



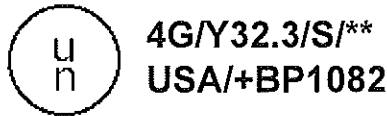
CTL Project Number	3878
Revision Number	00
Date Testing Completed	04/19/12
Date of Report	04/19/12

**DEPARTMENT OF TRANSPORTATION
PERFORMANCE ORIENTED PACKAGE TESTING
CERTIFICATION**

Performed by:
Container Technologies Laboratory, Inc.
9567 Alden Street
Lenexa, KS 66215
913-888-2000

Testing Performed for:
Bell Container Corporation
615 Ferry Street
Newark, NJ 07105
973-344-6997

Design Qualification Testing of a
UN 4G Combination Package
Bell Sample ID #22773



**** Is to be replaced by the year of manufacture
(last two digits only, e.g. 2005 would be 05)**

This package is certified for shipment via aircraft.

**Bryan J. Bunn,
ME**

Digitally signed by Bryan J. Bunn, ME
DN: cn=Bryan J. Bunn, ME, o=Container
Technologies Laboratory, Inc.,
ou=Certification Officer, email=ctf.
enr@sbcglobal.net, c=US
Date: 2012.04.19 14:56:44 -05'00'

Bryan J Bunn, Mechanical Engineer
Certification Officer

CONTAINER TECHNOLOGIES LABORATORY, Inc.
 PACKAGE ENGINEERING · RESEARCH · CONSULTATION · TESTING
 9567 Alden · Lenexa, KS 66215 · 913-888-2000 · Fax 913-888-2993

CTL Project # **3878**
 Certificate # **+BP1082**

Requesting Party:

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

Phone: 973-344-6997

Package Tested - Bell Sample ID #22773

A combination package comprising four 9-pint natural plastic round bottles with T-style friction fit integral handles and white plastic screw cap closure inside a BC flute regular slotted container.

The use of other packaging methods or components than those specified in this report may render this certification invalid. It is the responsibility of the shipper / end user to ensure appropriate use and authorized materials.

Packaging identification code UN 4G
 Package configuration Combination
 Tested to performance standard (PG) Y (Group II)

<u>TEST</u>	<u>SPECIFICATION</u>	<u>TEST LEVEL</u>	<u>TIME</u>	<u>RESULTS</u>
Cobb	49CFR 178.516	112 g/m ²	30 min	Pass
Drop	49CFR 178.603	1.9 m	N/A	Pass
Stacking	49CFR 178.606	272.4 kg	24 hr	Pass
Vibration	49CFR 178.608	3.9 Hz	1 hr	Pass
Internal Pressure	49CFR 173.27	100 kPa	30 min	Pass

The packagings prepared for transport described herein were tested in accordance to the above testing procedure and successfully passed the tests according to the UN Recommendations on the Transportation of Dangerous Goods and Title 49 of The Code of Federal Regulations, Part 178. The packages may bear the marking:



** Year of Manufacture

Tested by: Bryan J Bunn, ME

Date April 19, 2012

"All manufacturing, engineering, and quality efforts are in vain if the product reaches its destination in a damaged condition."

SECTION I - PRODUCT and PACKAGING INFORMATION

See Appendices for more information

Product type	Group II liquid
Packing group	Y (Group II)
Max. specific gravity (SG)	1.84
Max. package weight (MGW)	32.3 kg

OUTER PACKAGING

UN code	UN 4G	
Packaging type	Fiberboard Box	
Manufacturer	Bell Container Corp.	
Location	Newark, NJ	
Style	RSC (box code 0201)	
Part / ID number	Bell Sample ID #22773	
Drawing number	J817308	
Flute type	Vertical B/C	
Facings	Kraft/kraft	
Basis weight (BMC)	42-23-42-23-42 lbs/MSF	
Basis weight (tested)	42.9 - 23.3 - 42.9 - 23.9 - 42.7 lbs/MSF	
Board grade (BMC)	350#	
Board grade (tested)	296 psi	
Size (OD, L x W x H)	342 x 332 x 360mm	
Size (ID, L x W x H)	324 x 324 x 330mm (12-3/4 x 12-3/4 x 13 in.)	
Tare weight	830g	
Manufacturer's joint	Glued inside flap	
Flap length	1-1/2 in.	
Flap type (gap or meet)	<i>Top</i>	<i>Bottom</i>
Outer	Meet	Meet
Inner	Gap	Gap
Board caliper (nominal)	0.266 in.	
Stacking height	Same as box height	
Handle(s)	None	
Location(s)	n/a	

TESTED VARIATION 1 (box closure)

Closure	2 in. wide, 1.6 mil plastic tape, top and bottom
Manufacturer	Shurtape HP 100
Tape overhang	One 19 in. long strip, minimum overhang 4 in.

TESTED VARIATION 2 (box closure)

Closure (top)	2 in. wide, 1.6 mil plastic tape
Manufacturer	Shurtape HP 100
Tape overhang	One 19 in. long strip, minimum overhang 4 in.

