


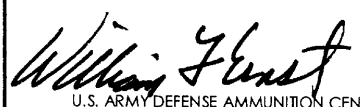
LOADING AND BRACING IN END OPENING ISO CONTAINERS OF MAU-91/B FIN ASSEMBLIES FOR M117 750-POUND BOMBS PACKED IN WIREBOUND PALLET BOXES

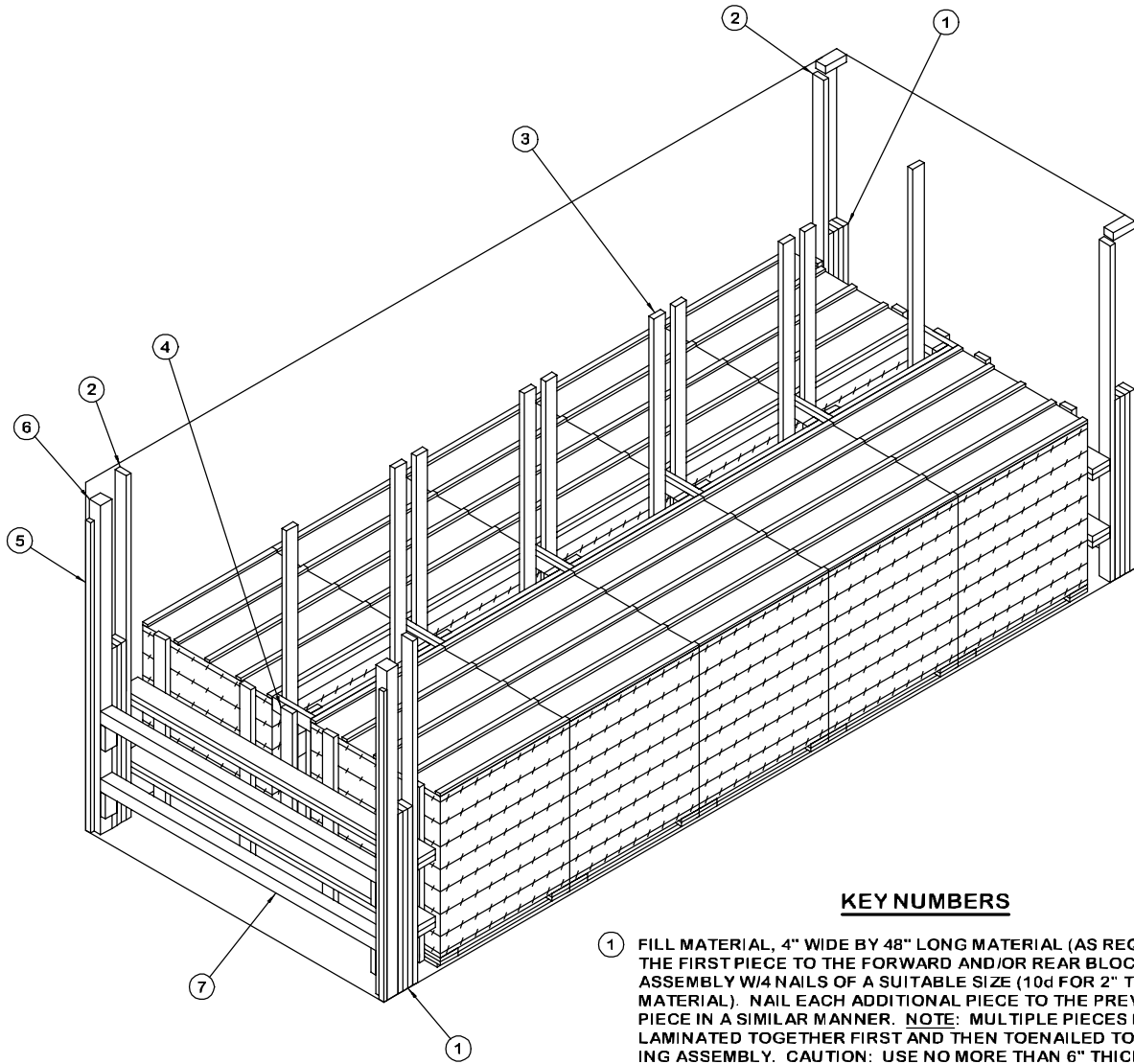
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- LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND 	ENGINEER TECHNICIAN DRAFTSMAN	BASIC REV. BASIC REV. BASIC REV.	MICHAEL SARDONE WILLIAM ERNST	DO NOT SCALE WEBSITE: HTTP://WWW.DAC.ARMY.MIL JUNE 1999			
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  U.S. ARMY DEFENSE AMMUNITION CENTER	TRANSPORTATION ENGINEERING DIVISION VALIDATION ENGINEERING DIVISION LOGISTICS ENGINEERING OFFICE	WILLIAM ERNST WILLIAM ERNST WILLIAM ERNST	TESTED WILLIAM ERNST	CLASS 19	DIVISION 48	DRAWING 4318	FILE 15PA1010



