

LOADING AND BRACING[⊕] WITH WOODEN DUNNAGE IN SIDE OPEN- ING ISO CONTAINERS OF MK82 500 POUND BOMBS ON MK9 MOD 0 METAL PALLETS

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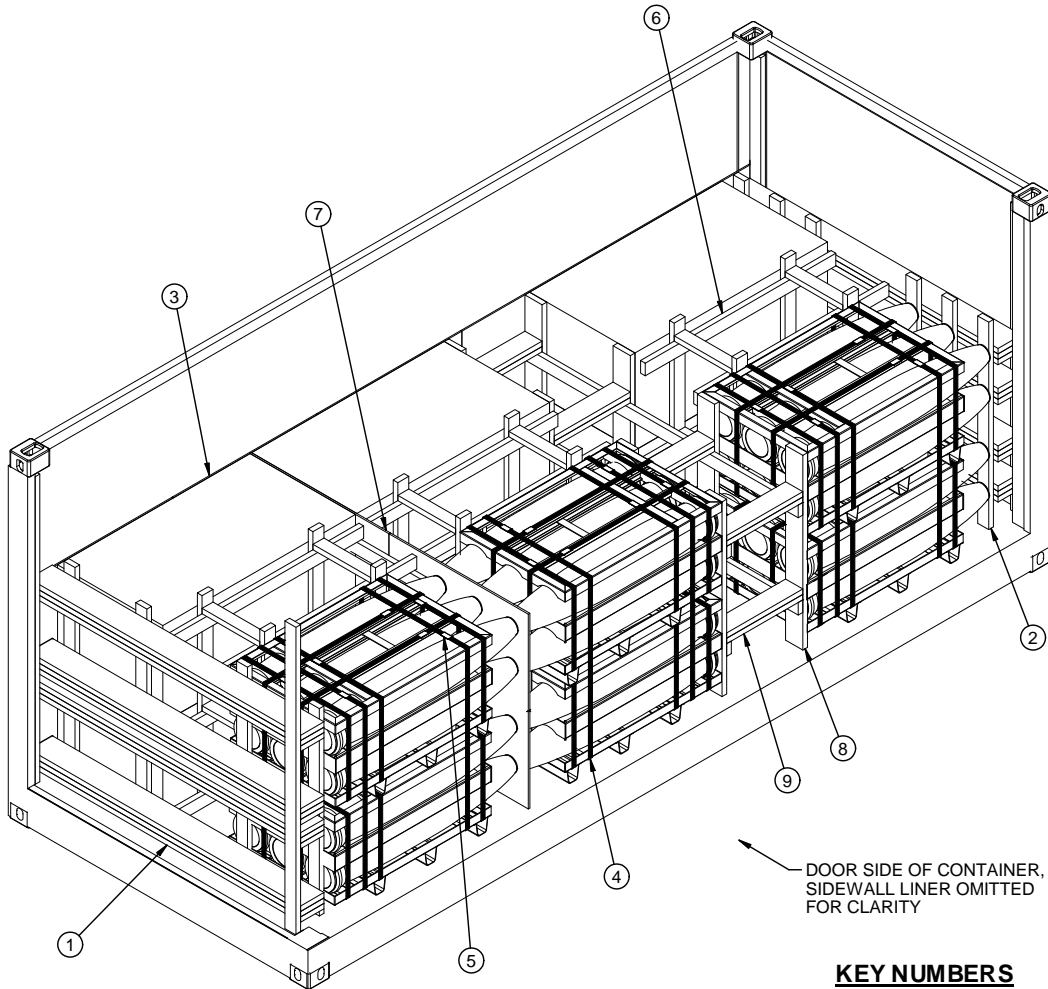
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⊕ THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL, MOTOR, OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