Closure (bottom)	Hot melt adhesive
Manufacturer	HB Fuller, PHC-9200
Style	Four 6 in. long, 1/4 in. wide strips, each quarter inside flap panel

Box Liner	None
Material	n/a
Thickness	n/a
Tare weight	n/a
Closure	n/a

INTERMEDIATE PACKAGING

Packaging type	None
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TESTED VARIATION 1 (box closure)

Closure	2 in. wide, 1.6 mil tan plastic tape, top and bottom
Manufacturer	Shurtape HP 100
Tape overhang	One 19 in. long strip, minimum overhang 4 in.

TESTED VARIATION 2 (box closure)

Closure (top)	3 in. wide, 1.6 mil tan plastic tape
Manufacturer	Shurtape HP 100
Tape overhang	One 19 in. long strip, minimum overhang 4 in.

Closure (bottom)	Hot melt adhesive
Manufacturer	HB Fuller, PHC-9200
Style	Four 6 in. long, 1/4 in. wide strips, each quarter inside flap panel

Box Liner	None
Material	n/a
Thickness	n/a
Tare weight	n/a
Closure	n/a

PRIMARY PACKAGING

Packaging type	Plastic bottle	
Manufacturer	PurePak Technology	
Location	Chandler, AZ	
Style	Round plastic Beta bottle with 38-439 buttress finish	
Part / ID number	n/a	
Drawing number	M4851 / 0091411	
Mold number	C95	
Material	Natural HDPE, Equistar Chemicals Petrothene LR7340	
Method of construction	Blow molded	
Nominal capacity	4.137L (9 pint labeled capacity)	
Total (overflow) capacity	4.222L	
Size (OD)	158.3 x 322.3mm	
Tare weight	218.2g (with handle)	
Wall thickness	<i>Measured</i>	<i>Nominal</i>
Nominal	n/a	1.05mm
Base radius	0.76mm	n/a
Handle(s)	Injection molded natural HDPE T-style handle	
Location(s)	Neck	
Size	98.3 x 81.8 x 27.5mm	
Attachment	Friction fit	
Quantity (per outer packaging)	4	

Closure	Screw cap	
Manufacturer	Rexam Plastic Packaging	
Location	Brookville, PA	
Style	Ribbed deep skirt screw cap, 38-439A Stock Acid Closure	
Part / ID number	MJ-410-1A	
Drawing number	QIM-317-7937	
Size (OD)	43.1 x 25.2mm	
Tare weight	10.2g	
Threads	38MM-439 buttress, 6 TPI	
Application methodology	Torqued, 58kg-cm (50 in.-lbs)	
Liner	Three-ply coated foam liner	
Manufacturer	Tri-Seal International	
Location	Blauvelt, NY	
Part / ID number	F-217 liner	
Drawing number	n/a	
Material	0.020 in. LDPE / 0.065 in. foamed LDPE / 0.095 in. LDPE	
Size (OD)	35.1 x 1.47mm	
Tare weight	0.6g	

SECTION 2 - TEST METHODOLOGY and RESULTS

See Appendices for more information

Note - Two variations tested, as denoted by sample number a/b

COBB Test - 49CFR 178.516 (ISO 535)

Five (5) pieces of the outer surface (felt side) of the outer packaging were prepared for testing and initial weights recorded. Each piece is tested, with respect to ISO International Standard 535, for thirty (30) minutes and re-weighed. A comparison is made between the initial and final values to determine the amount of water absorption.

Conditioning	23° C (73° F) / 50% RH, minimum 24 hours
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Sample	Mass gain (g/m ²)
1	114
2	112
3	110
4	111
5	113

Average absorption g/m²

Pass / Fail

Pass / Fail Criteria

The water absorption of the outer surface of the outer packaging must be less than 155 g/m².

Drop Test - 49CFR 178.603

(See Appendix A for calculation details)

Sample packages, prepared as for shipment, are subjected to a free-fall drop test onto a rigid, non-resilient, flat horizontal surface in the orientations listed below. If any drop sequence has more than one orientation option, the orientation most likely to result in failure is chosen.

Drop height	1.9m
Conditioning	-18° C (0° F), minimum 24 hours
Fill methodology	Simulated liquid product to 98% overflow volume
Fill material	Water / anti-freeze solution

Sample	Drop Orientation	Results
1a/1b	Bottom (face 3)	Pass
2a/2b	Top (face 1)	Pass
3a/3b	Long side (face 2)	Pass
4a/4b	Short side (face 6)	Pass
5a/5b	Top corner (corner 1-2-6)	Pass

Results

No significant damage or deterioration evident. No loss/leakage of product/contents, and no significant damage to any packaging component.

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 or pressure equalization.

Stacking Test - 49CFR 178.606

(See Appendix A for calculation details)

Three samples, prepared as described below, are subjected to a force applied to the top surface of the test sample, equivalent to the total weight of identical packages which might be stacked on it during transport (with a minimum stack height of 3m (10 ft.)).

