

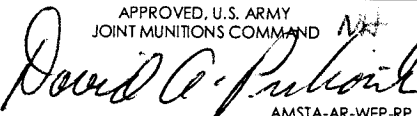

BASIC PROCEDURES

UNITIZATION PROCEDURES FOR COMMERCIAL AMMUNITION AND COMPONENTS PACKED IN FIBERBOARD BOXES IN WIREBOUND OR FIBERBOARD 4-WAY ENTRY PALLET BOXES

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U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND  AMSJA-AR-WEP-RP	CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 10.		
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  U.S. ARMY DEFENSE AMMUNITION CENTER	DO NOT SCALE	AUGUST 1984	
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GENERAL NOTES

(GENERAL NOTES CONTINUED)

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 749-1, 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 COMMERCIAL AMMUNITION INTO UNIT LOADS, ARE SET FORTH IN THIS DRAWING. THIS DRAWING WILL BE CONSIDERED THE BASIC DOCUMENT FOR THE UNITIZATION OF COMMERCIAL AMMUNITION ITEMS AND COMPONENTS PACKED IN FIBERBOARD BOXES. THIS DOCUMENT INCLUDES MATERIAL SPECIFICATIONS AND UNITIZING STANDARDS APPLICABLE TO UNITIZATION, PLUS INFORMATION RELATIVE TO TYPICAL POSITIONING OF BOXES WITHIN EITHER A WIREBOUND OR FIBERBOARD PALLET BOX AND INSTALLATION OF UNITIZING STEEL STRAPPING. FOR TYPICAL UNITIZATION PROCEDURES, SEE PAGES 5, 6, 7 AND 8. ADDITIONALLY, "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ARE SPECIFIED ON PAGE 9.
- C. THIS DOCUMENT DELINEATES TWO SEPARATE UNITIZATION METHODS FOR COMMERCIAL AMMUNITION ITEMS AND COMPONENTS; I.E., UNITIZATION METHODS UTILIZING EITHER WIREBOUND PALLET BOXES OR TRIPLE WALL FIBERBOARD BOXES. EITHER UNITIZATION METHOD IS APPROVED FOR USE, WITH THE PREFERRED METHOD BEING THAT WHICH RESULTS IN THE LEAST EXPENSE TO THE GOVERNMENT.

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MATERIAL SPECIFICATIONS

- PALLET - - - - - -: MIL SPEC MIL-P-15011; 4-WAY ENTRY, STYLE 1, 1A OR 1B, TYPE I, CLASS 1, PRESERVATIVE TREATED AND HEAT TREATED. SEE GENERAL NOTES "t" AND "w".
- BOX, WIREBOUND PALLET - - - - - -: ASTM D6254; PARTIAL 4-WAY ENTRY, TYPE I OR IV, CLASS 1 TREATMENT A.
- BOX, FIBERBOARD PALLET - - - - - -: ASTM D5168; TRIPLE WALL, CLASS WEATHER RESISTANT, STYLE E, REGULAR SLOTTED CONTAINER, AAA FLUTE. ALL BASES (PALLET) SHALL BE MILITARY SPECIFICATION MIL-P-15011 AS STATED ABOVE.
- LUMBER - - - - - -: TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20. PRESERVATIVE AND HEAT TREATMENT REQUIRED. SEE GENERAL NOTES "t" AND "w".
- 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 "x".
- STRAPPING, STEEL - -: ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH B (GRADE 2), SIZE 3/4" OR 1-1/4" X .035" OR .031". NOTE: BRITE OR SLIT EDGES SHALL HAVE FINISH A OVERLAY.
- SEAL, STRAP - - - -: ASTM D3953; CLASS H, FINISH B (GRADE 2), DOUBLE NOTCH TYPE, STYLE I, II, III, OR 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.
- PLYWOOD - - - - - -: A-A-55057; TYPE A, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- HARDBOARD - - - - - -: COMMERCIAL GRADE
- FILLER, HONEYCOMB VOID - - - - - -: FIBERBOARD, FACING PAPER WEIGHT 69 POUNDS/1,000 SQUARE FEET, CORE PAPER WEIGHT 33 POUNDS/1,000 SQUARE FEET, 1/2" CORE CELL CENTERS, INTERNATIONAL HONEYCOMB CORP. (OR EQUAL).
- FILLER, FIBERBOARD -: ASTM D4727; TYPE SF (SOLID FIBERBOARD), CLASS DOMESTIC, ALL GRADES.
- FILLER, TRIPLE WALL FIBERBOARD - - - - - -: ASTM D4727; TYPE CF (CORRUGATED FIBERBOARD), CLASS D/FR (DOMESTIC AND DOMESTIC/FIRE RETARDANT), VARIETY TW (TRIPLE WALL), ALL GRADES.

- D. GENERALLY, UNIT LOADS WILL BE CONSTRUCTED TO CONFORM TO THE STANDARDS LISTED BELOW.
 - 1. GROSS WEIGHT.
 - (A) WIREBOUND PALLET BOX UNIT LOADS ARE BASED UPON MAXIMUM GROSS WEIGHT OF 2,500 POUNDS.
 - (B) FIBERBOARD PALLET BOX UNIT LOADS ARE BASED UPON MAXIMUM GROSS WEIGHT OF 4,000 POUNDS
 - 2. ALLOWABLE DIMENSIONS.
 - (A) WIREBOUND PALLET BOX UNIT LOADS SHALL BE LIMITED TO A MAXIMUM INSIDE DEPTH (HEIGHT OF LOAD) OF 48". THE INSIDE LENGTH OR WIDTH SHALL NOT EXCEED 60"; THE SUM OF THE INSIDE LENGTH AND WIDTH DIMENSIONS SHALL NOT EXCEED 102". ADDITIONALLY, THE OUTSIDE LENGTH OR WIDTH SHALL NOT EXCEED 46".
 - (B) FIBERBOARD PALLET BOX UNIT LOADS SHALL NOT EXCEED 54" IN HEIGHT, INCLUDING PALLET HEIGHT. THE UNIT LOADS SHALL BE EITHER 40" IN LENGTH BY 48" IN WIDTH FOR STYLE 1 (40" X 48") PALLET, 35" IN LENGTH BY 45-1/2" IN WIDTH FOR STYLE 1A (35" X 45-1/2") PALLET, OR 42" IN LENGTH BY 53" IN WIDTH FOR STYLE 1B (42" X 53") PALLET.
 - 3. AMMUNITION BOXES SHALL BE ARRANGED WITHIN FIBERBOARD PALLET BOX UNIT LOADS TO MOST EFFECTIVELY UTILIZE THE INTERIOR CUBE. LONGITUDINAL OR LATERAL VOIDS GREATER THAN 1/4" MUST BE FILLED. VOID FILLERS CAN CONSIST OF HARDBOARD, PLYWOOD, SOLID CORE FIBERBOARD, TRIPLE WALL AAA FLUTED FIBERBOARD, HONEYCOMB VOID FILLER (SEE "MATERIAL SPECIFICATION" BELOW), OR WOODEN SPACER ASSEMBLIES. FOR ADDITIONAL GUIDANCE, SEE "TYPICAL FIBERBOARD BOX UNITIZATION PROCEDURES" ON PAGES 7 AND 8.
 - 4. SINCE WIREBOUND PALLET BOX UNIT LOADS ARE CONSTRUCTED TO FIT A SPECIFIC AMMUNITION BOX SIZE, THE UNIT LOADS SHOULD BE CONFIGURED TO MOST EFFECTIVELY AND EFFICIENTLY UTILIZE TRANSPORTATION AND MATERIAL HANDLING EQUIPMENT. SEE THE "TYPICAL WIREBOUND PALLET BOX UNITIZATION PROCEDURES" ON PAGES 5 AND 6.
 - 5. AN AMMUNITION BOX (COMMERCIAL EXTERIOR PACK) WILL NOT CONTAIN MORE THAN ONE LOT OF AMMUNITION WHEN THE QUANTITY OF BOXES COMPRISING A LOT IS GREAT ENOUGH TO CONSTRUCT MORE THAN ONE UNIT LOAD. NOTICE: MULTIPLE (MORE THAN TWO) LOTS ARE PERMITTED TO BE PALLETIZED TOGETHER AS A UNIT LOAD WHEN A SINGLE LOT QUANTITY IS INSUFFICIENT TO COMPLETE ONE UNIT LOAD. MULTIPLE LOTS ON A PALLET WILL BE OF THE SAME NATIONAL STOCK NUMBER (NSN) AND WILL BE UNITIZED IN ACCORDANCE WITH THE PROCEDURES SPECIFIED HEREIN. MULTIPLE-LOT UNIT LOADS WILL BE MARKED IN ACCORDANCE WITH DAC DRAWING ACV00561.
 - 6. LESS-THAN-FULL BOXES OF AN AMMUNITION ITEM (LIGHT BOXES) ARE LIMITED TO ONLY ONE LIGHT BOX PER ITEM LOT. A UNIT LOAD WILL NOT CONTAIN MORE THAN ONE LIGHT BOX PER ITEM LOT ON A PALLET. ADDITIONAL REQUIREMENTS ARE SPECIFIED IN THE "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ON PAGE 9.
 - 7. A UNIT LOAD, SUCH AS THE LAST UNIT LOAD FOR AN AMMUNITION LOT, CAN BE ASSEMBLED WITH LESS LAYERS THAN OTHER UNIT LOADS IN THE LOT. UNIT LOADS, INCLUDING PARTIAL UNIT LOADS, HOWEVER, WILL NOT BE ASSEMBLED WITH A PARTIAL LAYER; REINFORCED EMPTY BOXES, FILLER ASSEMBLIES, OR VOID FILLER WILL BE USED TO ACHIEVE FULL-LAYER UNIT LOADS. FOR SPECIFIC GUIDANCE SEE THE "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ON PAGE 9.
- E. ANY REQUEST FOR DEVIATION FROM THE STANDARDS DESCRIBED IN GENERAL NOTE "D" OR FROM THE PROCEDURES AND SPECIFICATIONS DELINEATED HEREIN MUST BE DIRECTED TO THE ARMY COMMANDER, U.S. ARMY TACOM-ARDEC, ATTN: AMSTA-AR-WEP-RP, ROCK ISLAND, IL 61299-7300 FOR SPECIFIC APPROVAL.
- F. CONFIGURATION MANAGEMENT PROCEDURES CONTAINED IN MIL-STD-973 DO NOT APPLY TO THE UNITIZATION PROCEDURES CONTAINED WITHIN THIS DRAWING.

