

APPROVED BY  
BUREAU OF EXPLOSIVES

*J. M. [Signature]*

DATE 6/4/2000

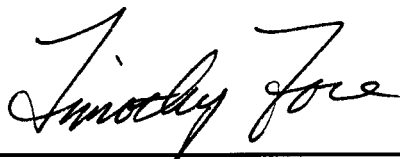

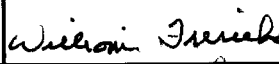


# LOADING AND BRACING<sup>●</sup> IN END OPENING ISO CONTAINERS OF PALLETIZED UNITS OF BOMBS, GENERAL PURPOSE, 1000-LB, MK83 AND MODS (3-BOMB PALLET UNIT)

## INDEX

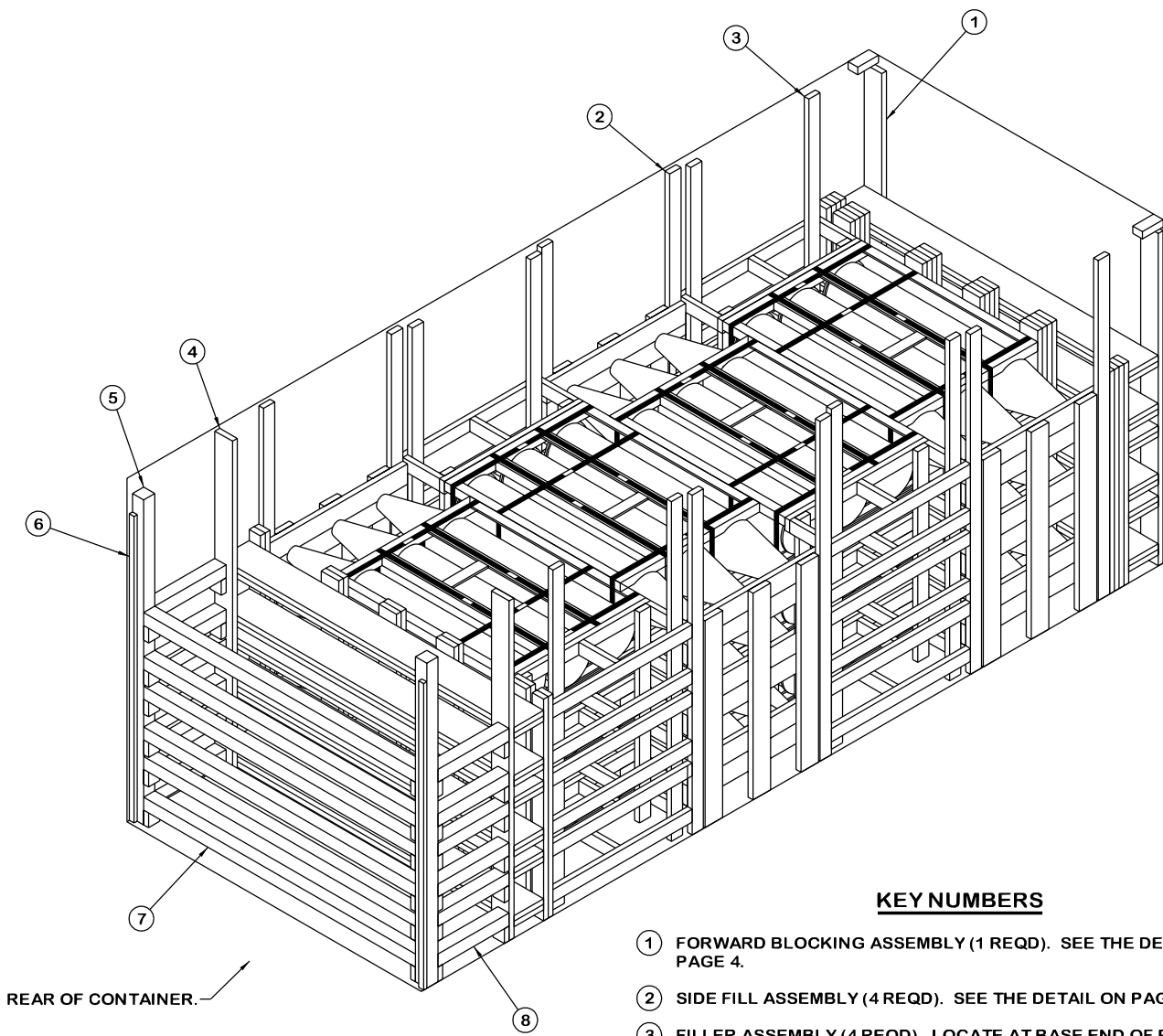
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- LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS. SEE GENERAL NOTE "M" ON PAGE 3.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND  	ENGINEER	BASIC	WILLIAM FRERICHS	DO NOT SCALE			
		REV.	MICHAEL SARDONE				
	TECHNICIAN	BASIC		AUGUST 1984			
	REV.		REVISION NO. 1      JUNE 1999				
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  	DRAFTSMAN	BASIC	JEAN MUCHOW	SEE THE REVISION LISTING ON PAGE 3			
		REV.		CLASS	DIVISION	DRAWING	FILE
	TRANSPORTATION ENGINEERING DIVISION			19	48	4192	15PB1002
VALIDATION ENGINEERING DIVISION							
LOGISTICS ENGINEERING OFFICE							

