HORIZON PTS

UN/ICAO/IMDG Approval Certificate
Including Air Transport

Horizon Package Testing Service Inc. is a current DOT UN Third Party Certification Agency under §107.403

Project ID: #4530 **Certificate Number: +CA2474**

Requesting Party:

Mr. Steve Clark
CKS Packaging
943 Trollingwood Road
Haw River, NC 27258

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Packaging Description

NOTE: Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per
49 CFR 178.602 (3) Designated Packaging Code: 4G Tested To: Packing Group II (Y)

A combination package (4-1 GAL) comprising four (4) 1-gallon (3.8 liter) blow molded round industrial style jugs tested with CRC screw cap closures with glued-in foam liners (alternate tested screw caps see page 4). Jugs are placed within a single wall Kraft/Kraft Regular Slotted Fiberboard Carton (RSC) Outer closure method tested with one (1) strip of 48mm wide pressure sensitive plastic tape one (1) strip top flap seam and one (1) strip bottom flap seam. ***Alternate Closure:*** one (1) strip of 48mm wide pressure sensitive plastic tape one (1) strip top flap seam and hot melt adhesive bottom closure. *The use of other packaging methods or components may render this report invalid.*

Packaging Performance Tests

TEST	SPEC	TEST LEVEL	RESULT
COBB TEST	UN Para 6.1.4.12.1	121.2 g/m^2	Pass
DROP TEST	UN Para 6.1.5.3	1.2 meter	Pass
STACKING TEST	UN Para 6.1.5.6	154.8 kg	Pass
HYDROSTATIC TEST	UN Para 6.1.5.5	100 kPa	Pass
VIBRATION STANDARD	49CFR 178.608	1 hour	Pass

UN/DOT Package Marking

In accordance with the US Code of Federal Regulations Volume 49 Section 178.601, I certify that the samples of the Package, prepared as for transport, described herein and tested in the manner summarized above, successfully pass the tests according to the criteria specified in paragraphs 6.1.4.12.1, 6.1.5.3, 6.1.5.5 and 6.1.5.6 as set forth in the UN Recommendations of the Committee of Experts on the Transportation of Dangerous Goods, Chapter 6, and US 49CFR Section 178.601 (1) and 178.608, that the packages may bear the marking:

4G / Y 19.6 / S / *
USA/+CA2474

* Year of Manufacture

By_____ Date: August 10, 2022

JAMES A. STEVENS
HORIZON PACKAGE TESTING SERVICE, INC. CERTIFICATION OFFICER

August 10, 2022

CKS Packaging
943 Trollingwood Road
Haw River, NC 27258
336-578-5800

Attn: Mr. Steve Clark

Gentlemen/Mesdames:

RE: Summary of Packaging Performance for UN/IACO/IMDG Including Air Transport Certification
Transport of Dangerous Goods, Packing Group II
Corrugated Box Containing Four (4) 1-Gallon Industrial Round Style Plastic Jugs
Certification: +CA2474
Project ID: #4530
Customer ID: 4-1 GAL

Tests performed to certify compliance with the UN Recommendations of the Committee of Experts on the Transport of Dangerous Goods, Chapter 6, Twelfth Revised Edition and US 49CFR Section 178.608, as follows:

TEST	SPEC	TEST LEVEL	RESULT
COBB TEST	UN Para 6.1.4.12.1	121.2 g/m^2	Pass
DROP TEST	UN Para 6.1.5.3	1.2 meter	Pass
STACKING TEST	UN Para 6.1.5.6	154.8 kg	Pass
HYDROSTATIC TEST	UN Para 6.1.5.5	100 kPa	Pass
VIBRATION STANDARD	49CFR 178.608	1 hour	Pass

The packages satisfy the requirements for a fiberboard box (4G) outer packaging tested to Packing Group II specifications for a Type Y certificate. *The use of other packaging methods or components may render this report invalid.*

NOTE: 49CFR 178.601 (e) For combination packaging, periodic retests must be conducted at least once every 24-months. Re-certification due date is August 10, 2024

Respectfully submitted,
Horizon Package Testing Service
horizonpts@yahoo.com

James A. Stevens
Certification Officer
JS
Encl.

M Number Renewals

As of August 2022

All plants with Combination packages – 4G; Single Jerrican 3H, Single gallon 1H; or Special Provision 386.

M6295 – 5515 Tulane Drive, Atlanta, GA 30336

M6296 – 300 Fisk Drive, Atlanta, GA 30336

M6297 – 333 W. Michigan Street, Orlando, FL 32806

M6298 – 109 West Felix, Fort Worth, TX 76115

M6299 – 943 Trollingwood Road, Haw River, NC 27258

M6300 – 4020 N. 29th Terrace, Hollywood, FL 33020

Ken Anderson

Sr. Director Quality and EHS

3.8-Liter Jugs with Master CRC Screw Cap Packing Overview
Page 1 of 1

ITEM	PART NUMBER
RSC Box	4 -1 Gallon
48mm Wide Tape	Scotch 375-0
1-Gallon Jug	MA8114
Screw Cap	1025252
1A - Alternate RSC Bottom Closure, Hot Melt Adhesive	Dura Pro M-204-1

1

1A

2

3

Photo 1: Assemble the RSC by placing one (1) strip of 48mm wide pressure sensitive plastic tape, centered longitudinally along and spanning the **bottom** flap seam, extending a minimum of 2-inches onto sides of carton with tape adhered firmly in place. Major and minor flaps have a 5mm gap when closed.

Photo 1A: Alternate Method – Install 2 beads of hot melt adhesive on the inner side of both major flaps approximately 1-inch and 1+3/4-inch from each flap edge, press major flaps onto minor flaps until held firmly in place. Major flaps meet when closed.

Photo 2: Insert four (4) filled and closed 3.8 liter industrial round jugs into the shipper with the handles facing the center. 24 in/lb screw cap application torque.

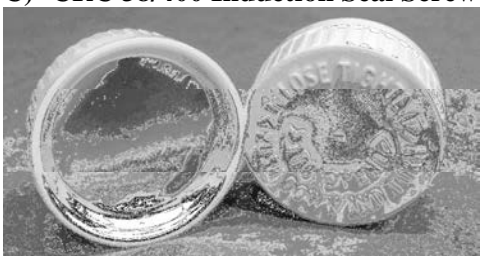
Photo 3: Complete assembly by placing one (1) strip of 48mm wide pressure sensitive plastic tape, centered longitudinally along and spanning the **top** flap seam, extending a minimum of 2-inches onto sides of carton with tape adhered firmly in place. Major and minor flaps have a 5mm gap when closed.

NOTE: Tested screw caps see page 5

Tested Screw Caps per 49CFR 178.601 Variation 1

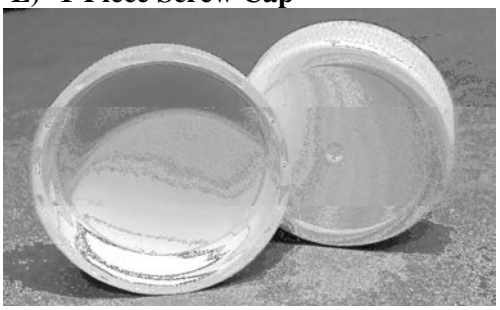
B) Master CRC Screw Cap

C) CRC 38/400 Induction Seal Screw Cap



D) 1-Piece Induction Seal Screw Cap

E) 1-Piece Screw Cap



Packages Tested

Four (4) 1-gallon (3.8 liter) blow molded round industrial style jugs tested with CRC screw cap closures with glued-in foam liners (alternate tested screw caps see page 4). Jugs are placed within a single wall Kraft/Kraft Regular Slotted Fiberboard Carton (RSC) Outer closure method tested with one (1) strip of 48mm wide pressure sensitive plastic tape one (1) strip top flap seam and one (1) strip bottom flap seam. ***Alternate Closure:*** one (1) strip of 48mm wide pressure sensitive plastic tape one (1) strip top flap seam and hot melt adhesive bottom closure.

TEST	SPEC	Test Weight	Sample Number
DROP TEST	UN Para 6.1.5.3	19.6 kg	1, 2, 3, 4 and 5
STACKING TEST	UN Para 6.1.5.6	19.6 kg	6,7 and 8
VIBRATION STANDARD	49CFR 178.608	19.6 kg	9, 10 and 11

4-1 GAL Package

Cobb Test

Guidelines: ISO 535:1991; *UN* Para 6.1.4.12.1; ASTM 4919 (13.1)
Methods: The absorption of water over a 30-minute period must not be greater than 155 g/m². Average the results from five (5) test specimens. Weigh each specimen before testing and place under the test apparatus consisting of a metal ring (cross-sectional area of 100 square cm) clamped to a flat base plate. Pour 100 ml of water into the ring and let stand for the 30-minute period. Pour the water from the ring 15 seconds before the expiration of the test period, blot the surface with blotting paper and roller, and immediately weigh. The difference between the original and final weight, multiplied by 100, is the weight of water absorbed, in grams per square meter. Samples were conditioned at +23°C and 50% RH for 24 hours prior to testing.

***Results*:** **Pass**

Sample	Original Weight, gr	Final Weight, gr	*Difference, g/m²*
1	*15.39	**16.61	122
2	15.16	16.36	120
3	15.46	16.64	118
4	15.34	16.56	122
5	15.13	16.37	124

- Five (5) samples reveal an average Cobb of **121.2 g/m²**

*

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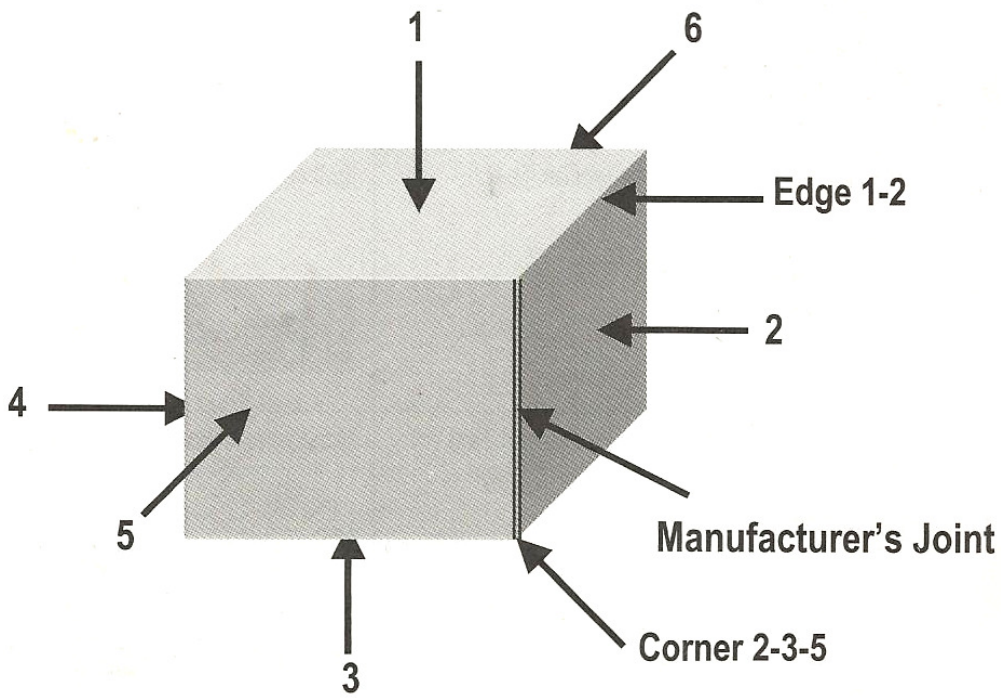
Box Testing Orientation

1. **Identify Faces** according to the diagram below:



2. **Identify Edges** using the numbers of the two faces forming that edge.
   Example: Edge 1-2 is the edge formed by face 1 and face 2 of the package.

3. **Identify Corners** using the numbers of the three faces that meet to form that corner.
   Example: corner 2-3-5 is the corner formed by face 2, face 3 and face 5 of the package.