(CONTINUED ON PAGE 3)

- G. UNIT LOADS MUST ONLY BE CONSTRUCTED WITH FULL LAYERS. FOR REDUCED QUANTITIES, HOWEVER, ONE OR MORE FULL LAYERS MAY BE OMITTED, AND/OR A FULL LAYER MAY CONSIST OF BOXED ITEMS AND A FILLER ASSEMBLY, A HONEYCOMB VOID FILLER, OR A REINFORCED EMPTY BOX (ES). SEE THE "PROVISIONS FOR LESS-THAN-FULL-LAYER UNIT LOADS" ON PAGE 9. ONLY ONE UNIT LOAD HAVING REDUCED QUANTITY OF ITEMS SHOULD BE PERMITTED PER LOT OF THAT ITEM.
- H. UNLESS OTHERWISE SPECIFIED, A PLUS-OR-MINUS 1/4" IS ALLOWED ON OVERALL DIMENSIONS OF ANY PIECE OF DUNNAGE OR DUNNAGE ASSEMBLY. HOWEVER, SIMILAR PIECES IN AN ASSEMBLY MUST BE WITHIN 1/8" OF THE SAME DIMENSION.
- J. DIMENSIONAL LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF A NOMINAL SIZE UNLESS OTHERWISE SPECIFIED, FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE. NOTE: IF THE 1" X 2", 2" X 2", OR 2" X 3" DUNNAGE LUMBER SPECIFIED IN THE APPENDICES IS NOT READILY AVAILABLE, TWO ACCEPTABLE SIZE DUNNAGE PIECES CAN BE MADE BY RIPPING (SAWING) A PIECE OF NOMINAL SIZE 1" X 4", 2" X 4", OR 2" X 6" LUMBER, RESPECTIVELY, ON THE CENTER LINE OF ITS WIDTH.
- 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 PALLET BOXES AND/OR THE PALLET DECK. AFTER TENSIONING, ALL STRAPS WILL BE SECURED USING ONE SEAL AND TWO PAIR OF NOTCHES PER SEAL. SEALS MAYBE LOCATED ON A SIDE OR ON THE TOP OF THE UNIT, AS REQUIRED BY OPERATIONAL NECESSITY. SEE THE "ALLOWABLE TOLERANCES FOR ASSEMBLING UNITS" DETAIL ON PAGE 10.
- L. 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. SEE "STRAP RETENSIONING TAB" VIEW ON PAGE 10.
- M. DETERMINATION OF LENGTH OF STRAPPING. THE FOLLOWING DEFINITIONS APPLY:

L=LENGTH OF STRAP REQUIRED IN INCHES.
 A=LENGTH OF UNIT IN INCHES.
 W=WIDTH OF UNIT IN INCHES.
 H=HEIGHT OF UNIT, INCLUDING PALLET, IN INCHES.

1. THE LENGTH OF A LOAD STRAP REQUIRED FOR A SPECIFIC UNIT, WHERE THE STRAP PASSES THROUGH THE STRAP SLOT OR ABOVE THE PALLET DECK, WILL BE DETERMINED USING THE FOLLOWING FORMULA: $L=2W + 2H + 2"$.
 2. THE LENGTH OF A HORIZONTAL STRAP REQUIRED FOR A SPECIFIC UNIT, WHERE THE STRAP ENCLOSES THE UNIT LOAD, WILL BE DETERMINED BY USING THE FOLLOWING FORMULA: $L=2A + 2W + 12"$.
 3. THE LENGTH OF A TIEDOWN STRAP REQUIRED FOR A SPECIFIC UNIT, WHERE THE STRAP PASSES UNDER THE PALLET DECK, WILL BE DETERMINED BY USING THE FOLLOWING FORMULA: $L=2A + 2W + 2"$.
- N. PALLET BOX UNIT LOADS SHALL BE INSPECTED FOR TORN, DETE-RIORATED, 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 4 (B) BELOW.
 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 STRAP.
 3. A DAMAGED OR DEFECTIVE SEAL IS SUFFICIENT CAUSE FOR RE-PLACEMENT OF THE SEAL.
 4. LOOSE STRAPS SHOULD BE CHECKED FOR DEGREE OF LOOSE-NESS BY POSITIONING THE HOOK OF A SCALE (COMMONLY KNOWN AS A FISH SCALE) BEHIND THE STRAPS NEAR THE MID-POINT AT THE TOP OF THE UNIT LOAD. PULL THE SCALE UNTIL A READING OF 20 POUNDS IS OBTAINED. THE DISTANCE BETWEEN THE TOP PALLET ADAPTER AND THE STRAP MUST NOT EXCEED 1-1/2". IF MEASUREMENT EXCEEDS 1-1/2", THE STRAP MUST BE TIGHTENED OR REPLACED. SEE PAGE 9 FOR GUIDANCE. TIGHT-ENING CAN BE ACCOMPLISHED BY EITHER OF TWO METHODS.

