U. S. DEPARTMENT OF TRANSPORTATION

Performance Oriented Package Test Report
File # U-4585-09 Date: 02/18/09
(Periodic Testing Required on 02/2011)

SECTION I CERTIFICATION

Tested by:

gh Package & Product Testing
& Consulting of Arizona, Inc.
21609 N. 12th Ave. Suite #300
Phoenix, AZ 85027
623.869.8008

Tested for:

PurePak Technology
324 S. Bracken Lane Suite #: 3
Chandler, AZ 85224
Attn: Michael Dodd
480.926.0022

Design Qualification Test
4G Combination Package for Liquids (4 Schemes)
Inner Packagings: Four 9 Pint Plastic Bottles
Testing Date(s): 01/28/09 - 02/17/09

un **4G/Y32.3/S/****
USA/+BV1289
***year of manufacture*

TRANSPORTATION MODES

This packaging design was successfully tested as required by 49CFR and is suitable for use for shipments of compatible hazardous materials via surface and air (Cargo Aircraft Only) modes of transportation[1]. Use of packaging methods or package components other than those documented in this report may invalidate this certification The shipper is required to insure this packaging design is used in accordance with all requirements of the national & international regulations applicable to the intended commodity and intended mode(s) of transport (49CFR, ICAO/IATA, IMO/IMDG, et. al.).

[1]49CFR (§172.101, §173.24(i) & §173.27(f)) & ICAO/IATA may limit the quantities allowed in inner/outer packagings and/or prohibit shipments of specific commodities via aircraft.

Frank Reyes

Mr. Frank Reyes (*Certifying Official*)
gh Package & Product Testing
and Consulting of Arizona, Inc.

SECTION II PACKAGE DESCRIPTION

The 4G Combination Package Designs were tested specifically for surface and air shipments of four 9 pint bottles containing a compatible PG II, SG1.84, Corrosive Liquid, Class 8 material. Use of these packaging designs for a commodity other than that for which it was tested will be at the discretion of the shipper. The bottles are placed into a fiberboard box. The four schemes (designs) are identical in all respects except for the closure methods used for the exterior containers and the use of bags. Scheme A consists of bottles w/o bags – the top of the outer packaging is taped and the bottom is glued. Scheme B consists of bottles w/o bags – the top and bottom of the outer package are taped. Scheme C consists of bottles with bags – the top of the outer packaging is taped and the bottom is glued. Scheme D consists of bottles with bags – the top and bottom of the outer package are taped. The following tables describe the components of the package design.

Exterior Container – 4G (See section V for drawings)

Box style	RSC, White FEFCO Style: 201	
Manufacturer	Sound Packaging L.L.C. Chandler, AZ	
Specification	BETA	
Material of Construction	Corrugated - White	
Number of walls – flute type	Double wall C/B Flute	
BMC: ECT/Mullen	275 lb Mullen	
Dimension (OD) LxWxH	33 x 33.7 x 33.0 cm (13" x 13" x 14") actual	
Dimension (ID) LxWxH	32.4 x 32.4 x 33.0 cm ($12^{3}/_{4}$" x $12^{3}/_{4}$" x 13") per drawing	
Mass (wt)	2.04 lbs (0.93 kgs)	
Stacking height	14"	
Method of joining panels	Glued MFJ	
Mfr's joint - Flap size	$1^{1}/_{2}$"	
Mfr's joint - Location	5-2 corner (ASTM numbering scheme)	
Top flap gap/meet	Inner: 0	Outer: $^{3}/_{16}$"
Bottom flap gap/meet	Inner: 0	Outer: $^{3}/_{16}$"
Handles:	N/A	
Closure method/material **Scheme A & C**	**Top**: 2" clear poly self-adhesive tape (Scotch 3M) extended 3" beyond the long center seam of the box to the short sides. **Bottom**: SETCO Waterproof thermoset adhesive system. Four 6" ¼" strips on each quarter inside flap panel.	
Closure method/material **Scheme B & D**	**Top & Bottom**: 2" clear poly self-adhesive tape (Scotch 3M) extended 3" beyond the long center seam of the box to the short sides 2 and 4 (ASTM numbering format)	

Material Analysis - Box

Standards: • T.A.P.P.I. Method T- 410; " Grammage of Paper and Paperboard".
• T.A.P.P.I. Method T- 411; " Thickness of Paper and Paperboard".

Box	Basis Weight (lbs/MSF) per Mfg. Letter of 06/12/09	Actual Combined Board Caliper	Actual Mullen
Inside Facing	42.00	Actual: 0.2735"	BMC: 275 p.s.i. Actual: 270 p.s.i. average
Middle Facing	26.00		
Outer Facing	42.00		
Flute: C	26.00		
Flute: B	26.00		

Note: Letter of 06/12/09 is kept as part of the manufacturer submitted data.