FACES TESTED

Drop:	Stack:	Vibration:
#1 3	#6 1&3	#9 3
#2 1	#7 1&3	#10 3
#3 2	#8 1&3	#11 3
#4 5		
#5 1-2-5		

CRC Screw Cap (B) Taped Closure

Per 49CFR 178.601 Variation 1

Drop Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Stack Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)

Hydrostatic Pressure Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.605, *and* 173.199 (b) (4), ASTM D4919 (9.1)

Closure	CRC Screw Cap
Manufacturer	Berry Plastics (812-424-2904) 101 Oakley Street Evansville, IN 47710
Material	Polypropylene
Tare Weight	8.40 grams
Size (mm, OD)	45.18 X 17.99 (D x H)
Size (in, OD)	1.77 X 0.708 (D x H)
Liner	Laminated Coated Foam
Tare Weight	0.40 grams
Size (mm, OD)	34.44 X 1.04 (D x thickness)
Size (in, OD)	1.35 X 0.041 (D x thickness)
Application Torque	23 in/lbs, applied
Method	Mark-10 Cap Torque Tester

Drop Test - CRC Screw Cap (B) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Methods: Five samples, one for each drop, are required for testing. First drop: Flat o bottom (using 1st sample). Second drop: Flat on top (using 2nd sample). Third drop: Flat on the long side (using 3rd sample). Fourth drop: Flat on short side (using 4th sample). Fifth drop: On a corner (using 5th sample). Testing of 4G combination packages with plastic inner receptacles intended for liquids is performed when the packagings have been filled to 98% of capacity and the completed packagings have been reduced to -18°C prior to testing.

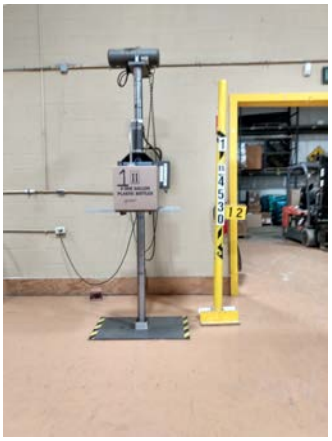
Criteria for passing the test: For combination packagings, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging. The package/product is dropped from 1.2 meter.

***Results*:**

TEST with Photo	RESULT
• Sample #1 is impacted flat on the #3 face.	No breakage/leakage
• Sample #2 is impacted flat on the #1 face.	No breakage/leakage
• Sample #3 is impacted flat on the #4 face.	No breakage/leakage
• Sample #4 is impacted flat on the #6 face.	No breakage/leakage
• Sample #5 is impacted diagonally on the #1-2-5 corner. (top mfr's joint corner sustained major deformation)	No breakage/leakage

After the completion of the drop test samples #1 thru #5 were placed on their sides and observed for any leakage, each were then opened and inspected, samples #1 thru #5 sustained no damage to the inner containers, sample #5 sustained major deformation on the 1-2-5 corner.

1.2 Meters



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Drop Test - CRC Screw Cap (B) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Methods: Five samples, one for each drop, are required for testing. First drop: Flat o bottom (using 1st sample). Second drop: Flat on top (using 2nd sample). Third drop: Flat on the long side (using 3rd sample). Fourth drop: Flat on short side (using 4th sample). Fifth drop: On a corner (using 5th sample). Testing of 4G combination packages with plastic inner receptacles intended for liquids is performed when the packagings have been filled to 98% of capacity and the completed packagings have been reduced to -18°C prior to testing.

Criteria for passing the test: For combination packagings, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging. The package/product is dropped from 1.2 meter.

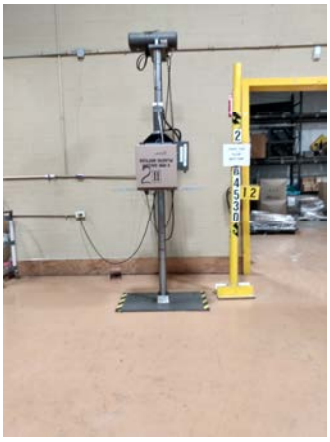
***Results*:**

TEST with Photo	RESULT
• Sample #1 is impacted flat on the #3 face.	No breakage/leakage
• Sample #2 is impacted flat on the #1 face.	No breakage/leakage
• Sample #3 is impacted flat on the #2 face.	No breakage/leakage
• Sample #4 is impacted flat on the #5 face.	No breakage/leakage
• Sample #5 is impacted diagonally on the #1-2-5 corner. (top mfr's joint corner sustained major deformation)	No breakage/leakage

After the completion of the drop test samples #1 thru #5 were placed on their sides and observed for any leakage, each were then opened and inspected, samples #1 thru #5 sustained no damage to the inner containers, sample #5 sustained major deformation on the 1-2-5 corner.

1.2 Meters

1



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Stacking Test - CRC Screw Cap (B) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)
Methods: Three test containers are subjected to a force applied to the top surface equal to the total weight of identical packages stacked on it in transit. The minimum height of the stack is 3-meters. Three (3) filled containers are closed as for shipment and subjected to a free standing compression load of **154.8 kg**, equivalent to a 3-meter high stack of identical packages continuously for 24 hours. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Free Standing ___X_____
Guided Load _____

Criteria for passing the test: No test sample may leak. No sample may show any deterioration, which would adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages. The following details the compressive load applied in the stacking test:

Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

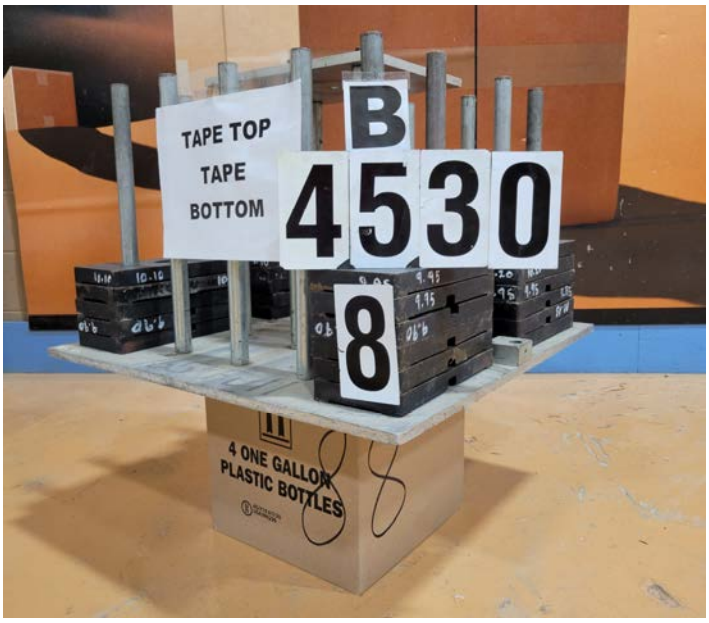
Stacking Load = [(SH/PH) = n -1] x MGW

[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg (341.2 lbs)

TEST: Samples #6 - #8 are subjected to an actual top load of 161.0 kg

RESULTS: After completion of the stack test samples #6 thru #8 were placed on their sides, each were then opened and inspected, each sample, after completion has shown 5mm ±2 compression after 24 hours.
NOTE: Stacking stability was not assessed since a guided load test was not performed

Stack Test (sample #8 photo)



Actual Top Load of 161.0 kg (355.0 lbs)

Stacking Test - CRC Screw Cap (B) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)
Methods: Three test containers are subjected to a force applied to the top surface equal to the total weight of identical packages stacked on it in transit. The minimum height of the stack is 3-meters. Three (3) filled containers are closed as for shipment and subjected to a free standing compression load of **154.8 kg**, equivalent to a 3-meter high stack of identical packages continuously for 24 hours. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Free Standing ___X_____
Guided Load _____

Criteria for passing the test: No test sample may leak. No sample may show any deterioration, which would adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages. The following details the compressive load applied in the stacking test:

Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

Stacking Load = [(SH/PH) = n -1] x MGW

[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg (341.2 lbs)

TEST: Samples #6 - #8 are subjected to an actual top load of 161.0 kg

RESULTS: After completion of the stack test samples #6 thru #8 were placed on their sides, each were then opened and inspected, each sample, after completion has shown 5mm ±2 compression after 24 hours.
NOTE: Stacking stability was not assessed since a guided load test was not performed

Stack Test Sample #6 photo)

Actual Top Load of 161.0 kg (355.0 lbs)

Hydrostatic Pressure Test - CRC Screw Cap (B)

Guidelines: *Code of Federal Regulations 49*, Section 178.605, *and* 173.199 (b) (4), ASTM D4919 (9.1)

Methods: Plastic inner receptacles are subjected to the test pressure for 30 minutes. The hydraulic pressure is applied through a leak-proof fitting to three (3) inner receptacles. The receptacles must be supported in a manner that does not invalidate the test. The test pressure must be applied continuously and evenly, and it must be kept constant throughout test period. The units are subjected to the test pressure for thirty (30) minutes each at not less than 95 kPa. Containers submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Criteria for Passing the Test: The receptacle passes the test if, for each sample tested, there is no leakage of liquid from the receptacle.

***Results*:** **Each samples body expanded as the pressure was applied, no leakage occurred**

TEST	RESULT
Samples receptacles are subjected to an internal pressure of 100 kPa (14.5 psi) for 30 minutes.	No rupture/leakage

Hydrostatic Pressure Test – CRC Screw Cap (B)

Vibration Standard - CRC Screw Cap (B) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.608. ASTM D4919 (11.1)
Methods: Three packages are filled and closed as for shipment. Testing is performed for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm. The packages are left free to move vertically, bounce and rotate in their normal shipping orientation. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Rotary Vibration Table _____
Vertical Linier Vibration Table ___X___

Criteria for Passing the Test: A packaging passes the Vibration Standard if there is no rupture or leakage from any of the packages. No test sample should show any deterioration, which could adversely affect transportation safety, or any distortion liable to reduce packaging strength.

TEST: Samples #9 - #11 are vibrated for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm.

Immediately following the test, each package must be removed from the platform, turned on its side and observed for any evidence of leakage.

RESULTS: No damage/leakage, each sample was opened and inspected after completion, inner packagings were intact, outer packaging did show minor scuffing on the bottom #3 face, inner packagings remained closed and sustained no damage, outer packaging closure was intact.

Vibration Standard

Vibration Standard - CRC Screw Cap (B) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.608. ASTM D4919 (11.1)
Methods: Three packages are filled and closed as for shipment. Testing is performed for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm. The packages are left free to move vertically, bounce and rotate in their normal shipping orientation. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Rotary Vibration Table _____
Vertical Linier Vibration Table ___X___

Criteria for Passing the Test: A packaging passes the Vibration Standard if there is no rupture or leakage from any of the packages. No test sample should show any deterioration, which could adversely affect transportation safety, or any distortion liable to reduce packaging strength.

TEST: Samples #9 - #11 are vibrated for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm.

Immediately following the test, each package must be removed from the platform, turned on its side and observed for any evidence of leakage.

RESULTS: No damage/leakage, each sample was opened and inspected after completion, inner packagings were intact, outer packaging did show minor scuffing on the bottom #3 face, inner packagings remained closed and sustained no damage, outer packaging closure was intact.

Vibration Standard

CRC 38/400 Induction Seal Cap (C)

Per 49CFR 178.601 Variation 1
Drop Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Stack Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)

Hydrostatic Pressure Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.605, *and* 173.199 (b) (4), ASTM D4919 (9.1)

Closure	CR 38/400 Induction Seal Screw Cap
Manufacturer	Berry Plastics (812-424-2904) 101 Oakley Street Evansville, IN 47710
Part No.	QIM-500-A109
Material	Polypropylene
Tare Weight	7.40 grams
Size (mm, OD)	44.52 X 16.65 (D x H)
Size (in, OD)	1.75 X 0.655 (D x H)
Liner	Laminated Coated Foam/Foil Induction Seal
Tare Weight	0.60 grams
Size (mm, OD)	37.18 X 1.13 (D x thickness)
Size (in, OD)	1.37 X 0.045 (D x thickness)
Application Torque	23 in/lbs, applied
Method	Mark-10 Cap Torque Tester
Seal	Foil Heat Induction Seal
Method	Electromagnetic Induction Sealing Machine DGYF-500A

Drop Test - CRC 38/400 Induction Seal Cap (C) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Methods: Five samples, one for each drop, are required for testing. First drop: Flat o bottom (using 1st sample). Second drop: Flat on top (using 2nd sample). Third drop: Flat on the long side (using 3rd sample). Fourth drop: Flat on short side (using 4th sample). Fifth drop: On a corner (using 5th sample). Testing of 4G combination packages with plastic inner receptacles intended for liquids is performed when the packagings have been filled to 98% of capacity and the completed packagings have been reduced to -18°C prior to testing.

Criteria for passing the test: For combination packagings, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging. The package/product is dropped from 1.2 meter.