ISOMETRIC VIEW

KEY NUMBERS

- ① FILL MATERIAL, 4" WIDE BY 48" LONG MATERIAL (AS REQD). NAIL THE FIRST PIECE TO THE FORWARD AND/OR REAR BLOCKING ASSEMBLY W/4 NAILS OF A SUITABLE SIZE (10d FOR 2" THICK MATERIAL). NAIL EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR MANNER. **NOTE:** MULTIPLE PIECES MAY BE LAMINATED TOGETHER FIRST AND THEN TOENAILED TO A BLOCKING ASSEMBLY. **CAUTION:** USE NO MORE THAN 6" THICK OF FILL MATERIAL AT THE FORWARD END OF THE CONTAINER.
- ② FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 4.
- ③ CENTER FILL ASSEMBLY (5 REQD). SEE THE DETAIL ON PAGE 4.
- ④ SPACER PIECE, 2" X 4" X 41-1/2" (2 REQD). NAIL TO THE FIRST AND LAST CENTER FILL ASSEMBLIES W/2-10d NAILS AT EACH END.
- ⑤ DOOR POST VERTICAL RETAINER (2 REQD). SEE THE DETAIL ON PAGE 8.
- ⑥ DOOR POST VERTICAL (2 REQD). SEE THE DETAIL ON PAGE 6 AND "DETAIL B" ON PAGE 7.
- ⑦ DOOR SPANNER, 4" X 4" MATERIAL, CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF: 7'-1-3/8") (2 REQD). TOENAIL TO THE FILL MATERIAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 6.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	324	216
2" X 6"	61	61
4" X 4"	29	39
NAILS	NO. REQD	POUNDS
10d (3")	316	5
12d (3-1/4")	8	1/4
DOOR POST VERTICAL RETAINER -- 2 REQD		64 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	10	6,460 LBS
DUNNAGE		702 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		11,862 LBS (APPROX)

L. MAXIMUM LOAD WEIGHT CRITERIA:

THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY "WEIGHT LAWS" OF CERTAIN STATES. ALSO, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY OTHER WEIGHT RESTRICTIONS IMPOSED ON THE INTERMODAL CONTAINER SYSTEM.

M. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:

1. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
2. THE LOAD LIMIT OF A T/COFC RAILCAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.

N. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.

O. 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 0.454 KG.

P. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FILLER ASSEMBLY ON PAGE 5.

1. IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT (ONE OR TWO LADING UNITS), LADING UNITS NORMALLY MAY BE ELIMINATED FROM THE CENTER OF THE LOAD.
2. IF A LOAD IS REDUCED BY A LARGE AMOUNT (MORE THAN TWO LADING UNITS), LADING UNITS SHOULD BE ELIMINATED AS REQUIRED AND THE TOTAL LOAD SHIFTED FORE OR AFT, AS NECESSARY, TO ACHIEVE A SYMMETRICAL WEIGHT DISTRIBUTION. THE DEPICTED PROCEDURES WILL BE FOLLOWED AS CLOSELY AS POSSIBLE, MAKING ONLY THOSE ADJUSTMENTS TO THE DUNNAGE WHICH ARE REQUIRED TO ACCOMMODATE THE NUMBER OF UNITS TO BE SHIPPED.