Inner Packaging - 4 required for each Scheme (See section V for drawings)

Type, Grade, & style	HDPE 9 Pint round bottle w/attached handle
Manufacturer	PurePak Technology Corp, Chandler, AZ
Material	HDPE Resin – Equistar LR7340
Drawing ID	Title of Drawing: 9 Pint BETA BOTTLE –39-439 FINISH
Method of Construction	Extrusion - blow molding
Thickness – Minimum (Bottom)	Radius: 0.030" Tail Scar: 0.075"
Thickness – Minimum	Body: 0.038" E Wall:0.090"
Average Thickness (Bottom)	0.077"
Average Thickness – (Sides)	0.056"
Neck Finish size	38 - 439
Thread type	SPI 38MM – 439 buttress
Thread style	Buttress
Thread pitch	6 tpi
T's & E's	T: 1.4515" E: 1.3740"
Neck Opening	1.1355"
Dimensions	12.664" x 6.240" dia
Capacity (Nominal)	9 Pint
Capacity (Maximum/Overflow)	1.12 gal. x 4 = 4.48 gal
Mass (total weight)	226g x 4 =904 (1.99 lbs. = 0.90 kgs)
Handle(s) mat'l type, nbr & position	Injection Molded HDPE carry handle attached to the neck by friction fit.
Closure Equipment	Injection Molded deep skirt cap
Closure Methods.	Hand applied and mechanically applied
	Torque wrench and adapter to 45 in/lbs (for testing purposes only. (manufacturer recommends 35 to 50 in/lbs. – product dependent.)

Inner Closure - 4 required for each Scheme - (See section V for drawing)

Type, Grade, & style	White Acid Cap, polypropylene deep skirt cap.
Manufacturer	Rexam Plastic Packaging -Brookville, PA
Specification or Part Nbr	QIM-317-4937
Material	Polypropylene/white ribbed
Dimensions including the skirt	1.016" (Height) x 1.650" (Top Dia) x 1.702" (Bottom Dia)
Thickness – Maximum	0.1465"
Thickness- Minimum	0.0935"
Thread type	SPI 38MM – 439 buttress
Thread style	Buttress
Thread pitch	6 tpi
T's & E's	T 1.3860" E 1.4740"
Mass (total weight)	11g x 4 = 44g = 0.10 lbs = 0.05 kgs
Liner type	Extruded Tri-layer 0.0555" thick
Liner Material	Virgin HDPE-HDPE foam-HDPE
Closure Equipment	Hand applied and mechanically applied
Torque wrench and adapter to 45 in/lbs (for testing purposes only. (manufacturer recommends 35 to 50 in/lbs. – product dependent.)	Torque wrench and adapter to 45 in/lbs (for testing purposes only. (manufacturer recommends 35 to 50 in/lbs. – product dependent.)

Bags - 8 each required for Schemes C & D (double bagged)

Type, Grade, & style	Non-gusseted
Manufacturer	AZ Bags, Phoenix, AZ
Material	LDPE
Dimensions	22.5" x 12"
Thickness- Min/Nom	0.0020"\0.0015"
Mass (total weight)	0.20 lbs (0.09 kgs)
Method of Closure	¼" red vinyl self adhesive tape pinched at both ends to secure the closing of the bag

SECTION III TEST DESCRIPTIONS AND RESULTS

Laboratory Conditions: Ambient.
The samples were filled to a minimum of 98% full and prepared as for shipment prior to testing.

The following gh Package & Product Testing and Consulting of AZ, Inc. personnel were present during testing:

- Michael Greer – President – (Proof Reading)
- Jason Sager –Laboratory Technician
- Frank Reyes – Certifying Officer

The following tables describe testing/conditions/results

Test Specimen Characteristics (All Schemes)

Specific Gravity:	1.84
State:	liquid
Dummy Load	Glycol /Water mixture
Gross Weight w/o bags	71.18 lbs (32.28 kgs)
Gross Weight with bags (schemes C and D)	71.38 lbs (32.36 kgs.)

Drop Test : (All Schemes)
Test Method: 49 CFR 178.603
Number of Packages Tested – 20 (5 for each scheme)
The samples were conditioned in accordance with 49 CFR 178.603(c). The temperature was reduced to 0°F prior to tests. The contents consisted of Glycol water mixture.
Drop Height – 1.84 meters (See Section IV for calculations.)
Results

Box	Tested Weight	Orientation	Result
1A & 1B	71.18 lbs (32.28 kgs)	Flat on Top	Pass – No damage
2A & 2B	71.18 lbs (32.28 kgs)	Flat on Short Side	Pass – No damage
3A & 3B	71.18 lbs (32.28 kgs)	Flat on Bottom	Pass – No damage
4A & 4B	71.18 lbs (32.28 kgs)	Flat on Long Side	Pass – No damage
5A & 5B	71.18 lbs (32.28 kgs)	Top Corner	Pass – Corner deflection
1C & 1D	71.38 lbs (32.36 kgs.)	Flat on Top	Pass – No damage
2C & 2D	71.38 lbs (32.36 kgs.)	Flat on Short Side	Pass – No damage
3C & 3D	71.38 lbs (32.36 kgs.)	Flat on Bottom	Pass – No damage
4C & 4D	71.38 lbs (32.36 kgs.)	Flat on Long Side	Pass – No damage
5C & 5D	71.38 lbs (32.36 kgs.)	Top Corner	Pass – Corner deflection

Pass/Fail Criteria :
A package is considered to successfully pass the drop tests if for each sample tested: There is no damage to the outer packaging likely to adversely affect safety during transport, there is no leakage of the filling substance from the inner packaging and any discharge from a closure is slight and ceases immediately after impact.