***Results*:**

TEST with Photo	RESULT
• Sample #1 is impacted flat on the #3 face.	No breakage/leakage
• Sample #2 is impacted flat on the #1 face.	No breakage/leakage
• Sample #3 is impacted flat on the #4 face.	No breakage/leakage
• Sample #4 is impacted flat on the #5 face.	No breakage/leakage
• Sample #5 is impacted diagonally on the #1-2-5 corner. (top mfr's joint corner sustained major deformation)	No breakage/leakage

After the completion of the drop test samples #1 thru #5 were placed on their sides and observed for any leakage, each were then opened and inspected, samples #1 thru #5 sustained no damage to the inner containers, sample #5 sustained major deformation on the 1-2-5 corner.

1.2 Meters

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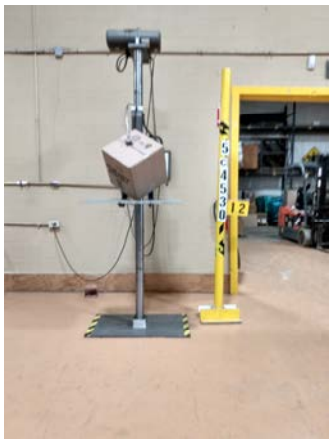

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Drop Test - CRC 38/400 Induction Seal Cap (C) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Methods: Five samples, one for each drop, are required for testing. First drop: Flat o bottom (using 1st sample). Second drop: Flat on top (using 2nd sample). Third drop: Flat on the long side (using 3rd sample). Fourth drop: Flat on short side (using 4th sample). Fifth drop: On a corner (using 5th sample). Testing of 4G combination packages with plastic inner receptacles intended for liquids is performed when the packagings have been filled to 98% of capacity and the completed packagings have been reduced to -18°C prior to testing.

Criteria for passing the test: For combination packagings, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging. The package/product is dropped from 1.2 meter.

***Results*:**

TEST with Photo	RESULT
• Sample #1 is impacted flat on the #3 face.	No breakage/leakage
• Sample #2 is impacted flat on the #1 face.	No breakage/leakage
• Sample #3 is impacted flat on the #4 face.	No breakage/leakage
• Sample #4 is impacted flat on the #5 face.	No breakage/leakage
• Sample #5 is impacted diagonally on the #1-2-5 corner. (top mfr's joint corner sustained major deformation)	No breakage/leakage

After the completion of the drop test samples #1 thru #5 were placed on their sides and observed for any leakage, each were then opened and inspected, samples #1 thru #5 sustained no damage to the inner containers, sample #5 sustained major deformation on the 1-2-5 corner.

1.2 Meters

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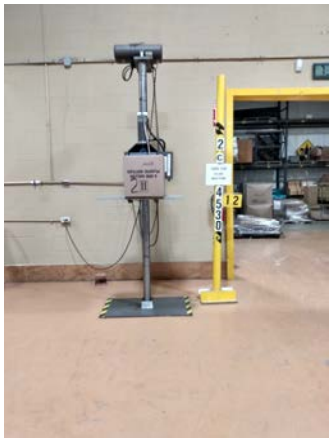

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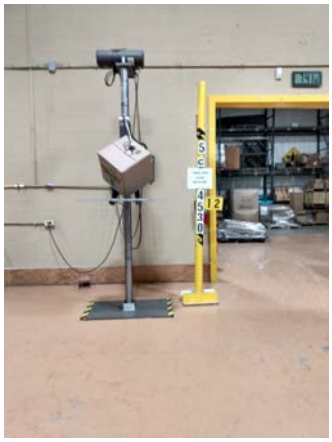

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Stacking Test - CRC 38/400 Induction Seal Cap (C) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)
Methods: Three test containers are subjected to a force applied to the top surface equal to the total weight of identical packages stacked on it in transit. The minimum height of the stack is 3-meters. Three (3) filled containers are closed as for shipment and subjected to a free standing compression load of **154.8 kg**, equivalent to a 3-meter high stack of identical packages continuously for 24 hours. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Free Standing ___X_____
Guided Load _____

Criteria for passing the test: No test sample may leak. No sample may show any deterioration, which would adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages. The following details the compressive load applied in the stacking test:

Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

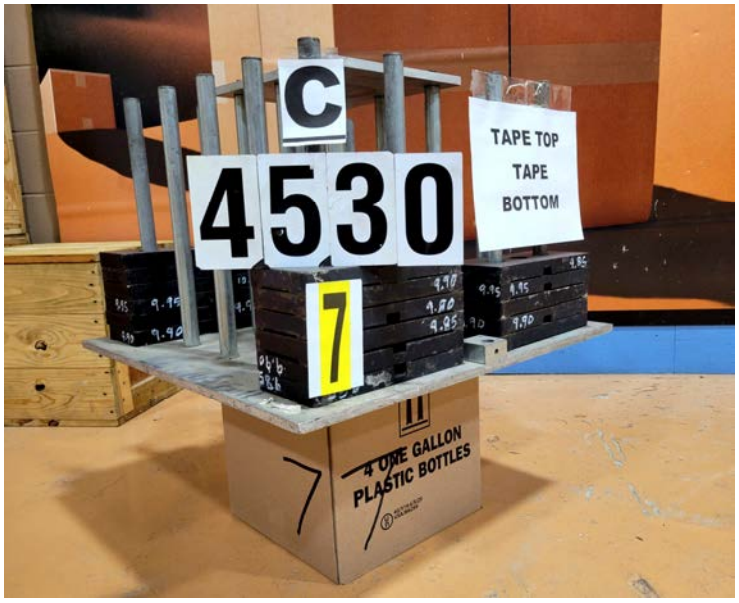
Stacking Load = [(SH/PH) = n -1] x MGW

[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg (341.2 lbs)

TEST: Samples #6 - #8 are subjected to an actual top load of 161.0 kg

RESULTS: After completion of the stack test samples #6 thru #8 were placed on their sides, each were then opened and inspected, each sample, after completion has shown 5mm ±2 compression after 24 hours.
NOTE: Stacking stability was not assessed since a guided load test was not performed

Stack Test (sample #7 photo)



Actual Top Load of 161.0 kg (355.0 lbs)

Stacking Test - CRC 38/400 Induction Seal Cap (C) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)
Methods: Three test containers are subjected to a force applied to the top surface equal to the total weight of identical packages stacked on it in transit. The minimum height of the stack is 3-meters. Three (3) filled containers are closed as for shipment and subjected to a free standing compression load of **154.8 kg**, equivalent to a 3-meter high stack of identical packages continuously for 24 hours. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Free Standing ___X_____
Guided Load _____

Criteria for passing the test: No test sample may leak. No sample may show any deterioration, which would adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages. The following details the compressive load applied in the stacking test:

Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

Stacking Load = [(SH/PH) = n -1] x MGW

[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg (341.2 lbs)

TEST: Samples #6 - #8 are subjected to an actual top load of 161.0 kg

RESULTS: After completion of the stack test samples #6 thru #8 were placed on their sides, each were then opened and inspected, each sample, after completion has shown 5mm ±2 compression after 24 hours.
NOTE: Stacking stability was not assessed since a guided load test was not performed

Stack Test (sample #7 photo)

Actual Top Load of 161.0 kg (355.0 lbs)

Hydrostatic Pressure Test – CRC 38/400 Induction Seal Cap (C)

Guidelines: *Code of Federal Regulations 49*, Section 178.605, *and* 173.199 (b) (4), ASTM D4919 (9.1)

Methods*:* Plastic inner receptacles are subjected to the test pressure for 30 minutes. The hydraulic pressure is applied through a leak-proof fitting to three (3) inner receptacles. The receptacles must be supported in a manner that does not invalidate the test. The test pressure must be applied continuously and evenly, and it must be kept constant throughout test period. The units are subjected to the test pressure for thirty (30) minutes each at not less than 95 kPa. Containers submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Criteria for Passing the Test: The receptacle passes the test if, for each sample tested, there is no leakage of liquid from the receptacle.

***Results*:** **Each samples body expanded as the pressure was applied, no leakage occurred**

TEST	RESULT
Samples receptacles are subjected to an internal pressure of 100 kPa (14.5 psi) for 30 minutes.	No rupture/leakage

Hydrostatic Pressure Test – CR 38/400 Induction Seal Cap

Vibration Standard - CRC 38/400 Induction Seal Cap (C) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.608. ASTM D4919 (11.1)
Methods: Three packages are filled and closed as for shipment. Testing is performed for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm. The packages are left free to move vertically, bounce and rotate in their normal shipping orientation. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Rotary Vibration Table _____
Vertical Linier Vibration Table ___X___

Criteria for Passing the Test: A packaging passes the Vibration Standard if there is no rupture or leakage from any of the packages. No test sample should show any deterioration, which could adversely affect transportation safety, or any distortion liable to reduce packaging strength.

TEST: Samples #9 - #11 are vibrated for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm.

Immediately following the test, each package must be removed from the platform, turned on its side and observed for any evidence of leakage.

RESULTS: No damage/leakage, each sample was opened and inspected after completion, inner packagings were intact, outer packaging did show minor scuffing on the bottom #3 face, inner packagings remained closed and sustained no damage, outer packaging closure was intact.

Vibration Standard

Vibration Standard - CRC 38/400 Induction Seal Cap (C) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.608. ASTM D4919 (11.1)
Methods: Three packages are filled and closed as for shipment. Testing is performed for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm. The packages are left free to move vertically, bounce and rotate in their normal shipping orientation. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Rotary Vibration Table _____
Vertical Linier Vibration Table ___X___

Criteria for Passing the Test: A packaging passes the Vibration Standard if there is no rupture or leakage from any of the packages. No test sample should show any deterioration, which could adversely affect transportation safety, or any distortion liable to reduce packaging strength.

TEST: Samples #9 - #11 are vibrated for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm.

Immediately following the test, each package must be removed from the platform, turned on its side and observed for any evidence of leakage.

RESULTS: No damage/leakage, each sample was opened and inspected after completion, inner packagings were intact, outer packaging did show minor scuffing on the bottom #3 face, inner packagings remained closed and sustained no damage, outer packaging closure was intact.

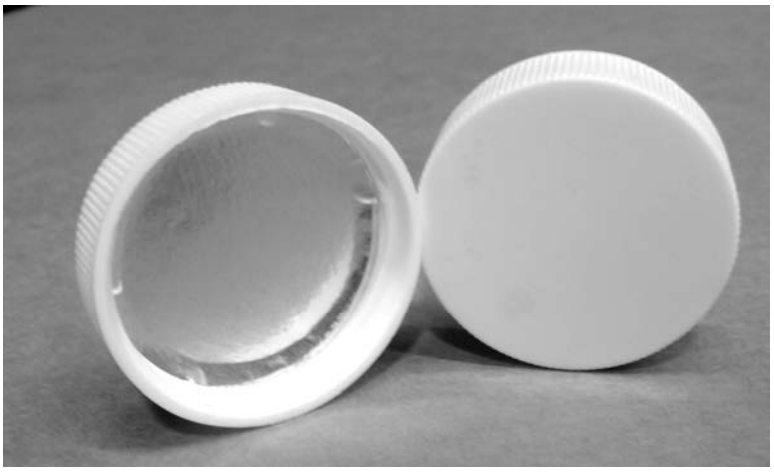
Vibration Standard

1-Piece Induction Seal Cap (D)

Per 49CFR 178.601 Variation 1
Drop Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Stack Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)

Hydrostatic Pressure Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.605, *and* 173.199 (b) (4), ASTM D4919 (9.1)



Closure	1-Piece Induction Seal Screw Cap
Manufacturer	Phoenix Closures Incorporated (630-544-3475) 1899 High Grove Lane Naperville, IL 60540
Part No.	38-400-6213 S
Material	Polypropylene
Tare Weight	2.80 grams
Size (mm, OD)	40.30 X 11.33 (D x H)
Size (in, OD)	1.58 X 0.446 (D x H)
Liner	Paper-Pulp/Foil Induction Seal
Tare Weight	0.50 grams
Size (mm, OD)	36.60 X 0.71 (D x thickness)
Size (in, OD)	1.44 X 0.028 (D x thickness)
Application Torque	23 in/lbs, applied
Method	Mark-10 Cap Torque Tester
Seal	Foil Heat Induction Seal
Method	Electromagnetic Induction Sealing Machine DGYF-500A

Drop Test – 1-Piece Induction Seal Cap (D) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Methods: Five samples, one for each drop, are required for testing. First drop: Flat o bottom (using 1st sample). Second drop: Flat on top (using 2nd sample). Third drop: Flat on the long side (using 3rd sample). Fourth drop: Flat on short side (using 4th sample). Fifth drop: On a corner (using 5th sample). Testing of 4G combination packages with plastic inner receptacles intended for liquids is performed when the packagings have been filled to 98% of capacity and the completed packagings have been reduced to -18°C prior to testing.

