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QUALIFICATION TESTING OF THE COMBAT TALON II
RECEIVER/TRANSMITTER CONTAINER

HQ AFLC/DSTZ
AIR FORCE PACKAGING EVALUATION ACTIVITY
Wright-Patterson AFB OH 45433-5999

August 1989
ABSTRACT

Aeronautical Systems Division, ASD/VXAL, requested assistance from the Air Force Packaging Evaluation Activity (AFPEA) to choose an off-the-shelf container and qualify it for the receiver/transmitter (R/T) used on Combat Talon II aircraft.

The R/T prototype container was tested at the AFPEA, HQ AFLC/DSTZ, Wright-Patterson AFB, OH 45433-5999. The container is environmentally sealed and outfitted with a humidity indicator and pressure relief valve. The container is designed to protect one R/T during worldwide shipment, storage, and handling.

The container test plan was developed to test the fragility and environmental sealing qualification requirements. The tests were conducted in accordance with Federal Test Method Standard No. 101, and Military Standard 648.

Results of the tests conducted on the prototype container show that the container provides adequate mechanical protection but only marginal environmental protection. Based on the projected operational environment, the system program office has elected to use the container.
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<tr>
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ii
INTRODUCTION

BACKGROUND: Aeronautical Systems Division (ASD/VXAL), Wright-Patterson AFB OH 45433-5000 requested assistance from the Air Force Packaging Evaluation Activity (AFPEA) to choose an off the shelf container for the ku-band and x-band receiver transmitters (R/T) and perform qualification testing. Since the two R/T's are identical only one container design is necessary. The container chosen was a plastic multipurpose container designed by Hardigg Industries, South Deerfield, MA 01373.

PURPOSE: The purpose of this project was to determine if the container design will protect the contents, one R/T for Combat Talon II aircraft, during worldwide shipment, storage, and handling.

DESCRIPTION OF TEST CONTAINER

The 11214-8678-100 prototype container, now referred to as -100, was subjected to extensive testing. The sides, edges and latches of the container were numbered counterclockwise from the forward end as shown in figure 1.

Design: The -100 prototype is a controlled-breathing container (see figure 2), with a pressure relief valve and humidity indicator. The container is designed to limit the transmission of shocks to the R/T to 40 Gs. Fourteen wing latches allow quick access to the container contents without the use of tools.

Construction: The container is rotationally molded from a formulation of polyethylene. Two pound density polyethylene foam encapsulates the item (see figure 3). A silicone gasket provides a seal between the container base and the container cover.

TEST OUTLINE AND TEST EQUIPMENT

Test Plan: Tests were conducted in accordance with AFPEA Test Plan 88-P-102 (see table 1). The tests used were selected to meet the qualification requirements for fragility and environmental sealing. Test methods, procedures and pass/fail criteria used were as outlined in Federal Test Method Standard No. 101 (FED-STD-101) and Military Standard 648. Any modifications to the standard procedures are noted in the test plan or the results.

Test Load: All tests were conducted using the R/T test load fabricated at the AFPEA. The test load weighs 145 pounds and simulates the center of gravity and the mass moment of inertia of an actual R/T.
Test Site: All testing was conducted at the AFPEA, HQ AFLC/DSTZ, Building 70, Area C, Wright-Patterson AFB OH 45433-5999. The equipment required for each test is noted in the test plan.

TEST PROCEDURES AND RESULTS

Weight Test

**Test No. 1:** The container was weighed to determine weight compliance.

**Results:** The cover weighed 58 pounds, the base weighed 65.5 pounds, total tare weight of 123.5 pounds. The results of this test are acceptable.

Leak Test

**Test No. 2:** The pneumatic pressure test was conducted in accordance with FED-STD-101, Method 5009.2 at 0.50 psig. The vacuum retention test was conducted in accordance with FED-STD-101, Method 5009.2 at 0.50 psig. The failure criteria for the test was 0.025 psig loss during a 30 minute period, after temperature and pressure stabilization.

