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13. ABSTRACT (Maximum 200 words) This Performance Oriented Packaging (POP) test was conducted to ascertain whether the CNU-464/E Shipping and Storage Container meets the Packing Group II requirements specified by the United Nations Recommendation on the Transportation of Dangerous Goods Document, ST/SG/AC.10/1, Revision 6, Chapters 4 and 9 and the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 1 October 1991. The container's contents consisted of one inert rocket motor section weighing 69.8 kg (154 pounds), and an additional 7.2 kg (16 pounds) of sand. Gross weight of the loaded container was 170.9 kg (377 pounds). The test results indicate that the container has conformed to the POP requirements. In addition, due to their similarities in size and weight, this test is considered representative of qualification testing for the CNU-463/E Shipping and Storage Containers as per the variation in Title 49 CFR 107, Sec. 178.601h.					
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**PERFORMANCE ORIENTED PACKAGING TESTING
OF
CONTAINER, SHIPPING AND STORAGE, CNU-464/E AND CNU-463/E
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS**

**Author:
J. Mike Dwyer
Mechanical Engineering Technician**

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

July 1992

FINAL

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**Sponsoring Organization:
Naval Air Systems Command
(AIR-41821E)
Naval Air Systems Command Headquarters
Washington, DC 20361-0001**

INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the CNU-464/E Shipping and Storage Container (Packing Group II) meets the requirements specified by the United Nations Recommendation on the Transportation of Dangerous Goods Document, ST/SG/AC.10/1, Revision 6, Chapters 4 and 9 and the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 1 October 1991. The container's contents consisted of one inert rocket motor section weighing 69.8 kg (154 pounds), and an additional 7.2 kg (16 pounds) of sand. Gross weight of the loaded container was 170.9 kg (377 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.

In addition, due to their similarities in size and weight, this test is considered representative of qualification testing for the CNU-463/E Shipping and Storage Containers as per the variation in Title 49 CFR 107, Sec. 178.601h.

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 1025.8 kg (2,262 pounds) was stacked on the 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.
- 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 rocket motor was completely retained by the container.

REFERENCE MATERIAL

- A. United Nation's "Recommendation on the Transportation of Dangerous Goods," ST/SG/AC.10/1, Revision 6.
- B. Code of Federal Regulations, Title 49 CFR, Parts 107-178.
- C. 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

DATA SHEET:	
Container: CNU-464/E and CNU-463/E Shipping and Storage Containers	
Type: 4B1	Container P/N or NSN: 3067AS100
Specification Number: 80-004	Material: Aluminum
Gross Weight: 170.9 kg (377 pounds)	Dimensions: 83" L x 14-3/4" W x 18" H
Closure (Method/Type): Latches	Tare Weight: 93.8 kg (207 pounds)
Additional Description:	
PRODUCT:	
Name: See table	NSN(s): See table
United Nations Number: See table	
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:	Flash Point: N/A
Net Weight: See table	
TEST PRODUCT:	
Name: Rocket Motor (Inert)	Physical State: Solid
Consistency: N/A	Density/Specific Gravity: N/A
Test Pressure (Liquids Only): N/A	
Amount Per Container: N/A	Net Weight: 77.1 kg (170 pounds)
The net weight includes the maximum net product weight plus an additional 7.2 kg (16 pounds).	

TABLE 1
Products Approved for Shipping in the
CNU-464/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)
TBD	TBD	WPU-6/B Rocket Motor	DL 3067AS100	1.3C	0186	1	154.7	361.7

CNU-463/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)
TBD	TBD	WGU-16/B Guidance Section	DL 3066AS100	TBD	TBD	1	91.6	298.6

TBD = To Be Determined

**CNU-464/E AND CNU-463/E
SHIPPING AND STORAGE CONTAINER
POP MARKING**

UN 4B1/Y171/S//USA/DOD/NAD**

**** YEAR LAST PACKED OR MANUFACTURED**