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- (A) A STRAP TENSIONING TOOL CAN BE USED IF THE STRAP HAS AT LEAST A 6" LONG TAB AT THE SEAL. SEE GENERAL NOTE "L" FOR GUIDANCE.
 - (B) AN 18" OR LONGER STRAP CAN BE USED AS A SPLICE PIECE. CUT THE LOOSE STRAP ON BOTH SIDES OF THE ORIGINAL SEAL AND DISCARD THE CUT OUT SECTION. OVERLAP ONE END OF THE ORIGINAL STRAPPING SO AS TO PROTRUDE SLIGHTLY BEYOND THE END OF THE SEAL TO BE USED. POSITION AND SECURE SEAL TO OVERLAPPED SECTION WITH TWO PAIR OF NOTCHES. USING A STRAP-PING TOOL, TENSION AND SEAL THE LENGTHENED STRAP. THE STRAP SPLICE PIECE MAY BE CUT FROM NEW STRAP OR USED STRAP, PROVIDED IT IS AT LEAST OF AS GOOD A QUALITY AS THE STRAP TO WHICH IT IS BEING SECURED. NOTE: ONLY ONE SPLICE PER STRAP IS ALLOWED ON UNIT LOADS OF AMMUNITION.
5. CAUTION: WHEN A STRAP IS REPLACED, SPLICED OR RETEN-SIONED, 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. LOAD, HORIZONTAL, AND TIEDOWN STRAP QUANTITIES FOR PAL-LET BOX UNIT LOADS OF AMMUNITION OR COMPONENTS WILL BE AS FOLLOWS:
1. WIREBOUND PALLET BOX UNIT LOADS SHALL BE STRAPPED IN ACCORDANCE WITH THE GUIDANCE CONTAINED IN FEDERAL SPECIFICATION PPP-B-587, WITH THE EXCEPTION OF THE TYPE OF STRAPPING TO BE USED. STRAPPING TO BE APPLIED TO WIREBOUND PALLET BOXES WILL BE 3/4" WIDE BY .035" OR .031" THICK OF A CLASS, TYPE, AND FINISH AS SPECIFIED IN THE "MA-TERIAL SPECIFICATIONS" ON PAGE 2. FOR ADDITIONAL GUID-ANCE SEE THE TYPICAL WIREBOUND PALLET BOX UNITIZATION PROCEDURES" ON PAGES 5 AND 6.
 2. FIBERBOARD PALLET BOX UNIT LOADS SHALL BE STRAPPED IN ACCORDANCE WITH THE FOLLOWING GUIDANCE:
 - (A) ALL STRAPS APPLIED TO THE UNIT LOADS SHALL BE OF THE SAME WIDTH, CLASS, TYPE, AND FINISH. STRAP THICKNESS CAN BE EITHER .035" OR .031" AND CAN BE MIXED ON A UNIT LOAD. SEE " MATERIAL SPECIFICA-TIONS" ON PAGE 2 FOR STRAPPING SPECIFICATIONS.
 - (B) HORIZONTAL STRAPS WILL NOT BE APPLIED TO ANY FI-BERBOARD PALLET BOX UNIT LOADS.
 - (C) ALL FIBERBOARD BOX UNIT LOADS SHALL HAVE TWO LOAD STRAPS APPLIED TO VERTICALLY ENIRCLE THE UNIT LOAD. THESE STRAPS MUST BE THREADED THROUGH THE TWO OUTERMOST PALLET STRAP SLOTS, REGARDLESS OF WHICH STYLE PALLET IS BEING USED. SEE THE "TYPICAL FIBERBOARD PALLET BOX UNITIZA-TION PROCEDURES" ON PAGES 7 AND 8.
 - (D) EITHER 3/4" WIDE OR 1-1/4" WIDE STRAPPING MAY BE USED FOR TIEDOWN STRAPPING ON FIBERBOARD PALLET BOX UNIT LOADS. THE QUANTITY OF TIEDOWN STRAPS TO BE APPLIED TO UNIT LOADS WILL BE BASED UPON ONE 3/4" TIEDOWN STRAP BEING CAPABLE OF RESTRAINING 700 POUNDS OF LADING AND ONE 1-1/4" TIEDOWN STRAP BE-ING CAPABLE OF RESTRAINING 1,100 POUNDS OF LADING. TO DETERMINE THE REQUIRED NUMBER OF TIEDOWN STRAPS FOR A SPECIFIC UNIT LOAD, DIVIDE THE GROSS WEIGHT OF THE UNIT LOAD BY 700 POUNDS OR 1,100 POUNDS, WHICHEVER IS APPLICABLE, AND ROUND OFF TO THE NEXT HIGHER WHOLE NUMBER; E.G., IF THE GROSS WEIGHT OF A UNIT LOAD IS 1,900 POUNDS, THEN THE RE-QUIRED NUMBER OF 3/4" STRAPS WOULD BE $(1,900/700 = 2.7)$ 3 STRAPS, OR THE REQUIRED NUMBER OF 1-1/4" STRAPS WOULD BE $(1,900/1,100 = 1.7)$ 2 STRAPS. CAUTION: RE-GARDLESS OF THE GROSS WEIGHT OF A UNIT LOAD, NO LESS THAN TWO TIEDOWN STRAPS WILL BE APPLIED TO ANY ONE UNIT LOAD. FOR ADDITIONAL GUIDANCE SEE THE "TYPICAL FIBERBOARD PALLET BOX UNITIZATION PROCEDURES" ON PAGES 7 AND 8.
 - (E) THE WIDTH OF STRAPPING TO BE USED BY THE INSTALLA-TION/ACTIVITY PERFORMING THE UNITIZING OPERATION WILL BE DETERMINED BY THE AVAILABILITY OF THE TWO STRAPPING WIDTHS, THE AVAILABILITY OF REQUIRED TENSIONING EQUIPMENT, AND THE ECONOMIC IMPACT USING ONE SIZE IN LIEU OF THE OTHER SIZE.