**Results:** At the end of the 30 minute test period the pressure loss was 0.024 psig. At the end of the 30 minute test period the vacuum loss was 0.024 psig. The results of this test are acceptable.

Rough Handling Tests (+140°F)

**Test No. 3a:** The high temperature cornerwise-drop (rotational) test was conducted in accordance with FED-STD-101, Method 5005.1. Due to the location of the center of gravity the maximum attainable height of the drop was 28 inches.

**Results:** Visual inspection revealed no external damage to the container. A maximum of 8 Gs was obtained during the test.

**Test No. 3b:** The high temperature edgewise-drop (rotational) test was conducted in accordance with FED-STD-101, Method 5008.1. Due to the location of the center of gravity the maximum attainable height of the drop was 28 inches.

**Results:** Visual inspection revealed no external damage to the container. A maximum of 10 Gs was obtained during the test.

**Test No. 3c:** The high temperature pendulum-impact test was conducted in accordance with FED-STD-101, Method 5012. The impact velocity was 7 ft/sec, the height of the drop was 9 inches.
Results: Visual inspection revealed no external damage to the container. A maximum of 17 Gs was obtained during the test. The container was opened after the pendulum-impact test. Visual inspection revealed no damage to the container or the test load. The results of these tests are acceptable. See appendix 1 for detailed acceleration results.

Leak Test

Test No. 4: The pneumatic pressure test was conducted in accordance with FED-STD-101, Method 5009.2. The test was performed at 0.50 psig. The failure criteria for the test was a 0.0125 psig loss during a 15 minute period after temperature and pressure stabilization.

Results: At the end of the 15 minute test period the pressure loss was 0.01 psig. The result of this test is acceptable.

Rough Handling Tests (-20°F)

Test No. 5a: The low temperature cornerwise-drop (rotational) test was conducted in accordance with FED-STD-101, Method 5005.1. Due to the location of the center of gravity the maximum attainable height of the drop was 24 inches.

Results: Visual inspection revealed no external damage to the container. A maximum of 11 Gs was obtained during the test.

Test No. 5b: The low temperature edgewise-drop (rotational) test was conducted in accordance with FED-STD-101, Method 5008.1. Due to the location of the center of gravity the maximum attainable height of the drop was 29 inches.

Results: Visual inspection revealed no external damage to the container. A maximum of 14 Gs was obtained during the test.

Test No. 5c: The low temperature pendulum-impact test was conducted in accordance with FED-STD-101, Method 5012. The impact velocity was 7 ft/sec, the height of the drop was 9 inches.

Results: Visual inspection revealed no external damage to the container. A maximum of 29 Gs was obtained during the test. The container was opened after the pendulum-impact test. Visual inspection revealed no damage to the container or the test load. However after cold conditioning the decals fell off the container. The results of this test are acceptable.
Leak Test

Test No. 6: The pneumatic pressure test was conducted in accordance with FED-STD-101, Method 5009.2. The test was performed at 0.50 psig. The failure criteria for the test was a 0.0125 psig loss during a 15 minute period after temperature and pressure stabilization.

Results: At the end of the 15 minute test period the pressure loss was 0.01 psig. The result of this test is acceptable.

Vibration Fatigue Test

Test No. 7: The vibration fatigue test was conducted in accordance with MIL-STD-648, paragraph 5.3.2. The container was rigidly attached to the platform (see figure 4). A sinusoidal vibration excitation was applied in a vertical direction and cyclically swept for 7.5 minutes at 2 minutes per octave to locate the resonant frequency. Input from 5 to 12.5 Hz was at 0.125 inch double amplitude and input from 12.5 to 50.0 Hz was at 1.0 G. A 30 minute dwell test was conducted at the resonant frequency.

Results: Visual inspection revealed no damage to the container or the test load. A maximum of 2.7 Gs was obtained at the resonant frequency of 11.5 Hz. The maximum transmissibility obtained was 2.4. The results of this test are acceptable.

