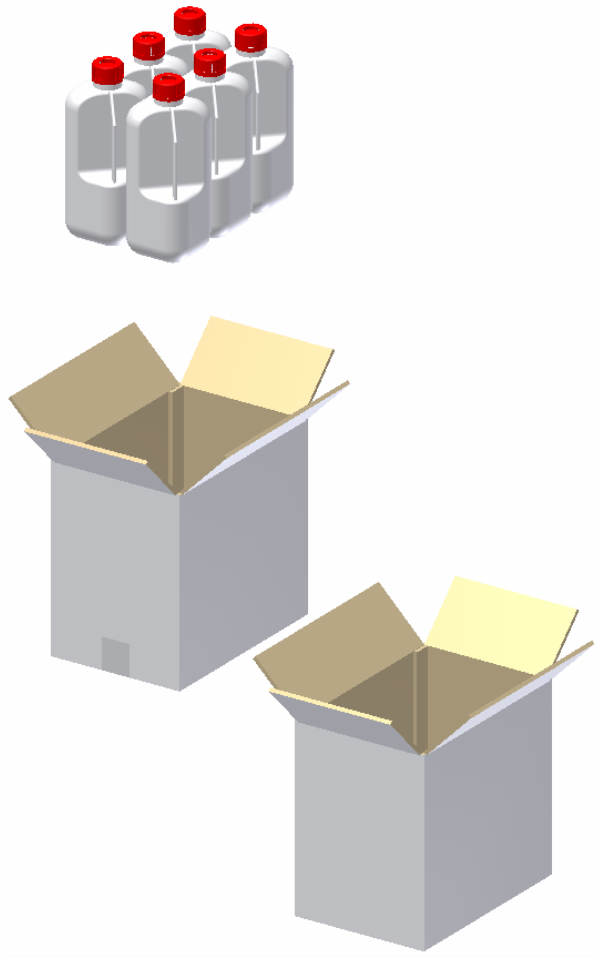
PurePak Technology Corporation
324 South Braken Lane Suite 3
Chandler, AZ 85224

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

SECTIONS II & V: PACKAGING DESCRIPTION / COMPONENT DRAWINGS

6 x 2.5 Liter Plastic Bottle with 45mm Opening

ASSEMBLY DRAWING



TEST LEVELS

Certification Type:	Design Qualification
Packaging Code Designation:	4G
Packing Group:	II
Specific Gravity:	1.9
Internal Pressure:	300kPa

TEST SAMPLE PREPARATION
(Refer to Section IV)

Overall Packaging Tare Weight:	1,951 Grams	
Inner Packaging Fill Capacity (98% Maximum Capacity):		
Methanol/Water	2,322.7 Grams	
Water	2,402.0 Grams	
Package Test Weight:		
Methanol/Water	15.8 Kg	(34.8 Lbs.)
Water	16.3 Kg	(35.9 Lbs.)
Authorized Package Gross Mass:	29.3 Kg	(64.5 Lbs.)

CLOSING METHODS – INNER PACKAGING

Application Torque	50 In-Lbs
Equipment:	Kaps All Electronic Torque Tester #701

CLOSING METHODS – SHIPPER

Top Flaps:

