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Performance Oriented Packaging (POP) Testing of Base Burner Assembly for M864, 155MM Projectile, packed six (6) per wood box.

12. PERSONAL AUTHOR(S)
Raymond J. Siroy

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)
This Performance Oriented Packaging (POP) report is for the Base Burner Assembly for the M864, 155MM Projectile, packed six (6) per wood box in accordance with drawing 12561471. This report describes the results of testing conducted with Inert Base Burner Assembly.

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I. Report Number: DOD POP HMTR/AYD 93-013

II. Title: Performance Oriented Packaging (POP) Testing of Base Burner Assembly for M864, 155MM Projectile, Packed Six (6) per Wood Box

Author: Raymond J. Siroy
Packaging Engineer

Performing Activity: U.S. Army Armament Research, Development and Engineering Center (ARDEC)

Address: Department of the Army
Commander, U.S. Army ARDEC
Attn: SMCAR-AEP
Picatinny Arsenal, N.J. 07806-5000

Date: July 1994

Report Type: Final

1. DATA SHEET:

a. CONTAINER (Outer Pack)

Type: Box
UN Code: 4C1
Part Number: 12913033
Spec Number: MIL-B-2427
Material: Wood
Capacity: 29619.19 Cubic Inches (1808.78 cu. cm)
Dimensions:

Inside: 53.34 cm. x 35.71 cm x 15.55 cm
(21 in. x 14 1/16 in. x 6 1/8 in.)

Outside: 65.71 cm. x 39.52 cm x 21.10 cm
(25 7/8 in. x 15 9/16 in. x 8 5/16 in.)

Closure (Method/Type): Nailed and Strapped

Tare Weight: 9.09 kg (20 lbs)

b. CONTAINER (Inner Pack)

Type: Box
UN Code: 4G
Part Number: 12913032
Spec Number: PPP-B-636
Material: Fiberboard
Capacity: 184.29 Cubic Inches (3017.64 cu.cm)
Dimensions:

Inside: 16.02 cm. x 16.02 cm x 11.74 cm
(6 5/16 in. x 6 5/16 in. x 4 5/8 in.)

Outside: 17.29 cm. x 17.29 cm x 13.97 cm
(6 13/16 in. x 6 13/16 in. x 5 1/2 in.)

Closure (Method/Type): Taped

Tare Weight: 3.18 Kg (7 lbs)

Quantity: 6

c. PRODUCT

Name: Base Burner Assembly
United Nations Proper Shipping Name: Rocket Motors
United Nations Number: 0186
NSN: 1320-01-2311693
Drawing Number: 9381130
Physical State: Solid
United Nations Packing Grou[illegible]
Quantity Per Wood Box: 6 Base B[illegible]ner Assembly

d. TEST MATERIALS:

Name: Inert Base Burner Assembly
Physical State: Solid
Size:
Diameter = 6.039 inches
Length = 5.325 inches max

Quantity: 6 Inert Base Burner Assembly plus additional simulated weight.
Gross Weight: 170 pounds (77.27 kg)

2. BACKGROUND:

This report contains the testing and test results performed for Performance Oriented Packaging Certification of Base Burner Assembly (Part Number 9381130) for the M864, 155MM Projectile, Packed Six (6) per Wood Box in accordance with drawing 12561471. Tests were performed in accordance with Part 178, Subpart M-Testing of Non-bulk Packaging and Packages, Title 49 of the Code of Federal Regulations (CFR).

3. INTRODUCTION:

The Department of Transportation (DOT) per CFR, Title 49, Parts 100-180, dated 1 Oct 92, requires that hazardous materials be packed in containers which satisfy the Performance Oriented Packaging (POP) requirements.

The Wood Box, part number 12913033, is being used as the shipping container for Base Burner Assembly (Part Number 9381130) for the M864, 155MM Projectile. The package contains six (6) of Base Burner Assembly per wood box in accordance with drawing 12561471. Each packed wood box has an individual estimated gross weight of 115 pounds.

