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PERFORMANCE ORIENTED PACKAGING TESTING
OF
PPP-B-601 ERAPS WOOD BOX
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

Author:
Eric Wu
Mechanical Engineer

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

31 October 1991

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INTRODUCTION

The PPP-B-601 ERAPS Wood Box tested, contained a simulated load of 182.7 kg (403 pounds) of sand representing the worst case of loading. Three girthwise straps were installed on the box at the following locations: 23 inches from the fwd end, 23 inches from the aft end, and 47 inches from the fwd end. (See figure 1.) Overall weight of the box was 237 kg (523 pounds). This Performance Oriented Packaging (POP) test was performed to ascertain whether this standard container (Packing Group II) would meet the requirements as 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 Title 49 CFR 107 dated 1 October 1991. A base level vibration test was also conducted in accordance with the final rulings specified in the Department of Transportation's Performance Oriented Packaging Standards. Due to unavailability and the high cost of the boxes, the number of boxes used was less than the number required by the regulations. This has been approved by the Under Secretary of Defense, Memorandum for the Joint Logistics Commanders dated 22 February 1990.



FIGURE 1
PPP-B-601 ERAPS Wood Box Shipping Configuration

TESTS PERFORMED

1. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR 107, Part 178, Subpart M, Sec. 178.608. One sample box was placed on the repetitive shock platform. The box was restrained during vibration in all but the vertical direction. The frequency of the platform was increased until the box left the platform 1/16 of an inch at some instant during each cycle. Test time was 1 hour at a frequency of 3.75 Hz.

2. Stacking Test

This test was performed in accordance with Title 49 CFR 107, Part 178, Subpart M, Sec. 178.606. One box was used for this test. The box was 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 sample). A weight of 1,428 kg (3,150 pounds) was stacked on the sample box. The test was performed for 24 hours. After the allowed time, the weight was removed and the box examined.

3. Drop Test

This test was performed in accordance with Title 49 CFR 107, Part 178, Subpart M, Sec. 178.603. Two boxes were used throughout the test. 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

All tests were performed at an ambient temperature of $+70 \pm 20$ °F.

PASS/FAIL

1. Base Level Vibration Test

The criteria for passing the base level vibration test is outlined in Title 49 CFR 107, 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 107, 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 107, 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

Immediately after the vibration test was completed, the box was removed from the platform, turned on its side and observed for any evidence of leakage. There was no leakage to the box as a result of this test.

2. Stacking Test

The box was visibly checked after the 24-hour period was over. There was no leakage, distortion, or deterioration to the box as a result of this test.

3. Drop Test

After each drop, the box was inspected for any damage which would be a cause for rejection. Final inspection indicated damage was minimal with only minor denting noted. The box remained intact and functional upon completion of the tests.

REFERENCE MATERIAL

A. United Nation's "Recommendation on the Transportation of Dangerous Goods," ST/SG/AC.10/1, Revision 6

B. Title 49 CFR 107, et al., Performance Oriented Packaging Standard; Changes to Classification, Hazard Communication, Packaging and Handling Requirements Based on UN Standards and Agency Initiative.

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: ERAPS Wood Box	
Type: 4C1	Container P/N or NSN: P/N 130-0151-002 (just box)
Specification Number: PPP-B-601	Material: Natural wood
Gross Weight: 237.1 kg (523 pounds)	Dimensions: 19.5" H x 17" W x 102" L
Closure (Method/Type): 6 latches with 3-3/4" banding	Tare Weight: 54.4 kg (120 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: Sand	Physical State: Solid
Consistency: N/A	
Density/Specific Gravity: N/A	
Test Pressure (Liquids Only): N/A	
Amount Per Container: N/A	Net Weight: 182.7 kg (403 pounds)

TABLE 1
 PPP-B-601 ERAPS Wood Box

NALC	P/N	Type	Packing Drawing	UN Code	UN Number	#/ Cntr	Weight (lb)
N/A	130-0001	AN/SSQ-75	130-0157-002	N/A	3090	1	365

PPP-B-601
ERAPS WOOD BOX
POP MARKING

UN 4C1/Y237/S/*/USA/DOD/NAD**

**** YEAR LAST PACKED OR MANUFACTURED**

Encl (2)