

R@K Testing, LLC

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: 2.5 **Kg**

Description of outside fiberboard container : **Reference: Gebauer, 12x4.7 ounce Aerosol Cans
Ethyl Chloride UN1037**

Style : Regular Slotted Container (RSC) weight: .6 lbs.
Box makers certification stamp: A-Kobak Container, Hinckley, OH

Facing Liner Weights : 42.1# / msf - 44.2# / msf

Medium Weights : 27.9# / msf Board Test Grade : 200# Flute : C

Carton Dimensions : Length 11.25" x Width 9.5625" x Depth 5.875" 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 12" 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 : The cans were inserted into a 32 ECT, C flute 12 cell partition with 1.375" perimeter air-cell. Can cell size: 1.8125" x 1.8125" x 5.125" tall. Total weight of assembled partitions: .4 lbs.

Description of inside receptacles: Twelve 4.7 ounce round metal aerosol cans. Can size with safety cap: 1.77" diameter x 5.06" tall, total weight empty: 51.16 grams. The can was manufactured by Crown Aerosol Packaging, 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: 4.7 grams. The safety cap was manufactured by Berry Plastics Corp. see specification C1443-1 for details.

Number per Package : Twelve (4x3 arrangement)

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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 = 5.6 lbs. / 2.5 kg
Tare Weight (packaging, including receptacles) = 3.4 lb.
Net “ product “ Weight (liquid , solid or gas) = 2.2 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	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

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

(3 - empty) samples were subjected to a weight of 550 **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	PASSED	.11 "	Deflection
	Sample # 2	PASSED	.11 "	Deflection
	Sample # 3	PASSED	.11 "	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)	97 g/m2
	2)	101 g/m2
	3)	112 g/m2
	4)	105 g/m2
	5)	111 g/m2

Mass increase can not exceed 155 g/m2 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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