

# UNITIZATION PROCEDURES FOR ARMOR TILE, M1 AND M2, PACKED 2(M2) OR 3(M1) PER WOODEN BOX, UNITIZED 32 BOXES PER 35" X 45-1/2" PALLET; APPROX BOX SIZE 38"L X 13-1/4"W X 4-9/16"H

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## U.S. ARMY MATERIEL COMMAND DRAWING

|   |   |                                |           |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |
|---|---|--------------------------------|-----------|------------------|--|---------------------------|---------------|--------------------------------|--|---|--------|----------------|-----------|------------------------------------|--|--|--|---------------------------------------|--------|-------|----------|----------------------------|--------|---------|------|--|--|----|----|--|--|------|----------|
| <p style="font-size: small;">APPROVED, U.S. ARMY<br/>JOINT MUNITIONS COMMAND</p> <p style="text-align: right;"><i>NLN</i></p> <p style="font-size: x-small;"><i>Mark J. Schmitt</i><br/>AMSJM-TT</p> <hr/> <p style="font-size: x-small;"><i>Raymond M. Allen</i><br/>AMSJM-TT</p> <p style="font-size: x-small;">APPROVED BY ORDER OF COMMANDING GENERAL,<br/>U.S. ARMY MATERIEL COMMAND</p> <p style="font-size: x-small;"><i>Charles P. Hood</i><br/>U.S. ARMY DEFENSE AMMUNITION CENTER</p> | <p style="text-align: center;"><b>CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL/DET THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 4.</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;"><b>DO NOT SCALE</b></td> <td colspan="2" style="text-align: center;"><b>JUNE 1986</b></td> </tr> <tr> <td style="font-size: x-small;">ENGINEER OR<br/>TECHNICIAN</td> <td style="font-size: x-small;">BASIC<br/>REV.</td> <td colspan="2" style="text-align: center;">LAURA A. FIEFFER<br/>MELVIN SIX</td> </tr> <tr> <td style="font-size: x-small;">TRANSPORTATION<br/>ENGINEERING<br/>DIVISION</td> <td style="font-size: x-small;">TESTED</td> <td style="font-size: x-small;">REVISION NO. 4</td> <td style="font-size: x-small;">JUNE 2003</td> </tr> <tr> <td colspan="4" style="text-align: center; font-size: x-small;">SEE THE REVISION LISTING ON PAGE 2</td> </tr> <tr> <td style="font-size: x-small;">VALIDATION<br/>ENGINEERING<br/>DIVISION</td> <td style="font-size: x-small;">TESTED</td> <td style="font-size: x-small;">CLASS</td> <td style="font-size: x-small;">DIVISION</td> </tr> <tr> <td style="font-size: x-small;">ENGINEERING<br/>DIRECTORATE</td> <td style="font-size: x-small;">TESTED</td> <td style="font-size: x-small;">DRAWING</td> <td style="font-size: x-small;">FILE</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;">19</td> <td style="text-align: center;">48</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;">4221</td> <td style="text-align: center;">20PA1009</td> </tr> </table> | <b>DO NOT SCALE</b>            |           | <b>JUNE 1986</b> |  | ENGINEER OR<br>TECHNICIAN | BASIC<br>REV. | LAURA A. FIEFFER<br>MELVIN SIX |  | TRANSPORTATION<br>ENGINEERING<br>DIVISION | TESTED | REVISION NO. 4 | JUNE 2003 | SEE THE REVISION LISTING ON PAGE 2 |  |  |  | VALIDATION<br>ENGINEERING<br>DIVISION | TESTED | CLASS | DIVISION | ENGINEERING<br>DIRECTORATE | TESTED | DRAWING | FILE |  |  | 19 | 48 |  |  | 4221 | 20PA1009 |
| <b>DO NOT SCALE</b>   |   | <b>JUNE 1986</b>               |           |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |
| ENGINEER OR<br>TECHNICIAN   | BASIC<br>REV.   | LAURA A. FIEFFER<br>MELVIN SIX |           |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |
| TRANSPORTATION<br>ENGINEERING<br>DIVISION   | TESTED  | REVISION NO. 4                 | JUNE 2003 |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |
| SEE THE REVISION LISTING ON PAGE 2  |   |                                |           |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |
| VALIDATION<br>ENGINEERING<br>DIVISION   | TESTED  | CLASS                          | DIVISION  |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |
| ENGINEERING<br>DIRECTORATE  | TESTED  | DRAWING                        | FILE      |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |
|   |   | 19                             | 48        |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |
|   |   | 4221                           | 20PA1009  |                  |  |                           |               |                                |  |   |        |                |           |                                    |  |  |  |                                       |        |       |          |                            |        |         |      |  |  |    |    |  |  |      |          |

