

**UNITED NATIONS / DOT
PERFORMANCE CERTIFICATION**



31HH1 DESIGN QUALIFICATION

**1000 Liter All Plastic Composite Framed Pallet IBC with
2" Vented and Non-Vented Bung Closures and QC II Dip Tube**

TEST REPORT #: 20-MN40058



31HH1 / Y / * / USA / +AA10038 / 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: Mario Puzo

TESTING PERFORMED BY:

TEN-E PACKAGING SERVICES, INC.

1666 County Road 74
Newport, MN 55055
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July 8, 2020

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NOTES AND COMMENTS

Rikutec manufactures 1000 liter IBC designs with Framed and Euro style pallet bases. The Inner Bottle, Outer Shell (box) and Cover are the same for all designs. The following test reports contain documentation for the variety of closures, gaskets and fittings intended to be used on any of the IBC designs:


- **Test Report 20-MN40058:** Framed Pallet with 2" Vented and Non-Vented Bung Closures, and QC II Dip Tube
- **Test Report 20-MN40059:** Framed Pallet with 2" Non-Vented Bung Closures, and QC II Dip Tube
- **Test Report 20-MN40060:** Euro Pallet with 2" Vented and Non-Vented Bung Closures and ENTEGRIS QC II Dip Tube

All three designs will be marked to 2010 Kg and will be covered under the same UN certification (+AA10038).

SECTION I: CERTIFICATION

**DESIGN QUALIFICATION of the Rikutec America Inc.
 1000 Liter All Plastic Composite Framed Pallet IBC with 2" Vented and Non-Vented
 Bung Closures and QC II Dip Tube**

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	CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Vibration	178.819	3.5 Hz – 1 Hour	Water	June 30, 2020	PASS
Bottom Lift	178.811	2,697.0 Kg	Water	June 30, 2020	PASS
Leakproofness	178.813	20 kPa – 10 Minutes	Empty	July 2, 2020	PASS
Hydrostatic	178.814	110 kPa – 10 Minutes	Water	July 2, 2020	PASS
Drop	178.810	1.9 m	Methanol/Water	July 8, 2020	PASS
TEST REPORT NUMBER:			20-MN40058		
UN MARKING: (CFR 49 – 178.703)			 31HH1 / Y / * / USA / +AA10038 / 0 / 2010		
PACKAGING IDENTIFICATION CODE:			31HH1 (178.707 Composite IBC)		
PERFORMANCE STANDARD:			Y (Packaging meets Packing Group II and III tests)		
MONTH AND YEAR OF MANUFACTURE:			*		
STATE AUTHORIZING ALLOCATION OF THE MARK:			USA		
PACKAGING CERTIFICATION AGENCY:			(+AA) TEN-E Packaging Services, Inc. (Newport, MN CAA #2006030022)		
THIRD PARTY PACKAGING IDENTIFICATION:			+AA10038		
STACKING TEST LOAD:			0 Kg (IBC is Not Intended to be Stacked in Transportation)		
MAXIMUM PERMISSIBLE GROSS MASS:			2,010 Kg (4,431 Lbs.)		
PERIODIC DESIGN REQUALIFICATION DATE:			July 8, 2021		
ADDITIONAL REQUIRED RIGID PLASTIC & COMPOSITE IBC MARKINGS (CFR 49 – 178.703(b)):					
RATED CAPACITY AT 20°C (liters):			1000 Liters		
TARE MASS (Kg):			Insert individual IBC tare mass		
GAUGE TEST PRESSURE (kPa):			110 kPa		
DATE OF LAST LEAKPROOFNESS TEST:			Insert Month & Year of Last Leakproofness Test		
DATE OF LAST INSPECTION:			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.

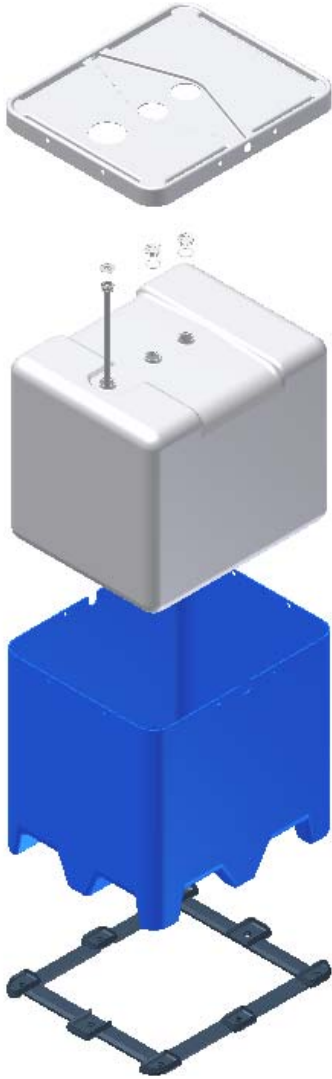
MANUFACTURER:
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SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS


1000 Liter All Plastic Composite Framed Pallet IBC with 2" Vented and Non-Vented Bung Closures, and QC II Dip Tube


ASSEMBLY DRAWING	TEST LEVELS		
	Certification Type:	Design Qualification	
	Packaging Code Designation:	31HH1	
	Packaging Group:	II	
	Specific Gravity:	1.9	
	Test Pressure:	110 kPa	
	TEST SAMPLE PREPARATION (Refer to Section IV)		
	Overall IBC Tare Weight: (Sample #1 and Sample #2)	96.0 Kg	
	Net Fill Weight (98% Maximum Capacity):		
	Water (Sample #1)	1,013.4 Kg	
	Methanol/Water (Sample #2)	965.3 Kg	
IBC Test Weight:			
Water (Sample #1)	1,109.4 Kg	2,445.7 Lbs.	
Methanol/Water (Sample #2)	1,061.3 Kg	2,339.7 Lbs.	
Maximum Permissible Gross Mass:	2,021.4 Kg	4,456.3 Lbs.	
(IBC will be marked to 2,010 Kg for the UN gross mass marking)			
CLOSING METHODS			
2" PP Closed Bung:			
Application Torque:	25 Ft-Lbs.		
2" PP Vented Plug:			
Application Torque:	25 Ft-Lbs.		
2" QC II Dip Tube:			
Application Torque:	25 Ft-Lbs.		
1-1/2" Plug on QC II Dip Tube:			
Application Torque:	4 Ft-Lbs.		
All closures torqued using Equipment: Torque Wrench #740			


COMPONENT INFORMATION

CLOSURE (K12992-PP)		DRAWING
Manufacturer: AS Stromungstechnik, Ostfildern, Germany		
Description:	2" Non-Vented Buttress Threaded Plug	
Quantity:	2	
Material:	Polypropylene, Natural	
Tare Weight:	35.717 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	
POE Profile Gasket (K12993):		
Description:	S62 Seal Ring, Natural Polyolefin Profile Gasket	
Tare Weight:	2.380 Grams	
Thickness:	3.8 mm (0.15")	
Diameter:	72.5 mm (2.85")	

CLOSURE (K13011-PP)		DRAWING
Manufacturer: AS Stromungstechnik, Ostfildern, Germany		
Description:	2" Vented Buttress Threaded Plug	
Quantity:	1	
Material:	Polypropylene, Natural with Microporous PTFE Vent	
Tare Weight:	35.668 Grams	
Overall Dimensions:		
• Height	35.0 mm (1.38")	
• 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	
POE Profile Gasket (K12993):		
Description:	S62 Seal Ring, Natural Polyolefin Profile Gasket	
Tare Weight:	2.493 Grams	
Thickness:	3.8 mm (0.15")	
Diameter:	72.5 mm (2.85")	

CLOSURE		DRAWING
Manufacturer: AS Stromungstechnik, Ostfildern, Germany		
Description:	1-1/2" QC II Threaded Sealing Cap	
Quantity:	1	
Material:	Polyethylene, Natural	
Tare Weight:	17.489 Grams	
Overall Dimensions:		
• Height	25.1 mm (0.99")	
• Diameter	75.7 mm (2.98")	
Thread Dimensions:		
• T	41.2 mm (1.62")	
• E	38.6 mm (1.52")	
Markings (QC Audit):	as www.qc-sytem.com patented U.S. Pat. No. 6,357,494	
Liner/Gasket:		
Description:	Polyethylene, Natural	
Tare Weight:	0.581 Grams	
Thickness:	2.8 mm (0.11")	
Diameter:	35.6 mm (1.40")	
DIP TUBE (Dwg. DT-62PE-XXX-1040-TF)		
Manufacturer: AS Stromungstechnik, Ostfildern, Germany		
Description:	2" QC II Buttress Threaded Insert with Diptube and Bottom Flexible Bellow	
Quantity:	1	
Material:	Polyethylene, Natural	
Tare Weight:	158 Grams	
Overall Dimensions:		
• Height	1,040.0 mm (40.94") (with Diptube)	
• Insert Height	34.0 mm (1.34")	
• Diameter	79.0 mm (3.11")	
Thread Dimensions (2" Container - Side):		
• Major Diameter	62.0 mm (2.44")	
• Minor Diameter	54.6 mm (2.15")	
Thread Dimensions (1-1/2" Shipping Cap - Side):		
• Major Diameter	42.7 mm (1.68")	
• Minor Diameter	40.4 mm (1.59")	
Thread Dimensions (3/4" Plug - Side):		
• Major Diameter	26.6 mm (1.05")	
• Minor Diameter	24.0 mm (0.94")	
Markings (QC Audit):	1903A617 1B2 3A4 5C5	
PE Profile Gasket (K12993):		
Description:	Natural Polyethylene Profile Gasket	
Tare Weight:	2.533 Grams	
Thickness:	3.8 mm (0.15")	
Diameter:	72.4 mm (2.85")	

