

**UNITED NATIONS / DOT  
PERFORMANCE CERTIFICATION**



**31HH1 DESIGN QUALIFICATION**

**Poly IBC UC 2.0 1000 Liter All Plastic Composite Framed IBC  
with Entegris Quick Connect II Dip Tube and  
AS and KTJ Bung Closures**

**TEST REPORT #: 23-MN40059 (REV 1)**



31HH1 / Y / \* / USA / +AA11220 / 0 / 2010

\* Insert the month and year (last two digits) of manufacture

**TESTING PERFORMED FOR:**

**RIKUTEC AMERICA, INC.**

371 Douglas Road  
Whitinsville, MA 01588

**ATTN: Alex Pytka**

**TESTING PERFORMED BY:**

**TEN-E PACKAGING SERVICES, INC.**

1666 County Road 74  
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Issue Date: June 26, 2023

Revision Date: August 25, 2023

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**REVISION HISTORY**

**Note for Rev 1:** Report 23-MN40033 dated June 26, 2023, was revised on August 25, 2023, due to the customer requesting to change the name of the dip tube “QC” to “Quick Connect” on pages 1, 3, 4, 6, & 7 of the report.

**NOTES AND COMMENTS**


Reference report 23-MN40059A (Rev 1) for documentation of the leakproofness and hydrostatic pressure testing conducted on alternate gasket options covered under Rikutec America, Inc. competent authority approval number 2020110503.

**SECTION I: CERTIFICATION**

**DESIGN QUALIFICATION of the Rikutec America, Inc.  
 Poly IBC UC 2.0 1000 Liter All Plastic Composite Framed IBC with  
 Entegris Quick Connect II Dip Tube and AS and KTJ Bung Closures**

TEN-E Packaging Services, Inc. is a current DOT UN Third-Party Certification Agency under §107.403 and certifies that the Rikutec America, Inc. 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
Vibration	178.819	3.7 Hz – 1 Hour	Water	June 14, 2023	PASS
Bottom Lift	178.811	2,715.6 Kg	Water	June 14, 2023	PASS
Leakproofness	178.813	20 kPa – 10 Minutes	Empty	June 15, 2023	PASS
Hydrostatic	178.814	110 kPa – 10 Minutes	Water	June 15, 2023	PASS
Drop	178.810	1.9 m	Methanol/Water	June 26, 2023	PASS
<b>TEST REPORT NUMBER:</b>			23-MN40059		
<b>UN MARKING: (CFR 49 – 178.703)</b>			 31HH1 / Y / * / USA / +AA11220 / 0 / 2010		
<b>PACKAGING IDENTIFICATION CODE:</b>			31HH1 (178.707 Composite IBC)		
<b>PERFORMANCE STANDARD:</b>			Y (Packaging meets Packing Group II and III tests)		
<b>MONTH AND YEAR OF MANUFACTURE:</b>			*		
<b>STATE AUTHORIZING ALLOCATION OF THE MARK:</b>			USA		
<b>PACKAGING CERTIFICATION AGENCY:</b>			(+AA) TEN-E Packaging Services, Inc. (Newport, MN CAA #2006030022)		
<b>THIRD PARTY PACKAGING IDENTIFICATION:</b>			+AA11220		
<b>STACKING TEST LOAD:</b>			0 Kg (not intended to be stacked in transportation)		
<b>MAXIMUM PERMISSIBLE GROSS MASS:</b>			2010 Kg (4,431 Lbs.)		
<b>PERIODIC DESIGN REQUALIFICATION DATE:</b>			June 26, 2024		
<b>ADDITIONAL REQUIRED RIGID PLASTIC &amp; COMPOSITE IBC MARKINGS (CFR 49 – 178.703(b)):</b>					
<b>RATED CAPACITY AT 20°C (liters):</b>			1000 Liters		
<b>TARE MASS (Kg):</b>			Insert Individual IBC Tare Mass		
<b>GAUGE TEST PRESSURE (kPa):</b>			110 kPa		
<b>DATE OF LAST LEAKPROOFNESS TEST:</b>			Insert Month & Year of Last Leakproofness Test		
<b>DATE OF LAST INSPECTION:</b>			Insert Month & Year of Last Inspection		

