

*J. H. [Signature]*

DATE 4/22/2001

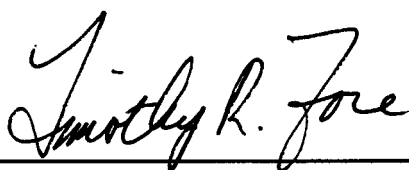

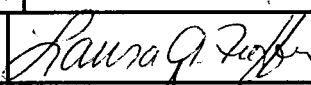
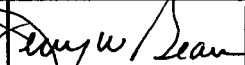
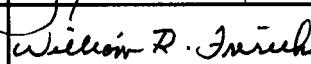
# LOADING AND BRACING IN SIDE OPENING ISO CONTAINERS OF 500 POUND GUIDED BOMB UNITS (GBU-12/MK82), COMPLETE ROUND

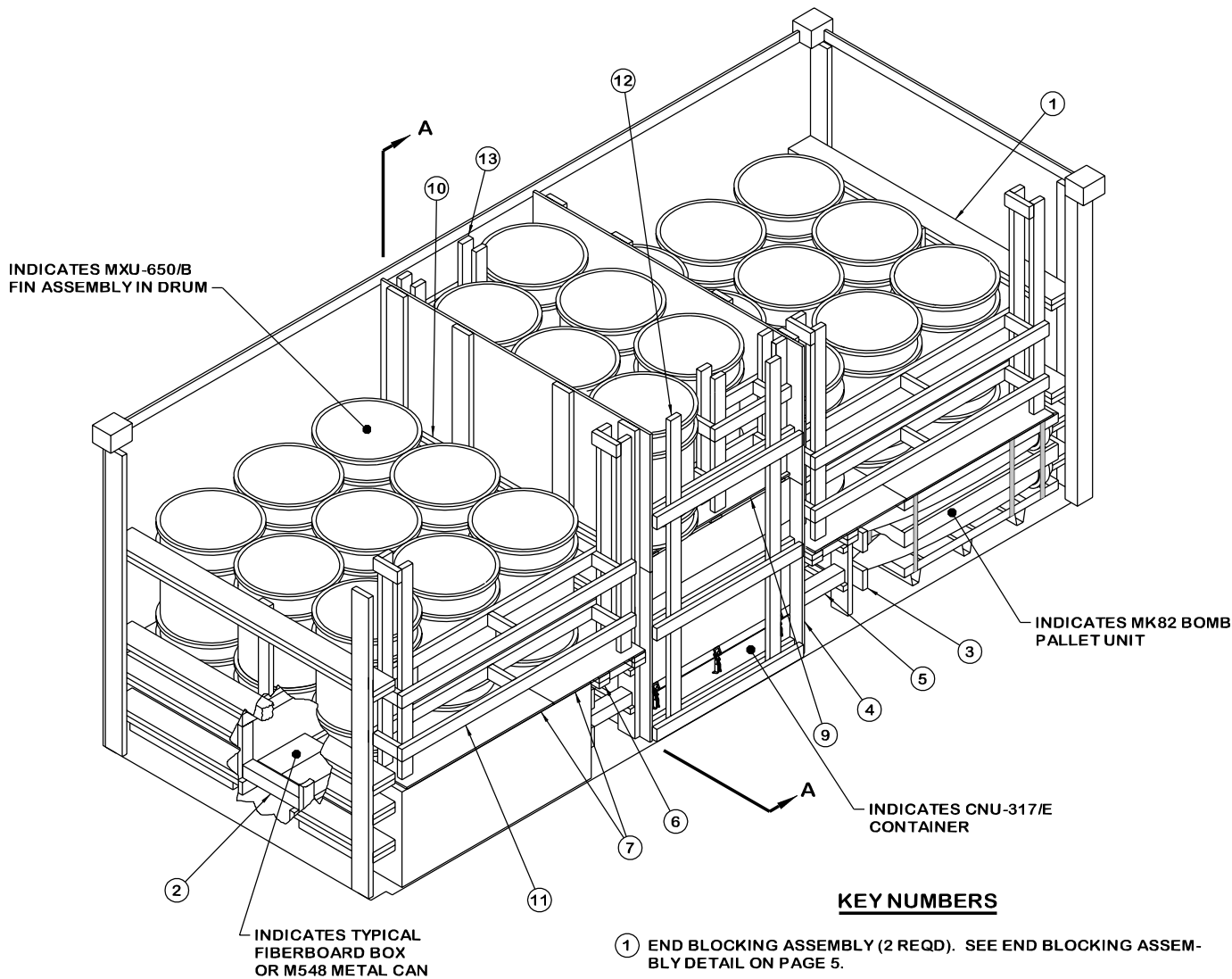
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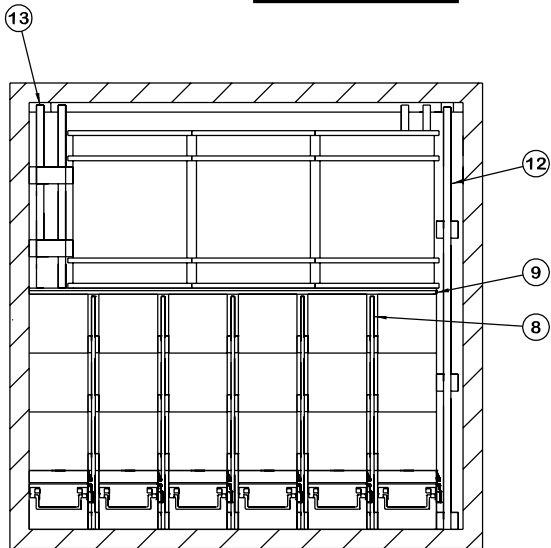
- LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY OPERATIONS SUPPORT COMMAND  	ENGINEER	BASIC		<b>DO NOT SCALE</b>				
		REV.		WEBSITE: <a href="http://www.dac.army.mil">HTTP://WWW.DAC.ARMY.MIL</a>				
	TECHNICIAN	BASIC	PATRICK DOUGHERTY		<b>MARCH 2001</b>			
	REV.							
	DRAFTSMAN	BASIC						
		REV.						
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  	TRANSPORTATION ENGINEERING DIVISION							
	VALIDATION ENGINEERING DIVISION				CLASS	DIVISION	DRAWING	FILE
	ENGINEERING DIRECTORATE				19	48	8718	SP15M12
U.S. ARMY DEFENSE AMMUNITION CENTER								



