FINAL REPORT
APRIL 2000

REPORT NO. 00-03

2.75-INCH ROCKET HYDRA PALLET
MIL-STD-1660 FIRST ARTICLE TEST

Prepared for:
U.S. Army Armament Research, Development
and Engineering Center
ATTN: AMSTA-AR-WEP-RP
Rock Island, IL 61299-7300

Distribution Unlimited

VALIDATION ENGINEERING DIVISION
MCALESTER, OKLAHOMA 74501-9053
<table>
<thead>
<tr>
<th>1. REPORT DATE (DD-MM-YYYY)</th>
<th>2. REPORT TYPE</th>
<th>3. DATES COVERED (FROM - TO)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>4. TITLE AND SUBTITLE</th>
<th>5a. CONTRACT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.75-INCH ROCKET HYDRA PALLET MIL-STD-1660 FIRST ARTICLE TEST</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. AUTHOR(S)</th>
<th>5b. GRANT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birchmeier, Joseph F. ;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. PERFORMING ORGANIZATION NAME AND ADDRESS</th>
<th>5c. PROGRAM ELEMENT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. ARMY DEFENSE AMMUNITION CENTER</td>
<td></td>
</tr>
<tr>
<td>VALIDATION ENGINEERING DIVISION</td>
<td></td>
</tr>
<tr>
<td>MCALESTER, OK 74501-9053</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. PERFORMING ORGANIZATION REPORT NUMBER</th>
<th>10. SPONSOR/MONITOR'S ACRONYM(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-03</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. SPONSORING/MONITORING AGENCY NAME AND ADDRESS</th>
<th>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Army Armament Research, Development and Engineering Center</td>
<td></td>
</tr>
<tr>
<td>ATTN: AMSTA-AR-WEP-RP</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. DISTRIBUTION/AVAILABILITY STATEMENT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A PUBLIC RELEASE</td>
<td></td>
</tr>
</tbody>
</table>

U.S. Army Armament Research, Development and Engineering Center
ATTN: AMSTA-AR-WEP-RP
14. ABSTRACT
The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SOSAC-DEV), was tasked by the U.S. Army Armament Research, Development and Engineering Center (ARDEC) to conduct a First Article Test per MIL-STD-1660, Design Criteria for Ammunition Unit Loads on the 2.75-inch Hydra 70, PA150, Rocket Pallet produced by Delfasco of Tennessee, Greeneville, TN. Two of the three pallets submitted by Delfasco were evaluated using MIL-STD-1660 test requirements. No significant flaws were found in the two pallets during testing so the third pallet was not evaluated. As a result of the performance of the pallets during testing, the 2.75 inch, Hydra 70, PA150, Rocket Pallet produced by Delfasco is recommended for USA-wide use.

15. SUBJECT TERMS
AVAILABILITY NOTICE

A copy of this report will be furnished each attendee on automatic distribution. Additional copies or authority for reprinting may be obtained by written request from:

Director
U.S. Army Defense Ammunition Center
ATTN: SOSAC-DEV
1 C Tree Road, Bldg. 35
McAlester, OK 74501-9053

DISTRIBUTION INSTRUCTIONS

Destroy this report when no longer needed. Do not return.

***

Citation of trade names in this report does not constitute an official endorsement.

***

The information contained herein will not be used for advertising purposes.
The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SOSAC-DEV), was tasked by the U.S. Army Armament Research, Development and Engineering Center (ARDEC) to conduct a First Article Test per MIL-STD-1660, Design Criteria for Ammunition Unit Loads on the 2.75-inch, Hydra 70, PA150, Rocket Pallet produced by Delfasco of Tennessee, Greeneville, TN. Two of the three pallets submitted by Delfasco were evaluated using MIL-STD-1660 test requirements. No significant flaws were found in the two pallets during testing so the third pallet was not evaluated. As a result of the performance of the pallets during testing, the 2.75 inch, Hydra 70, PA150, Rocket Pallet produced by Delfasco is recommended for USA-wide use.