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 Rikutec America, Inc. for services rendered. In the event of future changes to the above referenced test standards, it is the responsibility of Rikutec America, Inc. 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:**

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 Whitinsville, MA 01588



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


**Poly IBC UC 2.0 1000 Liter All Plastic Composite Framed IBC with Entegris Quick Connect II Dip Tube and AS and KTJ Bung Closures**

ASSEMBLY DRAWING	TEST LEVELS			
	Certification Type:	Design Qualification		
	Packaging Code Designation:	31HH1		
	Packing Group:	II		
	Specific Gravity:	1.9		
	Test Pressure:	110 kPa		
	<b>TEST SAMPLE PREPARATION</b> (Refer to Section IV)			
	Overall IBC Tare Weight: (Sample #1 and Sample #2)	97.0 Kg	213.8 Lbs.	
	Net Fill Weight (98% Maximum Capacity):			
	Water (Sample #1)	1,031.0 Kg	2,273.0 Lbs.	
	Methanol/Water (Sample #2)	980.0 Kg	2,160.6 Lbs.	
IBC Test Weight:				
Water (Sample #1)	1,128.0 Kg	2,486.7 Lbs.		
Methanol/Water (Sample #2)	1,077.0 Kg	2,374.3 Lbs.		
Maximum Permissible Gross Mass:	2,055.9 Kg	4,532.4 Lbs.		
<b>CLOSING METHODS</b>				
<b>Entegris Quick Connect II Dip Tube Insert:</b>				
Application Torque:	25 Ft-Lbs.			
Equipment:	Torque Wrench #740			
<b>Entegris Quick Connect II Shipping Cap:</b>				
Application Torque:	5 Ft-Lbs.			
Equipment:	Torque Wrench #740			
<b>2" PE Non-Vented Bung Closure:</b>				
Application Torque:	25 Ft-Lbs.			
Equipment:	Torque Wrench #740			

**COMPONENT INFORMATION**

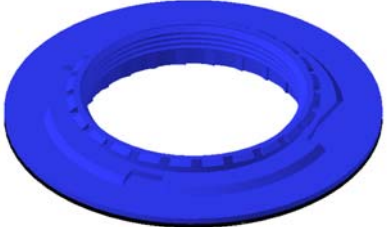
CLOSURE (9000662)		DRAWING
<b>Manufacturer: AS Stromungstechnik, Ostfildern, Germany</b>		
<b>Description:</b>	2" Non-Vented Buttress Threaded Plug	
<b>Quantity:</b>	2	
<b>Material:</b>	Polyethylene, Natural	
<b>Tare Weight:</b>	37.688 Grams	
<b>Overall Dimensions:</b>		
• <b>Height</b>	33.0 mm (1.30")	
• <b>Diameter</b>	80.0 mm (3.15")	
<b>Thread Dimensions:</b>		
• <b>Major Diameter:</b>	61.9 mm (2.44")	
• <b>Minor Diameter:</b>	55.6 mm (2.19")	
<b>Markings (QC Audit):</b>	as	
<b>POE PROFILE GASKET (K12993-811)</b>		
<b>Description:</b>	S62 Seal Ring, Natural Polyolefin Profile Gasket	
<b>Tare Weight:</b>	2.533 Grams	
<b>Thickness:</b>	3.8 mm (0.15")	
<b>Diameter:</b>	72.5 mm (2.85")	