<p>APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND</p> <p>RUS.ALLEN.J .1230354282</p> <small>Digitally signed by RUS.ALLEN.J.1230354282 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=RUS.ALLEN.J.1230354282 Date: 2014.11.24 13:48:53 -06'00'</small>	<p>CAUTION: VERIFY PRIOR TO USE AT HTTPS://MHP.REDSTONE.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.</p>						
	<p>DO NOT SCALE</p>		<p>SEPTEMBER 1998</p>				
<p>APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND</p> <p>SHIMP.UPTON .R.1231257183</p> <small>Digitally signed by SHIMP.UPTON.R.1231257183 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SHIMP.UPTON.R.1231257183 Date: 2014.11.25 08:32:51 -06'00'</small>	<p>ENGINEER OR TECHNICIAN</p>	<p>BASIC REV.</p>	<p>MICHAEL SARDONE</p>	<p>REVISION NO. 1</p>	<p>NOVEMBER 2014</p>		
	<p>ENGINEERING DIVISION</p>	<p>FIEFFER.LAUR A.A.1230375727</p> <small>Digitally signed by FIEFFER.LAUR.A.1230375727 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FIEFFER.LAUR.A.1230375727 Date: 2014.10.29 10:04:44 -06'00'</small>	<p>SEE THE REVISION LISTING ON PAGE 3</p>				
	<p>TEST REPORT</p>	<p>NA</p>	<p>FELICIANO.AD IN.1259200373</p> <small>Digitally signed by FELICIANO.ADIN.1259200373 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FELICIANO.ADIN.1259200373 Date: 2014.11.03 09:05:46 -06'00'</small>	<p>CLASS</p>	<p>DIVISION</p>	<p>DRAWING</p>	<p>FILE</p>
	<p>EXPLOSIVE SAFETY DIRECTORATE</p>	<p>CAMBRON.KIMBE RLY.K.1229953512</p> <small>Digitally signed by CAMBRON.KIMBERLY.K.1229953512 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=CAMBRON.KIMBERLY.K.1229953512 Date: 2014.11.13 08:06:29 -06'00'</small>	<p>19</p>	<p>48</p>	<p>4314</p>	<p>15PB1011</p>	



ISOMETRIC VIEW

DOOR SIDE OF CONTAINER,
SIDEWALL LINER OMITTED
FOR CLARITY

KEY NUMBERS

- ① END BLOCKING ASSEMBLY A (1 REQD). SEE THE DETAIL ON PAGE 5 AND GENERAL NOTES "D" AND "E" ON PAGE 3.
- ② END BLOCKING ASSEMBLY B (1 REQD). SEE THE DETAIL ON PAGE 5 AND GENERAL NOTES "D" AND "E" ON PAGE 3.
- ③ SIDEWALL LINER, PLYWOOD, 3/8" THICK BY 54" HIGH (AS REQD). POSITION SO AS TO BE BETWEEN THE LADING AND THE CONTAINER SIDEWALL AND THE CONTAINER DOORS. MAY BE SECURED IN PLACE BY TAPE.
- ④ UNITIZING STRAP, 1-1/4" X .035" OR .031" X 14'-9-1/2" LONG STEEL STRAPPING (12 REQD). INSTALL SO AS TO ENCIRCLE TWO PALLET UNITS AS SHOWN.
- ⑤ SEAL FOR 1-1/4" STEEL STRAPPING (12 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "S" ON PAGE 3.
- ⑥ CRIB FILL (3 REQD). SEE THE DETAIL ON PAGE 6, POSITION BETWEEN THE LATERALLY ADJACENT STACKS OF PALLET UNITS.
- ⑦ SEPARATOR GATE (1 REQD). SEE THE DETAIL ON PAGE 6.
- ⑧ CENTER GATE (2 REQD). SEE THE DETAIL ON PAGE 7.
- ⑨ STRUT, 2" X 6" BY CUT-TO-FIT (REF: 24-38") (DOUBLED) (8 REQD). LAMINATE SECOND STRUT TO FIRST W/4-10d NAILS. TOENAIL TO THE CENTER GATES W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 7.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	289	193
2" X 6"	69	69
2" X 8"	174	232
NAI LS	NO. REQD	POUNDS
10d (3")	532	8-1/4
12d (3-1/4")	16	1/2
PLYWOOD, 3/8" - 173.13 SQ FT REQD - 178.50 LBS		
PLYWOOD, 1/2" - 33.47 SQ FT REQD - 46.02 LBS		
STEEL STRAPPING, 1-1/4" - 175.5' REQD- 25.07 LBS		
SEAL FOR 1-1/4" STRAPPING - 12 REQD - 0.55 LBS		

LOAD AS SHOWN

ITEM	QUANTI TY	WEIGHT (APPROX)
PALLET UNIT	12	38,100 LBS
DUNNAGE		1,245 LBS
CONTAINER		6,050 LBS
TOTAL WEI GHT		45,395 LBS (APPROX)

