APPROVED BY BUREAU OF EXPLOSIVES

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LOADING AND BRACING IN END OPENING ISO CONTAINERS OF MK82 (500 POUND) BOMBS ON MHU-122/E METAL PALLETS

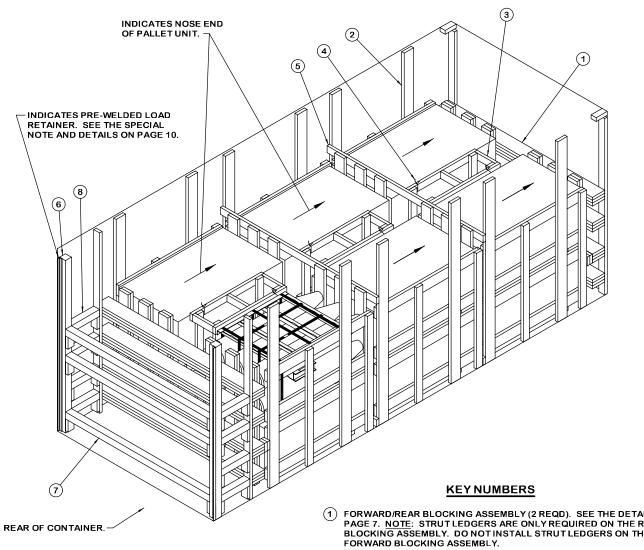
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LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR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

U.S. ARMY MATERIEL COMMAND DRAWING

approved, u.s. army industrial operations command	ENGINEER	BASIC	LAURA FIEFFER	_	DO	NOTSCA	LE
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ISOMETRIC VIEW

BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
2" x 4" 2" x 6" 2" x 8" 4" x 4"	313 399 182 48	209 399 243 63	
NAILS	NO. REQD	POUNDS	
10d (3") 12d (3-1/4")	1, 040 44	16 3/4	
WIRE 12' REQD 0.20 LBS			

- (1) FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 7. NOTE: STRUT LEDGERS ARE ONLY REQUIRED ON THE REAR BLOCKING ASSEMBLY. DO NOT INSTALL STRUT LEDGERS ON THE
- (2) SIDE FILL ASSEMBLY (6 REQD). SEE THE DETAIL ON PAGE 6.
- (3) CENTER FILL ASSEMBLY (3 REQD). SEE THE DETAIL ON PAGE 6.
- 4 TIE WIRE, 24" LONG (6 REQD, 2 PER CENTER FILL ASSEMBLY). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE LONGITUDINAL PIECE OF THE CENTER FILL ASSEMBLY AND THE PALLET FRAME.
- (5) SEPARATOR GATE (2 REQD). SEE THE DETAIL ON PAGE 7.
- (6) DOOR POST VERTICAL (2 REQD). SEE THE DETAIL ON PAGE 8, AND "DETAIL A" AND "DETAIL B" ON PAGE 9.
- (7) DOOR SPANNER, 4" X 4" MATERIAL, CUT TO A LENGTH THAT WILL PROVIDE FOR A DRIVE FIT (REF: 7'-1-3/8") (3 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 5.
- (8) STRUT, 4" X 4" BY CUT-TO-FIT (REF: 16-5/8") (8 REQD). TOENAIL TO THE BUFFER PIECE OF THE REAR BLOCKING ASSEMBLY AND THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 5.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT DUNNAGE CONTAINER		1,843 LBS

TOTAL WEIGHT - - - - - - 43,659 LBS (APPROX)

PAGE 2

12 PALLET UNIT LOAD (METHOD A)

(GENERAL NOTES CONTINUED)

- H. WHETHER A CONTAINER IS FULL OR IS LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAV-ITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CONTAINER.
- J. <u>CAUTION</u>: 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.
- 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:
 - 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 LOADS ON PAGES 2 AND 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL-LOAD" DETAILS ON PAGE 12.

GENERAL NOTES

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCOR-DANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF MK82 (500 POUND) BOMBS ON MHU-122/E METAL PALLETS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE MHU-122/E METAL PALLET WITH MK82 BOMBS INSTALLED. SEE PAGE 5 AND MIL-STD-1323/239 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 LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE LONGITUDINAL PIECES ON THE CENTER FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE LATERAL 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 BUFFER PIECES ON THE FORWARD BLOCKING ASSEMBLY 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 WUST 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 BLOCK-ING.