Test type	Static (dead load)
Force application methodology	Individual test loads
Required load	236.9 kg
Test load	272.4 kg
Duration	24 hour
Conditioning	23° C (73° F) / 50% RH, minimum 24 hours
Sample preparation	Fill and sealed as for shipment

Sample	Applied load	Results
6a/6b	272.4 kg	Pass
7a/7b	272.4 kg	Pass
8a/8b	272.4 kg	Pass

Results

No significant damage or deterioration evident. No loss/leakage of product/contents, and no significant damage to any packaging component.

Pass / Fail Criteria

A package is considered to successfully pass the stack tests if, for each sample tested: No test sample may show any deterioration or distortion which could adversely affect safety or container strength during transport causing instability in stacks of packages.

Vibration Test - 49CFR 178.608

Three sample packages, prepared as for shipment, are placed on a vibration table that has a peak-to-peak displacement of one inch. Testing is performed at a frequency that causes the package to be raised from the platform such that a metal shim may be passed between the vibration table surface and the bottom of any test sample. Packages are given sufficient space to freely bounce and rotate.

Test type	Vertical linear (servo/hydraulic)
Frequency	3.9 Hz
Test shim	1/16 in. metal shim, 2 in. wide
Duration	1 hour
Conditioning	23° C (73° F) / 50% RH, minimum 24 hours
Samples tested	Three samples tested concurrently

Sample	Test level	Results
9a/9b	1 hour @ 3.9 Hz	Pass
10a/10b	1 hour @ 3.9 Hz	Pass
11a/11b	1 hour @ 3.9 Hz	Pass

Results

No significant damage or deterioration evident. No loss/leakage of product/contents, and no significant damage to any packaging component.

Pass / Fail Criteria

A package is considered to successfully pass the vibration tests if, for each sample tested: No test sample may leak, rupture or show any deterioration which could adversely affect safety or container strength, during transport.

Internal Pressure Test - 49CFR 173.27

Three (3) primary packagings of each style are filled with liquid and subjected to an internal pressure with respect to the type of material. Note - alternate primary packagings (50mL and 25mL) were subjected to internal pressure testing only.

Packaging material	Plastic
Test level	100 kPa
Duration	30 min.
Pressure application	Leakproof fitting through bottom surface

Sample	Test level	Results
1c	30 min. @ 100 kPa	Pass
2c	30 min. @ 100 kPa	Pass
3c	30 min. @ 100 kPa	Pass

Results

No significant damage or deformation to the primary packaging. No leakage of liquid from the primary packaging/closure.

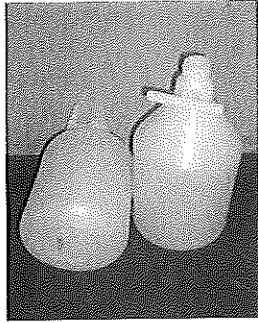
Pass / Fail Criteria

A package is considered to successfully pass the internal pressure tests if, for each sample tested: There is no leakage of liquid from the container.

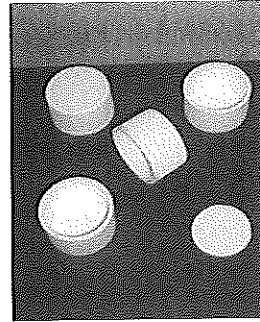
CONCLUSIONS

The packagings tested as described in this report passed all specified tests as per 49CFR part 178.

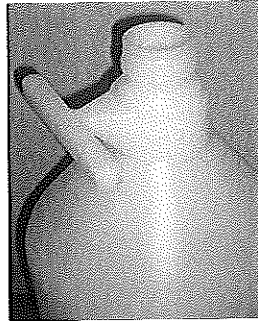
APPENDIX A - PHOTOS



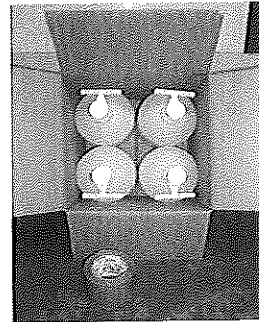
Inner / Primary Packaging



Package Assembly and Orientation



Package Assembly and Orientation



Package Assembly and Orientation

APPENDIX B - CALCULATION DETAILS

Stacking strength test load calculation

Stack height (SH)	3	m
Gross weight (GW)	32.3	kg
Package height (PH)	360	mm

Formula for calculating test load

$$TL \text{ (static)} = [(SH - PH)/PH] \times GW$$

$$TL \text{ (dynamic)} = [(SH - PH)/PH] \times GW \times 1.5$$

Test load (static)	236.9 kg
Test load (dynamic)	355.3 kg

Gross weight calculation

Tare weight of package (PW)	1.8	kg, complete package, empty		
Overflow volume (OF)	4.222	L, primary packaging		
Num. of primary containers (N)	4			
Max. specific gravity (SG)	1.84			
Fill level (FL)	0.98	(liquids)	0.95	(solids)

Formula for calculating MGW

$$MGW = PW + (N \times OF \times SG \times FL)$$

MGW	32.3kg
-----	--------

Drop height calculation

Max. specific gravity (SG)	1.84			
Drop multiplier (M)	1.50	(PGI)	1.00 (PGII)	0.67 (PGIII)

Formula for calculating drop ht.

$$DH = SG \times M$$

Drop height	1.9m
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APPENDIX C - TEST EQUIPMENT and INSTRUMENTATION

Orientation - The following face designations are given assuming the package is positioned such that the manufacturer's joint is directly in front of and to the right of the observer.

