

**UNITED NATIONS / DOT
PERFORMANCE CERTIFICATION**



4G PERIODIC RETEST

**6 x 2.6 Liter Square Plastic Bottle Packaging with
Two Closure Variables**

TEST REPORT #: 26-CA20051

 4G / Y30.6 / S / **
USA / +CC7198

**Insert the last two digits of the year of manufacture

TESTING PERFORMED FOR:

PUREPAK TECHNOLOGY CORPORATION

75 West Baseline Road Suite D44
Gilbert, AZ 85233

ATTN: Michael Dodd

TESTING PERFORMED BY:

TEN-E PACKAGING SERVICES, INC.

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

June 15, 2026



TEN-E Packaging Services, Inc.

Test Report # 26-CA20051

June 15, 2026

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NOTES AND COMMENTS

Testing was conducted on the 6 x 2.6 Liter Square Plastic Bottle with the following Closure Variables:

- V#1: 38-439 Polypropylene Closure
- V#2: 45mm HDPE Tamper Evident Closure

This package uses DOT-SP 14656. This special permit authorizes the manufacture, mark, sale, and use of certain combination packaging for the transportation in commerce of the hazardous materials authorized by this special permit. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein. The most recent revision supersedes all previous revisions.

SECTION I: CERTIFICATION

Periodic Retest of the PurePak Technology Corporation 6 x 2.6 Liter Square Plastic Bottle Packaging with Two Closure Variables

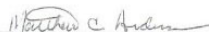
TEN-E Packaging Services, Inc. is a current DOT UN Third-Party Certification Agency under §107.403 and certifies that the **PurePak Technology Corporation** packaging referenced above has passed the standards of the DEPARTMENT OF TRANSPORTATION'S TITLE 49 CFR; Performance Oriented Packaging Standards, 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	49 CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Drop	178.603	1.9 m	Methanol/Water Solution	March 30, 2026	PASS
Stacking	178.606	272.2 Kg – 24 Hours	Empty	March 27, 2026	PASS
Pressure	173.27	300 kPa - 30 Minutes	Water	April 27, 2026	PASS
Vibration	178.608	3.1 Hz – 1 Hour	Water	June 15, 2026	PASS
Cobb	178.516	30 Minutes	---	April 9, 2026	PASS
TEST REPORT NUMBERS:			26-CA20051, 22-CA20077		
UN MARKING: (CFR 49 – 178.503)			u n 4G / Y30.6 / S / ** USA / +CC7198		
PACKAGING IDENTIFICATION CODE:			4G - Fiberboard Box (178.516)		
PERFORMANCE STANDARD:			Y (Packaging meets Packing Group II and III tests)		
AUTHORIZED GROSS MASS:			30.6 Kg (67.4 Lbs.)		
"S" DESIGNATION:			Denotes Inner Packagings		
YEAR OF MANUFACTURE:			**Insert the last two digits of the year of manufacture		
STATE AUTHORIZING THE MARK:			USA		
PACKAGING CERTIFICATION AGENCY:			(+CC) TEN-E Packaging Services, Inc. (Ontario, CA CAA #2006030021)		
THIRD PARTY PACKAGING IDENTIFICATION:			+CC7198		
PERIODIC RETEST DATE:			June 15, 2028		
CLIENT CA OR SP NUMBER:			DOT-SP 14656		

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.

