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13. ABSTRACT (Maximum 200 words)  This Performance Oriented Packaging (POP) test was conducted to ascertain whether the CNU-491/E Shipping and Storage Container meets the Packing Group II 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 two Tactical Air Launched Decoys (TALD) weighing 363 kg (800 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 37 kg (80 pounds) were added. Gross weight of the loaded container was 615 kg (1,355 pounds). The test results indicate that the container has conformed to the POP requirements.					
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PERFORMANCE ORIENTED PACKAGING TESTING  
OF  
CONTAINER, SHIPPING AND STORAGE, CNU-491/E  
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

DTIC QUALITY IMPROVED 5

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## INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the CNU-491/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 two Tactical Air Launched Decoys (TALD) weighing 364 kg (800 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 37 kg (80 pounds) were added. Gross weight of the loaded container was 616 kg (1,355 pounds).

Due to unavailability only one container was used for testing. This is less than the number required by the regulations. Approval for this deviation has been granted by the Under Secretary of Defense, Memorandum for the Joint Logistics Commanders dated 22 February 1990.

## TESTS PERFORMED

### 1. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.608. The container was placed on a repetitive shock platform which has a vertical linear motion of 1-inch double amplitude. Movement of the container was restricted during vibration in all but the vertical direction. The frequency of the platform was increased until the container 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. The 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 2,457 kg (5,420 pounds) was stacked on the test container. The test was performed for 24 hours. The weight was then removed and the container 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.
- b. Flat top.

- c. Flat on long side.
- d. Flat on short side.
- e. One corner.

**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 3.6 Hz. Immediately after the vibration test was completed, the container was removed from the platform, turned on its side and inspected. No unfavorable distortion or deterioration was observed.

### **2. Stacking Test**

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

### **3. Drop Test**

After each drop, the container was inspected. The two TALD 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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## TEST DATA SHEET

<b>POP MARKING:</b>	
UN 4H1/Y616/S/**/USA/DOD/NAD	
**YEAR LAST PACKED OR MANUFACTURED	
Container: CNU-491/E Shipping and Storage Container	
Type: 4H1	Container P/N or NSN: P/N 43-28100
Drawing Number: 43-28100	Outer Packaging Material: Plastic
Dimensions: 113" L x 33" W x 24" H	Gross Weight: 615 kg (1,355 pounds)
Closure (Method/Type):	Tare Weight: 216 kg (475 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: TALD shape	Physical State: N/A
Consistency: N/A	Density/Specific Gravity: N/A
Test Pressure (Liquids Only): N/A	Net Weight: 399 kg (880 pounds)
Additional Description:	
The net weight includes the current maximum product weight plus an additional 37 kg (80 pounds).	

N/A = Not Assigned

TABLE 1  
Products Approved for Shipping in the  
CNU-491/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)
3W78	1410-01-248-4995	TALD, ADM-141	43-28100	1.4C	0276	2	800	1,290

TALD = Tactical Air Launched Decoys