**ISOMETRIC VIEW**



**SECTION A-A**

- ① END BLOCKING ASSEMBLY (2 REQD). SEE END BLOCKING ASSEMBLY DETAIL ON PAGE 5.
- ② CRIB FILL (2 REQD). SEE DETAIL ON PAGE 6.
- ③ CENTER GATE A (2 REQD). SEE DETAIL ON PAGE 6.
- ④ CENTER GATE B (2 REQD). SEE DETAIL ON PAGE 7.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (REF: 16-5/8") (16 REQD). POSITION BETWEEN CENTER GATES "A" AND "B". TOENAIL TO THE CENTER GATES W/2-12d NAILS AT EACH END. SEE THE "BEVEL CUT" DETAIL ON PAGE 9.
- ⑥ SOLID FILL, 4" WIDE MATERIAL BY 48" LENGTH BY THICKNESS AS REQUIRED TO PROVIDE FOR A DECK HEIGHT EVEN WITH DECKING PIECE MARKED ⑦. NAIL FIRST PIECE TO THE STRUT, PIECE MARKED ⑤ W/2 APPROPRIATELY SIZED NAILS AT EACH JOINT. LAMINATE ADDITIONAL PIECES TO FIRST PIECE IN A SIMILAR MANNER.
- ⑦ DECKING, PLYWOOD, 1/2" THICK BY 48" WIDE BY 7'-5" LONG AND 30" WIDE BY 7'-5" LONG (2 EACH REQD). POSITION ON TOP OF THE BOMB PALLET UNITS. NOTE THAT HOLES MAY BE DRILLED OR CUT TO ALLOW FOR THE PALLET STACKING PINS.
- ⑧ SPACER ASSEMBLY (5 REQD). SEE DETAIL ON PAGE 7. POSITION BETWEEN THE STACKS OF FOUR HIGH CNU-317/E CONTAINERS.
- ⑨ DECKING ASSEMBLY (1 REQD). SEE DECKING ASSEMBLY DETAIL ON PAGE 8. POSITION ON TOP OF CNU-317/E CONTAINERS.
- ⑩ SOLID FILL, 4" WIDE MATERIAL BY 6'-3" LONG BY THICKNESS AS REQUIRED. NAIL TO THE 2" X 6" PIECES OF CENTER GATE B W/2-10d NAILS AT EACH JOINT. POSITION SOLID FILL AT TWO LOCATIONS BETWEEN THE DRUM RINGS. LAMINATE ADDITIONAL PIECES AS REQUIRED IN A SIMILAR MANNER.
- ⑪ DOOR SIDE FILL ASSEMBLY A (2 REQD). SEE DETAIL ON PAGE 8.
- ⑫ DOOR SIDE FILL ASSEMBLY B (1 REQD). SEE DETAIL ON PAGE 9.
- ⑬ DRUM SPACER ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 9.

- J. 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.
- 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. 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. ANTI-CHAFING MATERIAL, CONSISTING OF NEUTRAL BARRIER MATERIAL, PLYWOOD, OR HARDBOARD, MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN THE LADING AND THE SIDE OPENING CONTAINER TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO LOADS OF 500 LB GBU-12 (MK82) BOMBS AND ASSOCIATED COMPONENTS IN A SIDE OPENING CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINERS WITH THE GBU-12 COMPONENTS. SEE PAGE 4 FOR DETAILS OF THE COMPONENTS. CAUTION: REGARDLESS OF THE QUANTITY OF 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 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 AND 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 MOTOR OR WATER CARRIERS. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN ALSO BE USED.
- D. WHEN LOADING THE 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 SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE HORIZONTAL PIECE WITH 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 CONTAINER.
- E. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 6" MATERIAL IS ACTUALLY 3/4" THICK BY 5-1/2" 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 ENDWALLS. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE END BLOCKING ASSEMBLIES 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 ENDWALLS 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 LONGITUDINAL BLOCKING.
- H. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.