| PALLET UNIT DATA                |              |                           |                      |                   |
|---------------------------------|--------------|---------------------------|----------------------|-------------------|
| ITEMS INCLUDED                  |              | HAZARD CLASS AND DIVISION | COMPAT-ABILITY GROUP | APPROX WEIGHT LBS |
| NSN                             | DODIC        |                           |                      |                   |
| 1375-01-223-1413<br>01-223-2918 | ML91<br>ML92 | 1. 2. 1<br>1. 2. 2        | D<br>D               | 2, 479<br>2, 479  |

• HAZARD CLASSIFICATION DATA CONTAINED IN THE ABOVE CHART IS FOR GUIDANCE AND INFORMATIONAL PURPOSES ONLY. VERIFICATION OF THE SPECIFIED DATA SHOULD BE MADE BY CONSULTING THE MOST RECENT JOINT HAZARD CLASSIFICATION SYSTEM LISTING OR OTHER APPROVED LISTING(S).

### REVISIONS

REVISION NO. 1, DATED JUNE 1986, CONSISTS OF:

ADDING ITEM BY NSN TO THE "PALLET UNIT DATA" CHART.

REVISION NO. 2, DATED MARCH 1987, CONSISTS OF:

CHANGING BOX TYPE.

REVISION NO. 3, DATED JULY 1989, CONSISTS OF:

ADDING PALLET DUNNAGE.

REVISION NO. 4, DATED JUNE 2003, CONSISTS OF:

1. UPDATING THE MATERIAL SPECIFICATIONS.
2. ADDING GENERAL NOTES RELATING TO BOX DRAWING REFERENCE, COOLER NAILS AND HEAT TREATED LUMBER.

### MATERIAL SPECIFICATIONS

PALLET - - - - -: MIL SPEC MIL-P-15011; 4-WAY ENTRY, STYLE 1A, TYPE I, CLASS 1, PRESERVATIVE TREATED AND HEAT TREATED. SEE GENERAL NOTE "J" ON PAGE 3 AND "O" ON PAGE 4.

LUMBER - - - - -: SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20. PRESERVATIVE AND HEAT TREATMENT REQUIRED. SEE GENERAL NOTE "J" ON PAGE 3 AND "O" ON PAGE 4.

NAILS - - - - -: ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMS). ALT: UNDERLAYMENT NAIL (NLUL), PALLET NAIL (NLPL), OR COOLER NAIL (NLCL) OF SAME SIZE. SEE GENERAL NOTE "N" ON PAGE 4.

STRAPPING, STEEL - -: ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH B (GRADE 2), SIZE 3/4" X .035" OR .031", NOTE: BRITE OR SLIT EDGES SHALL HAVE FINISH A OVERLAY.

SEAL, STEEL - - - - -: ASTM D3953; CLASS H, FINISH B (GRADE 2), DOUBLE NOTCH TYPE, STYLE I, II, III, R IV. ALTERNATIVE SEAL FINISH: SIGNODE OR DELTA PAINTED SEALS MAY BE USED AS AN ALTERNATIVE IF ALL SURFACES ARE PAINTED. GRITTED BACKING IS NOT PERMITTED.

**GENERAL NOTES**

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AUGMENTS TM 743-200-1 (CHAPTER 5) AND CONFORMS TO MIL-STD-1660.
- B. DIMENSIONS, CUBE AND WEIGHT OF A PALLET UNIT WILL VARY SLIGHTLY DEPENDING UPON THE ACTUAL DIMENSIONS OF THE BOXES AND THE WEIGHT OF THE SPECIFIC ITEM BEING UNITIZED.
- C. THE LOAD STRAPS MUST BE PRE-POSITIONED ON THE PALLET DECK PRIOR TO PLACING BOXES ON THE PALLET. LOAD STRAPS MUST BE TENSIONED AND SEALED PRIOR TO APPLICATION OF TIEDOWN STRAPS.
- D. INSTALL EACH TIEDOWN STRAP TO PASS UNDER THE DECK/STRINGER BOARDS OF THE PALLET AND TO BE LOCATED AS SHOWN. TIEDOWN STRAPS WILL NOT BE APPLIED UNTIL THE LOAD STRAPS HAVE BEEN TENSIONED AND SEALED.
- E. THE FOLLOWING AMC DRAWINGS ARE APPLICABLE FOR OUTLOADING AND STORAGE OF THE ITEMS COVERED BY THIS APPENDIX.