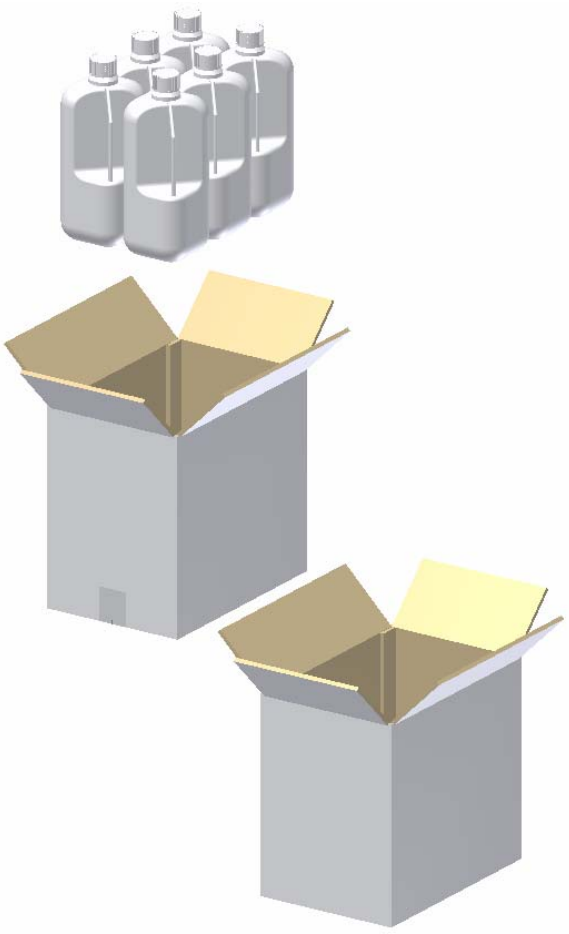
Type:	Pressure Sensitive Tape
Width:	48mm (2")
Overlap:	2" Minimum
Tape Pattern:	Center Seam
Inner Flaps:	4-1/2” Width Gap
Outer Flaps:	Meet

Bottom Flaps:

Type:	Option #1) Pressure Sensitive Tape Option #2) Hot Melt Glued
Width:	Option #1)48mm (2")
Overlap:	Option #1)2" Minimum
Tape Pattern:	Option #1)Center Seam
Inner Flaps:	4-1/2” Width Gap
Outer Flaps:	Meet

6 x 2.5 Liter Plastic Bottle with 38mm Opening

ASSEMBLY DRAWING



TEST LEVELS

Certification Type:	Design Qualification
Packaging Code Designation:	4G
Packing Group:	II
Specific Gravity:	1.9
Internal Pressure:	300kPa

TEST SAMPLE PREPARATION
(Refer to Section IV)

Overall Packaging Tare Weight:	1,944 Grams	
Inner Packaging Fill Capacity (98% Maximum Capacity):		
Methanol/Water	2,307.6 Grams	
Water	2,386.3 Grams	
Package Test Weight:		
Methanol/Water	15.7 Kg	(34.6 Lbs.)
Water	16.2 Kg	(35.7 Lbs.)
Authorized Package Gross Mass:	29.1 Kg	(64.1 Lbs.)

CLOSING METHODS – INNER PACKAGING

Application Torque	35 In-Lbs
Equipment:	Kaps All Electronic Torque Tester #701

CLOSING METHODS – SHIPPER

Top Flaps:

Type:	Pressure Sensitive Tape
Width:	48mm (2")
Overlap:	2" Minimum
Tape Pattern:	Center Seam
Inner Flaps:	4-1/2” Width Gap
Outer Flaps:	Meet

Bottom Flaps:

Type:	Option #1) Pressure Sensitive Tape Option #2) Hot Melt Glued
Width:	Option #1)48mm (2")
Overlap:	Option #1)2" Minimum
Tape Pattern:	Option #1)Center Seam
Inner Flaps:	4-1/2” Width Gap
Outer Flaps:	Meet

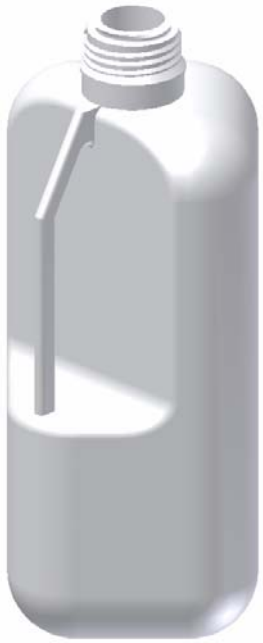
For Packagings with an Established Gross Mass:

