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DODPOPHM/USA/DOD/NADTR92034 REVISION A

Superseding  
DODPOPHM/USA/DOD/NADTR92034  
February 1993

**PERFORMANCE ORIENTED PACKAGING TESTING  
OF  
CONTAINER, SHIPPING AND STORAGE, MK 723 MOD 0  
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS**

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Performing Activity:  
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January 1994

**FINAL**

DISTRIBUTION UNLIMITED

Sponsoring Organization:  
Program Executive Officer  
Cruise Missiles Project and Unmanned Aerial Vehicles  
Joint Project, Code PEO(CU)-C4136  
Washington, DC 20361-1014

796 94-02069



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**REPORT DOCUMENTATION PAGE**Form Approved  
OMB No 0704-0188

Public reporting burden of this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, 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 01/94	3. REPORT TYPE AND DATES COVERED POP Test (12/92)	
4. TITLE AND SUBTITLE Performance Oriented Packaging Testing of Container, Shipping and Storage, Mk 723 Mod 0 for Packing Group II Solid Hazardous Materials			5. FUNDING NUMBERS	
6. AUTHOR(S) Karen McDonnell				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Packaging, Handling, Storage and Transportation Center Naval Weapons Station Earle Colts Neck, NJ 07722-5023			8. PERFORMING ORGANIZATION REPORT NUMBER DODPOPHM/USA/DOD/NADTR92034 REVISION A	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Program Executive Officer Cruise Missiles Project and Unmanned Aerial Vehicles Joint Project, Code PEO(CU)-C4136 Washington, DC 20361-1014			10. SPONSORING/MONITORING AGENCY REPORT NUMBER Same as above	
11. SUPPLEMENTARY NOTES N/A				
12a. DISTRIBUTION/AVAILABILITY STATEMENT			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) <p>This Performance Oriented Packaging (POP) test was conducted to ascertain whether the Mk 723 Mod 0 Shipping and Storage Container (Drawing #JCM-14219) meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 106 through 178, dated 1 October 1992. The packaged commodity used for the test was an inert gas generator weighing 91 kg (200 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 19 kg (41 pounds) were added. Gross weight of the loaded container was 164 kg (362 pounds). The test results indicate that the container has conformed to the POP requirements.</p>				
14. SUBJECT TERMS POP Test of Mk 723 Mod 0 Shipping and Storage Container			15. NUMBER OF PAGES 6	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT UL	

## INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the Mk 723 Mod 0 Shipping and Storage Container (Drawing #JCM-14219) meets the Packing Group II requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 106 through 178, dated 1 October 1992. The packaged commodity used for the test was an inert gas generator weighing 91 kg (200 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 19 kg (41 pounds) were added. Gross weight of the loaded container was 164 kg (362 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 178.608. 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 178.606. 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 657 kg (1,448 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 178.603. Five drops were performed from a height of 1.2 meters (4 feet), impacting the following surfaces:

- a. Flat bottom.
- b. Flat top.
- c. Flat on long side.

- d. Flat on short side.
- e. One corner.

**PASS/FAIL**

**1. Base Level Vibration Test**

The criteria for passing the base level vibration test is outlined in Title 49 CFR 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 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 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 3.5 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**

A. Code of Federal Regulations, Title 49 CFR, Parts 106-178.

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.

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## TEST DATA SHEET

<b>POP MARKING:</b>	
UN 4C1/Y164/S/**/USA/DOD/NAD	
**YEAR LAST PACKED OR MANUFACTURED	
<b>Nomenclature:</b> Mk 723 Mod 0 Shipping and Storage Container	
<b>Type:</b> 4C1	<b>NSN:</b> NSN 8140-01-328-4938
<b>Drawing Number or P/N:</b> JCM-14219	<b>Outer Packaging Material:</b> Wood Cradle Assembly
<b>Dimensions:</b> 28-7/8" L x 25-3/8" W x 28-1/2" H	<b>Gross Weight:</b> 164 kg (362 pounds)
<b>Closure (Method/Type):</b> Removeable Cover with Locking Ring	<b>Tare Weight:</b> 55 kg (121 pounds)
<b>Additional Description:</b> Wood Cradle Assembly Built Around an MS Drum	
<b>PACKAGED COMMODITY:</b>	
<b>Name:</b> See table 1	<b>NSN(s):</b> See table 1
<b>United Nations Number:</b> See table 1	
<b>United Nations Packing Group:</b> II	
<b>Physical State (Solid, Liquid, or Gas):</b> Solid	
<b>Vapor Pressure (Liquids Only):</b> N/A <b>At 50 °C:</b> N/A <b>At 55 °C:</b> N/A	
<b>Consistency/Viscosity:</b> N/A	<b>Density/Specific Gravity:</b> N/A
<b>Amount Per Package:</b> See table 1	<b>Flash Point:</b> N/A
<b>Net Weight:</b> See table 1	
<b>PACKAGED COMMODITY USED FOR TEST:</b>	
<b>Name:</b> Inert Gas Generator	<b>Physical State:</b> Solid
<b>Consistency:</b> N/A	<b>Density/Specific Gravity:</b> N/A
<b>Test Pressure (Liquids Only):</b> N/A	<b>Net Weight:</b> 109 kg (241 pounds)
<b>Additional Description:</b>  The net weight includes the current maximum commodity weight plus an additional 19 kg (41 pounds).	

N/A = Not Applicable

**TABLE 1**  
**Commodities Approved for Shipping in the**  
**Mk 723 Mod 0 Shipping and Storage Container**

NALC/ DODIC	NSN	Commodity Nomenclature	Packing Document Number	Haz Class/Div	UN Number	Units/ Package	Total Net Weight kg (lb)	Total Gross Weight kg (lb)
YW75	1338-01-329-6317	TOMAHAWK CLS Gas Generator	JCM-14219	1.3C	0186	1	91 (200)	146 (321)

CLS = Capsule Launch System