

# ANAMA Package & Container Testing Services, Inc.

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Project #0474

Certification #+CM0083

Date of Report: 6/19/2014

Periodic Retest Date: 6/19/2016

## DEPARTMENT OF TRANSPORTATION PERFORMANCE ORIENTED PACKAGE TESTING CERTIFICATION

**This package is certified for shipment by air.**

### Testing Performed by:

ANAMA Package & Container Testing Services, Inc. (+CM)

Approval CA2013040016

607 Fayette Avenue

Mamaroneck, NY 10543

(914) 899-3300

### Testing Performed for:

Bell Container Corporation

615 Ferry Street

Newark, NJ 07105

Ms. Elizabeth Willis

(973) 344-4400

[ekwillis@BellContainer.com](mailto:ekwillis@BellContainer.com)

4G Design Qualification Testing

**350# DW Fiberboard Box 4-9 Pint Natural HDPE Round Beta Bottles with 38/439 Acid Screw Caps**

**Box Part #J507089**

Variation 1 (PurePak Configuration A): Box taped on top and bottom

Variation 2 (PurePak Configuration B): Box taped on top, hot melt glued on bottom



**4G / Y 32.3 / S / \*\***

**USA / +CM0083**

\*\* insert year the packaging is manufactured

Anton Cotaj, Certification Officer

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## SECTION 1 - CERTIFICATION

4G Design Qualification Testing of the Bell Container Corporation, Newark, NJ  
350# DW Fiberboard Box 4-9 Pint Natural HDPE Round Beta Bottles with 38/439 Acid Screw Caps  
Box Part #J507089

### Requesting Party:

Bell Container Corporation  
615 Ferry Street  
Newark, NJ 07105  
Ms. Elizabeth Willis

Tel: (973) 344-4400

Email: ekwillis@BellContainer.com

ANAMA Packaging & Container Testing Services, Inc. is a current DOT UN Third-Party Certification Agency under §107.403 and certifies that the Bell Container Corporation, Newark, NJ packaging prepared as for transport, referenced above and tested in June 2014 has passed the Standards of the US Department of Transportation, Title 49CFR, Performance Oriented Packaging Standards; Section 178. This package is also certified under IMDG, ICAO/IATA Regulations and UN Recommendations of the Committee of Experts on the Transportation of Dangerous Goods. It is the responsibility of the shipper / end user to ensure appropriate use.

The use of other packaging methods or components other than those documented in this report may render this report invalid.

### SUMMARY OF PERFORMANCE TESTS

Test	Specification	Test Level	Time	Results
Drop	49 CFR 178.603	1.9 m	N/A	Pass
Stacking	49 CFR 178.606	261 kg	24 Hours	Pass
Internal Pressure	49 CFR 173.27	100 kPa	30 Minutes	Pass
Cobb	49 CFR 178.516	145.0 gr/m <sup>2</sup>	30 Minutes	Pass
Vibration	49 CFR 178.608	235 CPM	60 Minutes	Pass

Test Report #0083

UN Marking (49 CFR 178.503)



4G / Y 32.3 / S / \*\*  
USA / +CM0083

Package Identification Code	4G - Fibreboard Box (49 CFR 178.516)
Performance Standard	Y - Packaging meets Packing Group II and III Tests
Authorized Gross Mass	32.3 kg (71.06 lbs)
"S" Designation	Denotes Inner Packaging
Year of Manufacture	** Insert year the packaging is manufactured
Country Authorizing The Mark	USA
DOT UN Third-Party Certification Agency	(+CM) ANAMA Package & Container Testing Services, Inc. Approval CA2013040016
Third Party Packaging Identification Number	+CM0083

  
Anton Cotaj, Certification Officer

## SECTION 2 - Description of The Tested Package

Four (4) 9 Pint liquid filled round natural HDPE bottles with oval handles, white PP screw caps with foamed plastic liners inner packagings inserted 2 X 2 into regular slotted fibreboard box (International Box Code 0201) outer packaging.

Variation 1 (PurePak Configuration A): Box was taped on top and bottom

Variation 2 (PurePak Configuration B): Box was taped on top and hot melt glued on bottom

The use of other packaging methods or components may render this report invalid.

### INNER PACKAGING – 4 Required (Reference Section 8 for drawings)

Type	<b>Beta Bottle</b>	
Style/Description	Narrow-mouth round bottle with 38-439 buttress thread neck finish	
Manufacturer	PurePak Technology Corporation, Chandler, AZ	
Drawing #	M4851	
PurePak Part #	504666	
Material of Construction	Equistar a Lyondell Chemical Company , LP, Houston, TX; HDPE Petrothene LR7340, 0.953 g/cc density	
Resin Color	Natural	
Method of Construction	Extrusion blow molded	
Minimum Thickness	Body: 0.67 mm	Bottom: 1.14 mm
Nominal Thickness	Body: 1.20 mm	Bottom: 1.95 mm
Dimension (mm, OD), D X H	159.6 x 323.1	
Neck Finish	G.C.M.I. 38-439	
Thread Type	SPI 38MM - 439CT	
Thread Pitch	6 TPI	
Neck Opening (mm, OD)	37.3	
Neck Opening (mm, ID)	29.1	
Neck Height (mm)	60.2	
Thread Height (mm)	16.9	
Overflow Capacity	4258 mL	
Nominal Capacity	4172 mL	
Tare Weight	222.4 grams (with handle); 192.3 grams (without handle)	
Handle	Injection molded natural HDPE oval handle fits (pressed on) on bottle neck; 28.5 grams, 119.9 x 101.6 x 38.7 (mm, OD)	
Print/Label	M 4851; C 050314	
Gross Weight (as tested)	4.71 kg each	
Net Weight	9 Pint	
Test Material	Water/Antifreeze Solution, SG = 1.06	

**INNER PACKAGING CLOSURES – 4 Required (Reference Section 8 for drawings)**

Type	<b>38MM Screw cap</b>
Description	Serrated rib, deep skirt buttress screw cap
Style	38/439 A Stock Acid Closure
Manufacturer	Rexam Plastic Packaging, Brookville, PA
Part #	MJ-410-1A
PurePak Part #	20038485
Drawing #	QIM-317-4937
Material of Construction	PP, Flint Hills Resources, 118 Huntsman Way, Longview, TX 75602; Polypropylene Homopolymer Flint Hills P4G3T-150X, .9 g/cc density
Resin Color	White
Method of Construction	Injection molded
Thread Type	SPI 38MM – 439 CT
Thread Pith	6 TPI
Dimension (mm, OD), D X H	43.2 x 25.6
Dimension (mm, ID), D X H	35.5 x 22.6
Tare Weight	10.1 grams
Application Torque	58 kg-cm (50 lbs-inch)
Method of Closure	Torque Wrench with 38MM Adapter, CDI, Model No. 301LDIN

**INNER PACKAGING CLOSURE LINER – 1 Required (Reference Section 8 for drawings)**

Type	Foamed liner
Liner Type	Three-ply co-extruded material; foamed virgin LDPE core between two solid layers of HDPE, 0.003"solid HDPE, 0.049" foamed LDPE and 0.003"solid LDPE for an aggregate thickness of 0.055"
Liner Manufacturer	Tri-Seal International, Inc., Blauvelt, NY
Part #	F-439
Dimension/Diameter (mm)	35.3
Thickness (mm)	1.51
Tare Weight	0.6 grams

