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13. ABSTRACT (Maximum 200 words)

Qualification tests were performed to determine whether the in-service CNU-163/E Shipping and Storage Container could be utilized to contain properly dunnaged solid type hazardous materials weighing up to a gross weight of 109 kg (240 pounds). The tests were conducted in accordance with Performance Oriented Packaging (POP) requirements specified by the United Nations Recommendations on the Transportation of Dangerous Goods, ST/SG/AC.10/1 and the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178. The container has conformed to the POP performance requirements; i.e., the container successfully retained its contents throughout the specified tests.

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POP Test of CNU-163/E Shipping and Storage Container

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**PERFORMANCE ORIENTED PACKAGING TESTING
OF
CONTAINER, SHIPPING AND STORAGE, CNU-163/E
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS**

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January 1992

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INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the CNU-163/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 contents consisted of a simulated load of 95 kg (210 pounds) of sand. Gross weight of the loaded container was 108.8 kg (240 pounds). The containers were identified as #1 through #5.

TESTS PERFORMED

1. Base Level Vibration Test

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

2. Stacking Test

This test shall be performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.606. Containers #1, #2, and #3 shall be used for this test. Each container shall be subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a height of 3 meters (including the test container). A weight of 109 kg (240 pounds) shall be stacked on each test container. The test shall be performed for 24 hours. The weight shall then be removed and the containers examined.

3. Drop Test

This test shall be performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.603. Five drops shall be 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): "A packaging passes the vibration test if there is no rupture or leakage from any of the packages."

2. Stacking Test

The criteria for passing the stacking test is outlined in Title 49 CFR, Sec. 178.606(d): "No test sample may leak. In composite packagings or combination packagings, there must be no leakage of the filling substance from the inner receptacle, or inner packaging. No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages."

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--

(1) For removable head drums for solids, the entire contents are retained by an inner packaging (e.g., a plastic bag) even if the closure on the top head of the drum is no longer sift-proof;

(2) For a composite or combination packaging, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging;

(3) For a drum, jerrican or bag, any discharge from a closure is slight and ceases immediately after impact with no further leakage;

(4) For packagings for explosives, no rupture of the packaging occurs.

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 4.0 Hz. Immediately after the vibration test was completed, each container was removed from the platform, turned on its side and observed for evidence of leakage. No leakage was observed.

2. Stacking Test

Each container was visibly checked after the 24-hour period was over. No leakage, distortion, or deterioration was observed.

3. Drop Test

After each drop, the containers were inspected for evidence of leakage. No leakage was observed. Container #5 subjected to the corner drop sustained damage consisting of breakage and cracking of the corner section (approximately 9" x 5" section) exposing the internal end cushion spacer. There was no spillage of the contents and the container remained secure on completion of the test. Final inspection of the remaining four containers tested revealed no damage.

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-163/E Shipping and Storage Container	
Type: 4H1	Container P/N or NSN:
Specification Number:	Material:
Gross Weight: 109 kg (240 pounds)	Dimensions: 52.50" L x 24.00" W x 24.00" H
Closure (Method/Type):	Tare Weight: 14 kg (30 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:	Physical State:
Consistency: N/A	
Density/Specific Gravity: N/A	
Test Pressure (Liquids Only): N/A	
Amount Per Container: N/A	Net Weight: 95 kg (210 pounds)

TABLE 1
 CNU-163/E Shipping and Storage Container
 (Armament Section Container)

NALC	NSN	Type	Packing Drawing	UN Code	UN Number	#/ Cntr	Weight (lb)
ZW87	1420-00-393-2614	FZU-27A/B	67A242F1	1.1D	0286	1	180
ZW87	1420-00-393-2614	FZU-27B/B	67A242F1	1.1D	0286	1	180
ZW87	1420-00-393-2614	FZU-27/B	67A242F1	1.1D	0286	1	180
UW97	1420-01-115-1001	FZU-42/B	67A242F1	1.1D	0286	1	180
JW88	1420-01-097-5340	FZU-42A/B	67A242F1	1.1D	0286	1	180
MW96	1420-01-117-5243	FZU-42B/B	67A242F1	1.1D	0286	1	180
YW78	1336-00-135-6855	WU-18/B	67A242F1	1.1D	0286	1	180
V577	1336-01-230-9087	WU-20/B	67A242F1	1.1D	0286	1	180
V580	1336-01-283-1392	WU-24/B	67A242F1	1.1D	0286	1	180
V581	1336-01-283-1393	WU-25/B	67A242F1	1.1D	0286	1	180
V578	1336-01-283-8446	WU-21/B	67A242F1	1.1D	0286	1	180

NOTE: The container is qualified for a maximum net weight of 210 pounds.

CNU-163/E
SHIPPING AND STORAGE CONTAINER
POP MARKING

UN 4H1/Y109/S//USA/DOD/NAD**

**** YEAR LAST PACKED OR MANUFACTURED**