Prepared by:  
WILLIAM R. MEYER  
Lead Validation Engineer

Reviewed by:  
JERRY W. BEAVER  
Chief, Validation Engineering Division
**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. INTRODUCTION</td>
<td>1-1</td>
</tr>
<tr>
<td>A. BACKGROUND</td>
<td>1-1</td>
</tr>
<tr>
<td>B. AUTHORITY</td>
<td>1-1</td>
</tr>
<tr>
<td>C. OBJECTIVE</td>
<td>1-1</td>
</tr>
<tr>
<td>D. CONCLUSION</td>
<td>1-1</td>
</tr>
<tr>
<td>2. ATTENDEES</td>
<td>2-1</td>
</tr>
<tr>
<td>3. TEST PROCEDURES</td>
<td>3-1</td>
</tr>
<tr>
<td>4. TEST EQUIPMENT</td>
<td>4-1</td>
</tr>
<tr>
<td>5. TEST RESULTS</td>
<td>5-1</td>
</tr>
<tr>
<td>6. INTERIM TEST REPORT</td>
<td>6-1</td>
</tr>
<tr>
<td>7. DRAWING</td>
<td>7-1</td>
</tr>
</tbody>
</table>
PART 1 – INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SOSAC-DEV), was tasked by the U.S. Army Armament Research, Development and Engineering Center (ARDEC) to conduct a First Article Test per MIL-STD-1660, Design Criteria for Ammunition Unit Loads on the 2.75-inch, Hydra 70, PA150, Rocket Pallet produced by Delfasco of Tennessee, Greeneville, TN.

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by the U.S. Army Operations and Support Command (Prov), Rock Island, IL. Reference is made to the following:


C. OBJECTIVE. The objective of the tests was to determine if the pallet and its associated metal adapters produced by Delfasco met MIL-STD-1660 test requirements prior to the acceptance of the pallets by the U.S. Army (USA).

D. CONCLUSION. Two of the three pallets submitted by Delfasco were evaluated using MIL-STD-1660 test requirements. No significant flaws were found in the two pallets during testing so the third pallet was not evaluated. As a result of the performance of the pallets during testing, the 2.75 inch, Hydra 70, PA150, Rocket Pallet produced by Delfasco is recommended for USA-wide use.
### PART 2 - ATTENDEES

DATES PERFORMED: MARCH 29-31, 2000

<table>
<thead>
<tr>
<th>ATTENDEE</th>
<th>MAILING ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>William R. Meyer</td>
<td>Director U.S. Army Defense Ammunition Center</td>
</tr>
<tr>
<td>General Engineer</td>
<td>ATTN: SOSAC-DEV</td>
</tr>
<tr>
<td>DSN 956-8090</td>
<td>1 C Tree Road, Bldg. 35</td>
</tr>
<tr>
<td>(918) 420-8090</td>
<td>McAlester, OK 74501-9053</td>
</tr>
<tr>
<td>Michael S. Bartosiak</td>
<td>Director U.S. Army Defense Ammunition Center</td>
</tr>
<tr>
<td>Mechanical Engineer</td>
<td>ATTN: SOSAC-DEM</td>
</tr>
<tr>
<td>DSN 956-8083</td>
<td>1 C Tree Road, Bldg. 35</td>
</tr>
<tr>
<td>(918) 420-8083</td>
<td>McAlester, OK 74501-9053</td>
</tr>
<tr>
<td>Arnold Jewett</td>
<td>General Dynamics Ordinance Systems</td>
</tr>
<tr>
<td>Design Specialist</td>
<td>Lakeside Avenue</td>
</tr>
<tr>
<td>(802) 657-6254</td>
<td>Burlington, VT 05401-4985</td>
</tr>
</tbody>
</table>
PART 3 - TEST PROCEDURES

The test procedures outlined in this section were extracted from the MIL-STD-1660, Design Criteria for Ammunition Unit Loads, 8 April 1977. This standard identifies nine steps that a unitized load must undergo if it is to be considered acceptable. The four tests that were conducted on the test pallets are summarized below.