Overall Inner Package Tare Weight (IPTW)	$4 \times (222.4 + 10.1 + 0.6) = 4 \times 233.1 = 932.4 \text{ grams (0.932 kg)}$
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**OUTER PACKAGING - UN 4G (Reference Section 8 for drawings)**

Type	<b>Fiberboard Box</b>	
Style	Regular Slotted Container (RSC), FEDCO Style: 0201	
Manufacturer	Bell Container Corporation, Newark, NJ	
Part #	J507089	
Bell Sample #	22773	
Material of Construction	MW/Kraft Vertical Corrugated	
Dimension (mm, OD), L X W X H	340 x 338 x 360 (13-3/8" x 13-3/8" x 14-3/16")	
Dimension (mm, ID), L X W X H	324 x 324 x 330 (12-3/4" x 12-3/4" x 13")	
Stacking Height (mm)	360 (14.1875")	
Number of Walls - Flute Type	Double-Wall BC-Flute	
Tare Weight	860 grams (1.89 lbs)	
BMC (Box Marked Certification)	350# (42-23-42-23-42)	
Tested Basis Weight (lbs/1000ft²)	43.4 – 23.1 – 43.1 – 23.5 – 42.2	
Combined Weight (lbs/1000ft²)	128.8	
Tested Burst Strength (lbs/inch²)	264.5	
Tested Caliper	7.01 mm (0.275")	
Method of Joining Panels	Inside Glued MFJ	
Mfr's Joint Flap Size	38 mm (1-1/2")	
Mfr's Joint Location	5-2 corner as per the ASTM diagram	
Top Flap Gap/Meet	Inner: 38 mm (1-1/2") gap	Outer: Meet
Bottom Flap Gap/Meet	Inner: 38 mm (1-1/2") gap	Outer: Meet
Print	UN 4G/Y32.3/14/12/USA/+BP1082	

**Box Closure Method – (Refer to Section 7 for Closing Instruction)**

**Variation 1 (PurePak Configuration B)**

Closure Part #	3M Scotch Brand 375
Description	50 mm (2") wide, 0.078 mm (3.1 Mil) thick clear pressure sensitive plastic tape
Tape Manufacturer	3M, St. Paul, MN
Top Closure	One (1) 1.7 grams, 457 mm (18") long piece along the center seam with 51 mm (2") extension over each side
Bottom Closure	One (1) 1.7 grams, 457 mm (18") long piece along the center seam with 100 mm (4") extension over each side
Method of Closure	3M Brand Tape Dispenser

**Variation 2 (PurePak Configuration A)**

Closure Part #'s	3M Scotch Brand 375 (tape) & PHC-9200 Hot Melt Adhesive
Tape Description	50 mm (2") wide, 0.078 mm (3.1 Mil) thick clear pressure sensitive plastic tape
Glue Description	Hot Melt Adhesive
Tape Manufacturer	3M, St. Paul, MN
Glue Manufacturer	H.B. Fuller, Edison, NJ
Top Closure	One (1) 1.7 grams, 457 mm (18") long piece along the center seam with 51 mm (2") extension over each side
Bottom Closure	Four (4) 152.4 mm (6") long, 6.35 mm (1/4") wide strips on each quarter inside flap panel
Method of Closure	Boxes were submitted pre-glued

Overall Outer Package Tare Weight (OPTW)	$860 + (2 \times 1.7) = 863.4$ grams (0.863 kg)
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### SECTION 3 - Test Description and Test Results

#### Drop Test – 49 CFR 178.603

Test Specimen/Contents Characteristics	
Number of Packages Tested	10 total (5 per each variation)
Product Specific Gravity	1.9
Packing Group Number	PG II
State	Liquid
Dummy Load (Liquid)	Water/Antifreeze Mixture, SG = 1.06
Drop Height Multiplier	0.67 for PG III; 1 for PG II & 1.5 for PG I
Drop Height	1.9 m rounded up (1.9 x 1.0 = 1.9 m)
Conditioning Temperature & Duration, 49 CFR178.603(c)	24 Hours @ 73 °F & 50 % R.H.
Content (Dummy Load) Test Temperature	73 °F

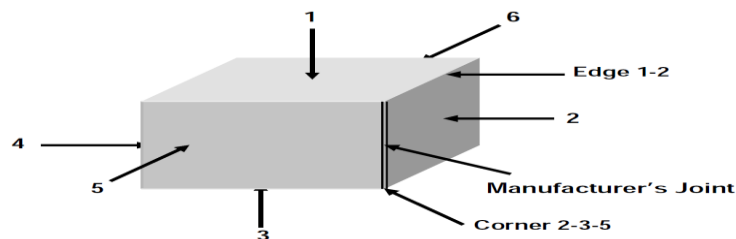
#### Drop Test Method:

The inner packagings were filled to 98% overflow capacity with dummy load.

The packages were assembled as per closing instruction (Reference Section 7).

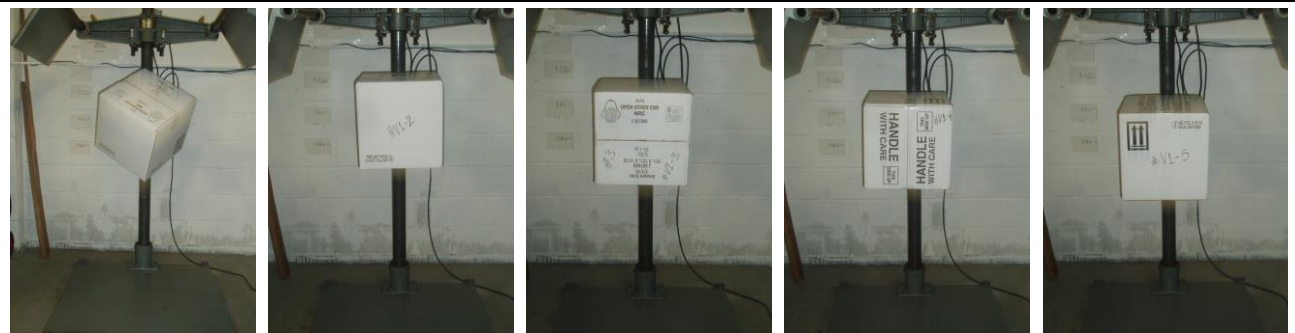
Ten (10) assembled packages, were subjected to a free fall drop test from a height of 1.9 meter onto a solid steel plated concrete floor as described below.

Drops were conducted with 60 seconds of removal of the outer packagings from the conditioning chamber.