Stacking Test :
Test Method: 49 CFR 178.606
Number of Packages Tested – 12 (3 for each scheme)
Lab weights were applied to the tops of the packages using platens (load spreaders) as specified by 178.606(c). (24-hour – free standing)
See Section IV for calculations.
Results:

Box	Required Load	Applied Load	Results
1A & 1B	538.94 lbs (244.42 kgs)	600 lbs (272.11 kgs)	Passed
2A & 2B	538.94 lbs (244.42 kgs)	600 lbs (272.11 kgs)	Passed
3A & 3B	538.94 lbs (244.42 kgs)	600 lbs (272.11 kgs)	Passed
1C & 1D	540.45 lbs (245.10 kgs)	600 lbs (272.11 kgs)	Passed
2C & 2D	540.45 lbs (245.10 kgs)	600 lbs (272.11 kgs)	Passed
3C & 3D	540.45 lbs (245.10 kgs)	600 lbs (272.11 kgs)	Passed

Note: Stacking stability was not assessed since a guided load test was not performed.
Pass/Fail Criteria:
No test sample may leak. There must be no leakage of the filling substance from the inner receptacle, or inner packaging. No test sample may show any deterioration that could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation. The containers must maintain the load without significant deflection.

Vibration Standard: (All Schemes)
Test Method: 49 CFR 178.608
Packages Tested – 12 (3 for each scheme).
The packages were placed on a rotary vibration table for one hour with an input of 1.1g @ 4Hertz. Package/vibration table separation was obtained at 176.2 CPM (RPM)
Results

Package 1A, 1B, 1C, & 1D	No damage
Package 2A, 2B. 2C, & 2D	No damage
Package 3A, 3B, 3C, & 3D	No damage

Pass/Fail Criteria :
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 that could adversely affect transportation safety or any distortion liable to reduce packaging strength.

Water Resistance:
Test Method): ISO Standard 535 as required by 49CFR 178.514 (b)(1)
Samples Tested: 5. The specimens were conditioned in accordance to 50% RH +/- 2% at 73°F for 24 hours prior to material analysis and Cobb testing.
Results

Sample	#1	#2	#3	#4	#5	Average	Passed
g/m^2	110	120	100	100	90	104	Y

Pass/Fail Criteria:
An increase in mass of greater than 155 g/m2 over the 30-minute duration of the test represents an unacceptable level of water absorption.

Pressure Test:
Test Method: 49 CFR 173.27(c)
Packages Tested – 3.
The containers were subjected to hydraulic pressure for 30 minutes.
See section IV for calculations.
Results:

Sample	Required Pressure	Applied Load	Results
1	100 kPa (14.55 psig)	103.4 kPa (15 psig)	Passed
2	100 kPa (14.55 psig)	103.4 kPa (15 psig)	Passed
3	100 kPa (14.55 psig)	103.4 kPa (15 psig)	Passed

Pass/Fail Criteria:
No test sample may leak while undergoing the test.

SECTION IV CALCULATIONS

Package Gross Weight Schemes A & B

Components	lbs	kgs
Box	2.04	0.93
Inner Receptacles	1.99	0.90
Inner Closures	0.10	0.05
Total Tare Weight	**4.13**	**1.87**
Lading Weight	67.05	30.41
Gross Weight	**71.18**	**32.28**
Marked Weight	**32.2 kg**	

Lading Weight = max vol x .98 x 8.3 x SG
4.48 x .98 x 8.3 x 1.84 = 67.05 lbs (30.41 Kg.)

Package Gross Weight Schemes C & D

Components	lbs	kgs
Box	2.04	0.93
Inner Receptacles	1.99	0.90
Inner Closures	0.10	0.05
Bags	0.20	0.09
Total Tare Weight	**4.33**	**1.96**
Lading Weight	67.05	30.41
Gross Weight	**71.38**	**32.37**
Marked Weight	**32.3 kg**	

Lading Weight = max vol x .98 x 8.3 x SG
4.48 x .98 x 8.3 x 1.84 = 67.05 lbs (30.41 Kg.)

Drop Test Height:
Specific Gravity of Certification 1.84
Packing Group of Certification II
Drop Test Height (performed by height): 1.84 x 1.0m = 1.84m
Dummy Load: Glycol Water Mixture

Stack Test: Schemes A & B

STACK TEST FORMULA		
REPORT #	U-4585-09	Load=[(120/H)-1]*[W+(S*V*8.3*98%)] 98% = in fill factor 8.3 = wt of 1 gal of water
H =	14.00	Height of Container (inches)
W =	4.13	Tare Weight of Package (lbs)
S =	1.84	Specific Gravity of Lading
V =	4.48	Max Volume of Liquid (gals)
Applied	600.00	Applied Weight (lbs)

Required	538.94 lbs	244.42 kgs
Applied	600.00 lbs	272.11 kgs
Lading Wt	67.05 lbs	30.41 kgs