Criteria for passing the test: For combination packagings, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging. The package/product is dropped from 1.2 meter.

***Results*:**

TEST with Photo	RESULT
• Sample #1 is impacted flat on the #3 face.	No breakage/leakage
• Sample #2 is impacted flat on the #1 face.	No breakage/leakage
• Sample #3 is impacted flat on the #2 face.	No breakage/leakage
• Sample #4 is impacted flat on the #6 face.	No breakage/leakage
• Sample #5 is impacted diagonally on the #1-2-5 corner. (top mfr's joint corner sustained major deformation)	No breakage/leakage

After the completion of the drop test samples #1 thru #5 were placed on their sides and observed for any leakage, each were then opened and inspected, samples #1 thru #5 sustained no damage to the inner containers, sample #5 sustained major deformation on the 1-2-5 corner.

1.2 Meters

1

2

3

4

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Drop Test – 1-Piece Induction Seal Cap (D) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Methods: Five samples, one for each drop, are required for testing. First drop: Flat o bottom (using 1st sample). Second drop: Flat on top (using 2nd sample). Third drop: Flat on the long side (using 3rd sample). Fourth drop: Flat on short side (using 4th sample). Fifth drop: On a corner (using 5th sample). Testing of 4G combination packages with plastic inner receptacles intended for liquids is performed when the packagings have been filled to 98% of capacity and the completed packagings have been reduced to -18°C prior to testing.

Criteria for passing the test: For combination packagings, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging. The package/product is dropped from 1.2 meter.

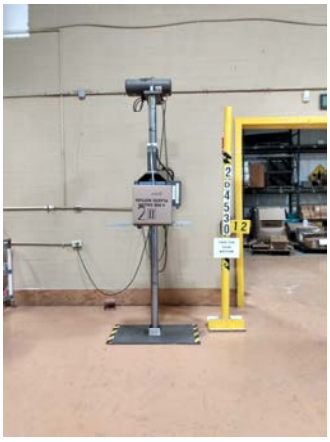
***Results*:**

TEST with Photo	RESULT
• Sample #1 is impacted flat on the #3 face.	No breakage/leakage
• Sample #2 is impacted flat on the #1 face.	No breakage/leakage
• Sample #3 is impacted flat on the #4 face.	No breakage/leakage
• Sample #4 is impacted flat on the #6 face.	No breakage/leakage
• Sample #5 is impacted diagonally on the #1-2-5 corner. (top mfr's joint corner sustained major deformation)	No breakage/leakage

After the completion of the drop test samples #1 thru #5 were placed on their sides and observed for any leakage, each were then opened and inspected, samples #1 thru #5 sustained no damage to the inner containers, sample #5 sustained major deformation on the 1-2-5 corner.

1.2 Meters

1



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3

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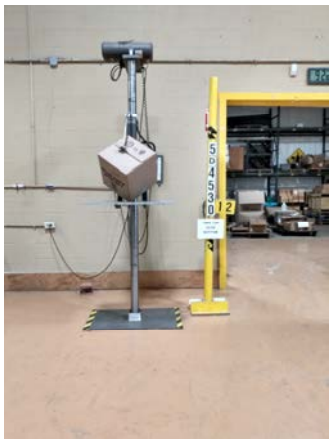

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Stacking Test – 1-Piece Induction Seal Cap (D) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)
Methods: Three test containers are subjected to a force applied to the top surface equal to the total weight of identical packages stacked on it in transit. The minimum height of the stack is 3-meters. Three (3) filled containers are closed as for shipment and subjected to a free standing compression load of **154.8 kg**, equivalent to a 3-meter high stack of identical packages continuously for 24 hours. . Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Free Standing ___X_____
Guided Load _____

Criteria for passing the test: No test sample may leak. No sample may show any deterioration, which would adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages. The following details the compressive load applied in the stacking test:

Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

Stacking Load = [(SH/PH) = n -1] x MGW

[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg (341.2 lbs)

TEST: Samples #6 - #8 are subjected to an actual top load of 161.0 kg

RESULTS: After completion of the stack test samples #6 thru #8 were placed on their sides, each were then opened and inspected, each sample, after completion has shown 7mm ±2 compression after 24 hours.
NOTE: Stacking stability was not assessed since a guided load test was not performed

Stack Test (sample #6 photo)

Actual Top Load of 161.0 kg (355.0 lbs)

Stacking Test – 1-Piece Induction Seal Cap (D) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)
Methods: Three test containers are subjected to a force applied to the top surface equal to the total weight of identical packages stacked on it in transit. The minimum height of the stack is 3-meters. Three (3) filled containers are closed as for shipment and subjected to a free standing compression load of **154.8 kg**, equivalent to a 3-meter high stack of identical packages continuously for 24 hours. . Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Free Standing ___X_____
Guided Load _____

Criteria for passing the test: No test sample may leak. No sample may show any deterioration, which would adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages. The following details the compressive load applied in the stacking test:

Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

Stacking Load = [(SH/PH) = n -1] x MGW

[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg (341.2 lbs)

TEST: Samples #6 - #8 are subjected to an actual top load of 161.0 kg

RESULTS: After completion of the stack test samples #6 thru #8 were placed on their sides, each were then opened and inspected, each sample, after completion has shown 7mm ±2 compression after 24 hours.
NOTE: Stacking stability was not assessed since a guided load test was not performed

Stack Test (sample #8 photo)

Actual Top Load of 161.0 kg (355.0 lbs)

Hydrostatic Pressure Test – 1-Piece Induction Seal Cap (D)

Guidelines: *Code of Federal Regulations 49*, Section 178.605, *and* 173.199 (b) (4), ASTM D4919 (9.1)

Methods: Plastic inner receptacles are subjected to the test pressure for 30 minutes. The hydraulic pressure is applied through a leak-proof fitting to three (3) inner receptacles. The receptacles must be supported in a manner that does not invalidate the test. The test pressure must be applied continuously and evenly, and it must be kept constant throughout test period. The units are subjected to the test pressure for thirty (30) minutes each at not less than 95 kPa. Containers submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Criteria for Passing the Test: The receptacle passes the test if, for each sample tested, there is no leakage of liquid from the receptacle.

***Results*:** **Each samples body expanded as the pressure was applied, no leakage occurred**

TEST	RESULT
Samples receptacles are subjected to an internal pressure of 100 kPa (14.5 psi) for 30 minutes.	No rupture/leakage

Hydrostatic Pressure Test – 1-Piece Induction Seal Cap

Vibration Standard - 1-Piece Induction Seal Cap (D) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.608. ASTM D4919 (11.1)
Methods: Three packages are filled and closed as for shipment. Testing is performed for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm. The packages are left free to move vertically, bounce and rotate in their normal shipping orientation. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Rotary Vibration Table _____
Vertical Linier Vibration Table ___X___

Criteria for Passing the Test: A packaging passes the Vibration Standard if there is no rupture or leakage from any of the packages. No test sample should show any deterioration, which could adversely affect transportation safety, or any distortion liable to reduce packaging strength.

TEST: Samples #9 - #11 are vibrated for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm.

Immediately following the test, each package must be removed from the platform, turned on its side and observed for any evidence of leakage.

RESULTS: No damage/leakage, each sample was opened and inspected after completion, inner packagings were intact, outer packaging did show minor scuffing on the bottom #3 face, inner packagings remained closed and sustained no damage, outer packaging closure was intact.

Vibration Standard

Vibration Standard - 1-Piece Induction Seal Cap (D) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.608. ASTM D4919 (11.1)
Methods: Three packages are filled and closed as for shipment. Testing is performed for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm. The packages are left free to move vertically, bounce and rotate in their normal shipping orientation. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Rotary Vibration Table _____
Vertical Linier Vibration Table ___X___

Criteria for Passing the Test: A packaging passes the Vibration Standard if there is no rupture or leakage from any of the packages. No test sample should show any deterioration, which could adversely affect transportation safety, or any distortion liable to reduce packaging strength.

TEST: Samples #9 - #11 are vibrated for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm.

Immediately following the test, each package must be removed from the platform, turned on its side and observed for any evidence of leakage.

RESULTS: No damage/leakage, each sample was opened and inspected after completion, inner packagings were intact, outer packaging did show minor scuffing on the bottom #3 face, inner packagings remained closed and sustained no damage, outer packaging closure was intact.

Vibration Standard

1-Piece Screw Cap (E)

Per 49CFR 178.601 Variation 1
Drop Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Stack Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)

Hydrostatic Pressure Test - ***Guidelines***: *Code of Federal Regulations 49*, Section 178.605, *and* 173.199 (b) (4), ASTM D4919 (9.1)

Closure	1-Piece Screw Cap
Manufacturer	Phoenix Closures Incorporated (630-544-3475) 1899 High Grove Lane Naperville, IL 60540
Part No.	38-400-6213 S
Material	Polypropylene
Tare Weight	3.70 grams
Size (mm, OD)	41.14 X 11.85 (D x H)
Size (in, OD)	1.62 X 0.466 (D x H)
Liner	Laminated Coated Foam
Tare Weight	0.30 grams
Size (mm, OD)	34.70 X 0.81 (D x thickness)
Size (in, OD)	1.36 X 0.032 (D x thickness)
Application Torque	23 in/lbs, applied
Method	Mark-10 Cap Torque Tester
Seal	Foil Heat Induction Seal
Method	Electromagnetic Induction Sealing Machine DGYF-500A

Drop Test – 1-Piece Screw Cap (E) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Methods: Five samples, one for each drop, are required for testing. First drop: Flat o bottom (using 1st sample). Second drop: Flat on top (using 2nd sample). Third drop: Flat on the long side (using 3rd sample). Fourth drop: Flat on short side (using 4th sample). Fifth drop: On a corner (using 5th sample). Testing of 4G combination packages with plastic inner receptacles intended for liquids is performed when the packagings have been filled to 98% of capacity and the completed packagings have been reduced to -18°C prior to testing.

Criteria for passing the test: For combination packagings, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging. The package/product is dropped from 1.2 meter.

***Results*:**

TEST with Photo	RESULT
• Sample #1 is impacted flat on the #3 face.	No breakage/leakage
• Sample #2 is impacted flat on the #1 face.	No breakage/leakage
• Sample #3 is impacted flat on the #2 face.	No breakage/leakage
• Sample #4 is impacted flat on the #4 face.	No breakage/leakage
• Sample #5 is impacted diagonally on the #1-2-5 corner. (top mfr's joint corner sustained major deformation)	No breakage/leakage

After the completion of the drop test samples #1 thru #5 were placed on their sides and observed for any leakage, each were then opened and inspected, samples #1 thru #5 sustained no damage to the inner containers, sample #5 sustained major deformation on the 1-2-5 corner.

1.2 Meters

1

2

3

4

5

Drop Test – 1-Piece Screw Cap (E) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.603; *UN* Para 6.1.5.3; ASTM D4919 (7.1)

Methods: Five samples, one for each drop, are required for testing. First drop: Flat o bottom (using 1st sample). Second drop: Flat on top (using 2nd sample). Third drop: Flat on the long side (using 3rd sample). Fourth drop: Flat on short side (using 4th sample). Fifth drop: On a corner (using 5th sample). Testing of 4G combination packages with plastic inner receptacles intended for liquids is performed when the packagings have been filled to 98% of capacity and the completed packagings have been reduced to -18°C prior to testing.

Criteria for passing the test: For combination packagings, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging. The package/product is dropped from 1.2 meter.

