TEN-E Packaging Services, Inc.

UNITED NATIONS / DOT PERFORMANCE CERTIFICATION

RIKUTEC America
RIKUTEC Group

6HH1 DESIGN QUALIFICATION

200 Liter Plastic Composite Twin Drum with KTJ & AS Closed Bung Closures

TEST REPORT #: 25-MN30090

(un) 6HH1 / X1.9 / 280 / **
USA / +AA12053
**Insert the year packaging is manufactured

TESTING PERFORMED FOR:

RIKUTEC AMERICA, INC.
2510-B W. Whitner Street
Anderson, SC 29624

ATTN: Alex Pytka

TESTING PERFORMED BY:

TEN-E PACKAGING SERVICES, INC.
1666 County Road 74
Newport, MN 55055
Phone: 651-459-0671
Fax: 651-459-1430

August 18, 2025

TABLE OF CONTENTS

SECTION I: CERTIFICATION

Design Qualification of the Rikutec America, Inc.
200 Liter Plastic Composite Twin Drum with KTJ & AS Closed 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, 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	2.85 m	Methanol/Water	August 18, 2025	PASS
Leakproofness	178.604	30 kPa – 5 Minutes	Empty	August 18, 2025	PASS
Hydrostatic	178.605	280 kPa - 30 Minutes	Water	July 9, 2025	PASS
Stacking	178.606	816.5 Kg – 28 Days	Water	August 13, 2025	PASS
Vibration	178.608	4.0 Hz – 1 Hour	Water	July 17, 2025	PASS

TEST REPORT NUMBER:	25-MN30090
UN MARKING: (CFR 49 – 178.503)	(un) 6HH1 / X1.9 / 280 / ** USA / +AA12053
PACKAGING IDENTIFICATION CODE:	6HH1-Plastic Receptacle in Plastic Drum (178.522)
PERFORMANCE STANDARD:	X (Packaging meets Packing Group I, II and III tests)
MAXIMUM PRODUCT SPECIFIC GRAVITY:	1.9
HYDROSTATIC TEST PRESSURE:	280 kPa
YEAR OF MANUFACTURE:	** Insert year the packaging is manufactured
STATE AUTHORIZING THE MARK:	USA
PACKAGING CERTIFICATION AGENCY:	(+AA) TEN-E Packaging Services, Inc. (Newport, MN CAA #2006030022)
THIRD PARTY PACKAGING IDENTIFICATION:	+AA12053
PERIODIC RETEST DATE:	August 18, 2026

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:
Rikutec America, Inc.
2510-B W. Whitner Street
Anderson, SC 29624

Tyler Kinderman
Project Manager
TEN-E Packaging Services, Inc.
1666 County Road 74
Newport, MN 55055

SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS

200 Liter Plastic Composite Twin Drum with KTJ & AS Closed Bung Closures

ASSEMBLY DRAWING

TEST LEVELS

Certification Type:	Design Qualification	
Packaging Code Designation:	6HH1	
Packing Group:	I	
Specific Gravity:	1.9	
Internal Pressure:	280 kPa	

TEST SAMPLE PREPARATION
(Refer to Section IV)

Overall Packaging Tare Weight:	16.7 Kg	
Fill Capacity (98% Maximum Capacity):		
Methanol/Water Solution	181.8 Kg	
Water	189.1 Kg	
Package Test Weight		
Methanol/Water Solution	198.5 Kg	437.6 Lbs.
Water	205.8 Kg	453.7 Lbs.

CLOSING METHODS

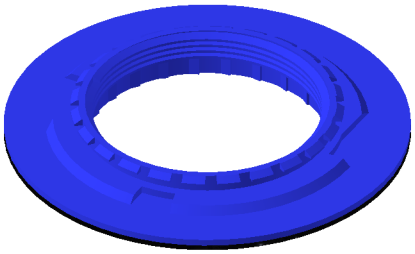
2” Closed Bung Closures:	
Application Torque:	25 Ft-Lbs.
Equipment:	Torque Wrench #740
1” Vent Plug:	Installed by Manufacturer

COMPONENT INFORMATION

3/4” PLUG (9002806)		DRAWING
Manufacturer: Abel GmbH & Co.KG – Meinershagen, Germany		
Description:	3/4" Threaded Center Plug	
Quantity:	1	
Material:	Polyethylene, White	
Tare Weight:	3.998 Grams	
Overall Dimensions:		
• **Height**	13.2 mm (0.52”)	
• **Diameter**	30.0 mm (1.18”)	
Thread Dimensions:		
• **T**	25.9 mm (1.02”)	
• **E**	23.4 mm (0.92”)	
Markings (QC Audit):	PP	
GASKET:		
Description:	3/4" Polyethylene, Natural O-Ring	
Tare Weight:	0.375 Grams	
Thickness:	2.8 mm (0.11”)	
Diameter:	28.7 mm (1.13”)	

