

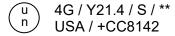
# UNITED NATIONS / DOT PERFORMANCE CERTIFICATION



## **4G DESIGN QUALIFICATION**

4 x 9 Pint Beta Plastic Bottle Packaging with Vented Closure and Two Case Sealing Mechanisms

**TEST REPORT #: 21-CA20095** 



\*\*Insert the year packaging is manufactured

# **TESTING PERFORMED FOR:**

## PUREPAK TECHNOLOGY CORPORATION

324 South Bracken Lane Suite 3 Chandler, AZ 85224

**ATTN: Michael Dodd** 

# **TESTING PERFORMED BY:**

# TEN-E PACKAGING SERVICES, INC.

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

Fax: 909-937-1262

June 4, 2021



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# **NOTES AND COMMENTS**

Tested as a design qualification due to a change in the basis weight of the corrugated shipper. The packaging will retain the +CC8142 Identification.

4 x 9 Pint Beta Plastic Bottle Packaging with Vented Closure and the following Case Sealing  Mechanism Variables:		
Option #	Top Flaps	Bottom Flaps
1	2" 3M #34508 Scotch Tape	2" 3M #34508 Scotch Tape
2	2" 3M #34508 Scotch Tape	Hot Melt Adhesive (Prepared by Client as for Transport) (Three Strips of Thermoset Adhesive – 1/2" x 4")



## **SECTION I: CERTIFICATION**

# Design Qualification of the PurePak Technology Corporation 4 x 9 Pint Beta Plastic Bottle Packaging with Vented Closure and Two Case Sealing Mechanisms

**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 and the UN Recommendations on the Transport of Dangerous Goods. It is the responsibility of the end user to determine authorization for use under these regulations. The use of other packaging methods or components other than those documented in this report may render this certification invalid.

SUMMARY OF PERFORMANCE TESTS					
UN / DOT TEST	CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Drop	178.603	1.2 m	Methanol/Water Solution	May 28, 2021	PASS
Stacking (#1)	178.606	181.4 Kg – 24 Hours	Empty	May 26, 2021	PASS
Stacking (#2)	178.606	181.4 Kg – 24 Hours	Empty	May 27, 2021	Pass
Vibration	178.608	3.4 Hz – 1 Hour	Water	June 3, 2021	PASS
Cobb	178.516	30 Minutes		June 4, 2021	PASS
TEST REPORT	TEST REPORT NUMBER: 21-CA20095				
UN MARKING: (CFR 49 – 178.	UN MARKING: (CFR 49 – 178.503) u 4G / Y21.4 / S / ** USA / +CC8142				
PACKAGING IDENTIFICATION CODE:		4G - Fiberboard Box (178.516)			
PERFORMANCE STANDARD:		Y (Packaging meets Packing Group II and III tests)			
AUTHORIZED GROSS MASS:		21.4 Kg (47.1 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 CAA #2006030021)			
THIRD PARTY PACKAGING IDENTIFICATION: +CC		+CC8142			
PERIODIC RET	PERIODIC RETEST DATE: June 4, 2023				

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE OR FIT FOR A PARTICULAR PURPOSE, ARE DISCLAIMED. In no event shall TEN-E Packaging Services, Inc. liability exceed the total amount paid by **PurePak Technology Corporation** for services rendered. In the event of future changes to the above referenced test standards, it is the responsibility of **PurePak Technology Corporation** to determine whether additional testing or updating of past testing is necessary to verify that the packaging we have tested remains in compliance with those standards.

**MANUFACTURER:** 

PurePak Technology Corporation 324 South Bracken Lane Suite 3 Chandler, AZ 85224 Matthew C. Anderson
Project Manager
TEN-E Packaging Services, Inc.
326 North Corona Avenue
Ontario, CA 91764