LOAD AS SHOWN

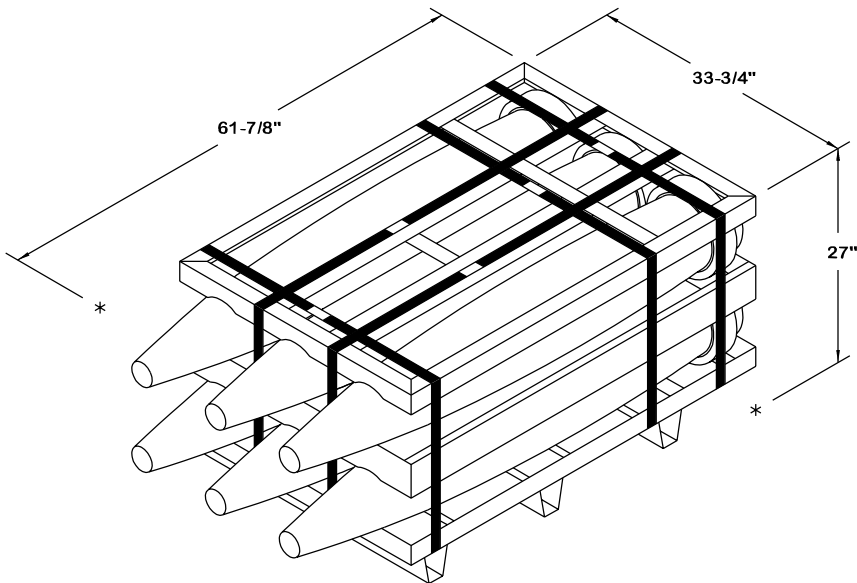
ITEM	QUANTITY	WEIGHT (APPROX)
MK82 BOMB PALLET UNIT - CNU-317/E CONTAINER	4	12,552 LBS
WITH MAU-169D/B DRUM WITH MXU-650/B	24	2,400 LBS
FW26 BOX	3	78 LBS
G119 BOX	4	156 LBS
CY72 BOX	1	5 LBS
DUNNAGE		1,734 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		26,575 LBS (APPROX)

(CONTINUED AT LEFT)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	221	74
2" X 2"	55	19
2" X 4"	356	238
2" X 6"	135	135
2" X 8"	115	153
4" X 4"	35	46
NAILS	NO. REQD	POUNDS
6d (2")	272	1-3/4
10d (3")	704	10-3/4
12d (3-1/4")	64	1-1/4
PLYWOOD, 1/2" - 124.42 SQ FT REQD		171.08 LBS
PLYWOOD, 3/4" - 106.33 SQ FT REQD		219.31 LBS

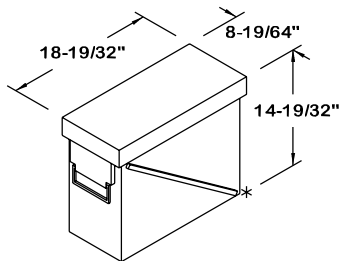
MATERIAL SPECIFICATIONS

- 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.
- ANTI-CHAFING MATERIAL - - - - - : MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
- HARDBOARD - - - - - : ANSI/AHA A135.4, CLASS 1.



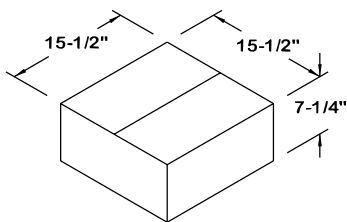
**MK82 (E485) BOMBS ON MK9 PALLET**

GROSS WEIGHT - - - - - 3,138 LBS (APPROX)  
 CUBE - - - - - 32.5 CU FT (APPROX)



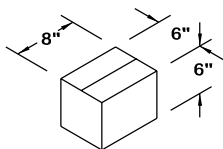
**FUZE SET (G119) IN M548 METAL BOX**

GROSS WEIGHT - - - - - 39 LBS (APPROX)  
 CUBE - - - - - 1.3 CUBIC FEET (APPROX)



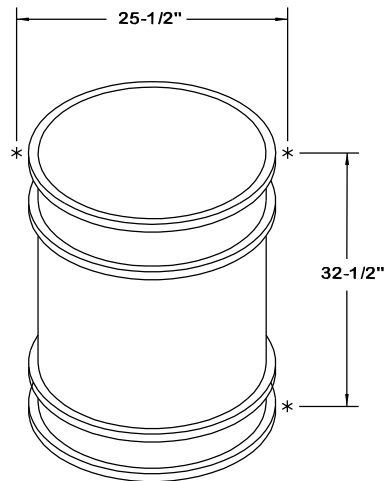
**SWIVEL AND LINK ASSEMBLY (CY72) IN FIBERBOARD BOX**