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 MK82 500 POUND BOMBS ON MK9 MOD 0 PALLETS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4 AND NAVY DRAWING WR-54/31 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 6,500 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH SIDE OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-6-1/4" LONG BY 90" WIDE BY 89" 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 HORIZONTAL PIECES ON THE CRIB FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND QUANTITY OF THE DUNNAGE LUMBER USED MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE PALLET UNIT. THE LOADS MUST BE AS TIGHT AS POSSIBLE LONGITUDINALLY, BUT THE VOID MUST NOT EXCEED 3/4" OVERALL. EXCESSIVE SLACK CAN BE ELIMINATED BY INCREASING THE LENGTH OF THE STRUTS.
- E. 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.
- F. THIS DRAWING DEPICTS A 12-PALLET UNIT MAXIMUM CONFIGURATION, WITH A LADING WEIGHT OF 45,395 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 CAN NOT EXCEED 40,000 POUNDS GROSS WEIGHT. IN ORDER TO COMPLY WITH THIS RESTRICTION, TWO PALLET UNITS MUST BE ELIMINATED FROM THE 12-PALLET UNIT MAXIMUM LOAD. THIS WILL RESULT IN A 10-PALLET UNIT LOAD WITH A GROSS WEIGHT OF 39,045 POUNDS. SEE THE "LESS-THAN-FULL" LOAD PROCEDURES ON PAGE 8 FOR DETAILS.
- 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.

(CONTINUED AT RIGHT)

- 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. 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.
- 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 PROCEDURE" ON PAGE 8.
- P. AS REQUIRED BY THE ASSOCIATION OF AMERICAN RAILROADS (AAR), ALL 1-1/4" AND 2" STEEL STRAPPING USED FOR LOAD RESTRAINT MUST BE MARKED AS SPECIFIED WITHIN THE APPLICABLE AAR RULES GOVERNING LOADING, BLOCKING AND BRACING OF FREIGHT WITHIN THE CONVEYANCE. FOR THE SPECIFIC MARKING SIZE, FREQUENCY, ETC., REQUIRED, REFER TO THE APPROPRIATE AAR LOADING RULES.
- Q. 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.
- R. LOAD-BLOCKING 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 19-48-4267-15PA1009. 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. NOTE THAT HORIZONTAL STRUT BRACING PIECES FOR THE UPPER LEVEL OF STRUTS FOR ALL BUT THE UPPERMOST TIER OF A LOAD MAY BE DIFFICULT TO APPLY TO THE TOP SURFACES OF THE STRUT AS DEPICTED. STRUT BRACING WILL BE EQUALLY EFFECTIVE IF APPLIED TO THE UNDER SIDE OF THOSE STRUTS.
- S. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEAL SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 4 FOR GUIDANCE.
- T. 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.

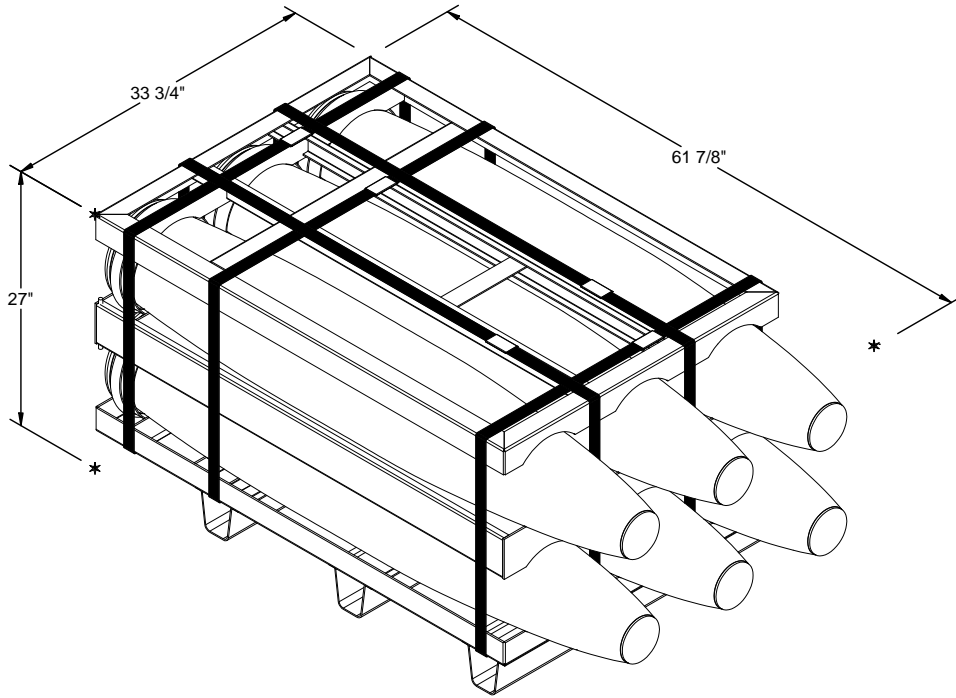
REVISION

REVISION NO. 1, DATED NOVEMBER 2014, CONSISTS OF:

1. CHANGING TO END BLOCKING AND CENTER GATE.
2. ADDING GENERAL NOTES.

MATERIAL SPECIFICATIONS

<u>LUMBER</u>	- - - - -	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
<u>NAILS</u>	- - - - -	ASTM F1667; COMMON STEEL NAIL NLCMS OR NLCMMS).
<u>PLYWOOD</u>	- - - - -	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.
<u>STRAPPING, STEEL</u>	- -	ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
<u>SEAL, STRAP</u>	- - - -	ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE 1, 11, OR 1V.



