

APPROVED BY  
BUREAU OF EXPLOSIVES

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# LOADING AND BRACING\* IN SIDE OPENING ISO CONTAINERS OF 2.75 INCH HYDRA ROCKETS PACKED IN PA151 CYLINDRICAL METAL CON- TAINERS ON 4-WAY ENTRY WOODEN PALLETS WITH METAL TOP LIFT

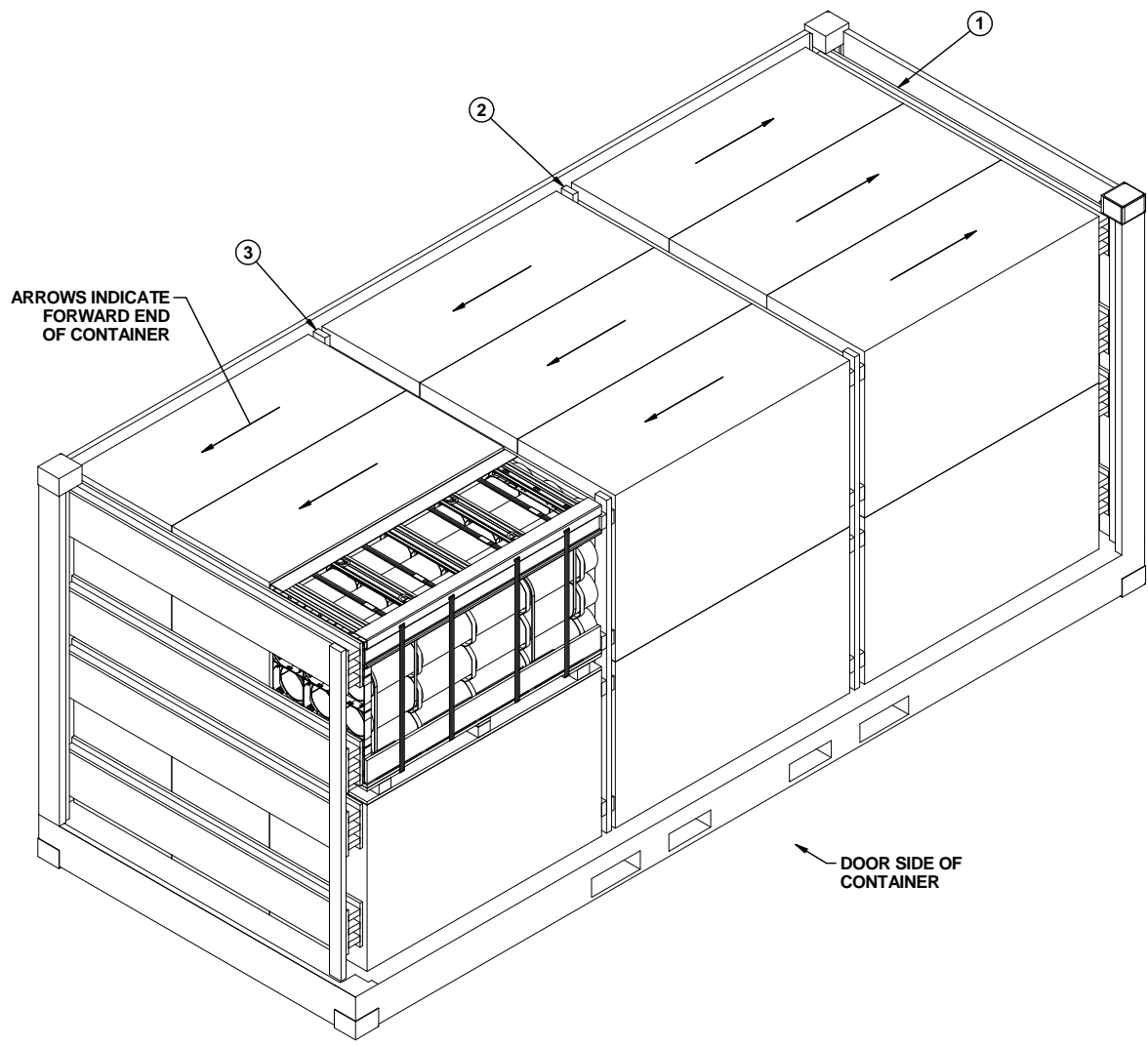
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\*THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY CONTAINER-ON-FLATCAR (COFC) RAIL, MOTOR, OR WATER CARRIERS.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND		<b>CAUTION:</b> VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.			
<i>David A. Smith</i>		<b>DO NOT SCALE</b>		<b>OCTOBER 2007</b>	
		ENGINEER OR TECHNICIAN	BASIC REV.	ADIN FELICIANO	
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND		TRANSPORTATION ENGINEERING DIVISION	<i>Rauna G. Zuffo</i>		CLASS DIVISION DRAWING FILE
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		ENGINEERING DIRECTORATE	<i>James Lee</i>		
U.S. ARMY DEFENSE AMMUNITION CENTER		19	48	4334/61	15PM1025



