

**UNITED NATIONS / DOT
PERFORMANCE CERTIFICATION**



4G PERIODIC RETEST

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

TEST REPORT #: 23-CA20079



4G / Y21.4 / S / **
USA / +CC8142

**Insert the year packaging is manufactured

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
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May 30, 2023

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NOTES AND COMMENTS

4 x 9 Pint Plastic Bottle with Vented Closure Packaging with Two Case Sealing Mechanisms:
 #1) Taped Top and Bottom Flaps
 #2) Taped Top and Hot Melt Glued Bottom Flaps

SECTION I: CERTIFICATION

**Periodic Retest of the PurePak Technology Corporation
 4 x 9 Pint Plastic Bottle with Vented Closure Packaging with 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	49 CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Drop	178.603	1.2 m	Methanol/Water Solution	May 10, 2023	PASS
Stacking	178.606	181.4 Kg – 24 Hours	Empty	May 16, 2023	PASS
Stacking	178.606	181.4 Kg – 24 Hours	Empty	May 17, 2023	PASS
Vibration	178.608	3.7 Hz – 1 Hour	Water	May 9, 2023	PASS
Cobb	178.516	30 Minutes	---	May 30, 2023	PASS
TEST REPORT NUMBER:			23-CA20079, 21-CA20095		
UN MARKING: (CFR 49 – 178.503)			 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:			+CC8142		
PERIODIC RETEST DATE:			May 30, 2025		

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:

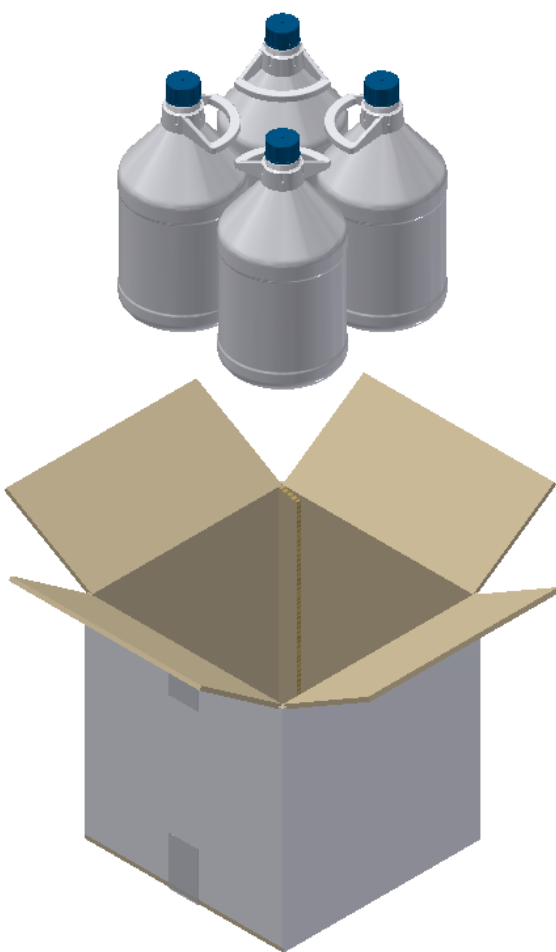
PurePak Technology Corporation
 75 West Baseline, Road, Suite D44
 Gilbert, AZ 85233



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

SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS

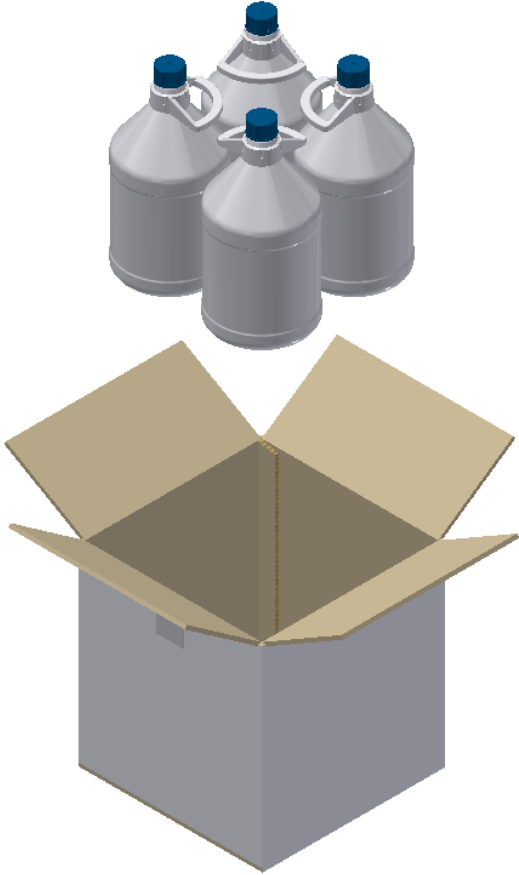
4 x 9 Pint Beta Plastic Bottle Packaging with Vented Closure with Taped Top and Bottom Flaps

