

# BASIC PROCEDURES

## UNITIZATION PROCEDURES FOR BOXED AMUNITION AND COMPO- NENTS ON SKIDDED BASES

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NOTICE:

THIS BASIC PROCEDURES DRAWING WILL BE AUGMENTED BY SEPARATELY ISSUED APPENDICES BEARING THE DRAWING AND FILE NUMBERS OF THIS DOCUMENT. AN APPENDIX WILL DELINEATE THE APPROVED CONFIGURATIONS OF A UNIT LOAD FOR ONE ITEM OF AMMUNITION OR FOR A CATEGORY OF AMMUNITION ITEMS. APPENDICES CANNOT STAND ALONE, BUT MUST BE USED IN CONJUNCTION WITH THIS BASIC PROCEDURE DRAWING. THE DRAWING NUMBER OF EACH APPENDIX WILL CONTAIN A SUB-NUMBER FOR IDENTIFICATION (E.G., THE DRAWING NUMBER FOR APPENDIX 3 WILL BE 19-48-4138/3-20PM1000). A BLOCK OF SUB-NUMBERS HAS BEEN SELECTED FOR EACH CLASS OF FSC GROUP 13 ITEMS: I.E., ONE BLOCK FOR CLASS 1305, ANOTHER BLOCK FOR CLASS 1310, ETC. IN SOME INSTANCES, AN ITEM MAY HAVE MORE THAN ONE STANDARD PACK, THUS REQUIRING MORE THAN ONE APPENDIX WHEN THE PACKAGE SIZES VARY APPRECIABLY. SUCH ADDITIONAL APPENDICES WILL BE IDENTIFIED BY ADDING A LETTER TO THE SUB-NUMBER (E.G. 19-48-4138/13A-20PM1000). APPENDICES WILL NOT NECESSARILY BE ISSUED BY NUMERICAL SEQUENCE. ALSO, SOME SUB-NUMBERS WITHIN THE BLOCK SELECTED FOR A CLASS OF ITEMS MAY NOT BE USED IF ALL APPLICABLE ITEMS WITHIN THAT CLASS ARE COVERED BY AN APPENDIX (E.G., IN THE SELECTED BLOCK OF SUB-NUMBERS OF 1 THRU 50, NUMBERS 48, 49, AND 50 MAY NOT BE USED, THUS THE SUB NUMBER 51 WILL FOLLOW 47).

THIS DRAWING SUPERCEDES THE "SKID BASE ASSEMBLY" AND "UNIT ASSEMBLY" PORTIONS DELINEATED ON PAGES 2, 3, AND 4 OF DRAWING 19-48-4020-1-2-5-11PA1001, DATED 1 DECEMBER 1961, THRU REVISION 2 THERETO, DATED JUNE 1968. HOWEVER, THE "SKIDDED UNIT" DATA WITHIN THE TABULAR DATA PORTION OF DRAWING 19-48-4020-1-2-5-11PA1001 WILL CONTINUE TO BE VALID FOR EACH ITEM LISTED WITHIN THAT DRAWING UNTIL SUPERCEDED BY AN APPENDIX TO THIS DOCUMENT FOR THAT ITEM.

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## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, COMBAT CAPABILITIES DEVELOPMENT COMMAND ARMAMENTS CENTER  HANSSSEN.JOSEP H.W.1376495538  <small>Digitally signed by HANSSSEN.JOSEPH.W.13764955 38 Date: 2023.11.21 06:31:32 -06'00'</small>	<b>CAUTION: VERIFY PRIOR TO USE AT <a href="https://www.dau.edu/cop/ammo/Pages/Default.aspx">https://www.dau.edu/cop/ammo/Pages/Default.aspx</a> THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 14.</b>			<b>OCTOBER 1976</b>			
APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND  WARD.GINA. M.1369379808  <small>Digitally signed by WARD.GINA.M.1369379808 Date: 2023.11.21 07:51:52 -06'00'</small>	DESIGN ENGINEER	BASIC REV.	JOHN WILSON  MADELINE BANKS		REVISION NO. 7	NOVEMBER 2023	
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  BRAILSFORD.KEIT H.ANTHONY.10286 55661  <small>Digitally signed by BRAILSFORD.KEITH.ANTHONY. 1028655661 Date: 2023.11.22 16:11:14 -06'00'</small>	ENGINEERING DIVISON	FIEFFER.LAUR A.A.1230375727  <small>Digitally signed by FIEFFER.LAURA.A.1230375727 Date: 2023.10.31 14:25:49 -05'00'</small>		<b>SEE THE REVISION LISTING ON PAGE 2</b>			
TEST ENGINEER TEST REPORT	NA	FELICIANO.AD IN.1259200373  <small>Digitally signed by FELICIANO.ADIN.1259200373 Date: 2023.11.13 13:56:20 -06'00'</small>		CLASS	DIVISION	DRAWING	FILE
EXPLOSIVE SAFETY DIRECTORATE	CUMMINS.PAU L.A.1231883122  <small>Digitally signed by CUMMINS.PAUL.A.1231883122 Date: 2023.11.14 09:48:36 -06'00'</small>		<b>19</b>	<b>48</b>	<b>4138</b>	<b>20PA1000</b>	

## **REVISIONS**

REVISION NO. 1, DATED JUNE 1977, CONSISTS OF:

CHANGING GENERAL NOTES "A", "D.2", "N.2", AND "N.3" TO CONFORM TO CURRENT STANDARDS.

REVISION NO. 2, DATED JUNE 1978, CONSISTS OF:

1. CHANGING SPECIAL NOTE 1 ON PAGE 7 TO CONFORM TO CURRENT STANDARDS.
2. ADDING SPECIAL NOTES 7 AND 8 ON PAGE 7 AND 11 ON PAGE 5.
3. CHANGING PLYWOOD SPECIFICATIONS ON PAGE 3 TO CONFORM TO CURRENT STANDARDS.

REVISION NO. 3, DATED JUNE 1985, CONSISTS OF:

1. CHANGING PRESERVATIVES IN MATERIAL SPECIFICATIONS.
2. CHANGING SPECIAL NOTE 7 ON PAGE 5 TO CONFORM TO CURRENT STANDARDS.
3. CHANGING SPECIAL NOTE 3 ON PAGE 7 TO CONFORM TO CURRENT STANDARDS.

REVISION NO. 4, DATED MAY 1989, CONSISTS OF:

UPDATING GENERAL NOTES.

REVISION NO. 5, DATED AUGUST 2000, CONSISTS OF:

1. ADDING REQUIREMENT TO PRESERVE WOODEN FILLER ASSEMBLIES UTILIZED WITH THESE PROCEDURES.
2. UPDATING DRAWING FORMAT.
3. UPDATING GENERAL NOTES.
4. ADDING CLIPLESS SEAL NOTE.
5. CHANGING MATERIAL SPECIFICATIONS TO COMMERCIAL STANDARDS DUE TO CANCELLED MILITARY SPECIFICATIONS.

REVISION 6, DATED NOVEMBER 2011, CONSISTS OF CHANGES PER ECP R07K3003(1-3) INCLUDING:

1. UPDATING DRAWING FORMAT.
2. UPDATING GENERAL NOTE "E" TO CORRECT ADDRESS.
3. REMOVING GENERAL NOTE "P" (STRAP CUTTER).
4. ADDING STRAP THICKNESS TO MATERIAL SPECIFICATIONS

REVISION NO. 7, DATED NOVEMBER 2023, CONSISTS OF CHANGES PER ECP R22K3012 INCLUDING:

1. UPDATING GENERAL NOTE "X" (PRESERVATIVE TREATMENT).
2. ADDING GENERAL NOTES "Y" (SPLITS) AND "Z" (HEAT TREATMENT).
3. UPDATING MATERIAL SPECIFICATIONS TO CURRENT STANDARDS.

## GENERAL NOTES

(GENERAL NOTES CONTINUED)

