This Performance Oriented Packaging (POP) test was conducted to ascertain whether the Shipping and Storage Container for the Mk 70 Mod 0 Explosive Charge Kit 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 an inert practice explosive charge kit weighing 30 kg (65 pounds) and a weighted load simulating an additional explosive charge kit. This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 9 kg (19 pounds) were added. Gross weight of the loaded container was 100 kg (220 pounds). The test results indicate that the container has conformed to the POP requirements.
PERFORMANCE ORIENTED PACKAGING TESTING OF CONTAINER, SHIPPING AND STORAGE, FOR MK 70 MOD 0 EXPLOSIVE CHARGE KIT FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

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October 1992

FINAL

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Sponsoring Organization:
Naval Mine Warfare Engineering Activity (Code 7310)
Washington, DC 20361-8050
INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the Shipping and Storage Container for the Mk 70 Mod 0 Explosive Charge Kit 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 an inert practice explosive charge kit weighing 30 kg (65 pounds) and a weighted load simulating an additional explosive charge kit. This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 9 kg (19 pounds) were added. Gross weight of the loaded container was 100 kg (220 pounds).

Due to unavailability only one container was 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 379 kg (836 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. Six drops were performed from a height of 1.2 meters (4 feet) in the following orientations (three drops for each orientation):

   a. Horizontally on the side.

   b. Diagonally on the edge between the cover assembly and the top ring of the container.
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)  
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Officer-in-Charge  
Naval Mine Warfare Engineering Activity  
Port Hueneme Division  
Naval Surface Warfare Center  
ATTN: J. Foster (Code 7310)  
Yorktown, VA 23691-5071
## TEST DATA SHEET

### POP MARKING:

UN 1A2/Y100/S/**/USA/DOD/NAD

**YEAR LAST PACKED OR MANUFACTURED

<table>
<thead>
<tr>
<th>Container</th>
<th>Shipping and Storage Container for Mk 70 Mod 0 Explosive Charge Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>1A2</td>
</tr>
<tr>
<td>P/N or NSN</td>
<td>NSN 6T 1350-01-297-9048</td>
</tr>
<tr>
<td>Drawing Number:</td>
<td>5917205</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>24&quot; dia x 30&quot; H</td>
</tr>
<tr>
<td>Closure (Method/Type):</td>
<td>Locking Ring</td>
</tr>
<tr>
<td>Additional Description:</td>
<td>MS Drum</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>Consistency/Viscosity:</td>
<td>N/A</td>
</tr>
<tr>
<td>Amount Per Container:</td>
<td>See table 1</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>1 inert practice explosive charge kit and dummy load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State:</td>
<td>Solid</td>
</tr>
<tr>
<td>Consistency:</td>
<td>N/A</td>
</tr>
<tr>
<td>Amount Per Container:</td>
<td>See table 1</td>
</tr>
<tr>
<td>Test Pressure (Liquids Only):</td>
<td>N/A</td>
</tr>
<tr>
<td>Net Weight:</td>
<td>68 kg (149 pounds)</td>
</tr>
</tbody>
</table>

Additional Description:
The net weight (two items) includes the current maximum commodity weight plus an additional 9 kg (19 pounds).

N/A = Not Applicable
### TABLE 1

Commodities Approved for Shipping in the Shipping and Storage Container for the Mk 70 Mod 0 Explosive Charge Kit

<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>9W23</td>
<td>1351-01-185-7447</td>
<td>Kit, Control Unit, Mk 126</td>
<td>5917207</td>
<td>1.1D</td>
<td>0408</td>
<td>1</td>
<td>90</td>
<td>161</td>
</tr>
<tr>
<td>9W24</td>
<td>1351-01-185-7448</td>
<td>Kit, Charge, Explosive, Mk 70</td>
<td>5917205</td>
<td>1.1D</td>
<td>0137</td>
<td>2</td>
<td>130</td>
<td>201</td>
</tr>
</tbody>
</table>