Leak Test

Test No. 8: The pneumatic pressure test was conducted in accordance with FED-STD-101, Method 5009.2. The test was performed at 0.50 psig. The failure criteria for the test was a 0.0125 psig loss during a 15 minute period after temperature and pressure stabilization.

Results: At the end of the 15 minute test period the pressure loss was 0.008 psig. The result of this test is acceptable.

Hoisting Strength Test

Test No. 9: The single ring hoisting test was conducted in accordance with MIL-STD-648, paragraph 5.8.5. The loaded container was lifted by a lift ring and suspended for five minutes.

Results: Visual inspection of the container revealed no damage or deformation. The result of this test is acceptable.
Cover Handle Pull Test

Test No. 10: The cover handle pull test was performed using one handle to lift the 58 pound cover off the ground. A 192 pound weight was placed on the cover to give a total weight of 250 pounds. The cover was suspended for 5 minutes.

Results: Visual inspection revealed no deflection or permanent deformation to the cover handle or the container cover. The results of this test are acceptable.

Leak Test

Test No. 11: The pneumatic pressure test was conducted in accordance with FED-STD-101, Method 5009.2. The test was performed at 0.50 psig. The failure criteria for the test was a 0.0125 psig loss during a 15 minute period after temperature and pressure stabilization.

Results: At the end of the 15 minute test period the pressure loss was 0.012 psig. The result of this test is acceptable.

Superimposed Load Test

Test No. 12a: The ambient superimposed load test was conducted in accordance with FED-STD-101, Method 5016.1. A load of 2909 pounds was placed on top of the container using load spreaders. This simulates the loading of a stack of five containers with a safety factor of two on the bottom container (see figure 5).

Results: Visual inspection revealed no damage to the container. The result of this test is acceptable.

Test No. 12b: The high temperature, high humidity superimposed load test was conducted in accordance with FED-STD-101, Method 5016.1. A load of 1455 pounds was placed on top of the container using load spreaders this simulates the loading of a stack of five containers with a safety factor of one on the bottom container (see figure 6).

Results: Visual inspection revealed a permanent deformation of the container (see figure 7). This deformation did not cause any damage to the R/T or impair stackability. The result of this test is acceptable.
Test No. 13: The pneumatic pressure test was conducted in accordance with MIL-STD-101, Method 5009.2. The test was performed at 0.60 psig. The failure criteria for the test was a 0.0105 psig loss during a 15 minute period after temperature and pressure stabilization.

Results: The container would not pressurize and a leakage rate could not be obtained. This occurred due to the permanent deformation of the container from the high temperature, high humidity superimposed load test.

CONCLUSION

The 10 prototype container provided adequate mechanical protection for the contents when tested in accordance with the container test plan. However, the container provides marginal environmental protection, especially if the container will be shipped and/or stored in a stacked configuration under tropical conditions.

RECOMMENDATIONS

Additional cushion cut outs around the pressure relief valve and humidity indicator. Decals on the containers need better adherence for cold temperature environments. Container walls need to be made stiffer for more stability. The container should never be used for lengthy storage.
### Table 1. Test Plan

**AIR FORCE PACKAGING EVALUATION ACTIVITY**

(Container Test Plan)

<table>
<thead>
<tr>
<th>CONTAINER SIZE (L x W x D) INCHES</th>
<th>WEIGHT (LBS)</th>
<th>CUBE (CU. FT.)</th>
<th>QUANTITY</th>
<th>DATE</th>
</tr>
</thead>
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<td>INTERIOR:</td>
<td>EXTERIOR:</td>
<td>GROSS:</td>
<td>ITEM:</td>
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<td></td>
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<td></td>
<td>3 Jul 89</td>
</tr>
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**AFPEA PROJECT NUMBER**

88-P-102

**ITEM NAME**

LRUs

**CONTAINER NAME**

Composite Container

**MANUFACTURER**

Hardigg Industries

**CONTAINER COST**

**Part numbers 11214-8678-100**

**PACK DESCRIPTION**

Composite Container

**CONDITIONING**

As noted below.