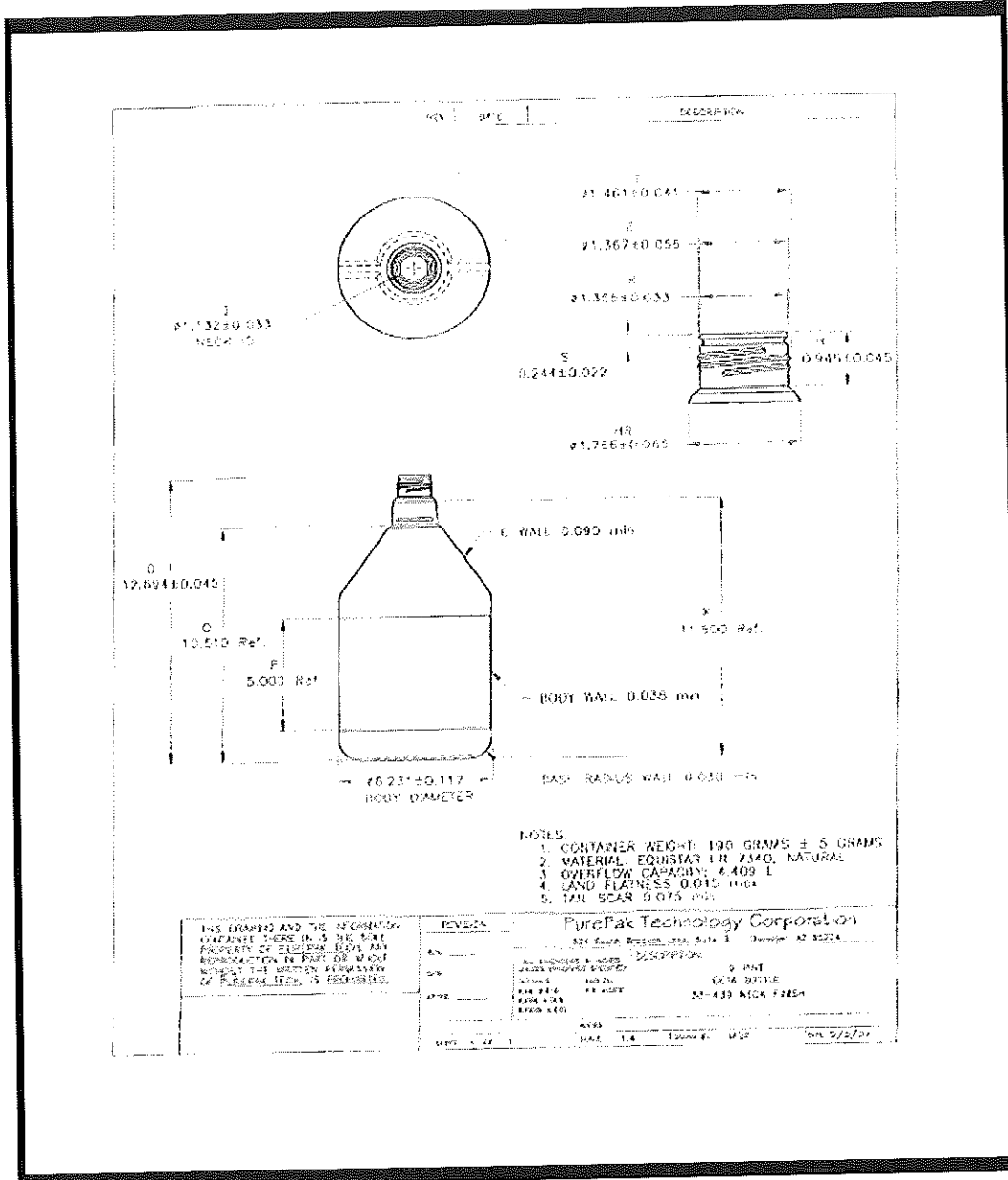
Face 1	Top
Face 3	Bottom
Face 2	Right side
Face 4	Left side
Face 5	Front
Face 6	Back