A. STACKING TEST. The unit load was tested to simulate a stack of identical unit loads stacked 16 feet high, for a period of one hour. This stacking load was simulated by subjecting the unit load to a compression weight equal to an equivalent 16-foot stacking height. The compression load was calculated in the following manner. The unit load weight was divided by the unit load height in inches and multiplied by 192. The resulting number was the equivalent compressive force of a 16-foot-high load. Figure 1 below shows an example of a unit load in the compression tester.

Figure 1. Example of Compression Tester.
(2.75-inch Hydra 70, PA151 Rocket Pallet in the compression tester.)
B. REPETITIVE SHOCK TEST. The repetitive shock test was conducted IAW Method 5019, Federal Standard 101. The test procedure is as follows: The test specimen was placed on (not fastened to) the platform. With the specimen in one position, the platform was vibrated at 1/2-inch amplitude (1-inch double amplitude) starting at a frequency of approximately 3 cycles per second. The frequency was steadily increased until the package left the platform. The resonant frequency was achieved when a 1/16-inch-thick feeler gage momentarily slid freely between every point on the specimen in contact with the platform at some instance during the cycle. Midway into the testing period, the specimen was rotated 90 degrees, and the test continued for the duration. Unless failure occurred, the total time of vibration was three hours. Figure 2 shows an example of the repetitive shock test.

Figure 2. Example of the Repetitive Shock Test. ("Clip-Lok" pallet on the vibration table.)
C. **EDGEWISE ROTATIONAL DROP TEST.** This test was conducted using the procedures of Method 5008, Federal Standard 101. The procedure for the edgewise rotational drop test is as follows: The specimen was placed on its skids with one end of the pallet supported on a beam 4-1/2 inches high. The height of the beam was increased if necessary to ensure that there was no support for the skids between the ends of the pallet when dropping took place, but was not high enough to cause the pallet to slide on the supports when the dropped end was raised for the drops. The unsupported end of the pallet was then raised and allowed to fall freely to the concrete, pavement, or similar underlying surface from a prescribed height. Unless otherwise specified, the height of drop for level A protection conforms to the following tabulation:

<table>
<thead>
<tr>
<th>GROSS WEIGHT (WITHIN RANGE LIMITS)</th>
<th>DIMENSIONS OF ANY EDGE, HEIGHT OR WIDTH (WITHIN RANGE LIMITS)</th>
<th>HEIGHT OF DROPS ON EDGES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Pounds)</td>
<td>(Inches)</td>
</tr>
<tr>
<td>150 - 250</td>
<td>60 - 66</td>
<td>36</td>
</tr>
<tr>
<td>250 - 400</td>
<td>66 - 72</td>
<td>32</td>
</tr>
<tr>
<td>400 - 600</td>
<td>72 - 80</td>
<td>28</td>
</tr>
<tr>
<td>600 - 1,000</td>
<td>80 - 95</td>
<td>24</td>
</tr>
<tr>
<td>1,000 - 1,500</td>
<td>95 - 114</td>
<td>20</td>
</tr>
<tr>
<td>1,500 - 2,000</td>
<td>114 - 144</td>
<td>17</td>
</tr>
<tr>
<td>2,000 - 3,000</td>
<td>Above 145 - No limit</td>
<td>15</td>
</tr>
<tr>
<td>Above - 3,000</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>
D. INCLINE-IMPACT TEST. This test was conducted by using the procedure of Method 5023, Incline-Impact Test of Federal Standard 101. The procedure for the incline-impact test is as follows: The specimen was placed on the carriage with the surface or edge to be impacted projecting at least 2 inches beyond the front end of the carriage. The carriage was brought to a predetermined position on the incline and released. If it were desired to concentrate the impact on any particular position on the container, a 4- by 4-inch timber would be attached to the bumper in the desired position before the test. The carriage struck no part of the timber. The position of the container on the carriage and the sequence in which surfaces and edges were subjected to impacts was at the option of the testing activity and depends upon the objective of the tests. This test was to determine satisfactory requirements for a container or pack, and, unless otherwise specified, the specimen was subjected to one impact on each surface that has each dimension less than 9.5 feet. Unless otherwise specified, the
velocity at the time of the impact was 7 feet-per-second. Figure 4 shows an example of this test.