ASSEMBLY DRAWING	TEST LEVELS		
	Certification Type:	Periodic Retest	
	Packaging Code Designation:	4G	
	Packing Group:	II	
	Specific Gravity:	1.2	
	TEST SAMPLE PREPARATION (Refer to Section IV)		
	Overall Packaging Tare Weight:	1,710.0 Grams	
	Fill Capacity (98% Maximum Capacity):		
	Methanol/Water Solution	3,935.7 Grams	
	Water	4,137.6 Grams	
	Package Test Weight:		
	Methanol/Water Solution	17.4 Kg	38.3 Lbs.
	Water	18.2 Kg	40.1 Lbs.
	Authorized Package Gross Mass:	21.5 Kg	47.3 Lbs.
	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 Part Number MMM115994 Pressure Sensitive Tape		
Width:	48 mm (2")		
Overlap:	2" Minimum		
Tape Pattern:	Center Seam		
Bottom Flaps:			
Manufacturer:	3M, St. Paul, MN		
Type:	3M Part Number MMM115994 Pressure Sensitive Tape		
Width:	48 mm (2")		
Overlap:	2" Minimum		
Tape Pattern:	Center Seam		

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.



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


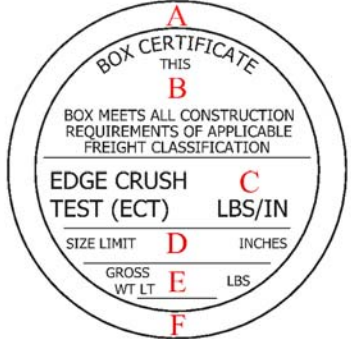
ASSEMBLY DRAWING	TEST LEVELS		
	Certification Type:	Periodic Retest	
	Packaging Code Designation:	4G	
	Packing Group:	II	
	Specific Gravity:	1.2	
	TEST SAMPLE PREPARATION (Refer to Section IV)		
	Overall Packaging Tare Weight:	1,710.0 Grams	
	Fill Capacity (98% Maximum Capacity):		
	Methanol/Water Solution	3,935.7 Grams	
	Water	4,137.6 Grams	
	Package Test Weight:		
Methanol/Water Solution	17.4 Kg	38.3 Lbs.	
Water	18.2 Kg	40.1 Lbs.	
Authorized Package Gross Mass:	21.5 Kg	47.3 Lbs.	
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 Part Number MMM115994 Pressure Sensitive Tape		
Width:	48 mm (2")		
Overlap:	2" Minimum		
Tape Pattern:	Center Seam		
Bottom Flaps:			
Type:	(Prepared by Client as for Transport) Hot Melt Adhesive (Three Strips of Thermoset Adhesive – 1/2" x 4") (PHC-9256)		

For Packagings with an Established Gross Mass:

If the gross mass calculation in this report exceeds the previously established gross mass, the manufacturer may elect to maintain the current gross mass marking (e.g. the gross mass rating of the UN marking on the packaging may be less than the calculated gross mass indicated in this report) or use the newly established gross mass. In no event shall the gross mass marking on the packaging exceed the gross mass to which the packaging was tested.

COMPONENT INFORMATION

CLOSURE (QIM-317-4937)		DRAWING
Manufacturer: Berry Plastics, Evansville, IN		
Description:	38mm Threaded Vented Closure	
Quantity:	4	
Material:	Polypropylene	
Tare Weight:	10.64 Grams	
Overall Dimensions:		
• 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):	3	
LINER:		
Description:	Perforated Disc with a Non-Woven Teflon Surface Membrane	
Tare Weight:	0.63 Grams	
Thickness:	0.050"	
Diameter:	1.360"	
PLASTIC BOTTLE (ZB38RD9A)		DRAWING
Manufacturer: PurePak Technology Corporation, Gilbert, 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	4,222.0 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	0.032"	
Markings (QC Audit):	SPI "2" HDPE Recycling Symbol PPT C95 SET 2 4/23 1	







