R@K Testing, LLC

UNITED NATIONS

Performance Oriented Package Tests
U.S. Department of Transportation 49 CFR
4G Certified Fiberboard Box, Combination Type Packagings
Requalification

UN Code: **4G** Fiberboard Boxes Packing Group: **I** Overall Package Gross Mass: **1.5 Kg**

Reference: Gebauer, 4x4 ounce Glass Bottles-Primary with two Alternate inside containers.
Product: Ethyl Chloride UN1037

Description of outside fiberboard container:
Style: Regular Slotted Container (RSC) weight: 132 grams.
Cad samples provided by A-Kobak, Hinckley, OH.
Cad# PO20288, dated 8-1-23.

Facing Liner Weights: 41.1 / msf - 38.9# / msf

Medium Weights: 23.5# / msf Board Test Grade: 200# Flute: C

Carton Dimensions:
Length 6.5" x Width 6.5" x Depth 6" Inside Dimensions
Length 6.875" x Width 6.875" x Depth 6.75" Outside Dimensions

Manufactures Joint: 1.5" inside glue

Outer box closure instructions: Two pieces (one top and one bottom) of **Intertape Polymer Corp. Sarasota, FL #8100 CLR 48mmx1371M IPG-IPG 6**, 48 mm wide x 10.875" long, 1.5 mil transparent water-proof pressure sensitive sealing tape. The tape was applied at the center intersection of the two major flaps (no flap gap) of the outer box and a minimum of 2" onto the sides of the box.

Description of Inner Packaging Materials: each bottle was inserted into one auto-bottom tuck top die-cut folding carton, size: 2.3125" x 2.3125" x 6" O.D. (57 mm thick) with inside glue joint, weight 20.5 grams. See **Nosco Gurnee, IL,** specification #931070**.** Each individual boxed bottle was placed into one of the cells in a 4-cell partition set. Partition size (set-up): 6.375” x 6.375” x 6” O.D., weight: 66 grams. Basis weight: **32.5#-22.6#B-32.3**. Samples provided by A-Kobak, Hinckley, OH

Description of inside receptacles: Four 4-ounce plastic coated amber round glass bottles, manufactured by **O-I Toano, VA**, size: 2.15” diameter x 4.84” tall without closure cap, weight:142.5 grams. See Gebauer SPEC-100170R2, dated 2-28-12. One **Jaco Mfg. Bera, OH** closure cap: 24mm black twist-on plastic cap (torqued to 20 inch/ lbs.) with metal lever, plastic nozzle and rubber nozzle seal, size: 1.125” diameter x 1.3125”, weight: 10.5 grams. The cap was protected by a 1.25” diameter x 1.75” tall solid fiber tube with a ¼” x 1.625” slot on the side, weight: 6 grams. Solid fiber tube manufactured by **A Precision Products Group Co., Apple Creek, Ohio.**

Number per Package: Four (2x2 arrangement in partition set)

UN Test Report Number: 101725

Description of inside Receptacles and Packing Instructions for the Alternate Packages.

Note: the alternate packages utilized the **same outer box, flap closure method and partition set** used for the **Primary Package.**

Alternate 1. Four 4.7 ounce round metal **aerosol cans** with plastic snap-on caps. Can size with safety cap: 1.77" diameter x 5.06" tall, total weight empty: 51.16 grams. The cans were manufactured by **Crown Aerosol Packaging**, **Philadelphia, PA** see specification #100167R1 exhibit 4.1& 4.2 for part #CR-3007706-D dated 7-11-08. The aerosol sprayer was protected by a plastic cap. The cap was snapped in place over the top chime of the aerosol can. Cap size: 1.75" diameter x 1.5" tall, weight: 4 grams. The safety cap was manufactured by **Berry Plastics Corp**. **Evansville, IN**, see specification C1443-1 for details. Each filled can was placed into one of the cells of the 4-cell partition set. Total package weight: 2 lbs.

Alternate 2. Four 4.7 ounce round metal aerosol cans with **Accu-Stream spay nozzles**. Can size with plastic Accu-Stream 360 with Sure Lock Technology spray nozzle: 1.77" diameter x 5.125" tall, total weight empty: 51.16 grams. The cans were manufactured by **Crown USA Spartanburg, SC**, see specification #100167R1 exhibit 4.1& 4.2 for part #CR-3007706-D dated 7-11-08. The spray nozzle was snapped in place over the top chime of the aerosol can, weight 14.26 grams. The actuators were supplied by **Venture Plastics, Inc. Newton Falls, OH.** Each filled can was placed into one of the cells of the 4-cell partition set. Total package weight: 2 lbs.