GROSS WEIGHT - - - - - 5 LBS (APPROX)  
 CUBE - - - - - 1.0 CUBIC FEET (APPROX)



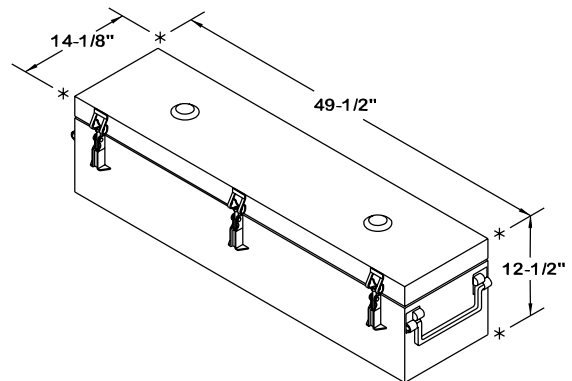
**SUPPORT CUP (FW26) IN FIBERBOARD BOX**

GROSS WEIGHT - - - - - 26 LBS (APPROX)  
 CUBE - - - - - 0.17 CUBIC FEET (APPROX)



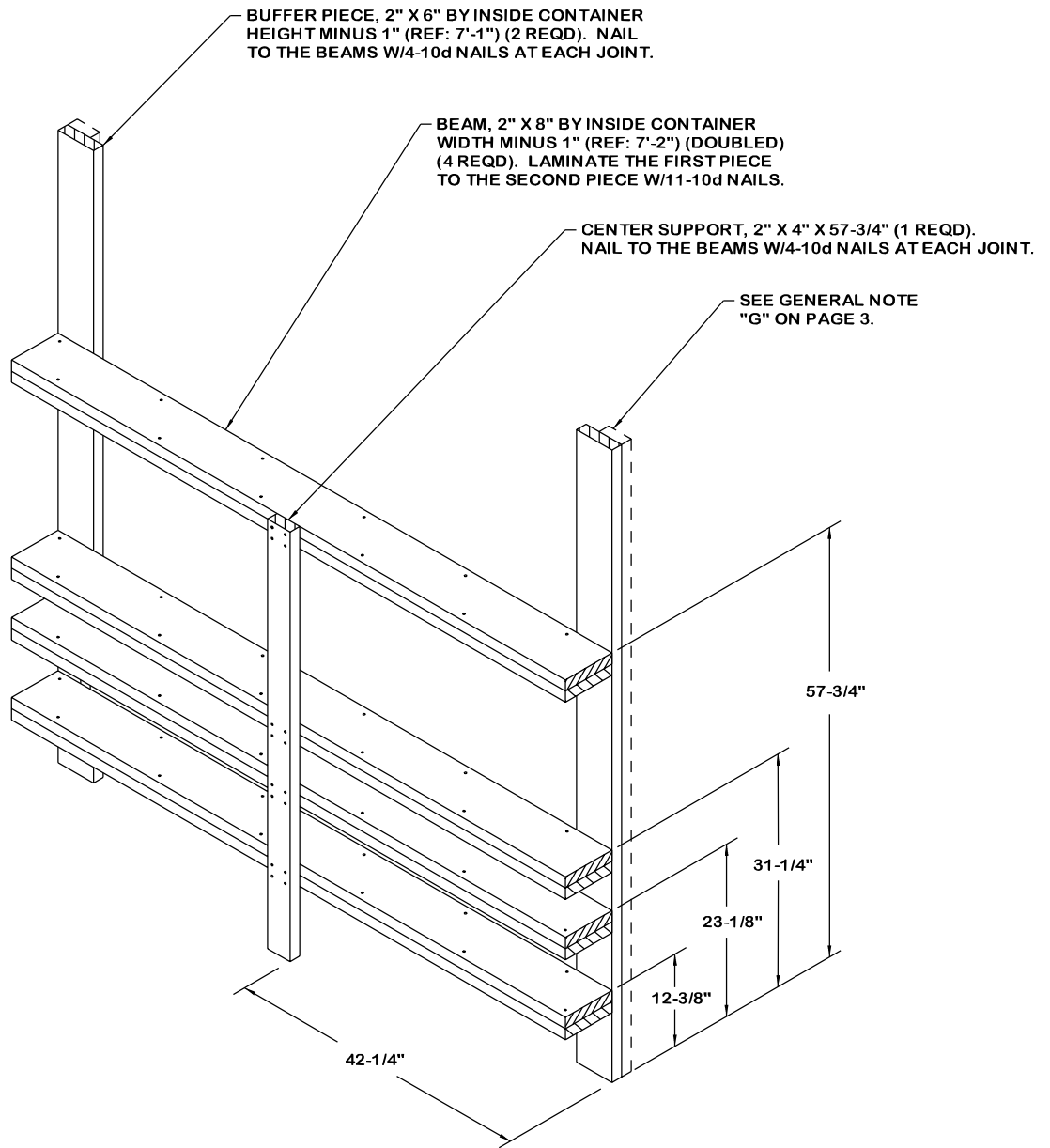
**MXU-650/B FIN ASSEMBLY (F763) IN DRUM**