- 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. APPROVED SPECIFICATIONS, COVERING THE ASSEMBLAGE AND UNITIZATION OF BOX-PACKED AMMUNITION INTO UNIT LOADS, ARE SET FORTH IN THIS DRAWING. THIS DRAWING WILL BE CONSIDERED THE BASIC DOCUMENT FOR THE UNITIZATION OF AMMUNITION ITEMS PACKED IN BOXES 27" OR LONGER, EXCEPT FOR SOME RESTRICTED ITEMS, SUCH AS WP FILLED AMMUNITION. THIS DOCUMENT INCLUDES SPECIFIC INFORMATION FOR THE CONSTRUCTION OF SKIDDED BASES (TYPE I OR TYPE II), MATERIAL SPECIFICATIONS AND UNITIZING STANDARDS APPLICABLE TO UNITIZATION, PLUS INFORMATION RELATIVE TO TYPICAL POSITIONING OF BOXES ON A SKIDDED BASE AND INSTALLATION OF UNITIZING STEEL STRAPPING. FOR SKIDDED BASE DETAILS AND TYPICAL UNITIZATION PROCEDURES SEE PAGES 6 THRU 11 (**CAUTION:** THE TYPE II SKIDDED BASE DETAILED ON PAGES 9 AND 10 WILL NOT BE USED FOR UNITIZING A LOAD WHICH HAS MORE THAN THREE STACKS OF BOXES). PROCEDURES FOR LESS-THAN-FULL-LAYER UNIT LOADS ARE DELINEATED ON PAGES 11 AND 12.
- C. APPENDICES PERTAINING TO THIS BASIC DOCUMENT WILL BE ISSUED SEPARATELY. ALL APPENDICES, HOWEVER, ARE A PART OF THIS BASIC PROCEDURES DRAWING. EACH APPENDIX WILL COVER THE APPROVED CONFIGURATION FOR A UNIT LOAD, THE SPECIFIC UNITIZATION SPECIFICATIONS AND THE PERTINENT TABULAR DATA FOR ONE ITEM OF AMMUNITION OR FOR A CATEGORY OF AMMUNITION ITEMS.
- D. GENERALLY, UNIT LOADS SHOWN IN THE APPENDICES WILL CONFORM TO THE STANDARDS LISTED BELOW.
1. GROSS WEIGHTS OF UNIT LOADS ARE BASED ON A MAXIMUM WEIGHT OF 2,000 POUNDS WITH AN ALLOWABLE OVERAGE OF 200 POUNDS.
  2. WHEN THE WIDTH OF A UNIT LOAD EXCEEDS 44", THE LENGTH OF THE UNIT LOAD MUST NOT EXCEED 44" TO FACILITATE LOADING 2-WIDE IN TACTICAL VEHICLES. THE HEIGHT OF THE LOAD SHOULD NOT EXCEED APPROXIMATELY ONE AND ONE-THIRD THE WIDTH OF THE UNIT LOAD, UP TO A MAXIMUM HEIGHT OF 54". HOWEVER, ANY OR ALL OF THE STATED DIMENSIONS FOR THE LENGTH, WIDTH OR HEIGHT OF A UNIT LOAD CAN BE INCREASED OR DECREASED, DEPENDING ON PECULIARITIES OF THE COMMODITY BEING UNITIZED AND ON IDENTIFIABLE FACTORS THAT INFLUENCE TOTAL COST EFFECTIVENESS THROUGHOUT THE AMMUNITION LOGISTICS SYSTEM.
  3. AN AMMUNITION BOX (EXTERIOR PACK) WILL NOT CONTAIN MORE THAN ONE LOT OF AMMUNITION PER BOX. UNIT LOADS WILL NOT CONTAIN MORE THAN TWO LOTS PER UNIT LOAD, EXCEPT WHERE REQUIRED FOR BALLISTIC SAMPLE SHIPMENT OR FOR TROOP USE AT POST, CAMP OR STATION. SEE GENERAL NOTE "R" ON PAGE 4 FOR ADDITIONAL GUIDANCE.
  4. LESS-THAN-FULL BOXES OF AMMUNITION ITEMS (LIGHT BOXES) ARE LIMITED TO ONLY ONE LIGHT BOX PER ITEM LOT. A UNIT LOAD WILL NOT CONTAIN MORE THAN TWO LIGHT BOXES (ONE PER LOT). ADDITIONAL REQUIREMENTS ARE SPECIFIED IN THE "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ON PAGES 11 AND 12.
  5. A UNIT LOAD, SUCH AS THE LAST UNIT LOAD FOR AN AMMUNITION LOT, CAN BE ASSEMBLED WITH LESS LAYERS THAN SPECIFIED FOR THE BASIC UNIT LOAD. HOWEVER, UNIT LOADS, INCLUDING PARTIAL UNIT LOADS, WILL NOT BE ASSEMBLED WITH A PARTIAL-LAYER. EMPTY BOXES OR DUNNAGE WILL BE USED TO ACHIEVE FULL-LAYER UNIT LOADS. FOR SPECIFIC GUIDANCE, SEE GENERAL NOTE "F" BELOW, GENERAL NOTE "V" ON PAGE 4, AND THE PROCEDURES FOR LESS-THAN-FULL-LAYER UNIT LOADS ON PAGES 11 AND 12.
- E. ANY REQUEST FOR DEVIATION FROM THE STANDARDS DESCRIBED IN GENERAL NOTE "D" OR FROM THE PROCEDURES DELINEATED IN AN APPENDIX MUST BE DIRECTED TO THE COMMANDER, U.S. ARMY RDECOM-ARDEC, ATTN: RDAR-EIL-TP, ROCK ISLAND, IL 61299-7300, FOR SPECIFIC APPROVAL. FOR EXAMPLE, SPECIFIC APPROVAL MUST BE OBTAINED FOR UNITIZATION OF ANY ITEM WHEN PACKED IN BOXES WHICH ARE DIFFERENT IN SIZE THAN THOSE SHOWN IN THE APPENDIX FOR THAT ITEM, EVEN THOUGH THE UNIT LOAD MAY COMPLY WITH THE STANDARDS DESCRIBED IN GENERAL NOTE "D".
- F. SKIDDED UNITS MUST ONLY BE MADE UP WITH FULL LAYERS. HOWEVER, FOR REDUCED QUANTITIES, ONE OR MORE FULL LAYERS MAY BE OMITTED, AND/OR A FULL LAYER MAY CONSIST OF BOXED ITEMS AND A FILLER ASSEMBLY OR AN EMPTY BOX(ES). SEE THE PROCEDURES FOR LESS-THAN-FULL-LAYER UNIT LOADS ON PAGES 11 AND 12. ONLY ONE SKIDDED UNIT HAVING A REDUCED QUANTITY OF ITEMS SHOULD BE PERMITTED PER LOT OF THAT ITEM. EACH LAYER OF BOXES WILL BE POSITIONED SO AS TO BE CENTERED LENGTHWISE AND WIDTHWISE ON THE DECK OF THE SKIDDED BASE.
- CARE SHALL BE TAKEN TO ENSURE THAT THE BOXES ARE EVENLY ALIGNED HORIZONTALLY AND VERTICALLY SO THAT THE SIDES AND ENDS OF THE SKIDDED UNIT DO NOT EXCEED A 1/2" TOLERANCE, RELATIVE TO THE SKIDDED BASE. SEE "ALLOWABLE TOLERANCES FOR ASSEMBLING UNITS" DETAILS ON PAGE 13.
- G. WHEN UNITIZING BOXES WITH TOP CLEATS, POSITION BOXES IN UNIT WITH CLEATS UPWARD. IF BOXES ARE OF THE HINGED-TOP TYPE, THE OUTSIDE BOXES IN THE TOP LAYER WILL BE POSITIONED SO THAT THE HINGES WILL BE INWARD. **CAUTION:** ROCKETS AND ROCKET MOTORS IN A PROPULSIVE STATE WILL BE POSITIONED IN THE UNIT LOAD WITH ALL NOSE ENDS IN ONE DIRECTION. UNIT STRAPS, IN THESE INSTANCES, MAY PASS OVER HINGES OF BOXES.
- H. A PLUS-OR-MINUS 1/4" IS ALLOWED ON OVERALL DIMENSIONS OF A SKIDDED BASE OR FILLER ASSEMBLY. HOWEVER, SIMILAR PIECES IN A SKIDDED BASE OR FILLER ASSEMBLY MUST BE WITHIN 1/8" OF THE SAME DIMENSION.
- J. DIMENSIONAL LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE UNLESS OTHERWISE SPECIFIED. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- K. IN ORDER TO OBTAIN COMPACT (SOUND) UNITS, ALL STRAPS SHALL BE LOCATED IN PROPER ALIGNMENT AND TENSIONED UNTIL THEY CUT INTO THE EDGE OF THE BOXES AND THE SKID BASE. AFTER TENSIONING, ALL STRAPS WILL BE SECURED USING ONE SEAL AND TWO PAIR OF NOTCHES PER SEAL. SEE "ALLOWABLE TOLERANCES FOR ASSEMBLING UNITS" DETAILS ON PAGE 13. SEALS MAY BE LOCATED ON A SIDE OR ON THE TOP OF THE UNIT, AS REQUIRED BY OPERATIONAL NECESSITY.
- L. WHEN APPLYING ANY STRAP, CARE MUST BE EXERCISED TO ASSURE THAT THE END OF THE STRAP ON THE UNDER SIDE 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 FEEDWHEEL TENSIONING TOOL, MANUAL OR PNEUMATIC, AND THE APPLICATION OF ONE ADDITIONAL SEAL, SEE "STRAP RETENSIONING TAB" VIEW ON PAGE 13.
- M. DETERMINATION OF LENGTH OF STRAPPING.
1. THE LENGTH OF A TIEDOWN STRAP REQUIRED FOR SPECIFIC UNIT, WHERE THE STRAP PASSES UNDER THE UNIT DECK, WILL BE DETERMINED BY USING THE FOLLOWING FORMULA:  $L = 2A + 2H + 2"$ . THE FOLLOWING DEFINITIONS APPLY: L = LENGTH OF STRAP REQUIRED, IN INCHES; A = LENGTH OF UNIT, IN INCHES; H = HEIGHT OF UNIT, INCLUDING SKIDDED BASE, IN INCHES.
  2. THE LENGTH OF A TIEDOWN STRAP REQUIRED FOR A SPECIFIC UNIT, WHERE THE STRAP PASSES UNDER A SKID POST, WILL BE DETERMINED BY USING THE FOLLOWING FORMULA:  $L = 2A + 2H + 12"$ . DEFINITIONS ARE THE SAME AS IN NOTE M.1.
- N. SKIDDED UNIT LOADS SHALL BE INSPECTED FOR TORN, DETERIORATED OR LOOSENED STRAPPING PRIOR TO SHIPPING.
1. TORN OR BROKEN STRAPS SHOULD BE REPLACED OR REPAIRED BY SPLICING IN A MANNER SIMILAR TO THAT DESCRIBED IN N.4.B ON PAGE 4.
  2. DETERIORATION DUE TO A MINOR AMOUNT OF RUST WILL NOT NECESSARILY BE CAUSE FOR REPLACING A STRAP. HOWEVER, AN EXTENSIVELY RUSTED/SCALED/PITTED STRAP IS CAUSE FOR REPLACING THE STRAP.
  3. A DAMAGED OR DEFECTIVE SEAL IS SUFFICIENT CAUSE FOR REPLACEMENT OF THE SEAL.
  4. LOOSE STRAPS SHOULD BE CHECKED FOR DEGREE OF LOOSENESS BY POSITIONING THE HOOK OF A SCALE (COMMONLY KNOWN AS A FISH SCALE) BEHIND THE STRAPS NEAR THE MIDPOINT AT THE TOP OR SIDE OF THE UNIT LOAD. PULL THE SCALE UNTIL A READING OF 20 POUNDS IS OBTAINED. THE DISTANCE BETWEEN THE BOX AND THE STRAP MUST NOT EXCEED 1-1/2". IF THE MEASUREMENT EXCEEDS 1-1/2", THE STRAP MUST BE TIGHTENED OR REPLACED. SEE PAGE 13 FOR GUIDANCE, TIGHTENING CAN BE ACCOMPLISHED BY EITHER OF TWO METHODS.  
  
(A) A RETENSIONING DEVICE CAN BE USED IF THE STRAP HAS AT LEAST A 6" LONG TAB AT THE SEAL. SEE GENERAL NOTE "L" ON PAGE 3.

(CONTINUED ON PAGE 4)

(GENERAL NOTES CONTINUED FROM PAGE 2)

(B) AN 18" LONG PIECE OF STRAP CAN BE USED AS A SPLICE PIECE. CUT THE LOOSE STRAP ON BOTH SIDES OF ORIGINAL SEAL AND DISCARD THE CUT OUT SECTION. OVERLAP ONE END OF THE STRAP SPLICE PIECE TO ONE END OF THE ORIGINAL STRAPPING SO AS TO PROTRUDE SLIGHTLY BEYOND THE END OF THE SEAL TO BE USED. POSITION AND SECURE THE SEAL TO THE OVERLAPPED SECTION WITH TWO PAIR OF NOTCHES. USING A STRAPPING TOOL, TENSION AND SEAL THE LENGTHENED STRAP. THE STRAP SPLICE PIECE MAY BE CUT FROM NEW STRAP OR FROM USED STRAP, PROVIDED IT IS AT LEAST OF AS GOOD A QUALITY AS THE STRAP TO WHICH IT IS BEING SECURED.

5. **CAUTION:** WHEN A STRAP IS REPLACED/SPLICED OR RETENSIONED, AND THE OTHER STRAPS ON A UNIT LOAD ARE NOT, CARE MUST BE EXERCISED TO INSURE THAT THE TENSION ON THE AFFECTED STRAP IS NEARLY THE SAME AS THAT OF THE OTHER STRAPS

O. AMMUNITION UNITIZED PRIOR TO DISTRIBUTION OF THIS DRAWING OR OF AN APPENDIX THERETO NEED NOT BE REUNITIZED SOLELY TO CONFORM TO THE STANDARDS SPECIFIED HEREIN OR TO THE METHOD SHOWN IN AN AUGMENTING APPENDIX. HOWEVER, BOX AND STRAP ALIGNMENT MUST CONFORM WITH THE TOLERANCE STANDARDS SPECIFIED ON PAGE 13 OF THIS DRAWING BEFORE A UNIT IS ACCEPTABLE FOR SHIPMENT. ALSO, THE CONDITION OF THE UNITIZING STRAPPING ON A UNIT LOAD MUST COMPLY WITH THE CRITERIA OF GENERAL NOTE "N" ON PAGE 3 AND ABOVE.

