

# LOADING AND BRACING<sup>⊕</sup> IN SIDE OPENING ISO CONTAINER OF BOMB, BLU-121, 2,000 LBS, ON MK79 PALLET

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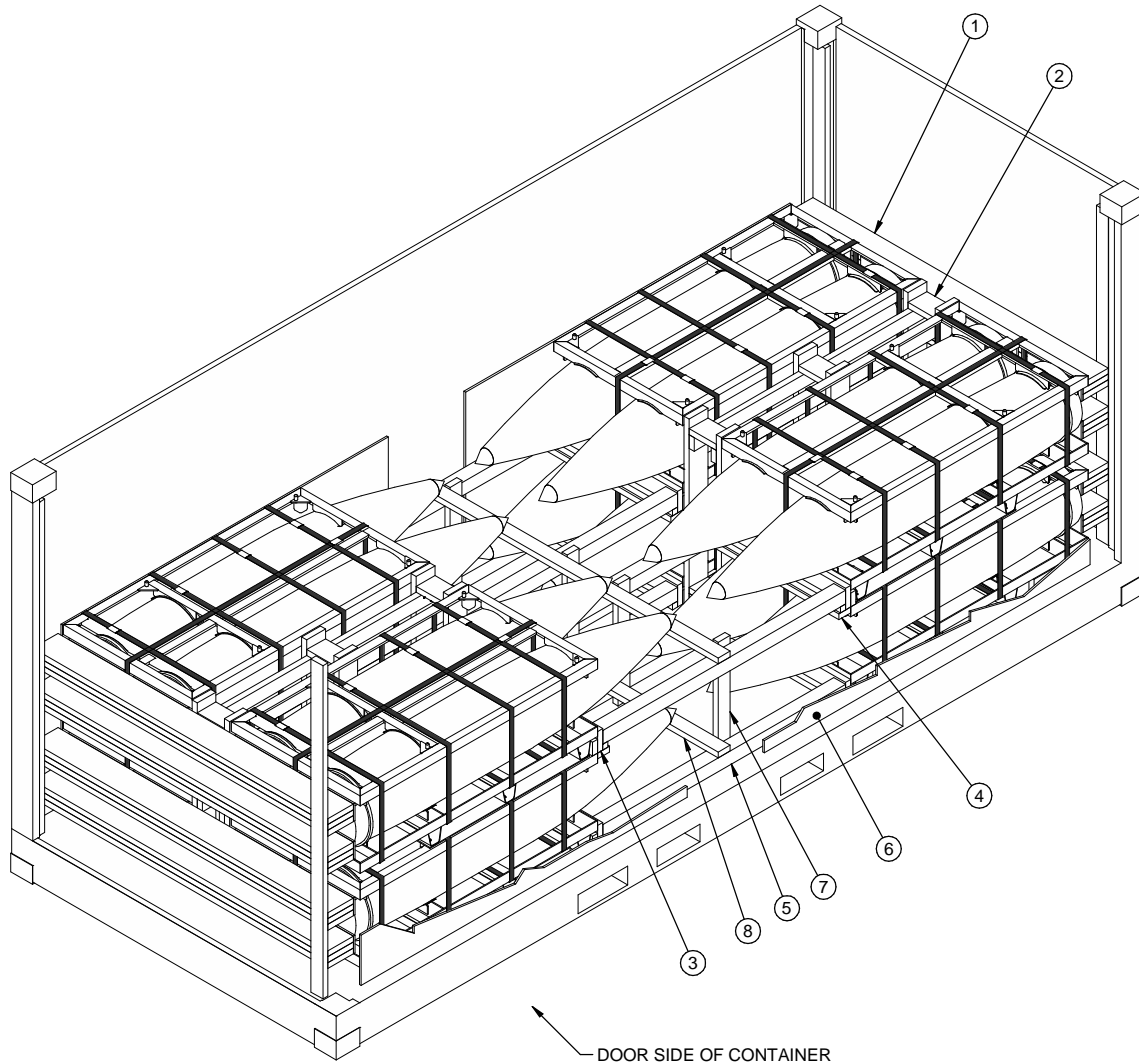
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⊕ THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED  
BY CONTAINER-ON-FLATCAR (COFC) RAIL, MOTOR, OR WATER CARRIERS.