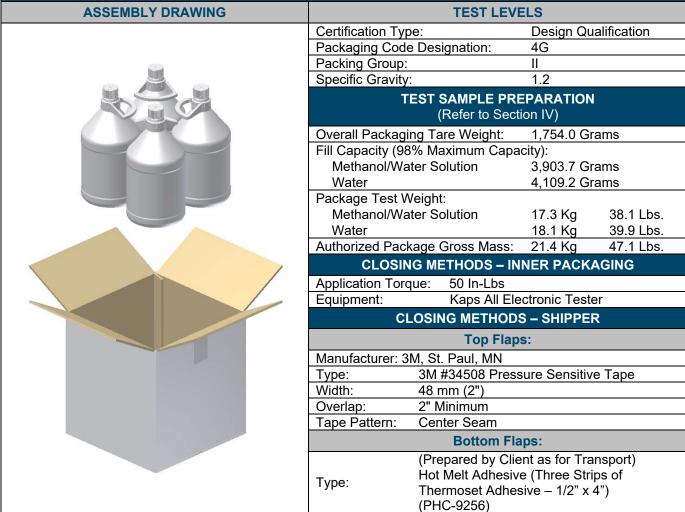


# **SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS**

### 4 x 9 Pint Beta Plastic Bottle Packaging with Vented Closure with Taped Top and Bottom Flaps **TEST LEVELS ASSEMBLY DRAWING** Certification Type: Design Qualification Packaging Code Designation: 4G Packing Group: Ш Specific Gravity: 1.2 **TEST SAMPLE PREPARATION** (Refer to Section IV) Overall Packaging Tare Weight: 1,754.0 Grams Fill Capacity (98% Maximum Capacity): Methanol/Water Solution 3,903.7 Grams 4,109.2 Grams Water Package Test Weight: Methanol/Water Solution 17.3 Kg 38.1 Lbs. 18.1 Kg 39.9 Lbs. Water Authorized Package Gross Mass: 21.4 Kg 47.1 Lbs. **CLOSING METHODS - INNER PACKAGING** Application Torque: 50 In-Lbs Equipment: Kaps All Electronic Torque Tester **CLOSING METHODS – SHIPPER** Top Flaps: Manufacturer: 3M, St. Paul, MN 3M #34508 Pressure Sensitive Tape Type: Width: 48 mm (2") 2" Minimum Overlap: Tape Pattern: Center Seam **Bottom Flaps:** Manufacturer: 3M, St. Paul, MN 3M #34508 Pressure Sensitive Tape Type: Width: 48 mm (2") Overlap: 2" Minimum Tape Pattern: Center Seam



# 4 x 9 Pint Beta Plastic Bottle Packaging with Vented Closure with Taped Top and Hot Melt Glued Bottom Flaps



### 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**

CLOS	URE (QIM-317-4937)	DRAWING
Manufacturer: Berry Plas		212111110
Description:	38mm Threaded Vented Closure	
Quantity:	4	
Material:	Polypropylene	
Tare Weight:	10.3 Grams	
Overall Dimensions:		Miller - will
Height	1.016" ± 0.015"	
Diameter	1.701" ± 0.015"	
Thread Dimensions:		
• T	1.481" ± 0.007"	
• E	1.389" ± 0.007"	
Markings (QC Audit):	10	
LINER:		
Description:	Perforated Disc with a Non-Woven	
	Teflon Surface Membrane	(
Tare Weight:	0.50 Grams	
Thickness:	0.043"	
Diameter:	1.376"	
PLASTIC	BOTTLE (ZB38RD9A)	DRAWING
Manufacturer: PurePak T	echnology Corporation, Chandler, AZ	
Description:	9 Pint Beta Plastic Bottle with Oval Handle	
Quantity:	4	
Material:	High Density Polyethylene	
Method of Manufacture:	Blow Molded	
Tare Weight:	193.0 Grams + 7.5 Grams / - 5.0 Grams	
Capacity:		
Rated	9 Pint	
Overflow	4,193.0 Grams	
Overall Dimensions:		
Height	12.680" ± 0.090"	
Diameter	6.267" ± 0.090"	
Thread Dimensions:		
• T	1.461" ± 0.015"	
• E	1.367" ± 0.015"	
Wall Thickness:		
Minimum	0032"	
Markings (QC Audit):	SPI "2" HDPE Recycling Symbol M4609 031021 06:47 / 2000 MADE IN USA 2 PPT C95 3/21	