|                            |      |                                |
|----------------------------|------|--------------------------------|
| CARLOADING                 | ---- | 19-48-4115-5PA1002             |
| TRUCKLOADING               | ---- | 19-48-4117-11PA1003            |
| STORAGE                    | ---- | 19-48-4118-1-2-3-4-14-22PA1002 |
| END OPENING ISO CONTAINER  | ---- | 19-48-4153-15PA1002            |
| MILVAN                     | ---- | 19-48-4166-15PA1003            |
| SIDE OPENING ISO CONTAINER | ---- | 19-48-4267-15PA1009            |

- F. IF ITEMS COVERED HERIN ARE UNITIZED PRIOR TO ISSUANCE OF THIS REVISION TO THIS DRAWING, THE BOXES NEED NOT BE REUNITIZED SOLELY TO CONFORM TO THIS DRAWING.

- G. UNLESS OTHERWISE SPECIFIED, A MANUFACTURING TOLERANCE OF PLUS-OR-MINUS 1/4" IS ALLOWED ON ALL DIMENSIONS. HOWEVER, SIMILAR PIECES IN AN ASSEMBLY MUST BE WITHIN 1/8" OF THE SAME DIMENSION.

- H. DIMENSIONAL LUMBER SPECIFIED THROUGHOUT THE DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.

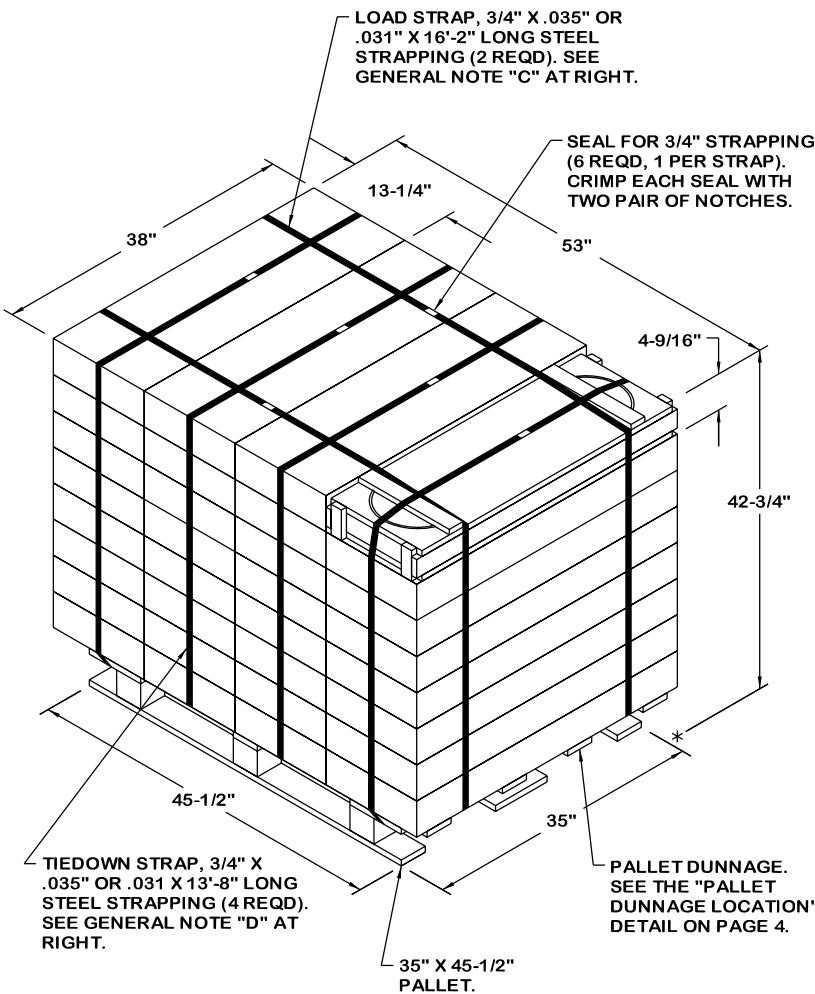
- J. ALL WOODEN DUNNAGE AND PALLETS, MUST BE PRESERVATIVE TREATED WITH EITHER COPPER-8-QUINOLINOLATE, ZINC NAPHTHENATE EMULSIFIABLE OR COPPER NAPHTHENATE. PALLETS AND DUNNAGE ASSEMBLIES MUST BE ASSEMBLED PRIOR TO TREATMENT. THE LETTERS "PA" DENOTING PQ56 (COPPER-8-QUINOLINOLATE) OR "PB" DENOTING M-GARD W550 (ZINC NAPHTHENATE EMULSIFIABLE) OR "PC" DENOTING M-GARD W510 OR CUNAPSOL (COPPER NAPHTHENATE) MUST BE APPLIED TO THE OUTER FACE OF THE CENTER POST ON THE 45-1/2" SIDES OF THE PALLET, IN LETTERS AT LEAST ONE-INCH HIGH.