#### Drop Test Results (Variation I: Tape Bottom, Tape Top)

Sample #	Test Weight (kg)	Orientation	Results
V1-1	19.80	Top (mfr's) corner (Corner 1-2-5)	Box outside impact corner was slightly crushed around, approximately 4" in diameter, however box was still in-tact and capable and safe for further handling. There was no leakage of the filling substance
V1-2	19.86	Top surface (Face 1)	There was no visible damage to the outer packaging, there was no leakage of the filling substance
V1-3	19.74	Long side (Face 2)	There was no visible damage to the outer packaging, there was no leakage of the filling substance
V1-4	19.71	Short side (Face 6)	There was no visible damage to the outer packaging, there was no leakage of the filling substance
V1-5	19.82	Bottom surface (Face 3)	There was no visible damage to the outer packaging, there was no leakage of the filling substance



V1 – Denotes Variation 1 (PurePak Configuration B)



**Drop Test Results (Variation I: Tape Bottom, Tape Top)**

Sample #	Test Weight (kg)	Orientation	Results
V2-1	19.85	Top (mfr's) corner (Corner 1-2-5)	Box outside impact corner was slightly crushed around, approximately 4" in diameter, however box was still in-tact and capable and safe for further handling. There was no leakage of the filling substance
V2-2	19.74	Top surface (Face 1)	There was no visible damage to the outer packaging, there was no leakage of the filling substance
V2-3	19.86	Long side (Face 2)	There was no visible damage to the outer packaging, there was no leakage of the filling substance
V2-4	19.73	Short side (Face 6)	There was no visible damage to the outer packaging, there was no leakage of the filling substance
V2-5	19.85	Bottom surface (Face 3)	There was no visible damage to the outer packaging, there was no leakage of the filling substance



V2 – Denotes Variation 1 (PurePak Configuration A)

**Pass/Fail Criteria -**

A package is considered to successfully pass the drop tests if for each sample tested:

- For packaging containing liquid, there is no leakage of the filling substance from the inner packaging.
- There is 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.
- Any discharge from a closure is slight and ceases immediately after impact or pressure equalization with no further leakage.
- No rupture is permitted in packagings for materials in Class 1 which would permit spillage of loose explosive substances or articles from the outer packaging.

**Stacking Test - 49 CFR 178.606 (See Section 5.2 for Calculation)**

Test Specimen/Contents Characteristics	
Number of Packages Tested	6 (3 per variation)
Product State	Liquid
Dummy Load (Liquid)	Water
Conditioning of Outer Packaging - 49 CFR 178.602(d)	24 Hours @ 73 °F & 50 % R.H.
Test Temperature	73 °F & 50 % R.H.
Test Method	Free standing, static (dead weight) test
Test Duration	24 hours
Minimum calculated stacking test weight	258.4 kg (568.4 lbs) per package
Actual stacking test weight	261.0 kg (575 lbs) per package
Test Duration	24 hours



**Stacking Test Method:**

The inner packagings were filled to 98% overflow capacity with dummy load.

The packages were assembled as per closing instruction (Reference Section 7).

Stacking test load (dead weight) of 261.0 kg was applied individually to the top of the three (3) assembled packages of each box variation using wood load spreaders and the weight was maintained for 24 hours.

**Stacking Test Results**

Test Sample #	Test Weight (kg)	Duration	Stacking Test	Results
V1-6	261	24 Hours		Boxes did not show any signs of deterioration or distortion, there was no leakage of the filling substance
V1-7	261	24 Hours		
V1-8	261	24 Hours		
V2-6	261	24 Hours		
V2-7	261	24 Hours		
V2-8	261	24 Hours		

V1 – Denotes Variation 1 (PurePak Configuration B)

V2 – Denotes Variation 2 (PurePak Configuration A)

**Pass/Fail Criteria -**

A package is considered to successfully pass the stack tests if for each sample tested:

- No test sample shows any deterioration or distortion that could adversely affect safety during transport causing instability in stacks of packages, or cause damage to inner packagings that is likely to reduce safety in transport.
- There no leakage of the filling substance from the inner receptacle, or inner packaging




**Internal (Hydraulic) Pressure Test - 49 CFR 178.605**

Test Specimen/Contents Characteristics	
Number of Inner Packages (IP) Tested	3
Product State	Liquid
Fill Capacity	Maximum
Closure Application	Refer to Section 7
Conditioning	Ambient
Test Pressure	100 kPa
Test Duration	30 minutes
Area of Pressurization	Through the bottom
Test Equipment	Regulated water source, Winters Pressure Gauge, WG2-6
Test Method	ASTM D7660-10

**Pressure (Hydraulic) Test Method:**

City Line Pressure was used to apply a gauge pressure of 100 kPa through individual leakproof fittings on three (3) closed bottles. This pressure was maintained for thirty (30) minutes.

**Pressure (Hydraulic) Test Results**

Test Sample #	Test Level (kPa)	Duration	Hydraulic Pressure Test	Results
IP-1	100	30 Minutes		Bottles maintained the 100 kPa test pressure for 30 minutes without leakage.
IP-2	100	30 Minutes		
IP-3	100	30 Minutes		

IP - Denotes Inner Packaging

**Pass/Fail Criteria**

A package is considered to successfully pass the internal pressure (hydrostatic) tests if for each sample tested:

- Packaging must be capable of withstanding the pressure requirements without leakage

### **Vibration Test - 49 CFR 178.608**

<b>Test Specimen/Contents Characteristics</b>	
Number of Packages Tested	6 (3 Simultaneously per variation) same samples used for stacking test
Product State	Liquid
Dummy Load (Liquid)	Water
Conditioning of Outer Packaging - 49 CFR 178.602(d)	24 Hours @ 73 °F & 50 % R.H.
Test Temperature	Ambient
Test Method	ASTM D999-08 Rotary Motion Vibration
Test Duration	60 minutes
Test Frequency	235 CPM



#### **Vibration Test Method:**

The inner packagings were filled to 98% overflow capacity with dummy load.

The packages were re-assembled as per closing instruction (Reference Section 7).

Three (3) assembled packages of each variation were simultaneously placed on a rotary vibration table platform having 25.4 mm peak-to-peak displacement and vibrated in normal shipping orientation for one (1) hour at 235 CPM such that a 1.6 mm thickness could be passed between the bottom of the samples and the platform. Immediately thereafter, the packages were removed from the platform and turned on its side for examination.

#### **Vibration Test Results**

Test Sample #	Frequency	Duration	Vibration Test	Results
V1-6	235 CPM	60 Minutes		Boxes did not show any signs of deterioration or distortion, there was no leakage of the filling substance
V1-7	235 CPM	60 Minutes		
V1-8	235 CPM	60 Minutes		
V2-6	235 CPM	60 Minutes		
V2-7	235 CPM	60 Minutes		
V2-8	235 CPM	60 Minutes		

V1 – Denotes Variation 1 (PurePak Configuration B)

V2 – Denotes Variation 2 (PurePak Configuration A)

#### **Pass/Fail Criteria -**

A package is considered to successfully pass the vibration test, if for each sample tested after it was immediately removed from table platform and turned on its side:

- There is no leakage or rupture from any of the packaging.
- No test sample shows any deterioration which could adversely affect safety or container strength, during transport liable to reduce packaging strength.

**Cobb (Water Absorption) Test - 49 CFR 178.516 [ISO International Standard 535-1976 (E)]**

Test Specimen/Contents Characteristics	
Number of Samples Tested	5
Test Duration	30 Minutes
Test Intensity	100 mL Distilled Water
Conditioning of Test Samples	24 Hours @ 73 °F & 50 % R.H.
Test Method	ISO 535, Cobb Method

***Cobb Test Results***

Sample #	#1	#2	#3	#4	#5	Average	Results
grams/m <sup>2</sup>	145.3	141.1	140.2	147.3	151.5	145.0	Pass

***Pass/Fail Criteria***

An increase in mass of greater than 155 grams/m<sup>2</sup> over the 30 minute duration of the tests represents an unacceptable level of water absorption.