PROJECT CA 207-84



REAR OF CONTAINER.

**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① FORWARD BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 4.
- ② SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 4.
- ③ FILLER ASSEMBLY (4 REQD). LOCATE AT BASE END OF PALLET UNIT. SEE THE DETAIL ON PAGE 5.
- ④ REAR BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 5.
- ⑤ DOOR POST VERTICAL (2 REQD). SEE THE DETAIL ON PAGE 6 AND "DETAIL B" ON PAGE 7.
- ⑥ DOOR POST VERTICAL RETAINER (2 REQD). SEE THE DETAIL AND "VIEW A" ON PAGE 8. NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/4-10d NAILS.
- ⑦ DOOR SPANNER, 4" X 4" MATERIAL, CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF: 7'-1-3/8") (6 REQD). TOENAIL TO THE DOOR POST VERTICALS W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 6. AFTER INSTALLING THE BOTTOM AND TOP DOOR SPANNERS, THE STRUTS, THE STRUTS, PIECES MARKED ⑧, ARE TO BE INSTALLED.
- ⑧ STRUT, 4" X 4" BY CUT-TO-FIT (12 REQD). TOENAIL TO THE BUFFER PIECES OF PIECE MARKED ④ AND TO PIECE MARKED ⑤ 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"	473	292
2" X 6"	263	263
2" X 10"	182	304
4" X 4"	80	107
NAILS	NO. REQD	POUNDS
10d (3")	1380	21-1/4
12d (3-1/4")	72	1-1/4
DOOR POST VERTICAL RETAINER -- 2 REQD --- 64 LBS		

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	12	35,220 LBS
DUNNAGE		2,019 LBS
CONTAINER		4,700 LBS
<b>TOTAL WEIGHT</b>		<b>41,939 LBS (APPROX)</b>

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 THE T/COFC RAIL CAR 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. NOTICE: THE FORWARD AND REAR BLOCKING ASSEMBLIES ARE DESIGNED SO THAT THE LOAD BEARING PIECES ARE NOT POSITIONED IN A SYMMETRICAL PATTERN. THIS REQUIRED POSITIONING IS DUE TO THE PALLET UNIT CONFIGURATION AND LOADING PATTERN. IF THE QUANTITY OF PALLET UNITS TO BE SHIPPED RESULTS IN AN UNEVEN NUMBER OF STACKS, OR IF THE PALLET UNITS ARE TO BE LOADED IN AN ORIENTATION OPPOSITE FROM THAT DEPICTED IN THE LOAD, THE POSITIONING OF THE LOAD BEARING PIECES ON THE FORWARD AND REAR BLOCKING ASSEMBLIES MUST BE REVERSED FROM WHAT IS DEPICTED IN THE APPLICABLE DETAILS.

Q. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:

1. PREFABRICATE ONE FORWARD BLOCKING ASSEMBLY, FOUR SIDE FILL ASSEMBLIES, FOUR FILLER ASSEMBLIES, ONE REAR BLOCKING ASSEMBLY, AND NAIL A DOOR POST VERTICAL RETAINER TO EACH DOOR POST VERTICAL, ONE RIGHT HAND AND ONE LEFT HAND.
2. INSTALL THE FORWARD BLOCKING ASSEMBLY.
3. INSTALL ONE SIDE FILL ASSEMBLY ON THE RIGHT SIDE OF THE CONTAINER, LOAD THREE PALLET UNITS, AND INSTALL ONE FILLER ASSEMBLY.
4. INSTALL ONE SIDE FILL ASSEMBLY ON THE LEFT SIDE OF THE CONTAINER, LOAD THREE PALLET UNITS, AND INSTALL ONE FILLER ASSEMBLY.
5. REPEAT STEP 3.
6. REPEAT STEP 4.
7. INSTALL THE REAR BLOCKING ASSEMBLY.
8. INSTALL THE TWO DOOR POST VERTICAL ASSEMBLIES (ONE RIGHT-HAND AND ONE LEFT-HAND).
9. INSTALL TWO DOOR SPANNER PIECES, ONE AT THE LOWEST POSITION AND ONE AT THE UPPERMOST POSITION.
10. INSTALL TWELVE STRUTS.
11. INSTALL THE REMAINING FOUR DOOR SPANNER PIECES.

REVISION

REVISION NO. 1, DATED JUNE 1999, CONSISTS OF:

STREAMLINING DUNNAGING METHODS AND UPDATING DRAWING METHODS.

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 GENERAL PURPOSE MK83 BOMBS, PACKED THREE PER MK11 PALLET UNIT. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 6 AND NAVY WR 54/35 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 VERTICAL PIECES ON THE SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE LATERAL PIECES IN THE FILLER 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 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. SEE THE "OMITTED UNIT ASSEMBLY" DETAIL ON PAGE 6.

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.

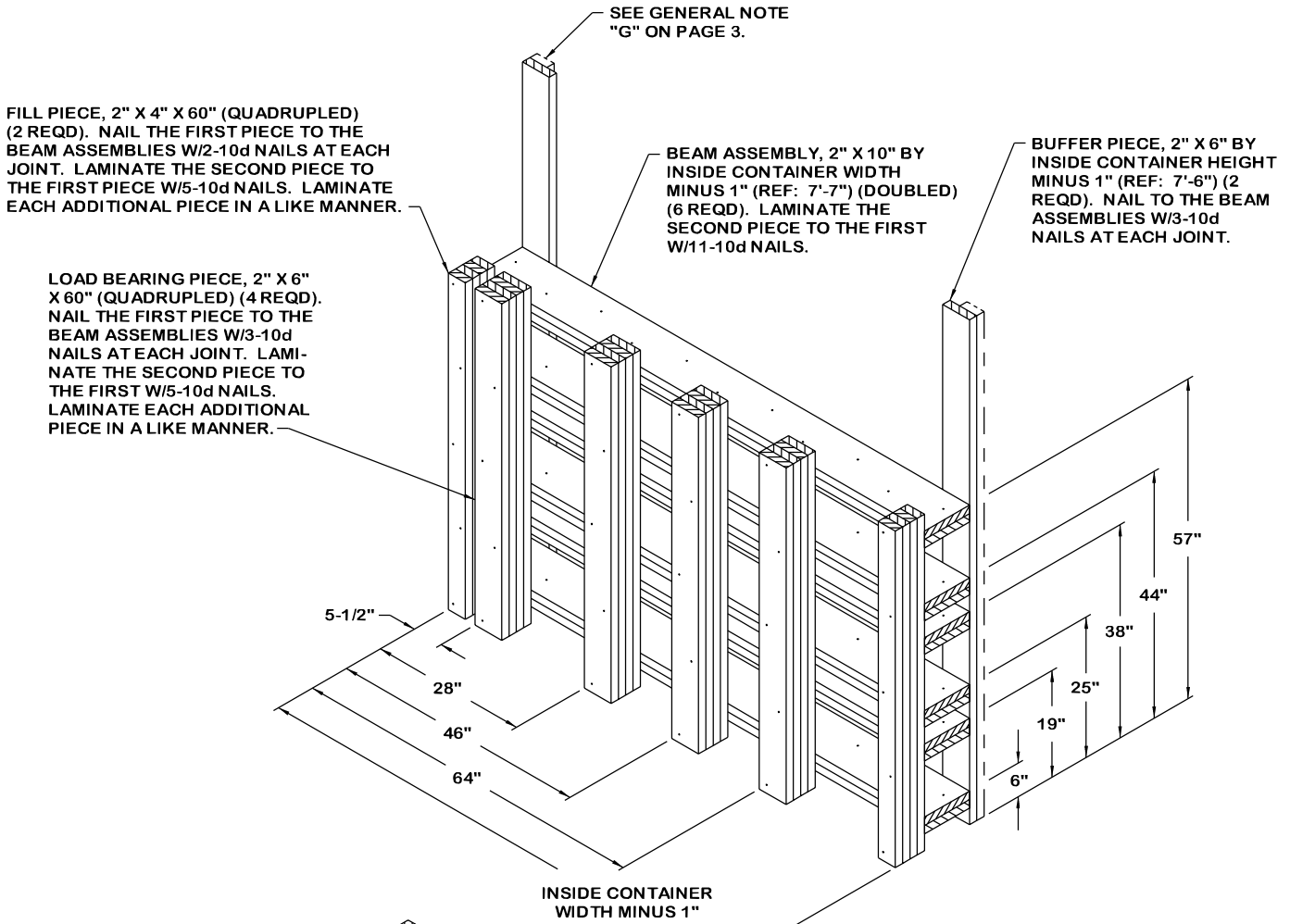
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MATERIAL SPECIFICATIONS

