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1

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11. TITLE (Include Security Classification) Performance Oriented Packaging Testing M57, M68, M91 120mm Mortar Cartridge (2) per wood box. HE Dwg. 5123007-01, WP SMOKE Dwg. 5125715-71, ILLUM Dwg. 5125015-02					
12. PERSONAL AUTHOR(S) Dmitry Kirshteyn					
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17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Performance Oriented Packaging Testing on the M57, M68, M91 120mm Mortar Cartridges, (2 per wood box).		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This report contains the testing and test results performed on the M57, M68, M91 120mm mortar cartridges packed two per wood box (NDI packaging).					
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I. Report Number: DOD POP HM TR/AYD 92-016.

II. Title: Performance Oriented Packaging Testing for M57, M68, M91 Projectiles.

Packed 1 per fiber container and 2 fiber container per wood box.

HE DWG. 5123007-01, WP SMOKE DWG. 5125715-71,

ILLUM DWG. 5125015-02

Author: Dmitry Kirshteyn

Performing Activity: ARDEC

Address: Department of the Army
Commander, U.S. Army Armament Research, Development
and Engineering Center
Picatinny Arsenal, N.J. 07806-5000
Attn: SMCAR-AEP

Date: September 1992

Approved for public release; distribution is unlimited.

14

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DIST	Special

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1. Data:

Container:

Type: Box, Natural Wood

UN Package Code: 4C1

Material: Natural Wood

Capacity: 61.2

Dimensions: 79.0 cm x 34.6 cm x 22.4 cm
(31.1" x 13.6" x 8.8")

Gross Weight: 42.0 kg (90 lbs)

Note: Although items are packed in the same wood box, they have different packing and marking drawings: M57, dwg. 5123007-01; M68, dwg. 5125715-71; M91, dwg. 5125015-02

Product:

Name: M57

Drawing Number: 5120057-05

United Nations Number: 0321

United Nations Packaging Group: II

United Nations Nomenclature: Cartridges for Weapons

Explosive Projectile

Physical State: Solid

Amount Per Container: 2 Rounds

NSN: 1315-01-315-1328

Name: M68

Drawing Number: 5120068-03

United Nations Number: 0245

United Nations Packaging Group: II

United Nations Nomenclature: Ammunition, Smoke, White,
Phosphorus

Smoke Projectile

Physical State: Solid

Amount Per Container: 2 Rounds

NSN: 1315-01-315-1330

Name: M91

Drawing Number: 5120091-02

United Nations Number: 0254

United Nations Packaging Group: II

United Nations Nomenclature: Ammunition, Illuminating

Illuminating Projectile

Physical State: Solid

Amount Per Container: 2 Rounds

NSN: 1315-01-315-1329

2. Background:

This report contains the testing and test results performed on cartridges packed in fiber container and two fiber container packed in wooden box (NDI). The weight of one packed out box was 90 lbs.

3. Testing:

Note: All testing was in accordance with the referenced sections of CFR 49.

a. Vibration Test (178.608):

Procedure-

Three boxes were vibrated (one at the time) on the vibration table unrestrained for a one hour time period. The peak-to-peak displacement was one inch and the frequency was 290 cycles per minute. This frequency was sufficient to allow the pack to become completely airborne enabling a 1/16" piece of strapping material to be slid underneath the pack during testing.

Results-

All three wood boxes received minor abrasions on all faces (except the top) from repetitive impacts with the side walls and base of the vibration table. The wood boxes experienced no structural damage and therefore there was no spillage of contents, satisfying the passing criteria.

b. Drop Test (178.603):

Procedure-

The test rounds were packed in their proper unit packaging and 2-round wooden overpack. Five boxes were tested (one per each drop). The wooden boxes were dropped in the following orientations: flat on bottom, flat on the top, flat on the long side, flat on the short side, on the corner. The height for all five drops was 2.1 meters.

Results-

There was no visible damage on the drops 1, 2, 4, 5. The drop "flat on the long side" had one of wood boards cracked. But the contents in all five drops remained inside the wood boxes and package was capable of being handled without danger of spillage, satisfying the passing criteria.

c. Stack Test (178.606).

Procedure-

A dead load of 1200 lbs. was applied to the top of a single packed wood box for 24 hour period. This simulates a stack height of 10 feet of identical packages.

Results-

No damage has been detected, which satisfying the passing criteria.

4. Referenced Material:

A. Federal Register, "49 CFR Part 107, 1991"

5. Based on the above equivalent POP Testing, the following POP symbol has been applied to wooden overpack IAW Drawing 9313721.

Insert last two digits of year packed

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USA/DOD/AYD