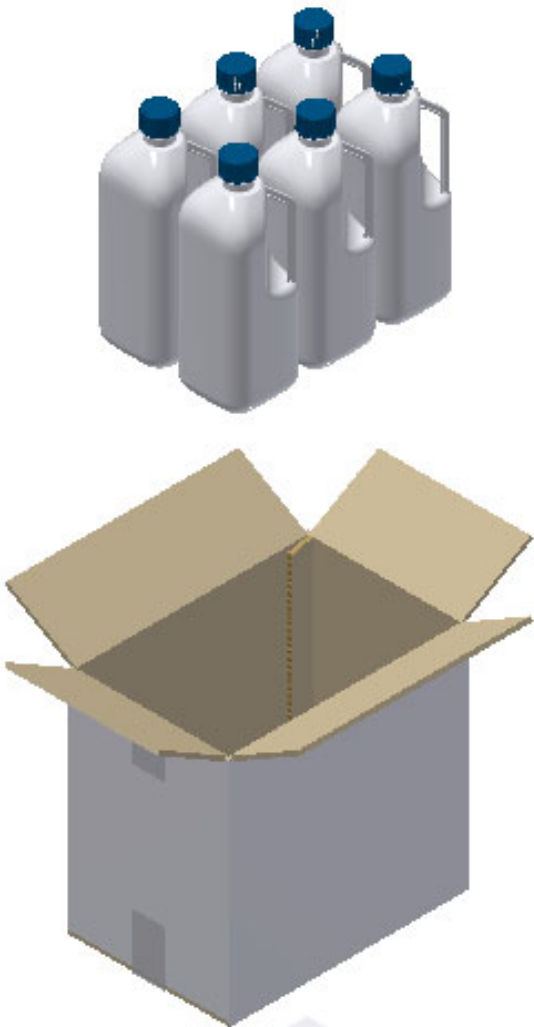
MANUFACTURER:

PurePak Technology Corporation
75 West Baseline Road Suite D44
Gilbert, AZ 85233


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

SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS

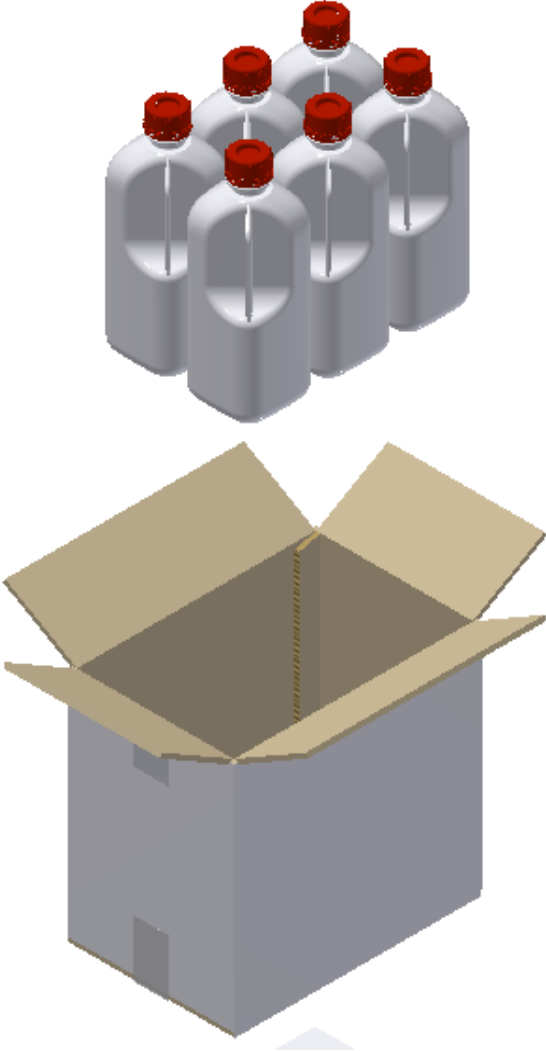
Variable #1: 6 x 2.6 Liter Square Plastic Bottle with 38-439 Polypropylene Closure