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**ISOMETRIC VIEW**

DOOR SIDE OF CONTAINER

**KEY NUMBERS**

- ① END BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 5.
- ② CRIB FILL ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 6. POSITION BETWEEN LATERALLY ADJACENT PALLET UNITS AS SHOWN.
- ③ CENTER GATE (8 REQD). SEE DETAIL ON PAGE 6. PLACE AGAINST THE PALLET UNITS WITH THE 2" X 4" CLEAT POSITIONED UNDER THE PALLET.
- ④ SOLID FILL, 2" X 6" X 38" (AS NEEDED TO FILL VOID BETWEEN THE TOP OF THE BOMBS IN THE BOTTOM LAYER AND THE BASE OF THE TOP PALLET) (4 REQD). LAMINATE THE FIRST LAYER TO THE SECOND LAYER W/4-10d NAILS. LAMINATE ADDITIONAL LAYERS IN A LIKE MANNER. TOENAIL THE CENTER GATE IN THE TOP LAYER TO FILL MATERIAL W/4-10d NAILS.
- ⑤ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 6' 0") (8 REQD). TOENAIL TO THE CENTER GATES W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 4.
- ⑥ LINER ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 5.
- ⑦ VERTICAL STRUT BRACING, 2" X 4" X 31" (4 REQD). POSITION AS SHOWN AND NAIL TO EACH STRUT W/2-10d NAILS AT EACH JOINT.
- ⑧ HORIZONTAL STRUT BRACING, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7' 3") (2 REQD). PLACE ALONG THE TOP AND BOTTOM ROW OF STRUTS AND NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	25	8
2" X 4"	159	106
2" X 6"	111	111
2" X 8"	174	232
4" X 4"	48	64
NAILS	NO. REQD	POUNDS
6d (2-1/2")	120	3/4
10d (3")	556	8-1/2
12d (3-1/2")	32	1/2
PLYWOOD, 1/2" - - 144.00 SQ FT REQD - 198.00 LBS		

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT - - - - -	8 - - - - -	33,064 LBS
DUNNAGE - - - - -	- - - - -	1,250 LBS
CONTAINER - - - - -	- - - - -	6,050 LBS
<b>TOTAL WEIGHT - - - - -</b>		<b>40,364 LBS (APPROX)</b>

## GENERAL NOTES

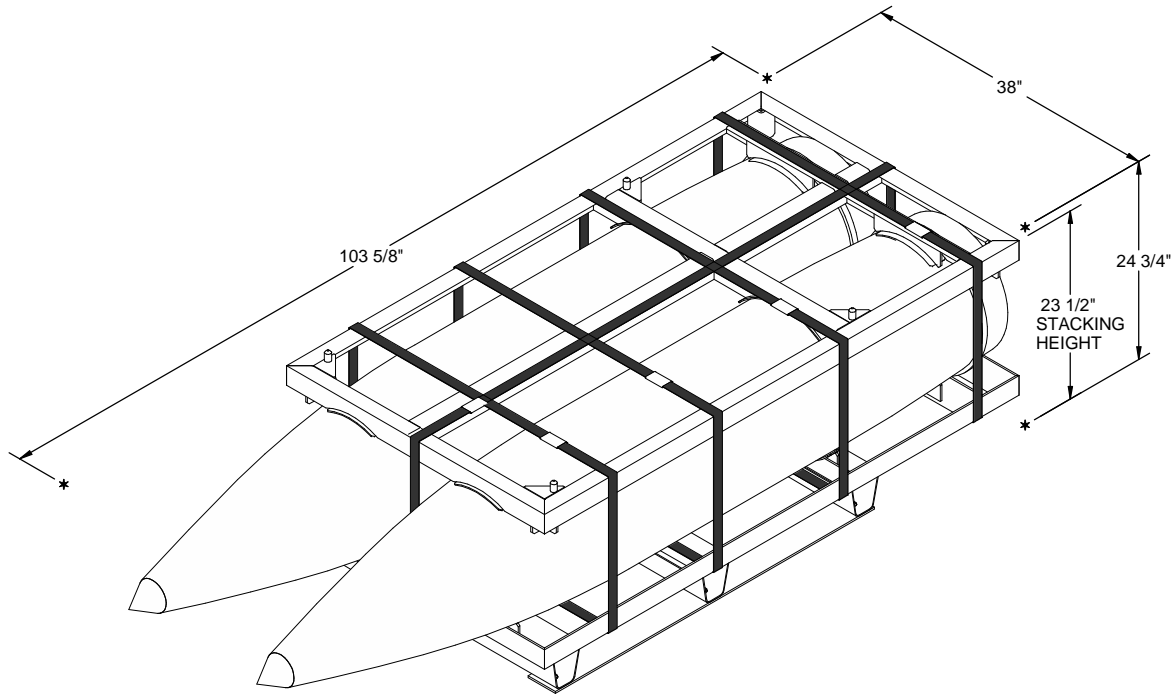
(GENERAL NOTES CONTINUED)