GROSS WEIGHT - - - - - 150 LBS (APPROX)  
 CUBE - - - - - 9.6 CUBIC FEET (APPROX)



**MAU-169D/B (E069) IN CNU-317/E CONTAINER**

GROSS WEIGHT - - - - - 100 LBS (APPROX)  
 CUBE - - - - - 5.0 CUBIC FEET (APPROX)

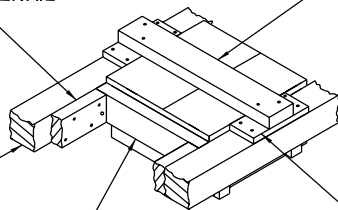


**END BLOCKING ASSEMBLY**

CLEAT, 2" X 4" X 12" (2 REQD PER BOX). NAIL TO THE STRUT W/4-10d NAILS. TOENAIL TO CROSS BLOCKING W/1-10d NAIL.

HOLD DOWN, 2" X 4" X LENGTH TO SUIT (1 REQD). NAIL THROUGH FILLER INTO STRUT W/2-10d NAILS AT EACH END.

INDICATES STRUT, PIECE MARKED ⑤ ON PAGE 2.

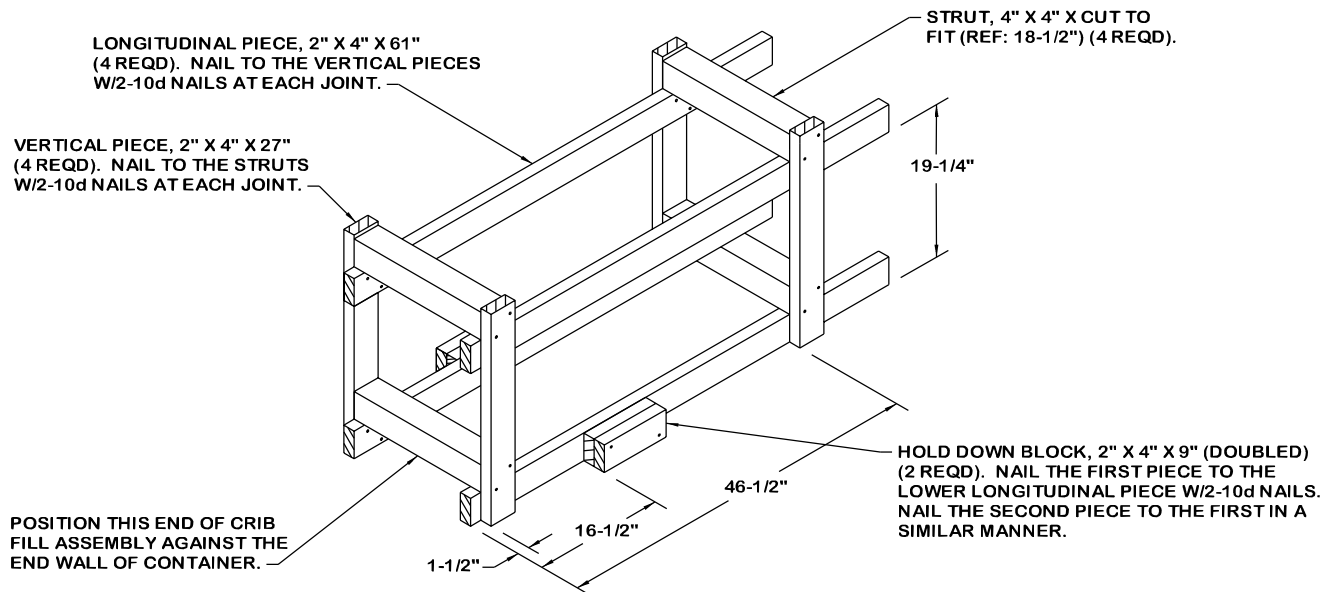


FILLER, 4" WIDE MATERIAL BY THICKNESS AS REQUIRED (2 REQD). NAIL TO THE STRUTS W/2 APPROPRIATELY SIZED NAILS AT EACH END.