ASSEMBLY DRAWING	TEST LEVELS	
	Certification Type:	Periodic Retest
	Packaging Code Designation:	4G
	Packing Group:	II
	Specific Gravity:	1.9
	Internal Pressure:	300 kPa
	TEST SAMPLE PREPARATION (Refer to Section IV)	
	Overall Packaging Tare Weight:	1,892 Grams
	Fill Capacity (98% Maximum Capacity):	
	Methanol/Water Solution	2,412 Grams
	Water	2,528 Grams
	Package Test Weight:	
	Methanol/Water Solution	16.3 Kg 35.9 Lbs.
	Water	17.0 Kg 37.4 Lbs.
	Authorized Package Gross Mass:	30.7 Kg 67.6 Lbs.
	CLOSING METHODS – INNER PACKAGING	
	38mm Polypropylene Closure	
	Application Torque:	50 In-Lbs.
	Equipment:	Torque Wrench #W702
	CLOSING METHODS – SHIPPER	
	Top Flaps:	
	Manufacturer:	3M, St. Paul, MN
	Type:	3M MMM115894 Pressure Sensitive Tape
	Width:	48 mm (2")
	Overlap:	2" Minimum
	Tape Pattern:	Center Seam
	Bottom Flaps:	
	Manufacturer:	3M, St. Paul, MN
	Type:	3M MMM115894 Pressure Sensitive Tape
	Width:	48 mm (2")
	Overlap:	2" Minimum
	Tape Pattern:	Center Seam

For Packaging's 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.

Variable #2: 6 x 2.6 Liter Square Plastic Bottle with 45mm HDPE TE Closure

ASSEMBLY DRAWING	TEST LEVELS
	Certification Type: Periodic Retest
	Packaging Code Designation: 4G
	Packing Group: II
	Specific Gravity: 1.9
	Internal Pressure: 300 kPa
	TEST SAMPLE PREPARATION (Refer to Section IV)
	Overall Packaging Tare Weight: 1,869 Grams
	Fill Capacity (98% Maximum Capacity): Methanol/Water Solution 2,423 Grams Water 2,530 Grams
	Package Test Weight: Methanol/Water Solution 16.4 Kg 36.1 Lbs. Water 17.0 Kg 37.4 Lbs.
	Authorized Package Gross Mass: 30.7 Kg 67.6 Lbs.
	CLOSING METHODS – INNER PACKAGING
	45mm HDPE TE Closure
	Application Torque: 25 In-Lbs.
	Equipment: Torque Wrench #W702
	CLOSING METHODS – SHIPPER
	Top Flaps:
	Manufacturer: 3M, St. Paul, MN
	Type: 3M MMM115894 Pressure Sensitive Tape
	Width: 48 mm (2")
	Overlap: 2" Minimum
	Tape Pattern: Center Seam
	Bottom Flaps:
	Manufacturer: 3M, St. Paul, MN
	Type: 3M MMM115894 Pressure Sensitive Tape
	Width: 48 mm (2")
	Overlap: 2" Minimum Tape Pattern: Center Seam

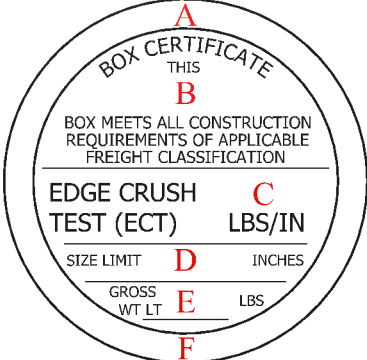
For Packaging's with an Established Gross Mass:

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-A) (50093)		DRAWING
Manufacturer: Berry Plastics, Evansville, IN		
Description:	38mm Ribbed Threaded Closure	
Quantity:	6	
Material:	Polypropylene	
Tare Weight:	0.70 Grams	
Overall Dimensions:		
• Height	1.016" ± 0.015"	
• Diameter	1.701" ± 0.015"	
Thread:		
• Type	38mm	
• Style	439	
Thread Dimensions:		
• T	1.481" ± 0.007"	
• E	1.389" ± 0.007"	
Markings (QC Audit):	3	
LINER:		
Description:	Polyethylene Foam Liner	
Tare Weight:	0.69 Grams	
Thickness:	0.060"	
Diameter:	1.379"	
PLASTIC BOTTLE (1221443)		
Manufacturer: PurePak Technology, Gilbert, AZ		
Description:	2.6 Liter Plastic Bottle with Handle and 38mm Threads	
Quantity:	6	
Material:	High Density Polyethylene	
Method of Manufacture:	Blow Molded	
Tare Weight:	210 Grams	
Capacity:		
• Rated	2.6 Liter	
• Overflow	2,579 mL (90.971 Ounces)	
Overall Dimensions:		
• Height	12.283" ± 0.090"	
• Width	5.275" ± 0.090" (diagonal measurement)	
• Depth	5.275" ± 0.090" (diagonal measurement)	
Thread Dimensions:		
• T	1.461"± 0.012"	
• E	1.367" 0.012"	
• Pitch	0.1636"	
Wall Thickness:		
• Minimum	0.040"	
Markings (QC Audit):	SPI "2" HDPE Recycling Symbol DODD AZ USA 3 5/25	