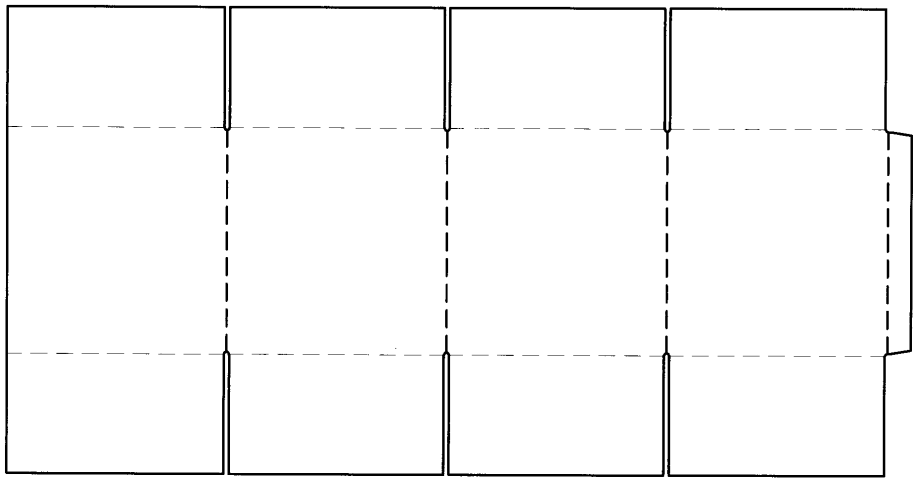
Stack Test: Schemes C & D

STACK TEST FORMULA		
REPORT #	U-4585-09	Load=[(120/H)-1]*[W+(S*V*8.3*98%)] 98% = in fill factor 8.3 = wt of 1 gal of water
H =	14.00	Height of Container (inches)
W =	4.33	Tare Weight of Package (lbs)
S =	1.84	Specific Gravity of Lading
V =	4.48	Max Volume of Liquid (gals)
Applied	600.00	Applied Weight (lbs)

Required	540.45 lbs	245.10 kgs
Applied	600.00 lbs	272.11 kgs
Lading Wt	67.05 lbs	30.41 kgs

SECTION V DRAWINGS

The following drawings and sketches apply to this report:
Exterior Container
Inner Receptacles
Inner Receptacle Closures
Bags



12 3/4 W X 12 3/4 D X 13 H
INSIDE DIMENSIONS

REV	DATE	DESCRIPTION	APPROVAL

PurePak Technology Corporation
324 South Bracken Lane, Suite 3, Chandler, AZ 85224

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED:
DECIMALS: X.XX ±.010 X.XXX ±.005 X.XXXX ±.002
ANGLES: X.X ±.500°

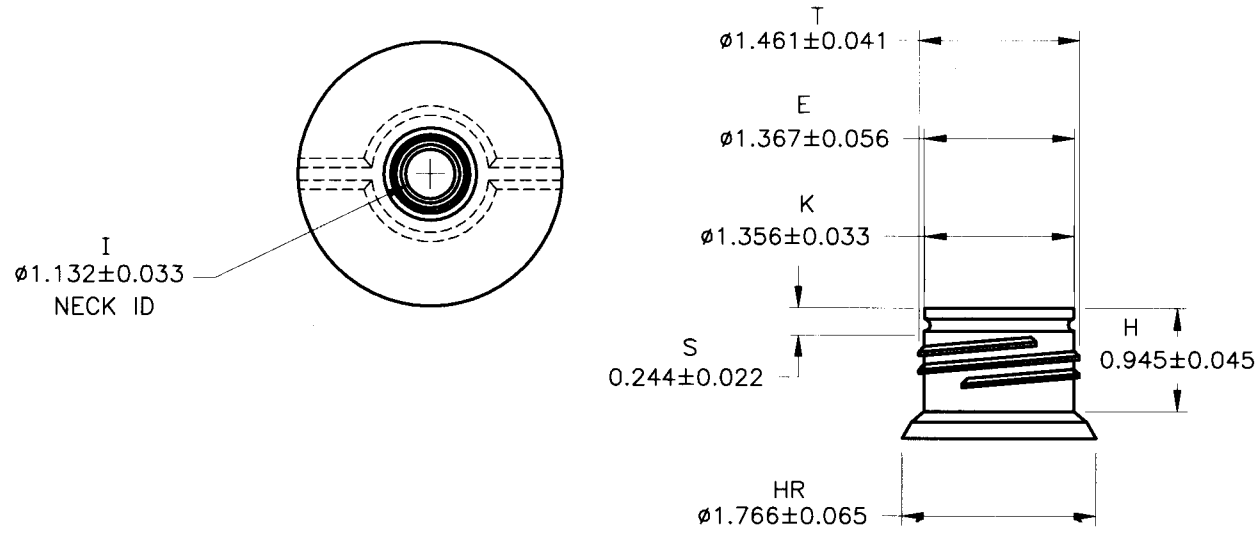
DESCRIPTION:
4X RESHIPPER CARTON
for BETA BOTTLE

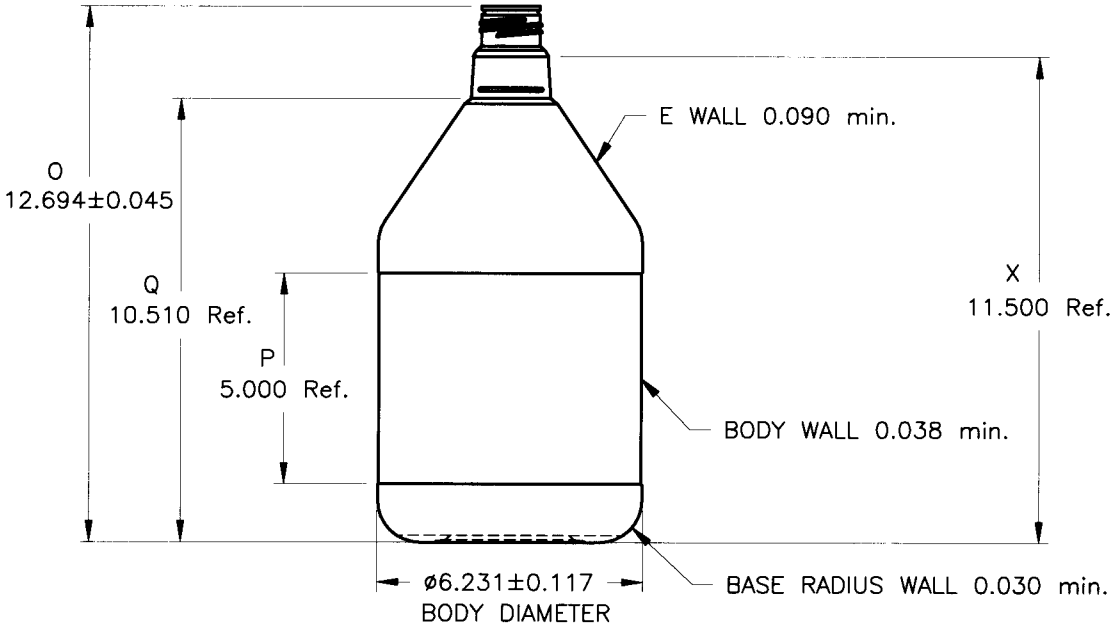
APPRD.