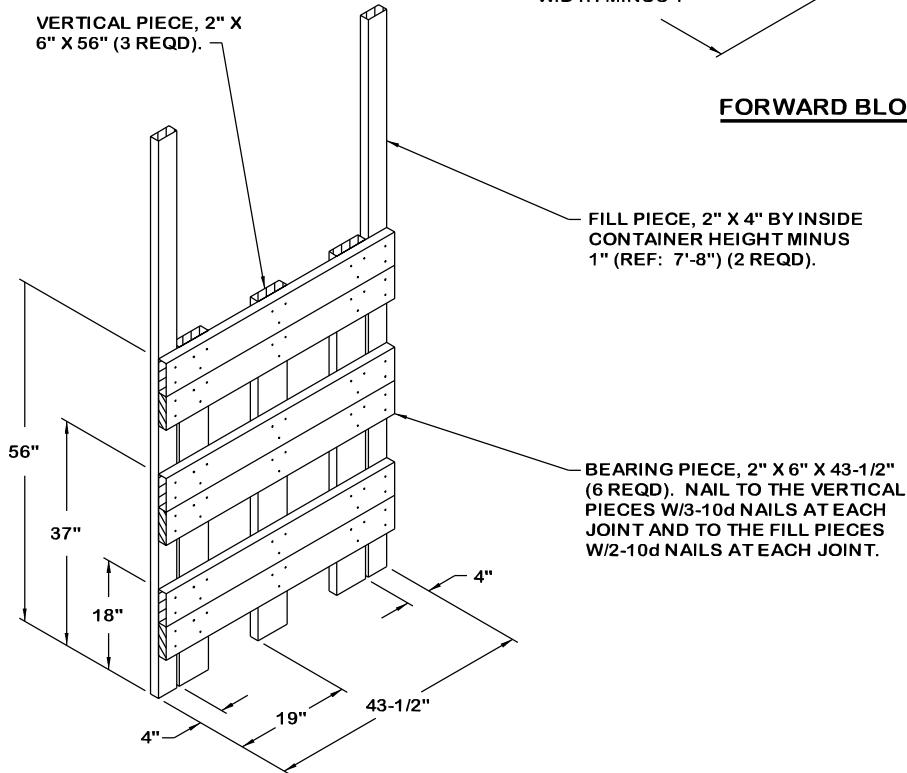
LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.