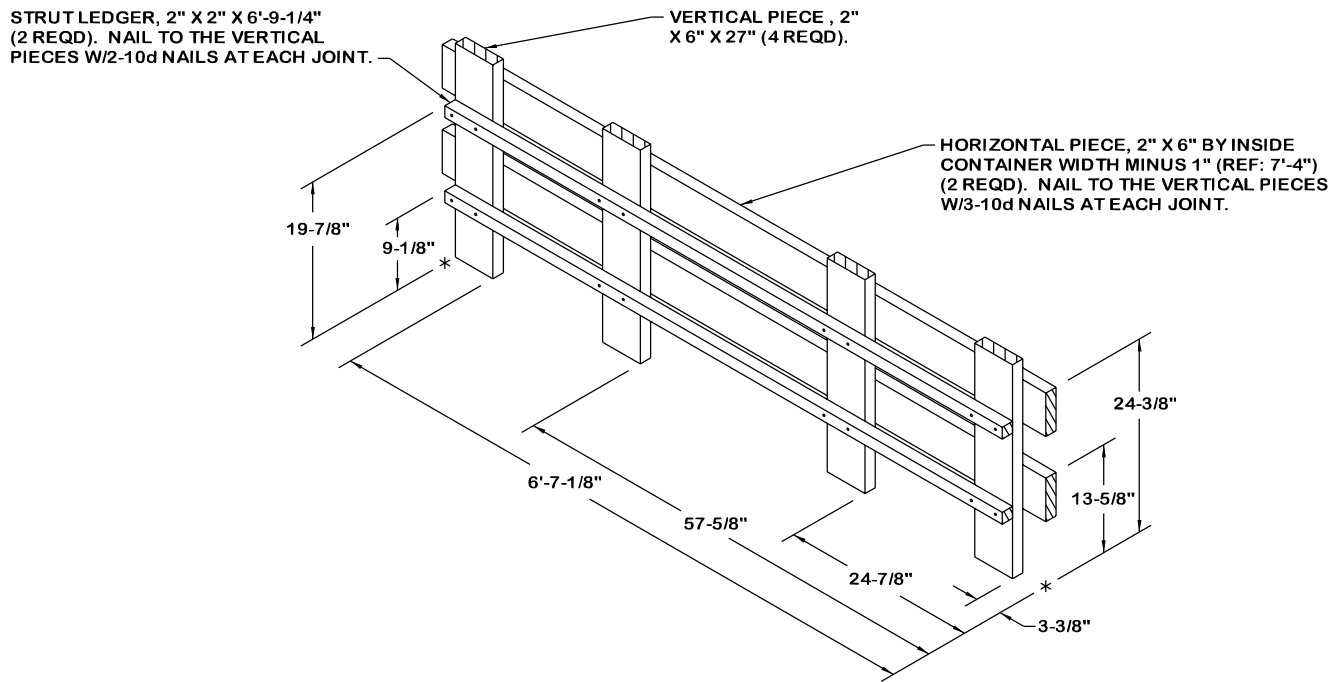
CROSS BLOCKING, 2" X 4" BY CUT TO FIT BETWEEN THE STRUTS (2 REQD PER BOX).

**SECUREMENT OF MISCELLANEOUS BOXES**

MISCELLANEOUS BOXES MAY ALSO BE PLACED IN THE VOID AREA BETWEEN THE LOAD BEARING PIECES OF THE CRIB FILL ASSEMBLIES. ADJUSTMENTS TO THE ABOVE DETAIL MAY BE MADE SO AS TO PROVIDE FOR SIMILAR SECUREMENT TO THE CRIB FILL ASSEMBLIES.



**CRIB FILL**



**CENTER GATE A**

**NOTE: THE VERTICAL PIECES MUST BE IN ALIGNMENT  
WITH THE NOSE ENDS OF THE BOMBS.**

PLYWOOD, 3/4" BY INSIDE CONTAINER HEIGHT MINUS 49" (REF: 39") BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-4") (1 REQD). NAIL TO THE VERTICAL PIECES W/1-6d NAIL EVERY 8".

VERTICAL PIECE, 2" X 6" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-4") (4 REQD).

PLYWOOD, 3/4" X 48" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-4") (1 REQD). NAIL TO THE VERTICAL PIECES W/1-6d NAIL EVERY 8".

STRUT LEDGER, 2" X 2" X 6'-9-1/4" (2 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

19-7/8"

9-1/8" \*

6'-7-1/8"

57-5/8"

24-7/8"

3-3/8"

**CENTER GATE B**

NOTE: THE VERTICAL PIECES MUST BE IN ALIGNMENT WITH THE NOSE ENDS OF THE BOMBS.

VERTICAL PIECE, 1" X 4" X 48" (2 REQD).

HORIZONTAL PIECE, 1" X 4" X 48" (8 REQD). NAIL TO THE VERTICAL PIECES W/2-6d NAILS AT EACH JOINT.

38-1/2"

