**REPORT DOCUMENTATION PAGE**

**AD-A257 399**

Public reporting burden of this collection of information is estimated at 45 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data required, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. **AGENCY USE ONLY (Leave blank)**

2. **REPORT DATE**

   10/92

3. **REPORT TYPE AND DATES COVERED**

   POP Test (09/92)

4. **TITLE AND SUBTITLE**

   Performance Oriented Packaging Testing of Mk 117 Mod 0 JATO Shipping Container for Packing Group II Solid Hazardous Materials

5. **FUNDING NUMBERS**

   DTIC ELECTED

   OCT 26 1992

6. **AUTHOR(S)**

   J. Mike Dwyer

7. **PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)**

   Naval Weapons Station Earle
   Test and Evaluation Branch (Code 5023)
   Colts Neck, NJ 07722-5000

8. **PERFORMING ORGANIZATION REPORT NUMBER**

   DODPOPHM/USA/DOD/NADTR92028

9. **SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)**

   Commander, Naval Surface Warfare Center
   Indian Head Division (Code 5710R)
   Indian Head, MD 20640-5035

10. **SPONSORING/MONITORING AGENCY REPORT NUMBER**

    Same as above

11. **SUPPLEMENTARY NOTES**

    N/A

12a. **DISTRIBUTION/AVAILABILITY STATEMENT**

    Distribution Statement A

12b. **DISTRIBUTION CODE**

    Available for public release and sale; its distribution is unlimited.

13. **ABSTRACT (Maximum 200 words)**

   This Performance Oriented Packaging (POP) test was conducted to ascertain whether the Mk 117 Mod 0 JATO Shipping Container meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was two inert rocket motors weighing 23 kg (50 pounds) each. This represents the current maximum commodity weight. Gross weight of the loaded container was 59 kg (130 pounds). The test results indicate that the container has conformed to the POP requirements.

14. **SUBJECT TERMS**

   POP Test of Mk 117 Mod 0 JATO Shipping Container

15. **NUMBER OF PAGES**

    7

16. **PRICE CODE**

    UNCLASSIFIED

17. **SECURITY CLASSIFICATION OF REPORT**

   UNCLASSIFIED

18. **SECURITY CLASSIFICATION OF THIS PAGE**

   UL

19. **SECURITY CLASSIFICATION OF ABSTRACT**

   UL

20. **LIMITATION OF ABSTRACT**

   UL

NSN 7540-01-280-5500

Standard Form 298 (Rev 2-89)
PERFORMANCE ORIENTED PACKAGING TESTING
OF
MK 117 MOD 0 JATO SHIPPING CONTAINER
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

Author:
J. Mike Dwyer
Mechanical Engineering Technician

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

October 1992

FINAL

DISTRIBUTION UNLIMITED

Sponsoring Organization:
Naval Surface Warfare Center
Indian Head Division (Code 5710R)
Indian Head, MD 20640-5035
INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the Mk 117 Mod 0 JATO Container meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was two inert rocket motors weighing 23 kg (50 pounds) each. This represents the current maximum commodity weight. Gross weight of the loaded container was 59 kg (130 pounds).

Due to unavailability only two container were used for testing. This is less than the number required by the regulations. Approval for this deviation has been granted by the Under Secretary of Defense, Memorandum for the Joint Logistics Commanders dated 22 February 1990.

TESTS PERFORMED

1. Base Level Vibration Test

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

2. Stacking Test

   This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.606. The container was subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a minimum height of 3 meters (including the test container). A weight of 762 kg (1,680 pounds) was stacked on the test container. The test was performed for 24 hours. The weight was then removed and the container examined.

3. Drop Test

   This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.603. Five drops were 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 #1.
c. Flat on long side using container #1.
d. Flat on short side using container #1.
e. One on the aft stbd corner using container #2.

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): No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength.

2. Stacking Test

The criteria for passing the stacking test is outlined in Title 49 CFR, Sec. 178.606(d): No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation.

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, no rupture occurs which would permit spillage of loose explosive substances or articles from the outer packaging.

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 3.6 Hz. Immediately after the vibration test was completed, the container was removed from the platform, turned on its side and inspected. No unfavorable distortion or deterioration was observed.