Figure 4. Example of the Incline-Impact Test. (2.75 Inch, Hydra 70, PA151 Rocket Pallet on incline-impact tester.)

E. **SLING COMPATIBILITY TEST.** Unit loads utilizing special design or non-standard pallets shall be lifted, swung, lowered and otherwise handled as necessary, using slings of the types normally used for handling the unit loads under consideration. Slings shall be easily attached and removed. Danger of slippage or disengagement when load is suspended shall be cause for rejection of the unit load.
PART 4 - TEST EQUIPMENT

A. COMPRESSION TESTER
   1. Manufacturer: Ormond Manufacturing
   2. Platform: 60- by 60-inches
   3. Compression Limit: 50,000 pounds
   4. Tension Limit: 50,000 pounds

B. TRANSPORTATION SIMULATOR
   1. Manufacturer: Gaynes Laboratory
   2. Capacity: 6,000-pound pallet
   3. Displacement: 1/2-inch amplitude
   4. Speed: 50 to 400 RPM
   5. Platform: 5- by 8-foot

C. INCLINED PLANE
   1. Manufacturer: Conbur Incline
   2. Type: Impact Tester
   3. Grade: 10 percent incline
   4. Length: 12-foot
PART 5 - TEST RESULTS

Two of three pallets submitted by Delsasco of Tennessee were inertly loaded to the specified design weight using two 4- by 4-inch lengths of lumber, two 2- by 4-inch lengths of lumber, and a quantity of ammunition simulant to bring each container individually to the required weight. Special care was taken to ensure that each container had the proper amount of weight in order to achieve a realistic pallet center of gravity (CG). Once properly prepared, the first two pallets were tested using MIL-STD-1660, Design Criteria for Ammunition Unit Loads, requirements. As a result of the good performance of the pallets during testing, the third pallet submission was not tested.

A. PALLET NO. 1.

Date:  29-30 March 2000
Weight:  2,245 pounds
Length:  78-1/2 inches
Width:  29-3/8 inches
Height:  43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 9,285 pounds for 60 minutes. No damage was noted as a result of this test. See figure 5 below for a picture of the test pallet in the compression unit.
Figure 5. PA150 Hydra Test Pallet in the Compression Tester.

2. **Repetitive Shock Test.** The test pallet was vibrated 90 minutes at 225 RPM in the longitudinal orientation and 90 minutes at 168 RPM in the lateral orientation. See figure 6 below.

Figure 6. PA150 Hydra Test Pallet on the Vibration Table.
3. **Edgewise Rotational Drop Test.** The test pallet was edgewise rotationally dropped from a height of 15-inches on the longitudinal and 12 inches on the lateral drops due the load slipping off the wooden block after a height of 12 inches was exceeded during testing. No problems were encountered.

4. **Incline-Impact Test.** The test pallet was incline-impacted on all four sides with the pallet impacting the stationary wall from a distance of 8 feet. Again, no problems were encountered.

5. **Sling Compatibility Test.** The test pallet was lifted off of the ground using the top lift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the top lift adapter was noted.

6. **Post Test Inspection.** Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for damage. Minor weld cracks were noted on the pallet deck that were in line with the pallet posts. Some minor cracking was noted on the bottom of the support posts that were in contact with the skids. No significant damage was noted in the top or bottom adapters or the pallet deck. See figure 7 below.

![Figure 7. Picture of First Pallet Taken After Testing.](image-url)
B. PALLET NO. 2.