SHEET 1 OF 1

SCALE: 1:8 DRAWN BY: MSR DATE: 8/15/07

REV	DATE	DESCRIPTION





NOTES:
1. CONTAINER WEIGHT: 190 GRAMS ± 5 GRAMS
2. MATERIAL: EQUISTAR LR 7340, NATURAL
3. OVERFLOW CAPACITY: 4.409 L
4. LAND FLATNESS 0.015 max.
5. TAIL SCAR 0.075 min.

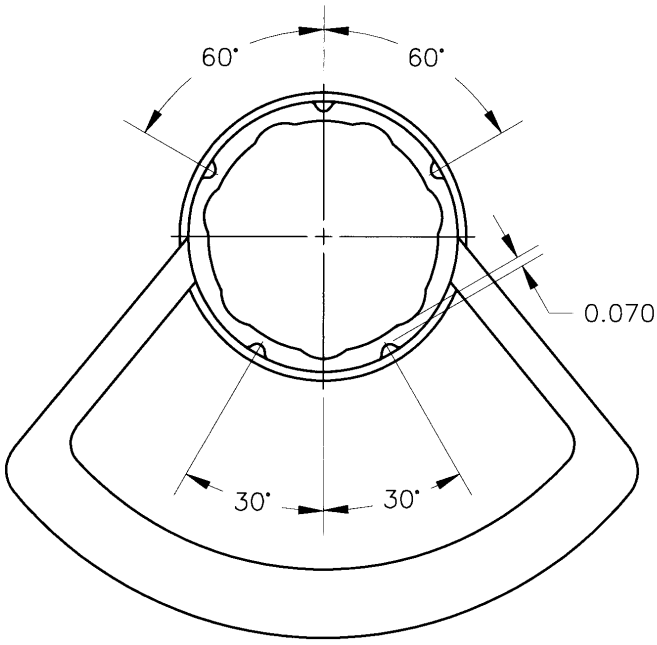
REVISION
REV.
DATE:
APPRD.

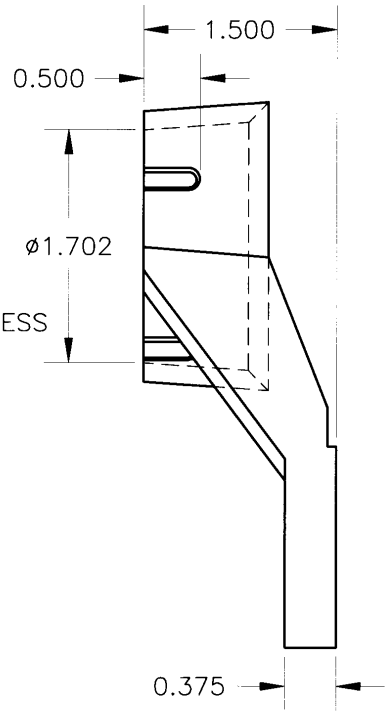
PurePak Technology Corporation
324 South Bracken Lane, Suite 3, Chandler, AZ 85224

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED:
DECIMALS: X.XX ±.010 X.XXX ±.005 X.XXXX ±.002
ANGLES: X.X ±.500'

DESCRIPTION:
9 PINT
BETA BOTTLE
38-439 NECK FINISH

SHEET 1 OF 1	APPRD.	SCALE: 1:4	DRAWN BY: MSR	DATE: 9/5/07





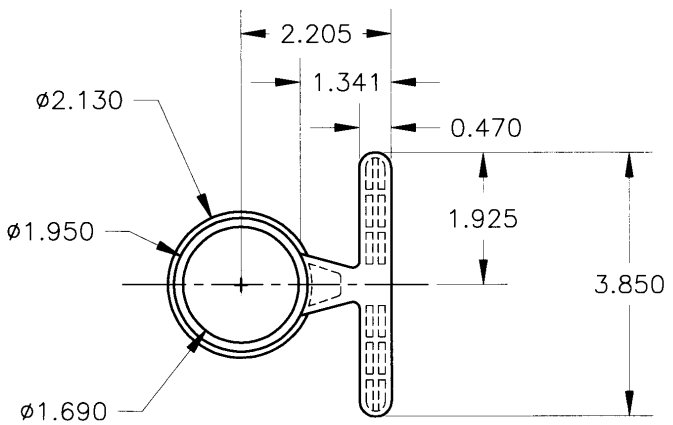
REV	DATE	DESCRIPTION	APPROVAL

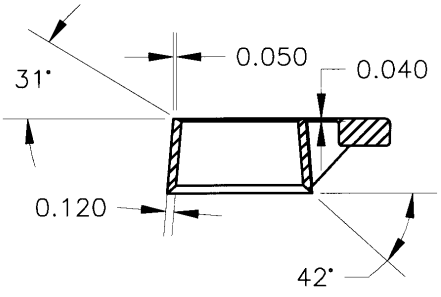
PurePak Technology Corporation
324 South Bracken Lane, Suite 3, Chandler, AZ 85224