2. Stacking Test

   The container was inspected after the 24-hour period was over. No unfavorable distortion or deterioration was observed.

3. Drop Test

   After each drop, the container was inspected. The contents were completely retained by the container.

REFERENCE MATERIAL


B. 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.

DISTRIBUTION LIST

Defense Technical Information Center (2 copies)
ATTN: DTIC/FDA
Bldg. 5, Cameron Station
Alexandria, VA 22304-6145

Defense General Supply Center
ATTN: DDRV-TMPA, D. Gay
Richmond, VA 23219

Commander
Naval Surface Warfare Center
ATTN: Crane Division (Code 4053)
Crane, IN 47522-5000
# TEST DATA SHEET

## POP MARKING:

**UN 4C1/Y59/S/**/USA/DOD/NAD**

**YEAR LAST PACKED OR MANUFACTURED**

<table>
<thead>
<tr>
<th>Container:</th>
<th>Mk 117 Mod 0 JATO Shipping Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>4C1</td>
</tr>
<tr>
<td>Drawing Number:</td>
<td>1638AS122</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>34-1/8&quot; L x 16-1/8&quot; W x 9-13/16&quot; H</td>
</tr>
<tr>
<td>Closure (Method/Type):</td>
<td>two 5/8&quot; straps and six 7-D nails</td>
</tr>
<tr>
<td>Outer Packaging Material:</td>
<td>Wood</td>
</tr>
<tr>
<td>Gross Weight:</td>
<td>59 kg (130 pounds)</td>
</tr>
<tr>
<td>Tare Weight:</td>
<td>14 kg (30 pounds)</td>
</tr>
</tbody>
</table>

## PACKAGED COMMODITY:

<table>
<thead>
<tr>
<th>Name:</th>
<th>See table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSN(s):</td>
<td>See table 1</td>
</tr>
<tr>
<td>United Nations Number:</td>
<td>See table 1</td>
</tr>
<tr>
<td>United Nations Packing Group:</td>
<td>II</td>
</tr>
<tr>
<td>Physical State (Solid, Liquid, or Gas):</td>
<td>Solid</td>
</tr>
<tr>
<td>Vapor Pressure (Liquids Only):</td>
<td>N/A</td>
</tr>
<tr>
<td>At 50 °C:</td>
<td>N/A</td>
</tr>
<tr>
<td>At 55 °C:</td>
<td>N/A</td>
</tr>
<tr>
<td>Consistency/Viscosity:</td>
<td>N/A</td>
</tr>
<tr>
<td>Density/Specific Gravity:</td>
<td>N/A</td>
</tr>
<tr>
<td>Amount Per Container:</td>
<td>See table 1</td>
</tr>
<tr>
<td>Flash Point:</td>
<td>N/A</td>
</tr>
<tr>
<td>Net Weight:</td>
<td>See table 1</td>
</tr>
</tbody>
</table>

## PACKAGED COMMODITY USED FOR TEST:

<table>
<thead>
<tr>
<th>Name:</th>
<th>Two Inert Rocket Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State:</td>
<td>Solid</td>
</tr>
<tr>
<td>Consistency:</td>
<td>N/A</td>
</tr>
<tr>
<td>Density/Specific Gravity:</td>
<td>N/A</td>
</tr>
<tr>
<td>Test Pressure (Liquids Only):</td>
<td>N/A</td>
</tr>
<tr>
<td>Net Weight:</td>
<td>45 kg (100 pounds)</td>
</tr>
</tbody>
</table>

Additional Description:

N/A = Not Applicable
TABLE 1
Commodities Approved for Shipping in the
Mk 117 Mod 0 JATO Shipping Container

<table>
<thead>
<tr>
<th>NALC/DODIC</th>
<th>NSN</th>
<th>Commodity Nomenclature</th>
<th>Packing Drawing Number</th>
<th>Haz Class/Div</th>
<th>UN Number</th>
<th>Units/Cntr</th>
<th>Total Net Weight (lb)</th>
<th>Total Gross Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H341</td>
<td>1340-01-177-2502</td>
<td>Mk 117 Mod 0 JATO Rocket Motor</td>
<td>1638AS123</td>
<td>1.3C</td>
<td>0188</td>
<td>2</td>
<td>100</td>
<td>130</td>
</tr>
</tbody>
</table>