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

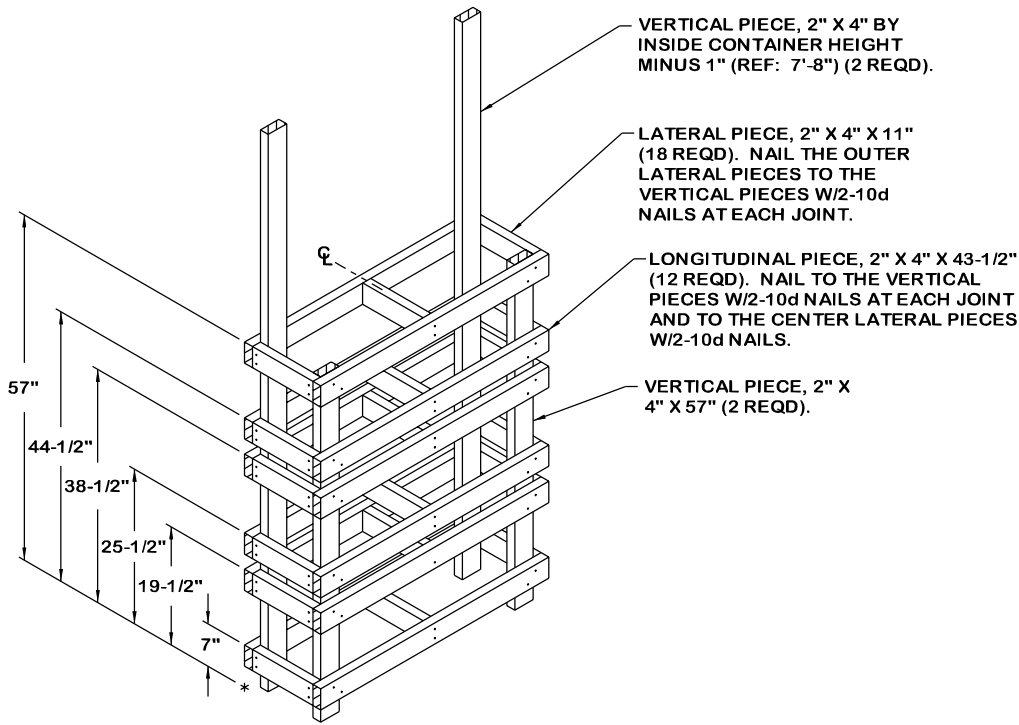
STEEL, STRUCTURAL - - - - - : ASTM A501, STEEL STRUCTURAL TUBING; AND ASTM A570, STEEL, STRIP, HOT-ROLLED, GRADE 36 (MINIMUM).