PALLET UNIT DATA

GROSS WEIGHT - - - - - 3,175 LBS
 CUBE - - - - - 32.6 CU FT



ONE SEAL WITH
TWO PAIR OF
NOTCHES.

STRAP JOINT A

METHOD OF SECURING A
STRAP JOINT WHEN USING
A NOTCH-TYPE SEALER.

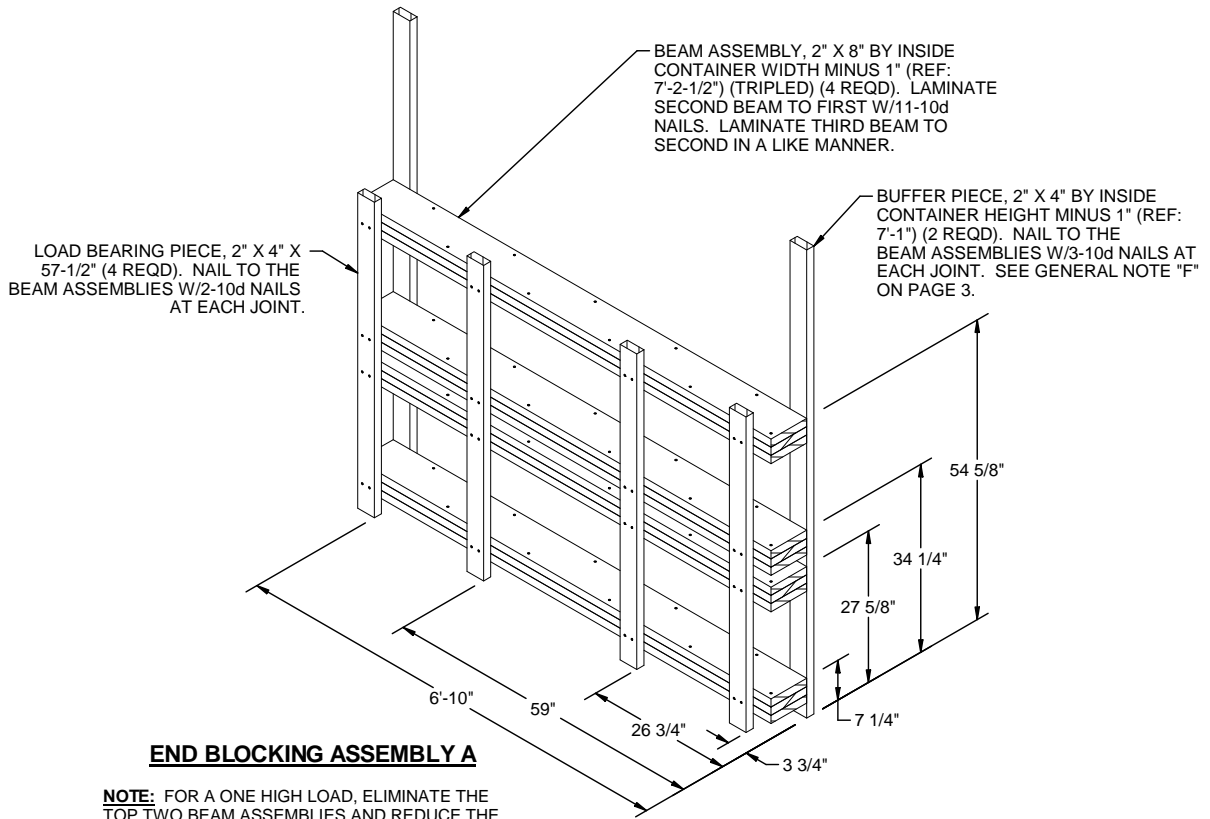


TWO SEALS, BUTTED
TOGETHER, WITH
TWO PAIR OF CRIMPS
EACH SEAL.