CLOSURE (500001)		DRAWING
Manufacturer: George MENSHEN GmbH, Finnentrop, Germany		
Description:	45mm Ribbed Threaded Tamper Evident Closure	
Quantity:	6	
Material:	High Density Polyethylene	
Tare Weight:	10.59 Grams	
Overall Dimensions:		
• Height	31.5mm ± 0.39mm	
• Diameter	51.3mm	
Thread:		
• Type	45mm	
• Style	Buttress	
Thread Dimensions:		
• T	1.744"	
• E	1.674"	
Markings (QC Audit):	2817.1 3	
LINER:		
Description:	PTFE Liner	
Tare Weight:	1.00 Grams	
Thickness:	0.0100"	
Diameter:	1.799"	
PLASTIC BOTTLE (1927106)		
Manufacturer: PurePak Technology, Gilbert, AZ		
Description:	2.6 Liter Plastic Bottle with Handle and 45mm Threads	
Quantity:	6	
Material/Pigment:	High Density Polyethylene / Natural	
Method of Manufacture:	Blow Molded	
Tare Weight:	204 Grams	
Capacity:		
• Rated	2.6 Liter	
• Overflow	2,581 mL (91.042 Ounces)	
Overall Dimensions:		
• Height	12.120" ± 0.090"	
• Width	5.270" ± 0.090" (diagonal measurement)	
• Depth	5.270" ± 0.090" (diagonal measurement)	
Thread Dimensions:		
• T	1.772" ± 0.010"	
• E	1.637" ± 0.010"	
• Pitch	1.540"	
Wall Thickness:		
• Minimum	0.038"	
Markings (QC Audit):	SPI "2" HDPE Recycling Symbol 06/03/2025-11-25-24	

SHIPPER (Part # 731195 & 1394833)		
Manufacturer: Packaging Corporation of America, Gas City, IN		
Description:	Regular Slotted Container	
Material/Flute (Outer to Inner):	Double Wall Mottled White Corrugated Fiberboard; C/B-Flute	
Basis Weight (Outer to Inner) Lbs./MSF:		
• Specification	35 / 23 / 35 / 23 / 35	
Tare Weight:	581 Grams	
DIMENSIONS		
	Specification Dimensions (Inside)	Measured Dimensions (Outside)
• Length	13-3/4"	14-3/8"
• Width	9"	9-5/8"
• Height	12-3/8"	13-1/2"
Board Caliper (Nominal):	0.243"	
Manufacturer's Joint:	Inside Glued, 1-3/8" Lap	
Markings (QC Audit):	u n 4G / Y30.6 / S / 25 DOT-SP 14656 USA / +CC7198 DOT-SP 14656 ART WORK DATE 12/13/24 13.75 X 9 X 12.375 ID 1394833	
BOX CERTIFICATE		
(A) Corrugated Manufacturer:	PACKAGING CORPORATION OF AMERICA	 A BOX CERTIFICATE THIS B BOX MEETS ALL CONSTRUCTION REQUIREMENTS OF APPLICABLE FREIGHT CLASSIFICATION EDGE CRUSH C TEST (ECT) LBS/IN SIZE LIMIT D INCHES GROSS E LBS WT LT F
(B) Structure:	Double Wall	
(C) ECT:	51 Lbs. Per Sq. Inch	
(D) Size Limit:	105"	
(E) Gross Wt. Lt:	120 Lbs.	
(F) Location:	GAS CITY, IN	