<table>
<thead>
<tr>
<th>TEST NO.</th>
<th>REF. STD./SPEC</th>
<th>TEST TITLE AND PARAMETERS</th>
<th>CONTAINER ORIENTATION</th>
<th>INSTRUMENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>WEIGHT TEST</td>
<td>Container cover weight should not be greater than 60 lbs. Total including container weight shall not be less than 123 lbs.</td>
<td>Fully assembled container</td>
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<td></td>
</tr>
<tr>
<td>2.</td>
<td>FED-STD-101</td>
<td>LEAK TEST</td>
<td>Pneumatic pressure at 0.50 PSIG and vacuum retention at 0.50 PSIG. Test duration to be a minimum of 30 minutes with 0.025 PSIG loss allowed after temperature stabilization.</td>
<td>Test at ambient condition from compressed air supply/vacuum pump.</td>
</tr>
<tr>
<td></td>
<td>Method 5009.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>FED-STD-101</td>
<td>ROUGH HANDLING TESTS (HIGH TEMPERATURE +140°F)</td>
<td>Edge wise drop (rotational) test. Condition at +140°F for not less than 24 hours. Drop height 36 inches or maximum height where container does not tilt over on side. Peak resultant acceleration shall not exceed 40Gs.</td>
<td>Test performed in chamber. One drop on two adjacent bottom edges, total of two drops. *</td>
</tr>
<tr>
<td></td>
<td>Method 5008.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COMMENTS:** * Remaining edge drops to be performed in Test No. 5a.

**PREPARED BY:**

Susan Hughey, Mechanical Engineer

**APPROVED BY:**

Ted Hinds, Chief, Design Br., AFPEA
<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>MANUFACTURER</th>
<th>CONTAINER COST</th>
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</thead>
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<td>LRUs</td>
<td>Hardigg Industries</td>
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**Container Name:** Part numbers 11214-8675-100

**Pack Description:** Corporate Container

**Conditions:** As stated below.

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<th>TEST STD SPEC AND TEST METHOD OR PROCEDURE NO.</th>
<th>TEST TITLE AND PARAMETERS</th>
<th>CONTAINER ORIENTATION</th>
<th>INSTRUMENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>86-P-102-191</td>
<td>Cornerwise-drop (rotational) test. Condition at -250°F for not less than 24 hours. Drop diagonal height 36 inches or maximum height where container does not tilt over on side. Peak resultant acceleration shall not exceed 40Gs.</td>
<td>Tri-axial in chamber.</td>
<td>Accelerometers.</td>
</tr>
<tr>
<td>2</td>
<td>106-P-102-154</td>
<td>Pendulum-impact test. Temperature of shock mitigation system at ( +105^\circ F ). Impact velocity 7 ft/sec, drop height 9 inches. Peak resultant acceleration shall not exceed 40Gs.</td>
<td>One impact on Tri-axial two adjacent accelerometer sides, total 2 impacts.</td>
<td>Accelerometers. <strong>Thermocouples</strong></td>
</tr>
<tr>
<td>3</td>
<td>106-P-102-140</td>
<td>Pneumatic pressure with Ambient Water manometer. Test duration not less than 15 minutes with 0.0125 PSIG. Test allowed after temperature stabilization.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments:** Remaining corner drops to be performed in Test No. 5b. Remaining side impacts to be performed in Test No. 5c.