CLOSED BUNG CLOSURE (21300105)		DRAWING
Manufacturer: Kunstofftechnik Jaeger, Braunschweig, Germany		
Description:	2” Buttress Threaded Plug	
Quantity:	1	
Material:	Polyethylene, Natural	
Tare Weight:	38.026 Grams	
Overall Dimensions:		
• **Height**	33.11 mm (1.304”)	
• **Diameter**	78.28 mm (3.082”)	
Thread Dimensions:		
• **T**	61.92mm (2.438”)	
• **E**	54.76 mm (2.156”)	
Markings (QC Audit):	1 5/25 SPI “2” HDPE Recycling Symbol	
PE PROFILE GASKET		
Description:	Polyethylene, Natural Profile Gasket	
Tare Weight:	2.584 Grams	
Thickness:	3.740 mm (0.147”)	
Diameter:	72.39 mm (2.850”)	

CLOSED BUNG CLOSURE (K12992-PE)			DRAWING
Manufacturer: AS Stromungstechnik, Ostfildern, Germany			
Description:	2” Non-Vented Buttress Threaded Plug		
Quantity:	2		
Material:	Polyethylene, Natural		
Tare Weight:	37.603 Grams		
Overall Dimensions:			
• **Height**	33.0 mm	(1.30”)	
• **Diameter**	80.0 mm	(3.15”)	
Thread Dimensions:			
• **Major Diameter:**	61.9 mm	(2.44”)	
• **Minor Diameter:**	55.6 mm	(2.19”)	
Markings (QC Audit):	As	2	
PE PROFILE GASKET			
Description:	Polyethylene, Natural Profile Gasket		
Tare Weight:	2.584 Grams		
Thickness:	3.740 mm	(0.147”)	
Diameter:	72.39 mm	(2.850”)	

CLAMPING NUT (9002749)		DRAWING
Manufacturer: Itplast, Sarreguemines, France		
Description:	Outer Buttress Threaded Clamping	
Quantity:	2 (1 on each opening)	
Material:	Polyethylene, Blue and Black, Rubber	
Tare Weight:	41.968 Grams	
Overall Dimensions:		
• **Height**	0.758”	
• **Diameter**	5.905”	
Thread Dimensions:		
• **T**	3.446”	
• **E**	3.245”	
Markings (QC Audit):	RIKUTEC 2/25 SPI “2” Recycling Symbol	

PLASTIC INNER RECEPTACLE (12200000)		DRAWING
Manufacturer: Rikutec, Altenkirchen, Germany		
Description:	200 Liter Tight Head Plastic Inner Receptacle	
Material/Pigment:	Polyethylene, Natural	
Method of Manufacture:	Blow Molded	
Tare Weight:	4.5 Kg	
Capacity:		
• **Rated (Nominal)**	200 Liter	
• **Overflow**	192.9 Liter (50.96 Gallons)	
Overall Dimensions:		
• **Height**	920.0 mm (36.22”)	
• **Overall Diameter**	560.0 mm (22.04”)	
• **Bottom Diameter**	492.5 mm (19.39”)	
70 mm Opening Thread Dimensions:		
• **T**	65.0 mm (2.55”)	
• **E**	57.68 mm (2.27”)	
• **Height**	0.779”	
Outside Thread Dimensions on Opening (clamping nut):		
• **T**	84.73 mm (3.34”)	
• **E**	80.57 mm (3.17”)	
Wall Thickness:		
• **Minimum**	2.06 mm (0.081”)	
Markings (QC Audit):	03 / 25-6577	

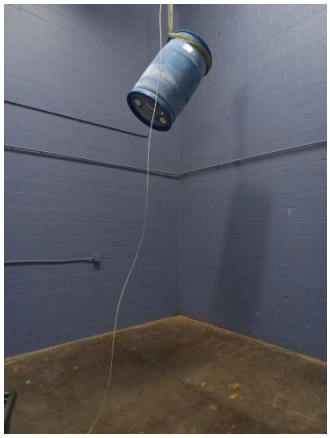
PLASTIC OUTER PACKAGING (12201003)		DRAWING
Manufacturer: Rikutec, Altenkirchen, Germany		
Description:	200 Liter Plastic Outer Packaging to Contain Inner Receptacle	
Lifting Ring:	Fully Integrated	
Material/Pigment:	Polyethylene, Blue	
Method of Manufacture:	Blow Molded	
Tare Weight:	11.2 Kg	
Overall Dimensions:		
• **Height**	967.0 mm (38.07”)	
• **Diameter**	578.0 mm (22.76”)	
Opening Dimensions:		
Inside Diameter	102.6 mm (4.04”)	
3/4” Fitting Thread Dimensions:		
• **T**	19.84 mm (0.78”)	
• **E**	19.10 mm (0.75”)	
Wall Thickness:		
• **Minimum**	4.0 mm (0.150”)	
Markings (QC Audit):	(un) 6HH1 / X1.9 / 280 / D BAM14926 – RIKUTEC RIKUTEC Dispense 04 / 25-5168 Recirculation SPI “2” PE-HD Recycling Symbol	