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.
- ② SEPARATOR GATE A (1 REQD). SEE THE DETAIL ON PAGE 6.
- ③ SEPARATOR GATE B (1 REQD). SEE THE DETAIL ON PAGE 6.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	30	10
2" X 4"	262	175
NAI LS	NO. REQD	POUNDS
6d (2")	560	3
10d (3")	192	3
PLYWOOD, 3/4" - - 111.2 SQ FT REQD - - 229.3 LBS		

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT - - - - -	18 - - - - -	36,180 LBS
DUNNAGE - - - - -	- - - - -	605 LBS
CONTAINER - - - - -	- - - - -	6,050 LBS
<b>TOTAL WEIGHT - - - - -</b>		<b>42,835 LBS (APPROX)</b>

**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).
- B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF 2.75 INCH ROCKETS, PACKED IN PA151 CONTAINERS, PALLETIZED. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4 AND AMC DRAWING 19-48-4326/61-20PM1012 FOR DETAILS OF THE PALLET UNIT. CAUTION: REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE SIDE OPENING ISO CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOAD AS SHOWN IS BASED ON A 6,050 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH SIDE OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 89" WIDE BY 88" HIGH, WITH A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. 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 INSTALLING SHEETS OF PLYWOOD ON THE DOOR SIDE OF THE CONTAINER.
- 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 ENDWALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE END 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 ENDWALLS, 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.
- 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.

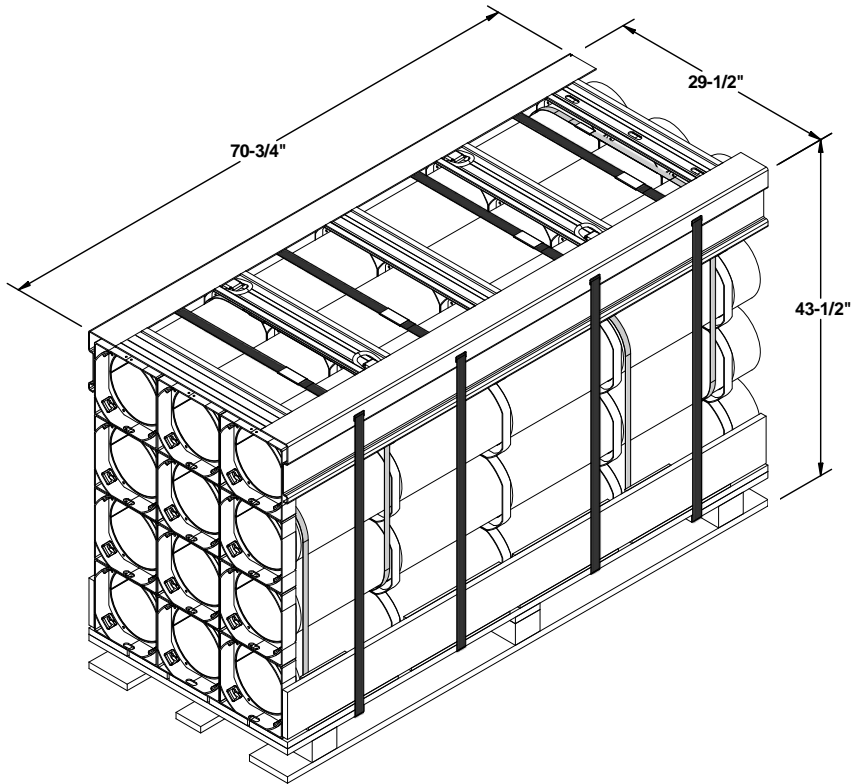
- M. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:
  1. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN 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.