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED:
DECIMALS: X.XX ±.010 X.XXX ±.005 X.XXXX ±.002
ANGLES: X.X ±.500°

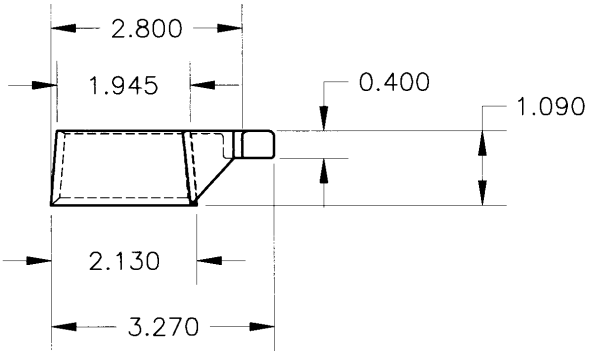
DESCRIPTION:
OVAL HANDLE
for BETA BOTTLE

APPRD.
SHEET 1 OF 1
SCALE: 1:1
DRAWN BY: MSR
DATE: 8/9/07





SECTION THRU CENTER



A	8/8/07	CHANGED TITLE BLOCK AND LAYOUT	APPROVAL

PurePak Technology Corporation
324 South Bracken Lane, Suite 3, Chandler, AZ 85224

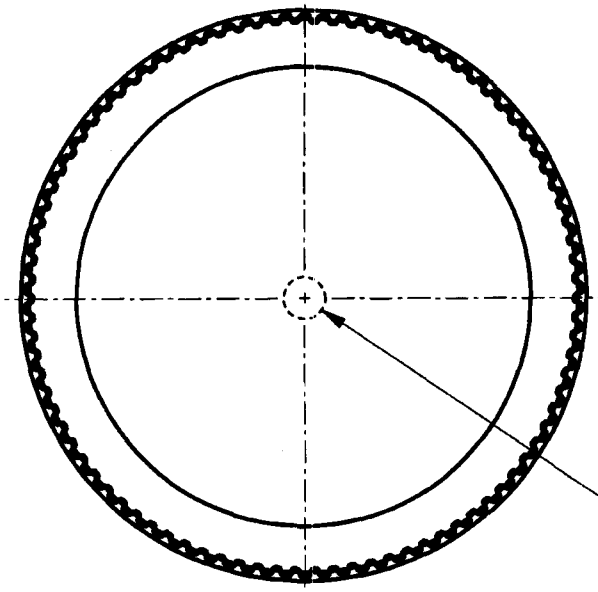
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED:
DECIMALS: X.XX ±.010, X.XXX ±.005, X.XXXX ±.002
ANGLES: X.X ±.500°

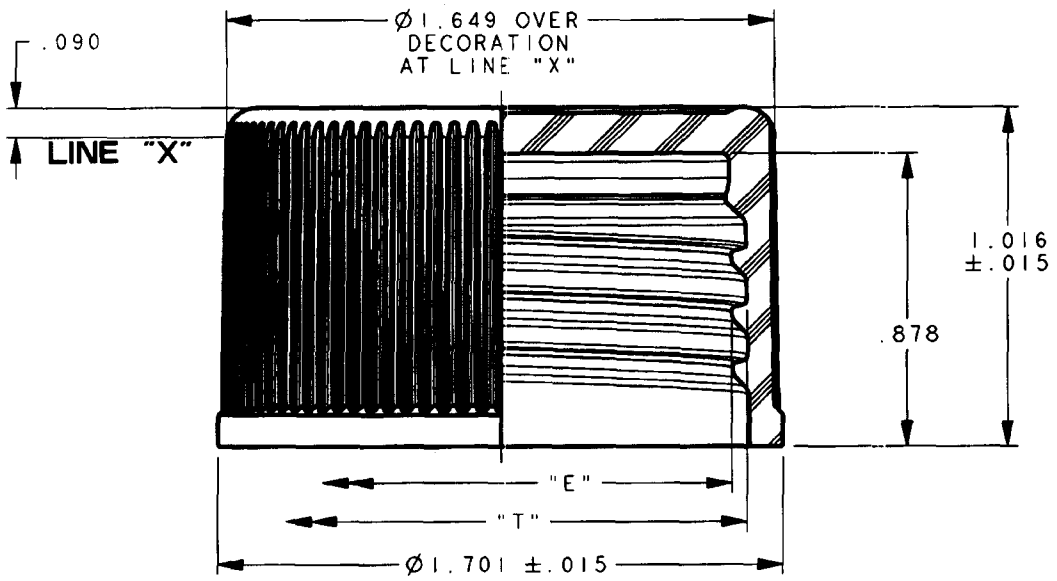
DESCRIPTION:
T – HANDLE
for BETA BOTTLE

APPRD.

SHEET 1 OF 1

SCALE: 1:2 | DRAWN BY: MSR | DATE: 8/8/07





"REFERENCE PRODUCT CENTER FOR CURRENT DRAWING"

UNSCREWING LUG IMPRESSIONS TO APPEAR IN BOTTOM SKIRT OF THE CLOSURE

DIMENSIONS ARE REPRESENTATIVE ONLY. FINAL SIZES TO BE DETERMINED AFTER PART IS MANUFACTURED

[F#] = FUNCTIONAL DIMENSION

NOTICE: THIS DRAWING CONTAINS INFORMATION DEEMED PROPRIETARY TO REXAM PLASTIC PACKAGING. THE INFORMATION CONTAINED HEREIN SHALL NOT BE COPIED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION FIRST OBTAINED FROM REXAM PLASTIC PACKAGING.