**SECTION 4 - Shippers Responsibility**

- The assembled combination package is authorized for air transport of hazardous material. Reference US DOT 49 CFR Section 173.27 for additional general requirements for air transport.
- It is the responsibility of the end shipper to determine authorization for use under these regulations.
- It is the shippers responsibility to determine if the packaging is compatible for products to be shipped.
- Use of the marking of this certification for any variations without further testing as allowed under US DOT 49 CFR Section 178.601 will be at complete responsibility of the shipper. By continuing to place the UN Markings on Packagings, the packaging manufacturer or shipper is certifying that each packaging is constructed in the same manner as the originally tested and certified packaging, and that each packaging is capable of withstanding the prescribed performance tests.
- According to 49 CFR Section 178.601 (1) Variation 1 - variations are permitted in inner packaging of a tested combination packaging without further testing of the package, provided an equivalent level of performance is maintained as described in 178.601 (1) Variation 4 (i),(A),(B),(C),(D),(E) and (F) and (ii).
- According to US DOT 49 CFR Section 178.601 (e), the packaging manufacturer shall achieve successful test results for the periodic retesting at intervals established by the manufacturer of sufficient frequency to ensure that each packaging produced by manufacturer is capable of passing the design qualification test. Changes in retest frequency are subject to the approval of the Associate Administrator for Hazardous Materials Safety. For combination packaging, the periodic retest must be conducted at least once every 24 months.

## SECTION 5 - Calculations

### 5.1 Certified Package Gross Mass Calculations Based on Test Level

Overall Inner Package Tare Weight (IPTW)	932.4 grams (0.932 kg)
Overall Outer Package Tare Weight (OPTW)	863.4 grams (0.863 kg)
Overall Package Tare Weight (PTW)	$IPTW + OPTW = 0.932 + 0.863 = 1.795 \text{ kg (3.95 lbs)}$
Overflow Capacity (OFC)	Weight of Liquid
Water/Antifreeze Mixture	4513 grams
Water	4258 grams
Nominal Capacity (NC) = OFC X 98%	Weight of Liquid
Water/Antifreeze Mixture	4423 grams
Water	4172 grams
Test Material Specific Gravity (TMSG)	OFC with Water Antifreeze Mixture / OFC with Water SG TMSG = 1.06
Number of Inner Packaging (NIP)	4
Packing Group Number	II
Product Specific Gravity (PSG)	1.9
Minimum Package Weight as Tested (PGW)	19.71 kg (43.36 lbs)
Packing Group Multiplication Factor (PMF)	1.0

Formula for Calculating Certified Gross Mass (CGW)	<b><math>CGW = PTW + (NIP \times NC \times PSG)</math></b>
	$CGW = 1.79 + (4 \times 4.172 \times 1.9) = 33.51 \text{ kg}$ <b><math>CGW = 32.3 \text{ kg (71.06 lbs)}</math></b> <b>(to match the previous marking)</b>
Certified Package Marking	<b><math>Y = 32.3 \text{ (71.06 lbs)}</math></b>

### 5.2 Stacking Strength Test Calculations

Test Load (TL)	$TL = [(SH - PH) - 1] \times CGW \text{ (static)}$
	$TL = [(SH - PH) - 1] \times CGW \times 1.5 \text{ (dynamic)}$
Overall Stacking Height of Packages (PH)	3000 mm (10 feet)
Overall Stacking Height of Package (SH)	360 mm (14.1875")
TL (Static)	$TL = [(3000/360) - 1] \times 32.3 = 8 \text{ (rounded up)} \times 32.3$ <b><math>TL = 258.4 \text{ kg (568.4 lbs)}</math></b> Rounded up to 261 kg (575 lbs) per package for test purposes

<b>Appendix A – Regulatory &amp; Industry Standard References</b>
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**Regulatory Standard References:**

Test	1.	2.	3.	4.	5.
	49 CFR	UN Regulation	IMDG	ICAO	IATA
Drop Test	178.603	6.1.5.3	6.1.5.3	6.4.3	6.3.3
Stacking Test	178.606	6.1.5.6	6.1.5.6	6.4.6	6.3.6
Hydrostatic Pressure	173.27(c)	4.1.1.4	4.1.1.4	4.1.1.6	5.0.2.9
Cobb Test	178.516	6.1.4.12.1		6.3.11.1	6.2.12.2
Vibration Test	178.608	-	-	4.1.1.1	5.0.2.7

1. United States Code of Federal Regulations (CFR), Title 49, Transportation, Parts 100-199
2. The United Nations Recommendations on The Transport of Dangerous Goods – Model Regulations (Orange Book)
3. International Maritime Dangerous Goods Code (IMDG)
4. Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO)
5. International Air Transport Association (IATA), Dangerous Goods Regulations

**Industry Standard References:**

Drop Test	ASTM D5276	Standard Test Method for Drop Test of Loaded Containers by Free Fall
Stacking Test	ASTM D4577	Standard Test Method for Compression Resistance of a Container Under Constant Load
Hydrostatic Pressure	ASTM D7660	Standard Guide for Conducting Internal Pressure Tests on United Nations (UN) Packagings
Cobb Test	ISO 535	Paper and Board – Determination of Water Absorption – Cobb Method
Vibration Test	ASTM D999	Standard Test Method for Vibration Testing of Shipping Containers

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

**Appendix B – Test Equipment & Instrumentation**

No.	Test Machine, Model # and Serial #	Capacity	Calibration Date	Re-Calibration Date
1	Drop Table, Gaynes Eng. Inc., Serial #G-13673-2	1-10 Feet	1/26/2014	1/26/2015
2	Vibration Table, Gaynes Eng. Inc. Model #6000V	3000 lbs	1/26/2014	1/26/2015
3.	Mannix, Digital Thermometer, Model No. DT721 (for Conditioning Freezer),	-148° to 2372° F	8/28/13	8/28/14
4.	Dickson, Paperless Temperature & Humidity Recorder Model: TH660 (for Cold Chamber)	-148° to 350° F	9/4/13	9/4/14
5.	Dickson, Paperless Temperature & Humidity Recorder Model: TH635 (for Hot Chamber)	-140° to 185° F, 0% to 95% RH	9/4/13	9/4/14
6.	Omega Engineering, Thermometer & Hygrometer, Model: RH520 (for Conditioning Room)	-20° to 140° F, 10% to 95% RH	9/4/13	9/4/14
7.	Ohaus Top Loading Balances, Model SoutPro	0-400 g	8/14/2013	8/14/2014
8.	Sortorius Analytical Balances	0-150 g	8/14/2013	8/14/2014
9.	Ohaus Bench Scale, Serial #5040335-5XZ	0-200 lb	8/14/2013	8/14/2014
10.	Salter-Bricknell Floor Scale; S/N: 141012403	0-2000 lbs	8/14/2013	8/14/2014
11.	Fowler Caliper, Model #53-679-080, S/N: 81PCS-13376	0 - 12"	8/26/2013	8/26/2014
12.	Torque-Meter, Tokyo, Johnichi, Japan, Model 2-OT #0441W	0-52 inch-pounds	8/14/2013	8/14/2014
13.	Toque Wrench, CDI, Model No. 301LDIN	0-30 inch-ponds	6/19/2013	6/19/2014
14.	Winters Pressure Gauge, WG2-6	0 - 60 psi	8/9/2013	8/9/2014
15.	Winters Negative Pressure Gauge	-30 to 15 psi	8/9/2013	8/9/2014
16.	The Mullen Tester, B.F Perkins and Son, Serial #769730	0 to 800 psi	6/14/2013	6/14/2014
17.	The Mullen Tester, B.F Perkins and Son, Serial #186696	0 to 300 psi	6/14/2013	6/14/2014
18.	ECT Testing Machine, Testing Machines, Inc., S/N 5852X	0 to 120 lbs	8/14/2013	8/14/2014
19.	ECT Testing Machine, Testing Machines, Inc., ANAMA ECT-1	0 to 120 lbs	8/14/2013	8/14/2014
20.	Measuring Tape, Ultra-Touch, ANAMA TM1 & TM2	0 to 25 Feet	8/14/2013	8/14/2014