TEST PROCEDURES and RESULTS

Preparation of Packagings for Testing
(49 CFR-178.602)

Each Inner receptacle was filled with: **water**

Total Gross Mass Weight = 3.3 lbs. / 1.5 kg
Tare Weight (packaging, including receptacles) = 2 lb.
Net "product" Weight (liquid or solid) = 1.3 lbs.

The fiberboard outer packaging was conditioned at 73 ^{O} F and 50 % Relative Humidity.
Special preparation of plastic inside containers at 0 ^{O} F performed? **n/a**

Drop Test (49 CFR-178.603)

All three packages **passed** this testing procedure including the Primary package and the 2 alternate packages.
Number of drops **5**, height of drops **72", Packing Group I, Great Danger Level.**

Test Results:

1st drop , flat on bottom	**PASSED**
2nd drop , flat on top	**PASSED**
3rd drop , flat on long side	**PASSED**
4th drop , flat on short side	**PASSED**
5th drop , bottom corner	**PASSED**

Comments: No leaks occurred from any inner receptacle
The outer fiberboard container did not exhibit any damage liable to affect safety during transit

TEST PROCEDURES and RESULTS

Stacking Test (49 CFR-178.606)

All three packages **passed** this testing procedure including the Primary package and the 2 alternate packages.

Three samples were subjected to a weight of **175 Lbs.** which is equal to or greater than identical packages of the same weight stacked to the height of 3-meters (9.84 feet) for **24-hours**.
Formula used for testing: 120/6.75=17.7-1=16.7x3.3lbs.=55.36x3=166.1 lbs.
Required compression: 166.1 lbs.
Actual compression: **175 lbs.**
Test Results:

Sample #1	**PASSED**	.2 **"**	Deflection
Sample #2	**PASSED**	.2 **"**	Deflection
Sample #3	**PASSED**	.2 **"**	Deflection

Comments: No rupture, leaking or deformation occurred

Cobb Test (49 CFR-178.516)

All three packages **passed** this testing procedure including the Primary package and the 2 alternate packages.
Quantity of five 5” x 5” square samples from outside shipping container.

Water absorbed
1) 148 **g/m2**
2) 150 **g/m2**
3) 148 **g/m2**
4) 149 **g/m2**
5) 150 **g/m2**

Mass increase cannot exceed **155 g/m2** after a 30-minute testing period.

Vibration Test (49 CFR-178.608)

All three packages **passed** this testing procedure including the Primary package and the 2 alternate packages.
Three samples were tested for a **60-minute duration @ 250 Cycles Per Minute** Frequency.
Mechanical Rotary Motion with a 1" peak to peak Amplitude.
Comments: Container and contents were not affected by the vibrations, no leakage of contents

TESTING EQUIPMENT used during the Performance Testing

L.A.B- V400 mechanical rotary vibration machine

Dongguan Kejian Instrument Co.-Drop tester

General Tools and Instruments #147 digital micrometer

TMI Cobb Tester and weighted roller #61-04-00-0004

U.S. Solid digital lab scale #JFDBS00081-210G

Haida-HD-A502S-1200 Compression Tester

RAK Testing, LLC certifies that the previously described testing services have been performed in accordance with standard good laboratory practices. The packaging tested has **PASSED** the standards of the United Nations Transport of Dangerous Goods and the Department of Transportation Title 49 CFR in accordance with recommendations for UN packaging, Code 4G, Fiberboard Boxes, Combination Type Packages, **Packing Group I**, **Great** Danger Level Hazardous Materials with overall gross weight not exceeding **1.5 Kg** for a **Quantity of (four) 4-ounce glass bottles with closures Primary and two Alternate inner containers.**

In the event that any changes are made to the use classification assumed as a basis for these test or to any part of this combination package, such as a different inner container, a different closure method or any other variation, these test results will be deemed invalid and are not to be relied upon.

RAK Testing, LLC does not perform Internal Pressure (Hydraulic) test or compatibility test on inside containers. These test if needed should be performed by your inside container supplier.

ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE OR FIT FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL RAK Testing, LLC LIABILITY EXCEED THE AMOUNT PAID BY THE CUSTOMER FOR TESTING SERVICES.

The appropriate certification markings to be displayed on the outside of the fiberboard container:
(Lower case “un” letters circled)

u 4G/X1.5/S/25 ** Last two digits of date of manufacture of fiberboard box, i.e., **25**

n USA/A-Kobak Container
Hinckley, OH

Re-Testing **MUST** be scheduled before 24-month anniversary from the last testing date.

Date Tested: 10-10 through 10-17-25
UN Test Report Number: 101725

Tested for:
A-Kobak Container
1701 West 130th St.
Hinckley, OH 44233
330.225.7791, Pat Sullivan

Test Performed by:
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Phone: 740-624-1314
Richard Kovaleski, CPLT