P. REFER TO DAC DRAWING ACV00617 FOR APPROVED SOURCES FOR SEAL-LESS (CLIPLESS) SEALING TOOL. THESE APPROVED SEALING TOOLS CAN BE USED IN PLACE OF SEALS CURRENTLY SPECIFIED IN THE "TYPICAL UNIT ASSEMBLY" TABLE LISTED ON PAGE 5.

Q. UNIT LOAD MARKING WILL BE ACCOMPLISHED IN ACCORDANCE WITH DAC DRAWING ACV00561.

R. IF THE REQUISITION QUANTITY IN SUPPORT OF AN AMMUNITION SHIPMENT IS LESS THAN A FULL LAYER QUANTITY OF BOXES FOR A UNIT LOAD, THE BOXES NEED NOT BE PALLETIZED FOR SHIPMENT. THE BOXES MAY BE PALLETIZED, HOWEVER, FOR ENHANCED HANDLING, CLASSIFIED/SENSITIVE ITEM CONSIDERATIONS, ETC., BUT DO NOT REQUIRE FILLER ASSEMBLIES TO COMPLETELY FILL OUT THE PALLET. NOTE THAT THE METHOD FOR BRACING AND STAYING OF THE LOOSE OR PALLETIZED BOXES MUST COMPLY WITH THE METHODS SPECIFIED WITHIN THE APPLICABLE 19-48 SERIES OUTLOADING PROCEDURAL.

S. OUTLOADING AND STORAGE OF SKIDDED UNITS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH AMC DRAWINGS

CARLOADING - - - - - 19-48-4123-5PA1003  
TRUCKLOADING - - - - - 19-48-4124-11PA1004  
STORAGE - - - - - 19-48-4125-1-2-3-4-14-22PA1003  
END OPENING ISO CONTAINER - 19-48-4153-15PA1002  
MILVAN - - - - - 19-48-4166-15PA1003  
SIDE OPENING ISO CONTAINER - 19-48-4267-15PA1009

OR WITH APPLICABLE PROCEDURAL DRAWINGS AS IDENTIFIED IN THE APPENDICES FOR SPECIFIC UNITS.

T. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM, AND ONE POUND EQUALS 0.454KG.

U. **CAUTION:** STRAPPING LESS THAN 3/4" WIDE OR LESS THAN .029" THICK WILL NOT BE USED. IF THE SPECIFIED STRAPPING IS NOT AVAILABLE FOR A SPECIFIC UNITIZING OPERATION, STRAPPING WIDER THAN SPECIFIED AND AT LEAST .029" THICK MAY BE USED ON AN INTERIM BASIS UNTIL THE SPECIFIED STRAPPING CAN BE ACQUIRED.

V. USE OF "FILLER ASSEMBLIES" IS MANDATORY FOR PARTIAL LAYERS OF WIREBOUND BOXES, UNLESS THE DETAILS OF "TYPICAL INSTALLATION OF REINFORCING BLOCKS IN EMPTY BOX" ON PAGE 12 ARE APPLIED.

W. WHEN PERFORMANCE ORIENTED PACKING (POP) MARKING IS REQUIRED ON BOXES, THIS MARKING WILL SHOW IN AT LEAST ONE PLACE ON THE UNITIZED LOAD.

X. ALL WOODEN DUNNAGE USED IN UNIT LOADS SHALL BE TREATED WITH EITHER TYPE I OR TYPE II WOOD PRESERVATIVE, IN ACCORDANCE WITH DEVCOM DRAWING 13064136. IF THE DUNNAGE CONSISTS OF MORE THAN ONE COMPONENT, IT MUST BE ASSEMBLED PRIOR TO TREATMENT. PRESERVATIVE MARKING SHALL BE APPLIED TO AT LEAST ONE LOCATION ON THE ASSEMBLY OR COMPONENT IN ACCORDANCE WITH PARAGRAPH 3.3.6 OF DEVCOM DRAWING 13064136.

Y. REFER TO MIL-DTL-15011K AMENDMENT 1 PARAGRAPH 3-2-1-3-1 FOR CRITERIA REGARDING ALLOWABLE SPLITS WITHIN SKID BASE LUMBER.

Z. ALL NON-MANUFACTURED WOOD USED IN THE UNIT LOAD WILL BE HEAT TREATED AND MARKED TO SHOW CONFORMANCE TO THE INTERNATIONAL PLANT PROTECTION CONVENTION STANDARD (IPPC), ISPM-15. SEE DAC DRAWING ACV00831 FOR ISPM-15 CERTIFICATION MARKING AND PLACEMENT DETAILS.

**TYPE I SKID BASE (SEE PAGES 6 AND 7)**

NAME OF PART	KEY NUMBER	MATERIAL		SPECIFICATION
		KIND	GRADE	
PLYWOOD DECK	3 & 3A	TYPE A (CONSTRUCTION & INDUSTRIAL)	C-D (INTERIOR W/EXTERIOR GLUE)	CID A-A-55057
POST A & B	1 & 2	WOOD, CLASS 2, STRUCTURAL	GROUP II OR III (SEE TABLE 1)	ASTM D6199
POST A & B ALTERNATIVE	1A & 2A	TYPE A (CONSTRUCTION & INDUSTRIAL)	C-D (INTERIOR W/EXTERIOR GLUE)	CID A-A-55057
CROSS TIE	4	WOOD, CLASS 2, STRUCTURAL	GROUP II OR III (SEE TABLE 1)	ASTM D6199
CROSS TIE ALTERNATIVE	4A	TYPE A (CONSTRUCTION & INDUSTRIAL)	C-D (INTERIOR W/EXTERIOR GLUE)	CID A-A-55057
RUNNER	6	WOOD, CLASS 2, STRUCTURAL	GROUP II OR III (SEE TABLE 1)	ASTM D6199
RUNNER ALTERNATIVE	5A	TYPE A (CONSTRUCTION & INDUSTRIAL)	C-D (INTERIOR W/EXTERIOR GLUE)	CID A-A-55057
FILLER BLOCK	5	WOOD, CLASS 2, STRUCTURAL	GROUP II OR III (SEE TABLE 1)	ASTM D6199
ADHESIVE				ASTM D4689
NAILS	3, 3A, 5A & 6	STEEL NAIL (SEE KEY NUMBERS FOR TYPE, STYLE, AND SIZE)		ASTM F1667-21A
PRESERVATIVE		WOOD PRESERVATIVE	SEE SPECIAL NOTES 6 ON PAGE 8 AND 2 ON PAGE 10	

**TYPE II SKID BASE (SEE PAGES 9 AND 10)**

NAME OF PART	KEY NUMBER	MATERIAL		SPECIFICATION
		KIND	GRADE	
TOP DECK BOARD	3 & 4	WOOD, CLASS 2, STRUCTURAL	GROUP I, II, OR III (SEE TABLE 1)	ASTM D6199
POST	1	WOOD, CLASS 2, STRUCTURAL	GROUP II OR III (SEE TABLE 1)	ASTM D6199
STRINGER BOARD	2	WOOD, CLASS 2, STRUCTURAL	GROUP II OR III (SEE TABLE 1)	ASTM D6199
RUNNER	5	WOOD, CLASS 2, STRUCTURAL	GROUP III (SEE TABLE 1)	ASTM D6199
NAILS	3, 4, & 5	STEEL NAIL (SEE KEY NUMBERS FOR TYPE, STYLE, AND SIZE)		ASTM F1667-21A
PRESERVATIVE		WOOD PRESERVATIVE	SEE SPECIAL NOTES 6 ON PAGE 8 AND 2 ON PAGE 10	

**TYPICAL UNIT ASSEMBLY (SEE PAGE 11)**

NAME OF PART	KIND	GRADE	SPECIFICATION
STRAPPING	STEEL, 1-1/4" X .035" OR .031" OR .029"	TYPE I, HEAVY DUTY, FINISH B <sup>•</sup> (GRADE 2)	ASTM D3953
STRAPPING	STEEL, 3/4" X .035" OR .031" OR .029"	TYPE I, HEAVY DUTY, FINISH B <sup>•</sup> (GRADE 2)	ASTM D3953
SEAL, STRAP	STEEL	CLASS H, FINISH B (GRADE 2), DOUBLE NOTCH TYPE, STYLE I, II, III, OR IV. ALTERNATIVE SEAL FINISH: SIGNODE PAINTED SEALS MAY BE USED AS AN ALTERNATIVE IF ALL SURFACES ARE PAINTED. GRITTED BACKING IS NOT PERMITTED.	ASTM D3953
STAPLE	STEEL	STFCS-189, STFCS-198, STFCS-207, OR STFCS-216, 15/16" OR 1" CROWN WIDTH X 3/4" LEG LENGTH FOR 3/4" STRAPPING OR STFCS-224, 1-17/32" CROWN WIDTH X 3/4" LEG LENGTH FOR 1-1/4" STRAPPING.	ASTM F1667-21A

**TABLE 1 WOOD GROUPS\***

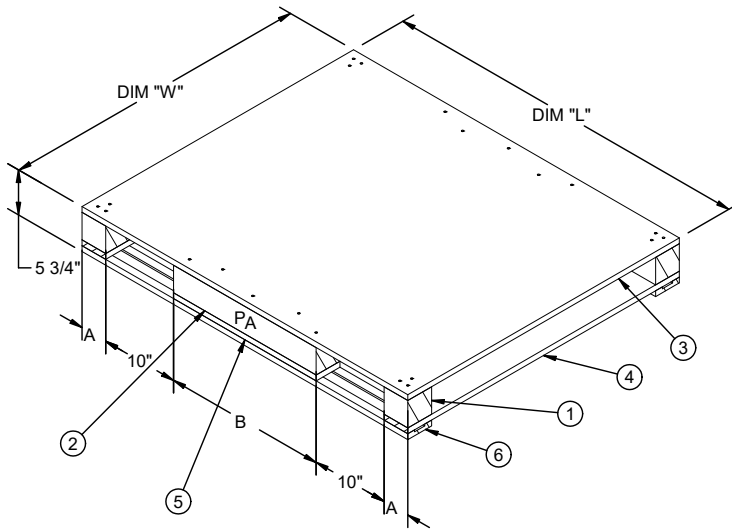
GROUP I	GROUP II	GROUP III
ASPEN CEDAR CHESTNUT COTTONWOOD FIR, DOUGLAS FIR, SILVER FIR, WHITE HEMLOCK, EASTERN HEMLOCK, WESTERN LARCH, WESTERN MAGNOLIA PINE, ALASKA PINE, PONDEROSA SPRUCE TAMARACK	ASH (EXCEPT WHITE) ELM, AMERICAN FIR, DOUGLAS (COAST) SWEETGUM LARCH, WESTERN MAPLE, SOFT PINE, SOUTHERN YELLOW SYCAMORE TUPELO, WATER	ASH, WHITE BEECH BIRCH, SWEET OR YELLOW ELM, ROCK HACKBERRY HICKORY LOCUST MAPLE, HARD OAK PECAN

\* THE WOOD GROUPS AS IDENTIFIED IN TABLE 1 ARE ONLY APPLICABLE TO THE PROCEDURES SPECIFIED IN THIS DOCUMENT

• USE OF OTHER THAN "FINISH B" STRAPPING REQUIRES SPECIFIC APPROVAL, ON A CASE BY CASE BASIS, FROM THE COMMAND IDENTIFIED WITHIN GENERAL NOTE "E" ON PAGE 3.

