

LOADING AND BRACING[⊕] IN SIDE OPENING ISO CONTAINERS OF 500 POUND GUIDED BOMB UNITS (GBU- 12/MK82 ON MHU149 PALLET), COMPLETE ROUND

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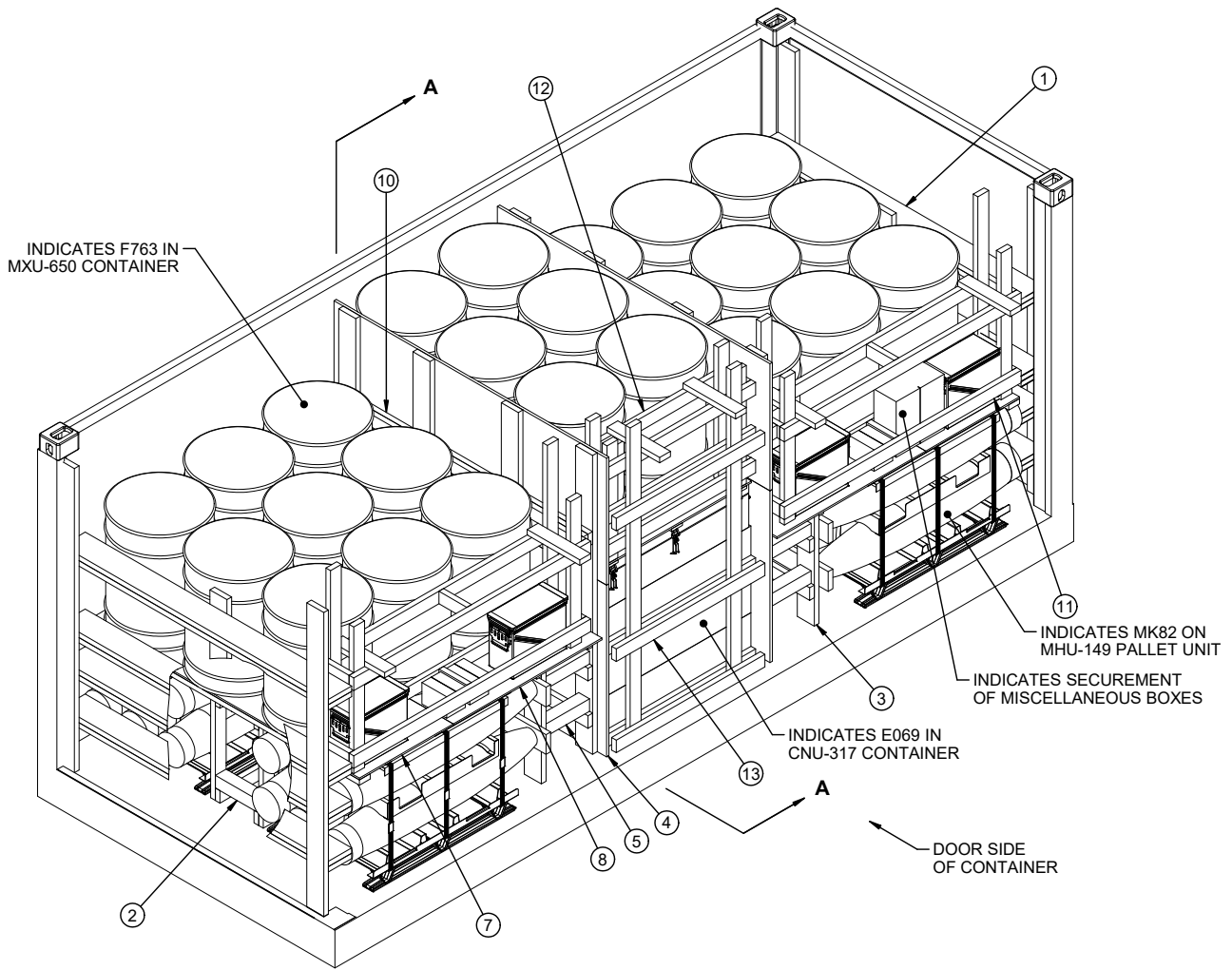
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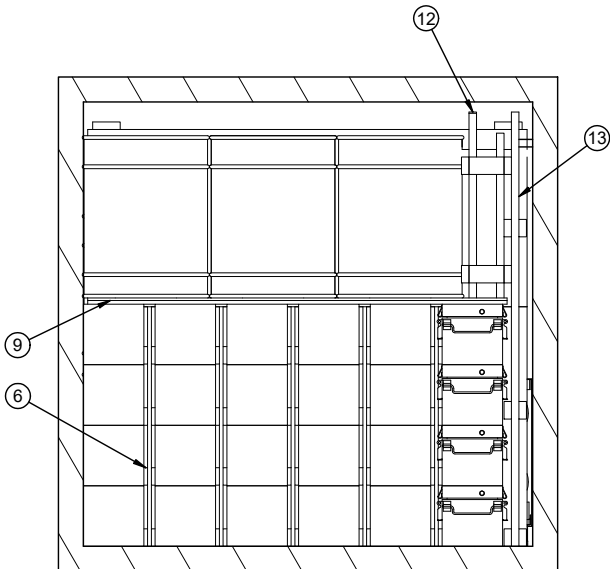
⊕ THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO
BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL, MOTOR, OR
WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND		CAUTION: VERIFY PRIOR TO USE AT https://www.dau.edu/cop/ammo/pages/default.aspx THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.					
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		DESIGN ENGINEER	BASIC REV.	PATRICK DOUGHERTY SPENCER HOVEY			
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND		ENGINEERING DIVISION	FIEFFER.LAUR A.A.1230375727	REVISION NO. 1 MAY 2021			
BRAILSFORD.KEITH H.ANTHONY.10286 55661	Digitally signed by BRAILSFORD.KEITH.ANTHONY. 1028655661 Date: 2021.06.07 07:29:54 -05'00'	TEST ENGINEER	FELICIANO.AD IN.1259200373	SEE THE REVISION LISTING ON PAGE 3			
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U.S. ARMY DEFENSE AMMUNITION CENTER		EXPLOSIVE SAFETY DIRECTORATE	FAIRHURST.ROBER T.JOHN.1015766880	19	48	8725	SP15M19