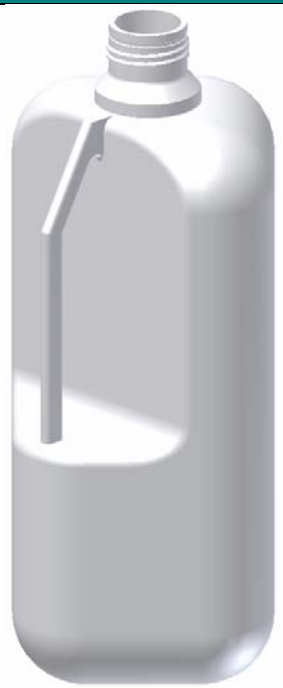
If the gross mass calculation in this report exceeds the previously established gross mass, the manufacturer may elect to maintain the current gross mass marking (e.g. the gross mass rating of the UN marking on the packaging may be less than the calculated gross mass indicated in this report) or use 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

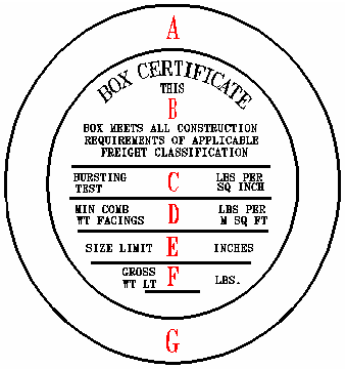
CLOSURE		Drawing
Manufacturer: Menshen: Kunststoffverarbeitung, Finnentrop (4.1451.99.2)		
Description:	45mm Threaded Closure Tamper Evident	
Quantity:	6	
Material:	High Density Polyethylene	
Density:	0.929 g/cc	
Tare Weight:	10.80 Grams	
Overall Dimensions:		
• **Height**	30.3mm	
• **Diameter**	51.3mm	
Thread:		
• **Type**	45mm	
• **Style**	Buttress	
Finish Dimensions:		
• **T**	1.797”	
• **E**	1.694”	
Markings (QC Audit):	1795 3	
PLUG		
Description:	PTFE Liner	
Tare Weight:	0.93 Grams	
Thickness:	0.012”	
Diameter:	45mm	

CLOSURE		Drawing
Manufacturer: Rexam Plastic Pkg: Evansville, IN (QIM-317-4937)		
Description:	38mm Threaded Closure	
Quantity:	6	
Material:	Polyethylene	
Density:	0.903 g/cc	
Tare Weight:	10.3 Grams	
Overall Dimensions:		
• **Height**	1.016” ± .015”	
• **Diameter**	1.701” ± .015”	
Thread:		
• **Type**	38mm	
• **Style**	439	
Finish Dimensions:		
• **T**	1.483” ± 0.007”	
• **E**	1.389” ± 0.007”	
Markings (QC Audit):	123	
LINER		
Description:	Polyethylene Foam Liner	
Tare Weight:	0.63 Grams	
Thickness:	0.057”	
Diameter:	1.372”	

PLASTIC BOTTLE		Drawing
Manufacturer: Berry Plastic Corporation: Anaheim, CA (Dwg #: D08-046)		
Description:	2.5 Liter Plastic Bottle (45mm Closure)	
Quantity:	6	
Material/Pigment:	High Density Polyethylene / Natural	
Method of Mfg:	Blow Molded	
Density:	0.947 g/cc	
Tare Weight:	208 Grams ± 8 Grams	
Capacity:		
• **Rated**	2.5 Liter	
• **Overflow**	2476cc ± 24cc	
Overall Dimensions:		
• **Height**	11.637” ± 0.080”	
• **Width**	5.302”	
• **Depth**	5.302” ± 0.080”	
Finish Dimensions:		
• **T**	1.771” ± 0.010”	
• **E**	1.644” ± 0.010”	
• **Thread Pitch**	1.540”	
Wall Thickness:		
• **Minimum**	0.037”	
Markings (QC Audit):	SPI “2” HDPE Recycling Symbol 116 4 DODD 3/11 M4609 A03241 19:17/7550	