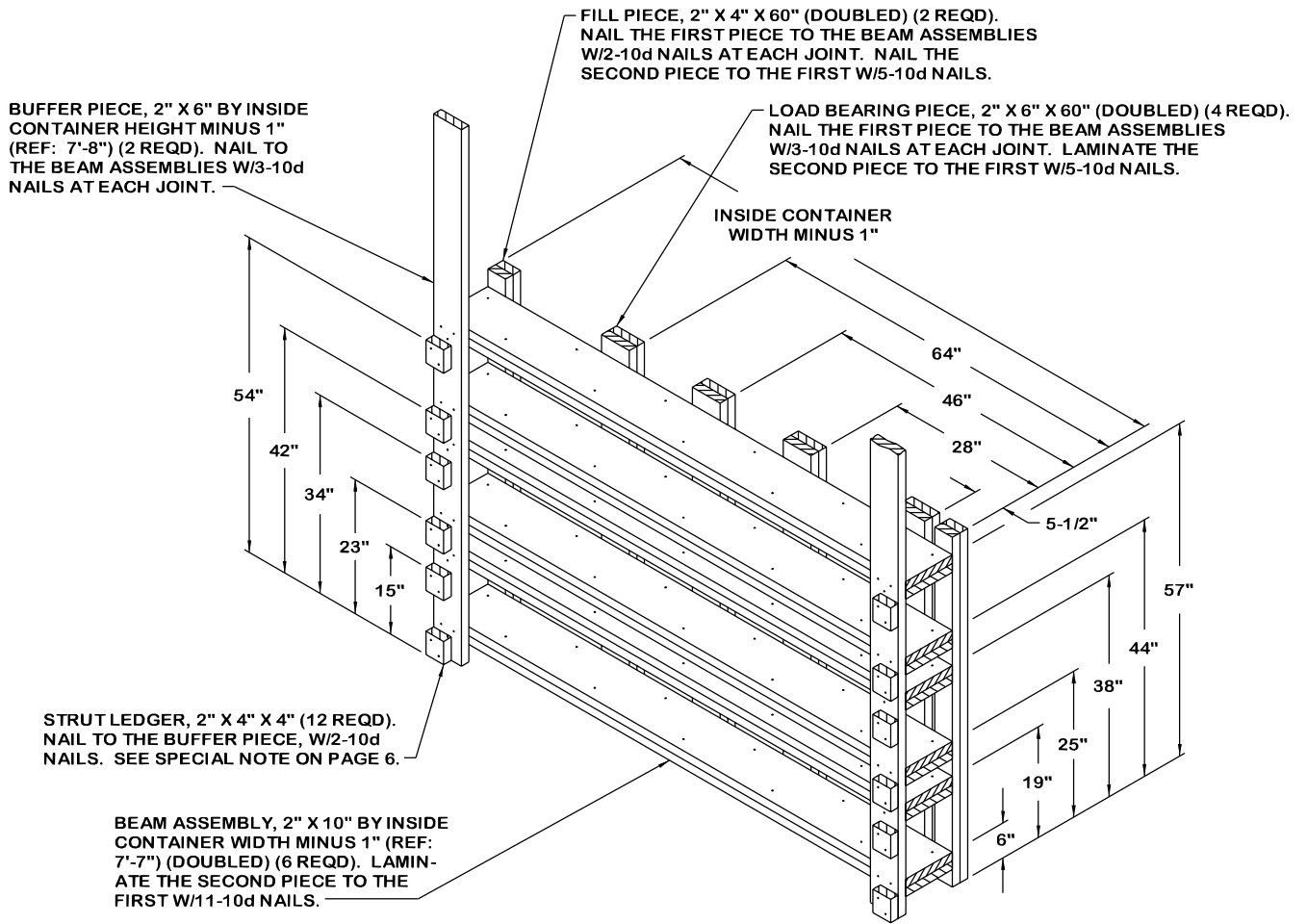
**FORWARD BLOCKING ASSEMBLY**



**SIDE FILL ASSEMBLY**

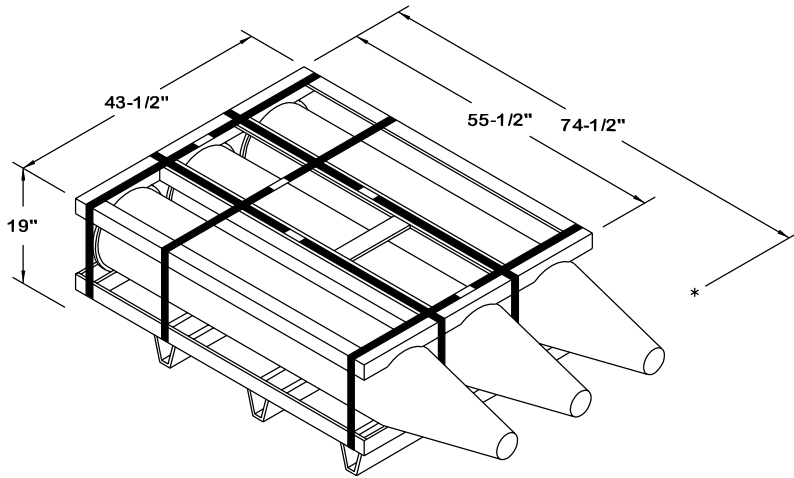


**FILLER ASSEMBLY**



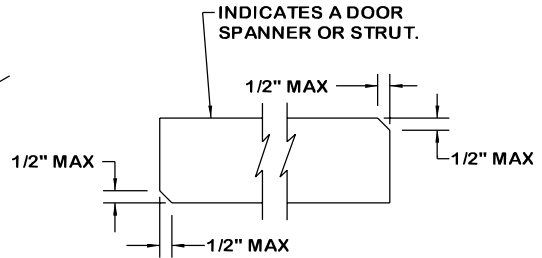
**REAR BLOCKING ASSEMBLY**

**DETAILS**



**MK11 PALLET UNIT**

GROSS WEIGHT ----- 2,935 LBS (APPROX)  
 CUBE ----- 35.6 CUBIC FEET (APPROX)



**BEVEL-CUT**

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

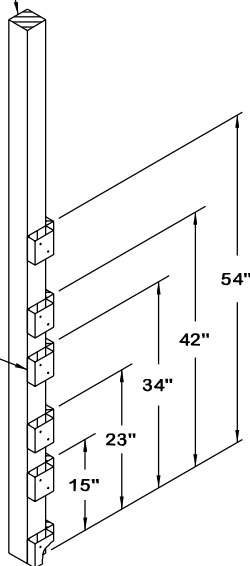
LONGITUDINAL PIECE, 2" X 6" X 40-1/2" (4 REQD). NAIL THE OUTER TWO PIECES TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.

LATERAL PIECE, 2" X 6" X 6'-2-1/2" (2 REQD). NAIL TO THE VERTICAL PIECES AND THE CENTER TWO LONGITUDINAL PIECES W/3-10d NAILS AT EACH JOINT.

VERTICAL PIECE, 2" X 6" X 20" (4 REQD).

VERTICAL PIECE, 4" X 4" X 7'-4" (1 REQD).

STRUT LEDGER, 2" X 4" X 4" (12 REQD). NAIL TO THE VERTICAL PIECE W/2-10d NAILS. SEE THE NOTE BELOW.