Q. DOOR SPANNERS AND DOOR SPANNER LEDGERS ARE NOT REQUIRED AND MAY BE OMITTED IF LESS THAN 6" OF FILL MATERIAL, PIECE MARKED ① ON PAGE 2, IS REQUIRED ON EITHER SIDE OF THE REAR OF THE LOAD.

R. RECOMMENDED SEQUENTIAL LOADING PROCEDURE:

1. PRE-FABRICATE TWO FORWARD/REAR BLOCKING ASSEMBLIES AND FIVE CENTER FILL ASSEMBLIES.
2. INSTALL FILL MATERIAL AT THE FORWARD END.
3. INSTALL THE FORWARD BLOCKING ASSEMBLY.
4. LOAD TWO PALLET UNITS AND ONE CENTER FILL ASSEMBLY.
5. REPEAT STEP 4 FOUR TIMES.
6. INSTALL THE REAR BLOCKING ASSEMBLY.
7. INSTALL THE RETAINERS AND FILL MATERIAL BETWEEN THE REAR BLOCKING ASSEMBLY AND THE LOAD RETAINERS.
8. INSTALL THE TWO DOOR SPANNERS.

A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).

B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF MAU-91/B FIN ASSEMBLIES PACKED IN WIREBOUND PALLET BOXES. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 5 AND AIR FORCE TPO 00-933-6451 FOR DETAILS OF THE PALLET UNIT. CAUTION: REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE EXCEEDED.

C. THE LOAD AS SHOWN IS BASED ON A 4,700 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH END OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 93" HIGH, WITH A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. OLDER/OTHER CONTAINERS MAY HAVE A TOTAL INSIDE HEIGHT OF 95", BUT A CLEAR HEIGHT UNDER THE ROOF BOWS OF 93", VERIFY INSIDE CONTAINER HEIGHT PRIOR TO FABRICATING DUNNAGE. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT, HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.

D. WHEN LOADING PALLET UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). THE UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS NOT TO EXCEED 1-1/2". EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LENGTHENING LATERAL PIECES OF THE CENTER FILL ASSEMBLIES. ADDITIONALLY, THE THICKNESS AND/OR QUANTITY OF THE LATERAL AND LONGITUDINAL PIECES IN THE CENTER FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE PALLET UNIT.

E. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. 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.

F. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.

G. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE FORWARD WALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE FORWARD FILL MATERIAL TO PROVIDE A FLAT SURFACE FOR THE BUFFER PIECES. A PIECE OF 2" X 4", 2" X 3" OR A SPECIAL WIDTH PIECE CUT-TO-FIT CAN BE USED. THIS FILL PIECE WILL BE NAILED WITH ONE APPROPRIATELY SIZED NAIL EVERY 12". NOTE THAT SOME CONTAINERS ARE EQUIPPED WITH "TIE-BARS" IN THE CORNER SLOT, WHICH PRECLUDE THE USE OF A FULL HEIGHT FILL PIECE. WHEN "TIE-BARS" ARE PRESENT, THE FILL PIECE MUST BE INSTALLED IN SEGMENTS DESIGNED TO FIT BETWEEN THE "TIE-BARS" VERTICALLY. THE FILL PIECE(S) IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER FORWARD WALL ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER FORWARD WALL, ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR FORWARD LONGITUDINAL BLOCKING.

H. WHETHER A CONTAINER IS FULL OR IS LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CONTAINER.

J. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.

K. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

(CONTINUED AT LEFT)

MATERIAL SPECIFICATIONS

LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.