- 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 2,000 POUND BOMBS ON MK79 METAL PALLETS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4 AND AIR FORCE TO 11A1-14-7 FOR DETAILS OF THE PALLET UNIT. **CAUTION:** REGARDLESS OF THE QUANTITY OF PALLET UNITS 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. OLDER/OTHER CONTAINERS MAY HAVE DIFFERENT INSIDE MEASUREMENTS, VERIFY INSIDE CONTAINER DIMENSIONS 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 CRIB FILL ASSEMBLIES, OR BY ADJUSTING THE LENGTH OF THE STRUTS ON THE CRIB FILL ASSEMBLY. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE PLYWOOD THICKNESS OF THE LINER ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE PALLET UNIT.
- E. THIS DRAWING DEPICTS AN EIGHT PALLET UNIT MAXIMUM CONFIGURATION, WITH A LADING WEIGHT OF 40,364 POUNDS. DUE TO RESTRICTIONS ENACTED BY THE SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND AND THE JOINT MUNITIONS COMMAND, ANY ISO CONTAINER DESTINED TO BE MOVED OVER CONUS HIGHWAYS CANNOT EXCEED 40,000 POUNDS GROSS WEIGHT. IN ORDER TO COMPLY WITH THIS RESTRICTION, ONE PALLET UNIT MUST BE ELIMINATED FROM THE EIGHT PALLET UNIT MAXIMUM LOAD. THIS WILL RESULT IN A SEVEN PALLET UNIT LOAD WITH A GROSS WEIGHT OF 36,372 POUNDS. SEE THE "LESS-THAN-FULL LOAD PROCEDURE" ON PAGE 7 FOR DETAILS.
- 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. **CAUTION:** DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- J. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- K. **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.
- L. 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.
- M. 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.
- N. 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.
- O. 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 PROCEDURES ON PAGE 7.
- P. 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.
- Q. STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN IN THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 73 OF DRAWING AMC 19-48-4153-15PA1002. BRACING IS NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48". THE LENGTH OF THE LOAD-BLOCKING STRUTS SHOULD BE KEPT AS SHORT AS POSSIBLE (APPROX 18" MINIMUM), BUT IN THE EVENT IT IS NECESSARY TO USE STRUTS WHICH ARE 8'-0" OR MORE IN LENGTH, IT WILL BE NECESSARY TO APPLY AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES AND THE CENTER GATES AND/OR BETWEEN ADJACENT STRUT BRACING PIECES.
- R. 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.
- S. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:  
1. PREFABRICATE TWO END BLOCKING ASSEMBLIES, FOUR LINER ASSEMBLIES, TWO CRIB FILL ASSEMBLIES AND EIGHT CENTER GATES.  
2. INSTALL ONE END BLOCKING ASSEMBLY AND ONE LINER ASSEMBLY.  
3. LOAD TWO PALLET UNITS AND ONE CRIB FILL ASSEMBLY.  
4. LOAD TWO PALLET UNITS ADJACENT TO THE PREVIOUSLY INSTALLED CRIB FILL ASSEMBLY.  
5. REPEAT STEPS 2, 3, AND 4.  
6. INSTALL EIGHT CENTER GATES, FILL MATERIAL, AND STRUTS.  
7. INSTALL HORIZONTAL AND VERTICAL STRUT BRACING.  
8. INSTALL TWO LINER ASSEMBLIES.