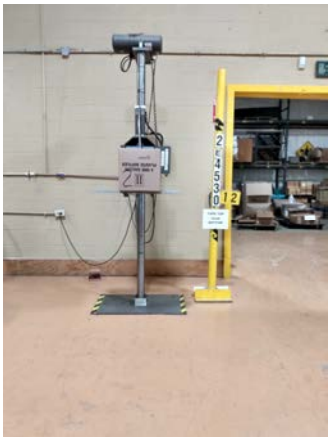
***Results*:**

TEST with Photo	RESULT
• Sample #1 is impacted flat on the #3 face.	No breakage/leakage
• Sample #2 is impacted flat on the #1 face.	No breakage/leakage
• Sample #3 is impacted flat on the #2 face.	No breakage/leakage
• Sample #4 is impacted flat on the #5 face.	No breakage/leakage
• Sample #5 is impacted diagonally on the #1-2-5 corner. (top mfr's joint corner sustained major deformation)	No breakage/leakage

After the completion of the drop test samples #1 thru #5 were placed on their sides and observed for any leakage, each were then opened and inspected, samples #1 thru #5 sustained no damage to the inner containers, sample #5 sustained major deformation on the 1-2-5 corner.

1.2 Meters

1



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Stacking Test – 1-Piece Screw Cap (E) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)
Methods: Three test containers are subjected to a force applied to the top surface equal to the total weight of identical packages stacked on it in transit. The minimum height of the stack is 3-meters. Three (3) filled containers are closed as for shipment and subjected to a free standing compression load of **154.8 kg**, equivalent to a 3-meter high stack of identical packages continuously for 24 hours. Samples were conditioned at +23ºC and 50% RH for 24 hours prior to testing.

Free Standing ___X_____
Guided Load _____

Criteria for passing the test: No test sample may leak. No sample may show any deterioration, which would adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages. The following details the compressive load applied in the stacking test:

Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

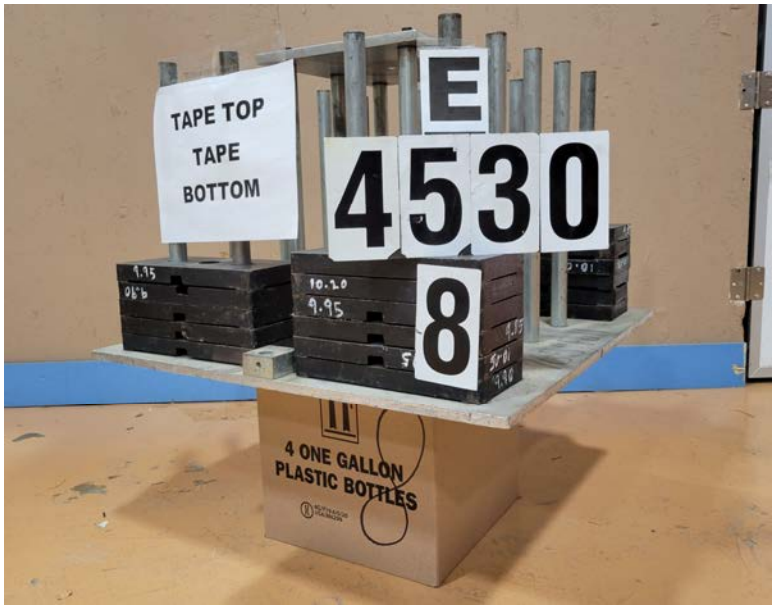
Stacking Load = [(SH/PH) = n -1] x MGW

[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg (341.2 lbs)

TEST: Samples #6 - #8 are subjected to an actual top load of 161.0 kg

RESULTS: After completion of the stack test samples #6 thru #8 were placed on their sides, each were then opened and inspected, each sample, after completion has shown 7mm ±2 compression after 24 hours.
NOTE: Stacking stability was not assessed since a guided load test was not performed

Stack Test (sample #8 photo)



Actual Top Load of 161.0 kg (355.0 lbs)

Stacking Test – 1-Piece Screw Cap (E) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.606, *UN* 6.1.5.6, ASTM 4919 (10.1)
Methods: Three test containers are subjected to a force applied to the top surface equal to the total weight of identical packages stacked on it in transit. The minimum height of the stack is 3-meters. Three (3) filled containers are closed as for shipment and subjected to a free standing compression load of **154.8 kg**, equivalent to a 3-meter high stack of identical packages continuously for 24 hours. Samples were conditioned at +23ºC and 50% RH for 24 hours prior to testing.

Free Standing ___X_____
Guided Load _____

Criteria for passing the test: No test sample may leak. No sample may show any deterioration, which would adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages. The following details the compressive load applied in the stacking test:

Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

Stacking Load = [(SH/PH) = n -1] x MGW

[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg (341.2 lbs)

TEST: Samples #6 - #8 are subjected to an actual top load of 161.0 kg

RESULTS: After completion of the stack test samples #6 thru #8 were placed on their sides, each were then opened and inspected, each sample, after completion has shown 7mm ±2 compression after 24 hours.
NOTE: Stacking stability was not assessed since a guided load test was not performed

Stack Test (sample #6 photo)

Actual Top Load of 161.0 kg (355.0 lbs)

Hydrostatic Pressure Test – 1-Piece Screw Cap

Guidelines: *Code of Federal Regulations 49*, Section 178.605, *and* 173.199 (b) (4), ASTM D4919 (9.1)

Methods*:* Plastic inner receptacles are subjected to the test pressure for 30 minutes. The hydraulic pressure is applied through a leak-proof fitting to three (3) inner receptacles. The receptacles must be supported in a manner that does not invalidate the test. The test pressure must be applied continuously and evenly, and it must be kept constant throughout test period. The units are subjected to the test pressure for thirty (30) minutes each at not less than 95 kPa. Samples were conditioned at +23ºC and 50% RH for 24 hours prior to testing.

Criteria for Passing the Test: The receptacle passes the test if, for each sample tested, there is no leakage of liquid from the receptacle.

***Results*:** **Each samples body expanded as the pressure was applied, no leakage occurred**

TEST	RESULT
Samples receptacles are subjected to an internal pressure of 100 kPa (14.5 psi) for 30 minutes.	No rupture/leakage

Hydrostatic Pressure Test – 1-Piece Screw Cap

Vibration Standard – 1-Piece Screw Cap (E) Taped Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.608. ASTM D4919 (11.1)
Methods: Three packages are filled and closed as for shipment. Testing is performed for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm. The packages are left free to move vertically, bounce and rotate in their normal shipping orientation. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Rotary Vibration Table _____
Vertical Linier Vibration Table ___X___

Criteria for Passing the Test: A packaging passes the Vibration Standard if there is no rupture or leakage from any of the packages. No test sample should show any deterioration, which could adversely affect transportation safety, or any distortion liable to reduce packaging strength.

TEST: Samples #9 - #11 are vibrated for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm.

Immediately following the test, each package must be removed from the platform, turned on its side and observed for any evidence of leakage.

RESULTS: No damage/leakage, each sample was opened and inspected after completion, inner packagings were intact, outer packaging did show minor scuffing on the bottom #3 face, inner packagings remained closed and sustained no damage, outer packaging closure was intact.

Vibration Standard

Vibration Standard - 1-Piece Screw Cap (E) Glued Bottom Closure

Guidelines: *Code of Federal Regulations 49*, Section 178.608. ASTM D4919 (11.1)
Methods: Three packages are filled and closed as for shipment. Testing is performed for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm. The packages are left free to move vertically, bounce and rotate in their normal shipping orientation. Packagings submitted are for **Periodic Retesting** and were tested at ambient conditions per 49 CFR 178.602 (3).

Rotary Vibration Table _____
Vertical Linier Vibration Table ___X___

Criteria for Passing the Test: A packaging passes the Vibration Standard if there is no rupture or leakage from any of the packages. No test sample should show any deterioration, which could adversely affect transportation safety, or any distortion liable to reduce packaging strength.

TEST: Samples #9 - #11 are vibrated for 1 hour at a frequency that causes the package to be raised from the vibrating platform 1.6mm.

Immediately following the test, each package must be removed from the platform, turned on its side and observed for any evidence of leakage.

RESULTS: No damage/leakage, each sample was opened and inspected after completion, inner packagings were intact, outer packaging did show minor scuffing on the bottom #3 face, inner packagings remained closed and sustained no damage, outer packaging closure was intact.

Vibration Standard

Conclusions

The packages were tested according to Paragraphs 6.1.5.3, 6.1.5.5, 6.1.5.6 and 6.1.4.12.1 of the Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods, Chapter 6, 12th Revision and 49CFR Section 178.601 (1) and 178.608 for Group II products.
The package met the test requirements and it is recommended that a UN certificate be issued with the mark Y, to wit:

4G / Y 19.6 / S / *
USA/+CA2474

* Year of Manufacture

where: 4G is the packaging type code
Y is the packing group
19.6 is the gross mass in kg
S is for combination packaging
* year of manufacture
USA is the country of testing
+CA2474 is test number of certifying agency

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

HPTS ID No	Equipment	Manufacturer	Model No.	Calibration Date	Calibration Due
1035	TAPPI Room	Horizon PTS	CH 1	N/A	
1087	Walk-in Freezer	US Cooler	FFL3476GLI	N/A	
1034	Cap Torque Tester	Mark-10	MTT03-50	In Service July 2021	July 2022
1098	Digital Temp. and RH Meter	Omega Corporation	RHXL5SD	In Service October 2021	October 2022
1099	Temp. Data Logger	Omega Corporation	OM-92-NIST	In Service October 2021	October 2022
1001	Scale	ScoutPro	400 grams	February 2022	23 Feb 2023
1002	Bench Top Scale	CAS SW	20 lb Capacity	February 2022	23 Feb 2023
1088	Digital Caliper	Fowler (12-inch)	54-100-112-2	April 2022	April 2023
1089	Digital Caliper	Fowler (6-inch)	54-100-177-0	April 2022	April 2023
1013	Metric Ruler	Johnson	M391	Verify	
1030	33-Ft Tape Measure	Master Mechanic	33-Ft	Verify	
1090	Temperature Control	Ranco	ETC-112000	N/A	
1092	Humidity Control	Honeywell	H6062A1000	N/A	
1036	Cobb Sizer	Gurly Precision Instruments	4.25 inch	N/A	
1038	Cobb Roller	Gurly Precision Instruments	4.25 inch	N/A	
1017	Drop Tower	Lansmont	PDT56ED	Verify	
1044	Weight Stands	Lansmont	125	Verify	
1096	Transport Simulator	L.A.B.	2000V	Verify	
1107	Drop Tower	LAB	AD125	Verify	
1018	Transport Simulator	Gaynes	RPM 300	Verify	
1078	Hydro Tank	Alloy Products	205 PSI	N/A	
1000	Electromagnetic Induction Sealer	China	DGYF-500A	N/A	

APPENDIX A

Inner Packaging

Four (4) 1-gallon (3.8 liter) blow molded round industrial style jugs tested with CRC screw cap closures with glued-in foam liners

INNER PACKAGING:	Product Information: Packing Group II Liquid
Manufacturer	CKS Packaging (336-578-5800) 943Trollingwood Road Haw River, NC 27258
Part No.	MA8114
Variations	49CFR 178.601 Variation 1 (see Pages 42 & 43)
Style	Blow Molded Industrial Round Jug
Nominal Capacity	3.8-liters (1-gallon)
Overflow Capacity	3.90-liters (1.03-gallons)
Tare Weight	130.0 grams
Size (mm, OD)	150 X 299 (D x H)
Size (in, OD)	5.90 X 11.77 (D x H)
Material	High Density Polyethylene (HDPE) 0.91mm average wall thickness (0.036 inch) 1.71mm average bottom **center** thickness (0.067 inch) 0.064mm average bottom **edge** thickness (0.025 inch)
Handle	Integral molded handle, top side
Count	Four (4) per tested outer shipper
Fill Material	Water = Vibration test, Stack test and Hydrostatic Pressure test Windshield washer solution = Drop Test
Closure	CRC Screw Cap
Manufacturer	Berry Plastics (812-424-2904) 101 Oakley Street Evansville, IN 47710
Material	Polypropylene
Tare Weight	8.40 grams
Size (mm, OD)	45.18 X 17.99 (D x H)
Size (in, OD)	1.77 X 0.708 (D x H)
Liner	Laminated Coated Foam
Tare Weight	0.40 grams
Size (mm, OD)	34.44 X 1.04 (D x thickness)
Size (in, OD)	1.35 X 0.041 (D x thickness)
Application Torque Method	23 in/lbs, applied Mark-10 Cap Torque Tester

APPENDIX B

Outer Packaging

A single wall Kraft/Kraft Regular Slotted Fiberboard Carton (RSC) Outer closure method tested with one (1) strip of 48mm wide pressure sensitive plastic tape one (1) strip top flap seam and one (1) strip bottom flap seam. ***Alternate Closure:*** one (1) strip of 48mm wide pressure sensitive plastic tape one (1) strip top flap seam and hot melt adhesive bottom closure.