CLOSURE (21300102)		DRAWING
<b>Manufacturer: Kunststofftechnik Jaeger, Braunschweig, Germany</b>		
<b>Description:</b>	2" Non-Vented Buttress Threaded Plug	
<b>Quantity:</b>	2	
<b>Material:</b>	Polyethylene, Natural	
<b>Tare Weight:</b>	35.590 Grams	
<b>Overall Dimensions:</b>		
• <b>Height</b>	34.5 mm (1.358")	
• <b>Diameter</b>	78.7 mm (3.102")	
<b>Thread Dimensions:</b>		
• <b>Major Diameter:</b>	61.9 mm (2.437")	
• <b>Minor Diameter:</b>	54.9 mm (2.162")	
<b>Markings (QC Audit):</b>	1	
<b>POE PROFILE GASKET (22010202):</b>		
<b>Description:</b>	Natural Polyolefin Profile Gasket	
<b>Tare Weight:</b>	2.533 Grams	
<b>Thickness:</b>	3.8 mm (0.15")	
<b>Diameter:</b>	72.5 mm (2.85")	

3/4" PLUG (DIT-1J-22-000)		DRAWING
<b>Manufacturer: Entegris, Chaska, MN</b>		
<b>Description:</b>	3/4" NPT Threaded Plug	
<b>Quantity:</b>	1	
<b>Material:</b>	High Density Polyethylene, Natural	
<b>Tare Weight:</b>	4.530 Grams	
<b>Overall Dimensions:</b>		
• <b>Height</b>	14.9 mm (0.59")	
• <b>Diameter</b>	29.5 mm (1.16")	
<b>Thread Dimensions:</b>		
• <b>T</b>	25.9 mm (1.02")	
• <b>E</b>	23.3 mm (0.92")	
<b>Markings (QC Audit):</b>	None	
<b>CLOSURE (DIT-1J-22-000)</b>		
<b>Manufacturer: Entegris, Chaska, MN</b>		
<b>Description:</b>	Quick Connect II Shipping Cap for Drum Insert	
<b>Quantity:</b>	1	
<b>Material:</b>		
• <b>Inner</b>	PFA, Natural	
• <b>Outer</b>	Polyethylene, Natural	
<b>Tare Weight:</b>	75 Grams	
<b>Overall Dimensions:</b>		
• <b>Height</b>	28.3 mm (1.11")	
• <b>Diameter</b>	100.7 mm (3.96")	
<b>Thread Dimensions:</b>		
• <b>Major Diameter</b>	74.0 mm (2.91")	
• <b>Minor Diameter</b>	70.2 mm (2.76")	
<b>Thread Dimensions:</b>		
• <b>Major Diameter</b>	26.6 mm (1.05")	
• <b>Minor Diameter</b>	24.0 mm (0.94")	
<b>Markings (QC Audit):</b>	PATENT NO. 5,108,015 Entegris Symbol	


DIP TUBE – QUICK CONNECT II DRUM INSERT (DIT-1J-22-000)		DRAWING
<b>Manufacturer: Entegris, Chaska, MN</b>		
<b>Description:</b>	Quick Connect II Threaded Drum Insert with Dip Tube and Secondary Tube	
<b>Quantity:</b>	1	
<b>Material:</b>	PFA, Natural	
<b>Tare Weight:</b>	232 Grams	
<b>Overall Dimensions:</b>		
• <b>Height</b>	Insert: 36.3 mm (1.43") With Dip Tube: 1,030.7 mm (40.58")	
• <b>Diameter</b>	73.4 mm      2.89"	
<b>Thread Dimensions (Container - Side):</b>		
• <b>Major Diameter</b>	62.8 mm      (2.47")	
• <b>Minor Diameter</b>	55.7 mm      (2.19")	
<b>Thread Dimensions (Shipping Cap - Side):</b>		
• <b>Major Diameter</b>	72.8 mm      (2.87")	
• <b>Minor Diameter</b>	69.1 mm      (2.72")	
<b>Markings (QC Audit):</b>	P      1108-10370649-FC	
<b>GASKET</b>		
<b>Description:</b>	Large, Medium, and Small Internal FEP Encapsulated O-Rings, Black	
<b>Large Gasket:</b>		
• <b>Tare Weight</b>	3.194 Grams	
• <b>Thickness</b>	3.3 mm      (0.13")	
• <b>Diameter</b>	57.4 mm      (2.26")	
<b>Medium Gasket:</b>		
• <b>Tare Weight</b>	1.610 Grams	
• <b>Thickness</b>	3.6 mm      (0.14")	
• <b>Diameter</b>	37.0 mm      (1.46")	
<b>Small Gasket:</b>		
• <b>Tare Weight</b>	0.671 Grams	
• <b>Thickness</b>	2.5 mm      (0.10")	
• <b>Diameter</b>	22.4 mm      (0.88")	
<b>O-RING</b>		
<b>Description:</b>	Outer Bottom FEP Encapsulated O-Ring, Red	
<b>Tare Weight:</b>	9.034 Grams	
<b>Thickness:</b>	6.1 mm      (0.24")	
<b>Diameter:</b>	77.7 mm      (3.06")	