(CONTINUED AT RIGHT)

- 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 "LESS-THAN-FULL LOAD PROCEDURE" ON PAGE 8.
- Q. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN PALLET UNITS OR BETWEEN PALLET UNITS AND THE SIDE OPENING CONTAINER, IF DESIRED, TO PREVENT CHAFING DAMAGE TO PALLET UNIT PAINT AND MARKINGS.
- R. RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD ON PAGE 2:
  1. PREFABRICATE TWO END BLOCKING ASSEMBLIES, ONE SEPARATOR GATE "A" AND ONE SEPARATOR GATE "B".
  2. INSTALL THE END BLOCKING ASSEMBLIES.
  3. LOAD TWELVE PALLET UNITS.
  4. INSTALL ONE SEPARATOR GATE "A".
  5. LOAD SIX PALLET UNITS.
  6. INSTALL ONE SEPARATOR GATE "B".

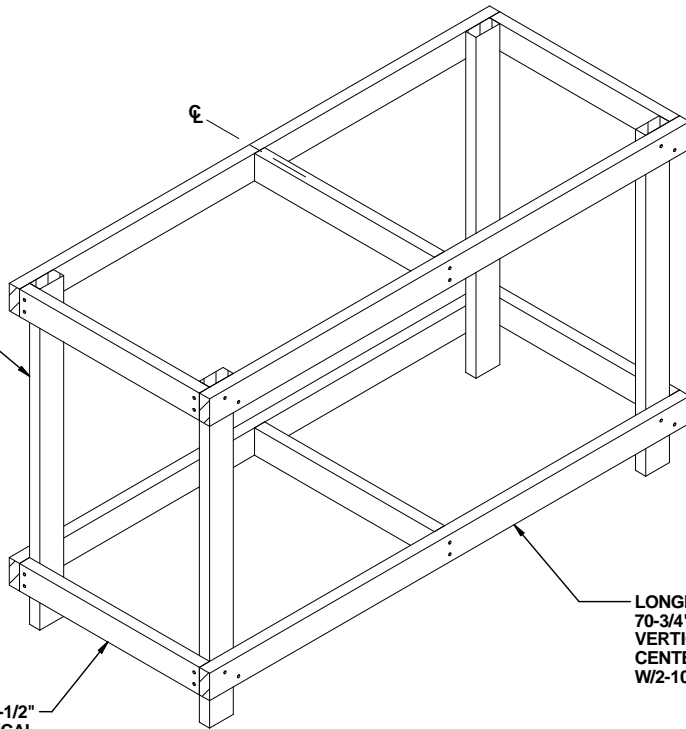
**MATERIAL SPECIFICATIONS**

- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS - - - - - : ASTM F1667; COMMON STEEL NAIL NLCMS OR NLCMMS).
- PLYWOOD - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR OR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- WIRE, CARBON STEEL - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.
- ANTI-CHAFING MATERIAL - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.



**PALLET UNIT**

GROSS WEIGHT - - - - - 2,010 LBS  
 CUBE - - - - - 52.6 CU FT



VERTICAL PIECE, 2" X 4" X 43-1/2" (4 REQD).

LATERAL PIECE, 2" X 4" X 26-1/2" (6 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.