(CONTINUED AT LEFT)

MATERIAL SPECIFICATIONS

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

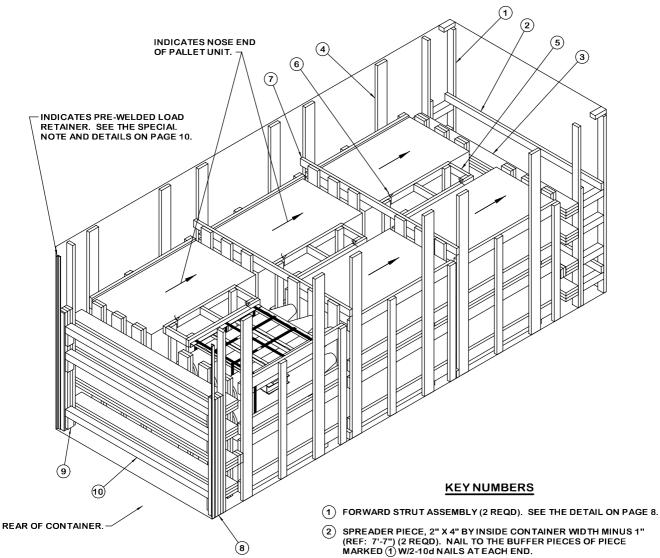
NAILS ----: ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).

WIRE, CARBON STEEL -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006

OR BETTER.

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

PAGE 3



ISOMETRIC VIEW

LOAD AS SHOWN

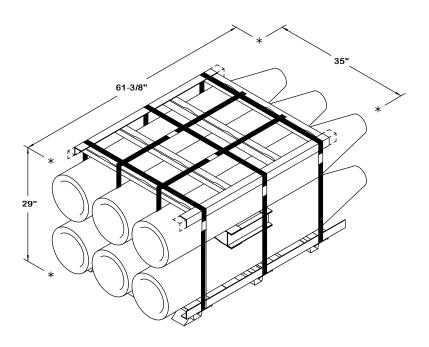
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT DUNNAGE	12	37, 116 LBS 1, 886 LBS 4, 700 LBS

TOTAL WEIGHT - - - - - - 43,702 LBS (APPROX)

BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
1" X 4" 2" X 4" 2" X 6" 2" X 8" 4" X 4"	10 375 399 182 30	4 250 399 243 40	
NAILS	NO. REQD	POUNDS	
6d (2") 10d (3") 12d (3-1/4")	10 1,056 44	1/4 16-1/4 3/4	
WIRE 12' REQD 0.20 LBS			

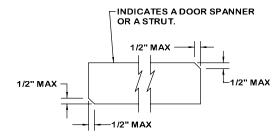
- (3) FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 7. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECES OF PIECE MARKED ① W/5-10d NAILS. NOTE: STRUT LEDGERS ARE NOT REQUIRED ON EITHER BLOCKING ASSEMBLY.
- (4) SIDE FILL ASSEMBLY (6 REQD). SEE THE DETAIL ON PAGE 6.
- (5) CENTER FILL ASSEMBLY (3 REQD). SEE THE DETAIL ON PAGE 6.
- TIE WIRE, 24" LONG (6 REQD, 2 PER CENTER FILL ASSEMBLY). IN-(6) STALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE LON-GITUDINAL PIECE OF THE CENTER FILL ASSEMBLY AND THE PALLET FRAME.
- (7) SEPARATOR GATE (2 REQD). SEE THE DETAIL ON PAGE 7.
- FILL MATERIAL, 4" WIDE BY 60" LONG MATERIAL (AS REQD). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/5 NAILS OF A SUITABLE SIZE (10d FOR 2" THICK MATERIAL). NAIL EACH ADDI-A SUITABLE SIZE (100 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 THE REAR BLOCKING ASSEMBLY. SEE THE "DETAIL A" AND "DETAIL B" ON PAGE 9.
- 9 DOOR SPANNER LEDGER, 2" X 4" X 6" (6 REQD OPTIONAL). LO-CATE SUCH THAT THE TOP OF THE DOOR SPANNERS WILL BE FLUSH WITH THE TOP OF THE BOTTOM, THIRD AND TOP BEAM ASSEMBLIES IN PIECE MARKED ③. NAIL TO THE FILL MATERIAL W/2-10d NAILS.
- (10) DOOR SPANNER, 4" X 4" MATERIAL, CUT TO A LENGTH THAT WILL PROVIDE FOR A DRIVE FIT (REF: 7'-1-3/8") (3 REQD). TOENAIL TO THE FILL MATERIAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-**CUT" DETAIL ON PAGE 5.**