**DOOR POST VERTICAL**

NOTE: THE STRUT LEDGERS CAN ONLY BE PRENAILED TO THE DOOR POST VERTICAL ON ONE SIDE OF THE CONTAINER FOR THE DOOR SPANNER PIECES. ALSO, THE STRUT LEDGERS FOR THE STRUTS CAN ONLY BE PRENAILED TO THE REAR BLOCKING ASSEMBLY OR THE DOOR POST VERTICAL AT THE LOWEST DIMENSION.

HOLD-DOWN PIECE, 2" X 3" (ACTUAL) X 8" (2 REQD). NAIL TO THE LATERAL PIECE W/3-10d NAILS.

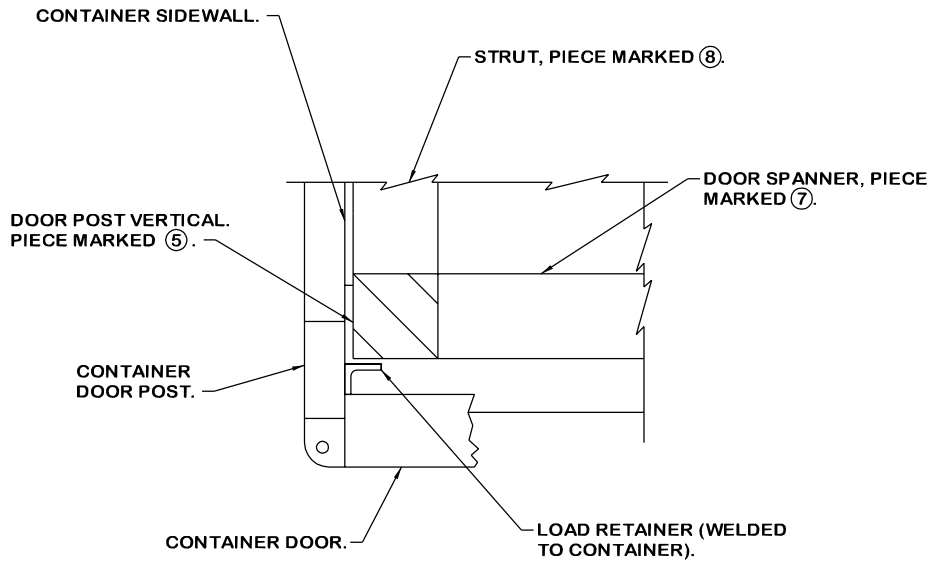
LATERAL PIECE, 2" X 8" X 6'-2-1/2" (2 REQD). NAIL TO THE VERTICAL PIECES AND THE CENTER TWO LONGITUDINAL PIECES W/3-10d NAILS AT EACH JOINT.

LONGITUDINAL PIECE, 2" X 8" X 40-1/2" (4 REQD). NAIL THE OUTER TWO PIECES TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.

ORIENT WITH THIS END ADJACENT TO THE SIDE FILL ASSEMBLY (NOSE END).

**OMITTED UNIT ASSEMBLY**

THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT. NO MORE THAN THREE FILLER ASSEMBLIES MAY BE USED IN THE LOAD DEPICTED ON PAGE 2.

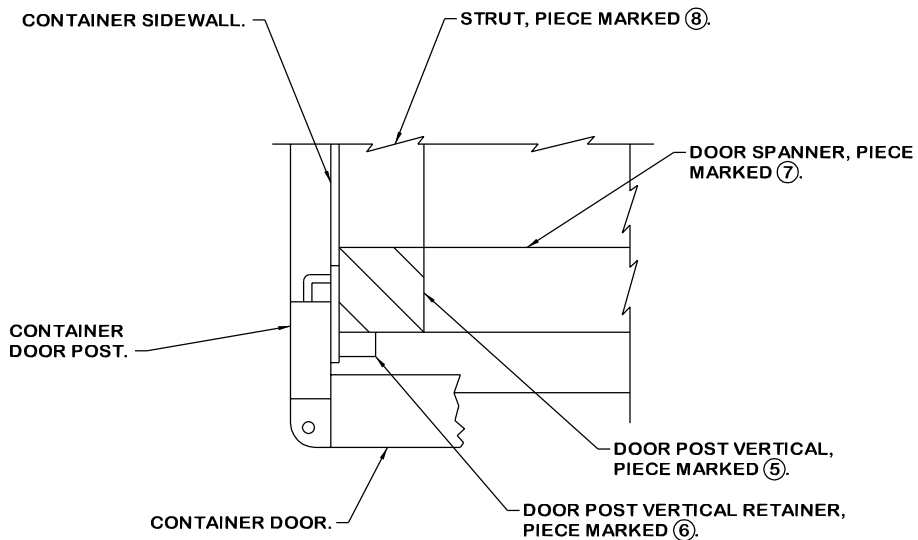


**DETAIL A**

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.