**TYPICAL FILLER ASSEMBLY (SEE PAGE 11)**

MATERIAL		
KIND	GRADE	SPECIFICATION
LUMBER	SEE TM 743-200-1 (DUNNAGE LUMBER)	VOLUNTARY PRODUCT STANDARD PS 20
NAILS	COMMON STEEL NAIL (NLCMS OR NLCMPS). ALT: UNDERLAYMENT NAIL (NLUL), PALLET NAIL (NLPL) OR COOLER NAIL (NLCL) OF SAME SIZE.	ASTM F1667-21A

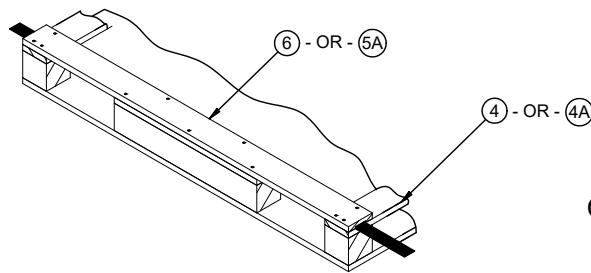


### KEY NUMBERS

- ① POST A, 4" X 4" MATERIAL (4 REQD). SEE "POST A" DETAIL ON PAGE 7 AND SPECIAL NOTES 2 AND 5 ON PAGE 8.
- ② POST B, 4" X 4" CUT TO SUIT (2 REQD). SEE "POST B" DETAIL ON PAGE 7 AND SPECIAL NOTES 4, 5, AND 6 ON PAGE 8.
- ③ DECK, PLYWOOD, 3/4" BY "DIM L" AND "DIM W" TO SUIT (1 REQD). NAIL TO POST "A" W/3-2-1/2" LONG X .131" DIA NAILS (TYPE I - STYLE 9, F1667 NLCMS-07) PER POST AND TO POST "B" W/5-2-1/2" LONG X .131" DIA. (TYPE I - STYLE 9, F1667 NLCMS-07) NAILS PER POST USING STAGGERED NAILING PATTERN SHOWN. SEE SPECIAL NOTES 1 AND 2 ON PAGE 8.
- ④ SKID CROSS TIE, 1" X 4" BY "DIM W" (2 REQD). SEE PARTIAL BOTTOM VIEW AT LEFT, "SKID CROSS TIE" DETAIL ON PAGE 7 AND NOTES 1, 7 AND 8 ON PAGE 8.
- ⑤ FILLER BLOCK, 1" X 4" X CUT-TO-SUIT (2 REQD). SEE "FILLER BLOCK" DETAIL ON PAGE 7 AND SPECIAL NOTES 4, 5 AND 7 ON PAGE 8.
- ⑥ RUNNER, 1" X 4" BY "DIM L" (2 REQD). POSITION AS SHOWN AND NAIL THRU SKID CROSS TIE INTO POST "A" W/3 - 3" LONG X .120 DIA (TYPE I - STYLE 16, F1667 NLPLD-07) NAILS AND THRU FILLER BLOCK INTO POST "B" W/5 (SAME TYPE) NAILS USING THE STAGGERED NAILING PATTERN SHOWN. DO NOT NAIL THRU STRAP SLOT. SEE "RUNNER" DETAIL ON PAGE 7 AND SPECIAL NOTES 2, 3, 7 AND 8 ON PAGE 8.

### TYPE I SKID BASE

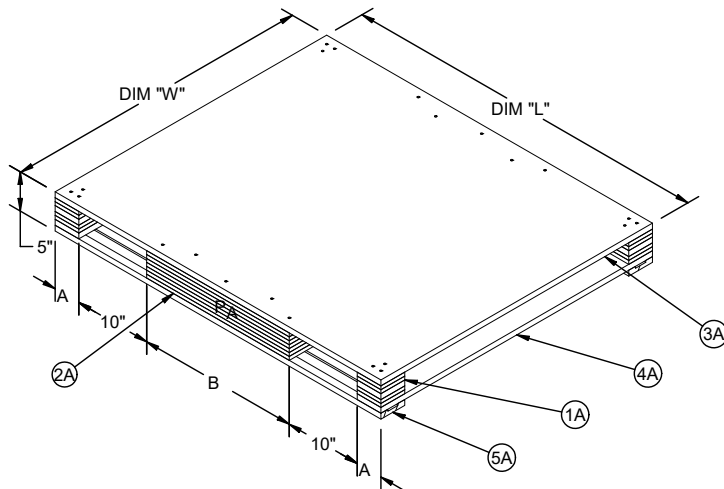
SEE KEY NUMBERS AT RIGHT, DETAILS ON PAGE 7, SPECIAL NOTES ON PAGE 8, AND MATERIAL SPECIFICATIONS ON PAGE 5.



### PARTIAL BOTTOM VIEW

### KEY NUMBERS

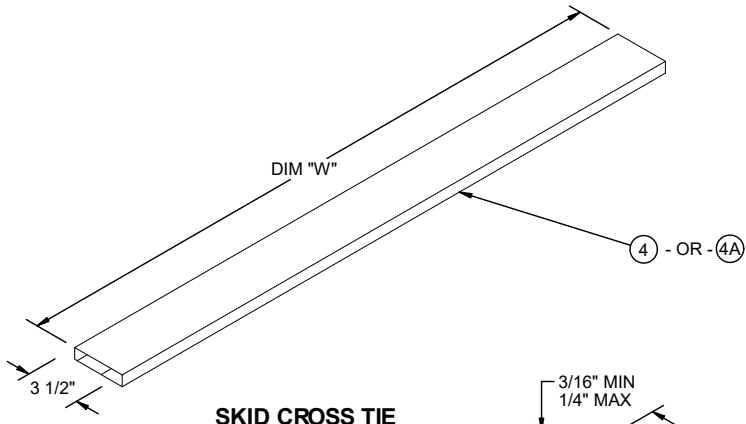
- ①A POST A (ALTERNATIVE), PLYWOOD, 3-1/2" WIDE X 3-1/2" LONG X 2-3/4" HIGH (4 REQD). LAMINATE FROM 1/2" TO 1" THICK PIECES TO A HEIGHT OF 2-3/4". SEE "POST A (ALTERNATIVE)" DETAIL ON PAGE 7 AND MATERIAL SPECIFICATIONS FOR ADHESIVE ON PAGE 5.
- ②A POST B (ALTERNATIVE), PLYWOOD, 3-1/2" HIGH X 3-1/2" WIDE BY "DIM B" (2 REQD). LAMINATE FROM 1/2" TO 1" THICK PIECES TO A HEIGHT OF 3-1/2". SEE "POST B (ALTERNATIVE)" DETAIL ON PAGE 7, SPECIAL NOTES 4 AND 5 ON PAGE 8 AND MATERIAL SPECIFICATIONS FOR ADHESIVE ON PAGE 5.
- ③A DECK (ALTERNATIVE), PLYWOOD, 3/4" BY "DIM L" AND "DIM W" TO SUIT (1 REQD). NAIL TO POST "A" W/3 - 2-1/2" LONG X .131" DIA NAILS (TYPE I - STYLE 9, F1667 NLCMS-07) PER POST AND TO POST "B" W/5 - 2-1/2" LONG X .131" DIA. (TYPE I - STYLE 9, F1667 NLCMS-07) NAILS PER POST USING STAGGERED NAILING PATTERN SHOWN. SEE SPECIAL NOTES 1 AND 2 ON PAGE 8.
- ④A SKID CROSS TIE (ALTERNATIVE), PLYWOOD, 3/4" X 3-1/2" BY "DIM W" (2 REQD). SEE PARTIAL BOTTOM VIEW AT LEFT, "SKID CROSS TIE" DETAIL ON PAGE 7 AND NOTES 1, 7 AND 8 ON PAGE 8.
- ⑤A RUNNER (ALTERNATIVE), PLYWOOD, 3/4" X 3-1/2" BY "DIM L" (2 REQD). POSITION AS SHOWN AND NAIL THRU SKID CROSS TIE INTO POST "A" W/3 - 3" LONG X .120 DIA (TYPE I - STYLE 16, F1667 NLPLD-07) NAILS AND THRU FILLER BLOCK INTO POST "B" W/5 (SAME TYPE) NAILS USING THE STAGGERED NAILING PATTERN SHOWN. DO NOT NAIL THRU STRAP SLOT. SEE "RUNNER" DETAIL ON PAGE 7 AND SPECIAL NOTES 2, 3, 7 AND 8 ON PAGE 8.



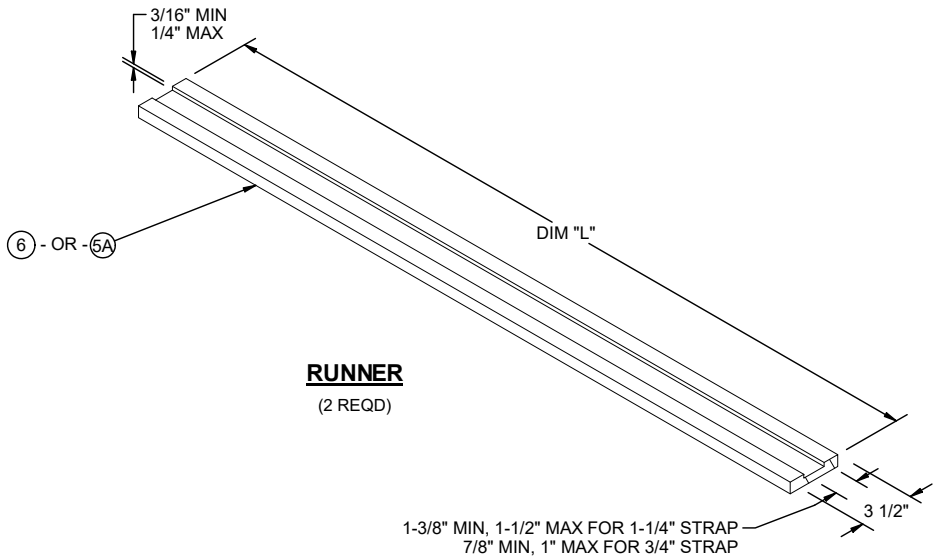
### TYPE I (ALTERNATIVE) SKID BASE

SEE KEY NUMBERS (ALTERNATIVE) AT RIGHT, DETAILS ON PAGE 7, SPECIAL NOTES ON PAGE 8, AND MATERIAL SPECIFICATIONS ON PAGE 5.

