

MIL-C-81313 (WP)  
7 September 1965

MILITARY SPECIFICATION  
CRADLES AND STACKING FRAMES  
AIR LAUNCHED WEAPONS

1. SCOPE

1.1 Scope. - This specification. establishes the requirements for the procurement of four types of Air Launched Weapons Cradles and two types of Cradle Stacking Frames for use with the above Cradles.

1.2 Classification. - Equipment supplied under this specification shall be classified as follows:

Cradles.

Cradle, S IDEWINDER, MHU-6 1/E

Cradle, Multiple Bomb, MHU-62/E

Cradle, Small,Universal, mIu-63/E

Cradle, Large, Universal, MHU-65/E

Stacking Frames.

Frame, Stacking, Small, MHU-64\E

Frame, Stacking, Large, MHU-66/E

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

FSC 1740

MIL-C-81313 (WP)

## SPECIFICATIONS

## FEDERAL

PPP-T-60                      Tape, Pressure Sensitive  
Adhesive, Waterproof -  
for Packaging and Sealing.

PPP-B-621                    Boxes, Nailed Wood.

## MILITARY

MIL-P-116                    Preservation, Methods of.

MI L-B-121                  Barrier Material, Grease-  
proofed, Waterproofed,  
Flexible.

MIL-B-131                    Barrier Material, Water  
Vaporproof, Flexible.

MIL-G-23827                Grease, Aircraft and Instru-  
ment, Gear and Actuator  
Screw.

## STANDARDS

## MILITARY

MI L-STD-129                Marking for Shipment  
and Storage.

MIL-STD-810                Environmental Test Methods  
for Aerospace and Ground  
Equipment.

## DRAWINGS

## BUREAU OF NAVAL WEAPONS

List of Drawings 620935    Cradle, SIDEWINDER,  
MHU-61/E

List of Drawings 620936    Cradle, Multiple Bomb,  
MHU-62/E

List of Drawings 620938    Cradle, Universal, Small,  
MHU-63/E

List of Drawings 620939	Cradle, Universal, Large, MHU-65/E
List of Drawings 620942	Frame Stacking, Small, MHU-64/E
List of Drawings 620943	Frame, Stacking, Large, MHU-66/E

(And all documents listed thereon.)

(Copies of specifications, standards, and drawings required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer. )

### 3. REQUIREMENTS

3.1 Construction. - The Cradles and Stacking Frames shall, as applicable, be manufactured in strict accordance with the following Bureau of Naval Weapons Lists of Drawings and all documents listed thereon:

#### Cradles

MHU-61/E	LD 620935
MHU-62/E	LD 620936
MHU-63/E	LD 620938
MHU-65/E	LD 620939

#### Stacking Frames

MHU-64/E	LD 620942
MHU-66/E	LD 620943

3.1.2 Preproduction sample. - Unless otherwise specified in the contract or order, preproduction samples shall be manufactured using the methods and procedures proposed for production. The samples will be tested as specified in Section 4 herein and is for the purpose of determining that, prior to starting production, the contractors production methods are capable of yielding items that comply with the technical requirements of the contract.

MIL-C-81313 (WP)

3.2 Performance requirements and product characteristics. - Equipment covered by this specification shall meet the following performance requirements and product characteristics.

3.2.1 Cradles.

3.2.1.1 Weight. - The weight of the unloaded Cradles shall not exceed the following values:

MHU-61/E	112 pounds.
MHU-62/E	195 pounds.
MHU-63/E	98 pounds.
MHU-65/E	125 pounds.

3.2.1.2 Tie-down straps. - As shown on applicable drawings, all Cradles, except the MHU-61/E, shall be furnished with 4,000 pound capacity, tie-down straps with quick-release buckles.

3.2.1.3 Cradle/Weapon configurations. - The Cradles procured under this specification shall be capable of accepting the following store configurations:

3.2.1.3.1 MHU-62/E. - The MHU-62/E Multiple Bomb Cradle supplied under this specification shall be capable of handling and restraining six hard shell stores individually or when attached to a multiple bomb rack. These stores can be either nine or 10-3/4 inches in diameter and can weigh up to 500 pounds each. The length of the Cradle supports shall be adjustable or the difference in length between stores.

3.2.1.3.2 MHU-63/E. - The MHU-63/E Small Universal Cradle supplied under this specification shall be capable of handling and restraining any eight through 16 inch diameter weapon or store. Further, these Cradles shall be capable of receiving MHU-64 Small Stacking Frames for purposes of stacking loaded Cradles three high. The Cradle shall be adjustable for weapons or stores of various lengths.