12 PALLET UNIT LOAD (METHOD B)



PALLET UNIT DETAIL

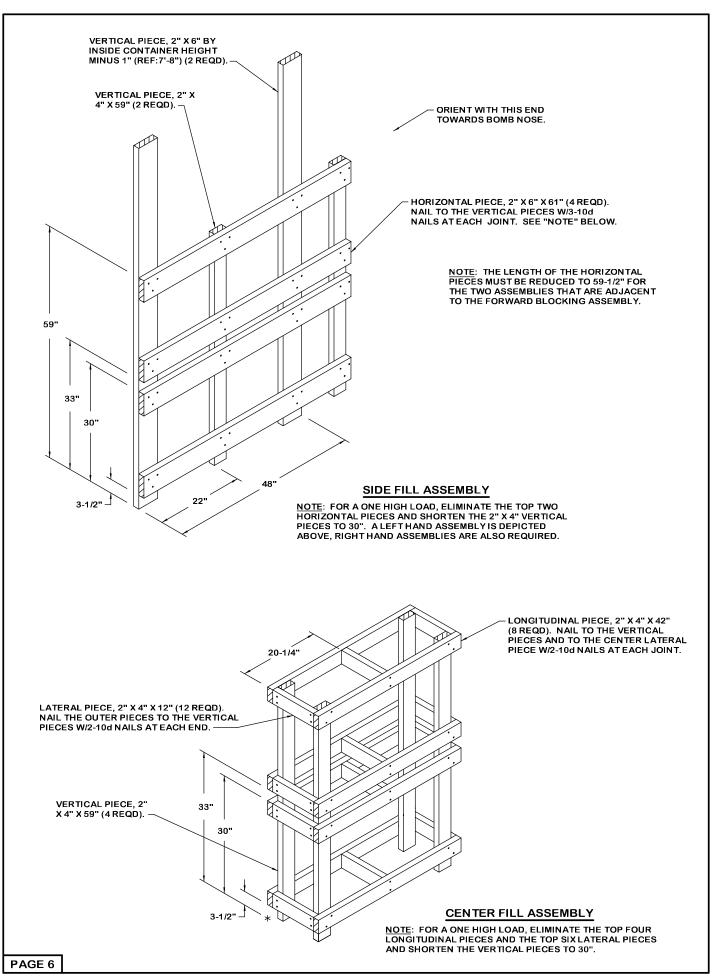
GROSS WEIGHT-----3,093 LBS (APPROX)
CUBE -----36.1 CUBIC FEET (APPROX)