- K. WHEN APPLYING ANY STRAP, CARE MUST BE EXERCISED TO ASSURE THAT THE END OF THE STRAP ON THE UNDERSIDE OF THE JOINT EXTENDS AT LEAST 6" BEYOND THE SEAL. THIS EXTRA MINIMUM LENGTH OF STRAP IS REQUIRED TO PERMIT SUBSEQUENT TIGHTENING OF LOOSENED STRAPPING. RETENSIONING CAN BE ACCOMPLISHED WITHOUT REPLACING STRAPPING OR SPLICING STRAPPING THROUGH THE USE OF A MANUAL OR PNEUMATIC FEEDWHEEL TYPE TENSIONING TOOL AND THE APPLICATION OF ONE ADDITIONAL SEAL.

- L. IN ORDER TO OBTAIN COMPACT AND SOUND UNITS, ALL STRAPS SHALL BE LOCATED IN PROPER ALIGNMENT AND TENSIONED UNTIL THEY CUT INTO THE EDGE OF THE BOXES AND THE PALLET DECK. AFTER TENSIONING, ALL STRAPS WILL BE SECURED USING ONE SEAL AND TWO PAIR OF NOTCHES PER SEAL.

- M. THE STYLE 1A PALLET DELINEATED IN THE DETAIL AT LEFT NEED NOT HAVE CHAMFERS OR STRAP SLOTS AS SPECIFIED WITHIN MILITARY SPECIFICATION MIL-P-15011 WHEN USED FOR THE UNITIZATION OF ITEMS COVERED BY THIS APPENDIX.

(CONTINUED ON PAGE 4)



**PALLET UNIT**

SEE GENERAL NOTE "B" AT RIGHT.

|   |      |                    |
|---|------|--------------------|
| 32 BOXES OF ARMOR TILES (2 OR 3 PER BOX) @ 75 LBS | ---- | 2,400 LBS (APPROX) |
| DUNNAGE   | ---- | 14 LBS             |
| PALLET  | ---- | 65 LBS             |

|              |      |                     |
|--------------|------|---------------------|
| TOTAL WEIGHT | ---- | 2,479 LBS (APPROX)  |
| CUBE         | ---- | 49.8 CU FT (APPROX) |