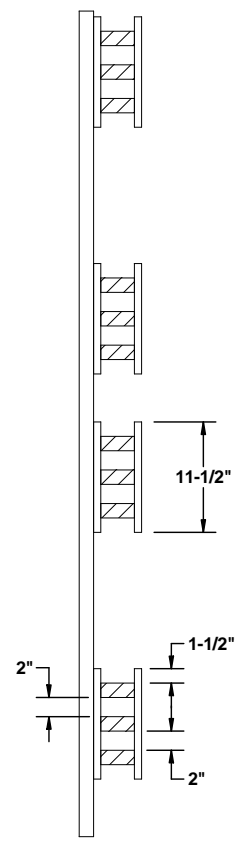
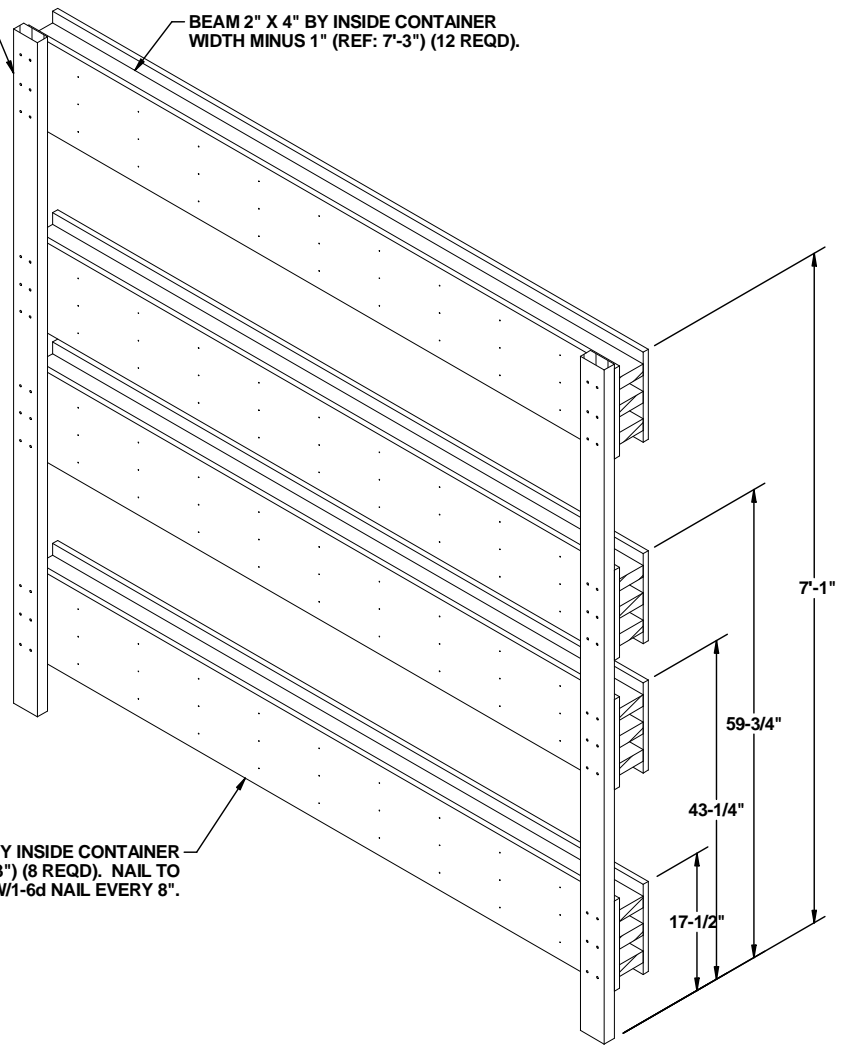
LONGITUDINAL PIECE, 2" X 4" X 70-3/4" (4 REQD). NAIL TO THE VERTICAL PIECES AND THE CENTER LATERAL PIECE W/2-10d NAILS AT EACH JOINT.

**FILLER ASSEMBLY  
 FOR MINUS ONE PALLET UNIT.**

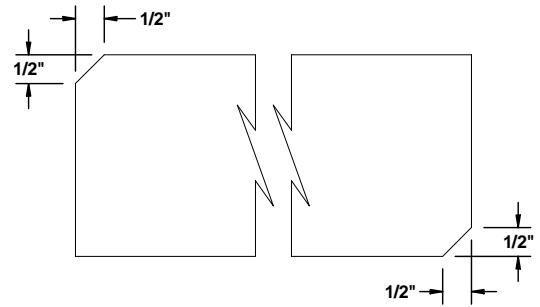
**BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (2 REQD). NAIL THROUGH PLYWOOD INTO THE BEAMS W/2-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "G" ON PAGE 3.**