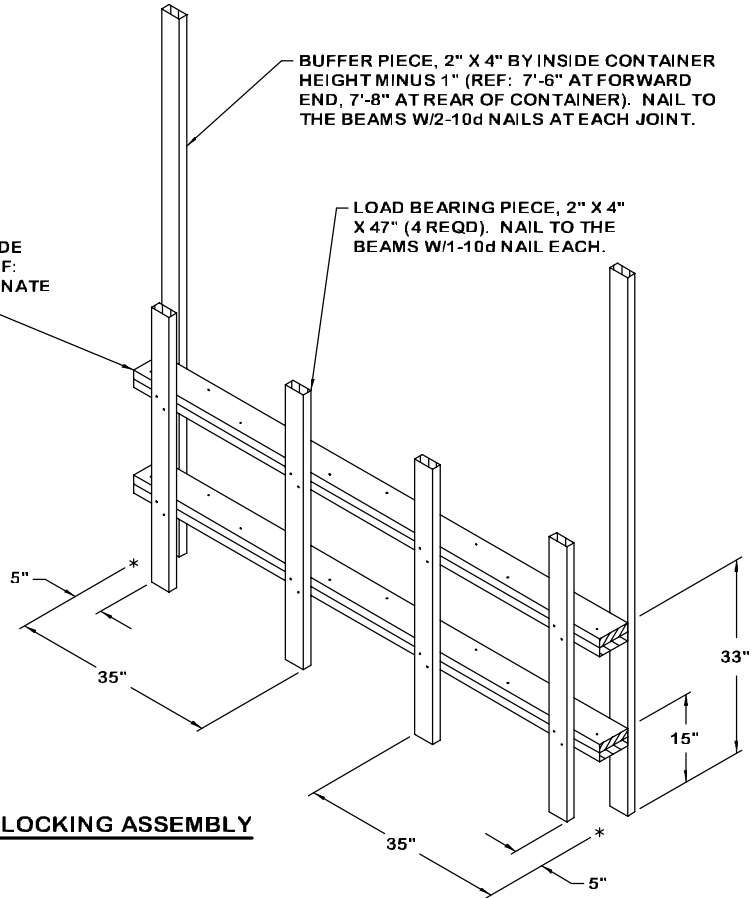
NAILS - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).

STEEL, STRUCTURAL - - - - - : ASTM A501, STEEL STRUCTURAL TUBING; AND ASTM A570, STEEL, STRIP, HOT-ROLLED, GRADE 36 (MINIMUM).

BEAM ASSEMBLY, 2" X 6" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (DOUBLED) (2 REQD). LAMINATE EACH PIECE W/11-10d NAILS.

BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-6" AT FORWARD END, 7'-8" AT REAR OF CONTAINER). NAIL TO THE BEAMS W/2-10d NAILS AT EACH JOINT.

LOAD BEARING PIECE, 2" X 4" X 47" (4 REQD). NAIL TO THE BEAMS W/1-10d NAIL EACH.

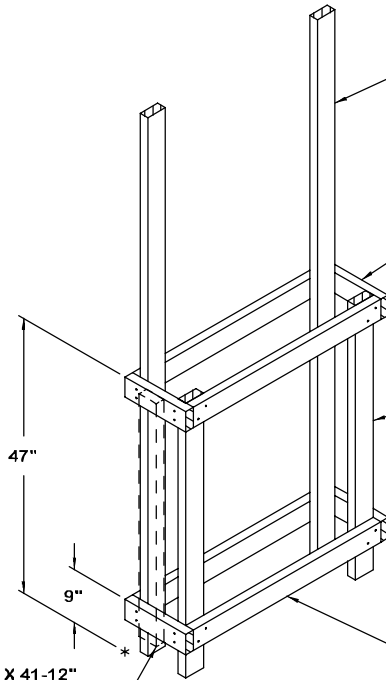


FORWARD/REAR BLOCKING ASSEMBLY

VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-8") (2 REQD).

LATERAL PIECE, 2" X 4" X 11-1/2" (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

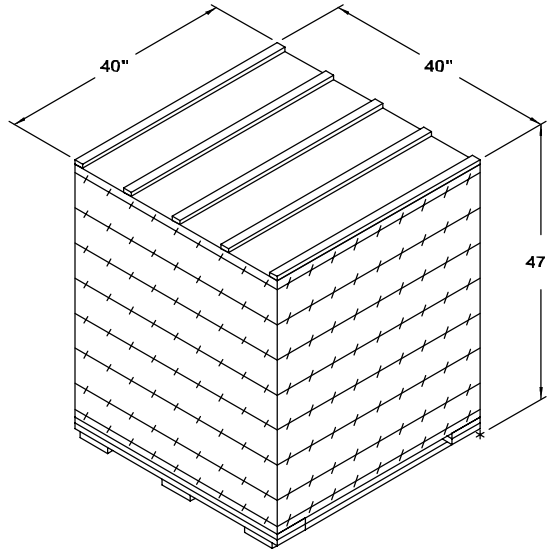
VERTICAL PIECE, 2" X 4" X 47" (2 REQD).