OUTER PACKAGING:

UN Code	4G
Manufacturer	Pratt-Statesville (704-878-6615) 185 Deer Ridge Drive Statesville, NC 28625
Part No.	4-1 Gallon
Variations	49CFR 178.601 Variation 4 (see Pages 42 & 43)
Style	Regular Slotted Fiberboard Carton (RSC)
Tare Weight	675.0 grams
Size (mm, OD)	325 X 325 X 337 (L x W x H)
Size (in, ID)	13+1/16 X 13+/16 X 12+1/2 (L x W x H)
Board Grade	44 ECT *Tests to*: 112 (56/30/56) lb./1000 ft^2 Combined Weight of Facings
Corrugations	Vertical "C" flute
Facings	Kraft/Kraft
Caliper	4.42mm (0.174 inch)
Mfr's Joint	Glued inside corner, 38mm tab (1+1/2 inch)
Flaps	Minor = 5mm gap when closed Major = 5mm gap when closed
Printing	Plastic Bottle Do Not Crush Or Cut, 4 One Gallon Plastic Bottles, 4G/ Y19.6/S/20/USA/M6299
Closure	48mm Pressure Sensitive Plastic Tape
Manufacturer	3M Scotch (800-362-3550) 3M Center Building St. Paul, MN 55144
Part No.	Scotch 375-0
Application	48mm wide pressure sensitive plastic tape, single strips top and bottom, centered both longitudinally along and spanning the flap seams, extending a minimum of 2-inches onto sides of carton with tape adhered firmly in place, major and minor flaps meet when closed
Method	Applied with a Uline 2-Inch Hand Held Tape Dispenser

Alternate Tested Bottom Closure Method

Manufacturer	IFS Industries, Inc. (610-378-1381) 400 Orrton Avenue Reading, PA 19603
Part No.	Dura Pro M-204-1
Application	Install 2 beads of hot melt adhesive on the inner side of both major flaps approximately 1-inch and 1+3/4-inch from each flap edge, press major flaps onto minor flaps until held firmly in place. Major flaps meet when closed
Method	Applied with a Bostik Thermogrip Electric Handheld Glue Gun #260
Top Closure	Follow above tape application method

APPENDIX C

Calculations

The following section details: (A) the method of calculating the gross weight of the packaging as indicated in the UN Mark; and, (B) the compressive load applied in the stacking test.

A. Gross weight of package, as tested = TW (kg)
Overflow volume of inner packaging = OV (liter) or (kg of H2O)
Number of Inner Packaging = N
Specific Gravity = SG
Weight of Empty Package = T (kg)
Specific Gravity of Water = 1
Tested Volume = 0.98

1)Packagings as Tested: **tare weight in grams**

Article	Tare Wght. gr.	NO. of Articles	Total gr.
1-gallon jug	129.90	4	519.60
Cap	8.40	4	33.60
Liner	0.40	4	2.80
RSC	675.0	1	675.0
Total	N/A	N/A	1,231.0

b) [T + (SG x OV x N x 1 x 0.98)]
[1.23 kg + 0.1 + (1.2 x 3.90 x 4 x 1 x 0.98)] = 19.6 kg

Maximum Gross Weight = 19.6 kg Mark = Y 19.6

NOTE: Calculated marked weight is 19.6 kg (43.2 lbs) for a specific gravity liquid of 1.2, Marked Weight for Vibration Standard is achieved by adding 3.0 kg of steel shot divided between the 4 containers of each Vibration sample.

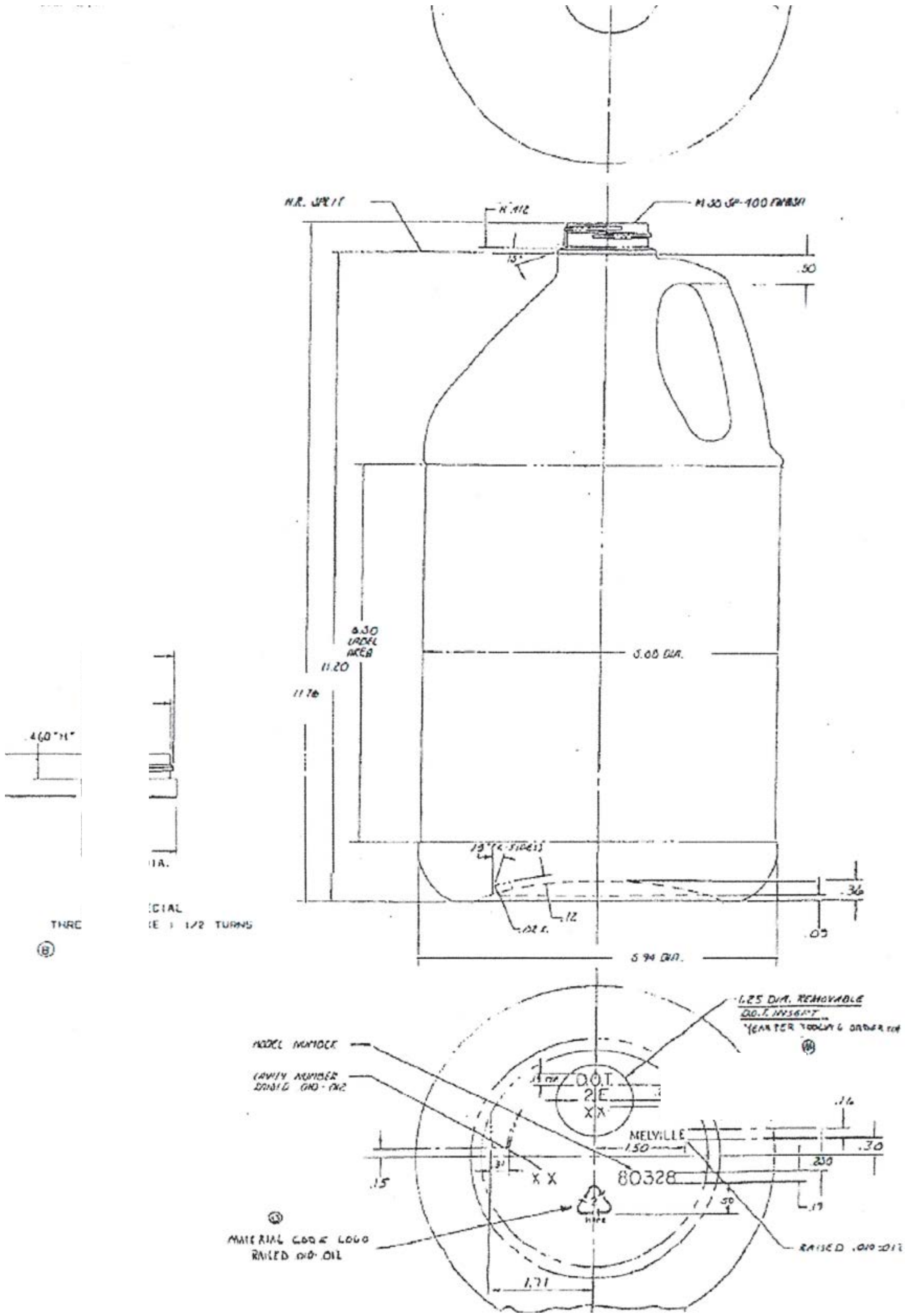
B. Stacking height = SH = (3 meter = 3000mm)
Height of Package = PH (mm)
Number of Packages = n
Maximum gross weight of the package = MGW (kg)

a) Stacking Load = [(SH/PH) = n -1] x MGW
[(3000mm/337mm) = 8.90 – 1] 7.90 x 19.6 kg = 154.8 kg

Stacking Load Minimum = 154.8 kg (341.2 lbs)

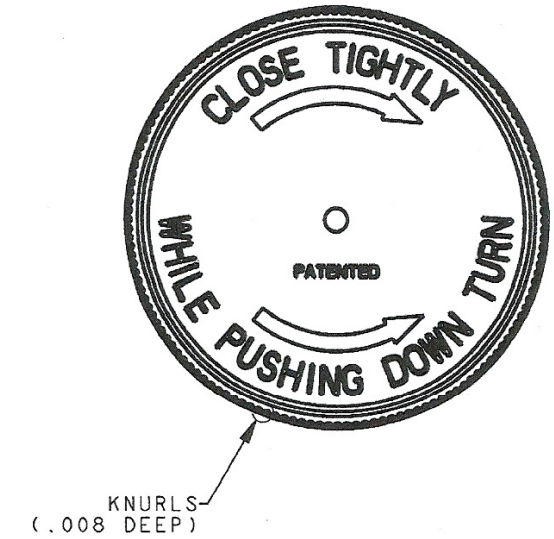
Actual Stacking Load = 161.0 kg (355.0 lbs)

1-Gallon Jug


.50
.36
TURNS
5.94 DIA.
1.25 DIA. REMOVABLE
D.O.T.
2E
XX
MELVILLE
1.50
.30
X X
80328
.15
1.71

CRC Screw Cap

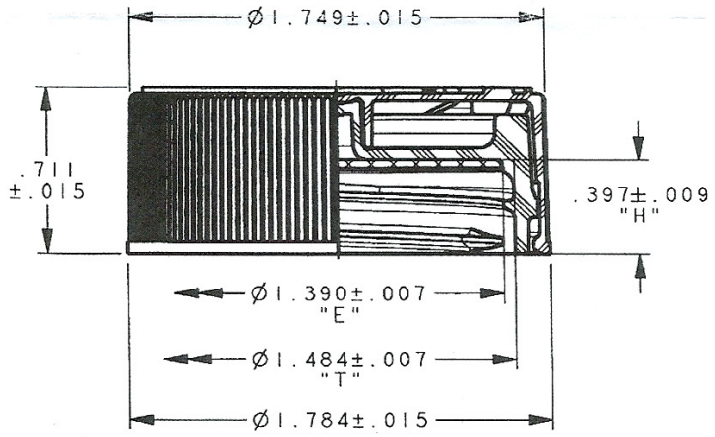
Berlin# 128506
mfg # 1025252



NOTES:

1. .040 LINER SHOWN
2. DIAMETERS TO BE TAKEN AS AVERAGE
3. THREAD PROFILE: MODIFIED BUTTRESS
4. REFERENCE IM-500-A105-38 FOR NECK FINISH REQUIREMENTS
5. RECOMMENDED 48 HOUR-REMOVAL TORQUE: 8-12 IN. LBS
6. CONTACT BERRY PLASTICS FOR LATEST REVISION

REV J - 11/12/12 - KSK



PATENTED

"REFERENCE PRODUCT CENTER FOR CURRENT DRAWING"

TOLERANCES (U.O.S.):
DECIMAL..... ±.007
FRACTIONAL... ±1/64
ANGLES..... ±1/2°

BERRY PLASTICS CORPORATION AND SUBSIDIARIES
LEADERSHIP BY DESIGN

TITLE: 38mm CR4
Child-Resistant Closure
TEXT

MATERIAL: POLYPRO

SCALE: 1.50; NOTED

DSGN'D BY:	DRAWN BY:	CHK'D BY:	APP'D BY:	DRAWING NO. REV.
R.BUSH	R.BUSH			K7025 J
DATE: 5-11-88	DATE: 5-11-88	DATE:	DATE:	

CR 38/400 Induction Seal Screw Cap

DESCRIPTION	MATERIAL	WEIGHT (REF)	MOLD NUMBERS
38mm-400 CR3A/LR OUTER	POLYPRO	4.1g	0814, 0838, 0911
38mm-400 CR3A/LR INNER	POLYPRO	3.5g	0813. 0839, 0910

NOTES:

DIAMETERS TO BE TAKEN AS AVERAGE

6 TPI THREAD CONSTRUCTION

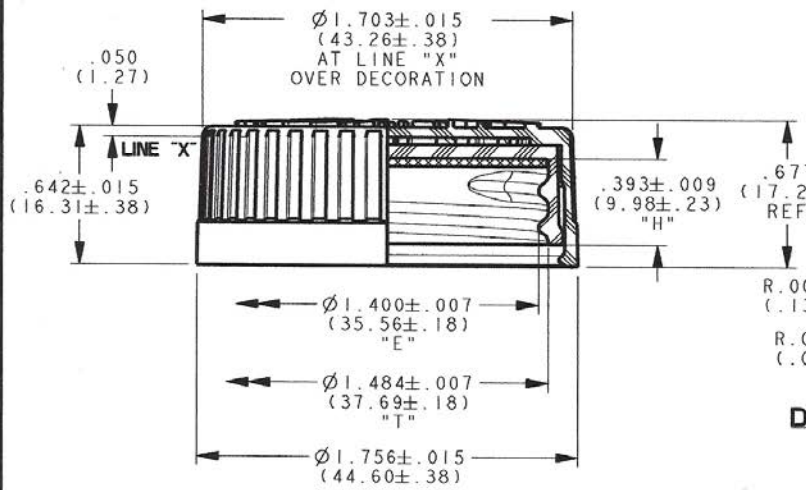
SEE DRAWING QIM-500-A137 FOR FINISH CONSIDERATIONS

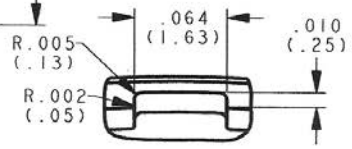
SUGGESTED APPLICATION TORQUE: 19-23 IN-LBS (2.1-2.6 N-M)

CAVITY NUMBER TO APPEAR ON INSIDE TOP SURFACE OF BOTH OUTER AND INNER CLOSURES

ENGLISH DIMENSIONS IN INCHES
METRIC DIMENSIONS IN (mm)

REV D - 6/10/13 - KSK





DECORATION DETAIL
REFERENCE ONLY
SCALE 10:1

42 EQUALLY SPACED RIBS

"REFERENCE PRODUCT CENTER FOR CURRENT DRAWING"

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

[F#] = FUNCTIONAL DIMENSION

BERRY PLASTICS CORPORATION AND SUBSIDIARIES
LEADERSHIP BY DESIGN

MATERIAL | TOLERANCES UNLESS SPECIFIED DEC. ± REF DEGREES ±1°
GRAM WEIGHT REF. ONLY | CI#

Mold No. | PROD. / SAMPLE

SCALE 1.5:1 & NOTED DRAWN K.KORING
DATE 10-08-09 CHECKED D.SPRICK

"T" ± | "E" ±

TITLE **CUSTOMER DRAWING**
38mm-400 CR3A/LR
CR CLOSURE ASSEMBLY (LINER RETENTION)

FOR STOCK

DRAWING NUMBER **QIM-500-A109** | REVISION **D**

1-Piece Induction Seal Screw Cap

SHALLOW SKIRTED CLOSURES

38-400-6213 S

Specifications:

DIAMETER 38 mm
THREAD PROFILE 400
NECK FINISH 38-400
CLOSURE TOP Stipple
CLOSURE SIDEWALL Fine Ribbed
MATERIAL PP

PACKAGING & FREIGHT INFORMATION

PACK TYPE	PCS/CTN	CTNS/PALT	PCS/PALT	CTN WT*	PALT WT*	FRT CLASS
Bulk	3,750	15	56,250	29(1)	440(1)	100(1)
Bulk	3,750	15	56,250	32(2)	485(2)	100(2)
CARTON DIMENSIONS: 24 x 16 x 15			**PALLET DIMENSIONS:** 48 x 40 x 50			

(1) Unlined Closures (2) Lined Closures *Approximate

MARKETS

Agricultural, Automotive, Industrial, and Medical Products, Dressings & Sauces, Food, Food Oil & Service, Personal Care & Cosmetics, Pharmaceuticals, Beverages, Household Chemicals, Nutraceuticals, and Dairy Products.

OPTIONS

Available in white, standard, and custom colors. Liners can be cut with tri-tab easy-open feature. Can be embossed or debossed with custom message.

CLOSURE BENEFITS

- A great general-purpose closure
- A proven closure for the Food Oil and Agricultural Chemical markets
- Fine-ribbed sides are easier to grip
- Our most popular closure style
- Popular for cosmetics

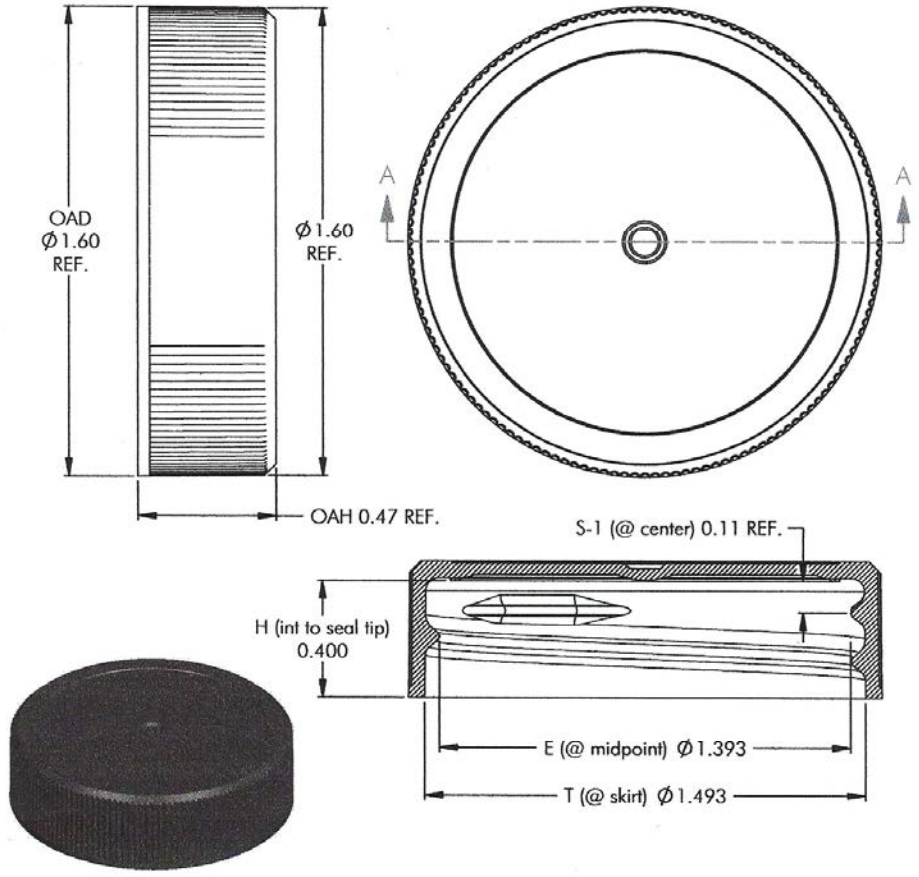
PHOENIX

PHXPKG.COM
P 630 420 4750 E greatpkg@phxpkg.com
1899 High Grove Lane Naperville, IL 60540

1-Piece Screw Cap

SHALLOW SKIRTED CLOSURES

38-400-6213 S



NOTES: (UNLESS OTHERWISE SPECIFIED) 1. ALL DIMENSIONS ARE IN INCHES. 2. SEE CHART FOR DIMENSIONAL TOLERANCE.	REV	DATE	DESCRIPTION	BY
	8	04.20.15	Re-define Reference Dimensions	DN

TOLERANCE		PITCH/TPI .167 / 6	TURNS 1-3/16	MAT'L PP	
.X	±0.1	DRAWN DMN	DATE 09.06.06	SCALE 5 : 2	REV
.XX	±0.02	38 - 400 - 6213 S			8
.XXX	±0.010				

PHOENIX™

PHXPKG.COM
P 630 420 4750 E greatpkg@phxpkg.com
1899 High Grove Lane Naperville, IL 60540

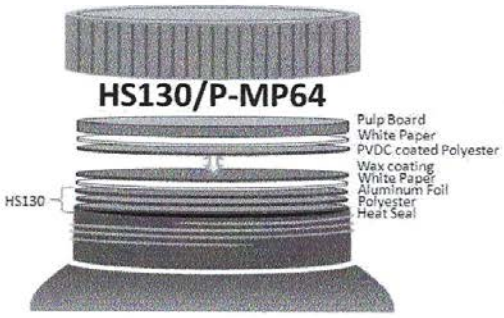
TRI SEAL PRODUCT DATA SHEET

TEKNIPLEX
Global strength. Superior solutions.

This data sheet describes HS130/P – MP64 products
Designed to provide "tamper ~~evident" seal to the rim of a~~
Polyethylene container with the innerseal liner and a
secondary seal with a primary liner consisting of PVDC
coated Polyester / White Paper / Pulp Board

The primary liner as well as the innerseal provides excellent
~~oxygen and moisture barrier and have good resistance to the~~
solvents described below
Available with custom or ~~standard printing~~

Material	Thickness (in)	Thickness (mm)
Pulp Board	0,0200 or 0,0350	0.5080 or 0.8890
White Paper	0,0030	0.0762
PVDC coated Polyester	0,0005	0.0127
Wax Coating	0,0005	0.0127
White Paper	0,0050	0.1270
Aluminum Foil	0,0010	0.0254
Polyester	0,0005	0.0127
Heat Seal	0,0015	0.0381



	Value for Innerseal	Value for Primary Liner
Good Chemical Resistance to	Aq. Media, Weak Acids And Alkalis, Alcohols	Aq. Media, Weak Acids And Alkalis, Alcohols
Water Vapor Transmission (WVTR) @ 100°F & 95%RH	Essentially Zero	0.6 gms/100in²/day
Oxygen (O_2) Transmission (OTR) @ 77°F & 0%RH, 21% O_2	Essentially Zero	0.1 cc/100in²/day

FDA Compliance	21 CFR 177.1520 (Olefin Polymers) 21 CFR 177.1210 (Closures with Sealing Gaskets for Food Containers) 21 CFR177.1630 (Polyethylene Phthalate Polymers)
Drug Master File (DMF)	1378
Other Compliances	USFDA Food Allergen Guidelines; California Proposition 65 labeling requirements; Limitations of heavy metals in packaging per CONEG & EU 94/62/EC, article 11

Original Date: 08/10/2001
Revised Date: 05/27/2011
Revision Number: 5
Revised by SR

TRI-SEAL PRODUCT DATA SHEET

TEKNIPLEX
Global strength. Superior solutions.

This data sheet describes F-217®-36 product

This product is a three-ply co-extruded liner consisting of a foamed Low Density Polyethylene core sandwiched between two solid layers of Low Density Polyethylene

Structure	Solid LDPE / Foamed LDPE / Solid LDPE	Solid LDPE / Foamed LDPE / Solid LDPE
Color	White or as Specified	White or as Specified
Clarity	Opaque	Opaque
Density	0,58 ± 0.03 g / cm³	36 ± 2 lbs / ft³
Thickness Tolerance		
for 20 ~ 60 mil (0,51 ~ 1,52 mm)	± 0,127 mm	± 5 mil
for 65 ~ 90 mil (1,65 ~ 2,29 mm)	± 0,178 mm	± 7 mil
for 95 ~ 125 mil (2,41 ~ 3,18 mm)	± 0,254 mm	± 10 mil
Available Width		
for 20 ~ 60 mil (0,51 ~ 1,52 mm)	22,2 ~ 1016,0 mm	7/8 ~ 40 inch
for 65 ~ 125 mil (1,65 ~ 3,18 mm)	25,4 ~ 228,6 mm	1 ~ 9 inch
Width tolerance	± 1,6 mm	± 1/16 inch

FDA Compliance	21 CFR 177.1520 (Olefin Polymers) 21 CFR 177.1210 (Closures with Sealing Gaskets for Food Containers) 21 CFR 175.300 (Resinous and Polymeric Coatings)
Drug Master File (DMF)	2434
Other Compliances	USFDA Food Allergen Guidelines; California Proposition 65 Labeling Requirements; Limitations of Heavy Metals in Packaging per CONEG & EU 94/62/EC, Article 11

Original Date: 08/05/1997
Revised Date: 04/19/2011
Revision Number: 3
Revised SR

TRI SEAL PRODUCT DATA SHEET

TEKNIPLEX
Global strength. Superior solutions.

- This data sheet describes F-217® WC/HD products
- This product is a three-ply co-extruded liner consisting of a foamed White Low Density Polyethylene (LDPE) core sandwiched between two solid layers of Low Density Polyethylene which contains High Density Polyethylene (HDPE) for improved stiffness.