ISOMETRIC VIEW



SECTION A-A

KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 5.
- ② CRIB FILL (2 REQD). SEE DETAIL ON PAGE 5. INSTALL BETWEEN LATERALLY ADJACENT STACKS OF BOMB PALLET UNITS.
- ③ CENTER GATE A (2 REQD). SEE DETAIL ON PAGE 6.
- ④ CENTER GATE B (2 REQD). SEE DETAIL ON PAGE 6.
- ⑤ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 15") (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 7.
- ⑥ SPACER ASSEMBLY (5 REQD). SEE DETAIL ON PAGE 7. INSTALL BETWEEN THE CNU-317 CONTAINERS AS SHOWN AT LEFT.
- ⑦ DECKING ASSEMBLY A, (2 REQD). SEE DETAIL ON PAGE 7. POSITION THE 2" X 4" PIECE OF THE DECKING ASSEMBLY AGAINST THE BASE OF THE BOMBS AND THE CRIB FILL. SEE VIEW "A" ON PAGE 5. NAIL THROUGH THE PLY-WOOD INTO THE CRIB FILL STRUT W/3-6d NAILS.
- ⑧ PLYWOOD, 1/2" X 88" BY CUT TO FIT (REF: 48") (2 REQD). POSITION ON TOP OF BOMB PALLETS AND DECKING SUPPORT PIECE OF CENTER GATE "B". NAIL TO CENTER GATE "B" W/6-6d NAILS.
- ⑨ DECKING ASSEMBLY B, (1 REQD). SEE DETAIL ON PAGE 7. POSITION ON TOP OF THE CNU-317 CONTAINERS.
- ⑩ SOLID FILL, 4" WIDE MATERIAL BY 6'-10' 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 FILL 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 (2 REQD). SEE DETAIL ON PAGE 8.
- ⑬ DOOR SIDE FILL ASSEMBLY C (1 REQD). SEE DETAIL ON PAGE 8.