SHIPPER (507089 & 817308)		
Manufacturer: PCA, Phoenix, AZ		
Description:	Regular Slotted Container	
Material/Flute	51 ECT Double Wall Mottled White Corru	gated Fiberboard; C/B-Flute
(Inner to Outer):	)	
Basis Weight (Outer to Inne	35 / 23 / 35 / 23 / 35	
Specification  Tare Weight:	815.0 Grams	
rare weight.		
	DIMENSIONS	
	Specification Dimensions (Inside)	Measured Dimensions (Outside)
Length	12-3/4"	13-3/8"
• Width	12-3/4"	13-3/8"
Height	13"	14"
Board Caliper (Nominal):	0.279"	
Manufacturer's Joint:	Inside Glued, 1-3/8" Lap	
Maulinga (OC Audit)	4G/X23.2/S/19 4G/Y33.8/S/19 4G/Y21.4/S/19 USA/+CC7640 USA/+CC7640 USA/+CC8142	
Markings (QC Audit):	Artwork Date: 02/27/19 12 ¾ X 12 ¾ X 13 ID 89732	
BOX CERTIFICATE		
(A) Communicad	BOX CERTIFICATE	
(A) Corrugated Manufacturer:		A CERTIFICATE
(B) Structure:	Double Wall	// B
(C) ECT:	51 Lbs. Per Sq. Inch	BOX MEETS ALL CONSTRUCTION REQUIREMENTS OF APPLICABLE FREIGHT CLASSIFICATION  EDGE CRUSH
(D) Size Limit:	105"	TEST (ECT) LBS/IN  SIZE LIMIT D INCHES
(E) Gross Wt. Lt:	120 Lbs.	GROSS E LBS
(F) Location:		F



# SECTION III: TEST PROCEDURES AND RESULTS

DROP TESTS Option #1

TEST	INFORMATION	TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.950 SG)	For packaging containing liquid, each packaging does not leak.
SAMPLE PREPARATION:	Refer to Section II	There can be no damage to the outer packaging likely to adversely
CONDITIONING:	-18°C (0°F) Freezer #W201	affect safety during transport. Inner receptacles, inner packagings or articles must remain completely
CONTENTS TEMP.:	-18.7°C (-1.6°F)	within the outer packaging and there must be no leakage of the filling
DROP HEIGHT:	1.2 Meters (48.0") (Refer to Section IV)	<ul><li>substance from the inner packaging.</li><li>Any discharge from a closure is slight and ceases immediately after</li></ul>
TEST EQUIPMENT:	L.A.B. Accu Drop 160	impact with no further leakage. (§178.603)
	DROP ORIENTATIONS AND TEST RE	SULTS
Sample #1: Flat on Botton	Sample #2: Flat on Top	*Sample #3: Flat on Long Side
		The state of the s
PASS: No leakage or damag		PASS: No leakage or damage.
*Sample #4: Flat on Short S	de *Sample #5: Bottom Corner	**Sample #1: Top Corner
PASS: No leakage or damag	e. PASS: No leakage. Slight deformation to impact location.	PASS: No leakage. Slight deformation to impact location.

<sup>\*</sup>Side and corner drops were conducted to impact the manufacturer's joint.

<sup>\*\*</sup>Flat on bottom drop sample was also used for the top corner drop.



Option #2

**DROP TESTS** 

	- Pro-		
TEST	NFORMATION	TEST CRITERIA	
TEST CONTENTS:	Methanol/Water Solution (0.950 SG)	For packaging containing liquid, each packaging does not leak.	
SAMPLE PREPARATION:	Refer to Section II	There can be no damage to the outer packaging likely to adversely	
CONDITIONING:	-18°C (0°F) Freezer #W201	affect safety during transport. Inner receptacles, inner packagings or articles must remain completely	
CONTENTS TEMP.:	-18.7°C (-1.6°F)	within the outer packaging and there must be no leakage of the filling	
DROP HEIGHT:	1.2 Meters (48.0") (Refer to Section IV)	<ul> <li>substance from the inner packaging.</li> <li>Any discharge from a closure is slight and ceases immediately after</li> </ul>	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	impact with no further leakage. (§178.603)	
	ROP ORIENTATIONS AND TEST RE	SULTS	
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.	
*Sample #15: Flat on Short Si	de *Sample #16: Bottom Corner	**Sample #12: Top Corner	
PASS: No leakage or damage	PASS: No leakage. Slight deformation to impact location.	<b>PASS:</b> No leakage. Slight deformation to impact location.	