Date: 31 March 2000
Weight: 2,245 pounds
Length: 78-1/2 inches
Width: 29-3/8 inches
Height: 43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 9,265 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 222 RPM in the longitudinal orientation and 90 minutes at 182 RPM in the lateral orientation. The center of gravity appeared to be too high which did not allow the pallet to vibrate at the desired amplitude. A wood cradle was made to brace the pallet towards the back of the vibration table to minimize the severity of the top heavy load and provide a vibration where the 1/16-inch feeler gage could move freely by each point of the pallet that was in contact with the platform. During both phases of testing no problems were noted.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped from a height of 15-inches on the longitudinal and 12 inches on the lateral drops. See figure 8 below.
4. **Incline-Impact Test.** No damage was noted to the pallet or the adapters in the first successful pallet test so this test was not repeated.

5. **Sling Compatibility Test.** The test pallet was lifted off of the ground using the top lift adapter by only one point due to the successful completion of the first pallet adapter. No shifting of the containers or permanent deformation of the top lift adapter was noted.

6. **Post Test Inspection.** Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. Similar to the first pallet, minor weld cracks were noted on some of the areas on the pallet deck that were in line with the pallet posts. Again, some minor weld cracking on the post where they contact the skids was also noted. No significant damage was noted in the top or bottom adapters or the pallet deck.

7. **Conclusion.** Both pallets met MIL-STD-1660 Design Criteria for Ammunition Unit Loads with no major problems noted.
PART 6 – INTERIM TEST REPORT

INTERIM TEST REPORT

VALIDATION ENGINEERING DIVISION
U.S. ARMY DEFENSE AMMUNITION CENTER
MCALESTER, OKLAHOMA 74501-9053

1. TEST TITLE: 2.75-Inch Rocket Hydra Pallet
   MIL-STD-1660 FAT Test

2. TEST NUMBER: 00-03

3. DATES OF TESTS: 29 - 31 March 2000

4. ITEM TESTED: 2.75-Inch Rocket Hydra metal pallets and associated adapters.

5. PURPOSE: To determine if the FAT pallets submitted meet MIL-STD-1660
   first article requirements prior to manufacturing. Note:
   Manufacturing process modified to include a straightening
   operation to the deck.

6. TEST ENGINEER: William Meyer

7. TEST OBSERVERS: Arnold Jewett, General Dynamics Ordinance Systems,
   Burlington, VT
   Michael Bartosiak, DAC, SIOAC-DEM

8. TESTS CONDUCTED: MIL-STD-1660
   a. Stacking Test.
   b. Repetitive Shock Test.
   c. Edgewise Rotational Drop Test.
   d. Incline-Impact Test.
   e. Sling Compatibility Test.

9. TEST OBSERVATIONS:
   During both series of tests, minor weld cracks were noted on the
   pallet deck in line with the skid support posts. Minor cracks were
   noted at the bottom of the support posts in contact with the skids.
   No other significant observations noted.

10. TEST CONCLUSION: Passed MIL-STD-1660 testing.
APPENDIX 60

UNITIZATION PROCEDURES FOR AMMUNITION AND COMPONENTS PACKED IN CYLINDRICAL METAL OR PLASTIC CONTAINERS ON 4-WAY ENTRY METAL PALLETS

2.75" HYDRA ROCKET, PACKED 4 PER PA150 CYLINDRICAL METAL CONTAINER, UNITIZED 12 PER 78.50" X 29.31" SPECIAL METAL PALLET; APPROX CONTAINER SIZE 78.50" L X 9.25" W X 9.25" H

NOTICE: THIS APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH THE BASIC UNITIZATION PROCEDURES DRAWING 19-48-4231-20PM1006.
### PALLET UNIT DATA