POP tests were conducted using Wood Boxes, each containing inert Base Burner Assemblies for a total gross weight of 170 pounds, resulting in a weight which is higher than the heaviest pack (estimated at 115 pounds) to insure wood box integrity. The tests were conducted in accordance with referenced sections of CFR, Title 49 and are valid only when approved ammunition is packed in the wood box as specified above for the Department Of Defense.

A total of five (5) packed wood boxes were POP tested in accordance with part 178, Subpart M-Testing of Non-bulk Packaging and Packages, Title 49 of the CFR.

4. TESTS PERFORMED:

a. Stacking Test

The CFR requires that the minimum height of the stack including the test sample must be 3.0 meters (10 feet). Three test samples are required. Each packed wood box has an individual gross weight of 170 pounds.

A 3.0 meter stack height of samples is equivalent to 2380 pounds (1081.8 kg) of stack weight. Three different test samples were each subjected to a stack weight of 2380 pounds for a period of 24 hours. The samples were then inspected for any damage or distortion. The above procedures were performed in strict manner in accordance with paragraph 178.606 "Stacking Test" of the CFR.

b. Vibration Test

Three packed wood boxes, each having an individual gross weight of 170 pounds were closed (nailed and strapped), as for shipment. The boxes were then placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The three packed wood boxes were then vibrated for one hour to such a degree that a piece of steel strapping (1/16 inch thick) easily passed underneath any of the boxes at any given time throughout the test. The three boxes were horizontally prevented from falling off of the vibrating platform while being free to move vertically, bounce and rotate. Upon completion of the test, all three packed wood boxes were removed from the vibrating platform, turned on their side and observed for any evidence of breakage and leakage. The above procedures were performed in strict manner in accordance with paragraph 178.608 "Vibration Standards" of the CFR.

c. Drop Tests

The CFR specifies that one box should be used for each drop orientation. Each box shall be dropped from a height of 1.2 meters (3.9 feet) in the following orientations: drop flat on the bottom, drop flat on the top, drop flat on the long side, drop flat on the short side, and drop on the corner. A total of five (5) boxes are specified for the five different orientations with one box being dropped for each orientation. For this test, however, the same three packed wood boxes that were tested in paragraph 4a and 4b were used for the Drop Test. Since the number of packed wood boxes available were only three, each box was dropped twice at two different orientations (for a total of six drops), with an extra drop on the opposite corner of the box. This exceeds the requirement of one drop per box, for the total of five boxes. The above procedures were performed in strict manner in accordance with paragraph 178.603 "Drop Test" of the CFR.

5. PASS/FAIL (DOT CRITERIA):

a. Stacking Test: A test sample passes the stacking test when no test sample spills its contents. 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.

b. Vibration Test: A packaging passes the vibration test if there is no rupture or spillage from any of the packages.

c. Drop Test: A package for explosives is considered to successfully pass the drop tests if for each sample tested, no rupture of the packing occurs.

6. TEST RESULTS:

a. Stacking Test

All three packed wood boxes were removed from the stacking platform after 24 hours of test. Each wood box was carefully inspected for any structural damage. All the wood boxes tested were intact and showed no evidence of rupture or spillage. All packages passed the test.

b. Vibration Test

All three packed wood boxes were removed from the platform after one hour vibration. Each of the wood box was physically inspected for any damage or spillage. All the wood boxes tested were intact and showed no evidence of deterioration. There was no spillage or any damage of the three packed wood boxes. All packages tested passed the test.

c. Drop Test

Upon completion of the drop tests, all three packed wood boxes tested were carefully inspected for any damage. There were no cracks in the wood, ruptures or spillage. All packages tested passed the test.

7. CONCLUSION:

Based upon the above successful POP testing, the following UN POP symbol has been applied to the wood box in accordance with drawing 12561471.

4C1/Y57/S/**
USA/DOD/AYD

** Last two digits of year packed.