SPACER PIECE, 2" X 4" X 41-12" (AS REQD). NAIL TO ASSEMBLIES ADJACENT TO FORWARD/REAR BLOCKING ASSEMBLIES W/2-10d NAILS AT EACH END.

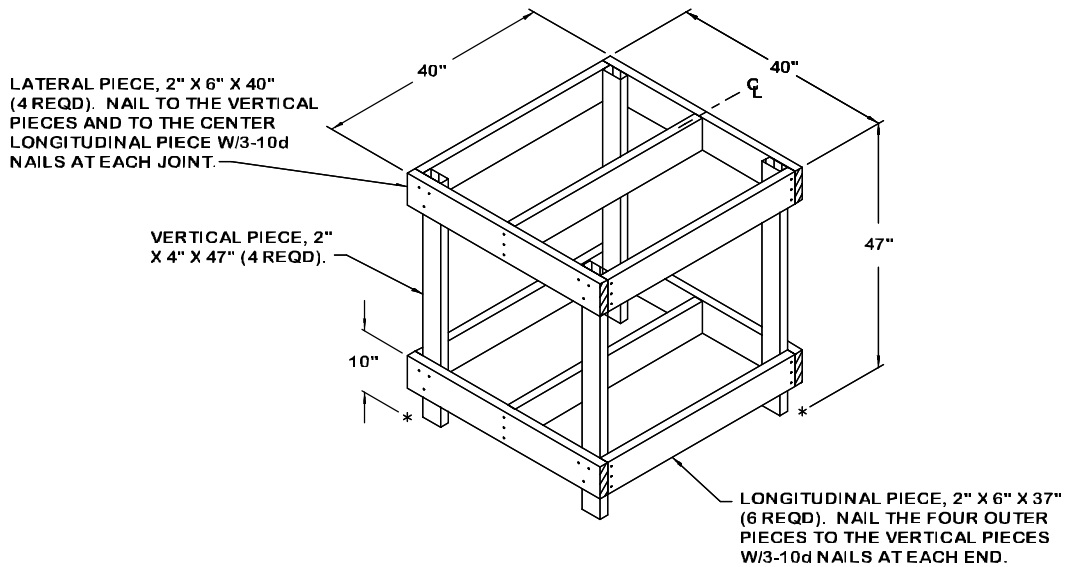
LONGITUDINAL PIECE, 2" X 4" X 37" (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10 NAILS AT EACH END.

CENTER FILL ASSEMBLY



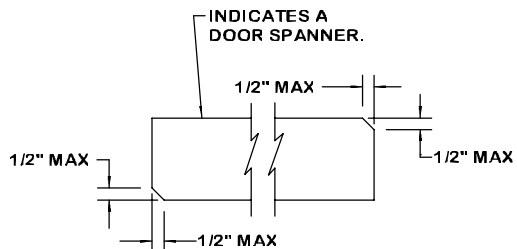
PALLET UNIT

GROSS WEIGHT ----- 646 LBS (APPROX)
 CUBE ----- 43.5 CU. FT. (APPROX)