**BEAM 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-3") (12 REQD).**

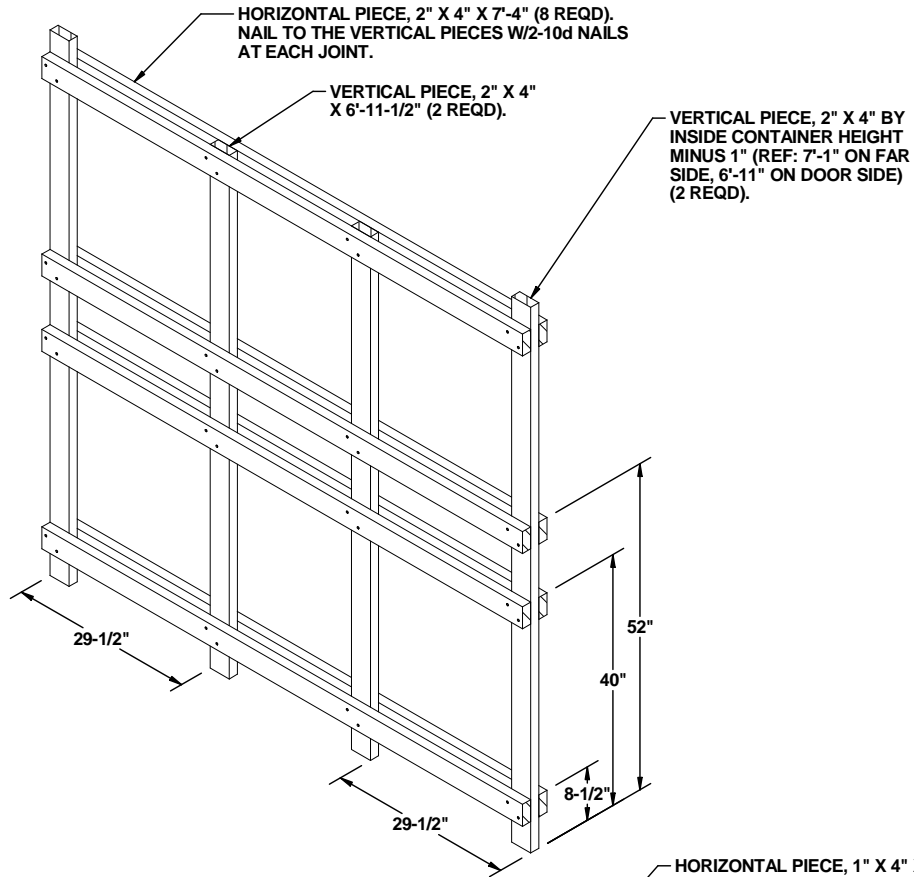
**PLYWOOD, 3/4" X 11-1/2" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-3") (8 REQD). NAIL TO THE BEAMS W/1-6d NAIL EVERY 8".**



**END BLOCKING ASSEMBLY**  
**NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES.**



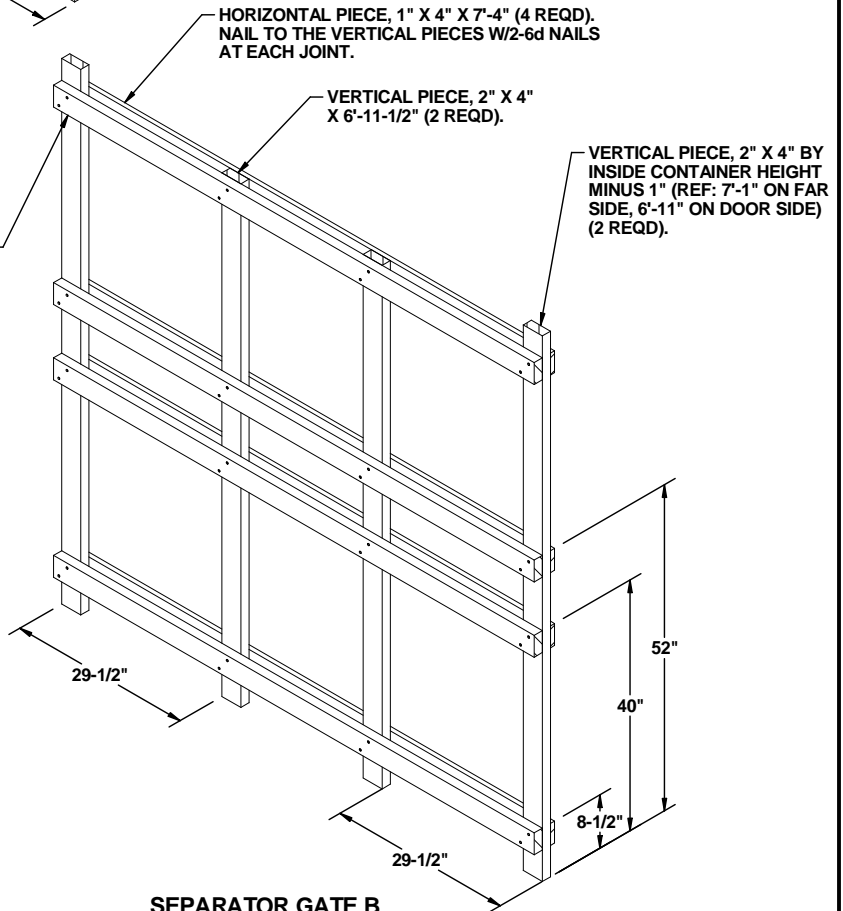
**BEVEL-CUT**  
**IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE INSTALLATION AND ACHIEVE A TIGHT FIT.**