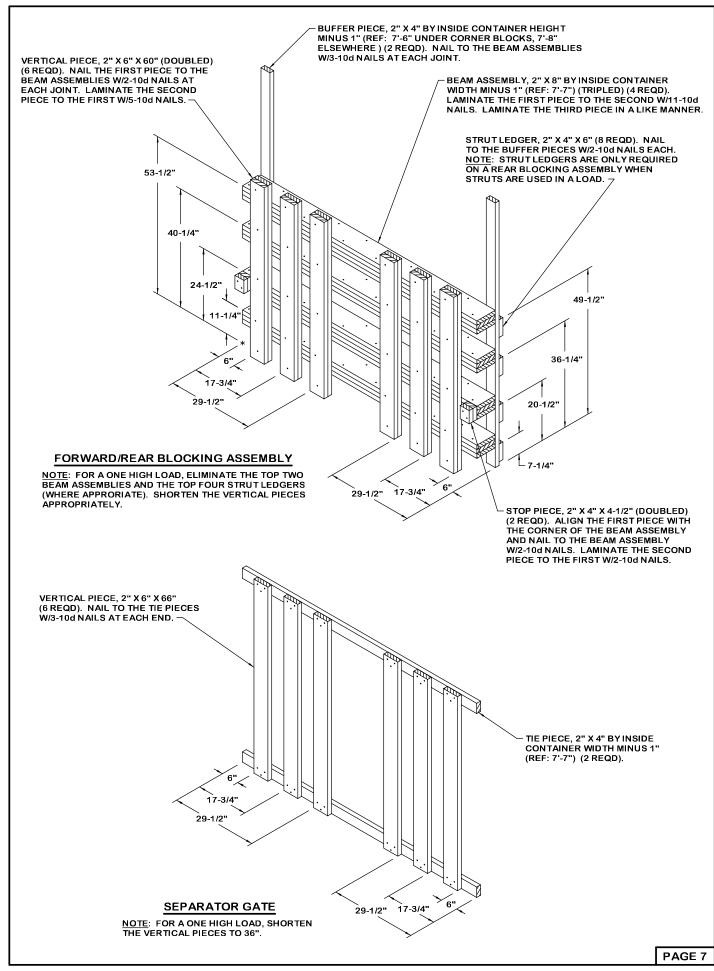


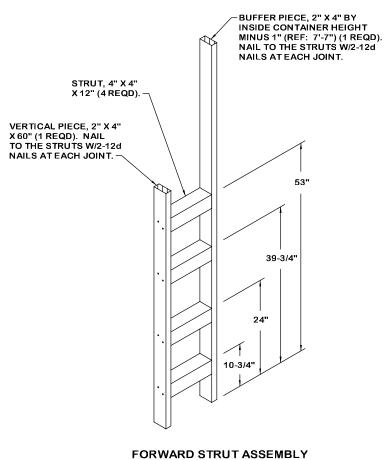
BEVEL-CUT

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

PAGE 5



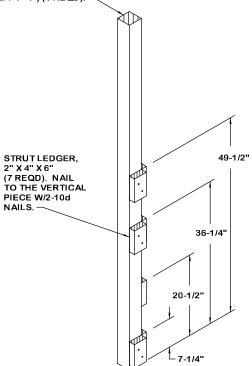




NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO STRUTS AND SHORTEN THE VERTICAL

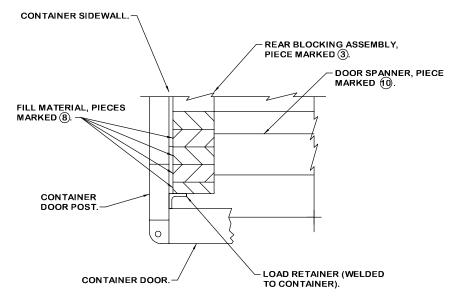
PIECE TO 30".

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



DOOR POST VERTICAL

A LEFT HAND ASSEMBLY IS DEPICTED, A RIGHT HAND ASSEMBLY IS ALSO REQUIRED. FOR A ONE HIGH LOAD, ELIMINATE THE UPPER TWO STRUT LEDGERS AND THE UPPER DOOR SPANNER LEDGER. RELOCATE THE MIDDLE DOOR SPANNER LEDGER AT 20-1/2".

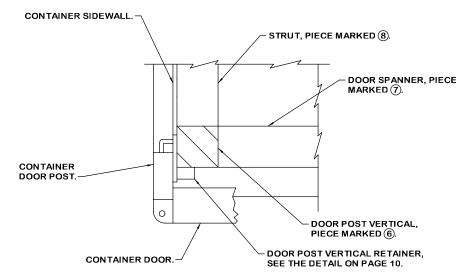


DETAIL A

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. KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 4.

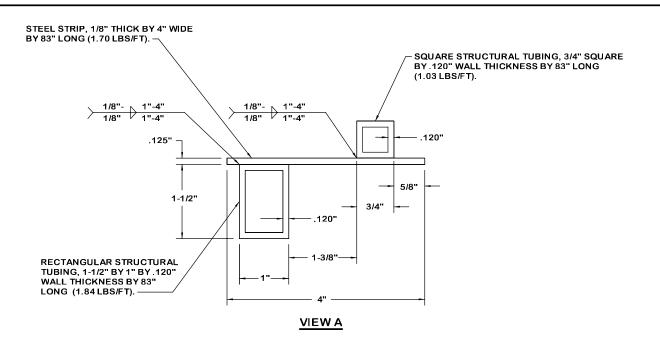
SPECIAL NOTE:

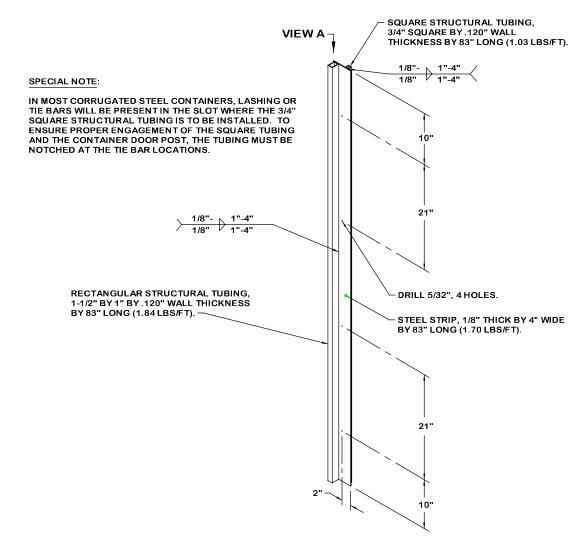
WHEN ISO CONTAINERS ARE NOT EQUIPPED WITH PRE-WELDED LOAD RETAINERS, AS DEPICTED IN "DETAIL A" ABOVE, DOOR POST VERTICAL RETAINERS WILL BE REQUIRED FOR THE LOADS DEPICTED ON PAGES 2 AND 4. SEE VARIOUS LOADS WITHIN AMC DRAWING 19-48-4153-15PA1002 FOR EXAMPLES. SEE PAGE 10 FOR DETAILS OF THE METAL DOOR POST VERTICAL RETAINER.



DETAIL B

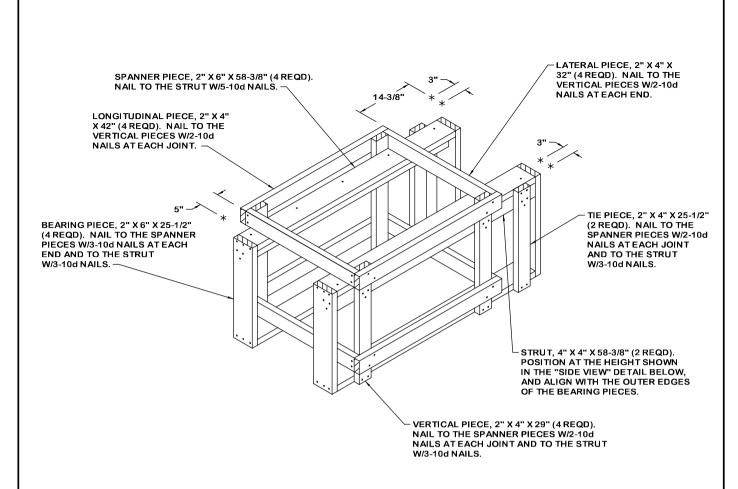
A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE DOOR POST VERTICAL RETAINER AND ADJACENT DUNNAGE PIECES. KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2.



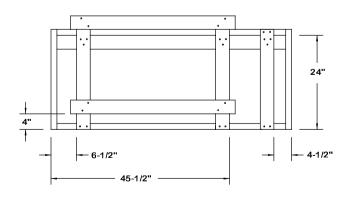


DOOR POST VERTICAL RETAINER

 $\underline{\text{NOTE}}$: 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.

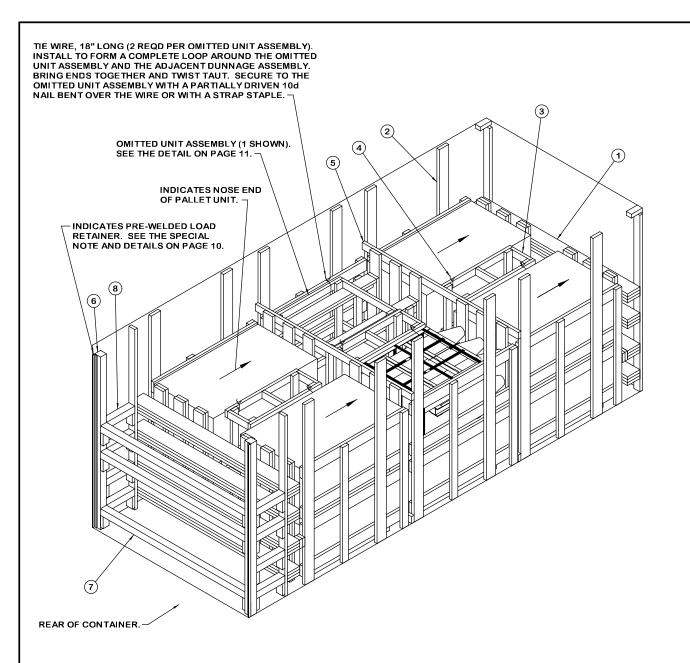


OMITTED UNIT ASSEMBLY



SIDE VIEW

PAGE 11



LESS-THAN-FULL-LOAD PROCEDURE

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (LESS THAN 12 UNITS). KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. THE PROCEDURES MAY ALSO BE APPLIED TO THE LOAD DEPICTED ON PAGE 4. SEE GENERAL NOTE "H" ON PAGE 3.