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 500 LB GBU-12 (MK82 ON MHU-149 PALLETS) BOMBS, INCLUDING 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 A 6,050 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 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 HORIZONTAL PIECES ON THE DOOR SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE HORIZONTAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". THE LOADS MUST BE AS TIGHT AS POSSIBLE LONGITUDINALLY, BUT THE VOID MUST NOT EXCEED 3/4" OVERALL. EXCESSIVE SLACK CAN BE ELIMINATED EITHER BY INCREASING THE LENGTH OF THE STRUTS BETWEEN CENTER GATES "A" AND "B" OR ADDING ADDITIONAL SOLID FILL MATERIAL TO CENTER GATE "B".
- 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 BE-SIDE A NAIL IN A LOWER PIECE.
- F. 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.

- G. 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.
- 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 BOBIE 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. 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.
- P. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN CONTAINERS, BETWEEN CONTAINERS AND THE SIDE OPENING CONTAINER, AND BETWEEN CONTAINERS AND STEEL STRAPPING. IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.

(CONTINUED AT RIGHT)

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MK82 BOMB PALLET UNIT	4	12,912 LBS
E069 IN CNU-317	24	2,400 LBS
F763 IN MXU-650	24	3,600 LBS
FW26 BOX	3	78 LBS
CY72 BOX	1	5 LBS
G119 BOX	4	156 LBS
DUNNAGE		1,731 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		26,932 LBS (APPROX)

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-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
- HARDBOARD** - - - - - : ANSI/AHA A135.4, CLASS 1

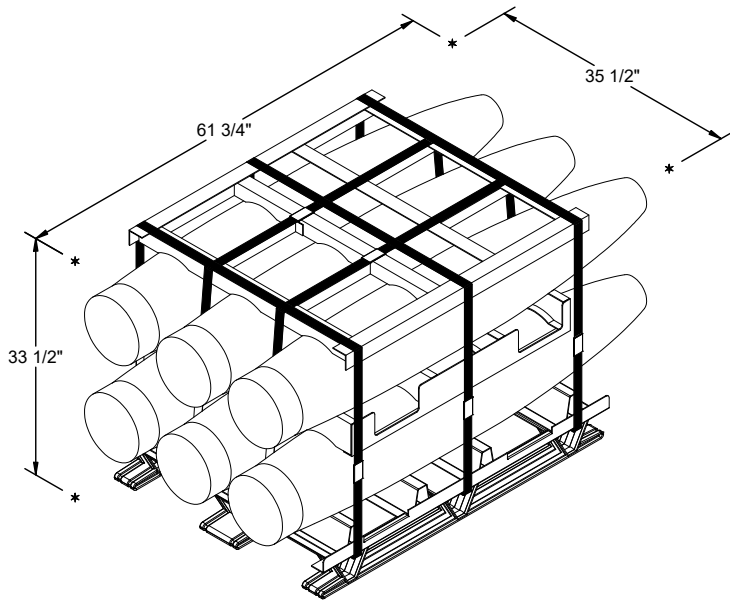
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	221	74
2" X 4"	384	256
2" X 6"	146	146
2" X 8"	115	153
4" X 4"	29	39
NAILS	NO. REQD	POUNDS
6d (2")	332	2
10d (3")	598	9-1/4
12d(3-1/4")	64	1-1/4
PLYWOOD, 1/2" - -	125.78 SQ FT REQD	172.94 LBS
PLYWOOD, 3/4" - -	102.06 SQ FT REQD	210.49 LBS

REVISION

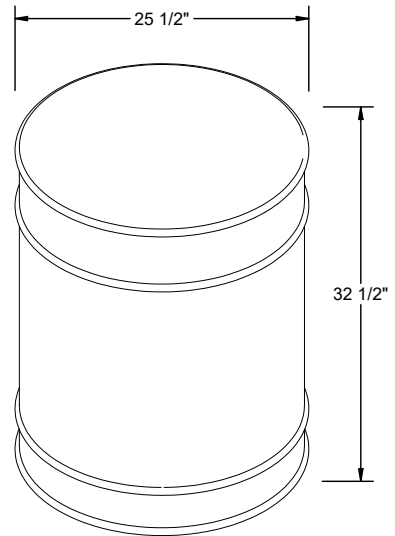
REVISION NO. 1, DATED MAY 2021, CONSISTS OF:

1. UPDATING DRAWING TO CURRENT STANDARDS.
2. ADJUSTING DOOR SIDE FILL ASSEMBLIES "A" AND "B" TO BE MORE SYMMETRIC.
3. LOWERING HORIZONTAL PIECE OF DOOR SIDE FILL ASSEMBLY "C" TO 29".
4. ADJUSTING LOCATION OF SPACER PIECES IN DOOR SIDE FILL ASSEMBLY "B".
5. UPDATING BILL OF MATERIAL AND LOAD AS SHOWN INFORMATION.



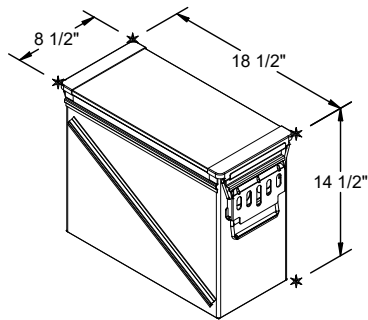
MK82 (E485) BOMBS ON MHU-149 PALLET

GROSS WEIGHT - - - - - 3,228 LBS (APPROX)
 CUBE - - - - - 42.5 CU FEET (APPROX)



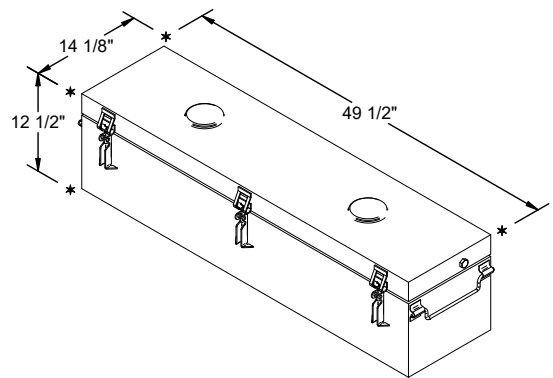
FIN ASSEMBLY (F763) IN MXU-650 CONTAINER