## MATERIAL SPECIFICATIONS

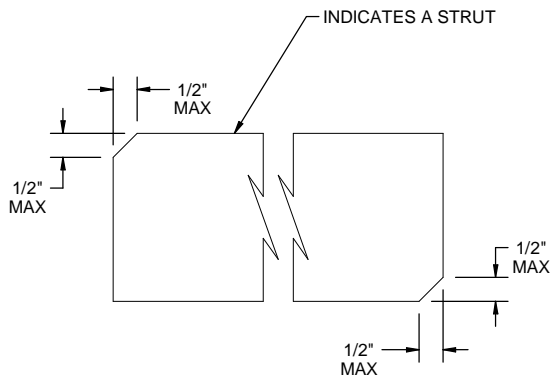
- LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL NLCMS OR NLCMMS).
- PLYWOOD** - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED 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.

(CONTINUED AT RIGHT)



**PALLET UNIT**

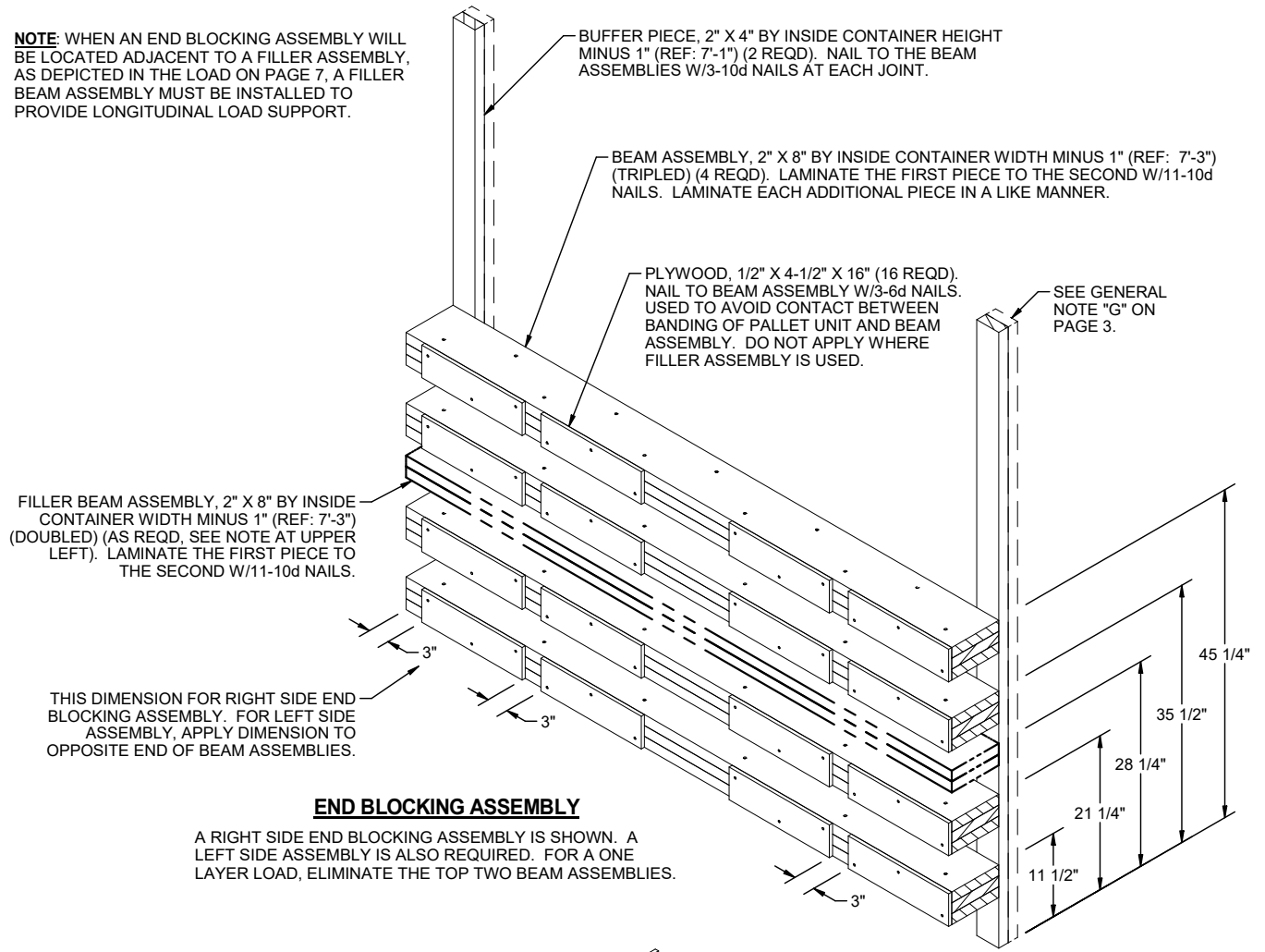
GROSS WEIGHT - - - - - 4,133 LBS  
 CUBE - - - - - 56.4 CU FT



