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I. Report Number: DOD POP HMTR/AYD 93-017

II. Title: Performance Oriented Packaging (POP) testing of Charge, Propelling,
155 MM, M119A2, Packed One per PA37A1 Round Rim Metal Ammunition
Container

Drawing Number: 9333957

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Performing Activity: U.S. Army Armament Research, Development
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| 19. ABSTRACT (Continue on reverse if necessary and identify by block number) | | | | | |
| <p>This Performance Oriented Packaging (POP) report is for the Propelling Charge, 155MM, M119A2, packed one per PA37A1 Round Rim Metal Ammunition Container in accordance with drawing 9333957. This report describes the results of testing conducted on the actual item.</p> | | | | | |
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| 22a. NAME OF RESPONSIBLE INDIVIDUAL STEVE RUFFINI <i>Steve Ruffini</i> | | | 22b. TELEPHONE (Include Area Code) 201-724-2515 | | 22c. OFFICE SYMBOL SMCAR-AEP |

1. DATA SHEET:

a. CONTAINER

Type: Removable head steel drum

UN Code: 1A2

Part Number: 9234357

Spec Number: MIL-C-2440

Material: Steel

Capacity: 17.1 liters

Dimensions: Inside Diameter = 6 13/16 in. min.
 Outside Diameter = 8 13/32 in. max.
 Inside Length = 28 3/4 in. min.
 Outside Length = 32 3/4 in. max.

Closure (Method/Type): Central plug which torques three spider arms into their respective bayonet slots

Tare Weight: 8.0 kg (17.6 lbs)

b. PRODUCT

Name: Charge, Propelling, 155 MM, M119A2, for HOW

United Nations Proper Shipping Name: Charges, Propelling, for Cannon

United Nations Number: 0242

NSN: 1320-01-051-4132

Drawing Number: 7548187

Physical State: Solid

United Nations Packing Group: II

Amount Per Container: 1

2. BACKGROUND:

This report contains the testing and test results performed for Performance Oriented Packaging Certification of Charge, Propelling, 155 MM, M119A2, packed one (1) per PA37A1 round rim metal ammunition container in accordance with drawing 7548187. 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 Code of Federal Regulations (CFR), Title 49, Parts 100-180, dated 1 Oct 92, requires that hazardous materials should be packed in a container that passes the Performance Oriented Packaging (POP) tests.

PA37A1 metal ammunition container, part number 9234357, is being used as shipping container for Propelling Charge, 155 MM, M119A2. The package contains one propelling charge, 155 MM, M119A2 per PA37A1 metal container in accordance with drawing 7548187.

A total of six (6) packed containers were POP tested in accordance with part 178, Subpart M-Testing of Non-bulk Packaging and Packages, Title 49 of the Code of Federal Regulations (CFR).

4. TESTS PERFORMED:

a. Drop Test

The Code of Federal Regulations (CFR), specifies that three containers should be used for each two drop orientations. Each three containers was dropped from a height of 1.2 meters (3.9 feet) in the following orientations: drop top down diagonally on the chime or edge of the container and drop top down on the closure of the container. A total of six (6) containers were used for two different orientations. The above procedures were performed in strict manner in accordance with paragraph 178.603 "Drop Test" of the CFR.

b. Vibration Test

Three (3) containers were placed on the vibrating platform and vibrated for a duration of one hour. The containers were unrestrained except horizontally to prevent them from falling off of the platform. The peak-to-peak displacement was one inch and the frequency was 300 rpm. This frequency was sufficient enough to allow the container to become completely airborne, enabling a 1/16 inch (.16 cm) thick piece of strapping materials to be slid underneath any of the container at any given time throughout the test. The above procedures were performed in strict manner in accordance with paragraph 178.608 "Vibration Standards" of the CFR.

c. Stacking Test

The Code of Federal Regulations (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 container has an individual weight of 42 pounds. A 3.0 meter stack height of samples is equivalent to 600 pounds (272.7 kg) of stack weight. Three different test samples were each subjected to a stack weight of 600 pounds for a period of 24 hours. The samples were then inspected and examined for any damage or distortion. The above procedures were performed in strict manner in accordance with paragraph 178.606 "Stacking Test" of the CFR.

5. PASS/FAIL (DOT CRITERIA):

- a. A package for explosives is considered to successfully pass the drop tests if for each sample tested, no rupture of the packing occurs.
- b. A packaging passes the vibration test if there is no rupture or leakage from any of the packages.
- c. A test sample passes the stacking test when no test sample leaks. 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.

6. TEST RESULTS:

a. Drop Test

The first three drops (drop top down on the closure) did not do any damage on any of the three containers. On the second three drops (drop top down diagonally on the edge) of the container sustained slightly dent on the rim and ring, but there was no cracked, rupture or spillage. All packages tested passed the test.

b. Vibration Test

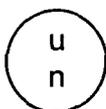
All three containers were removed from the platform after one hour vibration. Each of the container was physically inspected for any damage and leakage. All the containers tested were tightly intact and showed no evidence of deterioration. There was no spillage or any damage of the container. All packages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

c. **Stacking Test**

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

7. **CONCLUSION:**

Based upon the above successful POP testing, the following UNPOP symbol has been applied to the metal container in accordance with drawing 7548187.



1A2/Y19/S/**
USA/DOD/AYD

** Last two digits of year packed.

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| Accession For | |
| NTIS GRA&I | <input checked="" type="checkbox"/> |
| DTIC TAB | <input type="checkbox"/> |
| Unannounced | <input type="checkbox"/> |
| Justification | |
| By _____ | |
| Distribution/ | |
| Availability Codes | |
| Dist | Avail and/or Special |
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