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



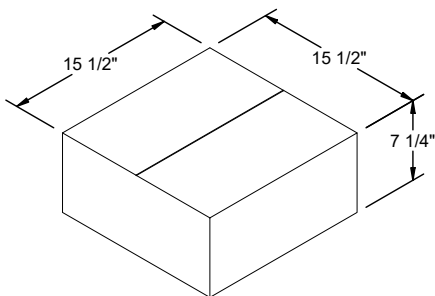
FUZE SET (G119) IN M548 METAL BOX

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



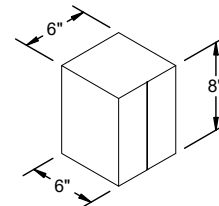
MAU-169 (E069) IN CNU-317 CONTAINER

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



SWIVEL AND LINK ASSEMBLY (CY72) IN FIBERBOARD BOX

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



SUPPORT CUP (FW26) IN FIBERBOARD BOX

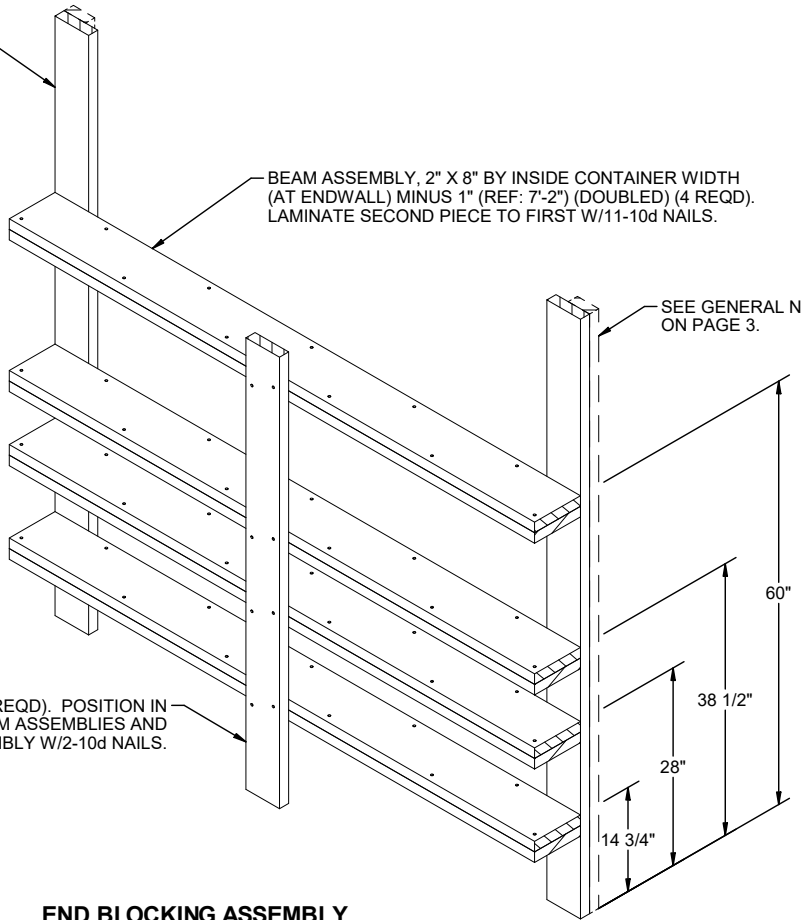
GROSS WEIGHT - - - - - 26 LBS (APPROX)
 CUBE - - - - - 0.17 CU FEET (APPROX)

BUFFER PIECE, 2" X 6" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1") (2 REQD). NAIL TO THE BEAMS W/4-10d NAILS AT EACH JOINT.

BEAM ASSEMBLY, 2" X 8" BY INSIDE CONTAINER WIDTH (AT ENDWALL) MINUS 1" (REF: 7'-2") (DOUBLED) (4 REQD). LAMINATE SECOND PIECE TO FIRST W/11-10d NAILS.

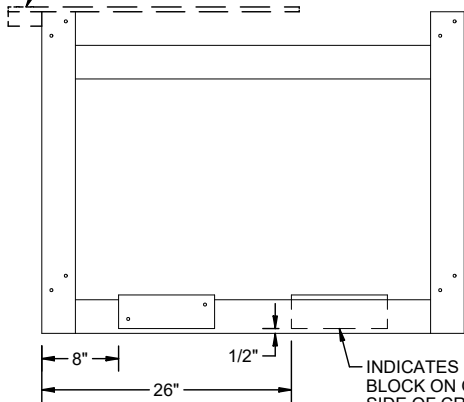
SEE GENERAL NOTE "F" ON PAGE 3.

STIFFENER, 2" X 6" X 64" (1 REQD). POSITION IN THE CENTER OF THE BEAM ASSEMBLIES AND NAIL TO EACH BEAM ASSEMBLY W/2-10d NAILS.



END BLOCKING ASSEMBLY

INDICATES POSITIONING OF DECKING ASSEMBLY A SHOWN AS KEY NUMBER ⑦ ON PAGE 2.



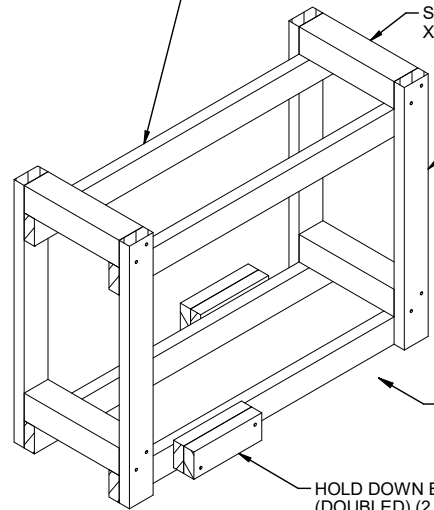
VIEW A

INDICATES HOLD DOWN BLOCK ON OPPOSITE SIDE OF CRIB FILL.

HORIZONTAL PIECE, 2" X 4" X 44" (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

STRUT, 4" X 4" X 14" (4 REQD).

VERTICAL PIECE, 2" X 4" X 33-1/2" (4 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.