STRAP JOINT B

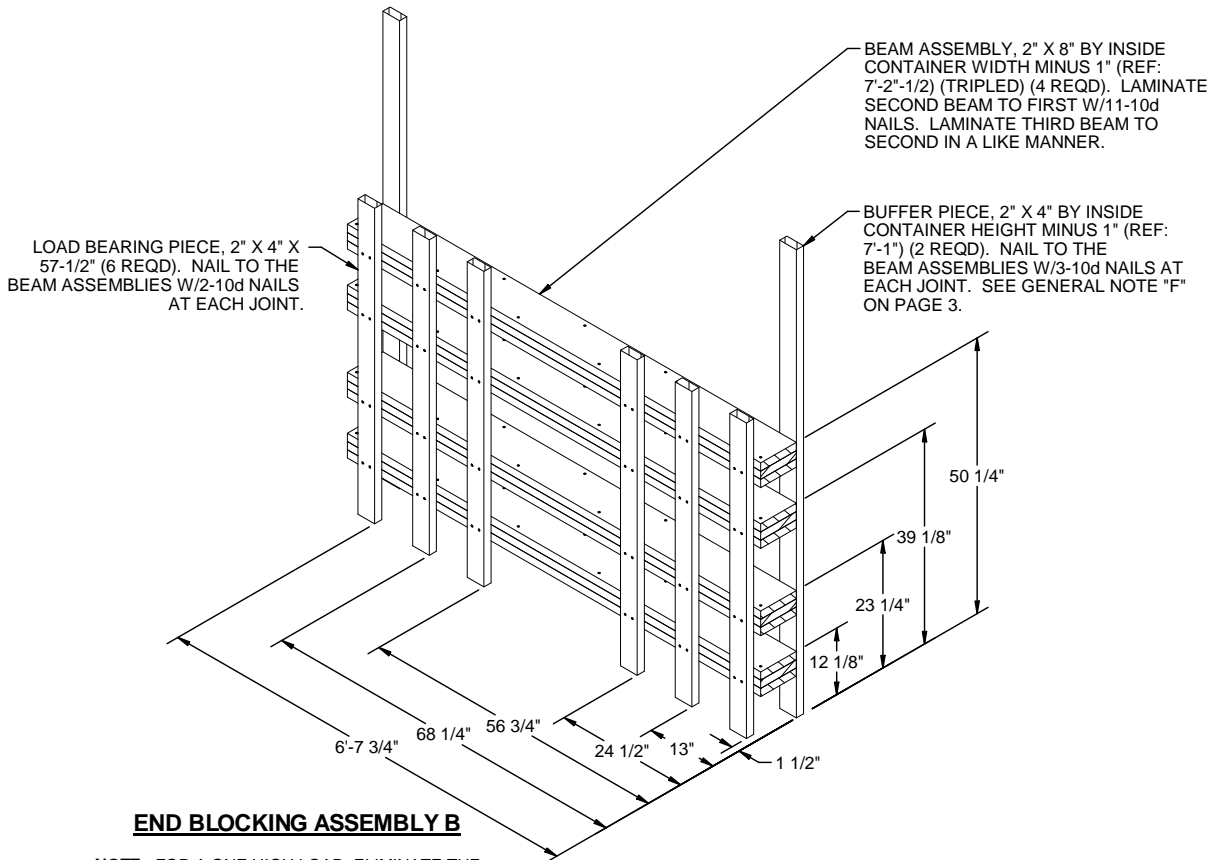
METHOD OF SECURING A
STRAP JOINT WHEN USING
A CRIMP-TYPE SEALER.