3.2.1.3.3 MHU-65/E. - The MHU-65/E Large Universal Cradle supplied under this specification shall be capable of

handling and restraining any 16 through 32 inch diameter weapon or store. Further, these Cradles shall be capable of receiving MHU-66/E Large Stacking Frames for purposes of stacking loaded Cradles two high. The Cradle shall be adjustable for weapons or stores of various lengths.

3.2.1 .3.4 MHU-61/E. - The MHU-61/E SIDEWINDER Cradle supplied under this specification shall be capable of handling and restraining four SIDEWINDER missiles. The loaded Cradle shall be capable of being stacked two high while being transported or stored.

### 3.2.2 Stacking frames.

3.2.2.1 Weight. - The total weight of the Stacking Frames shall not exceed the following values:

MHU-64/E	43	pounds.	.
MHU-66/E	81	pounds.	

3.2.2.2 Locking device. - As shown on applicable drawings, the Stacking Frames supplied under this specification shall be equipped with a non-selective positive locking device to secure Cradles when stacked.

3.2.2.3 Stacking Frame/Cradle configurations. - Stacking Frames supplied under this specification shall be capable of accepting the following Cradle configurations:

3.2.2.3.1 MHU-64/E. - The MHU-64/E Small Stacking Frame supplied under this specification shall support, when used in pairs, two or more stacked MHU-63/E Small Universal Cradles.

3.2.2.3.2 MHU-66/E. - The MHU-66/E Large Stacking Frame supplied under this specification shall support, when used in pairs, two stacked MHU-65/E Large Universal Cradles.

3.3 Cradle compatibility. - Unless otherwise specified, all Cradles supplied under this specification shall be compatible with certain weapons loaders, rough terrain trailers, transporting/loading trailers, and rough terrain fork lift trucks (see 6.2).

3.4 Environmental requirements. - The Cradles and Stacking Frames supplied under this specification shall be capable of meeting, without damage, the following environmental criteria:

MIL-C-81313 (WP )

<u>Requirement</u>	<u>Test Paragraph</u>
(a) <u>High temperature</u> - 160°F for eight hours.	4.5.1
(b) <u>Low temperature</u> - minus 65°F "for eight hours.	4.5.2
(c) <u>Humidity</u> - Method 507.1 Standard MIL-STD-810.	4.5.3
(d) <u>Sand and dust</u> - Method 510.1 Standard MIL-STD-810.	4.5.4

3.5 Workmanship. - The workmanship displayed in fabrication and assembly of the Cradles and Stacking Frames shall be such as to assure, within design limitations, ability of the Cradles and Stacking Frames to meet their performance requirements under all applicable environmental conditions. Unauthorized repair, welding, loose rivets, heavy burrs, indiscriminate placement of fasteners, and parts assembled by introduction of high stresses not prescribed by design, are typical signs of inferior workmanship. The standards of workmanship exhibited in any approved Preproduction sample, subject to any qualification stated in the Government's notice of approval, shall be determinative of the requirements of the contract relative to workmanship insofar as not specifically covered by applicable specifications.

#### 4. QUALITY ASSURANCE INSPECTIONS

4.1 Responsibility for inspection. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.2 Classification of tests. - The examination and testing of the Cradles and Stacking Frames supplied under this document shall be as follows:

- (a) Preproduction tests.
- (b) Acceptance tests.

4.2.1 Preproduction tests. - Unless otherwise specified and as applicable, one unit of each type (i.e., Cradle or Stacking Frame) shall be fabricated for preproduction testing. The preproduction sample and related components (see 6.2) shall be subjected to all examinations and tests of this document. Unless otherwise specified, these examinations and tests shall be performed by the contractor (see 6.2).

4.2.2 Acceptance tests. - Examination and testing of each Cradle and Stacking Frame for acceptance shall consist of those procedures specified in 4.3

4.3 Acceptance examination and static testing.

4.3.1 Test conditions. - Unless otherwise specified the Cradles and Stacking Frames shall be tested under the following conditions:

(a) Temperature - 77<sup>±</sup>18 degrees Fahrenheit.

(b) Humidity - 90 percent maximum.

(c) Barometric Pressure - Local Standard.

4.3.2 Examination. - The Cradle anti Stacking Frames shall be inspected to determine compliance with the requirements specified herein with respect to compliance with drawings, dimensions, materials, clearances, markings and workmanship.

4.3.2.1 Classification of Defects. - Unless otherwise specified (see 6.2), selected components of the Cradles or Stacking Frames shall be examined by utilization of applicable Bureau of Naval Weapons Classifications of Defects (NAVWEPS CD's).

4.3.2.2 Weight. - It shall be determined that the weight of each Cradle or Stacking Frame does not exceed the applicable values specified in 3.2.1.1 and 3.2.2.1.