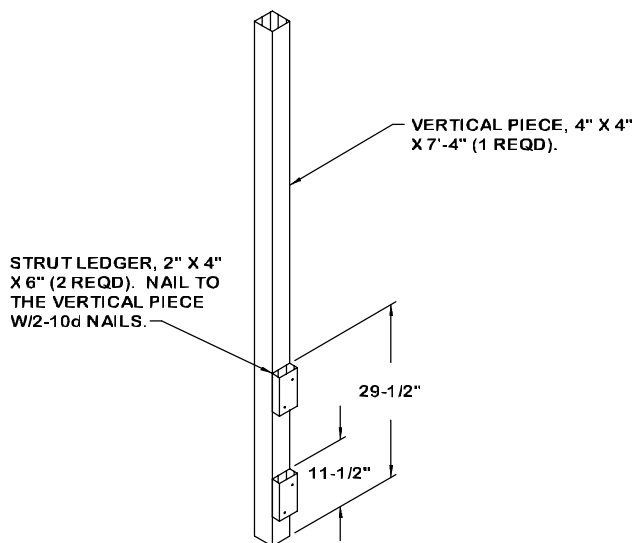
OMITTED UNIT ASSEMBLY

THIS ASSEMBLY IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT.
 NO MORE THAN FOUR OMITTED UNIT ASSEMBLIES MAY BE USED
 PER LOAD. DO NOT INSTALL AN OMITTED UNIT ASSEMBLY
 IMMEDIATELY ADJACENT TO ANOTHER OMITTED UNIT ASSEMBLY.

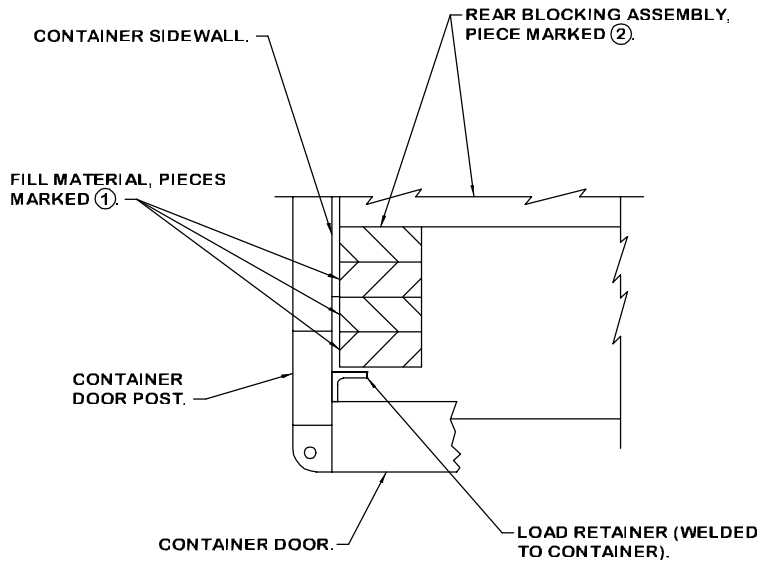


BEVEL-CUT

IF DESIRED, EACH END OF A DOOR SPANNER
PIECE MAY BE BEVEL-CUT AS SHOWN ABOVE
TO FACILITATE THE ACHIEVEMENT OF A
TIGHT DOOR-POST-TO-DOOR-POST FIT.



DOOR POST VERTICAL

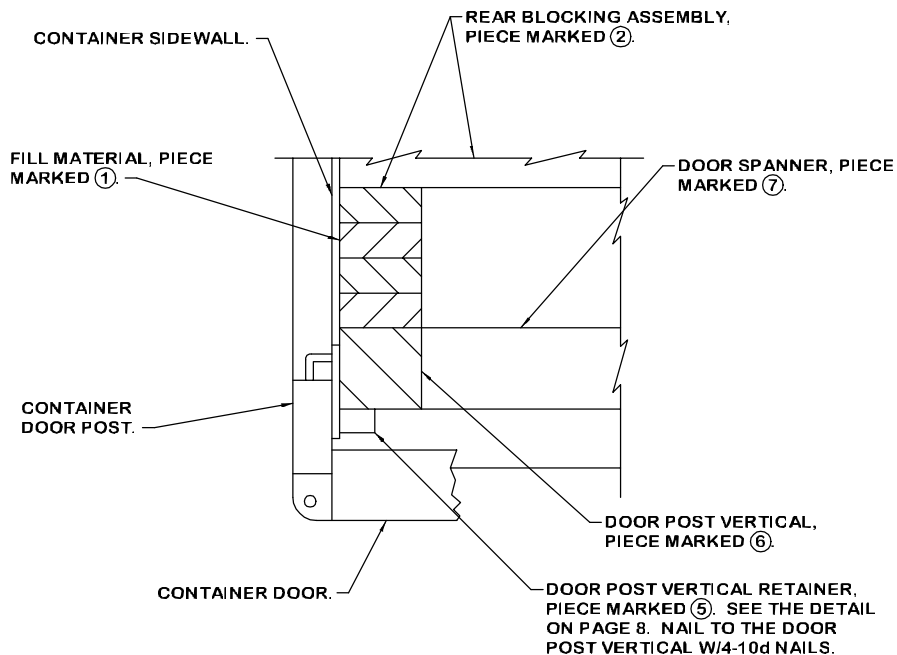


DETAIL A

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE FILL MATERIAL AND ADJACENT DUNNAGE PIECES.