SECTION III: TEST PROCEDURES AND RESULTS

DROP TESTS

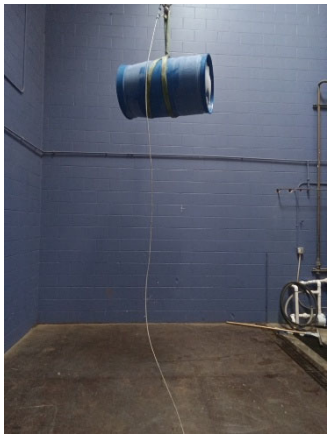
TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.969 SG)	• For packaging containing liquid, each packaging does not leak when equilibrium has been reached between the internal and external pressures. • The packaging or outer packaging of a composite or combination packaging must not exhibit any damage likely to 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 receptacles or inner packagings; • 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 #202	
TEST CONTENTS TEMP:	-18.2°C (-0.8°F)	
DROP HEIGHT:	2.85 Meters (113”) (Refer to Section IV)	
TEST EQUIPMENT:	Quick Release Hook Mechanism	

DIAGONAL TOP CHIME ON 2” CLOSED BUNG DROP TEST SET-UP AND RESULTS



Sample #	Results	Comments/Observations
1	PASS	No leakage. Slight deformation at point of impact.
2	PASS	No leakage. Top head cracked but the inner receptacle remained in the outer packaging.
3	PASS	No leakage. Top head cracked at the part line cracked but the inner receptacle remained in the outer packaging

FLAT ON SIDE DROP ON 2” CLOSED BUNG TEST SET-UP AND RESULTS



Sample #	Results	Comments/Observations
4	PASS	No leakage. Slight deformation at point of impact.
5	PASS	No leakage. Slight deformation at point of impact.
6	PASS	No leakage. Slight deformation at point of impact.

LEAKPROOFNESS TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty	• A packaging passes the test if there is no leakage of air from the packaging. (§178.604)
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	30 kPa	
TEST DURATION:	5 Minutes	
AREA OF PRESSURIZATION:	Through the Top Head	
TEST EQUIPMENT:	Regulated Air Source #: 1 Digital Pressure Gauge #: 613	

LEAKPROOFNESS PRESSURE TEST SET-UP AND RESULTS

Sample #	Results
1	PASS
2	PASS
3	PASS

Comments/Observations:
All three samples maintained the 30 kPa test pressure for 5 minutes without leakage

HYDROSTATIC PRESSURE TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	• For each test sample, there is no leakage of liquid from the package. (§178.605)
WATER TEMPERATURE:	17.5°C (63°F)	
FILL CAPACITY:	Maximum Capacity	
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	280 kPa	
TEST DURATION:	30 Minutes	
AREA OF PRESSURIZATION:	Through the Top Head	
TEST EQUIPMENT:	Regulated Water Source #: 1 Digital Pressure Gauge #: 613	

HYDROSTATIC PRESSURE TEST SET-UP AND RESULTS

Sample #	Results
1	PASS
2	PASS
3	PASS

Comments/Observations:
All three samples maintained the 280 kPa test pressure for 30 minutes without leakage.

STACKING & STACKING STABILITY TESTS

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	• No test sample may leak. • 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:	40°C (104°F) Chamber #201	
TEST LOAD APPLIED:	816.5 Kg (1,800.0 Lbs.) (Refer to Section IV)	
TEST DURATION:	28 Days	
TEST EQUIPMENT:	Guided Load Fixture w/ Dead Load Weight	

STACKING TEST SET-UP & RESULTS

Sample #	Maximum Deflection After 28 Days	Results
13	1-1/8"	**PASS**
14	1-5/8"	**PASS**
15	1-3/4"	**PASS**

Comments/Observations: Following the 28-day stack test, there was no leakage of contents from the test samples and no damage likely to affect the performance of the packaging.