4.3.3 Cradle/Weapon configuration tests. - Cradles, as applicable, shall be loaded with the simulated shapes described in the following paragraphs. It shall be determined that the Cradles support and restrain these shapes as required by applicable drawings. At the conclusion of the loading operation, the simulated shapes (for each specified size and weight) shall be allowed to remain in place for no less than four hours and then unloaded. Examination of the Cradles shall not reveal evidence of damage or permanent deformation.

## MIL-C-81313 (WP)

4.3.3.1 MHU-62/E. - The MHU-62/E Multiple Bomb Cradle shall be loaded with six cylinders, nine inches in diameter, each weighing not less than 350 nor more than 500 pounds and then with six cylinders, 10-3/4 inches in diameter, each weighing not less than 350 nor more than 500 pounds.

4.3.3.2 MHU-63/E. - The MHU-63/E Small Universal Cradle shall be loaded with a cylinder eight inches in diameter, weighing not less than 100 pounds nor more than 400 pounds and then with a cylinder 16 inches in diameter, weighing not less than 200 pounds nor more than 500 pounds.

4.3\*3\*3 MHU-65/E. - The MHU-65/E Large Universal Cradle shall be loaded with a cylinder 16 inches in diameter, weighing not less than 300 pounds nor more than 700 pounds and then with a cylinder 32 inches in diameter, weighing not less than 600 pounds nor more than 1,000 pounds.

4.3.3.4 MHU-61/E. - The MHU-61/E SIDEWINDER Cradle shall be loaded with four SIDEWINDER Missiles or dynamically simulated shapes. The Government will either supply missiles or shapes for this test or will furnish design data for the contractor to manufacture test shapes (see 6.2).

4.3.4 Stacking Frames/Cradle configuration tests. - The Cradles and Stacking Frames shall be tested as follows to insure compliance with stacking requirements.

4.3.4.1 MHU-64/E. - The MHU-64\E Small Stacking Frame shall be used in pairs to support a stack of three loaded (see 4.3.3.2) Small Universal Cradles. A random method of parts selection shall be used when this test is performed and the positive lock depicted on applicable drawings shall be maintained between the Stacking Frame and the Cradle. No evidence of permanent set or deformation to any of the parts shall be found during or after this test.

4.3.4.2 MHU-66/E. - The MHU-66/E Large Stacking Frame shall be used in pairs to support a stack of two loaded (see 4.3.3.3) Large Universal Cradles. A random method of parts selection shall be uses when this test is performed and the positive lock depicted on applicable drawings shall be maintained between the Stacking Frame and the Cradle. No evidence of permanent set or deformation to any of the parts shall be found during or after this test.



4.3.5 MHU-61/E Cradle stacking test. - The MHU-61/E SIDEWINDER Cradle shall be loaded (see 4.3.3.4) and placed upon another loaded SIDEWINDER Cradle. No evidence of permanent set or deformation to any of the parts shall be found during or after this test.

4.4 Cradle compatibility tests. - Unless otherwise specified in the contract or order, sample Cradles and Stacking Frames supplied as specified in 4.2.1 shall be prepared and tested as described herein. The Government at its option (see 6.2) will supply the contractor with any or all of the following type equipment:

- (a) Weapons Loader.
- (b) Rough Terrain Transport Trailer.
- (c) Transporting/Loading Trailer.
- (d) Rough Terrain Forklift Truck.

It shall be demonstrated that the loaded Cradles and Stacking Frames are compatible in all respects with the aforementioned equipment.

4.5 Environmental testing. - Unless otherwise specified in the contract or order, sample Cradles and Stacking Frames supplied as specified in 4.2.1 shall be subjected to the following environmental testing.

4.5.1 High temperature. - The Cradles and Stacking Frames shall be loaded as described in 4.3. The loaded Cradles and Stacking Frames shall be exposed to an ambient temperature of 160 degrees Fahrenheit for eight hours. At the end of the eight hour exposure and while still at 160 degrees, the Cradles and Stacking Frames shall be subjected to a complete loading and stacking operation. The temperature of the room shall be returned to 8\*10 degrees Fahrenheit and the loading and stacking operation repeated.

4.5.2 Low temperature. - The Cradles and Stacking Frames shall be loaded as described in 4.3. The loaded Cradles and Stacking Frames shall be exposed to an ambient temperature of minus 65 degrees Fahrenheit for eight hours. At the end of the eight hour exposure and while still at minus 65 degrees, the Cradles and Stacking Frames shall be subjected to a complete loading and stacking operation. The temperature of the room shall be returned to 80\*10 degrees Fahrenheit and the loading and stacking operation repeated.