**Prepared By:** Susan Hughey, Mechanical Engineer

**Approved By:** Ted Hinds, Chief, Design Br., AFPEA
**AIR FORCE PACKAGING EVALUATION ACTIVITY**  
*Container Test Plan*

<table>
<thead>
<tr>
<th>ITEM NAME</th>
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<tbody>
<tr>
<td>LRUs</td>
<td>Hardigg Industries</td>
</tr>
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**CONTAINER NAME**
Part numbers 11214-8678-100

**PACK DESCRIPTION**
Composite Container

**CONDITIONING**
As noted below.

<table>
<thead>
<tr>
<th>TEST NO.</th>
<th>REF STD/SPEC AND TEST METHOD OR PROCEDURE NO'S</th>
<th>TEST TITLE AND PARAMETERS</th>
<th>CONTAINER ORIENTATION</th>
<th>INSTRUMENTATION</th>
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</thead>
<tbody>
<tr>
<td>5.</td>
<td>ROUGH HANDLING TESTS (LOW TEMPERATURE -20°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. FED-STD-101 Method 5008.1</td>
<td>Edgewise drop (rotational) test. Condition at -20°F for not less than 24 hours. Drop height 36 inches or maximum height where container does not tilt over. Peak resultant acceleration shall not exceed 40Gs.</td>
<td>Test performed in chamber. One drop on two adjacent bottom edges, total of two drops.*</td>
<td>Tri-axial accelerometers</td>
<td></td>
</tr>
<tr>
<td>b. FED-STD-101 Method 5005.1</td>
<td>Cornerswise drop (rotational) test. Condition at -20°F for not less than 24 hours. Drop height 36 inches or maximum height where container does not tilt over. Peak resultant acceleration shall not exceed 40Gs.</td>
<td>Test performed in chamber. One drop on diagonal bottom corners, total of two drops.**</td>
<td>Tri-axial accelerometers</td>
<td></td>
</tr>
<tr>
<td>c. FED-STD-101 Method 5012</td>
<td>Pendulum-impact test. Condition at -65°F. Temperature of shock mitigation system at time of test shall be -20 (+0,-10°F). Impact velocity 7 ft/sec, drop height 9 inches. Peak</td>
<td>One impact on two adjacent sides, total of two Thermo impacts.***</td>
<td>Tri-axial accelerometers</td>
<td></td>
</tr>
</tbody>
</table>

**COMMENTS:**
* These edges are opposite those impacted in Test No. 3a.  
** These corners are opposite those impacted in Test No. 3b.  
*** These sides are opposite those impacted in Test No. 3c.

**PREPARED BY:**  
Susan Hughey, Mechanical Engineer  
Ted Hinds, Chief, Design Br., AFPEA

**APPROVED BY:**
Container Name: Composite Container

Pack Description: As noted below.

Test:
- **LEAK TEST**
  - Method: 5009.2
  - Procedure: FED-STD-101
  - Test: Pneumatic pressure with Ambient Water manometer
  - Pressure: 0.50 PSIG
  - Duration: Test duration not less than 15 minutes with 0.0125 PSIG loss allowed after temperature stabilization.

- **VIBRATION FATIGUE TEST**
  - Method: MIL-STD-648
  - Procedure: 5009.2
  - Input excitation of 0.125 inch double amplitude or 1G, whichever is less.
  - Sweep approximately logarithmically from 5 to 50 Hz (about 1/2 octave/min) for 7-1/2 minutes. Then dwell 30 minutes at the resonant frequency. The test may be interrupted to prevent excessive temperature rise in materials. Transmissibility shall not exceed 5 at the resonant frequency.

Comments:

Prepared By: Susan Hughey, Mechanical Engineer

Approved By: Ted Hinds, Chief, Design Br., AFPEA
### Container Test Plan

**AFPEA PROJECT NUMBER**: 88-P-102

<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>MANUFACTURER</th>
<th>CONTAINER NAME</th>
<th>CONTAINER COST</th>
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<tbody>
<tr>
<td>LRUs</td>
<td>Hardigg Industries</td>
<td>Part numbers 11214-8676-100</td>
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**PACK DESCRIPTION**: Composite Container