**BEVEL CUT**

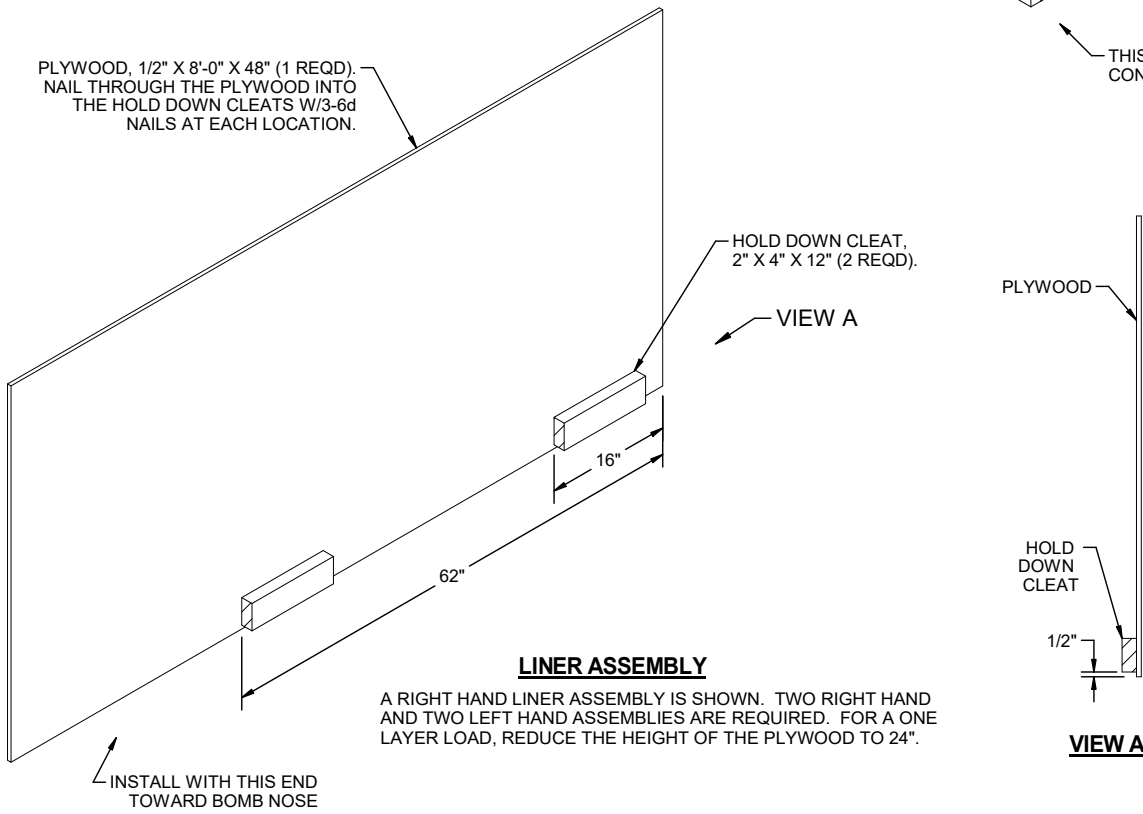
IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE INSTALLING THE STRUTS WITH A "DRIVE" FIT.