6" \*

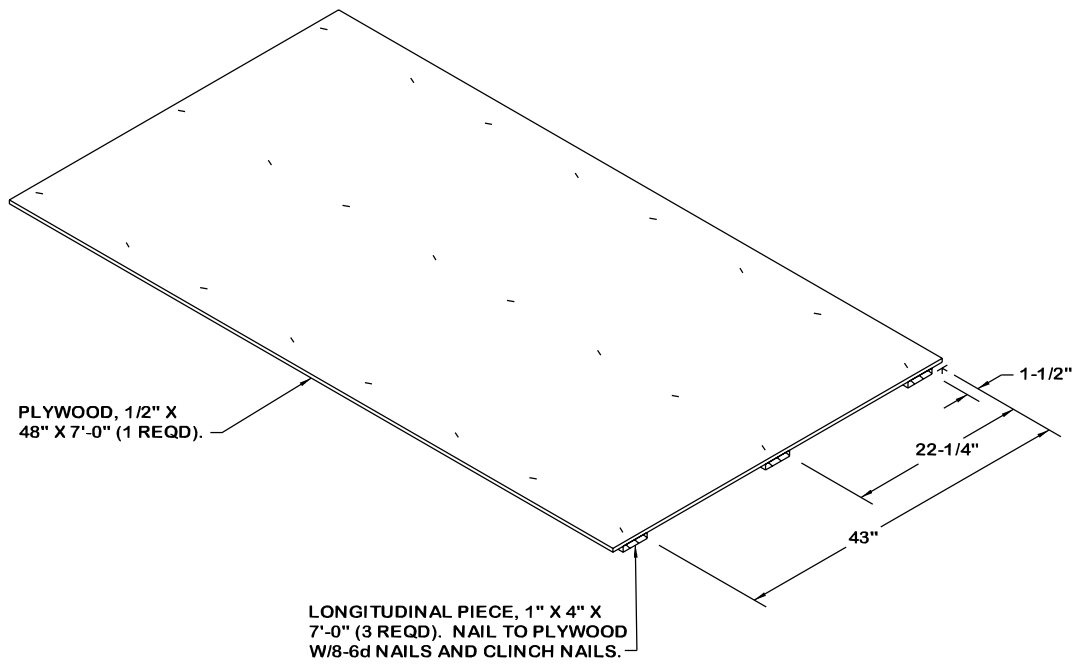
39-7/8"

27-3/4"

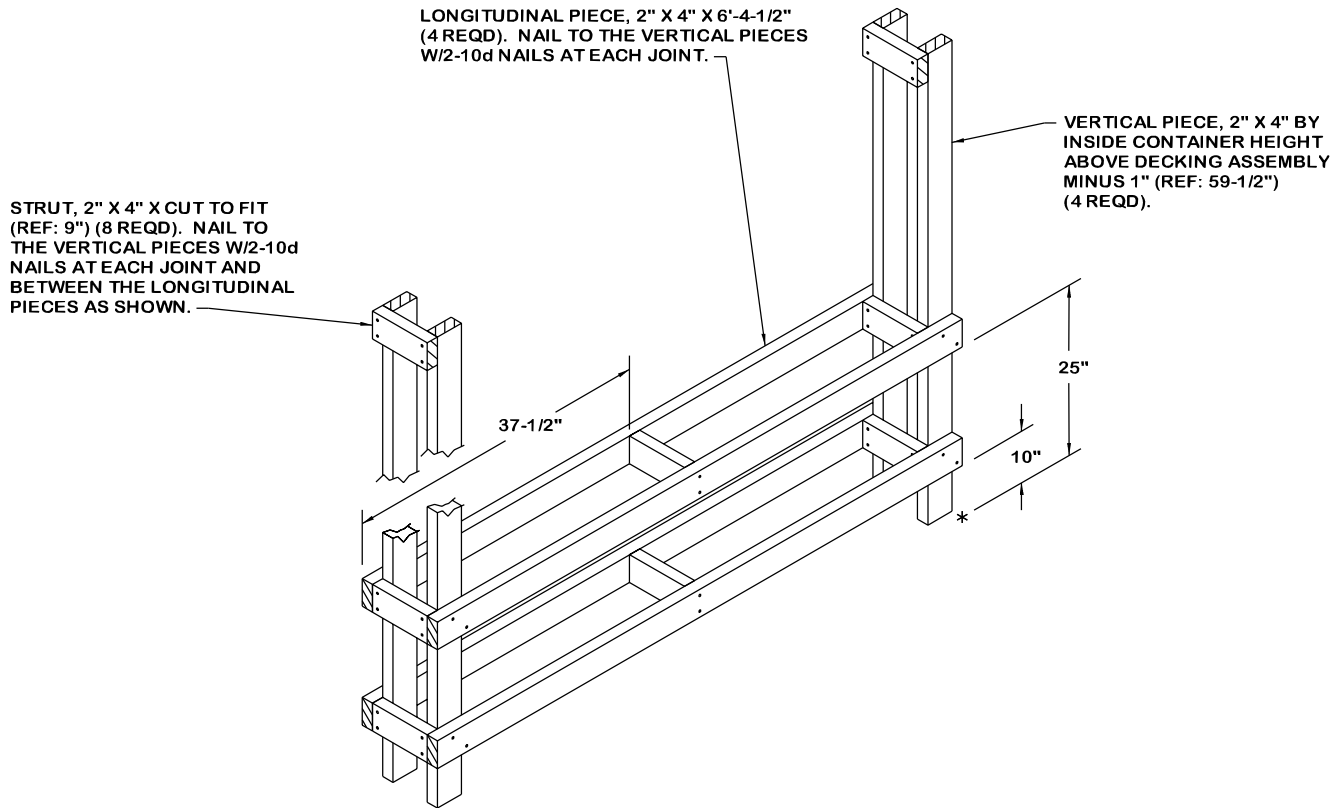
15-5/8"

**SPACER ASSEMBLY**

SPACER ASSEMBLY SHALL BE POSITIONED BETWEEN EACH FOUR HIGH STACK OF CNU-317/E CONTAINERS.