**BILL OF MATERIAL**

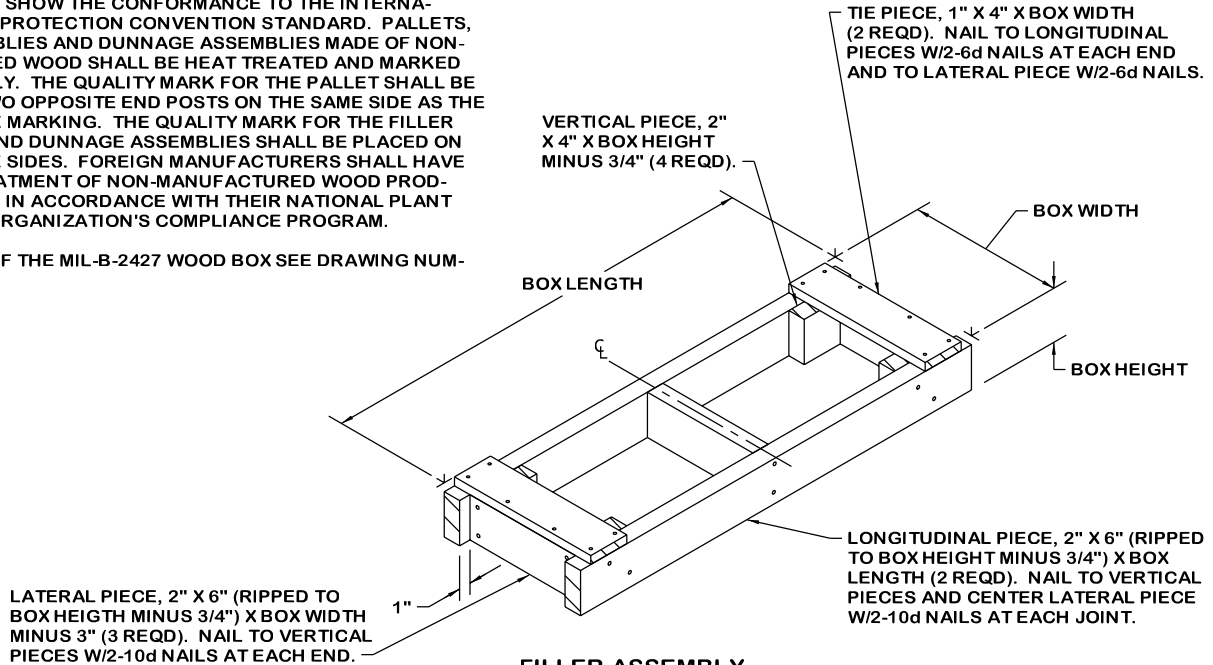
| LUMBER                  | LINEAR FEET | BOARD FEET |
|-------------------------|-------------|------------|
| 1" x 4"                 | 18.00       | 6.00       |
| NAILS                   | NO. REQD    | POUNDS     |
| 6d (2")                 | 6           | NIL        |
| 10d (3")                | 6           | NIL        |
| PALLET, 35" X 42-1/2"   | 1 REQD      | 65 LBS     |
| STEEL STRAPPING, 3/4"   | 87.00' REQD | 7.77 LBS   |
| SEAL FOR 3/4" STRAPPING | 6 REQD      | NIL        |

(GENERAL NOTES CONTINUED FROM PAGE 3)