**NOTE:** WHEN AN END BLOCKING ASSEMBLY WILL BE LOCATED ADJACENT TO A FILLER ASSEMBLY, AS DEPICTED IN THE LOAD ON PAGE 7, A FILLER BEAM ASSEMBLY MUST BE INSTALLED TO PROVIDE LONGITUDINAL LOAD SUPPORT.



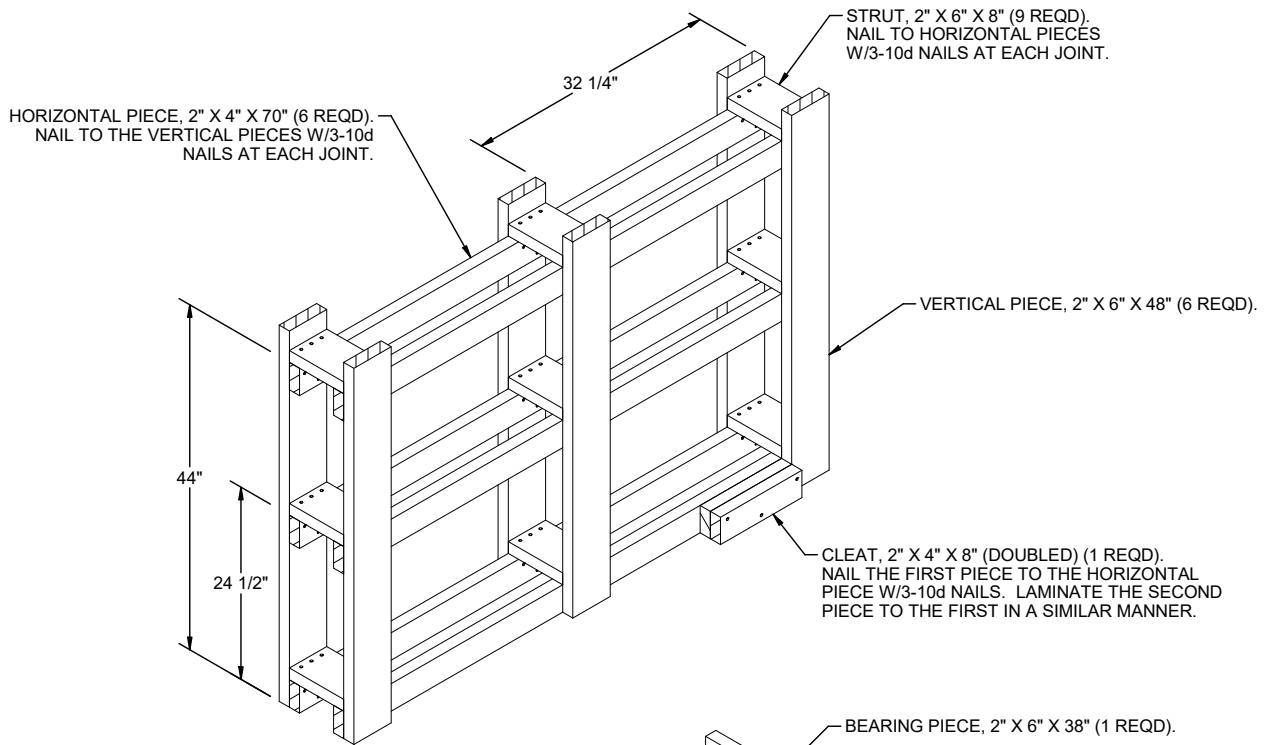
**END BLOCKING ASSEMBLY**

A RIGHT SIDE END BLOCKING ASSEMBLY IS SHOWN. A LEFT SIDE ASSEMBLY IS ALSO REQUIRED. FOR A ONE LAYER LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES.



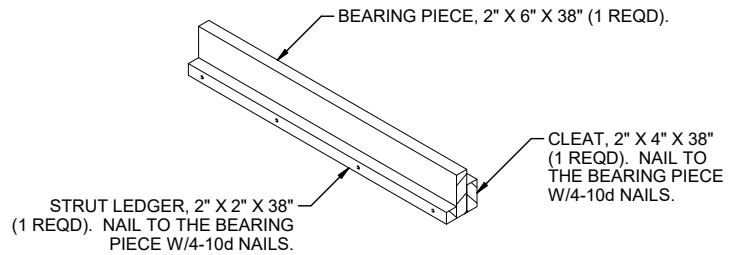
**LINER ASSEMBLY**

A RIGHT HAND LINER ASSEMBLY IS SHOWN. TWO RIGHT HAND AND TWO LEFT HAND ASSEMBLIES ARE REQUIRED. FOR A ONE LAYER LOAD, REDUCE THE HEIGHT OF THE PLYWOOD TO 24".