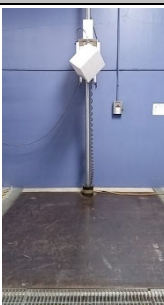
SECTION III: TEST PROCEDURES AND RESULTS

DROP TESTS

Variable #1: 38-439 Polypropylene Closure

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.968 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. Inner receptacles, inner packagings or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner packaging. - Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #W201	
CONTENTS TEMP.:	-18.1°C (-0.5°F)	
DROP HEIGHT:	1.9 Meters (75") (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. Slight deformation at impact corner.	PASS: No leakage. Slight deformation at impact corner.

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

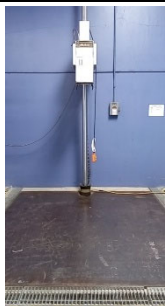
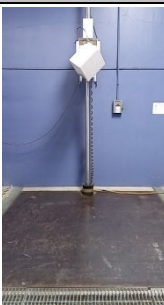
**Flat on bottom drop sample was also used for the top corner drop.

DROP TESTS

Variable #2: 45mm HDPE TE Closure

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.968 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. Inner receptacles, inner packagings or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner packaging. - Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #W201	
CONTENTS TEMP.:	-18.1°C (-0.6°F)	
DROP HEIGHT:	1.9 Meters (75") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #6: Flat on Bottom	Sample #7: Flat on Top	*Sample #8: Flat on Long Side
		
PASS: No leakage or damage.	PASS: No leakage or damage.	PASS: No leakage or damage.
*Sample #9: Flat on Short Side	*Sample #10: Bottom Corner	**Sample #6: Top Corner
		
PASS: No leakage or damage.	PASS: No leakage. Slight deformation at impact corner.	PASS: No leakage. Slight deformation at 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
TEST CONTENTS:	Empty	There can be no deterioration that could adversely affect transport safety or any distortion liable to reduce the package's strength, cause instability in stacks of packages, or cause damage to inner packagings that is likely to reduce safety in transport. (§178.606)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST LOAD APPLIED:	272.2 Kg (600.0 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
	11	1/8"	PASS
	12	1/8"	PASS
	13	1/8"	PASS
Comments/Observations: Following the 24-hour stack test, there was no damage likely to affect the performance of the packaging.			

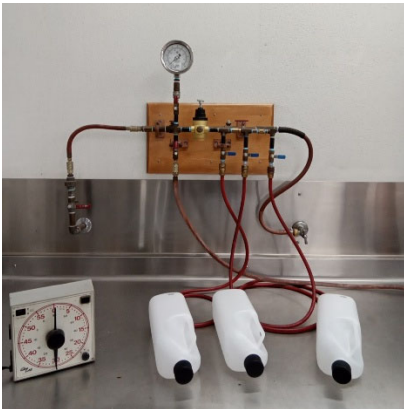
Stacking Stability: Not conducted; required only for guided load tests.

PRESSURE DIFFERENTIAL TEST

Variable #1: 38-439 Polypropylene Closure

TEST INFORMATION		TEST CRITERIA
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(c))
WATER TEMPERATURE:	20.1°C (68.1°F)	
FILL CAPACITY:	Maximum Capacity	
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	300 kPa	
TEST DURATION:	30 Minutes	
AREA OF PRESSURIZATION:	Through the Bottom	
TEST EQUIPMENT:	Regulated Water Source #: 1 Pressure Gauge #: W602	

HYDROSTATIC PRESSURE TEST SET-UP AND RESULTS

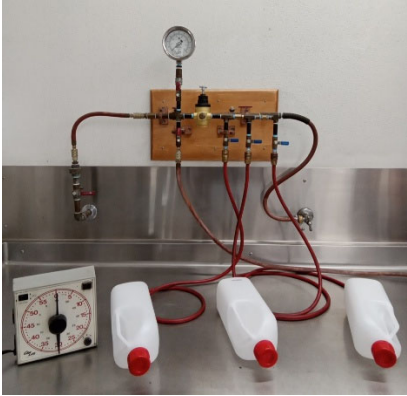
		Sample #	Results
		1	PASS
		2	PASS
		3	PASS
Comments/Observations			
All three samples maintained the 300 kPa test pressure for 30 minutes without leakage.			