Equipment	Manufacturer	Model No.	S/N
Drop Tester	Lansmont	PDT-56E	N/A
Dynamic Compression Tester	Lansmont	152-30 K-CTS	CC 152045
Hydraulic Vibration Tester	Lansmont	1800-5	VB-180-51
Gram scale	Fisher EMD	300	N/A
Digital caliper	Fowler	MAX-CAL	N/A
Temperature gauge	Extech Instruments	C917-B	N/A

APPENDIX D - ASSEMBLY INSTRUCTIONS

- Step 1** Seal bottom flaps of RSC outer packaging using one 19 in. long strip of 3 in. wide Shurtape HP 100 tan tape, with a minimum overhang down carton sides of 4 in.
- Step 2** Bottles were filled to 98% of total (overflow) capacity, and sealed with screw caps (minimum 50 in.-lbs application torque).
- Step 3** Insert bottles 2 x 2 x 1 into the outer packaging.
- Step 4** Repeat Step 1 to close and seal the top flaps of the outer carton.

APPENDIX E - PACKAGING DESIGN DRAWINGS



Petrothene®

LR 7340

High Density Polyethylene
Blow Molding Grade
Melt Index 0.38 Density 0.953

Applications

The PETROTHENE® LR 7340 series of polyethylene resins exhibits good stiffness and environmental stress crack resistance. Typical applications include bottles for household chemicals.

Certification

The Lase resin LR 7340 meets the requirements of the Food and Drug Administration regulation 21 CFR 177.1520. This regulation allows the use of this resin 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 Equistar products for specific applications.

Processing Techniques

Specific recommendations for processing LR 7340 can only be made when the processing conditions, equipment and end use are known. For further suggestions, please contact your Equistar sales representative.

Physical 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
Tensile Modulus	125,000	psi	D 750
Tensile Impact	131	ft-lbf/in	D 1922
Low Temperature Brittleness, F ₀	<-76	°C	D 746
Heat Deflection Temperature @ 66 psi	75	°C	D 648
Heat Sealing Point	127	°C	D 1526
Hardness, Shore D	67		D 2240
Environmental Stress Crack Resistance, F ₀	75	hrs	D 1693
	>500	hrs	D 2561

Product	LR 7340-01	LR 7340-11	LR 7340-45
Anal. Mat.	None	High	None
Shear Rate	None	None	High

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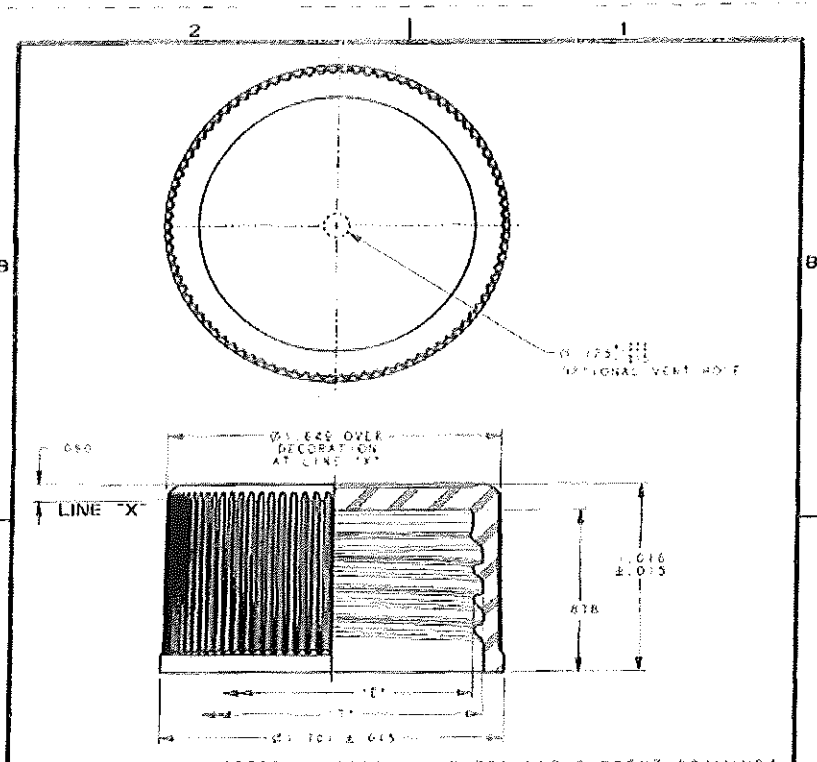
More detailed safety and disposal information on our products is contained in the Material Safety Data Sheet (MSDS). All users of our products are urged to read and use the MSDS. A MSDS is automatically distributed upon purchase of our products. You may request an advance or replacement copy by using our MSDS hotline at 800-737-6648.