## SECTION 6 – Inner & Outer Packaging Photographs

### Inner Packaging:



### Outer Packaging:



## SECTION 7 - Packaging Assembly (Closing) Instruction

### Closure Method:

Glue: H.B. Fuller Hot Melt Adhesive, PHC-9200

Tape: 3M, Scotch Brand 375, 2" wide, 3.1 Mil thickness, clear plastic adhesive tape

### Variation I (PurePak Configuration B):

- Top & Bottom box flaps were sealed with 2" wide, 3.1 Mil thick, clear plastic adhesive tape, one (1) 21" long strip along the flap seam with at least 4" extension over each side.
- Box flaps oriented in the same direction as the bottom.

### Variation II (PurePak Configuration A):

- Box bottom flaps were sealed with H.B. Fuller Hot Melt Adhesive (PHC-9200), four (4) 152.4 mm (6") long, 6.35 mm (1/4") wide strips on each quarter inside flap panel
  - Top box flaps were sealed with 51 mm (2") wide, 0.08 mm (3.1 Mil) thick, clear plastic adhesive tape, one (1) 457 mm (18") long strip along the flap seam with at least 51 mm (2") extension over each side.
- Box flaps oriented in the same direction as the bottom.

### Both Variations (PurePak Configuration A & B):

- Bottles were filled with liquid product to 98% capacity.
- Caps were closed to 58 kg-cm (50 lbs-inch) application torque.
- Closed bottles were inserted 2 X 2 inside the box with the bottle closure facing upward.




### Variation 1 (PurePak Configuration B):



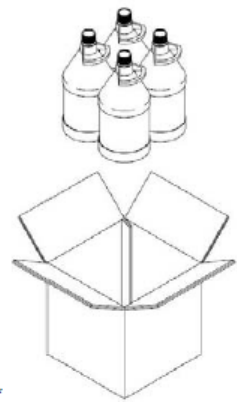


### Variation 2 (PurePak Configuration A):



**Shipper Closing Instructions:**

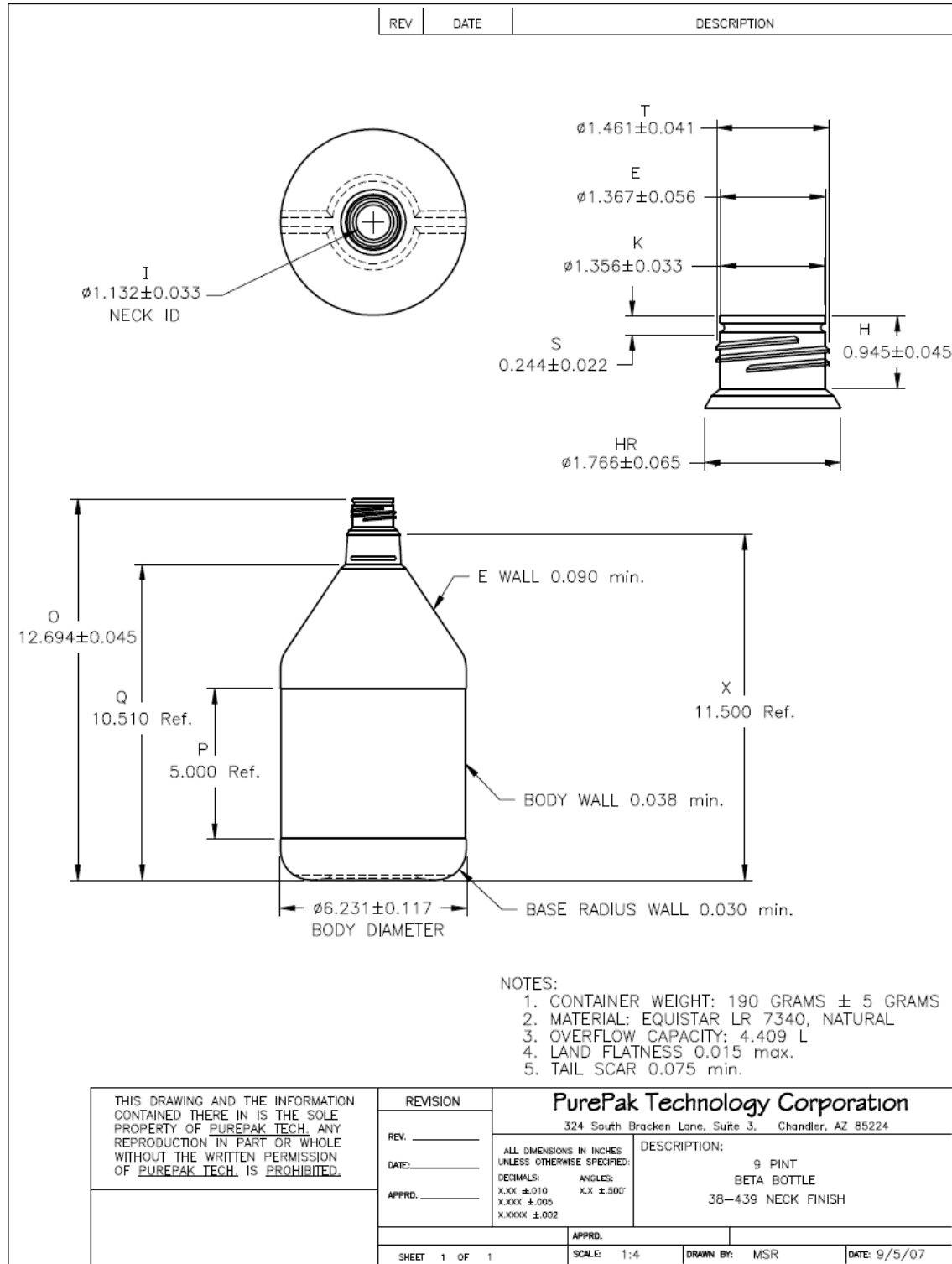
 <b>PurePak Technology Corporation</b>	<b>PACKAGING ASSEMBLY INSTRUCTIONS</b> Beta bottle
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**Package: Beta Bottle      Issue Date: May 16, 2013      Revision: C      UN Cert# +CC7640**