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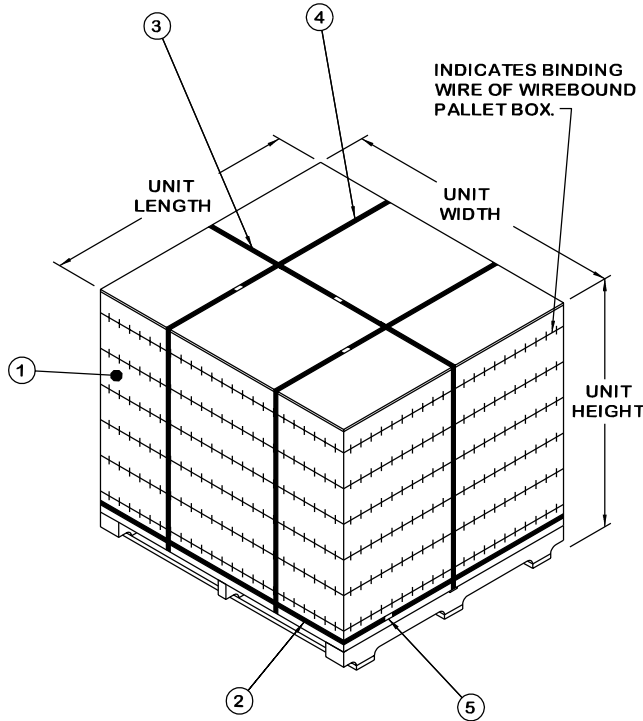
- P. COMMERCIALY PACKED AMMUNITION OR COMPONENTS UNITIZED PRIOR TO DISTRIBUTION OF THIS REVISION TO THIS DRAWING, NEED NOT BE REUNITIZED SOLELY TO CONFORM TO THE STANDARDS SPECIFIED HEREIN, UNLESS THE PREVIOUSLY UNITIZED LOADS PRESENT AN APPARENT HAZARDOUS CONDITION FOR HANDLING, SHIPMENT, OR STORAGE. STRAP ALIGNMENT, HOWEVER, MUST CONFORM WITH THE TOLERANCE STANDARDS SPECIFIED ON PAGE 10 OF THIS DRAWING, REGARDLESS OF UNITIZATION METHOD, BEFORE A UNIT LOAD IS ACCEPTABLE FOR STORAGE. ALSO, THE CONDITION OF THE UNITIZATION STRAPPING ON A LOAD MUST COMPLY WITH THE CRITERIA OF GENERAL NOTE "N" ON PAGE 3.
- Q. UNIT LOAD MARKING WILL BE ACCOMPLISHED IN ACCORDANCE WITH DAC DRAWING ACV00561, UNIT LOAD MARKING FOR SHIPMENT AND STORAGE, AMMUNITION AND EXPLOSIVES.
- R. OUTLOADING AND STORAGE OF PALLET UNITS OF COMPLETE ROUNDS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE APPLICABLE PROCEDURAL DRAWINGS AS IDENTIFIED IN THE APPENDICES FOR SPECIFIC UNITS.
- S. DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENT MAY BE CALCULATED ON THE BASIS THAT ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.
- T. ALL WOODEN DUNNAGE USED IN UNIT LOADS SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN MIL-B-2427 FOR CLEATED WOODEN BOXES. IF THE DUNNAGE CONSISTS OF MORE THAN ONE COMPONENT, IT MUST BE ASSEMBLED PRIOR TO TREATMENT. THE LETTERS PA DENOTING PQ56 (COPPER-8-QUINOLINOLATE), PB DENOTING M-GARD W550 (ZINC NAPHTHANATE EMULSIFIABLE) OR PC DENOTING M-GARD W510 OR CUNAPSOL 5 (COPPER NAPHTHANATE) MUST BE APPLIED TO THE WOOD DUNNAGE IN LETTERS AT LEAST ONE-INCH HIGH.
- U. A SPACER ASSEMBLY WILL BE DESIGNED SO THAT BOXES ON EACH SIDE OF A VOID WITHIN A PALLET BOX WILL BE BRACED AS STRONGLY AS IF THE BOXES THAT ARE LOADED INTO THE PALLET BOX OCCUPIED THE VOID. ALSO, A SPACER ASSEMBLY WILL BE DESIGNED IN A MANNER THAT WILL PREVENT DAMAGE TO ADJACENT BOXES. FOR ADDITIONAL GUIDANCE SEE THE "TYPICAL FIBERBOARD PALLET BOX UNITIZATION PROCEDURES" ON PAGES 7 AND 8.
- V. FILLER ASSEMBLIES WILL BE DESIGNED SO AS TO PROVIDE LATERAL AND LONGITUDINAL BRACING WITHIN THE PALLET BOX EQUIVALENT TO OR GREATER THAN THE STRENGTH OF THE BOX(ES) BEING OMITTED FROM A LAYER. FOR EXAMPLES OF TYPICAL FILLER ASSEMBLIES, SEE PAGES 5 AND 7.
- W. 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 TO BUILD FILLER ASSEMBLIES AND DUNNAGE ASSEMBLIES FOR THE PALLETIZED LOAD SHALL BE AFFILIATED WITH AN INSPECTION AGENCY ACCREDITED BY THE U.S. DEPARTMENT OF AGRICULTURE. 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 NONMANUFACTURED WOOD SHALL BE HEAT TREATED AND MARKED APPROPRIATELY. THE QUALITY MARK FOR THE PALLET SHALL BE PLACED ON TWO OPPOSITE END POST 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.
- X. COOLER NAILS MAY BE SUBSTITUTED FOR THE COMMON NAILS WITHIN EACH APPENDIX BY APPLYING THE FOLLOWING GUIDANCE. THE NUMBER OF COOLER NAILS TO BE USED WILL BE THE NUMBER OF COMMON NAILS MULTIPLIED BY 1.2 ROUNDED UP TO THE NEXT WHOLE NUMBER, THE SIZE OF 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.

REVISION NO. 1, DATED SEPTEMBER 2003, CONSISTS OF:

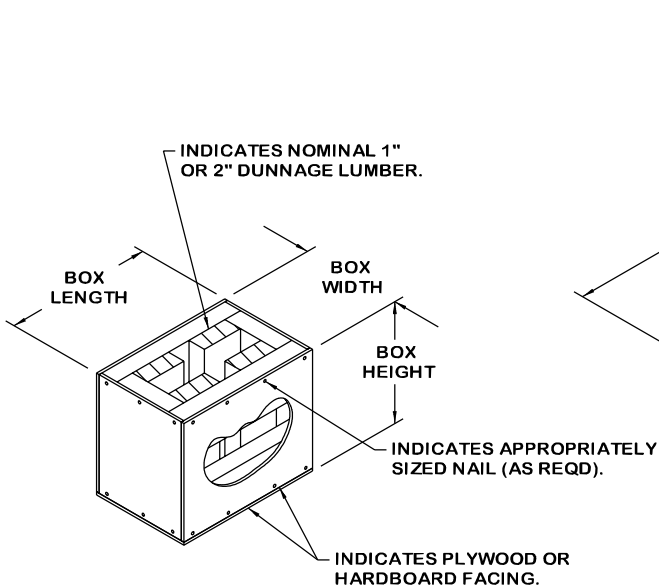
1. UPDATING GENERAL NOTES AND MATERIAL SPECIFICATIONS.
2. UPDATING DRAWING FORMAT.

UNITIZATION NOTES

- ① WIREBOUND PALLET BOX TO BE DESIGNED FOR THE MOST EFFECTIVE ECONOMICAL MEANS OF UNITIZING A SPECIFIED QUANTITY OF BOXES. SEE GENERAL NOTE "D" ON PAGE 2.
- ② HORIZONTAL STRAP, 3/4" X .035" OR .031" BY LENGTH-TO-SUIT STEEL STRAPPING (1 REQD). INSTALL TO ENCIRCLE PALLET BOX AS SHOWN. SEE GENERAL NOTES "K", "L", "M", AND "N" ON PAGE 3.
- ③ LOAD STRAP, 3/4" X .035" OR .031" BY LENGTH-TO-SUIT STEEL STRAPPING (1 REQD). LOAD STRAP MUST BE THREADED THROUGH THE PALLET STRAP SLOT. SEE GENERAL NOTES "K", "L", "M", AND "N" ON PAGE 3.
- ④ TIEDOWN STRAP, 3/4" X .035" OR .031" BY LENGTH-TO-SUIT STEEL STRAPPING (2 REQD). INSTALL EACH STRAP TO PASS UNDER THE TOP DECK BOARDS OF THE PALLET AS SHOWN. SEE GENERAL NOTES "K", "L", "M", AND "N" ON PAGE 3.
- ⑤ SEAL FOR 3/4" STRAPPING (4 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 3.