<table>
<thead>
<tr>
<th>NSN</th>
<th>ODDIC</th>
<th>GQ CLASS</th>
<th>COMP GROUP</th>
<th>APPROX WEIGHT LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1340-</td>
<td></td>
<td>(04).2</td>
<td>E</td>
<td>2.230</td>
</tr>
<tr>
<td>01-379-7814</td>
<td>H165</td>
<td>(04).2</td>
<td>G</td>
<td>2.230</td>
</tr>
<tr>
<td>01-379-6347</td>
<td>H453</td>
<td>(05).2</td>
<td>G</td>
<td>2.230</td>
</tr>
<tr>
<td>01-378-7703</td>
<td>H453</td>
<td>(04).2</td>
<td>G</td>
<td>2.230</td>
</tr>
<tr>
<td>01-370-6356</td>
<td>H454</td>
<td>(04).2</td>
<td>G</td>
<td>2.230</td>
</tr>
<tr>
<td>01-370-7797</td>
<td>H454</td>
<td>(04).2</td>
<td>G</td>
<td>2.230</td>
</tr>
<tr>
<td>01-370-7899</td>
<td>H374</td>
<td>(05).2</td>
<td>G</td>
<td>2.230</td>
</tr>
<tr>
<td>01-444-4055</td>
<td>H14</td>
<td></td>
<td></td>
<td>2.239</td>
</tr>
<tr>
<td>01-444-4097</td>
<td>H15</td>
<td></td>
<td></td>
<td>2.238</td>
</tr>
</tbody>
</table>

**Hazard Classification Data contained in the above chart is for guidance and informational purposes only. Verification of the specific data should be made by consulting the most recent joint hazard classification system listing or other approved listings.**

### REVISIONS

**REVISION NO. 1, DATED MARCH 1988, CONSISTS OF:**
1. Adding item by national stock number to "Pallet Unit Data" chart.
2. Changing general note "H" on page 3.
3. Changes in accordance with ECP MSTD03.

**REVISION NO. 2, DATED FEBRUARY 1988, CONSISTS OF:**
1. Deleting general note relating to strap cutter and re-literalizing other general notes.
2. Changing the storage drawing note on page 3 to reflect 19-48-4232/30.7-24 and 14-14-1229.
3. Adding item by national stock number to "Pallet Unit Data" chart and updating the hazard class.
4. Changes in accordance with ECP 483002.
**UNITIZING STRAP**

- 1-1/4" x 0.085" OR
- 0.625" x 1-3/8" LONG STEEL STRAPPING (4 REEL). SEE GENERAL NOTE "C" AT RIGHT.

**SEAL FOR 1-1/4" STRAPPING**

- (4 REEL). 1 PER STRAP.

CROP EACH SEAL WITH TWO PAIR OF NOTCHES.

**BUNDLING STRAP**

- 3/4" x 0.031"
- 3/32" x 0.031" LONG STEEL STRAPPING (4 REEL). SEE GENERAL NOTE "C" AT RIGHT.

**SEAL FOR 3/4" STRAPPING**

- (4 REEL). 1 PER STRAP.

CROP EACH SEAL WITH TWO PAIR OF NOTCHES.

---

**PALLE UNIT**

SEE GENERAL NOTE "8" AT RIGHT.

12 CONTAINERS OF 2.75 HYDRA HOSES

- 14 PER CONTAINER AT 152 LBS

- 1,964 LBS (APPROX.

- 105 LBS (APPROX.)

- TOTAL WEIGHT

- 2,235 LBS (APPROX.)

- 97.3 CU FT (APPROX.)

---

**GENERAL NOTES**

A. THIS APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH THE BASIC UNITIZATION PROCEDURES (DRAWING 19-48-4231-20PM). TO PREVENT ANY EARLIER UNITIZATION PROCEDURES SPECIFICATIONS AND CRITERIA SET FORTH WITHIN THE BASIC DRAWING WILL APPLY TO THE PROCEDURES DESCRIBED IN THIS APPENDIX. ANY EXCEPTIONS TO THE BASIC PROCEDURES ARE SPECIFIED IN THIS APPENDIX.

B. DIMENSIONS, CURVE AND WEIGHT OF A PALLET UNIT WILL VARY SLIGHTLY DEPENDING UPON THE ACTUAL DIMENSIONS OF THE CONTAINERS AND THE WEIGHT OF THE SPECIFIC ITEM BEING UNITIZED.

C. BUNDLING STRAPS MUST BE BUNDLED AND SEALED PRIOR TO THE APPLICATION OF THE UNITIZING STRAPS. BUNDLING STRAPS MUST ALSO BE INSTALLED AS CLOSE TO THE OUTER EDGES AS POSSIBLE, TO AVOID DAMAGE TO THE CONTAINER.