**SEPARATOR GATE A**

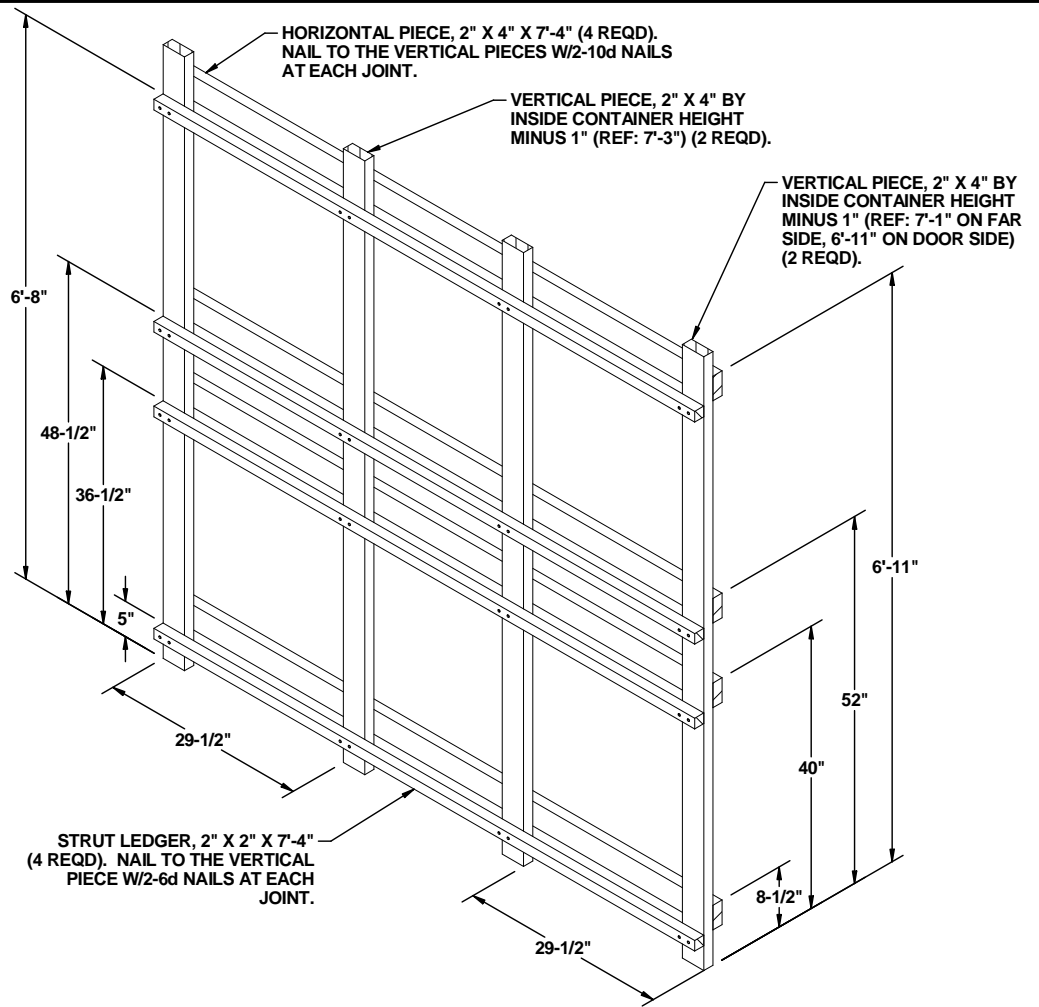
NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP  
FOUR HORIZONTAL PIECES AND REDUCE THE HEIGHT  
OF THE MIDDLE VERTICAL PIECES TO 40"

HORIZONTAL PIECE, 2" X 4" X 7'-4" (4 REQD).  
NAIL TO THE VERTICAL PIECES W/2-10d NAILS  
AT EACH JOINT.