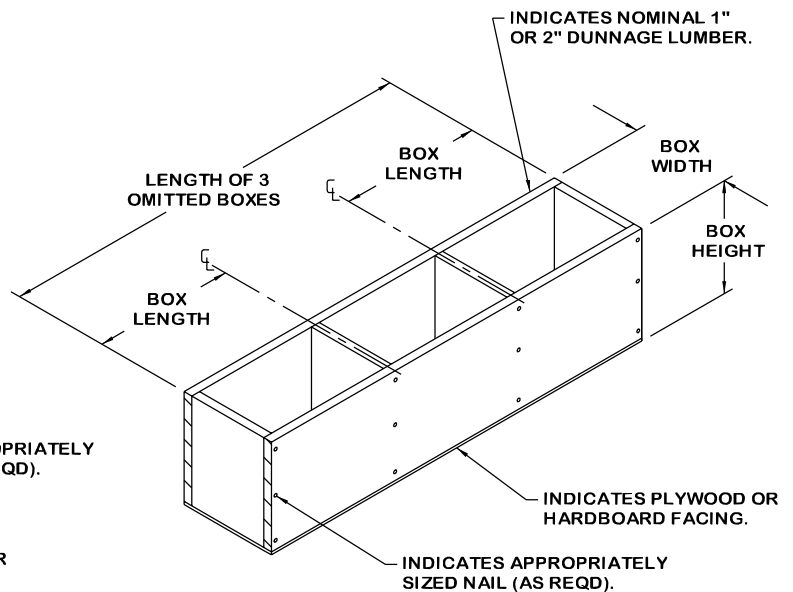


TYPICAL WIREBOUND PALLET BOX UNIT LOAD



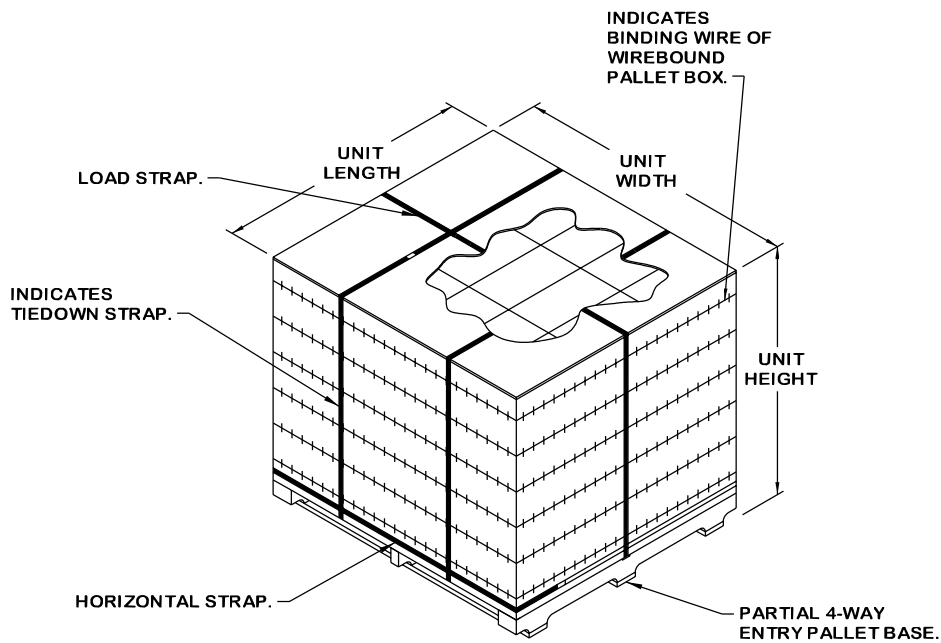
TYPICAL FILLER ASSEMBLY

THIS VIEW DEPICTS A TYPICAL FILLER ASSEMBLY TO BE USED WHEN ONE BOX IS OMITTED FROM A UNIT LOAD. SEE GENERAL NOTE "V" ON PAGE 3.



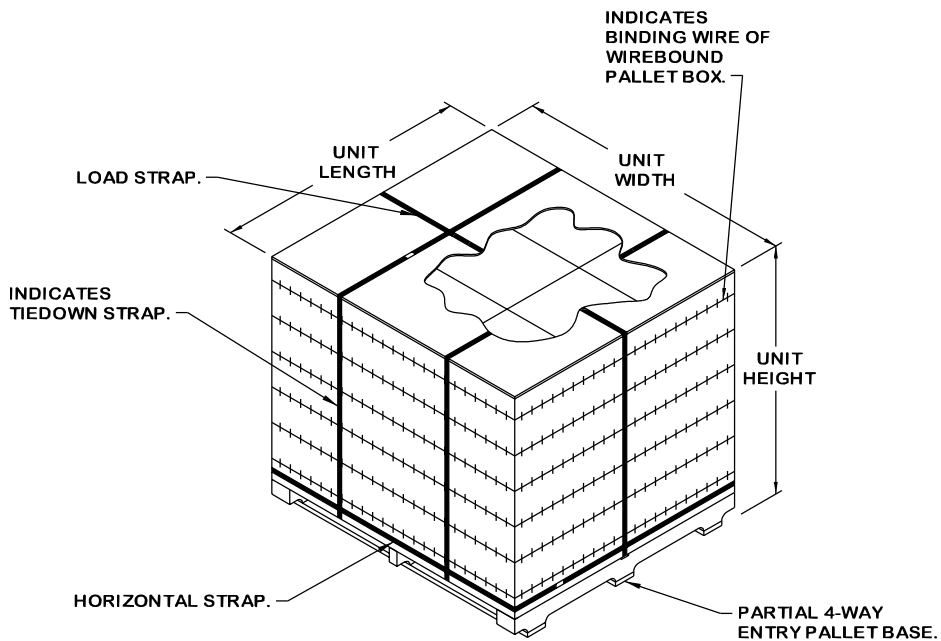
TYPICAL FILLER ASSEMBLY

THIS VIEW DEPICTS A TYPICAL FILLER ASSEMBLY TO BE USED WHEN THREE BOXES ARE OMITTED FROM A UNIT LOAD. SEE GENERAL NOTE "V" ON PAGE 3.



TYPICAL UNIT LOAD

THIS VIEW DEPICTS A TYPICAL UNIT LOAD FOR WHICH THE WIREBOUND PALLET BOX WAS CONSTRUCTED TO FIT A QUANTITY OF FIBERBOARD BOXES THAT ARE TO BE POSITIONED IN A 3-BOX LONG BY 6-BOX WIDE BY 6-BOX HIGH LOADING PATTERN WITHIN THE PALLET BOX.

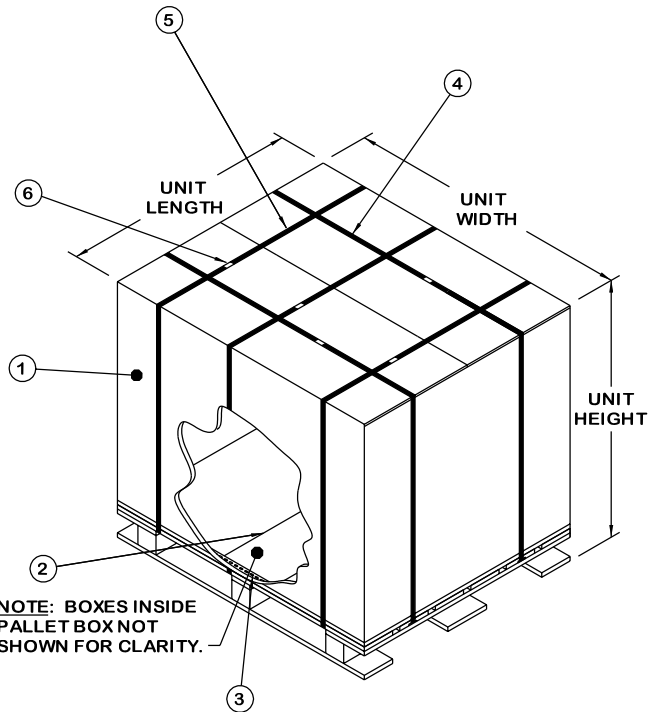


TYPICAL UNIT LOAD

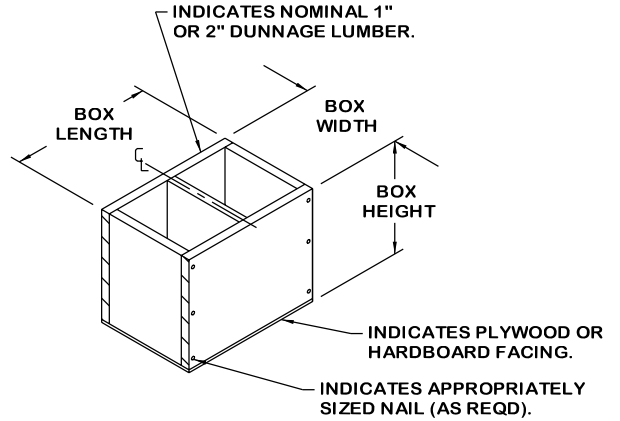
THIS VIEW DEPICTS A TYPICAL UNIT LOAD FOR WHICH THE WIREBOUND PALLET BOX WAS CONSTRUCTED TO FIT A QUANTITY OF FIBERBOARD BOXES THAT ARE TO BE POSITIONED IN A 3-BOX LONG BY 3-BOX WIDE BY 3-BOX HIGH LOADING PATTERN WITHIN THE PALLET BOX.

