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PERFORMANCE ORIENTED PACKAGING TESTING  
OF  
CONTAINER, SHIPPING AND STORAGE, CNU-316/E  
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

Author:  
Victor D. Saul  
Mechanical Engineering Technician

Performing Activity:  
Naval Weapons Station Earle  
Colts Neck, New Jersey 07722-5000

August 1992

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## **INTRODUCTION**

This Performance Oriented Packaging (POP) test was performed to ascertain whether the CNU-316/E Shipping and Storage Container (Packing Group II) meets the requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was a simulated load of 54 HARM fuze boosters weighing 10 kg (22 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 1 kg (3 pounds) were added. Gross weight of the loaded container was 22 kg (48 pounds). The containers were identified as #1 through #5.

## **TESTS PERFORMED**

### **1. Base Level Vibration Test**

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.608. Containers #1, #2, and #3 were placed on a repetitive shock platform which has a vertical linear motion of 1-inch double amplitude. Movement of the containers were restricted during vibration in all but the vertical direction. The frequency of the platform was increased until the containers left the platform 1/16 of an inch at some instant during each cycle. Test time was 1 hour.

### **2. Stacking Test**

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.606. Containers #1, #2, and #3 were used for this test. Each container was subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a minimum height of 3 meters (including the test container). A weight of 175 kg (384 pounds) was stacked on each test container. The test was performed for 24 hours. The weight was then removed and the containers examined.

### **3. Drop Test**

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.603. Five drops were performed from a height of 1.2 meters (4 feet), impacting the following surfaces:

- a. Flat bottom using container #1.
- b. Flat top using container #2.
- c. Flat on long side using container #3.
- d. Flat on short side using container #4.
- e. One corner using container #5.

**PASS/FAIL**

**1. Base Level Vibration Test**

The criteria for passing the base level vibration test is outlined in Title 49 CFR, Sec. 178.608(c): No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength.

**2. Stacking Test**

The criteria for passing the stacking test is outlined in Title 49 CFR, Sec. 178.606(d): No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation.

**3. Drop Test**

The criteria for passing the drop test is outlined in Title 49 CFR, Sec. 178.603(f): A package is considered to successfully pass the drop tests if for each sample tested, no rupture occurs which would permit spillage of loose explosive substances or articles from the outer packaging.

**TEST RESULTS**

**1. Base Level Vibration Test**

Satisfactory.

**2. Stacking Test**

Satisfactory.

**3. Drop Test**

Satisfactory.

**DISCUSSION**

**1. Base Level Vibration Test**

The input vibration frequency was 3.8 Hz. Immediately after the vibration test was completed, each container was removed from the platform, turned on its side and inspected. No unfavorable distortion or deterioration was observed.

**2. Stacking Test**

Each container was inspected after the 24-hour period was over. No unfavorable distortion or deterioration was observed.

**3. Drop Test**

After each drop, the containers were inspected. The contents were completely retained by the container.

**REFERENCE MATERIAL**

A. Code of Federal Regulations, Title 49 CFR, Parts 107-178.

B. Bureau of Explosives Tariff No. BOE 6000K Hazardous Materials Regulations of the Department of Transportation by Air, Rail, Highway, Water including Specifications for Shipping Containers.

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Texas Instruments, Inc.  
2501 South Highway 121  
Lewisville, TX 75067

**TEST DATA SHEET**

<b>POP MARKING:</b>	
UN 4A1/Y22/S/**/USA/DOD/NAD	
**YEAR LAST PACKED OR MANUFACTURED	
Container: CNU-316/E Shipping and Storage Container	
Type: 4A1	Container P/N or NSN: NSN 8140-01-162-3191
Drawing Number: 704AS2316	Outer Packaging Material: Steel
Dimensions: 15.350" L x 12.350" W x 14.550" H	Gross Weight: 22 kg (48 pounds)
Closure (Method/Type): Clamp	Tare Weight: 11 kg (23 pounds)
Additional Description:	
<b>PACKAGED COMMODITY:</b>	
Name: See table 1	NSN(s): See table 1
United Nations Number: See table 1	
United Nations Packing Group: II	
Physical State (Solid, Liquid, or Gas): Solid	
Vapor Pressure (Liquids Only): N/A      At 50 °C: N/A      At 55 °C: N/A	
Consistency/Viscosity: N/A	Density/Specific Gravity: N/A
Amount Per Container: See table 1	Flash Point: N/A
Net Weight: See table 1	
<b>PACKAGED COMMODITY USED FOR TEST:</b>	
Name: Simulated Fuze Boosters	Physical State: Solid
Consistency: N/A	Density/Specific Gravity: N/A
Test Pressure (Liquids Only): N/A	Net Weight: 11 kg (25 pounds)
Additional Description:	
The net weight includes the current maximum product weight plus an additional 1 kg (3 pounds).	

TABLE 1  
Products Approved for Shipping in the  
CNU-316/E Shipping and Storage Container

NALC/ DODIC	NSN	Product Nomenclature	Packing Drawing Number	Haz Class/Div	UN Number	Units/ Cntr	Total Net Weight (lb)	Total Gross Weight (lb)
V606	1336-01-159-3039	Booster, Fuze	704AS2316	1.1D	0042	54	22	45