END-OVER-END LAP JOINT DETAILS



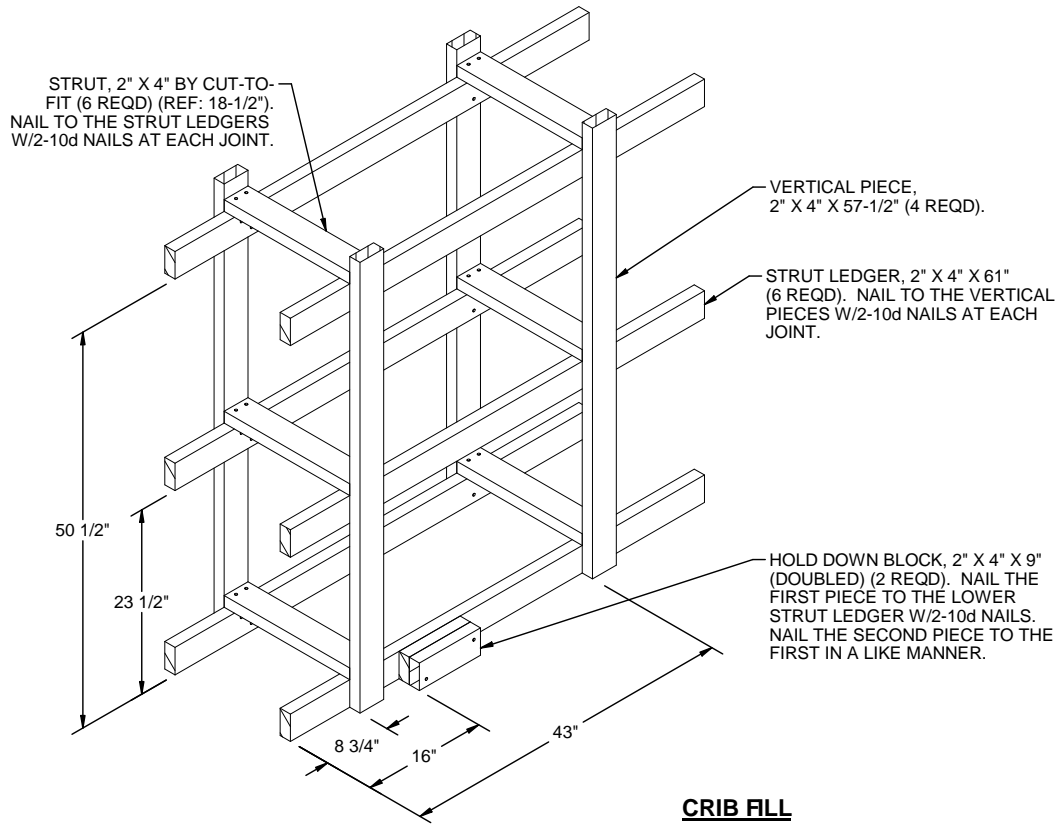
END BLOCKING ASSEMBLY A

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES AND REDUCE THE LOAD BEARING PIECES TO 29-1/2".



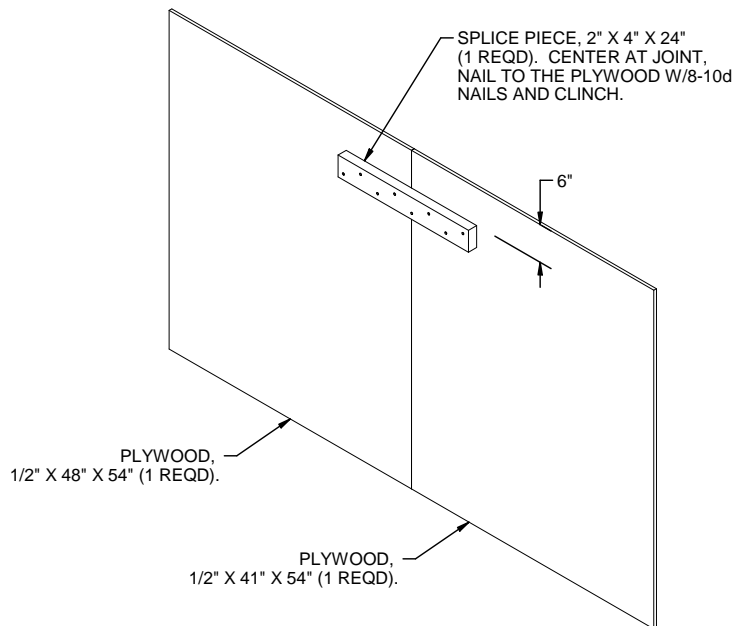
END BLOCKING ASSEMBLY B

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES AND REDUCE THE LOAD BEARING PIECES TO 29-1/2".