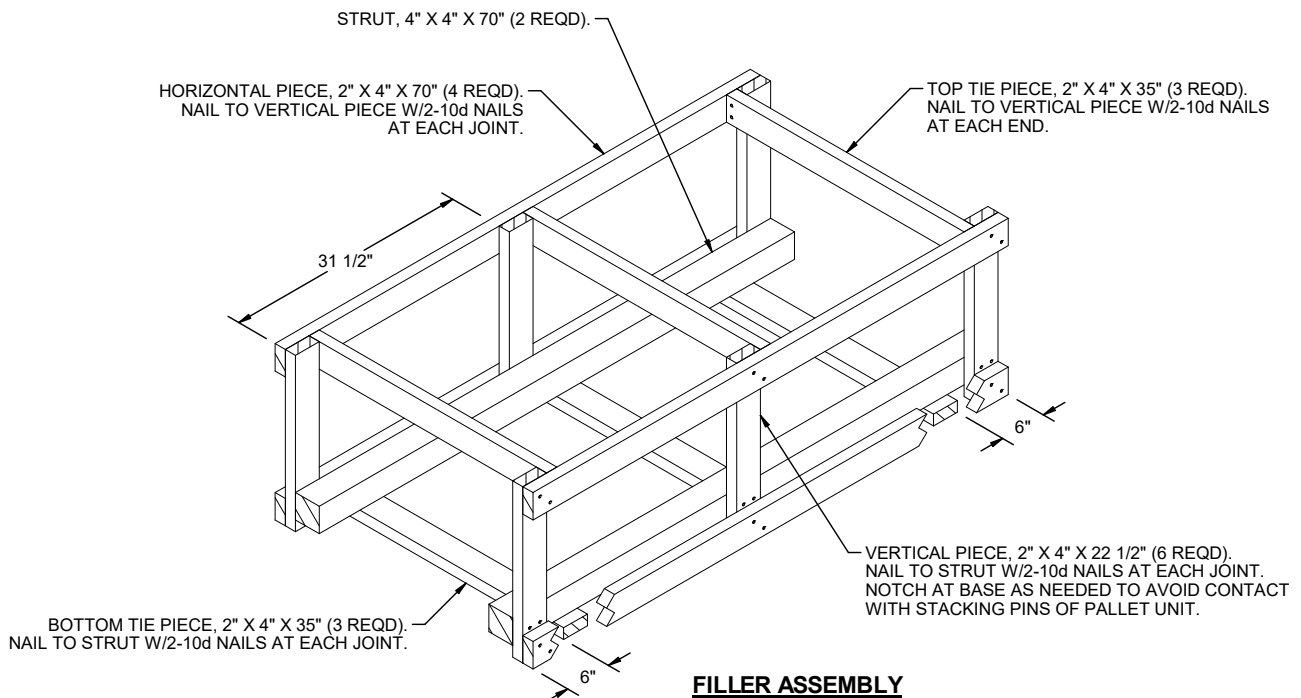
**CRIB FILL ASSEMBLY**

FOR A ONE LAYER LOAD, REDUCE THE HEIGHT OF THE VERTICAL PIECES TO 28", ELIMINATE THE TWO TOP HORIZONTAL PIECES AND THE THREE TOP STRUTS, AND REDUCE THE HEIGHT OF THE STRUTS AT 24 1/2" TO 22".



