

## **UNITED NATIONS**

Performance Oriented Package Tests  
U.S. Department of Transportation 49 CFR , HM - 181  
4G Certified Fiberboard Box, Combination Type Packagings

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

### **Reference: Gebauer, 4x4 ounce Glass Bottles Ethyl Chloride UN1037**

Description of outside fiberboard container :  
Style : Regular Slotted Container (RSC) weight: .4 lbs.  
Certification Stamp: A-Kobak , Hinckley, OH

Facing Liner Weights : 41.3# / msf - 43.4# / msf - 42.4# / msf

Medium Weights : 24.1# / msf - 24.2# / msf    Board Test Grade : 350#    Flute : CB

Carton Dimensions : Length 5.25" x Width 5.125" x Depth 7.25"    Outside Dimensions

Manufactures Joint : 1.5" inside glue

Flap Closure : 48 mm, 1.5 mil transparent water-proof pressure sensitive sealing tape.  
Two 48 mm x 9" long strips (one top and one bottom) were positioned onto the major flaps at the center intersection and 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: 2.25" x 2.25" x 5.9375" O.D. (.57 mm thick) with inside glue joint, weight 23.81 grams. See Nosco specification #931070.

Description of inside receptacles: Four 4 ounce plastic coated amber round glass bottles, weight: .3 lbs. manufactured by Lawson/Mardon-Wheaton. Size: 2.15" diameter x 4.84" tall without closure cap. See Kimble glass specification #DE-386210. The top of the glass bottle was closed with a 24 mm black twist-on plastic cap (torqued to 20 in./ lbs.) with metal lever, plastic nozzle and rubber seal, weight: 10.39 grams. The cap was protected with a 1.25" diameter x 1.75" tall solid fiber cylinder with a 1/4" x 1.625" slot on the side, weight: 6.89 grams.

Number per Package : Four (2x2 arrangement)

UN Test Report Number : 70811

## TEST PROCEDURES and RESULTS

Preparation of Packagings for Testing  
( U.N. Orange Book 9.7.3 , HM - 181 178.602 )

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 ° F and 50 % Relative Humidity for 24 hours

Special preparation of plastic inside containers at 0 ° F performed ? n/a

### **Drop Test** ( U.N. Orange Book 9.7.3 , HM - 181 178.603 )

Number of drops **5** , Height of drops 72" , Packing Group I , Great **Danger Level**

|                |                               |               |
|----------------|-------------------------------|---------------|
| Test Results : | 1st drop , flat on bottom     | <b>PASSED</b> |
|                | 2nd drop , flat on top        | <b>PASSED</b> |
|                | 3rd drop , flat on long side  | <b>PASSED</b> |
|                | 4th drop , flat on short side | <b>PASSED</b> |
|                | 5th drop , bottom corner      | <b>PASSED</b> |

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

### **Stacking Test** ( U.N. Orange Book 9.7.6 , HM - 181 178.606 )

( 3 - empty ) samples were subjected to a weight of **500 Lbs.** which is equal to or greater than identical packages of the same weight stacked to the height of 3 meters ( 9.84 feet ) x 1.5 for dynamic compression testing.

|                |               |       |            |
|----------------|---------------|-------|------------|
| Test Results : |               |       |            |
| Sample # 1     | <b>PASSED</b> | .21 " | Deflection |
| Sample # 2     | <b>PASSED</b> | .21 " | Deflection |
| Sample # 3     | <b>PASSED</b> | .21 " | Deflection |

Comments : No rupture , leaking , or deformation occurred

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## TEST PROCEDURES and RESULTS

**Cobb Test** ( U.N. Orange Book 9.6.11.1 , HM -181 178.516 )  
Quantity of ( 5 ) 5" x 5" square samples from outside shipping container

Water absorbed

- 1) 117 **g/m<sup>2</sup>**
- 2) 121 **g/m<sup>2</sup>**
- 3) 119 **g/m<sup>2</sup>**
- 4) 124 **g/m<sup>2</sup>**
- 5) 120 **g/m<sup>2</sup>**

Mass increase can not exceed 155 g/m<sup>2</sup> after a 30 minute testing period

**Vibration Test** ( HM - 181 178.608 )

( 3 ) samples were tested for a **60 minute duration @ 200 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

Gaynes-Vibration tester # 1250  
Gaynes-Drop tester # DT-125  
Testing Machines Inc. Compression tester # 17-37 with a 50,000 lbs. Capacity  
Testing Machines Inc. Cobb tester  
GBC Temperature and Humidity Chamber  
A&D Electronic Balance # EK-120 A

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