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



performance of the packaging.

STACKING TEST	Option #1
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TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty	
SAMPLE PREPARATION:	Refer to Section II	There can be no deterioration that could adversely affect transport safety or any distortion liable to
CONDITIONING:	73°F / 50% RH Quality Room #W202	reduce the package's strength, cause instability in stacks of
TEST LOAD APPLIED:	181.4 Kg (400.0 Lbs.) (Refer to Section IV)	packages, or cause damage to inner packagings that is likely to reduce
TEST DURATION:	24 Hours	safety in transport. (§178.606)
TEST EQUIPMENT:	Dead Load Weights	

# Sample # Maximum Deflection After 24 Hours 9 1/16" PASS 10 0" PASS Comments/Observations: Following the 24-hour stack test, there was no damage likely to affect the

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



STACKING TEST	Option #2
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TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty	
SAMPLE PREPARATION:	Refer to Section II	There can be no deterioration that could adversely affect transport safety or any distortion liable to
CONDITIONING:	73°F / 50% RH Quality Room #W202	reduce the package's strength, cause instability in stacks of
TEST LOAD APPLIED:	181.4 Kg (400.0 Lbs.) (Refer to Section IV)	packages, or cause damage to inner packagings that is likely to reduce
TEST DURATION:	24 Hours	safety in transport. (§178.606)
TEST EQUIPMENT:	Dead Load Weights	

# STACKING TEST SET-UP & RESULTS Sample # Maximum Deflection After 24 Hours 20 1/16" PASS 21 0" PASS 22 0" 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.



VIBRATION TEST	Option #1
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TEST	TEST INFORMATION				
TEST CONTENTS:	Water	Immediately following the period			
SAMPLE PREPARATION:	Refer to Section II	of vibration, each package must be removed from the platform, turned on its side and observed			
CONDITIONING:	73°F / 50% RH Quality Room #W202	for any evidence of leakage.  • A packaging passes the vibration			
TABLE DISPLACEMENT:	1"	test if there is no rupture or leakage from any of the packages.			
TEST FREQUENCY:	3.4 Hz	<ul> <li>No test sample should show any deterioration which could</li> </ul>			
TEST DURATION:	1 Hour	adversely affect transportation safety or any distortion liable to			
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Vibration System	reduce packaging strength. (§178.608)			

VIBRATION TEST SET-UP AND RESULTS						
	Sample #	Results	Comments/Observations			
	6	PASS				
111 958 534 1318 111 111 111 111 111 111 111 111 11	7	PASS	No leakage or damage.			
	8	PASS				



VIBRATION TEST Option #2

TEST	TEST INFORMATION				
TEST CONTENTS:	Water	Immediately following the period			
SAMPLE PREPARATION:	Refer to Section II	of vibration, each package must be removed from the platform, turned on its side and observed			
CONDITIONING:	73°F / 50% RH Quality Room #W202	for any evidence of leakage.  • A packaging passes the vibration			
TABLE DISPLACEMENT:	1"	test if there is no rupture or leakage from any of the packages.			
TEST FREQUENCY:	3.4 Hz	No test sample should show any deterioration which could			
TEST DURATION:	1 Hour	adversely affect transportation safety or any distortion liable to			
TEST EQUIPMENT:	Vertical motion using L.A.B. Palletizer Vibration System	reduce packaging strength. (§178.608)			

VIBRATION TEST SET-UP AND RESULTS						
	Sample #	Results	Comments/Observations			
	17	PASS				
	18	PASS	No leakage or damage.			
	19	PASS				



# **COBB WATER ABSORPTION TEST**

TES	T INFORMATION	TEST CRITERIA
NUMBER OF SAMPLES:	5	
SAMPLE SIZE:	5" x 5" (Minimum)	An increase in mass greater than
CONDITIONING:	73°F / 50% RH Quality Room #W202	<ul> <li>An increase in mass greater than 155 g/m² over the 30 minute</li> </ul>
WATER APPLIED:	100 mL / Sample	duration represents an unacceptable level of water
TEST DURATION:	30 Minutes / Sample	resistance. (§178.516)
TEST EQUIPMENT:	UWE Analytical Balance Gurley Cobb Water Absorption Fixtures	(3.1.5.6.16)