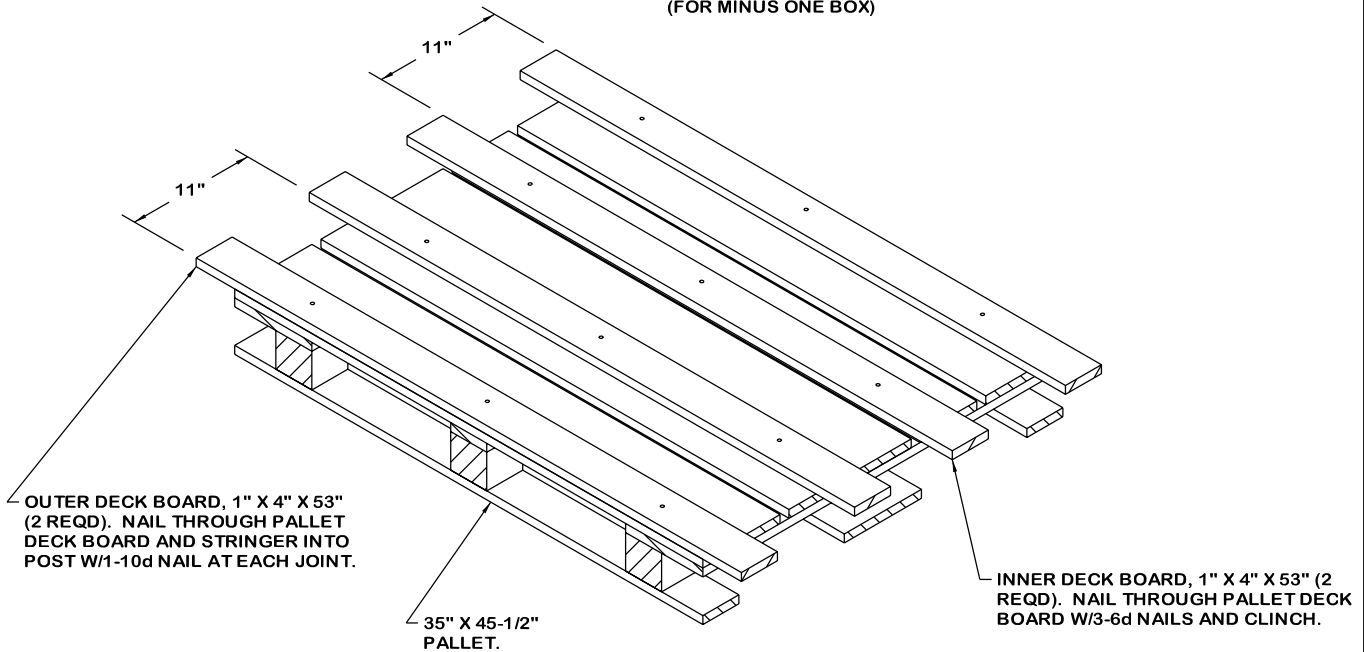
N. COOLER NAILS MAY BE SUBSTITUTED FOR THE COMMON NAILS AS SPECIFIED BY APPLYING THE FOLLOWING GUIDANCE. THE NUMBER OF COOLER NAILS TO BE USED WILL BE THE NUMBER OF COMMON NAILS MULTIPLIED BY 1.2 AND ROUNDED UP TO THE NEXT WHOLE NUMBER. THE SIZE OF THE COOLER NAILS TO BE USED WILL BE THE SAME AS SPECIFIED FOR THE COMMON NAILS (4d, 6d, 10d, ETC.) BUT WILL CONFORM TO THE SIZE AND WEIGHT TOLERANCES SPECIFIED WITHIN ASTM F1667 FOR COOLER NAILS.

O. ALL NON-MANUFACTURED WOOD USED IN THE PALLETIZED LOAD SHALL BE HEAT TREATED TO A CORE TEMPERATURE OF 56 DEGREES CELSIUS FOR A MINIMUM OF 30 MINUTES. THE PALLET MANUFACTURER AND THE MANUFACTURER OF WOOD USED TO BUILD FILLER ASSEMBLIES AND DUNNAGE ASSEMBLIES FOR THE PALLETIZED LOAD SHALL BE AFFILIATED WITH AN INSPECTION AGENCY ACCREDITED BY THE AMERICAN LUMBER STANDARDS COMMITTEE. THE PALLET MANUFACTURER AND THE MANUFACTURER OF WOOD USED TO BUILD FILLER ASSEMBLIES AND DUNNAGE ASSEMBLIES FOR THE PALLETIZED LOAD SHALL ENSURE TRACEABILITY TO THE ORIGINAL SOURCE OF HEAT TREATMENT. EACH PALLET, FILLER ASSEMBLY, OR DUNNAGE ASSEMBLY SHALL BE MARKED TO SHOW THE CONFORMANCE TO THE INTERNATIONAL PLANT PROTECTION CONVENTION STANDARD. PALLETS, FILLER ASSEMBLIES AND DUNNAGE ASSEMBLIES MADE OF NON-MANUFACTURED WOOD SHALL BE HEAT TREATED AND MARKED APPROPRIATELY. THE QUALITY MARK FOR THE PALLET SHALL BE PLACED ON TWO OPPOSITE END POSTS ON THE SAME SIDE AS THE PRESERVATIVE MARKING. THE QUALITY MARK FOR THE FILLER ASSEMBLIES AND DUNNAGE ASSEMBLIES SHALL BE PLACED ON TWO OPPOSITE SIDES. FOREIGN MANUFACTURERS SHALL HAVE THE HEAT TREATMENT OF NON-MANUFACTURED WOOD PRODUCTS VERIFIED IN ACCORDANCE WITH THEIR NATIONAL PLANT PROTECTION ORGANIZATION'S COMPLIANCE PROGRAM.

P. FOR DETAILS OF THE MIL-B-2427 WOOD BOX SEE DRAWING NUMBER 9395787.



**FILLER ASSEMBLY**  
(FOR MINUS ONE BOX)



**PALLET DUNNAGE LOCATION**

NOTE: AVOID NAILING THRU STRAP SLOTS.