### TYPE I SKID BASE CONSTRUCTION PROCEDURES

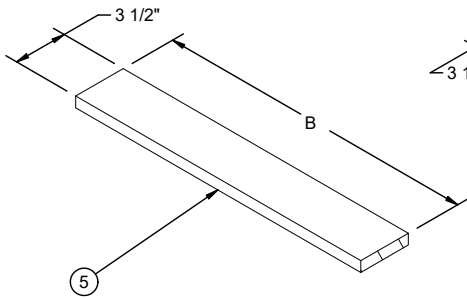


**SKID CROSS TIE**  
(2 REQD)

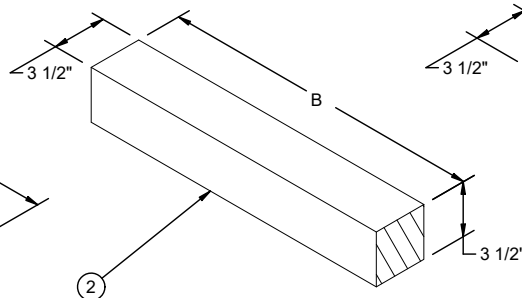


**RUNNER**  
(2 REQD)

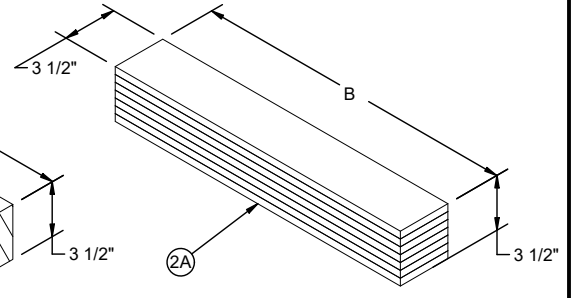
1-3/8" MIN, 1-1/2" MAX FOR 1-1/4" STRAP  
7/8" MIN, 1" MAX FOR 3/4" STRAP



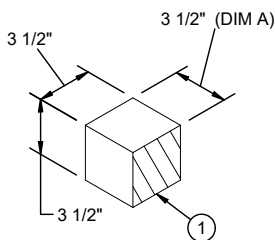
**FILLER BLOCK**  
(2 REQD) 1" X 4" MATERIAL



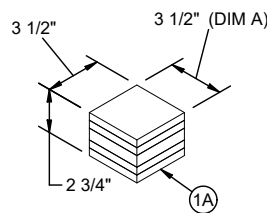
**POST B**  
(2 REQD) 4" X 4" MATERIAL



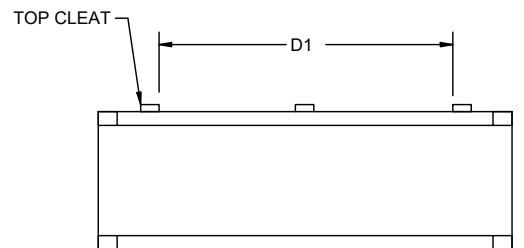
**POST B (ALTERNATIVE)**  
(2 REQD) PLYWOOD MATERIAL



**POST A**  
(4 REQD) 4" X 4" MATERIAL



**POST A (ALTERNATIVE)**  
(4 REQD) PLYWOOD MATERIAL



**CLEATED BOX**  
D1 = DISTANCE BETWEEN TWO OUTSIDE TOP CLEATS

**DETAILS (TYPE I SKID BASE)**

## **SPECIAL NOTES**

1. DIMENSION "W" (WIDTH OF SKID BASE) WILL BE DETERMINED AS FOLLOWS:
  - A. FOR CLEATED BOXES MORE THAN 38" LONG, DIMENSION "W" IS THE DISTANCE BETWEEN THE OUTSIDE TOP CLEATS ON THE TOP OF THE BOX, MINUS 1". SEE "CLEATED BOX" DETAIL ON PAGE 7.
  - B. FOR CLEATED BOXES 34" THROUGH 38" LONG, WITH 25" OR MORE BETWEEN OUTSIDE TOP CLEATS, DIMENSION "W" WILL BE 24".
  - C. FOR CLEATED BOXES 27" TO 34" LONG, THE CRITERIA OF 1.A ABOVE WILL BE APPLIED (DISTANCE BETWEEN CLEATS, MINUS 1").
  - D. FOR BOXES MORE THAN 38" LONG AND WITHOUT TOP CLEATS, DIMENSION "W" WILL BE 1/5 LESS THAN THE LONG DIMENSION (BOX LENGTH) OF THE BOX; E.G., IF THE BOX LENGTH IS 45" THEN  $45 \times \frac{1}{5} = 9$ "; THEREFORE, DIMENSION "W" =  $45 - 9 = 36$ ".
  - E. FOR BOXES 27" THROUGH 38" LONG WITHOUT TOP CLEATS, DIMENSION "W" WILL BE 24".
2. DIMENSION "L" (LENGTH OF SKID BASE) WILL BE THE NARROW DIMENSION (BOX WIDTH) OF THE BOX TIMES THE NUMBER OF BOXES IN THE FIRST LAYER OF THE SKIDDED UNIT MINUS 1" MAXIMUM.
3. RUNNERS NEED NOT BE DADOED IF APPLIED AFTER STRAPS ARE IN PLACE
4. SKIDDED BASES FOR UNIT LOADS WITH A LENGTH DIMENSION OF 32" OR MORE WILL HAVE MATERIAL LENGTH DIMENSIONS AS FOLLOWS:

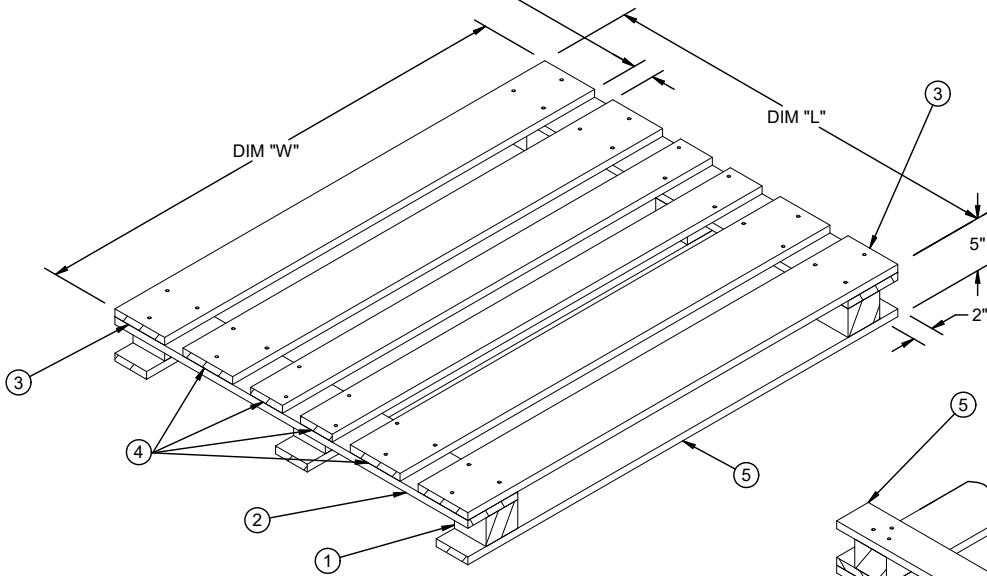
POST "A" = 3-1/2"  
POST "B" = DIM "L" - 27"  
FILLER BLOCK = DIM "L" - 27"
5. SKIDDED BASES FOR UNIT LOADS WITH A LENGTH DIMENSION LESS THAN 32" WILL HAVE FORK OPENINGS 8" WIDE AND HAVE MATERIAL LENGTH DIMENSIONS AS FOLLOWS:

POST "A" = 3-1/2"  
POST "B" = DIM "L" - 23"  
FILLER BLOCK = DIM "L" - 23"

NAILING PATTERN AND NUMBER OF NAILS FOR POSTS "B" WILL BE THE SAME AS SHOWN FOR POSTS "A". SEE DETAILS ON PAGE 6.
6. ALL ASSEMBLED SKIDDED BASES WILL BE PRESERVATIVE TREATED IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN GENERAL NOTE "X" ON PAGE 4. THE SKIDDED BASE MUST BE ASSEMBLED PRIOR TO TREATMENT. MARKING IN ACCORDANCE WITH DEVCOM DRAWING 13064136 PARAGRAPH 3.3.6 WILL BE APPLIED ON THE OUTSIDE SURFACE OF ONE OF THE CENTER POSTS IN LETTERS AT LEAST 1" HIGH.
7. WHEN THE SKID BASES ARE PROCURED COMPLETELY ASSEMBLED, THE SKID CROSS TIE, FILLER BLOCK, AND RUNNER MAY BE FASTENED IN ONE OPERATION USING NAILS AND NAILING PATTERN SPECIFIED.
8. WHEN THE SKID BASES ARE PROCURED WITHOUT THE RUNNER APPLIED, THE SKID CROSS TIES AND FILLER BLOCK WILL BE FASTENED TO EACH POST WITH ONE 2-1/2" LONG X .131" DIA COMMON NAIL. THE RUNNERS WILL BE NAILED TO THE POSTS AS INDICATED, TO COMPLETE A SKID BASE.
9. SKID BASES THAT ARE PROCURED FROM A MANUFACTURER WILL HAVE THE UNDER SIDE OF THE DECK STENCILED IN 1/2" MINIMUM LETTERS AS FOLLOWS:
  - A. MANUFACTURER'S NAME
  - B. MANUFACTURER'S ADDRESS
  - C. DATE (MONTH AND YEAR) OF MANUFACTURE
  - D. MANUFACTURER'S LOT NUMBER
10. TYPE I SKID BASES WILL NOT BE USED FOR UNITIZING WIREBOUND BOXES.

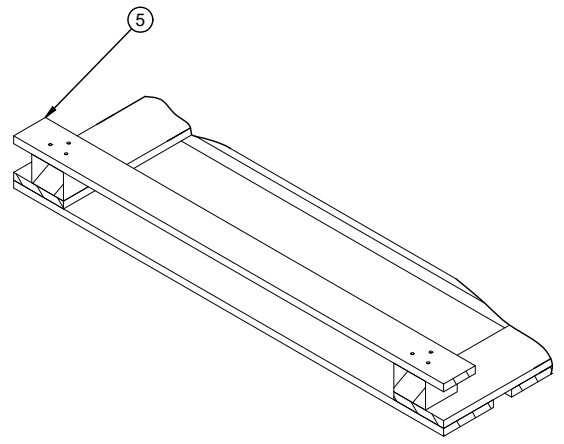


SEE SPECIAL NOTE 4 ON PAGE 10

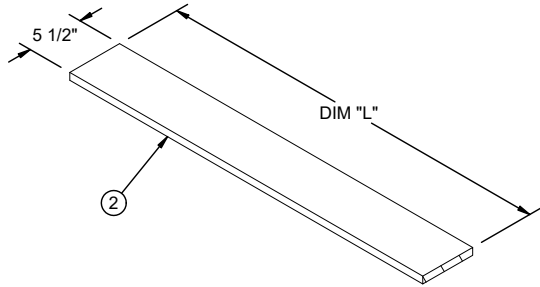


**TYPE II SKID BASE**

SEE SPECIAL NOTES ON PAGE 10, KEY NUMBERS BELOW AND MATERIAL SPECIFICATIONS ON PAGE 5. ALSO SEE GENERAL NOTE "B" ON PAGE 3 FOR RESTRICTED USE.