COBB WATER ABSORPTION TEST RESULTS						
REPRESENTATIVE SET-UP PHOTO	Sample #	Water Absorbed				
	1	146.0 g/m²				
	2	146.0 g/m²				
	3	141.0 g/m²				
	4	145.0 g/m²				
TENIE	5	155.0 g/m²				
TENE	AVERAGE:	146.6 g/m²				
Setting the Standard	RESULT	PASS				



# **REGULATORY AND INDUSTRY STANDARD REFERENCES**

REGULATORY REFERENCES							
	49 CFR①	UN@	IMDG3				
TEST	October 2020 Edition	21 <sup>st</sup> Edition	2020 Edition				
Drop:	178.603	6.1.5.3	6.1.5.3				
Stacking:	178.606	6.1.5.6	6.1.5.6				
Vibration:	178.608						
Cobb:	178.516(b)(1)	6.1.4.12.1	6.1.4.12.1				

- 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)

INDUSTRY STANDARD REFERENCES						
	ASTM@ D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall				
Drop:	ASTM@ D7790	Standard Test Method for the Preparation of Plastic Packagings Containing Liquids for United Nations (UN) Drop Testing				
	ISO® 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test by Dropping				
Stockings	ASTM@ D4577:	Standard Test Method for Compression Resistance of a Container Under Constant Load				
Stacking:	ISO® 2234:	Packaging – Complete, Filled Transport Packages – Stacking Test using Static Load				
Vibration	ASTM@ D999:	Standard Test Method for Vibration Testing of Shipping Containers				
Vibration:	ISO® 2247:	Packaging – Complete, Filled Transport Packages – Vibration Test at Fixed Low Frequency				
Cobb:	ISO® 535:	Paper and Board – Determination of Water Absorption – Cobb Method				

- American Society for Testing and Materials (ASTM)
- ⑤ International Organization for Standardization (ISO)

# **EQUIPMENT**

All inspection, measuring and test equipment that can affect product quality is calibrated and adjusted at prescribed intervals, or prior to use, and is traceable to NIST, using ANSI Z540 as an overall guide for calibration certification.



# **SECTION IV: MATHEMATICAL CALCULATIONS**

INFORMATION USED FOR CALCULATIONS						
Overall Packaging Tare Weight (PTW):	1,754.0 Grams					
Overflow Capacity (OFC):		Methanol/Water				
Methanol/Water	3,983.3 Grams	SG: 0.950				
Water	4,193.0 Grams					
Number of Inner Packagings (# IP):	4					
Packing Group	II					
Product Specific Gravity (PSG):	1.200					
Packing Group Multiplication Factor (MF):	1.00					
Overall Height of one Package (OH):	14.00 Inches					
Stack Test-# of Samples Tested Simultaneously:	1					

				98% OF OVERFL	OW					
	Overflow Capacity (OFC) x 98%									
١.	OFC	_ x _	98%							
	3,983.3	X	98% =	3,903.7 Grams	Methanol/Water					
	4,193.0	X	98% =	4,109.2 Grams	Water					

Overa	II Pk	g Tare Weigh	nt (PTV		SE TEST WEIGHT OF Career Control of the Career Care	GHTS apacity (OFC) x # of Inner Pkg (# IP)
PTW	+	(98% OFC	_	x	# IP)	<u></u>
1,754.0	+	3,903.7		x	4	Methanol/Water
1,754.0	+	4,109.2		x	4	Water
Methanol/Water:		17.3	Kg		38.1	Lbs.
Water:		18.1	Kg		39.9	Lbs.

			AUTHORIZ	ED PACKAG	E GROSS MASS (	CALCULATION	N (APGM)	
	Overall Pk	g Tare	Weight (PT	W) + (Produ	ict SG (PSG) x 98%	6 Overflow (C	PFC) x # of Inner Pkg (# IP))	
	PTW	+	(PSG	x	98% OFC	x	# IP)	
_	1,754.0	_ + _	1.2	x	4,109.2	x	4	
			21.4	Kg	47.1	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							
	1.2	x	1.00		Required Drop Height	Actual Drop Height						
			1.20	Meter	47.2 Inches	48 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	1	14.00	-1	=	7.5							
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										
21.4	x	7.5										
		160.5 Kç	I	353	3.8 Lbs.							