PLASTIC BOTTLE		Drawing
Manufacturer: Berry Plastic Corporation: Anaheim, CA (Dwg #: D08-045)		
Description:	2.5 Liter Plastic Bottle (38mm Closure)	
Quantity:	6	
Material/Pigment:	High Density Polyethylene / Natural	
Method of Mfg:	Blow Molded	
Density:	0.947 g/cc	
Tare Weight:	208 Grams ± 8 Grams	
Capacity:		
• **Rated**	2.5 Liter	
• **Overflow**	2462cc ± 24cc	
Overall Dimensions:		
• **Height**	11.637” ± 0.080”	
• **Width**	5.302”	
• **Depth**	5.302” ± 0.080”	
Finish Dimensions:		
• **T**	1.461” ± 0.015”	
• **E**	1.367” ± 0.015”	
• **Thread Pitch**	0.1640”	
Wall Thickness:		
• **Minimum**	0.040”	
Markings (QC Audit):	SPI “2” HDPE Recycling Symbol M4609 A032611 20:10/7550 3/11 2 DODD T16	

SHIPPER		
Manufacturer: Temple-Inland: Ontario, CA		
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**		
• **Measured**	42.9/27.6/34.7/28.3/43.4	
Combined Wt. of Facings:	121	
Tare Weight:	652 Grams	
Dimensions		
	Specification Dimensions (Inside)	**Measured Dimensions (Outside)**
• **Length**	13.74”	14-1/4”
• **Width**	9”	9-5/8”
• **Height**	11.875”	13-1/8”
Board Caliper (Nominal):	0.262”	
Manufacturer’s Joint:	Inside Glued, 1-1/4” Lap	
Markings (QC Audit):	u n 4G/Y29.1/S/10 USA/+CC6166 DOT-SP 14656 ART APPROVAL DATE: 02/20/10 13.75 X 9 X 11.875 ID 7942190	

BOX CERTIFICATE		
		
	(A) Corrugated Manufacturer:	Temple-Inland
	(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:	ONTARIO, CALIFORNIA, U.S.A.

SECTION III: TEST PROCEDURES AND RESULTS

DROP TESTS #1

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Methanol/Water Solution (0.967 SG)	• 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 and there is 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), Chamber #201	
TEST CONTENTS TEMP.:	-18.2°C (-0.76°F)	
DROP HEIGHT:	1.9 Meters (75") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160 #301	

DROP ORIENTATIONS & 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. Slight deformation to shipper on impact.	**PASS:** No leakage. Slight deformation to shipper on impact.

* Flat on Bottom Drop sample was also used for the Top Corner Drop

DROP TESTS #2

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Methanol/Water Solution (0.967 SG)	• 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 and there is 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), Chamber #201	
TEST CONTENTS TEMP.:	-18.0°C (-0.76°F)	
DROP HEIGHT:	1.9 Meters (75”) (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160 #301	

DROP ORIENTATIONS & TEST RESULTS

Sample #9: Flat on Bottom	Sample #10: Flat on Top	Sample #11: Flat on Long Side
		
PASS: No leakage or damage.	**PASS:** No leakage or damage.	**PASS:** No leakage or damage.

Sample #12: Flat on Short Side	Sample #13: Bottom Corner	*Sample #9: Top Corner
		
PASS: No leakage or damage.	**PASS:** No leakage. Slight deformation to shipper on impact.	**PASS:** No leakage. Slight deformation to shipper on impact.

* Flat on Bottom Drop sample was also used for the Top Corner Drop

DROP TESTS #3

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Methanol/Water Solution (0.967 SG)	• 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 and there is 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), Chamber #201	
TEST CONTENTS TEMP.:	-18.0°C (-0.76°F)	
DROP HEIGHT:	1.9 Meters (75”) (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160 #301	

DROP ORIENTATIONS & TEST RESULTS

Sample #17: Flat on Bottom	Sample #18: Flat on Top	Sample #19: Flat on Long Side
		
PASS: No leakage or damage.	**PASS:** No leakage or damage.	**PASS:** No leakage or damage.