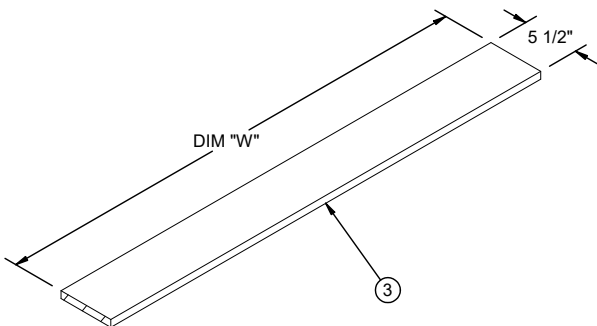


**PARTIAL BOTTOM VIEW**



**STRINGER**

(2 REQD) 1" X 6" MATERIAL



**TOP DECK BOARD**

(2 REQD) 1" X 6" MATERIAL

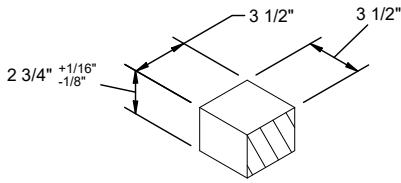
**KEY NUMBERS**

- ① POST, 4" WIDE X 2-3/4" HIGH X 3-1/2" LONG (6 REQD). SEE "POST" DETAIL 7 AND SPECIAL NOTE 2 ON PAGE 10.
- ② STRINGER, 1" X 6" MATERIAL BY DIM "L" (2 REQD). POSITION AS SHOWN. SEE "STRINGER" DETAIL AT LEFT, SPECIAL NOT 1.B ON PAGE 10, AND MATERIAL SPECIFICATIONS ON PAGE 5.
- ③ TOP DECK BOARD, 1" X 6" BY "DIM W" (2 REQD). POSITION AS SHOWN AND NAIL THRU STRINGER PIECE INTO POST W/3 NAILS (TYPE I – STYLE 16, F1667 NLPLD-08 OR -10), 3" TO 3-1/4" LONG X .135 DIAMETER AT EACH END WITH A STAGGERED NAILING PATTERN. SEE "TOP DECK BOARD" AT LEFT AND SPECIAL NOTE 1.A ON PAGE 10.
- ④ TOP DECK BOARD, 1" MATERIAL BY VARIABLE WIDTH BY "DIM W" (AS REQD). MAY BE 1" X 4" OR 1" X 6" MATERIAL POSITION AS SHOWN AND NAIL TO STRINGER PIECE W/2 NAILS FOR 4" MATERIAL AND 3 NAILS FOR 6" MATERIAL, (TYPE I – STYLE 16, F1667 NLPLD-01 OR -08 OR -10), 1-1/2" LONG X .120" DIAMETER NAILS AT EACH END. **NOTE:** USE 3" TO 3-1/4" LONG X .135" DIAMETER NAILS ON CENTER BOARD TO PENETRATE THE CENTER POSTS. SEE "TOP DECK BOARD" DETAIL AND SPECIAL NOTES 1.A, 4, AND 5 ON PAGE 10.
- ⑤ RUNNER, 1" X 4" BY DIM "W" (3 REQD). POSITION AS SHOWN AND NAIL TO POST W/3 NAILS (TYPE I – STYLE 16, F1667 NLPLD-04), 2-1/4" LONG X .120" DIAMETER AT EACH JOINT. SEE NAILING PATTERN IN "PARTIAL BOTTOM VIEW" ABOVE, RUNNER DETAIL AND SPECIAL NOT 1.A ON PAGE 10.

**TYPE II SKID BASE CONSTRUCTION PROCEDURES**

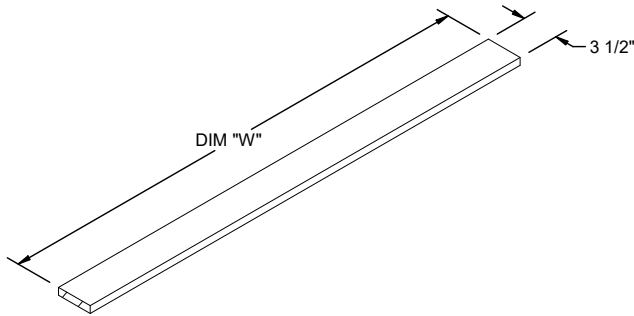
**SPECIAL NOTES**

1. FOR WOODEN BOXES, DIMENSIONS "W" AND "L" WILL BE DETERMINED AS FOLLOWS (**NOTICE**: FOR SPECIAL DIMENSIONAL AND OTHER GUIDANCE APPLICABLE TO WIREBOUND BOXES, SEE SPECIAL NOTE 6 BELOW):
  - A. DIMENSION "W" (WIDTH OF THE SKID BASE) WILL BE THE DISTANCE MEASURED OUTSIDE TO OUTSIDE OF THE TWO OUTSIDE CLEATS ON THE TOP OF THE BOX PLUS  $2-1/2 \pm 1/8$ ". WHEN UNITIZING BOXES WITHOUT TOP CLEATS, DIMENSION "W" WILL BE 1/5 LESS THAN THE LONG DIMENSION (BOX LENGTH) OF THE BOX; E.G., IF THE BOX LENGTH IS 45" THEN  $45 \times 1/5 = 9$ "; THEREFORE, DIMENSION "W" =  $45 - 9 = 36$ ".
  - B. DIMENSION "L" (LENGTH OF THE SKID BASE) WILL BE THE NARROW DIMENSION (BOX WIDTH) OF THE BOX TIMES THE NUMBER OF BOXES IN THE FIRST LAYER OF THE SKIDDED UNIT MINUS 1" MAXIMUM.
2. ALL ASSEMBLED SKIDDED BASES WILL BE PRESERVATIVE TREATED IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN GENERAL NOTE "X" ON PAGE 4. THE SKIDDED BASE MUST BE ASSEMBLED PRIOR TO TREATMENT. MARKING IN ACCORDANCE WITH DEVCOM DRAWING 13064136 PARAGRAPH 3.3.6 WILL BE APPLIED ON THE OUTSIDE SURFACE OF ONE OF THE CENTER POSTS IN LETTERS AT LEAST 1".
3. SKID BASES THAT ARE PROCURED FROM A MANUFACTURER WILL HAVE THE UNDER SIDE OF THE DECK STENCILED IN 1/2" MINIMUM LETTERS AS FOLLOWS:
  - A. MANUFACTURER'S NAME
  - B. MANUFACTURER'S ADDRESS
  - C. DATE (MONTH AND YEAR) OF MANUFACTURE
  - D. MANUFACTURER'S LOT NUMBER
4. THE QUANTITY OF SKID CROSS TIE PIECES AS WELL AS THE WIDTH OF THE PIECES MAY VARY DEPENDING UPON DIMENSION "L" OF THE SKID BASE. HOWEVER, THE SPACING BETWEEN TOP DECK BOARDS WILL BE A MINIMUM 1" – MAXIMUM 3".
5. FOR SECURING TOP DECK BOARDS TO STRINGERS, IT IS PERMISSIBLE TO USE NAIL (TYPE I-STYLE 3A, F1667 NLBXA-04), 1-3/4" LONG, .080" DIAMETER (14 GAGE) AND/OR STAPLE, GALVANIZED, 1-5/8" LONG BY 3/4" CROWN, 14 GAGE, CLINCHED (UTILIZING 30° – 50° STICHES) AS ALTERNATIVES TO THE NAIL SPECIFIED ON PAGE 9.
6. UNLESS OTHERWISE SPECIFIED IN THE APPLICABLE APPENDIX, ONLY TYPE II SKID BASES WILL BE UTILIZED FOR UNITIZING WIREBOUND BOXES. DIMENSION "W" FOR A TYPE II SKID BASE TO BE LOADED WITH WIREBOUND BOXES WILL BE THE LONG DIMENSION (BOX LENGTH) OF THE WIREBOUND BOX MINUS 1" MAXIMUM. THIS WILL PROVIDE A SKID BASE OF A SLIGHTLY LESSER WIDTH DIMENSION THAN THE WIREBOUND BOX LENGTH. WHEN STRAPPING A TYPE II SKID BASE LOADED WITH WIREBOUND BOXES AND FOUR TIEDOWN STRAPS ARE REQUIRED, A TIEDOWN STRAP WILL BE PLACED ADJACENT TO THE INBOARD SIDE OF EACH POST AND A TIEDOWN STRAP WILL BE PLACED ADJACENT TO THE OUTBOARD SIDE OF EACH POST. WHEN STRAPPING A TYPE II SKID BASE LOADED WITH WIREBOUND BOXES AND ONLY TWO TIEDOWN STRAPS ARE REQUIRED, A TIEDOWN STRAP WILL BE PLACED ADJACENT TO THE OUTBOARD SIDE OF EACH POST.



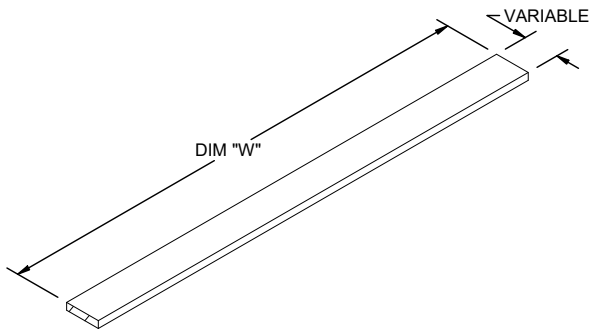
**POST**

(6 REQD)



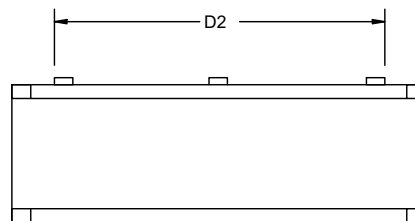
**RUNNER**

(3 REQD) 1" X 4" MATERIAL



**TOP DECK BOARD**

(AS REQD) 1" THICK MATERIAL



**CLEATED BOX**

D2 = DISTANCE FROM OUTSIDE TO OUTSIDE OF TWO OUTSIDE TOP CLEATS.