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Houston, Texas 77262-2833
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http://www.equistar.com
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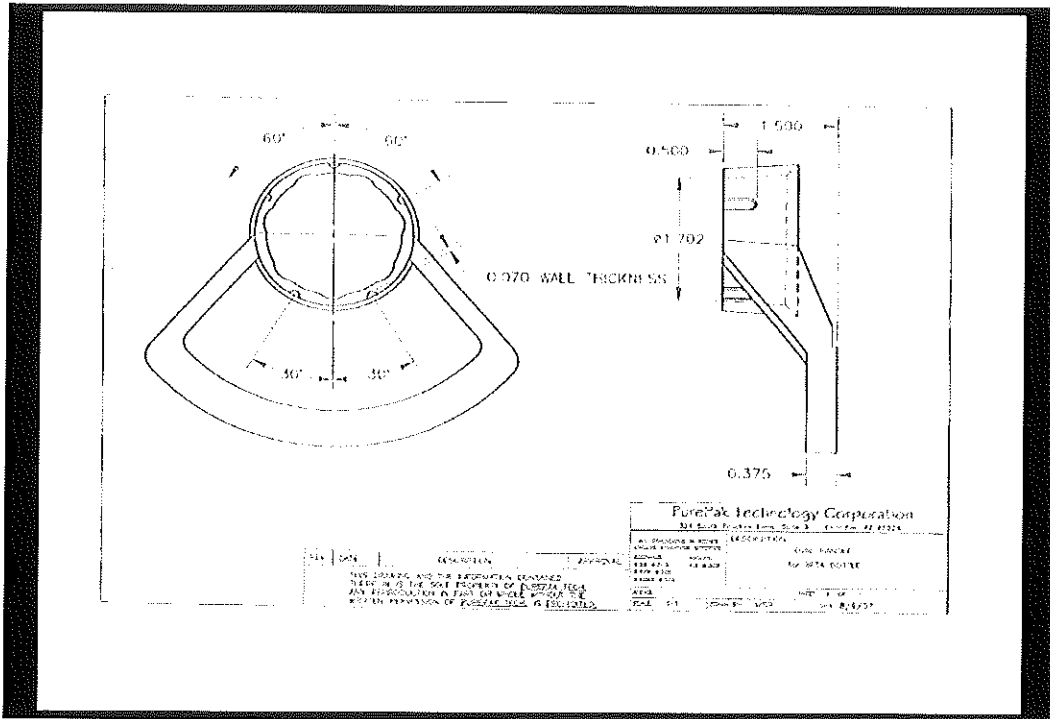
EQUISTAR

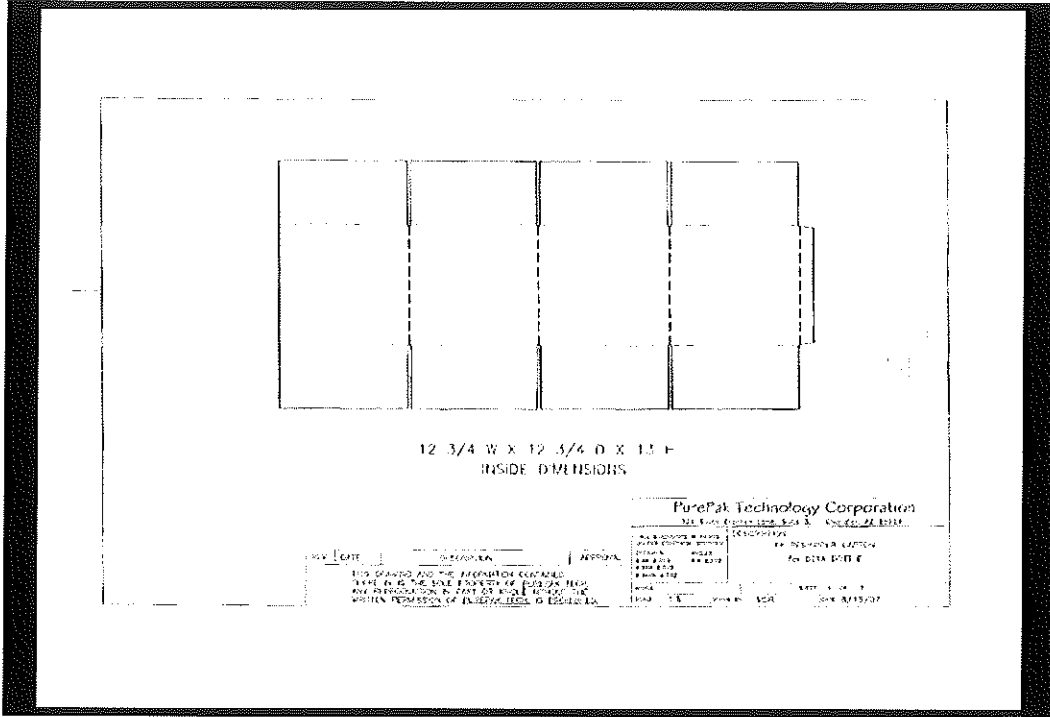


'REFERENCE PRODUCT CENTER FOR CURRENT DRAWING'