Typical Product Attributes

Construction

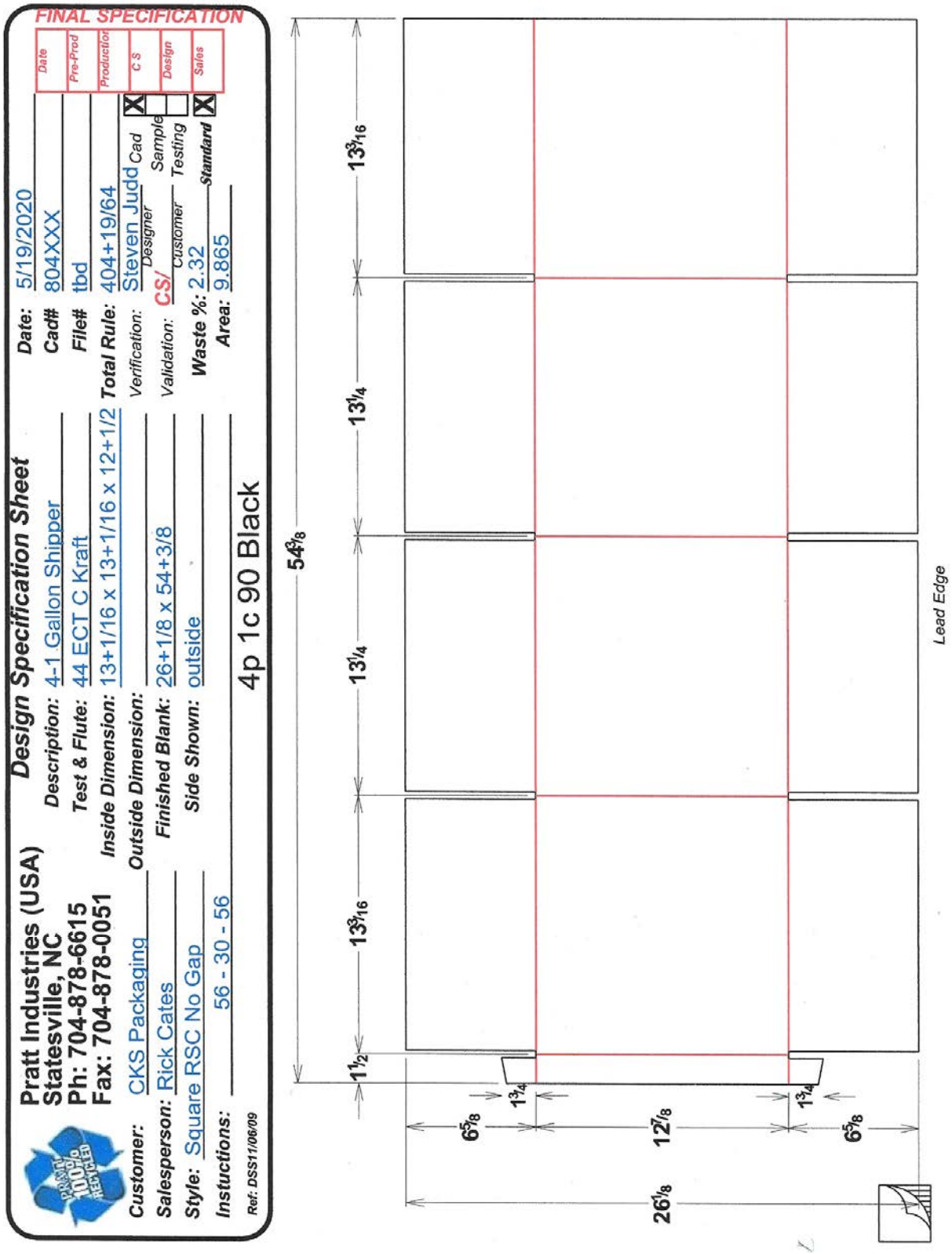
Structure	Solid PE / Foamed LDPE / Solid PE	Solid PE / Foamed LDPE / Solid PE
Color	White or as Specified	White or as Specified
Clarity	Opaque	Opaque
Density		
for 20 ~ 30 mil (0,51 ~ 0,76 mm)	0,48 ± 0,03 g / cm³	30 ± 2 lbs / ft³
for 35 ~ 125 mil (0,89 ~ 3,18 mm)	0,40 ± 0,03 g / cm³	25 ± 2 lbs / ft³
Thickness Tolerance		
for 20 ~ 60 mil (0,51 ~ 1,52 mm)	± 0,127 mm	± 5 mil
for 65 ~ 90 mil (1,65 ~ 2,29 mm)	± 0,178 mm	± 7 mil
for 95 ~ 125 mil (2,41 ~ 3,18 mm)	± 0,254 mm	± 10 mil
Available Width		
for 20 ~ 60 mil (0,51 ~ 1,52 mm)	22,2 ~ 1016,0 mm	7/8 ~ 40 inch
for 65 ~ 125 mil (1,65 ~ 3,18 mm)	25,4 ~ 228,6 mm	1 ~ 9 inch
Width tolerance	± 1,6 mm	± 1/16 inch

Regulatory Compliance

FDA Compliance	21 CFR177.1520 (Olefin Polymers) 21 CFR177.1210 (Closures with Sealing Gaskets for Food Containers) 21 CFR175.300 (Resinous and Polymeric Coatings)
Drug Master File (DMF)	2434
Other Compliances	USFDA Food Allergen Guidelines; California Proposition 65 Labeling Requirements; Limitations of Heavy Metals in Packaging per CONEG & EU 94/62/EC, Article 11

Original Date: 06/05/1997
Revised Date: 12/13/2011
Revision Number: 5
Revised by SR

Tri-Seal
900 Bradley Hill Road
Blauvelt, NY 10913
Tel: (845) 353-3300 – Fax: (845) 353-3376
http://www.tri-seal.com


FINAL SPECIFICATION
Pratt Industries (USA)
Statesville, NC
Ph: 704-878-6615
Fax: 704-878-0051
Design Specification Sheet
Description: 4-1 Gallon Shipper
Test & Flute: 44 ECT C Kraft
Inside Dimension: 13+1/16 x 13+1/16 x 12+1/2
Outside Dimension:
Finished Blank: 26+1/8 x 54+3/8
Side Shown: outside
4p 1c 90 Black
Date: 5/19/2020
Cad# 804XXX
File# tbd
Total Rule: 404+19/64
Verification: Steven Judd Cad
Validation: CS/ Customer Sample Testing
Waste %: 2.32 Standard
Area: 9.865
Customer: CKS Packaging
Salesperson: Rick Cates
Style: Square RSC No Gap
Instructions: 56 - 30 - 56
Ref: DSS11/08/09
Date
Pre-Prod
Production
C.S
Design
Sales
54 3/8
13 3/16
13 1/4
13 1/4
13 3/16
1 1/2
6 5/8
1 3/4
12 7/8
1 3/4
6 5/8
26 1/8
Lead Edge

DURA PRO®
an IFS brand

TECHNICAL DATA SHEET

M-204-1

ISSUE DATE: 07/21/2010

PRODUCT DESCRIPTION

M-204-1 is a general purpose fast setting hot melt adhesive.

USES

Primarily used for case and carton sealing.

FEATURES

- Fast setting
- Excellent heat resistance & hot tack
- Machines well
- FDA Status: Meets composition requirements of indirect food additives
- Regulation 21 CFR 175.105 "ADHESIVES"

TECHNICAL PROPERTIES

Viscosity:	1,300 cPs ± 100 @ 350°F
Softening point:	222 - 223°F
Speed of set:	Fast
Application temp.:	350°F ± 25

ADDITIONAL DATA

Type:	Modified synthetic hot melt
Open time:	Short
Color:	Tan

LIMITATIONS

Shelf Life: Twelve (12) months.

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Variation 1 and 4

(g) *Selective testing.* The selective testing of packagings that differ only in minor respects from a tested type is permitted as described in this section. For air transport, packagings must comply with § 173.27(c)(1) and (c)(2) of this subchapter.

(1) *Selective testing of combination packagings. Variation 1.* Variations are permitted in inner packagings of a tested combination package, without further testing of the package, provided an equivalent level of performance is maintained and, when a package is altered under Variation 1 after October 1, 2010, the methodology used to determine that the inner packaging, including closure, maintains an equivalent level of performance is documented in writing by the person certifying compliance with this paragraph and retained in accordance with paragraph (l) of this section. Permitted variations are as follows:

(i) Inner packagings of equivalent or smaller size may be used provided -

(A) The inner packagings are of similar design to the tested inner packagings (*i.e.*, shape - round, rectangular, etc.);

(B) The material of construction of the inner packagings (glass, plastic, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;

(C) The inner packagings have the same or smaller openings and the closure is of similar design (e.g., screw cap, friction lid, etc.);

(D) Sufficient additional cushioning material is used to take up void spaces and to prevent significant moving of the inner packagings;

(E) Inner packagings are oriented within the outer packaging in the same manner as in the tested package; and,

(F) The gross mass of the package does not exceed that originally tested.

(ii) A lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in paragraph (g)(1)(i) of this section, may be used provided sufficient cushioning is added to fill void space(s) and to prevent significant moving of the inner packagings.

(2) *Selective testing of combination packagings. Variation 2.* Articles or inner packagings of any type, for solids or liquids, may be assembled and transported without testing in an outer packaging under the following conditions:

(i) The outer packaging must have been successfully tested in accordance with § 178.603 with fragile (e.g. glass) inner packagings containing liquids at the Packing Group I drop height;

(ii) The total combined gross mass of inner packagings may not exceed one-half the gross mass of inner packagings used for the drop test;

(iii) The thickness of cushioning material between inner packagings and between inner packagings and the outside of the packaging may not be reduced below the corresponding thickness in the originally tested packaging; and when a single inner packaging was used in the original test, the thickness of cushioning between inner packagings may not be less than the thickness of cushioning between the outside of the packaging and the inner packaging in the original test. When either fewer or smaller inner packagings are used (as compared to the inner packagings used in the drop test), sufficient additional cushioning material must be used to take up void spaces.

(iv) The outer packaging must have successfully passed the stacking test set forth in § 178.606 of this subpart when empty, i.e., without either inner packagings or cushioning materials. The total mass of identical packages must be based on the combined mass of inner packagings used for the drop test;

(v) Inner packagings containing liquids must be completely surrounded with a sufficient quantity of absorbent material to absorb the entire liquid contents of the inner packagings;

(vi) When the outer packaging is intended to contain inner packagings for liquids and is not leakproof, or is intended to contain inner packagings for solids and is not siftproof, a means of containing any liquid or solid contents in the event of leakage must be provided in the form of a leakproof liner, plastic bag, or other equally efficient means of containment. For packagings containing liquids, the absorbent material required in paragraph (g)(2)(v) of this section must be placed inside the means of containing liquid contents; and

(vii) Packagings must be marked in accordance with § 178.503 of this part as having been tested to Packing Group I performance for combination packagings. The marked maximum gross mass may not exceed the sum of the mass of the outer packaging plus one half the mass of the filled inner packagings of the tested combination packaging. In addition, the marking required by § 178.503(a)(2) of this part must include the letter "V".

(3) *Variation 3.* Packagings other than combination packagings which are produced with reductions in external dimensions (*i.e.*, length, width or diameter) of up to 25 percent of the dimensions of a tested packaging may be used without further testing provided an equivalent level of performance is maintained. The packagings must, in all other respects (including wall thicknesses), be identical to the tested design-type. The marked gross mass (when required) must be reduced in proportion to the reduction in volume.

(4) *Variation 4.* Variations are permitted in outer packagings of a tested design-type combination packaging, without further testing, provided an equivalent level of performance is maintained, as follows:

(i) Each external dimension (length, width and height) is less than or equal to the corresponding dimension of the tested design-type;

(ii) The structural design of the tested outer packaging (*i.e.*, methods of construction, materials of construction, strength characteristics of materials of construction, method of closure and material thicknesses) is maintained;

(iii) The inner packagings are identical to the inner packagings used in the tested design type except that their size and mass may be less; and they are oriented within the outer packaging in the same manner as in the tested packaging;

(iv) The same type or design of absorbent materials, cushioning materials and any other components necessary to contain and protect inner packagings, as used in the tested design type, are maintained. The thickness of cushioning material between inner packagings and between inner packagings and the outside of the packaging may not be less than the thicknesses in the tested design type packaging; and

(v) Sufficient additional cushioning material is used to take up void spaces and to prevent significant moving of the inner packagings.

An outer packaging qualifying for use in transport in accordance with all of the above conditions may also be used without testing to transport inner packagings substituted for the originally tested inner packagings in accordance with the conditions set out in Variation 1 in paragraph (g)(1) of this section.