This Performance Oriented Packaging (POP) test was performed to ascertain whether the CNU-316/E Shipping and Storage Container (Packing Group II) meets the 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 a simulated load of 54 HARM fuze boosters weighing 10 kg (22 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 1 kg (3 pounds) were added. Gross weight of the loaded container was 22 kg (48 pounds). The test results indicate that the container has conformed to the POP requirements.
PERFORMANCE ORIENTED PACKAGING TESTING
OF
CONTAINER, SHIPPING AND STORAGE, CNU-316/E
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

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August 1992

FINAL

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Sponsoring Organization:
Naval Air Systems Command
(Code PMA-242)
Department of the Navy
Washington, DC 20361-8050
INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the CNU-316/E Shipping and Storage Container (Packing Group II) meets the 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 a simulated load of 54 HARM fuze boosters weighing 10 kg (22 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 1 kg (3 pounds) were added. Gross weight of the loaded container was 22 kg (48 pounds). The containers were identified as #1 through #5.

TESTS PERFORMED

1. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.608. Containers #1, #2, and #3 were placed on a repetitive shock platform which has a vertical linear motion of 1-inch double amplitude. Movement of the containers were restricted during vibration in all but the vertical direction. The frequency of the platform was increased until the containers 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. Containers #1, #2, and #3 were used for this test. Each 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 175 kg (384 pounds) was stacked on each test container. The test was performed for 24 hours. The weight was then removed and the containers 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 #2.

c. Flat on long side using container #3.

d. Flat on short side using container #4.

e. One corner using container #5.
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 3.8 Hz. Immediately after the vibration test was completed, each container was removed from the platform, turned on its side and inspected. No unfavorable distortion or deterioration was observed.
2. **Stacking Test**

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

3. **Drop Test**

After each drop, the containers were 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

Texas Instruments, Inc.
2501 South Highway 121
Lewisville, TX 75067
### TEST DATA SHEET

**POP MARKING:**

UN 4A1/Y22/S/**/USA/DOD/NAD

**YEAR LAST PACKED OR MANUFACTURED**

<table>
<thead>
<tr>
<th>Container:</th>
<th>CNU-316/E Shipping and Storage Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>4A1</td>
</tr>
<tr>
<td>Drawing Number:</td>
<td>704AS2316</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>15.350&quot; L x 12.350&quot; W x 14.550&quot; H</td>
</tr>
<tr>
<td>Closure (Method/Type):</td>
<td>Clamp</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>
<tr>
<td>Density/Specific Gravity:</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

**PACKAGED COMMODITY USED FOR TEST:**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Simulated Fuze Boosters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State:</td>
<td>Solid</td>
</tr>
<tr>
<td>Consistency:</td>
<td>N/A</td>
</tr>
<tr>
<td>Test Pressure (Liquids Only):</td>
<td>N/A</td>
</tr>
<tr>
<td>Net Weight:</td>
<td>11 kg (25 pounds)</td>
</tr>
<tr>
<td>Additional Description:</td>
<td>The net weight includes the current maximum product weight plus an additional 1 kg (3 pounds).</td>
</tr>
</tbody>
</table>
TABLE 1
Products Approved for Shipping in the CNU-316/E Shipping and Storage Container

<table>
<thead>
<tr>
<th>NALC/DODIC</th>
<th>NSN</th>
<th>Product 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>V606</td>
<td>1336-01-159-3039</td>
<td>Booster, Fuze</td>
<td>704AS2316</td>
<td>1.1D</td>
<td>0042</td>
<td>54</td>
<td>22</td>
<td>45</td>
</tr>
</tbody>
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