VIEW A

HOLD DOWN BLOCK, 2" X 4" X 10" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL PIECE W/2-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

CRIB FILL

HORIZONTAL PIECE, 2" X 6"
BY INSIDE CONTAINER WIDTH
MINUS 1" (REF: 7'-4") (2 REQD).
NAIL TO THE VERTICAL PIECES
W/3-10d NAILS AT EACH JOINT.

DECK SUPPORT, 2" X 4" BY INSIDE
CONTAINER WIDTH MINUS 7" (REF: 6'-10")
(1 REQD). NAIL TO THE VERTICAL
PIECES W/2-10d NAILS AT EACH JOINT.

24 3/4"

11 1/2"

3"

27"

VERTICAL PIECE, 2" X 6"
X 33-1/2" (4 REQD).

STRUT LEDGER, 2" X 4" BY INSIDE CONTAINER
WIDTH MINUS 7" (REF: 6'-10") (2 REQD). NAIL TO
THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

29 1/4"

16"

CENTER GATE A

27"

3"

DECK SUPPORT, 2" X 4"
BY INSIDE CONTAINER
WIDTH MINUS 7"
(REF: 6'-10") (1 REQD).
NAIL TO THE VERTICAL
PIECES W/2-10d NAILS
AT EACH JOINT.

VERTICAL PIECE, 2" X 6" BY INSIDE
CONTAINER DOOR OPENING HEIGHT
MINUS 1/2" (REF: 6'-11-1/2") (4 REQD).

33 1/2"

24 3/4"

11 1/2"

3"

27"

PLYWOOD, 3/4" BY INSIDE CONTAINER
DOOR OPENING HEIGHT MINUS 48-1/2"
(REF: 35-1/2") BY INSIDE CONTAINER
WIDTH MINUS 1" (REF: 7'-4") (1 REQD).
NAIL TO THE VERTICAL PIECES
W/1-6d NAIL EVERY 8".

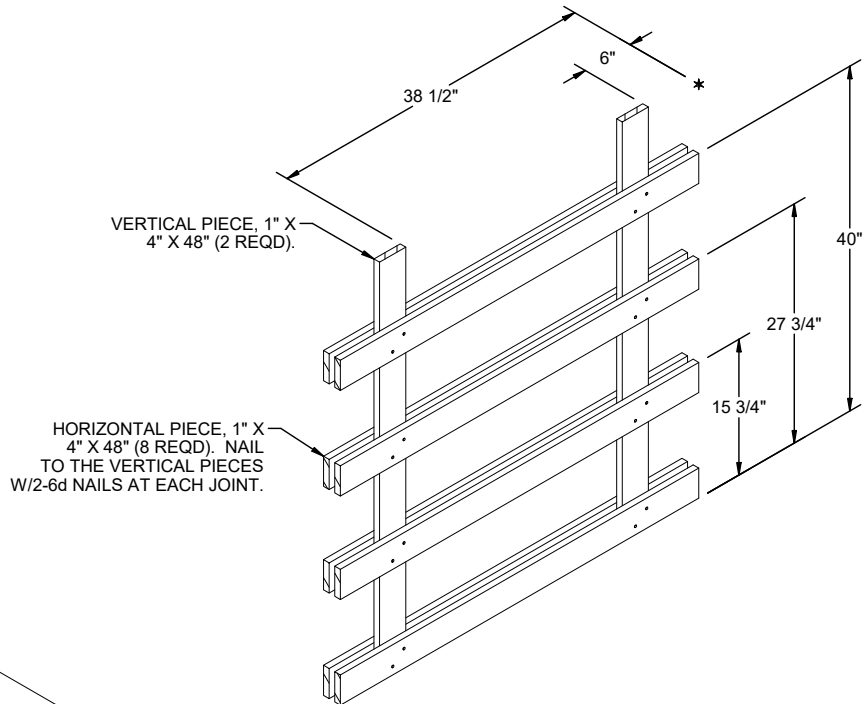
STRUT LEDGER, 2" X 4" BY INSIDE
CONTAINER WIDTH MINUS 7" (REF: 6'-10")
(2 REQD). NAIL TO THE VERTICAL
PIECES W/2-10d NAILS AT EACH JOINT.

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".