SHIPPER (507089 & 817308)		
Manufacturer: PCA, Phoenix, AZ		
Description:	Regular Slotted Container	
Material/Flute (Inner to Outer):	51 ECT Double Wall Mottled White Corrugated Fiberboard; C/B-Flute	
Basis Weight (Outer to Inner) Lbs./MSF:		
• Specification	35 / 23 / 35 / 23 / 35	
Tare Weight:	780.0 Grams	
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	
Markings (QC Audit):	 4G/X23.2/S/22 4G/Y33.8/S/22 4G/Y21.4/S/22 USA/+CC7640 USA/+CC7640 USA/+CC8142 Artwork Date: 12/16/21 507089 12 3/4 X 12 3/4 X 13 ID BETA OPEN OTHER END NRC	
BOX CERTIFICATE		
(A) Corrugated Manufacturer:	-----	
(B) Structure:	Double Wall	
(C) ECT:	51 Lbs. Per Sq. Inch	
(D) Size Limit:	105"	
(E) Gross Wt. Lt:	120 Lbs.	
(F) Location:	-----	

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. (\$178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #W201	
CONTENTS TEMP.:	-18.2°C (-0.7°F)	
DROP HEIGHT:	1.2 Meters (48.0") (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.



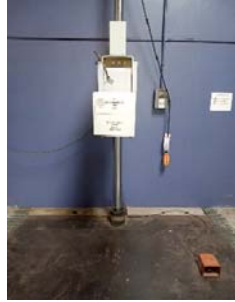



*Side and corner drops were conducted to impact the manufacturer's joint.

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

DROP TESTS Variable #2

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. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Freezer #W201	
CONTENTS TEMP.:	-18.2°C (-0.7°F)	
DROP HEIGHT:	1.2 Meters (48.0") (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. 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 Variable #1

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:	Ambient	
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	1/16"	PASS
	7	1/8"	PASS
	8	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.

STACKING TEST Variable #2

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:	Ambient	
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	1/16"	PASS
	18	0"	PASS
	19	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.

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. (\$178.608)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.7 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. (\$178.608)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.7 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	

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	<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

REPRESENTATIVE SET-UP PHOTO	Sample #	Water Absorbed
	1	96.0 g/m ²
	2	112.0 g/m ²
	3	169.0 g/m ²
	4	118.0 g/m ²
	5	161.0 g/m ²
	AVERAGE:	131.2 g/m²
	RESULT	PASS

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR ^①	UN ^②	IMDG ^③
	October 2022 Edition	22 nd Edition	2022 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

Drop:	ASTM ^④ D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall
	ASTM ^④ D7790	Standard Test Method for the Preparation of Plastic Packagings Containing Liquids for United Nations (UN) Drop Testing
	ISO ^⑤ 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test by Dropping
Stacking:	ASTM ^④ D8409	Standard Guide for Conducting Stacking Tests on UN Packagings Using Guided or Unguided Loads
	ASTM ^④ D4577:	Standard Test Method for Compression Resistance of a Container Under Constant Load
	ISO ^⑤ 2234:	Packaging – Complete, Filled Transport Packages – Stacking Test using Static Load
Vibration:	ASTM ^④ D999:	Standard Test Method for Vibration Testing of Shipping Containers
	ISO ^⑤ 2247:	Packaging – Complete, Filled Transport Packages – Vibration Test at Fixed Low Frequency
Cobb:	ISO ^⑤ 535:	Paper and Board – Determination of Water Absorption – Cobb Method

④ 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):	1,710.0 Grams	
Overflow Capacity (OFC):		<u>Methanol/Water</u>
Methanol/Water	4,016.0 Grams	SG: 0.960
Water	4,222.0 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 OVERFLOW

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>		
4,016.0	x	98% =	3,935.7 Grams	Methanol/Water
4,222.0	x	98% =	4,137.6 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>	
1,710.0	+	3,935.7	x	4	Methanol/Water
1,710.0	+	4,137.6	x	4	Water
Methanol/Water:		17.4	Kg	38.3	Lbs.
Water:		18.2	Kg	40.1	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>
1,710.0	+	1.2	x	4,137.6	x	4
		21.5	Kg	47.3	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			
		1.20	Meter	<u>Required Drop Height</u>	<u>Actual Drop Height</u>
				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					
<u>(118.2)</u>	/	<u>OH)</u>	-1	=	<u># 3m HS</u>
118.2	/	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)					
<u>APGM</u>	x	<u># 3m HS</u>			
21.5	x	7.5			
			161.3 Kg		355.6 Lbs.