CLAMPING NUT (2.0)		DRAWING
<b>Manufacturer: Rikutec America, Inc., Whitinsville, MA</b>		
<b>Description:</b>	Outer Buttress Threaded Clamping Nut used on 2.0 IBC designs	
<b>Quantity:</b>	3 (1 on each opening)	
<b>Material:</b>	Polyethylene, Blue, and Black Rubber	
<b>Tare Weight:</b>	60 Grams	
<b>Overall Dimensions:</b>		
• <b>Height</b>	0.758"	
• <b>Diameter</b>	5.905"	
<b>Thread Dimensions:</b>		
• <b>T</b>	3.446"	
• <b>E</b>	3.245"	
<b>Markings (QC Audit):</b>	RIKUTEC 1/23 SPI "2" Recycling Symbol	

PLASTIC INNER RECEPTACLE (2.0)		DRAWING
<b>Manufacturer: Rikutec America, Inc., Whitinsville, MA</b>		
<b>Description:</b>	Rikutec 2.0 1000 Liter Rigid Inner Receptacle with (3) 2" Buttress Threaded Top Fill Port Openings	
<b>Material:</b>	High Density Polyethylene, Natural	
<b>Resin Type:</b>	Two Layer Wall Design: <ul style="list-style-type: none"> <li>• Inside: Lupolen 4261 A Q149</li> <li>• Outside: Lupolen 4261 AG UV 60005</li> </ul>	
<b>Method of Manufacture:</b>	Blow Molded	
<b>Tare Weight:</b>	50.71 Lbs. (23.0 Kg)	
<b>Capacity:</b>		
• <b>Rated</b>	1,000 Liter	
• <b>Overflow</b>	277.9 Gallons (1,052.0 Liters)	
<b>Overall Dimensions:</b>		
• <b>Length</b>	1,155.7 mm (45.50")	
• <b>Width</b>	962.5 mm (37.88")	
• <b>Height</b>	1,044.7 mm (41.13")	
<b>2" Fill Port Opening Thread Dimensions</b>		
• <b>Major Diameter</b>	64.8 mm (2.55")	
• <b>Minor Diameter</b>	57.1 mm (2.25")	
<b>Clamping Nut Thread Dimensions</b>		
• <b>Major Diameter</b>	85.5 mm (3.37")	
• <b>Minor Diameter</b>	81.2 mm (3.20")	
<b>Dip Tube Opening Thread Dimensions</b>		
• <b>Major Diameter</b>	64.8 mm (2.55")	
• <b>Minor Diameter</b>	57.4 mm (2.26")	
<b>Wall Thickness (Minimum):</b>	2.387 mm (0.09")	
<b>Markings (QC Audit):</b>	 31HH1 / Y / 0123 / D / BAM 6808-RIKUTEC RIKUTEC 238528MD7 22/l Made in Germany SPI "2" PE-HD Recycling Symbol	