Sample #20: Flat on Short Side	Sample #21: Bottom Corner	*Sample #17: Top Corner
		
PASS: No leakage or damage.	**PASS:** No leakage. Slight deformation to shipper on impact.	**PASS:** No leakage. Slight deformation to shipper on impact.

* Flat on Bottom Drop sample was also used for the Top Corner Drop

DROP TESTS #4

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Methanol/Water Solution (0.967 SG)	• 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 and there is 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), Chamber #201	
TEST CONTENTS TEMP.:	-18.1°C (-0.58°F)	
DROP HEIGHT:	1.9 Meters (75”) (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160 #301	

DROP ORIENTATIONS & TEST RESULTS

Sample #25: Flat on Bottom	Sample #26: Flat on Top	Sample #27: Flat on Long Side
		
PASS: No leakage or damage.	**PASS:** No leakage or damage.	**PASS:** No leakage or damage.

Sample #28: Flat on Short Side	Sample #29: Bottom Corner	*Sample #25: Top Corner
		
PASS: No leakage or damage.	**PASS:** No leakage. Slight deformation to impact corner.	**PASS:** No leakage. Slight deformation to impact corner.

* Flat on Bottom Drop sample was also used for the Top Corner Drop

STACKING TESTS #1 & #3

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Empty	• There must be no leakage of the filling substance from the inner receptacle, or inner packaging. • 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, Chamber #202	
TEST LOAD APPLIED:	249.4 Kg (550.0 Lbs.) (Refer to Section IV)	
TEST DURATION:	24 Hours	
TEST EQUIPMENT:	Dead Load Weights	

STACKING TEST SET-UP AND RESULTS

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

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

STACKING TESTS #2 & #4

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Empty	• There must be no leakage of the filling substance from the inner receptacle, or inner packaging. • 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, Chamber #202	
TEST LOAD APPLIED:	249.4 Kg (550.0 Lbs.) (Refer to Section IV)	
TEST DURATION:	24 Hours	
TEST EQUIPMENT:	Dead Load Weights	

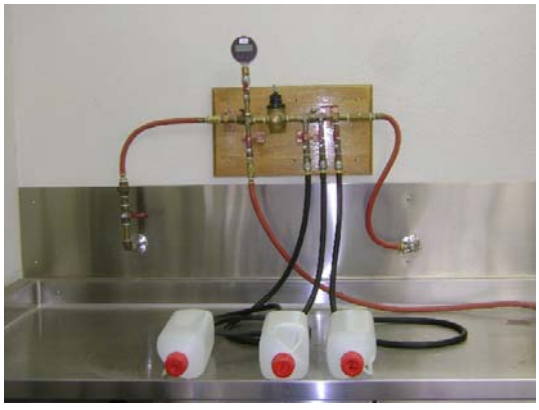
STACKING TEST SET-UP AND RESULTS

Sample #	Maximum Deflection After 24 Hours	Results
14	**0”**	**PASS**
15	**0”**	**PASS**
16	**0”**	**PASS**
Stacking Stability:	Not conducted; required only for guided load tests.	

PRESSURE DIFFERENTIAL TEST	#1

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Water	• Packaging for which retention of liquid is a basic function must be capable of withstanding the pressure requirements without leakage. (§173.27)
FILL CAPACITY:	Maximum Capacity	
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	300kPa	
TEST DURATION:	30 Minutes	
AREA OF PRESSURIZATION:	Through the Bottom	
TEST EQUIPMENT:	Regulated Water Source Gauge #605	

HYDROSTATIC PRESSURE TEST SET-UP & RESULTS

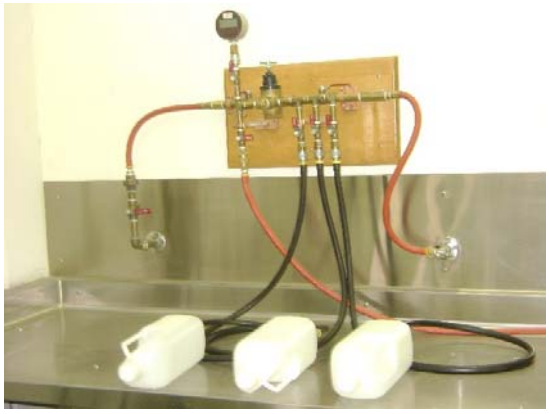


Sample #	Results	Comments / Observations
1	**PASS**	All three samples maintained the 300 kPa test pressure for 30 minutes without leakage.
2	**PASS**	
3	**PASS**	