NO. / CASE	LIST OF COMPONENTS	CONFIGURATION	SPEC / PART #
4	Berry 38-439 A Stock Acid Closures with Foam Liner	A & B	20038485
4	9 Pint Beta Bottles with 38-439 Neck Finish and Handle	A & B	504666
(1)	Regular Slotted Corrugated Container, Pre-assembled	A & B	507089
(1) Roll	2" Clear Pressure Sensitive Tape (Scotch 3M Packaging Tape)	A & B	
Adhesive	H.B. Fuller Hot Melt Adhesive PHC-9200	A	
<b>PACKAGING CONFIGURATIONS:</b>		<b>Case Sealing Method</b>	
Configuration A: 4 x 9 Pint Bottles		Top: 2" Clear Pressure Sensitive Tape	
		Bottom: H.B. Fuller Hot Melt Adhesive PHC-9200	
Configuration B: 4 x 9 Pint Bottles		Top: 2" Clear Pressure Sensitive Tape	
		Bottom: 2" Clear Pressure Sensitive Tape	
<b>ASSEMBLY INSTRUCTIONS:</b>		<b>Configuration</b>	
<p>Note: Refer to component list above. Examine all parts for defects. Once you have determined that this packaging is free from defects then follow these instructions for package assembly.</p> <ol style="list-style-type: none"> <li>1. Apply threaded closures to bottles with an application torque of 35 to 50 in-lbs using an appropriate closing tool.</li> <li>2. For Configuration A, place four (4) bottles into a pre-assembled carton with the bottle closures facing upward.</li> <li>3. Tape the top flaps closed with 2" clear pressure sensitive tape. Center the tape over the middle seam formed by the flaps being folded together. The length of the tape should be such that there is a 2" extension on each end.</li> <li>4. For Configuration B, fold in two opposite bottoms flaps of carton. Then fold in the remaining two adjacent bottom flaps making sure that the exposed flaps display the Box Maker's Certificate or the Guarantee Stamp.</li> <li>5. Tape the bottom flaps closed with 2" clear pressure sensitive tape. Center the tape over the middle seam formed by the flaps being folded together. The length of the tape should be such that there is a 2" extension on each end.</li> <li>6. Then place the four (4) bottles in the carton with the bottle closures facing upward.</li> <li>7. Tape the top flaps closed with 2" clear pressure sensitive tape. Center the tape over the middle seam formed by the flaps being folded together. The length of the tape should be such that there is a 2" extension on each end.</li> <li>8. Apply product labels and DOT hazard warning labels as required by work order instructions. Do not cover up any UN markings with labels or tape of any kind.</li> </ol>		<div style="text-align: center;">  </div> <div style="margin-top: 20px;">  <b>4G/X23.2/S/** USA/+CC7640</b> </div> <div style="margin-top: 20px;">  <b>4G/Y33.8/S/** USA/+CC7640</b> </div> <div style="margin-top: 20px;"> <b>** (Year of Manufacture)</b> </div>	

## SECTION 8 - Package Specifications & Drawings

### Bottle Drawing & Specifications



## Bottle Resin



Petrothene®

# LR7340

High Density Polyethylene  
 Sheet Extrusion Grade  
 Melt Index 0.38 Density 0.953

- Applications** The PETROTHENE LR7340 series of polyethylene resins exhibits good stiffness and environmental stress crack resistance. Typical applications include bottles for household chemicals.
- Regulatory Status** The base resin LR7340 meets the requirements of the Food and Drug Administration regulation 21 CFR 177.1520. This regulation allows the use of this olefin polymer in "...articles or components of articles intended for use in contact with food..." Specific limitations or conditions of use may apply. Contact your Equistar sales representative for more information about the use of specific products for specific applications.
- Processing Techniques** Specific recommendations for processing LR7340 can only be made when the processing conditions, equipment and end use are known. For further suggestions, please contact your Equistar sales representative.

Typical Properties	Property	Nominal Value	Units	ASTM Test Method
	Melt Index	0.38	g/10 min	D 1238
	Density	0.953	g/cc	D 1505
	Tensile Strength @ Yield	4,000	psi	D 638
	Elongation @ Break	>500	%	D 638
	Flexural Modulus	176,000	psi	D 790
	Tensile Impact	131	ft-lb/in.	D 1822
	Low Temperature Brittleness, F <sub>50</sub>	<-76	°C	D 746
	Heat Deflection Temperature @ 66 psi	75	°C	D 648
	Vicat Softening Point	127	°C	D 1525
	Hardness, Shore D	67		D 2240
	Environmental Stress Crack Resistance, F <sub>50</sub>	25	hrs	D 1693
		>500	hrs	D 2561

Product	LR734001	LR734011	LR734045
Antistat	None	High	None
Stearate	None	None	High

The information on this document is, to our knowledge, true and accurate. However, since the particular uses and the actual conditions of use of our products are beyond our control, establishing satisfactory performance of our products for the intended application is the customer's sole responsibility. All uses of Equistar products and any written or oral information, suggestions or technical advice from Equistar are without warranty, express or implied, and are not an inducement to use any process or product in conflict with any patent.

Equistar materials are not designed or manufactured for use in implantation in the human body or in contact with internal body fluids or tissues. Equistar makes no representation, promise, express warranty or implied warranty concerning the suitability of these materials for use in implantation in the human body or in contact with internal body tissues or fluids.

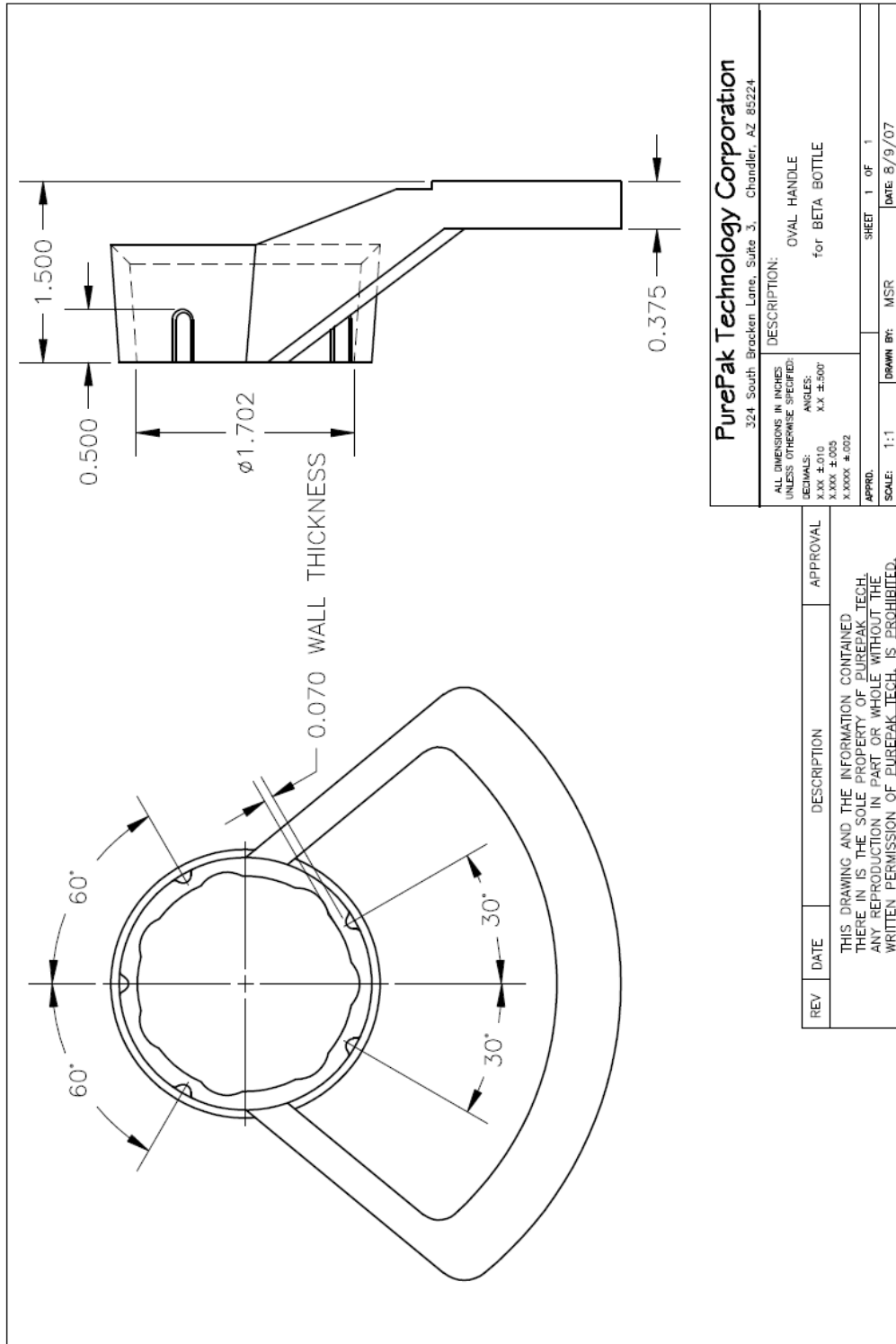
More detailed safety and disposal information on our products is contained in the Material Safety Data Sheet (MSDS). All users of our products are urged to retain and use the MSDS. A MSDS is automatically distributed upon purchase/order execution. You may request an advance or replacement copy by calling our MSDS Hotline at 800.700.0946.