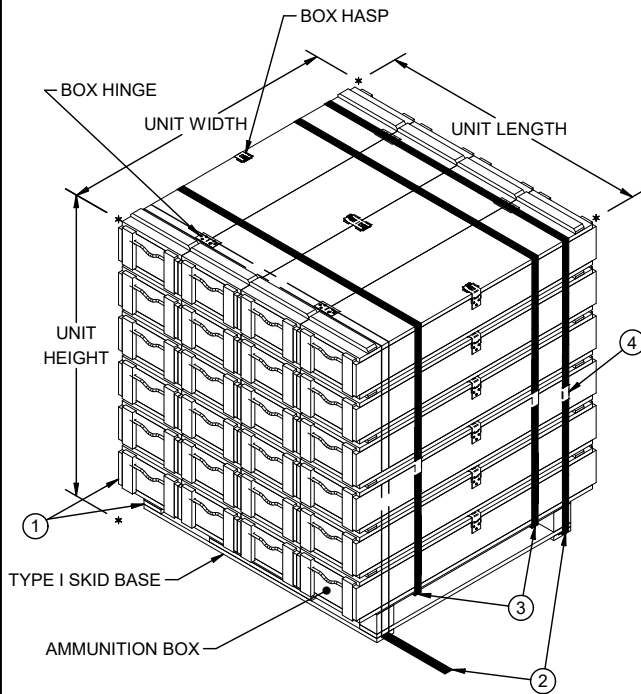
**DETAILS (TYPE II SKID BASE)**

## UNITIZATION NOTES

- ① POSITION BOXES (LENGTH CENTERED) ON SKID BASE AS SHOWN. IF BOXES ARE OF THE HINGED-TOP TYPE THE OUTSIDE BOXES IN THE TOP LAYER WILL BE POSITIONED SO THAT THE HINGES WILL BE INWARD. SEE GENERAL NOTE "G" ON PAGE 3.
- ② TIEDOWN STRAP (SKID), 1-1/4" OR 3/4" X .035" OR .031" OR .029" BY LENGTH TO SUIT STEEL STRAPPING (2 REQD). THREAD THROUGH THE STRAP SLOT IN THE RUNNER OF THE TYPE I SKID BASE, OR UNDER THE TOP DECK BOARD (NEAR THE POST) OF A TYPE II SKID BASE, AS SHOWN. SEE GENERAL NOTES "K", "L", AND "M.2" ON PAGE 3 AND "U" ON PAGE 4.
- ③ TIEDOWN STRAP, 1-1/4" OR 3/4" X .035" OR .031" OR .029" BY LENGTH TO SUIT STEEL STRAPPING (2 REQD). INSTALL EACH STRAP TO PASS UNDER THE DECK BOARD OF THE SKID BASE AND TO BE LOCATED NOT LESS THAN 2" NOR MORE THAN 6" FROM THE ADJACENT TIEDOWN (SKID) STRAP. SEE GENERAL NOTES "K", "L", AND "M.1" ON PAGE 3 AND "U" ON PAGE 4.
- ④ SEAL FOR STRAPPING (4 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIRS OF NOTCHES. USE APPROPRIATE SIZE SEAL FOR SIZE OF STRAP BEING USED. SEE GENERAL NOTE "K" ON PAGE 3.

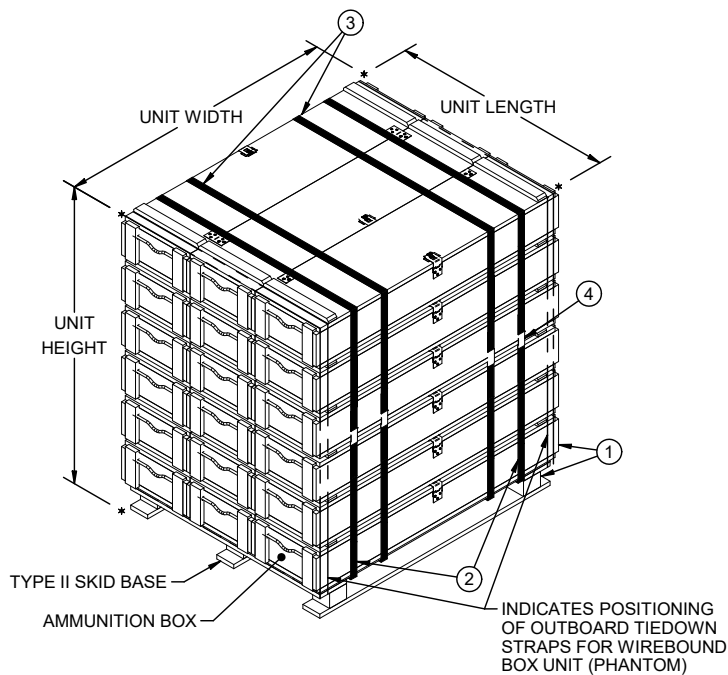
## PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS

1. THE FOLLOWING PROVISIONS SET FORTH THE SPECIFICATIONS THAT MUST BE FOLLOWED IF A FILLER-TYPE ASSEMBLY IS USED TO ACHIEVE A FULL-LAYER SKIDDED UNIT. SEE DETAILS ON PAGE 12.
  - A. FILLER "A" IS DESIGNED FOR USE IN THE PLACE OF ONE OR MORE BOXES OF A UNIT WHEN THE BOXES ARE 8-1/4" OR LESS IN HEIGHT.
  - B. FILLER "B" IS DESIGNED FOR USE IN THE PLACE OF ONE OR MORE BOXES OF A UNIT WHEN THE BOXES ARE MORE THAN 8-1/4" HIGH.
  - C. FILLERS WILL BE POSITIONED IN THE CENTER OF THE TOP LAYER OR LAYERS OF A UNIT LOAD AS SHOWN IN DETAILS ON PAGE 12.
  - D. WHEN A FILLER IS EXPANDED TO REPLACE SEVERAL OMITTED BOXES, INSTALL ONE STRUT (OR PAIR OF STRUTS FOR FILLER "B") FOR EACH EXTRA BOX OMITTED.
2. EMPTY BOXES, PREFERABLY "REJECTS", CAN BE USED AS FILLERS INSTEAD OF WOODEN DUNNAGE ASSEMBLIES SPECIFIED ON PAGE 12 TO ACHIEVE A FULL-LAYER SKIDDED UNIT. HOWEVER, EMPTY BOXES WILL BE USED ONLY IN THE TOP LAYER OF A SKIDDED UNIT AND POSITIONED AT EITHER OR BOTH ENDS OF A LAYER (NOT IN THE MIDDLE OF A LAYER). NO MORE THAN TWO EMPTY BOXES MAY BE USED IN A UNIT LOAD. WHEN EMPTY BOXES ARE USED TO FILL OUT A LAYER, THE EMPTY BOXES WILL BE PAINTED AND MARKED AS SPECIFIED IN DAC DRAWING ACV 00561 AND ARDEC DRAWING 12982865. SEE NOTE 5 BELOW.
3. IF EMPTY BOXES ARE USED AS FILLERS, WOOD REINFORCING BLOCKS OF 2" THICK MATERIAL BY LENGTHS REQUIRED, MAY BE POSITIONED INSIDE THE BOXES TO PREVENT THEM FROM CRUSHING OR COLLAPSING WHEN UNITIZING STRAPS ARE TENSIONED. TO HOLD THE BLOCKS IN PLACE, DRIVE 6d NAILS THROUGH THE BOX AND INTO THE ENDS OF THE REINFORCING BLOCKS. SEE THE "TYPICAL INSTALLATION OF REINFORCING BLOCKS IN EMPTY BOX" DETAIL ON PAGE 12.
4. LESS THAN FULL BOXES OF AMMUNITION (LIGHT BOXES) WILL BE PAINTED AND MARKED AS SPECIFIED IN ARDEC DRAWINGS 8796522 OR 12982865. LIGHT BOXES WILL ONLY BE PLACED IN THE TOP LAYER OF A UNIT AND LOCATED AT EITHER OR BOTH ENDS OF THE LAYER (NOT IN THE MIDDLE OF THE LAYER). NOT MORE THAN TWO LIGHT BOXES (ONE PER LOT) WILL BE PLACED IN A UNIT LOAD. SEE NOTE 5 BELOW.
5. TO SATISFY THE REQUIREMENTS FOR A FULL-LAYER UNIT, IT IS PERMISSIBLE TO LOCATE ONE EMPTY BOX AT ONE END AND ONE LIGHT BOX AT THE OTHER END OF THE TOP LAYER. HOWEVER, IF USE OF TWO EMPTY BOXES, OR TWO LIGHT BOXES, OR ONE EMPTY AND ONE LIGHT BOX DOES NOT PROVIDE FOR A FULL LAYER, ONE OR MORE FILLER ASSEMBLIES MUST BE USED IN THE MIDDLE OF THE LAYER TO INSURE COMPLIANCE WITH THE LIMITATIONS SPECIFIED IN NOTES 2 AND/OR 4 ABOVE.
6. EACH SKIDDED UNIT LOAD CONTAINING EMPTY AND/ OR LIGHT BOXES WILL HAVE A WEATHER RESISTANT PLACARD OR TAG PREPARED AND APPLIED TO THE UNIT LOAD, AS STATED IN DAC DRAWING ACV00561.



### UNIT ASSEMBLY ON TYPE I SKID BASE

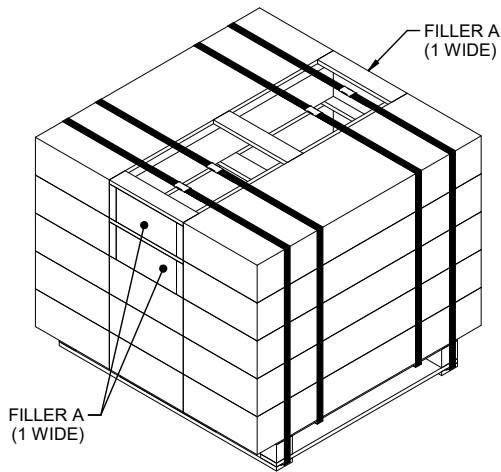
SEE GENERAL NOTE "F" ON PAGE 3 AND SPECIAL NOTE 10 ON PAGE 8.



### UNIT ASSEMBLY ON TYPE II SKID BASE

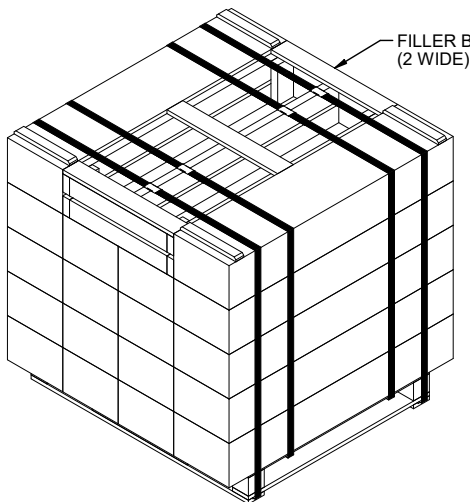
SEE GENERAL NOTE "F" ON PAGE 3 AND SPECIAL NOTE 6 ON PAGE 10.