MATERIAL	POLYPRO
TOLERANCES UNLESS SPECIFIED	DEC. ±.010 DEGREES ±1°
GRAM WEIGHT	10.3 REF. ONLY CI#
Mold No.	PROD. MJ-410-1A
	SAMPLE
SCALE	2:1
DRAWN	E. F. HAFFNER
DATE	9/25/2000
CHECKED	

LINE "C" IS .367 DOWN FROM INSIDE TOP.		
"T" at "C"	1.483	±.007
"E" at "C"	1.389	±.007

TITLE **CUSTOMER DRAWING**

38-439 A STOCK ACID CLOSURE

FOR STOCK

REXAM PLASTIC PACKAGING

DRAWING NUMBER **QIM-317-4937**

REVISION

MODEL NAME: im-317-4937 DIRECTORY: stock/prod

Stock

APPENDIX A – TEST EQUIPMENT AND INSTRUMENTATION

Compression Machine:120,000 lb: Tinius Olsen s/n 89611; recorder: DC-12-SIC s/n M9410202 Cal: 05/07. or Dead Load Weights.
Vibration Table 250 lb. (Oscillatory): Gaynes Engineering V250s/n G17680-3. System Cal: 05/07.
Vibration Table 4,000 lb. (Oscillatory): LAB– 4000-SVML s/n 813024. System Cal: 05/07
Vibration Table 4,000 lb. (Random): Zonic/Dactron: – 306875 s/n: 794435 System Cal: 05/07.
Large Item Drop Test: ASTM Electric Quick release: LAB model 30ER. S/n: G-20940-3
Scale: Pelouze model 4040. Cal: 05/07
Dual Leaf Drop Tester - 125 lb.: Gaynes m/n: 104 s/n 4585. Cal: None required.
Drop Tester - 200 lb.: Mrad Swing Arm pneumatic. None required.
Impact Shock Tester: 1,000 lb. MTS Dual Programmable. Model: 846-361. s/n: 922-55 use with Test Partner System for data acquisition.
Environmental Chamber #1: Cold Temperature. Master-Built Products. s/n MBA10346-5. Controller: Johnson Controls. Model #: A19ABC-24. s/n: LR948 Cal: 4-19-04. Monitoring: Cooper thermo-hygrometer. Model: TM99A. s/n: QC-4 Cal: 05/07
Environmental Chamber #2: Heat and Humidity: Crown Fixtures Inc. Custom made model 80.Temperature Controller: Honeywell. Model #: s/n Cal: 4/19/04 Monitoring: Extech Thermo-Hygrometer. Model #: 44701. s/n: 23214 Cal: 05/07
Environmental Chamber #3: Freezer–General Electric Chest style.Omega Thermocouple readout.. Cal: 05/07.
Environmental Chamber #4: Rain spray chamber – Per ASTM D951 specification with choke valves to control spray amount per hour. Custom made and designed. model: gh-001. s/n ghtestaz-001. Self-calibrating with rain gauge.
COBB Tester: (TMI with distilled water); Timer: Radio Shack m/n: 63-897 Cal: 05/07
HPT Tester: WIKA (gauge) Press. +/- 60 PSI m/n: 9699117 Cal: 05/07
Tester Incline Impact (made): custom Advanced Machinery. s/n: gh001;
Velocimeter-m/n: VS2200 s/n 082787-1 Cal: 05/07.
Caliper (Digital): Mitutoyo Corp. Model: CD-6"B. s/n: 0010699 Cal: 05/07
Mullen Tester: B.F. Perkin & Sons Burst Strength Tester s/n: 15138 Wika Gauge Cal: 05/07
Scale (bench): AND brand electronic. Model: HL-2000 Cal: 05/07
Scale (bench): Ohaus triple beam balance. Cal: 05/07
Recorder: Shock Lansmont m/n: Test Partner II s/n: version 2.27;
Amplifier: PCB m/n: 482A17 s/n 393 Cal: 05/07;
Accelerometer: PCB m/n: 356A22 s/n 16278 Cal: 11-19-06.
Tensile/Compression/ECT Machine: Chatillon ET-1100. s/n: 03292 Cal: 05/07
Torque Tester (Spring): Secure Pak 0-50 in./lbs s/n 50-3635MRA Cal: 05/07
Vacuum Chamber: Fast Vac. Model DV-85. Reptech (gauge) Pressure/ vacuum +/- 30 PSI Cal: 05/07

Updated 4-18-05 by SRR. Please notify Manager if item is to be added or removed from above list.

APPENDIX B – Understanding and Disclaimer Notice

This notice advises package manufacturers and package users regarding the use of United Nations Approved Certification Packs.

A "pack" as used herein, means the specific package or container submitted to gh Package & Product Testing and Consulting of Arizona, Inc. for testing and UN certification that the package or container meets the requirements of the Code of Federal Regulations, Title 49, §100 through §180. A pack, therefore, has specific components, including the package in which the containers are arranged for shipping, the containers, the contents of the containers, and all internal packaging elements designed to prevent the containers from moving and/or damage. Each component has unique specifications and characteristics, including, but not limited to, the material, shape, and weight of the package and containers and the internal packaging elements, and the material, specific gravity/density, shape, etc. of the contents of each container.