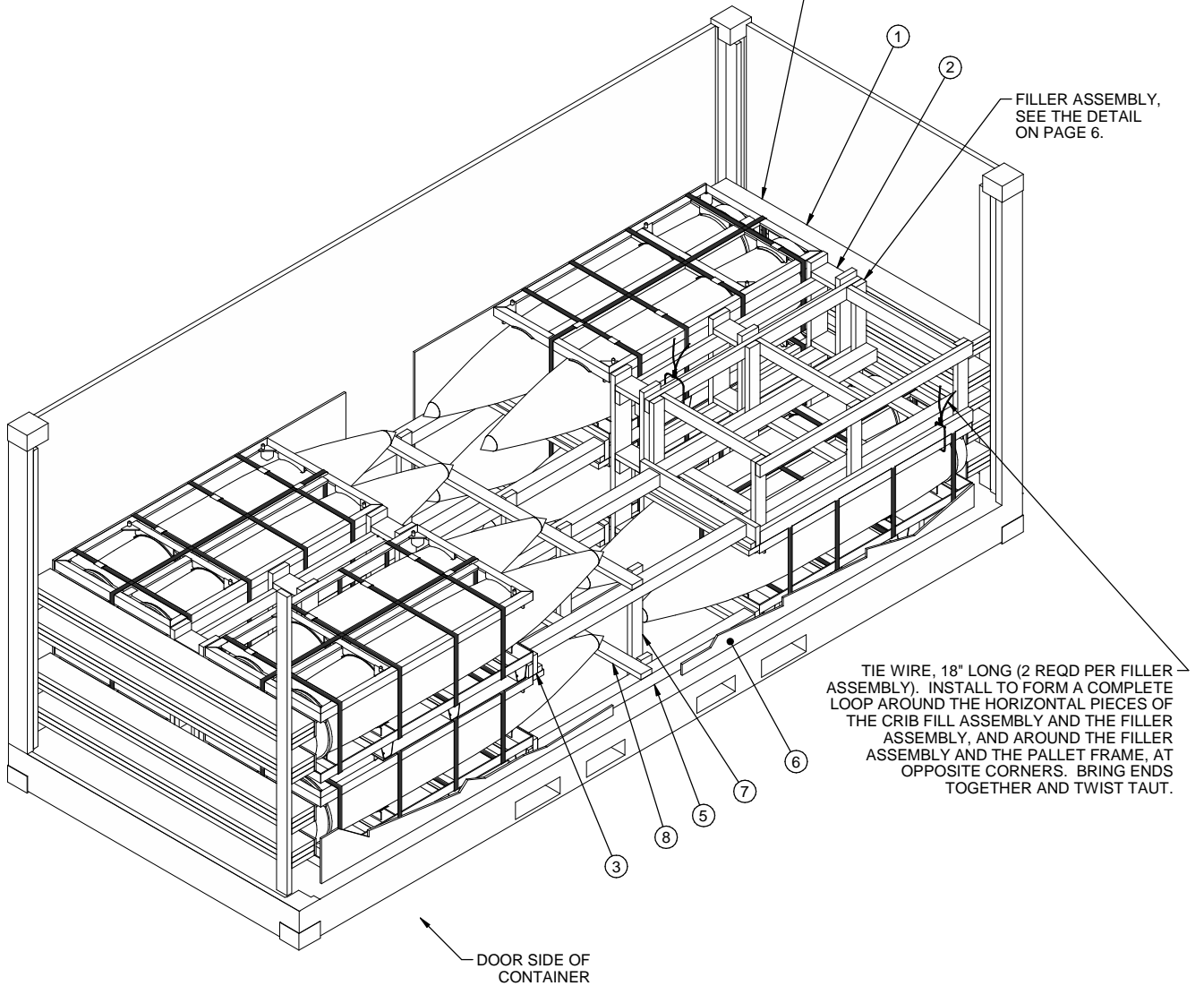
**CENTER GATE**

ELIMINATE THE CLEAT FOR GATES NEXT TO FILLER ASSEMBLIES.



**FILLER ASSEMBLY**

**NOTE:** THE RIGHT END BLOCKING ASSEMBLY HAS BEEN MODIFIED TO INCLUDE THE FILLER BEAM ASSEMBLY, TO CORRECTLY PROVIDE LONGITUDINAL SUPPORT WHEN USING THE FILLER ASSEMBLY. SEE THE DETAIL ON PAGE 5.



**LESS-THAN-FULL-LOAD PROCEDURE**

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (LESS THAN EIGHT UNITS). KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. SEE GENERAL NOTE "P" ON PAGE 3.