COVER – POLY BOX (2.0)		DRAWING
<b>Manufacturer: Rikutec America, Inc., Whitinsville, MA</b>		
<b>Description:</b>	Top HUVEX cover with (3) Access Holes Secured to Tote with (8) Plastic Pins	
<b>Quantity:</b>	1	
<b>Material:</b>	High Density Polyethylene, Natural	
<b>Tare Weight:</b>	10.5 Kg (23.15 Lbs.)	
<b>Overall Dimensions:</b>		
• <b>Length</b>	1,212.9 mm (47.75")	
• <b>Width</b>	1,003.3 mm (39.50")	
• <b>Height</b>	962.2 mm (37.88")	
• <b>Small Hole Diameter</b>	142.0 mm (5.63")	
• <b>Large Hole Diameter</b>	177.8 mm (7.00")	
<b>Markings (QC Audit):</b>	(u n) 31HH1 / Y / 0123 / D / BAM / 6808 RIKUTEC / 3314 / 2070 / TR6F142 POLY-IBC UC 1000 Max Capacity 1050 Liter / Tare 96kg Gauge of Pressure" 100 kPa Hersteller: RIKUTEC Made In Germany SPI "2" PE HD Recycling Symbol	
<b>FRAMED – POLY BOX</b>		
<b>Manufacturer: Rikutec America, Inc., Whitinsville, MA</b>		
<b>Description:</b>	4-Way Entry Plastic Outer Tote	
<b>Quantity:</b>	1	
<b>Material:</b>	HDPE / Foam / HDPE	
<b>Tare Weight:</b>	61.5 Kg (135.6 Lbs.) (with Bottom Frame)	
<b>Overall Dimensions:</b>		
• <b>Length</b>	1,193.8 mm (47.00")	
• <b>Width</b>	990.6 mm (39.00")	
• <b>Height</b>	1,168.4 mm (46.00")	
<b>FRAMED PALLET</b>		
<b>Description:</b>	Molded Pallet Feet and Bottom Detachable Plastic Framed Pallet with (8) Plastic Screws and Bolts	
<b>Markings (QC Audit):</b>		
• <b>Frame</b>	SPI "2" PE-HD Recycling Symbol	
• <b>Box</b>	None	

**SECTION III: TEST PROCEDURES AND RESULTS**

**VIBRATION TEST**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>An IBC passes the vibration test if there is no rupture or leakage. (§178.819)</li> </ul>
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>TABLE DISPLACEMENT:</b>	1"	
<b>TEST FREQUENCY:</b>	3.7 Hz	
<b>TEST DURATION:</b>	1 Hour	
<b>TEST EQUIPMENT:</b>	Vertical motion using L.A.B. 10000 Transportation Simulator	

**VIBRATION TEST SET-UP AND RESULTS (SAMPLE #1)**

	Results	Comments/Observations
	<b>PASS</b>	The IBC met the criteria for passing the test. No leakage or damage.

**BOTTOM LIFT TEST**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>For all IBC design types designed to be lifted from the base, there may be no permanent deformation which renders the IBC unsafe for transportation and no loss of contents. (\$178.811)</li> </ul>
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>NUMBER OF LIFTS:</b>	8 (Four-Way Entry with 2 Lifts per Direction of Entry)	
<b>FORK TINE PENETRATION:</b>	Entry 1 & 2: 36" Entry 3 & 4: 30"	
<b>COMBINED GROSS MASS LIFTED:</b>	2,715.6 Kg (5,986.8 Lbs.) (Refer to Section IV)	
<b>TEST EQUIPMENT:</b>	Fork Truck Dead Load Weights	




**BOTTOM LIFT TEST SET-UP AND RESULTS (SAMPLE #1)**

Direction of Entry #1	Direction of Entry #2	Direction of Entry #3	Direction of Entry #4
			
<b>Results</b>		<b>Comments/Observations</b>	
Lift #1: <b>PASS</b>	Lift #5: <b>PASS</b>	The IBC met the criteria for passing the test.  No leakage or damage.	
Lift #2: <b>PASS</b>	Lift #6: <b>PASS</b>		
Lift #3: <b>PASS</b>	Lift #7: <b>PASS</b>		
Lift #4: <b>PASS</b>	Lift #8: <b>PASS</b>		