PLASTIC INNER RECEPTACLE (T-1000L) (11000034)		DRAWING
Manufacturer: Rikutec America, Inc., Whitinsville, MA		
Description:	Rikutec 1000 Liter Rigid Inner Receptacle with (3) 2" Buttress Threaded Top Fill Port Openings	
Material:	High Density Polyethylene, Natural	
Resin Type:	Two Layer Wall Design: <ul style="list-style-type: none"> • Inside: Lupolen 4261 A Q149 • Outside: Lupolen 4261 AG UV 60005 	
Method of Manufacture:	Blow Molded	
Tare Weight:	47.4 Lbs. (21.5 Kg)	
Capacity:		
• Rated	1,000 Liter	
• Overflow	273.2 Gallons (1,034.0 Liter)	
Overall Dimensions:		
• Length	1,155.7 mm (45.50")	
• Width	962.5 mm (37.88")	
• Height	1,044.7 mm (41.13")	
2" Fill Port Opening Thread Dimensions		
• Major Diameter	64.8 mm (2.55")	
• Minor Diameter	57.1 mm (2.25")	
Dip Tube Opening Thread Dimensions		
• Major Diameter	64.8 mm (2.55")	
• Minor Diameter	57.4 mm (2.26")	
Wall Thickness (Minimum):	2.387 mm (0.09")	
Markings (QC Audit):	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px; margin-right: 5px;">u n</div> <div> 31HH1 / Y / 12 19 / D / BAM 6808-RIKUTEC RIKUTEC D-57610 Altenkirchen Made in Germany SPI "2" PE-HD Recycling Symbol </div> </div>	

COVER – POLY BOX		DRAWING
Manufacturer: Rikutec America, Inc., Whitinsville, MA		
Description:	Top Cover with (3) Access Holes Secured to Tote with (8) Plastic Pins	
Quantity:	1	
Material:	High Density Polyethylene, Natural	
Tare Weight:	10.5 Kg (23.1 Lbs.)	
Overall Dimensions:		
• Length	1,212.9 mm (47.75")	
• Width	1,003.3 mm (39.50")	
• Height	962.2 mm (37.88)	
• Small Hole Diameter	142.0 mm (5.63")	
• Large Hole Diameter	177.8 mm (7.00")	
Markings (QC Audit):	<p> u n 31HH1 / Y / 12 19 / D / BAM /6808 RIKUTEC/ 3314 / 2070 / TR6F142 POLY-IBC UC 1000 Max Capacity 1050 Liter / Tare 96kg Gauge of Pressure" 100 kPa SPI "2" PE HD Recycling Symbol Hersteller: RIKUTEC Richter Kunststofftechnik GmbH & Co. KG Graf- Zeppelin-Strasse 5, D57610 Alten Kirchen Germany (0) 2681 9546-0 </p>	
FRAMED BASE – POLY BOX		
Manufacturer: Rikutec America, Inc., Whitinsville, MA		
Description:	4-Way Entry Plastic Outer Tote with Molded Pallet Feet and Bottom Detachable Plastic Framed Pallet with (8) Plastic Screws and Bolts	
Quantity:	1	
Material:	High Density Polyethylene, Blue and Black	
Tare Weight:	65.0 Kg (143.3 Lbs.) (with Bottom Frame)	
Overall Dimensions:		
• Length	1,193.8 mm (47.00")	
• Width	990.6 mm (39.00")	
• Height	1,168.4 mm (46.00")	
Markings (QC Audit):		
• Frame	SPI "2" PE-HD Recycling Symbol	
• Box	None	

SECTION III: TEST PROCEDURES AND RESULTS

VIBRATION TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> An IBC passes the vibration test if there is no rupture or leakage. (§178.819)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	3.5 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. 6000 Transportation Simulator	





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

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

BOTTOM LIFT TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> 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)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
NUMBER OF LIFTS:	8 (Four-Way Entry with 2 Lifts per Direction of Entry)	
FORK TINE PENETRATION:	Entry 1 & 2: 36" Entry 3 & 4: 30"	
COMBINED GROSS MASS LIFTED:	2,697.0 Kg (5,945.8 Lbs.) (Refer to Section IV)	
TEST EQUIPMENT:	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:
			