SPECIAL NOTE:

WHEN ISO CONTAINERS ARE NOT EQUIPPED WITH PRE-WELDED LOAD RETAINERS, AS DEPICTED IN "DETAIL A" ABOVE, DOOR POST VERTICALS, DOOR POST VERTICAL RETAINERS AND DOOR SPANNERS WILL BE REQUIRED FOR THE LOAD DEPICTED ON PAGE 2. SEE VARIOUS LOADS WITHIN AMC DRAWING 19-48-4153-15PA1002 FOR EXAMPLES. SEE PAGE 8 FOR DETAILS OF THE METAL DOOR POST VERTICAL RETAINER.

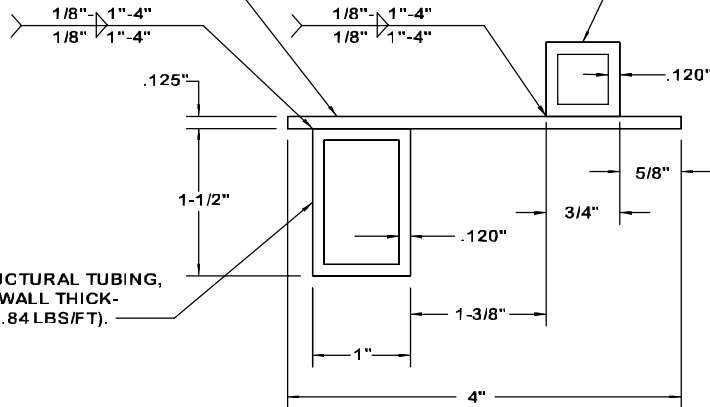


DETAIL B

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE DOOR POST VERTICAL RETAINER AND ADJACENT DUNNAGE PIECES.

STEEL STRIP, 1/8" THICK BY 4" WIDE BY 83" LONG (1.70 LBS/FT).

SQUARE STRUCTURAL TUBING, 3/4" SQUARE BY .120" WALL THICKNESS BY 83" LONG (1.03 LBS/FT). SEE SPECIAL NOTE BELOW.



VIEW A

RECTANGULAR STRUCTURAL TUBING, 1-1/2" BY 1" BY .120" WALL THICKNESS BY 83" LONG (1.84 LBS/FT).

SPECIAL NOTE:

IN MOST CORRUGATED STEEL CONTAINERS, LASHING OR TIE BARS WILL BE PRESENT IN THE SLOT WHERE THE 3/4" SQUARE STRUCTURAL TUBING IS TO BE INSTALLED. TO ENSURE PROPER ENGAGEMENT OF THE SQUARE TUBING AND THE CONTAINER DOOR POST, THE TUBING MUST BE NOTCHED AT THE TIE BAR LOCATIONS.

SQUARE STRUCTURAL TUBING, 3/4" SQUARE BY .120" WALL THICKNESS BY 83" LONG (1.03 LBS/FT).

VIEW A



RECTANGULAR STRUCTURAL TUBING, 1-1/2" BY 1" BY .120" WALL THICKNESS BY 83" LONG (1.84 LBS/FT).

DRILL 5/32", 4 HOLES.

STEEL STRIP, 1/8" THICK BY 4" WIDE BY 83" LONG (1.70 LBS/FT).

DOOR POST VERTICAL RETAINER

NOTE: THE ABOVE ASSEMBLY HAS BEEN SHOWN ROTATED 90° FROM THE ORIENTATION IN WHICH IT IS INSTALLED IN THE LEFT REAR CORNER OF THE CONTAINER. THE ASSEMBLY HAS BEEN ROTATED FOR HOLE LOCATION CLARITY.