PRESSURE DIFFERENTIAL TEST

Variable #2: 45mm HDPE TE Closure

TEST INFORMATION		TEST CRITERIA
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(c))
WATER TEMPERATURE:	20.1°C (68.1°F)	
FILL CAPACITY:	Maximum Capacity	
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	300 kPa	
TEST DURATION:	30 Minutes	
AREA OF PRESSURIZATION:	Through the Bottom	
TEST EQUIPMENT:	Regulated Water Source #: 1 Pressure Gauge #: W602	

HYDROSTATIC PRESSURE TEST SET-UP AND RESULTS

		<table><tr><th>Sample #</th><th>Results</th></tr><tr><td>1</td><td>PASS</td></tr><tr><td>2</td><td>PASS</td></tr><tr><td>3</td><td>PASS</td></tr></table>	Sample #	Results	1	PASS	2	PASS	3	PASS
Sample #	Results									
1	PASS									
2	PASS									
3	PASS									
<table><tr><th>Comments/Observations</th></tr><tr><td>All three samples maintained the 300 kPa test pressure for 30 minutes without leakage.</td></tr></table>			Comments/Observations	All three samples maintained the 300 kPa test pressure for 30 minutes without leakage.						
Comments/Observations										
All three samples maintained the 300 kPa test pressure for 30 minutes without leakage.										

VIBRATION TEST

Variable #1: 38-439 Polypropylene Closure

TEST INFORMATION		TEST CRITERIA
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:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.1 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
	14	PASS	No leakage or damage.
	15	PASS	
	16	PASS	

VIBRATION TEST

Variable #2: 45mm HDPE TE Closure

TEST INFORMATION		TEST CRITERIA
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:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.1 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Vibration System	

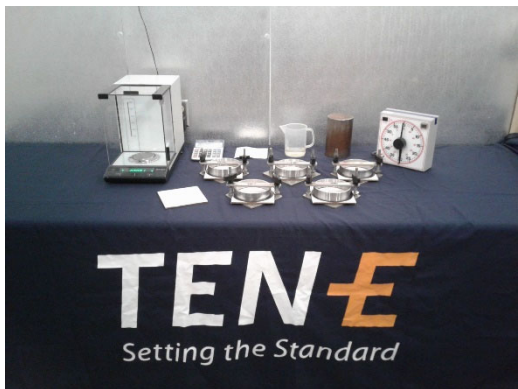
VIBRATION TEST SET-UP AND RESULTS

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

COBB WATER ABSORPTION TEST

TEST INFORMATION	TEST CRITERIA
NUMBER OF SAMPLES: 5 SAMPLE SIZE: 5" x 5" (Minimum) CONDITIONING: 73°F / 50% RH Quality Room #W202 WATER APPLIED: 100 mL / Sample TEST DURATION: 30 Minutes / Sample TEST EQUIPMENT: UWE Analytical Balance Gurley Cobb Water Absorption Fixtures	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

REPRESENTATIVE SET-UP PHOTO	Sample #	Water Absorbed
	1	123.0 g/m ²
	2	131.0 g/m ²
	3	148.0 g/m ²
	4	128.0 g/m ²
	5	122.0 g/m ²
	AVERAGE:	130.4 g/m²
	RESULT	PASS

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR ^①	UN ^②	IMDG ^③	ICAO ^④	IATA ^⑤
	October 2025 Edition	24 th Edition	2024 Edition	2025-2026 Edition	67 th 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 & 4;1.1.4	5.0.2.7
Cobb:	178.516(b)(1)	6.1.4.12.1	6.1.4.12.1	6;3.1.11.1	6.2.12.2