UNITIZATION NOTES

- ① SELECT ONE OF THREE SIZES OF FIBERBOARD PALLET BOXES THAT IS DEEMED THE MOST ECONOMICAL AND EFFECTIVE ONE FOR THE AMMUNITION ITEM TO BE UNITIZED. SEE GENERAL NOTE "D" ON PAGE 2.
- ② POSITION THE PALLET ON THE CORRESPONDING MIL-P-15011 PALLET. POSITION A PIECE OF TRIPLE WALL, AAA FLUTE FIBERBOARD, CUT-TO-FIT IN SIZE, IN THE BOTTOM OF THE BOX BETWEEN THE INSIDE END FLAPS.
- ③ FASTEN PALLET BOX TO PALLET W/3-8d NAILS DRIVEN THROUGH PERFORATED METAL STRAPPING (LENGTH - INSIDE PALLET BOX WIDTH MINUS 1") INTO THE PALLET DECK (2 REQD). NOTE: NAIL LOCATION WILL BE SUCH THAT A NAIL IS DRIVEN THROUGH THE PALLET DECK INTO A POST OF THE PALLET. IN LIEU OF THE SPECIFIED PERFORATED STRAPPING AND 8d NAILS, FOUR COMMERCIAL FIBERBOARD PALLET BOX FASTENERS CAN BE USED TO SECURE THE BOX TO THE PALLET.
- ④ LOAD STRAP, 3/4" OR 1-1/4" X .035" OR .031" BY LENGTH-TO-SUIT STEEL STRAPPING (2 REQD). LOAD STRAPS MUST BE THREADED THROUGH THE PALLET STRAP SLOT. SEE GENERAL NOTES "K", "L", "M", AND "N" ON PAGE 3.
- ⑤ TIEDOWN STRAP, 3/4" OR 1-1/4" X .035" OR .031" BY LENGTH-TO-SUIT STEEL STRAPPING (AS REQD). INSTALL EACH STRAP TO PASS UNDER THE TOP DECK BOARDS OF THE PALLET AS SHOWN. SEE GENERAL NOTES "K", "L", "M", AND "N" ON PAGE 3.
- ⑥ SEAL FOR 3/4" STRAPPING (AS REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 3.

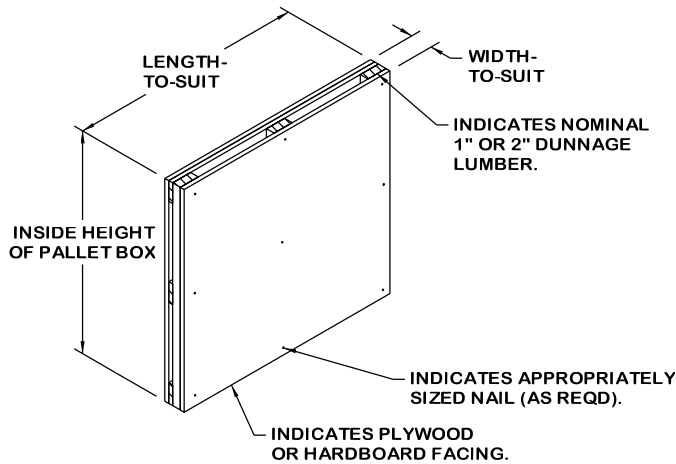


TYPICAL FIBERBOARD PALLET BOX UNIT LOAD



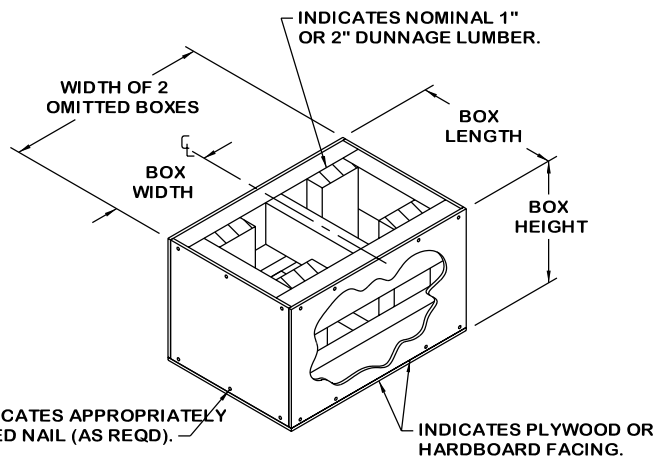
TYPICAL FILLER ASSEMBLY

THIS VIEW DEPICTS A TYPICAL FILLER ASSEMBLY TO BE USED WHEN ONE BOX IS OMITTED FROM A UNIT LOAD. SEE GENERAL NOTE "V" ON PAGE 3.



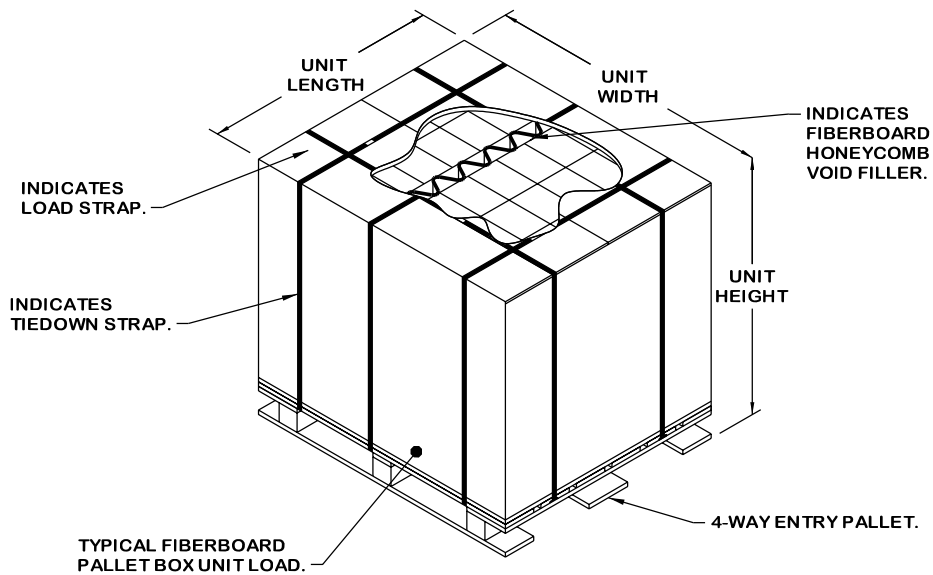
TYPICAL SPACER ASSEMBLY

THIS VIEW DEPICTS A TYPICAL WOODEN SPACER ASSEMBLY CONSTRUCTED TO FILL AN UNOCCUPIED VOID LOCATED WITHIN A PALLET BOX. SEE GENERAL NOTES "D.3" ON PAGE 2 AND "U" ON PAGE 4.



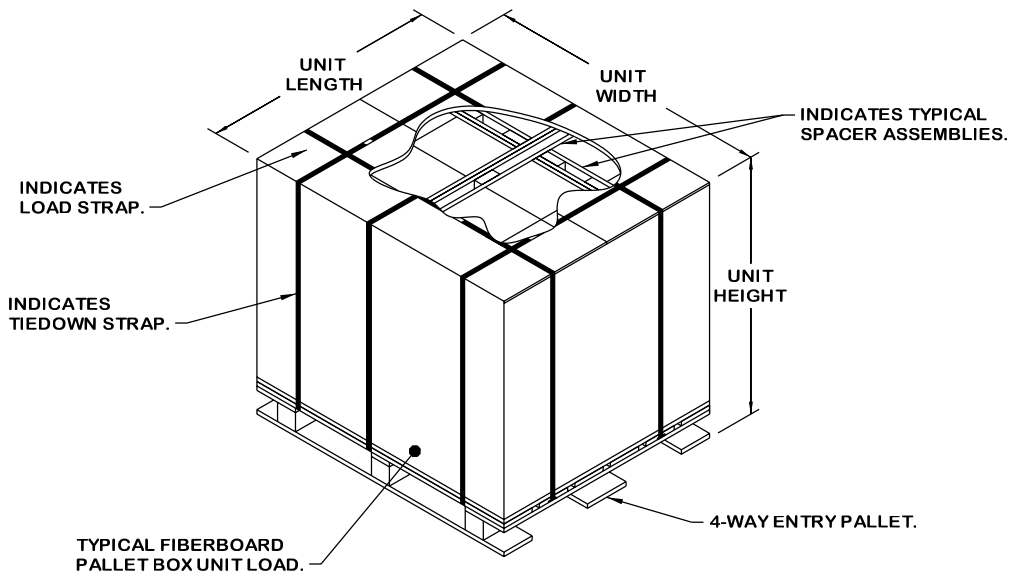
TYPICAL FILLER ASSEMBLY

THIS VIEW DEPICTS A TYPICAL FILLER ASSEMBLY TO BE USED WHEN TWO BOXES OMITTED FROM A UNIT LOAD. SEE GENERAL NOTE "V" ON PAGE 3.