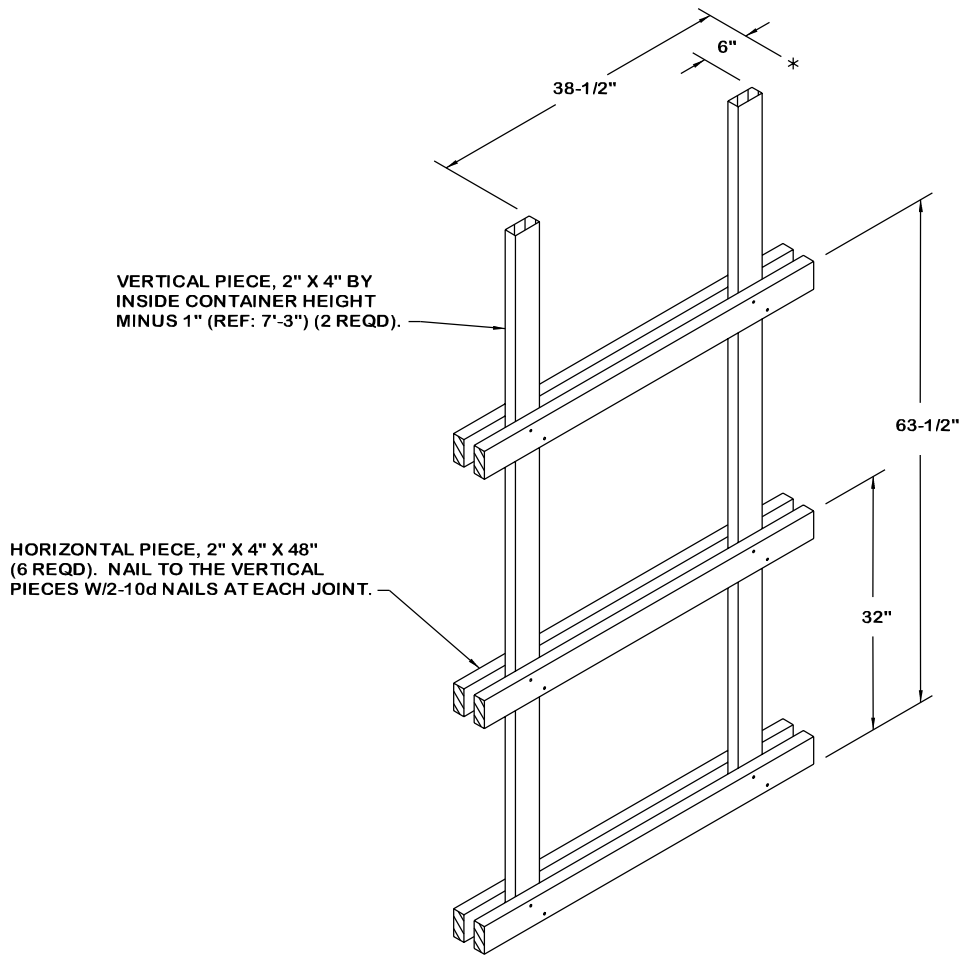


**DECKING ASSEMBLY**



**DOOR SIDE FILL ASSEMBLY A**





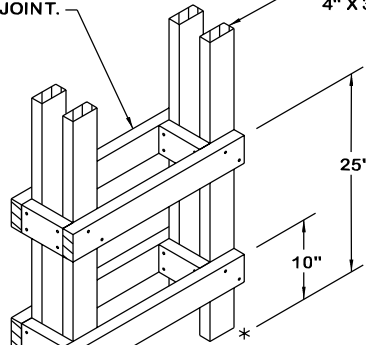
VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-3") (2 REQD).

HORIZONTAL PIECE, 2" X 4" X 48" (6 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

**DOOR SIDE FILL ASSEMBLY B**

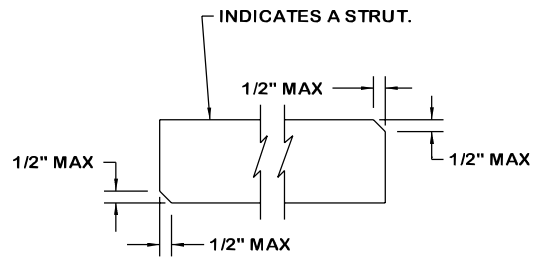
HORIZONTAL PIECE, 2" X 4" X 25" (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

VERTICAL PIECE, 2" X 4" X 37-3/4" (4 REQD).



STRUT, 2" X 4" X CUT TO FIT (REF: 6") (4 REQD). NAIL TO VERTICAL PIECES W/2-10d NAILS AT EACH END.

**DRUM SPACER ASSEMBLY**



**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.