**LEAKPROOFNESS TEST**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Empty	<ul style="list-style-type: none"> <li>For all IBC design types intended to contain solids that are loaded or discharged under pressure or intended to contain liquids, there may be no leakage of air from the IBC.</li> </ul> <p style="text-align: right;">(\$178.813)</p>
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>TEST PRESSURE:</b>	20 kPa	
<b>TEST DURATION:</b>	10 Minutes	
<b>AREA OF PRESSURIZATION:</b>	Through Top Head	
<b>TEST EQUIPMENT:</b>	Regulated Air Source #: 2 Pressure Gauge #: 615 & 641	




**LEAKPROOFNESS TEST SET-UP AND RESULTS (SAMPLE #1)**

Set-Up Photo	Leakproofness Photo	Leakproofness Photo
		
Results	Comments/Observations	
<b>PASS</b>	The IBC met the criteria for passing the test. No leakage.	

**HYDROSTATIC PRESSURE TEST**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Water	<ul style="list-style-type: none"> <li>For rigid plastic and composite IBC design types intended to contain solids loaded or discharged under pressure or intended to contain liquids, there may be no leakage and no permanent deformation which renders the IBC unsafe for transportation. (§178.814)</li> </ul>
<b>WATER TEMPERATURE:</b>	20.1°C (68.2°F)	
<b>FILL CAPACITY:</b>	Maximum Capacity	
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	Ambient	
<b>TEST PRESSURE:</b>	110 kPa	
<b>TEST DURATION:</b>	10 Minutes	
<b>AREA OF PRESSURIZATION:</b>	Through Top Head	
<b>TEST EQUIPMENT:</b>	Regulated Water Source #: 2 Pressure Gauge #: 615 & 641	

**HYDROSTATIC PRESSURE TEST SET-UP AND RESULTS (SAMPLE #1)**

Set-Up Photo	Hydrostatic Pressure Photo	Hydrostatic Pressure Photo
		
Results	Comments/Observations	
<b>PASS</b>	The IBC met the criteria for passing the test. No leakage.	



**DROP TEST**

TEST INFORMATION		TEST CRITERIA
<b>TEST CONTENTS:</b>	Methanol/Water Solution (0.967 SG)	<ul style="list-style-type: none"> <li>For all IBC design types, there may be no damage which renders the IBC unsafe to be transported for salvage or for disposable, and no loss of contents.</li> <li>The IBC shall be capable of being lifted by an appropriate means until clear of the floor for five minutes.</li> <li>A slight discharge from closures upon impact is not considered a failure provided that no further leakage occurs. (§178.810)</li> </ul>
<b>SAMPLE PREPARATION:</b>	Refer to Section II	
<b>CONDITIONING:</b>	-18°C (0°F) Chamber #202	
<b>TEST CONTENTS TEMP.:</b>	-18.4°C (-1.1°F)	
<b>DROP HEIGHT:</b>	1.9 Meters (75") (Refer to Section IV)	
<b>DROP ORIENTATION:</b>	Most Vulnerable Part of Base	
<b>TEST EQUIPMENT:</b>	Quick Release Hook Mechanism 5 Ton Overhead Hoist	

**DROP TEST SET-UP AND RESULTS (SAMPLE #1)**

Set-Up Photo	Post Drop Photo	Post Drop Photo
		
Results	Comments/Observations	
<b>PASS</b>	<p>The IBC met the criteria for passing the test. The outer shell cracked on the bottom in the left fork entry. No leakage.</p>	

## REGULATORY AND INDUSTRY STANDARD REFERENCES

### REGULATORY REFERENCES

TEST	49 CFR <sup>①</sup>	UN <sup>②</sup>	IMDG <sup>③</sup>
	October 2022 Edition	22 <sup>nd</sup> Edition	2022 Edition
<b>Vibration:</b>	178.819	6.5.6.13	---
<b>Bottom Lift:</b>	178.811	6.5.6.4	6.5.6.4
<b>Leakproofness:</b>	178.813	6.5.6.7	6.5.6.7
<b>Hydrostatic Pressure:</b>	178.814	6.5.6.8	6.5.6.8
<b>Drop:</b>	178.810	6.5.6.9	6.5.6.9