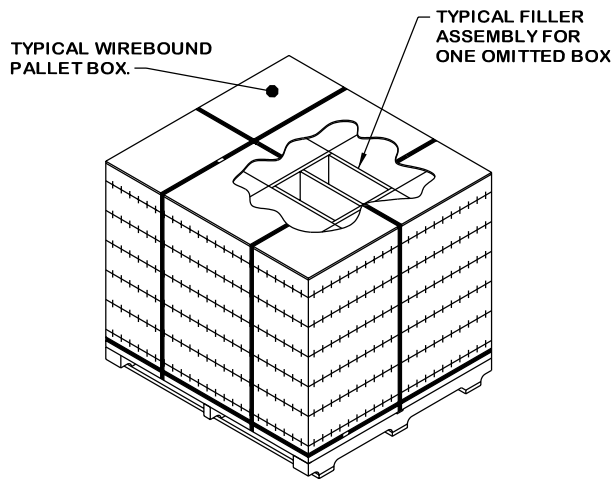
TYPICAL UNIT LOAD WITH ONE VOID FILLER

THIS VIEW DEPICTS THE APPLICATION OF FIBERBOARD HONEYCOMB VOID FILLER POSITIONED LENGTHWISE IN THE UNIT LOAD TO FILL THE UNOCCUPIED SPACE WITHIN THE PALLET BOX. SIMILARLY, TO FILL A WIDTHWISE VOID, HONEYCOMB VOID FILLER COULD BE POSITIONED WIDTHWISE WITHIN THE PALLET BOX. SEE GENERAL NOTES "D.3" ON PAGE 2 AND "U" ON PAGE 4.



TYPICAL UNIT LOAD

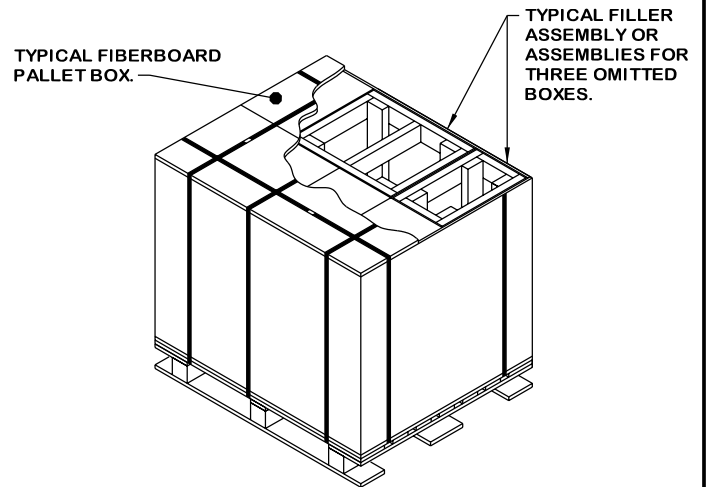
THIS VIEW DEPICTS A THE USE OF THREE SPACER ASSEMBLIES POSITIONED IN THE UNIT LOAD TO FILL THE UNOCCUPIED SPACE WITHIN THE PALLET BOX. SEE GENERAL NOTES "D.3" ON PAGE 2 AND "U" ON PAGE 4.



TYPICAL APPLICATION OF FILLER ASSEMBLY

PROVISIONS FOR LESS-THAN-FULL-LAYER LOADS

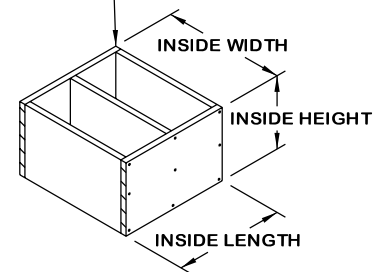
1. THE FOLLOWING PROVISIONS SET FORTH THE SPECIFICATIONS THAT MUST BE FOLLOWED IF A FILLER ASSEMBLY IS USED TO ACHIEVE A FULL-LAYER UNIT LOAD.
 - A. FILLERS ARE DESIGNED FOR USE IN THE PLACE OF ONE OR MORE BOXES OF A UNIT LOAD. SEE THE TYPICAL FILLER ASSEMBLY DETAILS ON PAGES 5 AND 7 AND GENERAL NOTE "V" ON PAGE 4.
 - B. FILLERS WILL BE POSITIONED IN THE TOP LAYER OR LAYERS OF THE UNIT LOAD. FILLERS MAY BE POSITIONED IN ANY STACK, INCLUDING CORNER STACKS, IN THE UNIT LOAD, DEPENDING UPON EASE OF FILLER INSTALLATION AND OPERATIONAL NECESSITY. SEE THE "TYPICAL APPLICATION OF FILLER ASSEMBLY" VIEWS ABOVE.
2. EMPTY BOXES, PREFERABLY "REJECTS", CAN BE USED AS FILLERS INSTEAD OF WOODEN DUNNAGE ASSEMBLIES INDICATED ABOVE, TO ACHIEVE A FULL-LAYER UNIT LOAD. THE EMPTY BOXES, HOWEVER, MUST HAVE A REINFORCING ASSEMBLY PLACED INSIDE EACH ONE TO PREVENT COLLAPSING OF THE BOXES WHEN FORCES ARE INCURRED DURING SHIPMENT OR STORAGE. SEE THE "TYPICAL REINFORCING ASSEMBLY FOR EMPTY BOX" DETAIL AT RIGHT.
3. WHEN EMPTY BOXES ARE USED TO ACHIEVE A FULL-LAYER UNIT LOAD, THEY WILL ONLY BE USED IN THE TOP LAYER AND WILL ONLY BE POSITIONED AT THE CORNERS OF THE LAYER (NOT IN THE MIDDLE OF THE LAYER) IN THE UNIT LOAD. NOT MORE THAN FOUR 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 IN ACCORDANCE WITH ARDEC DRAWING 12982865. SEE NOTE 5 BELOW.
4. LESS THAN FULL BOXES OF AMMUNITION (LIGHT BOXES) MAY BE USED TO ACHIEVE A FULL-LAYER UNIT LOAD; HOWEVER, THE LIGHT BOXES WILL BE PAINTED AND MARKED IN ACCORDANCE WITH ARDEC DRAWING 12982865. LIGHT BOXES WILL ONLY BE PLACED IN THE TOP LAYER AND LOCATED AT ANY OF THE FOUR CORNERS OF THE LAYER (NOT IN THE MIDDLE OF THE LAYER) IN THE UNIT LOAD. 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 USE A COMBINATION OF EMPTY AND LIGHT BOXES IN THE TOP LAYER. IF A TOTAL OF FOUR EMPTY AND LIGHT BOXES DOES NOT PROVIDE FOR A FULL LAYER, HOWEVER, ONE OR MORE FILLER ASSEMBLIES MUST BE USED IN THE MIDDLE OF THE LAYER TO INSURE COMPLIANCE WITH THE LIMITATIONS SPECIFIED IN NOTES 3 AND 4 ABOVE.
6. EACH UNIT LOAD CONTAINING EMPTY AND/OR LIGHT BOXES WILL HAVE A WEATHER RESISTANT PLACARD OR TAG PREPARED AND APPLIED TO THE UNIT LOAD SPECIFIED IN DAC DRAWING ACV00561. SEE THE "USE OF EMPTY/LIGHT BOXES TO ACHIEVE A FULL LAYER" DETAIL AT RIGHT.



TYPICAL APPLICATION OF FILLER ASSEMBLY

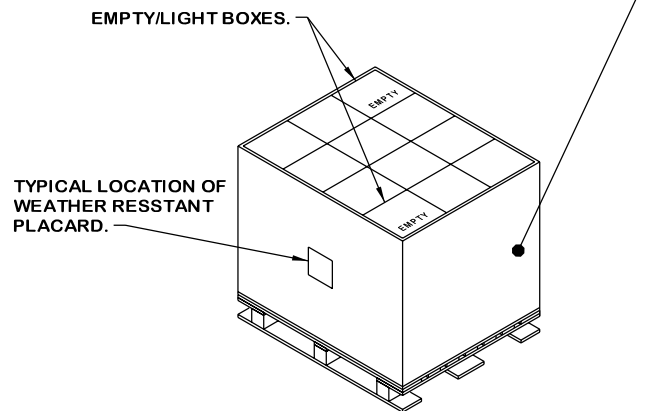
(THREE BOXES OMITTED)

NOTE: TYPICALLY, ASSEMBLY WILL BE CONSTRUCTED USING NOMINAL 1" THICK MATERIAL, NAILED TOGETHER W/6d NAILS, ASSEMBLY WILL BE SIZED THE SAME AS THE INSIDE DIMENSION OF THE BOX.