PRESSURE DIFFERENTIAL TEST	#2

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Water	• Packaging for which retention of liquid is a basic function must be capable of withstanding the pressure requirements without leakage. (§173.27)
FILL CAPACITY:	Maximum Capacity	
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	300kPa	
TEST DURATION:	30 Minutes	
AREA OF PRESSURIZATION:	Through the Bottom	
TEST EQUIPMENT:	Regulated Water Source Gauge #605	

HYDROSTATIC PRESSURE TEST SET-UP & 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**	

REPETITIVE SHOCK VIBRATION TESTS #1

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Water	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. (§178.608)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	73°F / 50% RH, Chamber #202	
TABLE DISPLACEMENT:	1”	
TEST FREQUENCY:	3.6 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Transportation Simulator #501	

VIBRATION TEST SET-UP & RESULTS

Sample #	Results	Comments / Observations
6	**PASS**	No leakage or damage.
7	**PASS**	
8	**PASS**	

REPETITIVE SHOCK VIBRATION TESTS #2

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Water	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. (§178.608)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	73°F / 50% RH, Chamber #202	
TABLE DISPLACEMENT:	1”	
TEST FREQUENCY:	3.7 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Transportation Simulator #501	

VIBRATION TEST SET-UP & RESULTS

Sample #	Results	Comments / Observations
14	**PASS**	No leakage or damage.
15	**PASS**	
16	**PASS**	

REPETITIVE SHOCK VIBRATION TESTS #3

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Water	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. (§178.608)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	73°F / 50% RH, Chamber #202	
TABLE DISPLACEMENT:	1”	
TEST FREQUENCY:	3.7 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Transportation Simulator #501	

VIBRATION TEST SET-UP & RESULTS

Sample #	Results	Comments / Observations
21	**PASS**	No leakage or damage.
23	**PASS**	
24	**PASS**	

REPETITIVE SHOCK VIBRATION TESTS #4

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
TEST CONTENTS:	Water	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. (§178.608)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	73°F / 50% RH, Chamber #202	
TABLE DISPLACEMENT:	1”	
TEST FREQUENCY:	3.7 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Transportation Simulator #501	

VIBRATION TEST SET-UP & RESULTS

Sample #	Results	Comments / Observations
30	**PASS**	No leakage or damage.
31	**PASS**	
32	**PASS**	

COBB WATER ABSORPTION TESTS

TEST INFORMATION		CRITERIA FOR PASSING THE TEST
SAMPLE SIZE:	(5) 5” x 5” Squares	• An increase in mass greater than 155 g/m² over the 30 minute duration represents an unacceptable level of water resistance. (§178.516)
CONDITIONING:	73°F / 50% RH, Chamber #202	
WATER APPLIED:	100mL / Sample	
TEST DURATION:	30 Minutes / Sample	
TEST EQUIPMENT:	UWE Analytical Balance #102	
	Gurley Cobb Water Absorption Apparatus	

COBB WATER ABSORPTION TEST RESULTS	
Sample #	**Water Absorbed (g/m²)**
1	**102 g/m²**
2	**106 g/m²**
3	**107 g/m²**
4	**107 g/m²**
5	**96 g/m²**
AVERAGE:	**103.6 g/m²**
RESULT	**PASS**

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR① 2010 Edition	UN② 16th Edition	IMDG③ 2010 Edition	ICAO④ 2011-2012 Edition	IATA⑤ 52nd 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; 1.1.6	5.0.2.9
Vibration:	178.608	---	---	4; 1.1.1	5.0.2.7
Cobb:	178.516	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 Goods by Air (ICAO)
⑤ International Air Transport Association (IATA) Dangerous Goods Regulations