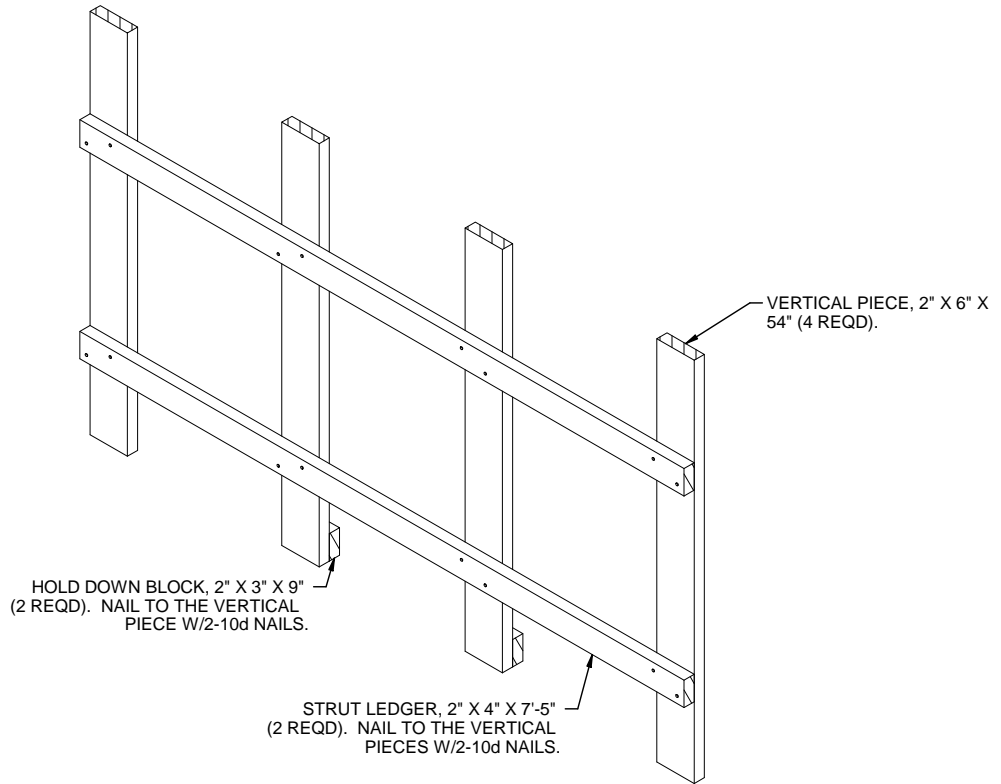
CRIB FILL

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO STRUTS AND STRUT LEDGERS AND REDUCE THE VERTICAL PIECES TO 29-1/2".



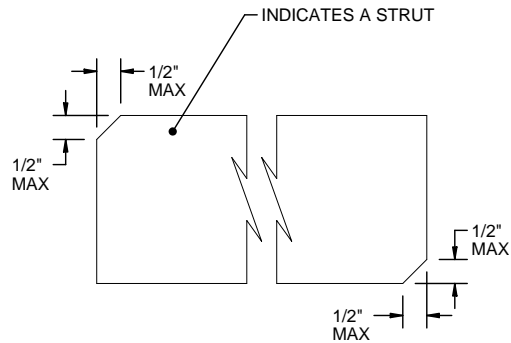
SEPARATOR GATE

NOTE: FOR A ONE HIGH LOAD, REDUCE THE 54" DIMENSION TO 29-1/2".



CENTER GATE

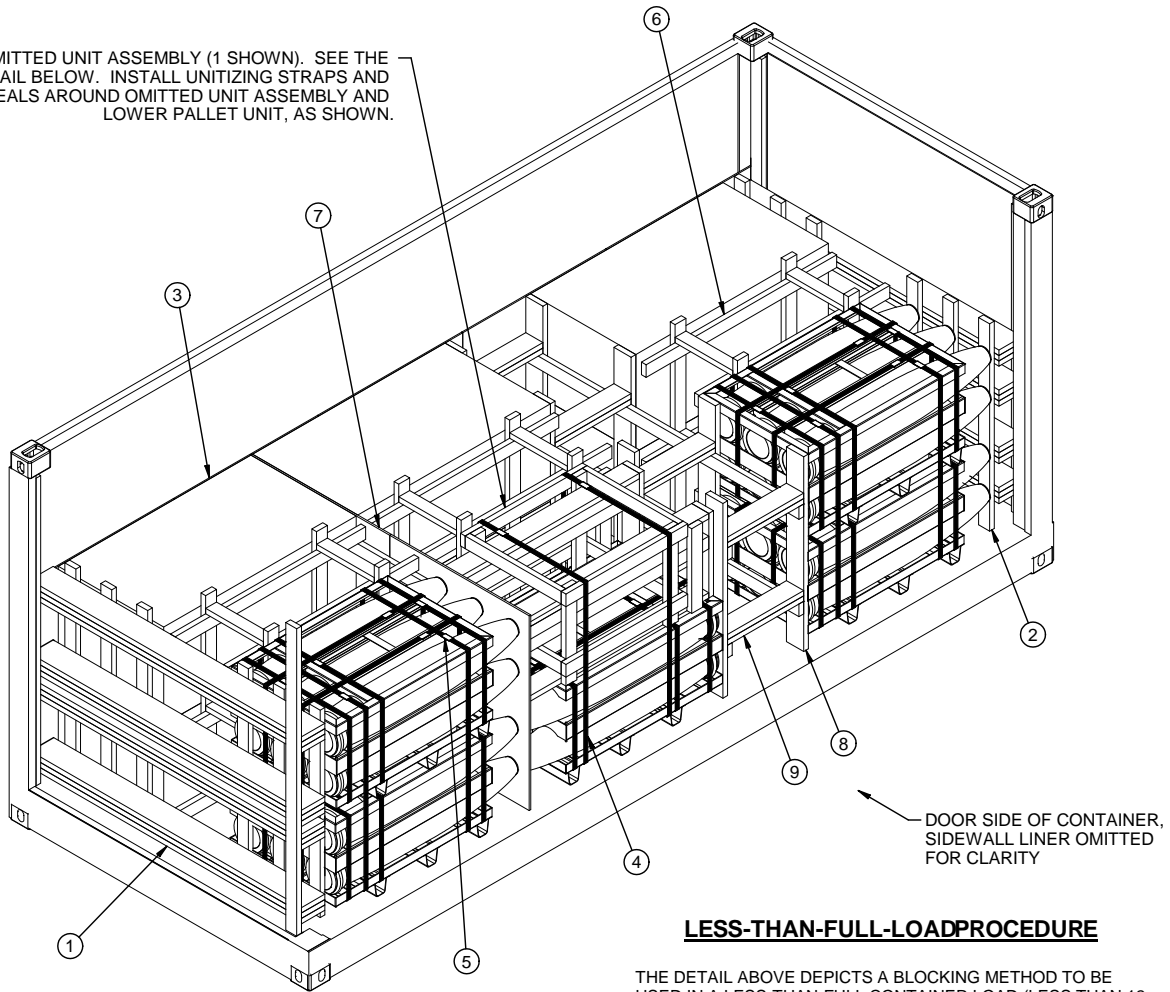
FOR A ONE HIGH LOAD, ELIMINATE THE TOP STRUT LEDGER AND REDUCE THE HEIGHT OF THE VERTICAL PIECES FROM 54" TO 27".