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND DECIMAL FRACTIONS UNLESS OTHERWISE SPECIFIED.		LINE "C" IS 3/8" DOWN FROM CENTER TOP
DIMENSIONS ARE REPRESENTATIVE ONLY. THESE SHALL BE THE DECISION OF THE PART MANUFACTURER.	MATERIAL: POLYPROPYLENE DEC: 0.000 DIMENSIONAL DRAW WEIGHT: 18.1227 GMS ± 0.10	TYPICAL OF "C" TYPICAL OF "C" TYPICAL OF "C"
1/2" 1/4" DIMENSION THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO REXAM PLASTIC PACKAGING CO. INFORMATION CONTAINED HEREIN SHALL NOT BE COPIED OR REPRODUCED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF REXAM PLASTIC PACKAGING.	Mold No. PROD. MJ-493-1A SAMPLE	TITLE: CUSTOMER DRAWING 38-439 A STOCK ACID CLOSURE
REXAM PLASTIC PACKAGING	DATE: 8/25/2004 CREATED	DRAWING NUMBER: QIM-317-4937 REVISION:

Stock





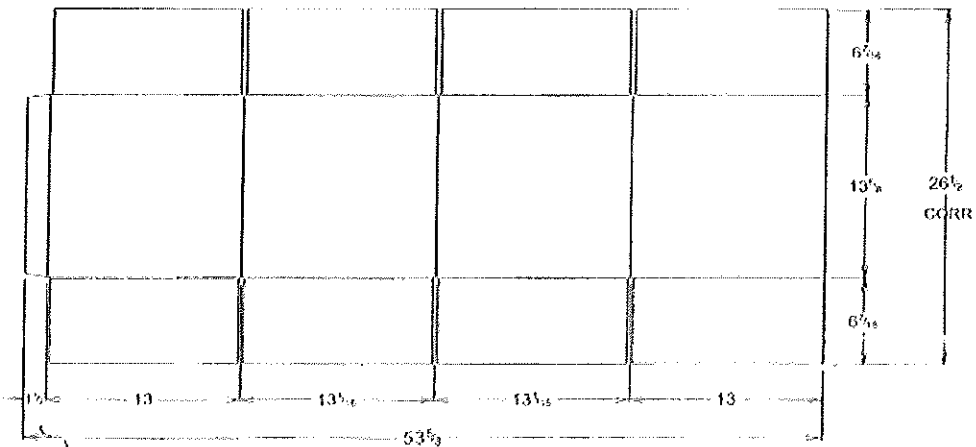
Bell Container Corp

CUST. BERRY_PLASTIC
SAMPLE #22773
STYLE GAP RSC
TEST 350DW
SIZE 12+3/4 x 12+3/4 x 13
DESIGNER CRAIG HURYK

DATE 03/22/2012
SALESMAN 25
IDENT J817308
IDENT
BLANK 26+1/2 x 63+5/8

BOARD COMBO: 42-23-42-23-42

M/F SCORES



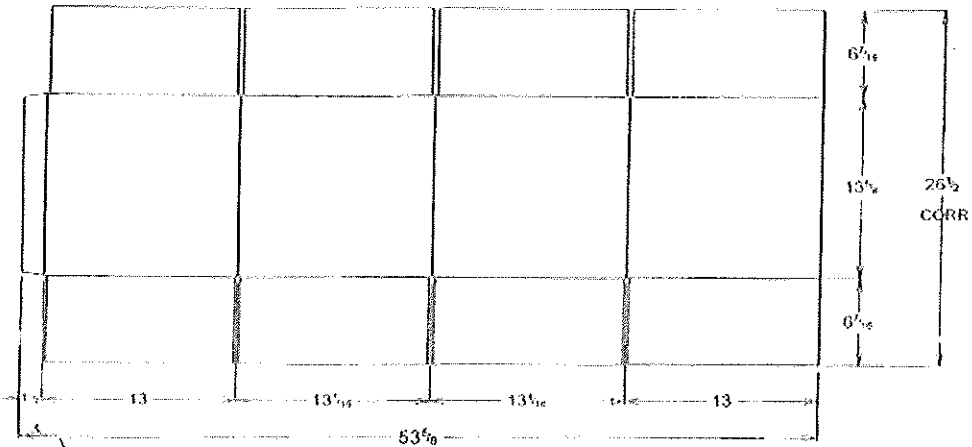
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SALESMAN 25
IDENT J817308
IDENT J817308
BLANK 26+1/2 x 53+5/8

350 DW HW ; BOARD CONBO: 42HW-23-42-23-12

M/F SCORES



HP 100

General Purpose Grade, Hot Melt
POPP Film Packaging Tape

Shurtape

TECHNICAL DATA

TYPICAL APPLICATIONS

- Sealing of light to medium weight packages
- Repair of packages
- Bundling

ADVANTAGES AND BENEFITS

- Aggressive rubber adhesive for a strong bond and long lasting seal
- For hand use or automated applicators
- Excellent bond on a wide range of substrates and surfaces

CONSTRUCTION

General Grade/Junction, General Purpose Grade
Backing: 25 micron biaxially oriented, cast
polypropylene film
Adhesive: Synthetic rubber resin

COLOR(S)

Clear (CU) Tan (TA)

STANDARD WIDTH(S)

48 mm 72 mm

STANDARD LENGTH(S)

50 m 100 m 914 m 1371 m 1828 m

Contact your Shurtape sales representative for other available sizes.