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

<b>Vibration:</b>	ASTM <sup>④</sup> D7387:	Standard Test Method for Vibration Testing of IBCs Used for Shipping Liquid Hazardous Materials (Dangerous Good)
	ISO <sup>⑤</sup> 2247:	Packaging – Complete, Filled Transport Packages – Vibration Test at Fixed Low Frequency
<b>Pressure:</b>	ASTM <sup>④</sup> D8134:	Standard Guide for Conducting Internal Hydrostatic Pressure Tests on United Nations (UN) IBC Design Types
<b>Drop:</b>	ASTM <sup>④</sup> D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall
	ASTM <sup>④</sup> D7790:	Standard Test Method for the Preparation of Plastic Packagings Containing Liquids for United Nations (UN) Drop Testing
	ISO <sup>⑤</sup> 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test by Dropping

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 IBC Tare Weight (IBCTW)- <b>Sample 1:</b>	97.0 Kg	213.8 Lbs.
Overall IBC Tare Weight (IBCTW)- <b>Sample 2:</b>	97.0 Kg	213.8 Lbs.
Overflow Capacity (OFC):		
Water	1,052.0 Kg	2,319.2 Lbs.
Methanol/Water	1,000.0 Kg	2,204.6 Lbs.
Actual Load Applied for Bottom Lift (BLALA):	1,587.6 Kg	3,500.0 Lbs.
Packing Group	II	
Product Specific Gravity (PSG):	1.90	<b>Min Wt To Be Applied</b>
Packing Group Multiplication Factor (MF):	1.00	3,178.3 Lbs. (Btm Lift)
# of IBC Stacked During Transportation (#IBC):	2	

**98% OF OVERFLOW**

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>					
1,052.0	x	98% =	1,031.0	Kg	2,273.0	Lbs. Water	Sample #1
1,000.0	x	98% =	980.0	Kg	2,160.6	Lbs. Methanol/Water	Sample #2

**IBC TEST WEIGHT (IBCW)**

Overall IBC Tare Weight (IBCTW) + 98% Overflow Capacity (OFC)

<u>IBCTW</u>	+	<u>98% OFC =</u>					
97.0	+	1,031.0	1,128.0	Kg	2,486.7	Lbs. Water	Sample #1
97.0	+	980.0	1,077.0	Kg	2,374.3	Lbs. Methanol/Water	Sample #2

**AUTHORIZED IBC GROSS MASS (AIBCGM)**

Overall IBC Tare Weight (IBCTW) + (Product SG (PSG) x 98% Overflow (OFC))

<u>IBCTW</u>	+	<u>(PSG</u>	x	<u>98% OFC)</u>			
97.0	+	1.90	x	1,031.0			
		2,055.9	Kg	4,532.4	Lbs.		

**BOTTOM LIFT CALCULATIONS**

The IBC must be loaded to 1.25 times the combined maximum permissible gross mass with load being evenly distributed

**Minimum Required Load**

Authorized IBC Gross Mass x 1.25

<u>ABCGM</u>	x	<u>1.25</u>	=	<u>Minimum Required Load</u>		
2,055.9	x	1.25	=	<b>2,569.9 Kg</b>	<b>5,665.5</b>	<b>Lbs.</b>

**Combined Gross Mass Lifted**

Actual Load Applied (ALA) + IBC Test Weight (IBCW)

<u>IBCW</u>	+	<u>ALA</u>	=	<u>Total Load Lifted</u>		
1,128.0	+	1,587.6	=	<b>2,715.6 Kg</b>	<b>5,986.8</b>	<b>Lbs.</b>

**DROP HEIGHT**

**Calculation For Product Specific Gravities Exceeding 1.2**

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

<u>PSG</u>	x	<u>MF</u>		<b>Packing Group:</b>	<b>II</b>
1.90	x	1.00		<u>Required Drop Height</u>	<u>Actual Drop Height</u>
		<b>1.90</b>	<b>Meter</b>	<b>74.8 Inches</b>	<b>75 Inches</b>