## MIL-C-81313 (WP)

4.5.3 Humidity. - The unloaded Cradles and Stacking Frames shall be subjected to the Humidity Test of Method 507.1, Standard MIL-STD-810. Five complete cycles of this humidity exposure shall be performed. At the completion of the five cycles, the Cradles and Stacking Frames shall be returned to a normal humidity environment and loaded and stacked as described in 4.3.

4.5.4 Sand and dust. - The loaded Cradles and Stacking Frames shall be subjected to the Sand and Dust Test of Method 510.1, Standard MIL-STD-810. At the conclusion of the test, the Cradles and Stacking Frames shall be returned to a normal environment and examined. The Cradles and Stacking Frames shall be unloaded to assure complete functioning of all parts.

## 51 PREPARATION FOR DELIVERY

5.1 Preservation and packaging. - Preservation and packaging shall be either Level A or Level C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Cleaning and drying. - The Cradles and Stacking Frames shall be cleaned and dried in accordance with Specification MIL-P-116. Cleaning shall be accomplished in accordance with Process C-1. Drying shall be accomplished in accordance with Procedure D-1 or D-4, or a combination of both.

5.1.1.2 Preservative application.

5.1.1.2.1 Unpainted bearing surfaces. - All unpainted metal bearing surfaces shall be coated with grease conforming to Specification MIL-G-23827, and wrapped with grease-proof barrier material conforming to Specification MIL-B-121, Type 11, Grade A, Class 2, secured in place with tape conforming to Specification PPP-T-60.

5.1.1.3 Unit packaging.

5.1.1.3.1 Cradles. - Each Cradle shall be unit packaged in accordance with Method IA-16 of Specification MIL-P-116.

Barrier material shall conform to Specification MIL-B-131 and containers shall conform to Specification PPP-B-621, Style 4.

5.1.1.3.2 Stacking Frames. - Each Stacking Frame shall be unit packaged in accordance with Method I of Specification MIL-P-116.

5.1.1.4 Packing,

5.1.1.4.1 Cradles. - Each Cradle shall be packed as specified in 5.1.1.3.1.

5.1.1.4.2 Stacking Frames. - Each Stacking Frame shall be unit packed in a container which conforms to Specification PPP-B-621, Style 4.

5.1.2 Level C.

5.1.2.1 Cleaning and drying. - The Cradles and Stacking Frames shall be cleaned and dried as specified in 5.1.1.1.

5.1.2.2 Preservative application. - The Cradles and Stacking Frames shall be preserved as specified in 5.1.1.2.

5.1.2.3 Unit packaging. - Each Cradle and Stacking Frame shall be unit packaged separately in accordance with Method I of Specification MIL-P-116.

5.1.2.4 Packing. - Each Cradle and Stacking Frame shall be unit packed separately in a container in accordance with Specification PPP-B-621, Style 4.

5.2 Marking. - In addition to any special markings required by the contract or order, the Cradles and Stacking Frames shall be marked in accordance with Standard MIL-STD-129,

## 6. NOTES

6.1 Intended use. - The Cradles and Stacking Frames described herein are intended for use by the Marine Corps in transporting and storing air launched weapons. This equipment will be used primarily at expeditionary airfields, in an extremely rough terrain environment.

MIL-C-81313 (WP)

6.2                    Ordering data. - Procurement document should include the following:

- (a) Title, number, and date of this specification.
- (b) Whether or not a preproduction sample is required.
- (c) Number of Cradles and Stacking Frames which will constitute the preproduction sample.
- (d) Information pertinent to the site of preproduction testing (see 4.2.1).
- (e) Whether or not preproduction test reports are required (see 4.2.1).
- (f) Whether or not inspection using applicable NAVWEPS CD'S is required (see 4.3.2.1).
- (g) Whether or not the Government will supply actual SIDEWINDER Missiles or simulated shapes thereof, and, if not, address of activity from which contractor may acquire design information sufficient to allow manufacture of simulated shapes.
- (h) Whether or not equipment will be supplied for preproduction compatibility testing (see 4.4).
- (i) Level of preservation and packaging required (see Section 5).
- (J) Name and address of activity to which contractor shall request ordnance or dynamically simulated shapes (see 4.303).

Preparing Activity:

Navy-BuWeps

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
<u>INSTRUCTIONS</u>		
<p>This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).</p>		
SPECIFICATION MIL-C-81313(WP) CRADLES AND STACKING FRAMES AIR LAUNCHED WEAPONS		
ORGANIZATION (of submitter)		CITY AND STATE
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT \$
MATERIAL PROCURED UNDER A <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE? <input type="checkbox"/> YES <input type="checkbox"/> NO IF "YES", IN WHAT WAY?		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED BY (Printed or typed name and activity)		DATE

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Bureau of Naval Weapons  
Washington, D. C. 20360

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