PHYSICAL PROPERTIES

	metric	in/oz
Thickness	1.0 mils	4.01 mm
Tensile Strength (longitudinal direction)	21 lbs/in width	36.8 N/10 mm
Tensile Strength (transverse direction)	36 lbs/in width	63.1 N/10 mm
Elongation	150 %	150 %
Adhesion to Stainless Steel	43 oz/in width	4.71 N/10 mm
Adhesion to Backing	18 oz/in width	1.97 N/10 mm
Holding Power to Fiberglass	10,000+ minutes	10,000+ minutes
Application Temperature Range	35 F to 110 F	2 C to 43 C
Service Temperature Range	20 F to 150 F	-7 C to 66 C

Physical and performance measurements shown above are standard from tests recommended by ASTM. Actual performance depends on Shurtape Technologies, LLC Quality Assurance and Technical Service Experiments and do not represent a guarantee of product performance. Individual results may vary slightly from these averages. The user should determine whether the product is fit for a particular purpose and is suitable for the user's intended application and use.

APPLICABLE STANDARDS

CGA-A-1684C; FDA Indirect Contact CFR 21, B, 175-105; FDA Indirect Contact CFR 21, 177.1520

STORAGE & USAGE CONDITIONS

Tape should be stored in its original packaging in a cool, dry area away from direct sunlight and should be used within 12 months of date of shipment. Surfaces to which tape is applied should be clean, dry and free of grease, oil or other contaminants.

Shurtape® is a registered trademark of Shurtape Technologies, LLC

Form # 06-01-100-458/211

Shurtape Technologies, LLC 113 West 35th Street, Hickory, NC 28601-1530 USA Phone 1-888-682-TAPE (10272) Fax 810-320-7851 www.shurtape.com
ISO 9001 CERTIFIED QUALITY SYSTEM

APPENDIX F - NOTE ON SUBSTITUTION OF WHITE LINER FOR KRAFT LINER

With respect to the corrugated outer carton

QUESTION

Can an already tested fibreboard box (CTL #3878, +BP1082, tested in April 2012) which was marked Bell Container Corporation, Newark, NJ with boxmakers certificate of 350# (42-23-42-23-42) and had tested to 339.0 lbs/in² Burst Strength, 128.6 (42.9/23.3/42.9/23.9/42.7) lbs/1000 ft² Combined Weight of Facings and 112.0 grams/m² average Cobb test, box size 12-3/4" x 12-3/4" x 13" (ID) containing same inner details and closed in the same manner substituted with the new box that differs only in the color of the outer facing be used without further testing the whole packaging?

RESPONSE

Our review of the Code of Federal Regulations Volume 49 reveals the following [Reference US DOT 49CFR Section 178.601 (c) (4) (i)] and based on the US DOT Response to Advanced Packaging Laboratories dated April 24, 1995:

"A different package is one that differs from a previously produced packaging in . . . material of construction . . ."

CONCLUSION

Based on the congruent results (below) for the MW/Kraft fibreboard box, we conclude that this box only differs to the brown box in the color of the outer liner and does not significantly differ from the previously tested Kraft/Kraft fibreboard in structural design, size, material of construction, strength characteristics of materials of construction, wall thickness and manner of construction. Based on the US DOT response dated April 24, 1995 to the same question "Corrugated fibreboard with the liner of different color would not be considered a different material of construction requiring new testing".

Style	Regular slotted container (International Box Code 0201); 1/8" gap between inner & outer flaps
Manufacturer	Bell Container Corporation, Newark, NJ
Size (mm, OD)	342 x 332 x 360 (13-7/16" x 13-1/8" x 14-1/4")
Size (mm, I)	324 x 324 x 330 (12-3/4" x 12-3/4" x 13")
Weight	835 grams (1.83 lbs)
Certification	350# (42MW-23-42-23-42);
Corrugations	MW/Kraft Vertical "BC" flute; 0.266" average caliper
Mfr's Joint	One (1) 38 mm (1-1/2") wide flap is glued inside
Bell Sample ID#	22827
Bell Item #	J817308

TEST RESULTS:

30 Minute Cobb Test (grams/m²)

Average Cobb – 109.84 grams/m² < 155 g/m² (PASS)

Basis Weight (lbs/1000 ft ²)		Bursting Strength (lbs/in ²)
Outer Liner	42.87	I/O 350, 350, 360, 365, 355.
"C" Medium	24.23	
Meddle Liner	43.52	O/I 335, 325, 325, 320, 330.
"B" Medium	24.2	
Inner Liner	43.19	Burst Strength – 341.5 lbs/in ²

Comb. Weight of Facings – 129.58 (lbs/1000 ft²)