INDUSTRY STANDARD REFERENCES

Drop:	ASTM⑥ D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall
	ISO⑦ 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test By Dropping
Stacking:	ASTM⑥ D4577:	Standard Test Method for Compression Resistance of a Container Under Constant Load
	ISO⑦ 2234:	Packaging – Complete, Filled Transport Packages – Stacking Tests using Static Load
Hydrostatic Pressure:	ASTM⑦ D7660:	Standard Guide for conducting Internal Pressure Tests on United Nations (UN) Packagings
Vibration:	ASTM⑥ D999:	Standard Test Method for Vibration Testing of Shipping Containers
	ISO⑦ 2247:	Packaging – Complete, Filled transport Packages – Vibration Test at Fixed Low Frequency
Cobb:	ISO⑦ 535:	Paper and Board - Determination of Water Absorption - Cobb Method

⑥American Society for Testing and Materials (ASTM)
⑦International 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

6 x 2.5 Liter Plastic Bottle with 45mm Opening

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	**1,951.0**	**Grams**	
Overflow Capacity (OFC):			**Methanol/Water SG**
Methanol/Water	**2,370.1**	**Grams**	**SG: 0.967**
Water	**2,451.0**	**Grams**	
Number of Inner Packagings (# IP):	**6**		
Packing Group	**II**		
Product Specific Gravity (PSG):	**1.9**		
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%

OFC	x	98%		
2,370.1	x	98% =	**2,322.7 Grams**	Methanol/Water
2,451.0	x	98% =	**2,402.0 Grams**	Water

PACKAGE TEST WEIGHTS

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

PTW	+	(98% OFC	x	# IP)	
1,951	+	2,323	**x**	6	Methanol/Water
1,951	+	2,402	**x**	6	Water

Methanol/Water:	**15.8**	**Kg**	**34.8**	**Lbs.**
Water:	**16.3**	**Kg**	**35.9**	**Lbs.**

AUTHORIZED PACKAGE GROSS MASS CALCULATION (APGM)

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

PTW	+	(PSG	x	98% OFC	x	# IP)
1,951	+	1.9	x	2,402	x	6

29.3	**Kg**	**64.5**	**Lbs.**

DROP HEIGHT

Calculation For Product Specific Gravities Exceeding 1.2

Product Specific Gravity (PSG) x Packing Group Multiplication Factor (MF)

Packing Group: II

PSG	x	MF		Required Drop Height	Actual Drop Height
1.9	x	1.00			
		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	/	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)

APGM	x	# 3m HS
29.3	x	8.0

234.4 Kg **516.8 Lbs.**

Stacking Test Load Calculation

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

Samples	x	(APGM	x	# 3m HS)
3	x	29.3	x	8.0

703.2 Kg **1,550.3 Lbs.**

6 x 2.5 Liter Plastic Bottle with 38mm Opening

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	**1,944.0**	**Grams**	
Overflow Capacity (OFC):			**Methanol/Water SG**
Methanol/Water	**2,354.6**	**Grams**	**SG: 0.967**
Water	**2,435.0**	**Grams**	
Number of Inner Packagings (# IP):	**6**		
Packing Group	**II**		
Product Specific Gravity (PSG):	**1.9**		
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%

OFC	x	98%		
2,354.6	x	98% =	**2,307.6 Grams**	Methanol/Water
2,435.0	x	98% =	**2,386.3 Grams**	Water

PACKAGE TEST WEIGHTS

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

PTW	+	(98% OFC	x	# IP)	
1,944	+	2,308	**x**	6	Methanol/Water
1,944	+	2,386	**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))

PTW	+	(PSG	x	98% OFC	x	# IP)
1,944	+	1.9	x	2,386	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)

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	/	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)

APGM	x	# 3m HS
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)

Samples	x	(APGM	x	# 3m HS)
3	x	29.1	x	8.0

698.4 Kg **1,539.7 Lbs.**