**CONDITIONING**: As noted below.

<table>
<thead>
<tr>
<th>TEST NO.</th>
<th>REF STD/SPEC AND TEST METHOD OR PROCEDURE NO'S</th>
<th>TEST TITLE AND PARAMETERS</th>
<th>ORIENTATION</th>
<th>INSTRUMENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>FED-STD-101 Method 5009.2</td>
<td>Pneumatic pressure with u.50 PSIG. Test duration not less than 15 minutes with 0.0125 PSIG loss allowed after temperature stabilization.</td>
<td>Ambient</td>
<td>Water manometer</td>
</tr>
<tr>
<td>9</td>
<td>MIL-STD-648 Para. 5.8.5</td>
<td>Single ring hoisting test. Hoist container at one lift point and leave hanging for five minutes. There shall be no damage or permanent deformation.</td>
<td>Ambient</td>
<td>Visual inspection</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Apply a force of 250 lbs on a cover handle in all directions that service loads are possible. There shall be no damage or permanent deformation.</td>
<td>Ambient</td>
<td>Scale</td>
</tr>
</tbody>
</table>

**COMMENTS**: 

**PREPARED BY**: Susan Hughey, Mechanical Engineer

**APPROVED BY**: Ted Hinds, Chief, Design Br., AFPEA

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 PAGE 5 OF
Container Size (L x W x D) (INCHES)  
INTERIOR:  
EXTERIOR:  
GROSS:  
ITEM:  
CUBE (CU. FT.)  
QUANTITY  
DATE  
3 Jul 89

ITEM NAME  
LRUs  
CONTAINER NAME  
Part numbers 11214-8678-100  
PACK DESCRIPTION  
Composite Container  
CONDITIONING  
As noted below.

TEST REF STD/SPEC AND TEST METHOD OR PROCEDURE NO'S  
TEST TITLE AND PARAMETERS  
CONTAINER INSTRUMENTATION  
ORIENTATION

1. LEAK TEST  
FED-STD-101  
Method 5009.2  
Pneumatic pressure with Ambient Water manometer  
0.50 PSIG. Test duration not less than 15 minutes with 0.0125 PSIG loss allowed after temperature stabilization.

2. SIS LOADED  
FED-STD-101  
Method 5016.1  
At ambient temperature, stack two containers with additional load on top to simulate stacking 5 containers or 16 ft high, whichever is greater. Load equals load on bottom container times a factor of safety of 2. Test duration not less than 1 hour. Additional load placed on top container such that the total load is carried by the stacking provisions. There shall be no permanent deformation.

The test shall be repeated with containers conditioned at 120°F and
AIR FORCE PACKAGING EVALUATION ACTIVITY
(Container Test Plan)

(Containment Test Plan)

AFPEA PROJECT NUMBER
88-P-102

CONTAINER SIZE (L x W x D) (INCHES)
WEIGHT (LBS)
CUBE (CU. FT.)
ITEM:
QUANTITY
DATE
3 Jul 89

ITEM NAME
LRUs

MANUFACTURER
Hardigg Industries

CONTAINER NAME
Part numbers 11214-8678-100

PACK DESCRIPTION
Composite Container

CONDITIONING
As noted below.

<table>
<thead>
<tr>
<th>TEST NO.</th>
<th>REF STD/SPEC AND TEST METHOD OR PROCEDURE NO'S</th>
<th>TEST TITLE AND PARAMETERS</th>
<th>CONTAINER ORIENTATION</th>
<th>INSTRUMENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>90% relative humidity for 168 hours. The safety factor shall be 1.</td>
<td></td>
<td></td>
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</table>

13. LEAK TEST
FED-STD-101 Method 5009.2
Pneumatic pressure with Ambient Water
0.50 PSIG. Test duration not less than 15 minutes with 0.0125 PSIG loss allowed after temperature stabilization.

COMMENTS:

PREPARED BY:
Susan Hughey, Mechanical Engineer

APPROVED BY:
Ted Hinds, Chief, Design Br., AFPEA
FIGURE 1. -100 Corner, Side and Latch Numbering.
Figure 2

-100
Prototype Container.

Figure 3

-100
Container Cushioning.
Figure 4

Vibration Fatigue Test.