BEVEL CUT

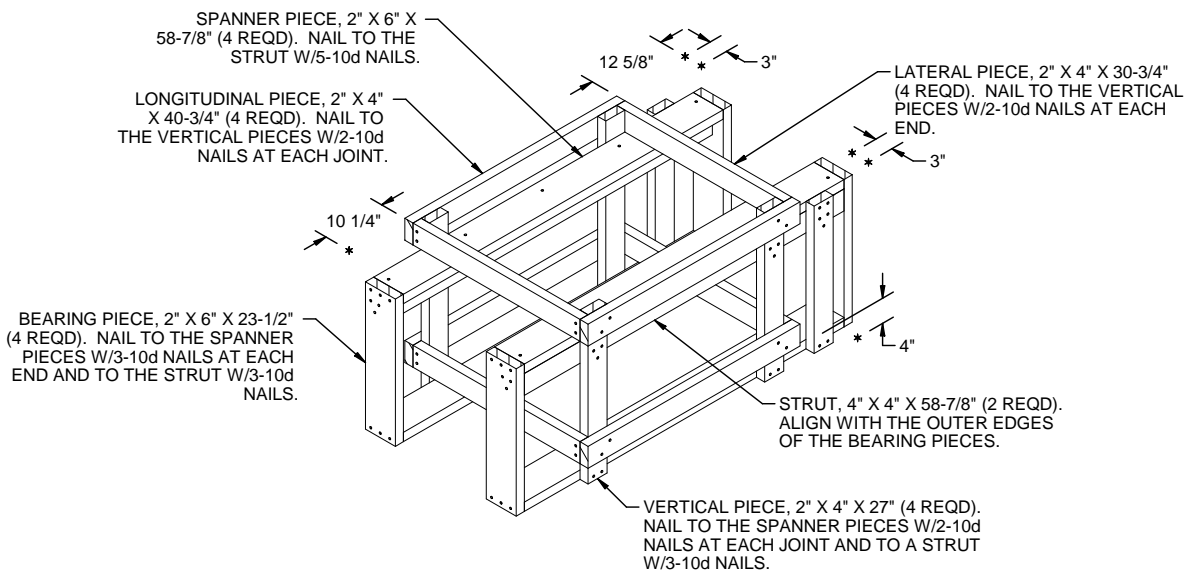
IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT CENTER GATE TO CENTER GATE FIT.

OMITTED UNIT ASSEMBLY (1 SHOWN). SEE THE DETAIL BELOW. INSTALL UNITIZING STRAPS AND SEALS AROUND OMITTED UNIT ASSEMBLY AND LOWER PALLET UNIT, AS SHOWN.



LESS-THAN-FULL-LOADPROCEDURE

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. SEE GENERAL NOTE "G" ON PAGE 3.



OMITTED UNIT ASSEMBLY

FOR MINUS ONE PALLET UNIT. NO MORE THAN THREE OMITTED UNIT ASSEMBLIES MAY BE USED IN A TWO HIGH LOAD, AND NO MORE THAN ONE MAY BE USED IN A ONE HIGH LOAD.