STACKING STABILITY TEST SET-UP & RESULTS

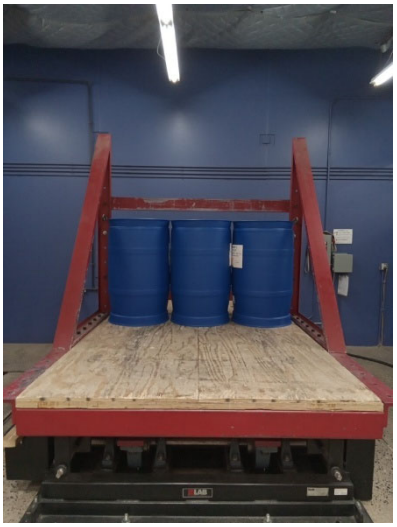
Results	CRITERIA FOR PASSING THE TEST
PASS	• In guided load tests, stacking stability must be assessed after test completion. • Two filled packagings of the same type must be placed on the test sample. • The stacked packages must maintain their position for one hour. (§178.606)

For stack stability, TEN-E places the filled samples one on top of the other. The bottom sample is rotated to the top until all three samples have been subjected to stacking stability for one hour each.

VIBRATION TEST

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:	4.0 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. 10000 Transportation Simulator	

VIBRATION TEST SET-UP AND RESULTS



Sample #	Results	Comments/Observations
1	PASS	No leakage or damage.
2	PASS	
3	PASS	

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES					
TEST	**49 CFR①**	**UN②**	**IMDG③**	**ICAO④**	**IATA⑤**
	October 2024 Edition	**23rd Edition**	**2024 Edition**	**2025-2026 Edition**	**66th Edition**
Drop:	178.603	6.1.5.3	6.1.5.3	6;4.3	6.3.3
Leakproofness:	178.604 & 178 Appendix B (2) & (3)	6.1.5.4	6.1.5.4	6;4.4	6.3.4
Hydrostatic Pressure:	178.605	6.1.5.5	6.1.5.5	6;4.5	6.3.5
Stacking:	178.606	6.1.5.6	6.1.5.6	6;4.6	6.3.6
Vibration:	178.608	---	---	4;1.1.1 & 4;1.1.4	5.0.2.7

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:	ASTM⑥ D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall
	ASTM⑥ D7790:	Standard Test Method for the Preparation of Plastic Packagings Containing Liquids for United Nations (UN) Drop Testing
	ISO⑦ 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test by Dropping
Hydrostatic Pressure:	ASTM⑥ D7660:	Standard Guide for Conducting Internal Pressure Tests on United Nations (UN) Packagings
Stacking:	ASTM⑥ D8409:	Standard Guide for Conducting Stacking Tests on UN Packagings Using Guided or Unguided Loads
	ASTM⑥ D4577:	Standard Test Method for Compression Resistance of a Container Under Constant Load
	ISO⑦ 2234:	Packaging – Complete, Filled Transport Packages – Stacking Test using Static Load
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

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.

SECTION IV: MATHEMATICAL CALCULATIONS

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	**16.7**	**Kg**
Overflow Capacity (OFC):		
Methanol/Water	**185.5**	**Kg**
Water	**192.9**	**Kg**
Packing Group	**I**	
Product Specific Gravity (PSG):	**1.9**	
Packing Group Multiplication Factor (MF):	**1.50**	
Nesting Height of one Package (NH):	**37.75**	**Inches**
Stack Test-# of Samples Tested Simultaneously:		

98% OF OVERFLOW

Overflow Capacity (OFC) x 98%

OFC	x	98%				
185.5	x	98% =	**181.8**	**Kg**	**400.8**	**Lbs. Methanol/Water**
192.9	x	98% =	**189.1**	**Kg**	**416.9**	**Lbs. Water**

PACKAGE TEST WEIGHT

Overall Pkg Tare Weight (PTW) + 98% Overflow Capacity (OFC)

PTW	+	98% OFC =					
16.7	+	181.8	**198.5**	**Kg**	**437.6**	**Lbs.**	**Methanol/Water**
16.7	+	189.1	**205.8**	**Kg**	**453.7**	**Lbs.**	**Water**

CALCULATED PACKAGE GROSS MASS (CPGM)

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

PTW	+	(PSG	x	98% OFC)
16.7	+	1.9	x	189.1
		375.9 **Kg**		**828.7** **Lbs.**

DROP HEIGHT

Calculation For Product Specific Gravities Exceeding 1.2

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

PSG		MF			**Packing Group:**	I
1.9	x	1.50		**Required Drop Height**		**Actual Drop Height**
		2.85	**Meter**	**112.2 Inches**		**113 Inches**

STACK TEST MINIMUM LOAD CALCULATIONS

Number of Packages in a 3m High Stack (118.2 / Nesting Height (NH) -1)

118.2 / Nesting Height of one Pkg (NH) - 1

(118.2	/	NH)	-1	=	# 3m HS
118.2	/	37.75	-1	=	2.1

Stack Test Load Calculation (Individual Package)

Calculated Pkg Gross Mass (CPGM) x # of Pkg in a 3m High Stack (# 3m HS)

CPGM		# 3m HS
375.9	x	2.1

789.4 Kg **1,740.3 Lbs.**