① United States Department of Transportation Code of Federal Regulations (CFR) Title 49, Transportation, Parts 100-185

② The United Nations Recommendations on the Transport of Dangerous Goods – Model Regulations (UN – Orange Book)

③ International Maritime Dangerous Goods Code (IMDG)

④ Technical Instructions for the Safe Transport of Dangerous Good by Air (ICAO)

⑤ International Air Transport Association (IATA) Dangerous Goods Regulations

INDUSTRY STANDARD REFERENCES

Drop:	ASTM ^⑥ D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall
	ASTM ^⑥ D7790:	Standard Test Method for the Preparation of Plastic Packagings Containing Liquids for United Nations (UN) Drop Testing
	ISO ^⑦ 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test by Dropping
Stacking:	ASTM ^⑥ D8409:	Standard Guide for Conducting Stacking Tests on UN Packagings Using Guided or Unguided Loads
	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.



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SECTION IV: MATHEMATICAL CALCULATIONS**Variable #1: 38-439 Polypropylene Closure****INFORMATION USED FOR CALCULATIONS**

Overall Packaging Tare Weight (PTW):	1,892.0 Grams	
Overflow Capacity (OFC):		Methanol/Water
Methanol/Water	2,461.0 Grams	SG: 0.968
Water	2,579.0 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):	13.50 Inches	
Stack Test-# of Samples Tested Simultaneously:	0	

98% OF OVERFLOW

Overflow Capacity (OFC) x 98%

OFC	x	98%		
2,461.0	x	98% =	2,411.8 Grams	Methanol/Water
2,579.0	x	98% =	2,527.5 Grams	Water

PACKAGE TEST WEIGHTS

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

PTW	+	(98% OFC)	x	# IP)	
1,892.0	+	2,411.8	x	6	Methanol/Water
1,892.0	+	2,527.5	x	6	Water
Methanol/Water:		16.3	kg	35.9	lb
Water:		17.0	kg	37.4	lb

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)
1,892.0	+	1.9	x	2,527.5	x	6
		30.7	kg	67.6	lb	



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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	<u>Required Drop Height</u>	<u>Actual Drop Height</u>
		1.90	74.8 Inches	75 Inches
		Meter		

STACKING TEST MINIMUM LOAD CALCULATIONS

Number of Packages in a 3m High Stack (118.2 / Overall Pkg Height (OH) -1)

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

<u>(118.2)</u>	/	<u>OH)</u>	-1	=	<u># 3m HS</u>
118.2	/	13.50	-1	=	7.8

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	
30.7	x	7.8	
		239.5 kg	528.0 lb

Variable #2: 45mm HDPE TE Closure

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	1,869.0 Grams	
Overflow Capacity (OFC):		Methanol/Water
Methanol/Water	2,472.0 Grams	SG: 0.968
Water	2,581.0 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):	13.50 Inches	
Stack Test-# of Samples Tested Simultaneously:	0	

98% OF OVERFLOW

Overflow Capacity (OFC) x 98%

OFC	x	98%		
2,472.0	x	98% =	2,422.6 Grams	Methanol/Water
2,581.0	x	98% =	2,529.4 Grams	Water

PACKAGE TEST WEIGHTS

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

PTW	+	(98% OFC)	x	# IP)	
1,869.0	+	2,422.6	x	6	Methanol/Water
1,869.0	+	2,529.4	x	6	Water
Methanol/Water:		16.4	kg	36.1	lb
Water:		17.0	kg	37.4	lb

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)
1,869.0	+	1.9	x	2,529.4	x	6
		30.7	kg	67.6	lb	



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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 (118.2 / Overall Pkg Height (OH) -1)

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

(118.2	/	OH)	-1	=	# 3m HS
118.2	/	13.50	-1	=	7.8

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	
30.7	x	7.8	
			239.5 kg
			528.0 lb