\* Petrothene is a registered trademark of Equistar Chemicals, LP.



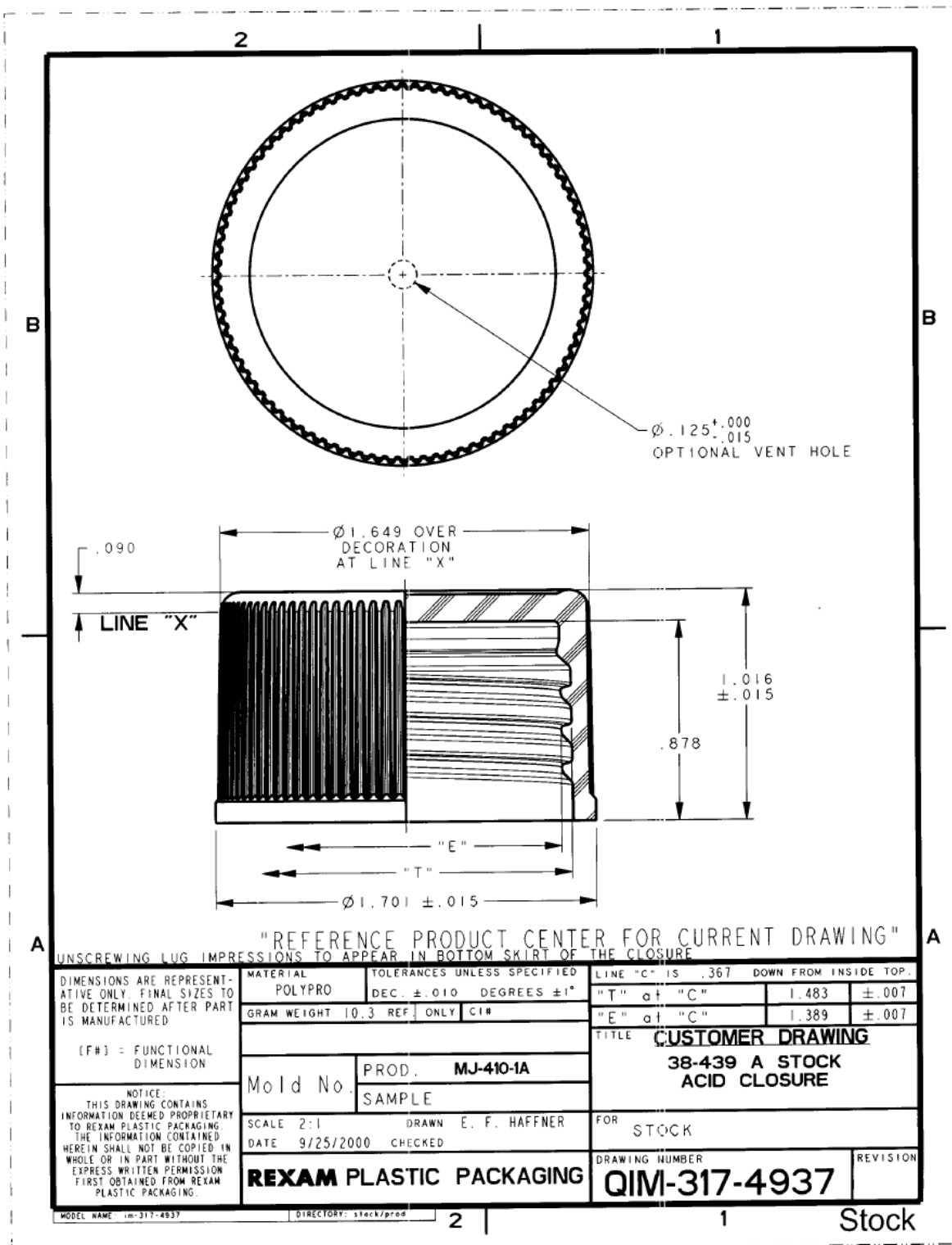
Lyondell Chemical Company  
 1221 McKinney, Suite 700  
 P.O. Box 2583  
 Houston, Texas 77252-2583  
 800.615.8999  
<http://www.equistarchem.com>

Bottle Handle Drawing & Specifications





Cap Drawing & Specifications



38MM Cap Resin



**P4G3T-150X**

**DESCRIPTION:** Homopolymer

**FEATURES:** Anti-static. Product does not contain animal derived components. Phthalate-free.

**APPLICATIONS:** Injection Molding: General Purpose

PROPERTY	NOMINAL VALUE	SI UNIT	NOMINAL VALUE	ENGLISH UNIT	ASTM TEST METHOD
Melt Flow Rate	5	g/10 min.			D 1238
Density	0.9	g/cm <sup>3</sup>			D 1505
Tensile Yield Strength Yield Elongation	35 11	MPa %	5100 11	psi %	D 638
Flexural Modulus 1% Secant Tangent	1386 1510	MPa	201 219	kpsi	D 790
Deflection Temperature @ 66 psi (.455 MPa)	95	°C	203	°F	D 648
Rockwell Hardness			98	R	D 785
Notched Izod @ 23°C	35	J/m	0.66	ft-lb/in	D 256
Gardner Impact @ 23°C	3	J	25	in-lb	D 5420

Mar-10



**REGULATORY**

Drug Master File listed

118 Huntsman Way, Longview, TX 75602 · Tel: 903-239-5200 · Fax: 903-234-0174

The data and information represented herein refer to typical values obtained in our laboratories by the methods or apparatuses indicated, and should be so considered. Since processing variables are a major factor in product performance, this information should serve only as a guide. Since customers' testing conditions are outside our control, the reproducibility of our data in a customer's testing facility is not guaranteed. Customer should confirm results under its testing conditions. There is no implied warranty of merchantability or fitness for a particular purpose. Establishing satisfactory performance of the product for the intended application is the customer's sole responsibility. No warranty is given concerning the existence or non-existence of any patents claiming any pertinent subject matter presented herein. The Company assumes no obligation, express or implied, or liability for use of or reliance on the information and data presented.