D. ALTHOUGH THE CONTAINERS, UNITIZED IN THE UNIT LOAD AT LEFT ARE CONSTRUCTED WITH INTERLOCKING DEVICES, THE CONTAINERS WILL NOT FUNCTION PROPERLY UNLESS THE CONTAINERS ARE POSITIONED SO THAT THE "PIN" OF THE INTERLOCKING DEVICES ARE FACED UPWARD. THIS ORIENTATION WILL AID IN THE PREVENTION OF CONTAINER MOVEMENT, BOTH LATERALLY AND LONGITUDINALLY, DURING SHIPMENT OF THE UNIT LOAD.

E. THE FOLLOWING ARE DRAWINGS ARE APPLICABLE FOR OUTLOADING AND STORAGE OF THE ITEMS COVERED BY THIS APPENDIX.

F. IF ITEMS COVERED HEREIN ARE UNITIZED PRIOR TO ISSUE OF THIS APPENDIX, THE CONTAINERS NEED NOT BE UNITIZED AGAIN UNDER THE REQUIREMENTS OF THIS APPENDIX.

G. FOR DETAILS OF THE PALLET AND PALLET ADAPTERS, SEE ANCONA DRAWING 4209/155 AND 4210/7078.

H. THE UNITIZATION PROCEDURES DESCRIBED HEREIN MAY ALSO BE USED FOR UNITIZING 2.75 HYDRA HOSES WHEN IDENTIFIED BY DIFFERENT NATIONAL STOCK NUMBERS THAN THOSE SHOWN ON PAGE 2. PROVIDE THE CONTAINER PACK TO COMPLY WITH ALL SPECIFICATIONS OF OTHER ITEMS MAY BE DIFFERENT THAN WHAT IS SHOWN.

I. EMPTY OR REJECT PAIRS CONTAINERS WILL BE USED AS FILLER CONTAINERS AS NECESSARY. FILLER CONTAINERS MUST BE INSTALLED IN THE MIDDLE OF THE TOP LAYERS 1 OF CONTAINERS. IF THREE LAYERS OF CONTAINERS, FILLER CONTAINERS ARE TO BE OMITTED. ONE FULL LAYER OF CONTAINERS WILL BE OMITTED. WHEN REJECTED FILLER CONTAINERS ARE USED IN PLACE OF OMITTED CONTAINERS TO COMPLETE A LAYER ON A PALLET, THEY WILL BE PAINTED AS SPECIFIED WITHIN MIL-3270-L/H), EXCEPT WHEN DEPARTMENTAL/HOURLY CONTAINERS ARE USED IN PLACE OF OMITTED CONTAINERS TO COMPLETE A LAYER ON A PALLET, THE WORD "EMPTY" WILL BE STENCILED OR PAINTED ON THE EMPTY CONTAINER IN 1/8 INCH LETTERS. THE WORD "EMPTY" WILL BE STENCILED OR PAINTED ON THE OPEN END PORTION OF THE CONTAINER WITH THE WORDS PAINTED OR STENCILED AT THE CIRCUMFERENCE, 180 DEGREES APART, AND THREE TIMES ON THE BODY OF THE CONTAINER WITH THE WORDS PAINTED LENGTHWISE ON THE CONTAINER SPACED 120 DEGREES APART AS MEASURED AROUND THE CONTAINER CIRCUMFERENCE.


---

**BILL OF MATERIAL**

| METAL PALLE | 78.00 x 26.00 | 1 REEL | 0.10 LBS |
| TOP COVERING | 3/4" | 1 REEL | 0.90 LBS |
| STEEL STRAPPING, 3/4" | 4.50 | 1 REEL | 0.03 LBS |
| SEAL FOR 3/4" STRAPPING | 4 REEL | 100 LBS |

---

**PROJECT**

CA 243/60-87

**DRAWING**

19-48-4231/40