Figure 5

Ambient Superimposed Load Test.
Figure 6
High Temperature,
High Humidity
Superimposed
Load Test.

Figure 7
-100
Container
Deformation.
<table>
<thead>
<tr>
<th>DISTRIBUTION LIST</th>
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</thead>
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<td>DTIC/FDAC</td>
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<tr>
<td>Cameron Station</td>
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<td>AFSC MSD/YBAC</td>
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<td>Eglin AFB FL 32542</td>
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DISTRIBUTION LIST (Cont'd)

Commander
Naval Supply Systems Command
Attn: N. Earl (SUP 0611F)
Washington DC 20370-5000

Commander
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Attn: E. Panigot (AIR 41212A)
Washington DC 20361

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Alexandria, VA 22332

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Port Hueneme, CA 93043

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700 Robbins Avenue
Attn: H. PURLONG
Philadelphia, PA 19111-5098

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Mechanicsburg, PA 17055-0738

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NWHC/Code 8023
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USAMCPSCC
Attn: SDSTO-TM
Tobyhanna, PA 18466-5097

DLSIE/AMXMC-D
US Army Logistics Mgt Ctr
Ft Lee VA 23801-6034

Commander
US Army Armament Munitions & Chemical Command,
Attn: SMCAR-AEP
(Mike Ivanroe) Bldg 455
Picatinny, NJ 07801-5000

HQ DLA/OWP
Cameron Station
Alexandria, VA 22304-6100

ASD/VXAL
Wright-Patterson AFB OH 45433

ASD/VXA
Wright-Patterson AFB OH 45433
### -100 Container - Detailed Acceleration Results

#### High Temperature Rough Handling Tests (+140°F)

<table>
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<tr>
<th>Impact</th>
<th>Position</th>
<th>Resultant</th>
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<tbody>
<tr>
<td>28&quot; rotational drop</td>
<td>Corner 1-2</td>
<td>7</td>
</tr>
<tr>
<td>28&quot; rotational drop</td>
<td>Corner 3-4</td>
<td>8</td>
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<tr>
<td>25&quot; rotational drop</td>
<td>Side 3</td>
<td>10</td>
</tr>
<tr>
<td>28&quot; rotational drop</td>
<td>Side 4</td>
<td>6</td>
</tr>
<tr>
<td>7 ft/sec pendulum-impact</td>
<td>Side 1</td>
<td>14</td>
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<tr>
<td>7 ft/sec pendulum-impact</td>
<td>Side 2</td>
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1. No damage to the container or the test load.

#### Low Temperature Rough Handling Tests (-20°F)

<table>
<thead>
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<th>Impact</th>
<th>Position</th>
<th>Resultant</th>
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</thead>
<tbody>
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<td>23&quot; rotational drop</td>
<td>Corner 1-4</td>
<td>8</td>
</tr>
<tr>
<td>24&quot; rotational drop</td>
<td>Corner 2-3</td>
<td>11</td>
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<tr>
<td>24&quot; rotational drop</td>
<td>Side 1</td>
<td>8</td>
</tr>
<tr>
<td>29&quot; rotational drop</td>
<td>Side 2</td>
<td>14</td>
</tr>
<tr>
<td>7 ft/sec pendulum-impact</td>
<td>Side 3</td>
<td>24</td>
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<tr>
<td>7 ft/sec pendulum-impact</td>
<td>Side 4</td>
<td>29</td>
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</tbody>
</table>

1. No damage to the container or the test load.

#### Vibration Fatigue Test

Natural frequency 11.5 Hz

Input: 0.04 G peak, 0.125 inch double amplitude

<table>
<thead>
<tr>
<th>Resultant</th>
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</thead>
<tbody>
<tr>
<td>Maximum Acceleration (Gs, peak to peak)</td>
<td>2.7</td>
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<tr>
<td>Maximum Transmissibility</td>
<td>2.4</td>
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</tbody>
</table>

1. No damage to the container or the test load.

APPENDIX 1