Results		Comments/Observations	
Lift #1: PASS	Lift #5: PASS	The IBC met the criteria for passing the test. No leakage or damage.	
Lift #2: PASS	Lift #6: PASS		
Lift #3: PASS	Lift #7: PASS		
Lift #4: PASS	Lift #8: PASS		

LEAKPROOFNESS TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty	<ul style="list-style-type: none"> 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. <p>(§178.813)</p>
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	20 kPa	
TEST DURATION:	10 Minutes	
AREA OF PRESSURIZATION:	Through Top Closure	
TEST EQUIPMENT:	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	
Pass	The IBC met the criteria for passing the test. No leakage.	

HYDROSTATIC PRESSURE TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> 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)
WATER TEMPERATURE:	21.8°C (71.2°F)	
FILL CAPACITY:	Maximum Capacity	
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	110 kPa	
TEST DURATION:	10 Minutes	
AREA OF PRESSURIZATION:	Through Top Closure	
TEST EQUIPMENT:	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	
Pass	The IBC met the criteria for passing the test. No leakage.	

DROP TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.968 SG)	<ul style="list-style-type: none"> 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. The IBC shall be capable of being lifted by an appropriate means until clear of the floor for five minutes. A slight discharge from closures upon impact is not considered a failure provided that no further leakage occurs. (§178.810)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Chamber #202	
TEST CONTENTS TEMP.:	-18.1°C (-0.6°F)	
DROP HEIGHT:	1.9 Meters (75.0") (Refer to Section IV)	
DROP ORIENTATION:	Most Vulnerable Part of Base	
TEST EQUIPMENT:	Quick Release Hook Mechanism 5 Ton Overhead Hoist	

DROP TEST SET-UP AND RESULTS (SAMPLE #2)

Set-Up Photo	Post Drop Photo	Post Drop Photo
		
Results	Comments/Observations	
Pass	The IBC met the criteria for passing the test. Minor vertical crack on the front corner of the outer shell upon impact. No leakage.	

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR ^①	UN ^②	IMDG ^③
	October 2019 Edition	20 th Edition	2018 Edition
Vibration:	178.819	6.5.6.13	---
Bottom Lift:	178.811	6.5.6.4	6.5.6.4
Leakproofness:	178.813	6.5.6.7	6.5.6.7
Hydrostatic Pressure:	178.814	6.5.6.8	6.5.6.8
Drop:	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

Vibration:	ASTM ^④ D7387:	Standard Test Method for Vibration Testing of IBCs Used for Shipping Liquid Hazardous Materials (Dangerous Good)
	ISO ^⑤ 2247:	Packaging – Complete, Filled Transport Packages – Vibration Test at Fixed Low Frequency
Pressure:	ASTM ^④ D8134:	Standard Guide for Conducting Internal Hydrostatic Pressure Tests on United Nations (UN) IBC Design Types
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

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)- Sample 1:	96.0 Kg		
Overall IBC Tare Weight (IBCTW)- Sample 2:	96.0 Kg		
Overflow Capacity (OFC):			
Methanol/Water	985.0 Kg		
Water	1,034.0 Kg		
Actual Load Applied for Bottom Lift (BLALA):	3,500.0 Lbs.	Min Wt To Be Applied	
Packing Group	II	3,124.3	Lbs. (Btm Lift)
Product Specific Gravity (PSG):	1.9		
Packing Group Multiplication Factor (MF):	1.00		
# of IBC Stacked During Transportation (#IBC):	0		

98% OF OVERFLOW

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>			
1,034.0	x	98% =	1,013.4 Kg	Water	Sample #1
985.0	x	98% =	965.3 Kg	Methanol/Water	Sample #2

IBC TEST WEIGHT (IBCW)

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

<u>IBCTW</u>	+	<u>98% OFC =</u>			
96.0	+	1,013.4	1,109.4 Kg	2,445.7 Lbs. Water	Sample #1
96.0	+	965.3	1,061.3 Kg	2,339.7 Lbs. Methanol/Wate	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>	
96.0	+	1.9	x	1,013.4	
		2,021.4 Kg		4,456.3 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>AIBCGM</u>	x	<u>1.25</u>	=	<u>Minimum Required Load</u>		
2,021.4	x	1.25	=	2,526.9 Kg	5,570.7	Lbs.

Combined Gross Mass Lifted

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

<u>IBCW</u>	+	<u>ALA</u>	=	<u>Total Load Lifted</u>		
1,109.4	+	1,587.6	=	2,697.0 Kg	5,945.8	Lbs.

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