Herein, the use of singular means plural and the use of plural means singular.

Each pack type (complete individual specification pack) when successfully tested pursuant to the appropriate regulations (Code of Federal Regulations, Title 49, IATA/ICAO, IMDG) is assigned a certification number specifically for the submitted pack. This number represents the report that references the tested pack's specifications and the characteristics of the hazardous material (i.e. specific gravity, particle size) to be placed in the package. gh Testing disclaims any and all responsibility for any substitutions and/or changes in the package or each component thereof, and for any and all variations of use of the package and its contents made by any user/client/customer/other party from the package and its components and contents as tested by gh Testing. The regulations require that design type qualification testing be performed on "identical" and "virtually identical" packs. gh Testing shall not be responsible for any use of variations not tested by gh Testing.

The original tests are based on submitted pack/specifications of submitted packs. It is the shipper's responsibility to ensure that the packs have the same liner board combinations as the pack that was tested and that each pack shipped is capable of meeting the Cobb Test, Drop Test, Hydraulic Pressure Test, Leakproof Test, Stack Test and all other required criteria set forth in the regulations once the pack certification is being used. All inner packs must be the same as those specifications submitted and tested.

Only the materials originally certified are approved for use. If the shipper changes manufacturers, it must ensure that the pack is virtually identical to the pack previously tested. If changes or substitutions become necessary, it is at the discretion of the shipper if a variation applies – gh Testing does not endorse the use of untested variations.

Material Safety Data Sheets (MSDS), submitted pack descriptions, specifications and drawings will be retained by gh Testing. Alterations to the pack invalidate the certification.

It is the shipper's responsibility to ensure that any combination packs it ships are recertified every two years. Composite and Single packages must be recertified every year.

The responsibility of the container markings, compatibility testing between the hazard and packaging, shipping documentation, packing and closing of the packaging are that of the shipper.

Permitted and prohibited uses of the UN Marking assigned by gh Package & Product Testing and Consulting, Inc.

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The Certification Number(s) issued by gh Package/Product Testing & Consulting, Inc. ("gh Testing") shall be used only by gh Testing's customer on hazardous packages certified by gh Testing and shall remain applicable only so long as the certification remains current, through the re-certification at gh Testing, and has not expired, or only so long as gh Testing's customer prepares and uses packages prepared for shipment in virtually and substantially identical packages to those tested and listed by gh Testing in this test report and certification.

Any use of Certification Number(s) issued by gh Testing in this report by its customer which is inconsistent with such permitted use (such as, and including where any part of the package is changed according to CFR 49, subtitle B, Chapter 1, Subchapter C, Parts 171-180) or by persons or entities who are not gh Testing's customer for whom this report and certification were made, whether in a recertification or otherwise, is strictly prohibited, and gh Testing, for itself, its successors, officers, shareholders, directors, and all others acting on its behalf, hereby disclaims any and all liability for claims, causes of action, damages and demands of whatsoever nature arising directly or indirectly out of or in any way based upon any such prohibited use. The certification Number(s) issued by gh Testing in this report shall expire and terminate immediately whereas and if a prohibited use occurs.

All reasonable efforts will have been exercised to provide accurate data from resultant tests or consultation. Test methods utilized and followed in conducting various tests involve standards established by ASTM, TAPPI, DOT, IATA/ICAO, Federal Spec., Mil-Spec., ISTA, as well as private company test standards and procedures. gh Testing assumes no responsibility for nor does it guarantee or warrant any specifically expressed or implied performance and only assumes responsibility for the test data presented by it as derived from specifications, drawings, and information submitted to it for testing. Responsibilities involving alterations and/or changes to the packages and/or product beyond item(s) originally tested are those solely of the user/supplier/client, of which, gh testing assumes no responsibility.

gh Testing will hold submitted material for a period of one (1) week after testing is completed (unless otherwise instructed by the client). After this time, gh Testing may dispose of the material or equipment to its discretion or a storage charge at a rate of $3.25 per square foot per month will be charged.

gh Testing shall not be liable for any incomplete, inaccurate, misrepresented, or inadequate specifications, drawings, details, or other information pertinent to the proper testing and description of the pack or contents. Should lack of such information supplied to gh Testing

give cause to penalty, gh Testing may seek financial reimbursement for any fines, legal fees, and lost billing and the undersigned shall indemnify gh Testing for all such fines and costs.

The completed testing above was in compliance with the customer requested test(s) and requirements. All reference and data logging materials used in the above testing are traceable to NIST. The testing performed above was performed at gh Package & Product Testing and Consulting of Arizona, Inc., in Phoenix Arizona. This test report cannot be reproduced, except in full, without written permission from gh Package & Product Testing and Consulting of Arizona, Inc. If the measurement uncertainty calculations are listed in the report, the measurement uncertainties represent an expanded uncertainties expressed at approximately 95% confidence level using a coverage factor of K=2.

Test Criteria and Understanding
All reasonable efforts have been exercised to provide accurate data from resultant tests or consultation. Test methods utilized and followed in conducting various tests involve standards established by A.S.T.M., T.A.P.P.I., D.O.T., Federal Spec. and Mil-Spec., I.S.T.A. as well as private company test standards and procedures. gh Testing assumes no responsibility or guarantees/warranties regarding (specifically stated or implied) performance and only assumes responsibility for the test data presented by it. Responsibilities involving alterations and/or changes to the packages and/or product beyond item(s) originally tested are those of the user/supplier/client, of which, gh testing assumes no responsibility.