**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.

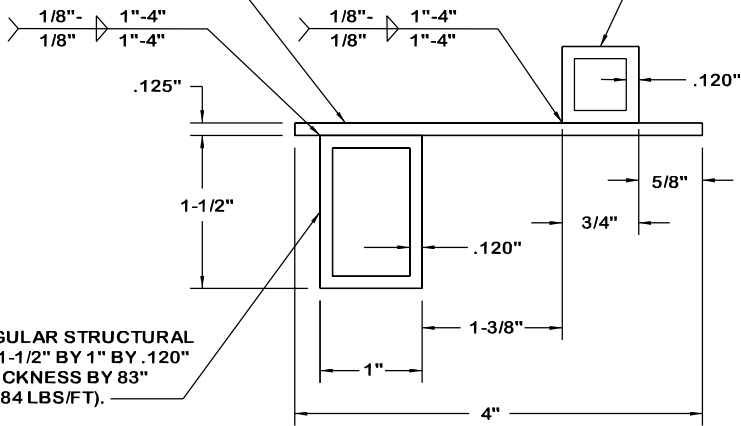


**DETAIL B**

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).



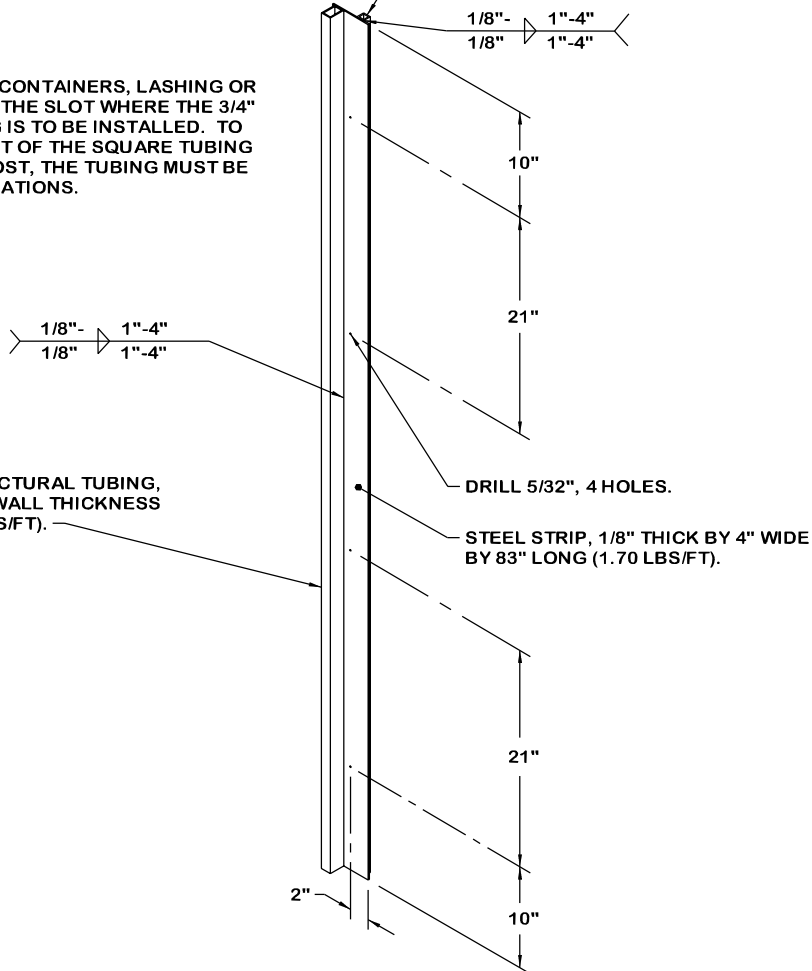
RECTANGULAR STRUCTURAL  
TUBING, 1-1/2" BY 1" BY .120"  
WALL THICKNESS BY 83"  
LONG (1.84 LBS/FT).

**VIEW A**

VIEW A  
SQUARE STRUCTURAL TUBING,  
3/4" SQUARE BY .120" WALL  
THICKNESS BY 83" LONG (1.03 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.



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.