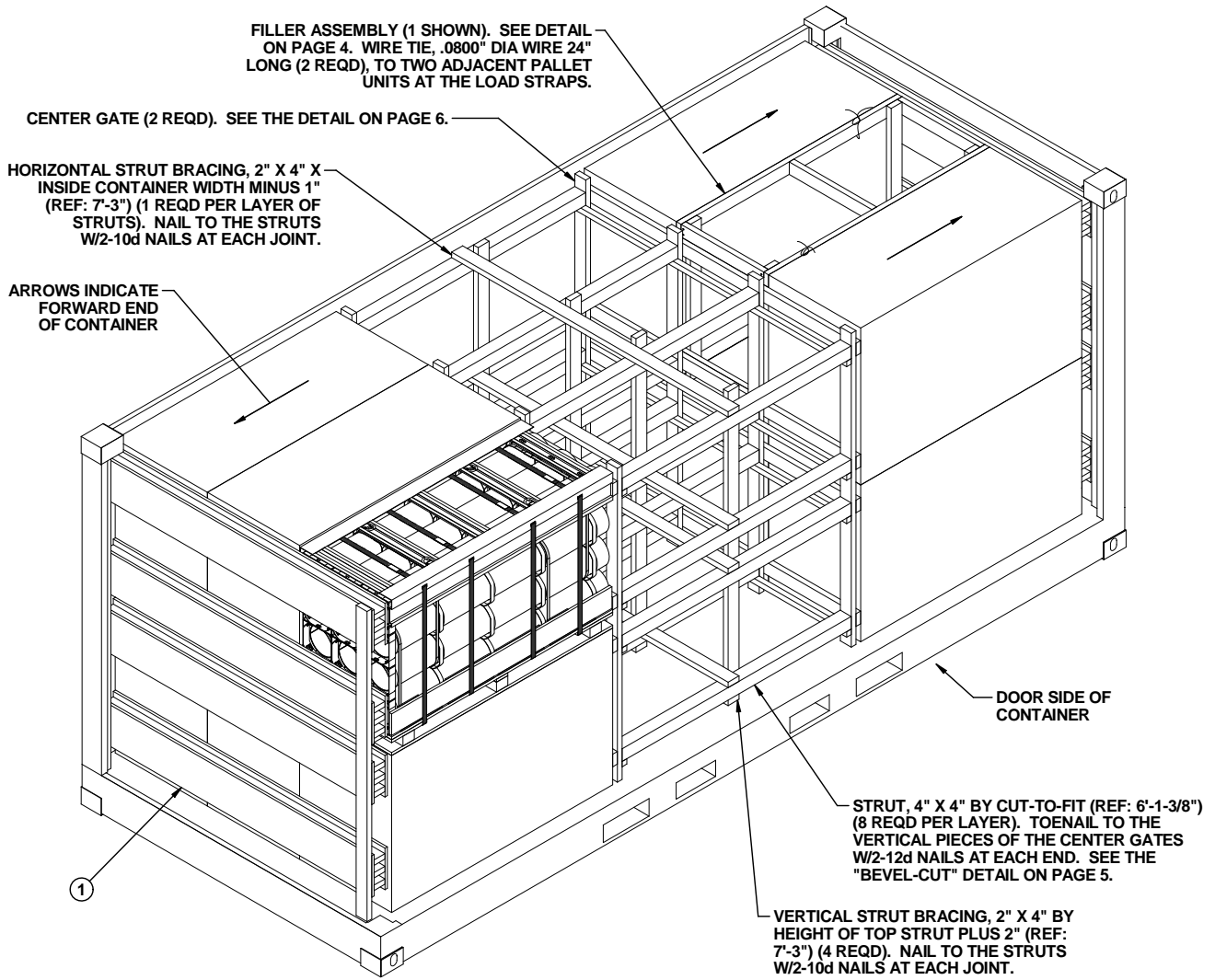
**SEPARATOR GATE B**

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP  
FOUR HORIZONTAL PIECES AND REDUCE THE HEIGHT  
OF THE TWO INNER VERTICAL PIECES TO 40"



**CENTER GATE**

NOTE: FOR ONE-HIGH LOADS, REMOVE THE TOP TWO HORIZONTAL PIECES AND LEDGERS AND REDUCE THE HEIGHT OF THE MIDDLE TWO VERTICAL PIECES TO 44".



**LESS-THAN-FULL LOADING PROCEDURE**  
 KEY NUMBERS REFER TO THE KEY NUMBERS ON PAGE 2.  
 SEE GENERAL NOTE "H" ON PAGE 3.