## TYPICAL UNITIZATION PROCEDURES



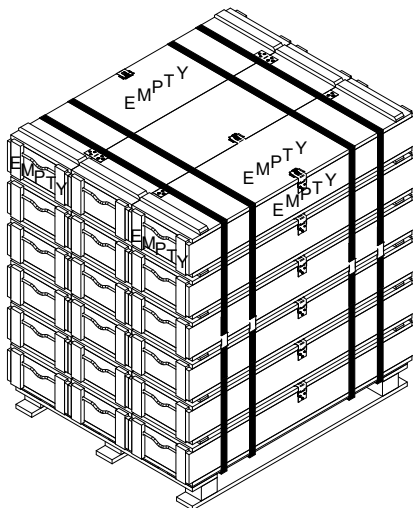
**APPLICATION OF FILLER A**

THIS VIEW SHOWS TWO "FILLER A" ASSEMBLIES POSITIONED WITHIN THE TOP TWO LAYERS OF A SKIDDED UNIT IN PLACE OF TWO OMITTED BOXES. SEE "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ON PAGE 11.



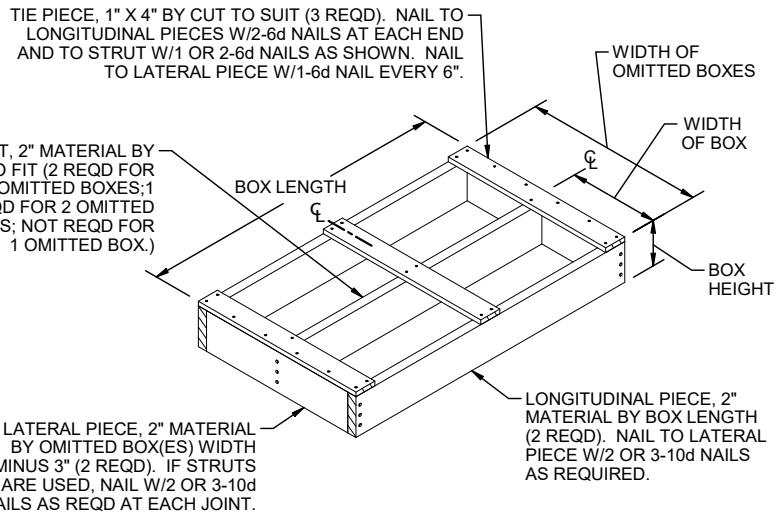
**APPLICATION OF FILLER B**

THIS VIEW SHOWS A "FILLER B" ASSEMBLY POSITIONED WITHIN THE SKIDDED UNIT IN PLACE OF TWO OMITTED BOXES. SEE "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ON PAGE 11.



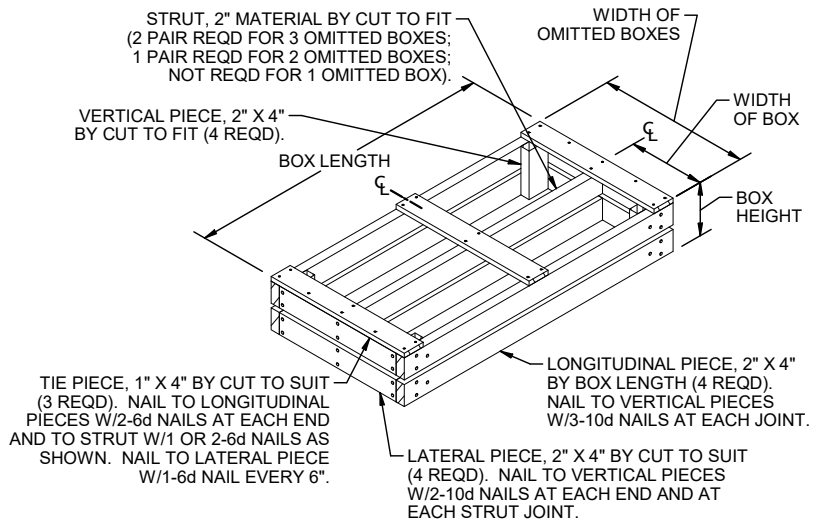
**USE OF EMPTY BOXES AS FILLERS**

SEE "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ON PAGE 11.



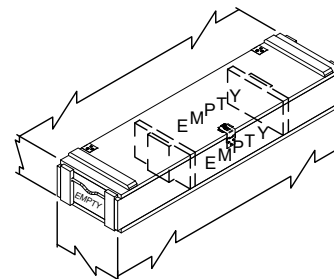
**FILLER A**

THIS FILLER IS DESIGNED FOR USE IN PLACE OF AN OMITTED BOX OR BOXES WHICH ARE 8-1/4" OR LESS IN HEIGHT. DETERMINE NAIL SIZES DEFINED ABOVE BY REFERRING TO COLUMN S (PENNY WEIGHT) IN THE TABLE FOR COMMON NAILS, TYPE I-STYLE 9, F1667 NLCMS.



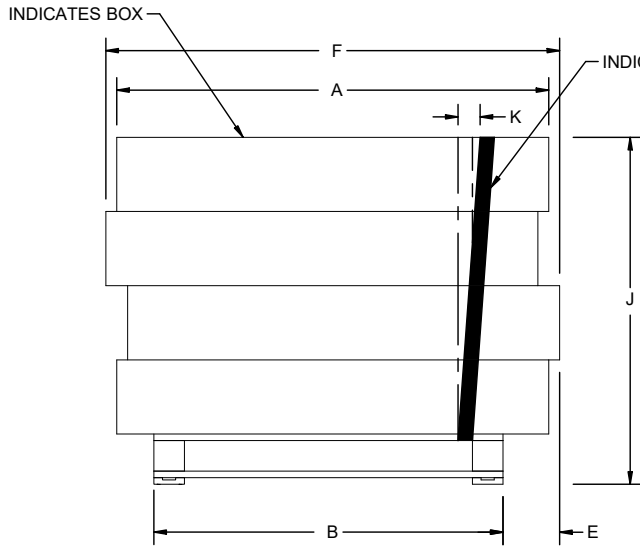
**FILLER B**

THIS FILLER IS DESIGNED FOR USE IN PLACE OF AN OMITTED BOX OR BOXES WHICH ARE MORE THAN 8-1/4" IN HEIGHT. DETERMINE NAIL SIZES DEFINED ABOVE BY REFERRING TO COLUMN S (PENNY WEIGHT) IN THE TABLE FOR COMMON NAILS, TYPE I-STYLE 9, F1667 NLCMS.

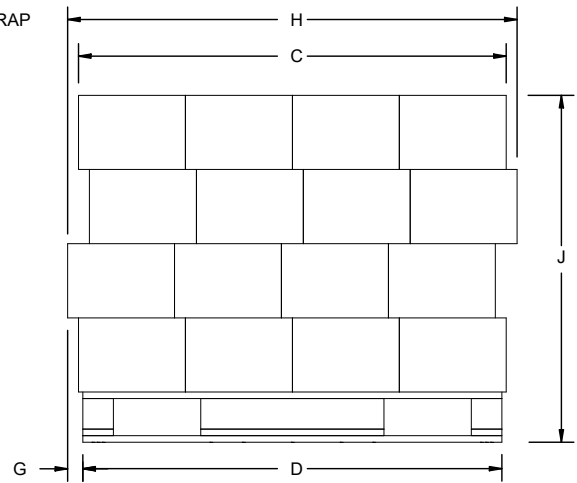


**TYPICAL INSTALLATION OF REINFORCING BLOCKS IN EMPTY BOX**

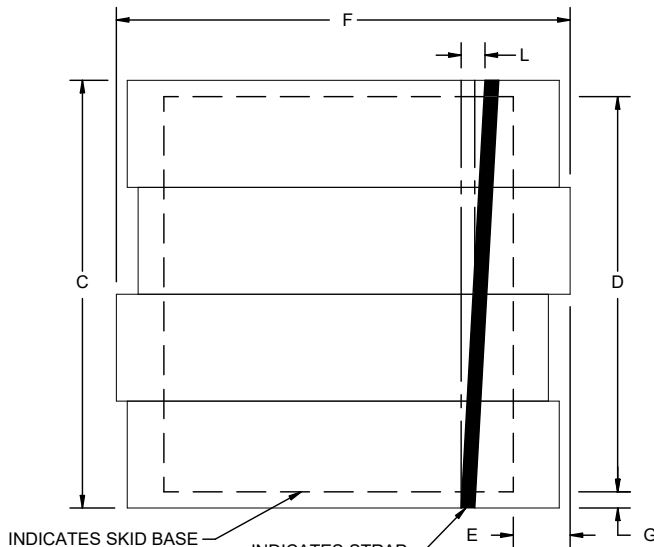
SEE "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ON PAGE 11.



**UNIT WIDTH VIEW**



**UNIT LENGTH VIEW**



**UNIT PLAN VIEW**

**SPECIAL NOTES:**

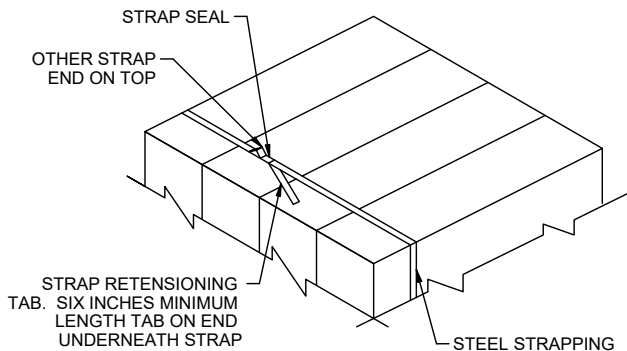
1. DIMENSIONS APPLICABLE TO ALLOWABLE TOLERANCES ARE EXPRESSED IN INCHES AND IDENTIFIED BY LETTERS AS FOLLOWS:

- A = UNIT WIDTH
- B = SKID BASE WIDTH
- C = UNIT LENGTH
- D = SKID BASE LENGTH
- E = (A-B)/2 WITH A PLUS OR MINUS 1/2" TOLERANCE FOR EACH LAYER AND FOR EACH STACK = LENGTHWISE OVERHANG
- F = "A" PLUS 1/2" MAXIMUM = ALLOWABLE UNIT LENGTH
- G = (C-D)/2 WITH A PLUS OR MINUS 1/2" TOLERANCE FOR EACH LAYER = WIDTHWISE OVERHANG
- H = "C" PLUS 1/2" MAXIMUM = ALLOWABLE UNIT WIDTH
- K = J/24 = MAXIMUM INCHES FROM TRUE ALIGNMENT (E.G., IF J = 48", K=48/24=2" MAX) = VERTICAL STRAP ALIGNMENT
- L = C/24 = MAXIMUM INCHES FROM TRUE ALIGNMENT (E.G., IF C = 36", L=36/24=1-1/2" MAX) = TRANSVERSE STRAP ALIGNMENT

2. BOX ALIGNMENT TOLERANCES APPLY TO EACH LAYER AND TO EACH STACK RELATIVE TO THE SKID BASE. SEE GENERAL NOTE "F" ON PAGE 3.

3. STRAPPING TOLERANCES APPLY TO ALL STRAPS AND TO ALL SURFACES WHICH EACH STRAP ENCOMPASSES; I.E., TOP, BOTTOM, AND BOTH SIDES.

**ALLOWABLE TOLERANCES FOR ASSEMBLING UNITS**



**STRAP RETENSING TAB**

SEE GENERAL NOTE "L" ON PAGE 3.