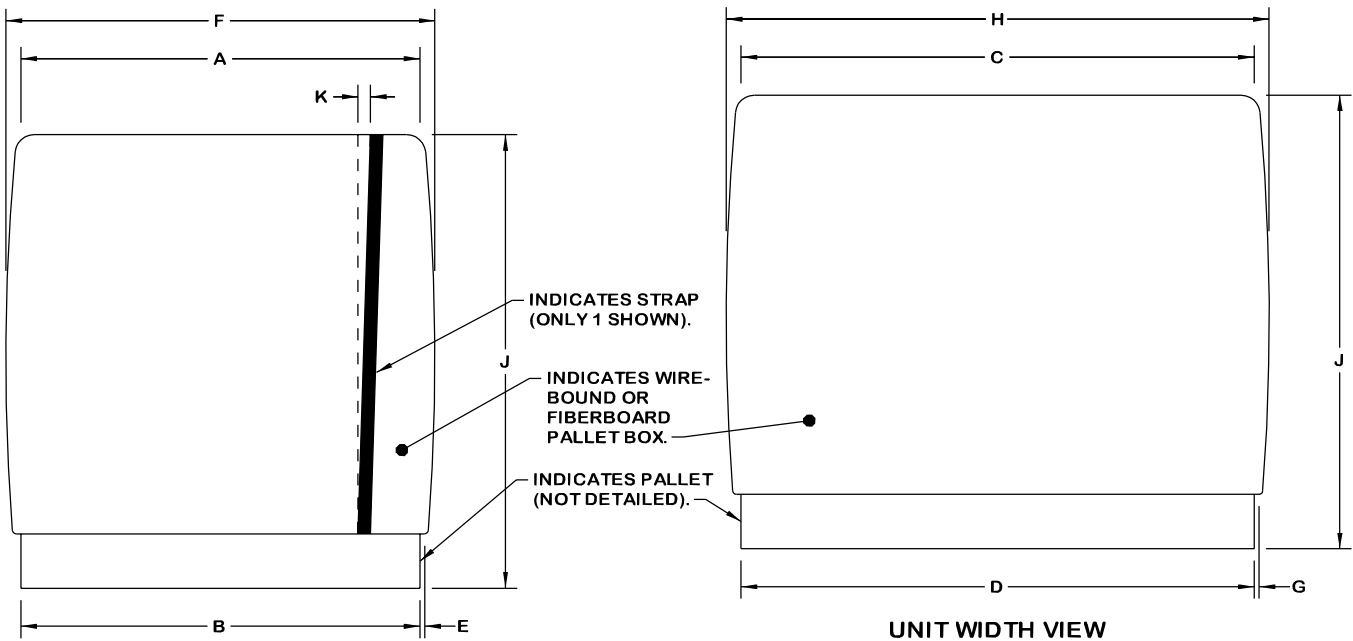
TYPICAL REINFORCING ASSEMBLY FOR EMPTY BOX

TYPICAL FIBERBOARD PALLET BOX UNIT LOAD. NOTE: PALLET BOX TOP AND UNITIZING STRAPS HAVE BEEN OMITTED FOR CLARITY PURPOSES.



USE OF EMPTY/LIGHT BOXES TO ACHIEVE A FULL LAYER

LESS-THAN-FULL-LAYER UNIT LOADS



UNIT LENGTH VIEW

UNIT WIDTH VIEW

SPECIAL NOTES:

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

A = UNIT LENGTH.

B = PALLET LENGTH.

C = UNIT WIDTH.

D = PALLET WIDTH.

E = LENGTHWISE OVERHANG = $(A - B)/2$; MAXIMUM ALLOWABLE LENGTHWISE OVERHANG IS 1/4". (DOES NOT APPLY TO THE BULGING OF THE PALLET BOX).

F = ALLOWABLE UNIT LENGTH = $A + 1"$ MAXIMUM.

G = WIDTHWISE OVERHANG = $(C - D)/2$; MAXIMUM ALLOWABLE WIDTHWISE OVERHANG IS 1/4". (DOES NOT APPLY TO THE BULGING OF THE PALLET BOX).

H = ALLOWABLE UNIT WIDTH = $C + 1"$ MAXIMUM.

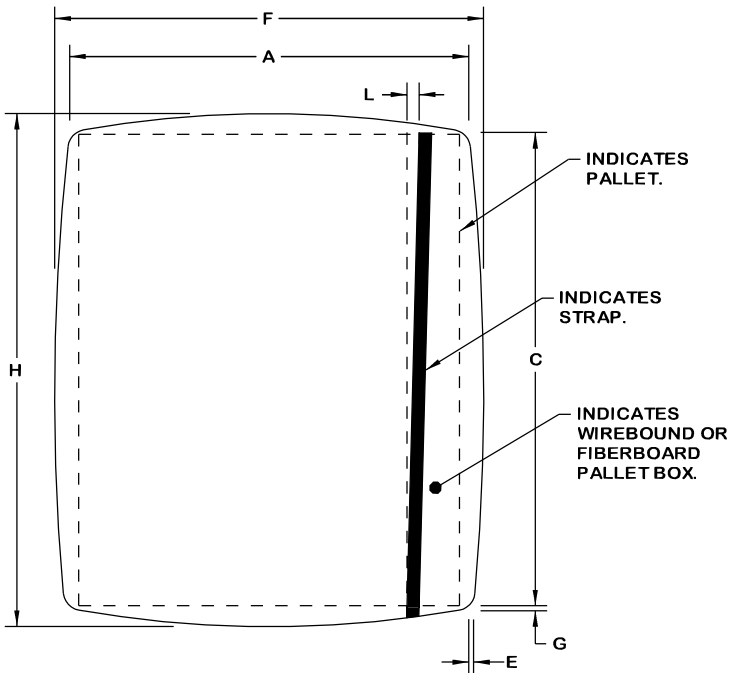
J = UNIT HEIGHT.

K = MAXIMUM ALLOWABLE VERTICAL STRAP VARIATION FROM THE TRUE ALIGNMENT = $J/40$; E.G., IF $J = 50"$, $K = 50"/40 = 1-1/4"$ MAXIMUM.

L = MAXIMUM ALLOWABLE TRAVERSE STRAP VARIATION FROM THE TRUE ALIGNMENT = $C/40$; E.G., IF $C = 55"$, $L = 55"/40 = 1-3/8"$ MAXIMUM.

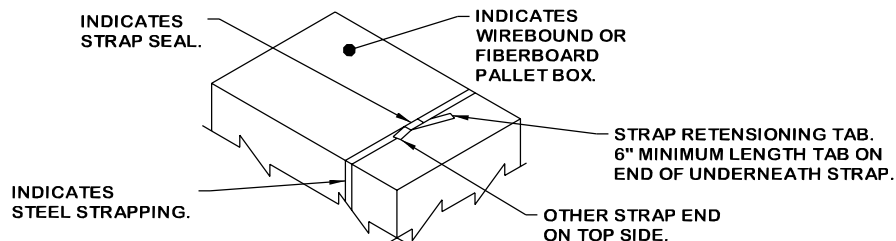
2. THE TOLERANCES SPECIFIED IN SPECIAL NOTE 1 APPLY TO EITHER WIREBOUND OR FIBERBOARD PALLET BOX UNIT LOADS WHEN UNIT LOADS ARE IN AN UNSTACKED CONDITION.

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



UNIT TOP VIEW

ALLOWABLE TOLERANCES FOR ASSEMBLING UNITS



STRAP TENSIONING TAB

SEE GENERAL NOTE "L" ON PAGE 3.