## Cap Liner Specifications

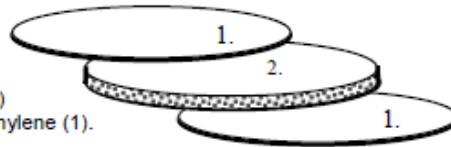


900 Bradley Hill Road, Blauvelt, New York 10913 (845) 353-3300 FAX: (845) 353-3376

### TECHNICAL DATA SHEET

**F- 439**

**Description:** Three -ply co-extruded material;  
 Foamed Virgin Low Density Polyethylene Core (2.)  
 Between Two Solid Layers of High Density Polyethylene (1).



### SPECIFICATIONS

Thickness			Available Web Width		
Minimum In (mm)	Maximum In (mm)	Deviation In (mm)	Minimum In (mm)	Maximum In (mm)	Deviation In (mm)
0.020 (0.51)	0.060 (1.52)	+/-0.005 (0.127)	1.0 (25.4)	25.0 (635.0)	+/-1/16 (1.6)
0.065 (1.65)	0.090 (2.29)	+/-0.007 (0.178)	1.0 (25.4)	9.00 (228.6)	+/-1/16 (1.6)
0.095 (2.41)	0.125 (3.18)	+/-0.010 (0.254)	1.0 (25.4)	9.00 (228.6)	+/-1/16 (1.6)

Density		Deviation		Thickness	
lbs/ft <sup>3</sup>	g/cc	lbs/ft <sup>3</sup>	g/cc	in	mm
36	0.58	+/-2	+/- 0.03	.020"-.030"	0.51-0.76
30	0.48	+/-2	+/-0.03	.030"-0.125"	0.76-3.18

**Code of Federal Regulations Compliance:** Complies to the following CFR's

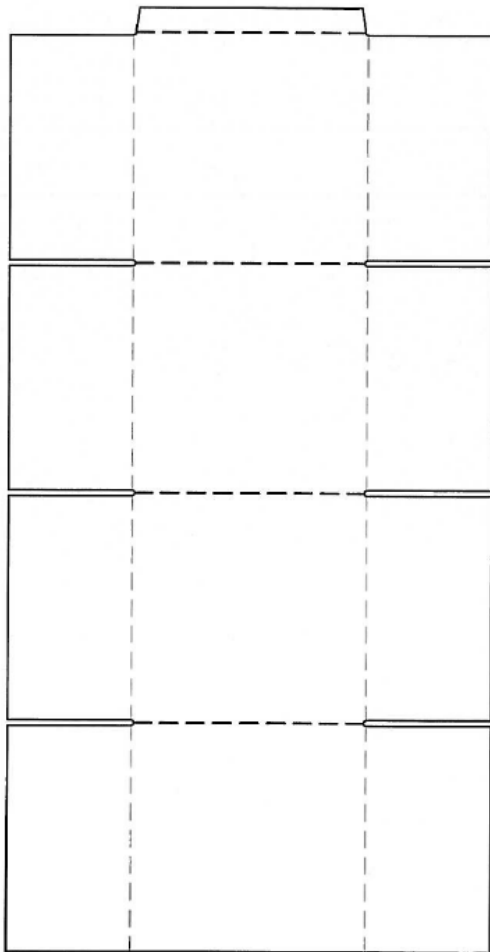
21CFR177.1520 Olefin polymers.  
 21CFR177.1210 Closures with sealing gaskets for food containers.  
 21CFR178.2010 Antioxidants and/or stabilizers for polymers.  
 21CFR175.300 Resinous and polymeric coatings.

Original Date: 08/05/97  
 Revision Date: 04/05/04  
 Revision Number: 3

**FDA Status:** The component materials of F-439 are listed under DMF 2434.

The aforementioned technical information and any recommendation are based on Tri-Seal's Laboratory Findings and are believed to be true and accurate, but we strongly recommend that our customers perform appropriate tests they feel necessary to ensure the compatibility and stability of any given product with ours. Tri-Seal, a Tekni-Plex Co. guarantees to replace any quantity proved to be defective. We will not be held liable for any injury, loss or change, whether direct, incidental or consequential, due to the use of or inability to use the product due to a breach of warranty of any agreement between Tri-Seal and the purchaser. Unless contained in this data sheet or agreed to in writing by the officers of the seller and user no other warranty will be honored.

Box Drawing & Specifications

		<p>12 3/4 W X 12 3/4 D X 13 H</p> <p>INSIDE DIMENSIONS</p>		<p><b>PurePak Technology Corporation</b>          324 South Brockton Lane, Suite 3, Chandler, AZ 85224</p>	
REV	DATE	DESCRIPTION	APPROVAL	DESCRIPTION	<p>4X RESHIPPER CARTON for BETA BOTTLE</p>
<p>THIS DRAWING AND THE INFORMATION CONTAINED          HEREIN IS THE SOLE PROPERTY OF PUREPAK TECH.          ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE          WRITTEN PERMISSION OF PUREPAK TECH. IS PROHIBITED.</p>				<p>ALL DIMENSIONS IN INCHES          UNLESS OTHERWISE SPECIFIED:</p> <p>DECIMALS: X.XX ±.010          ANGLES: X.X ±.500          X.XXX ±.005          X.XXXX ±.002</p>	
<p>APPROD.</p>				<p>SCALE: 1:8</p>	<p>DATE: 8/15/07</p>
<p>DRWN BY: MSR</p>				<p>SHEET 1 OF 1</p>	

Carton Sealing Tape Specifications

# Scotch® Superior Performance Box Sealing Tape 375



**Technical Data**

**April, 2006**

<b>Product Description</b>	Scotch® Box Sealing Tape 375 is a superior performance packaging tape used for box sealing, splicing, recooperage and other demanding packaging applications. This product has the strongest conformable backing and the most consistent pressure sensitive hot melt adhesive system available. This time proven construction assures superior performance in a wide range of environments and applications.
----------------------------	--

Construction	Backing	Adhesive	Colors
	Biaxially oriented 3M™ Scotchpro™ polypropylene film	Pressure sensitive hot melt rubber-resin	Clear and Tan

<b>Typical Physical Properties</b>	<b>Note: The following technical information and data should be considered representative or typical only, and should not be used for specification purposes.</b>
------------------------------------	---

ASTM Test Method		
Adhesion to Steel:	55 oz./in. width (80 N/100 mm width)	D-3330
Tensile Strength:		
Machine Direction:	35 lbs./in. width (613 N/100 mm width)	D-3759
Cross Direction:	70 lbs./in. width (1226 N/100 mm width)	D-3759
Elongation at Break:	180%	D-3759
Thickness - Backing:	2.0 mil (0.051 mm)	D-3652
Total:	3.1 mil (0.079 mm)	D-3652
Holding Power to Fiberboard:	12,000 + minutes	D-3654

- |                 |  |
|-----------------|--|
| <b>Features</b> | <ul style="list-style-type: none"><li>• Pressure sensitive hot melt rubber-resin adhesive.</li><li>• 3M™ Scotchpro™ biaxially oriented polypropylene backing.</li><li>• Meets CID A-A-1684B and ASTM D5486 Type III.</li><li>• Considered water-resistant as per ASTM D5570.</li><li>• Adheres instantly to most surfaces including cartons containing high levels of recycled content.</li><li>• The strongest conformable backing with the highest edge tear and split resistance.</li><li>• Complies with the environmental considerations of ASTM D 1974-92.</li><li>• Superior performance ensures reliable closures.</li></ul> |
|-----------------|--|