CENTER GATE B

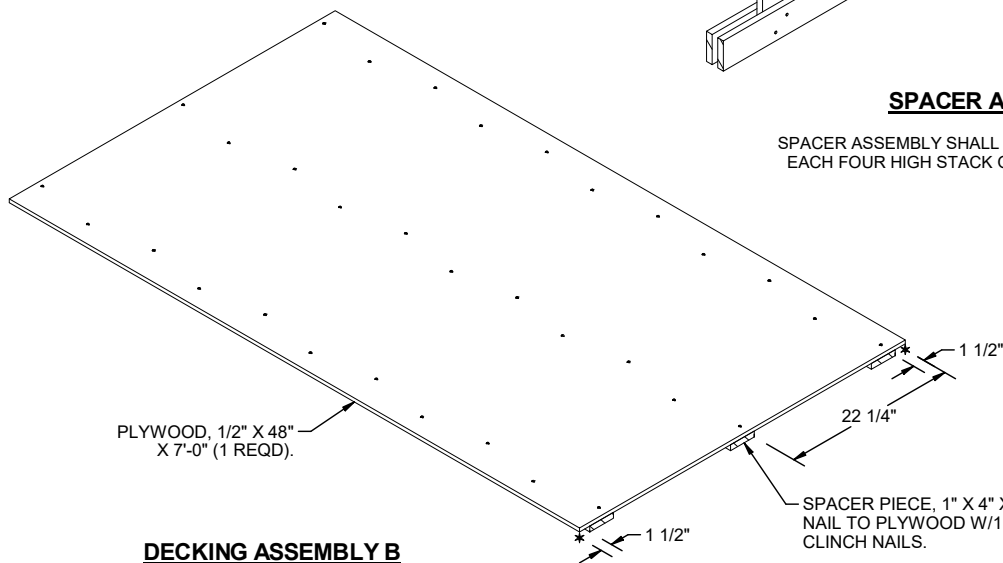
27"

3"

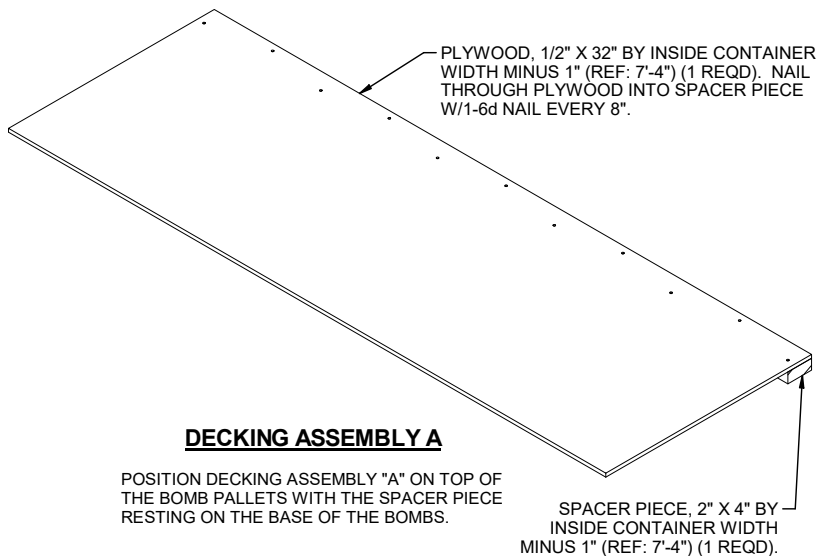


SPACER ASSEMBLY

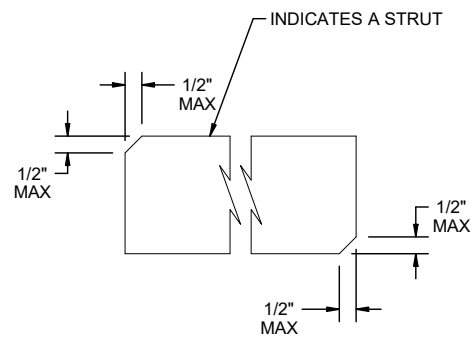
SPACER ASSEMBLY SHALL BE POSITIONED BETWEEN EACH FOUR HIGH STACK OF CNU-317 CONTAINERS.



DECKING ASSEMBLY B

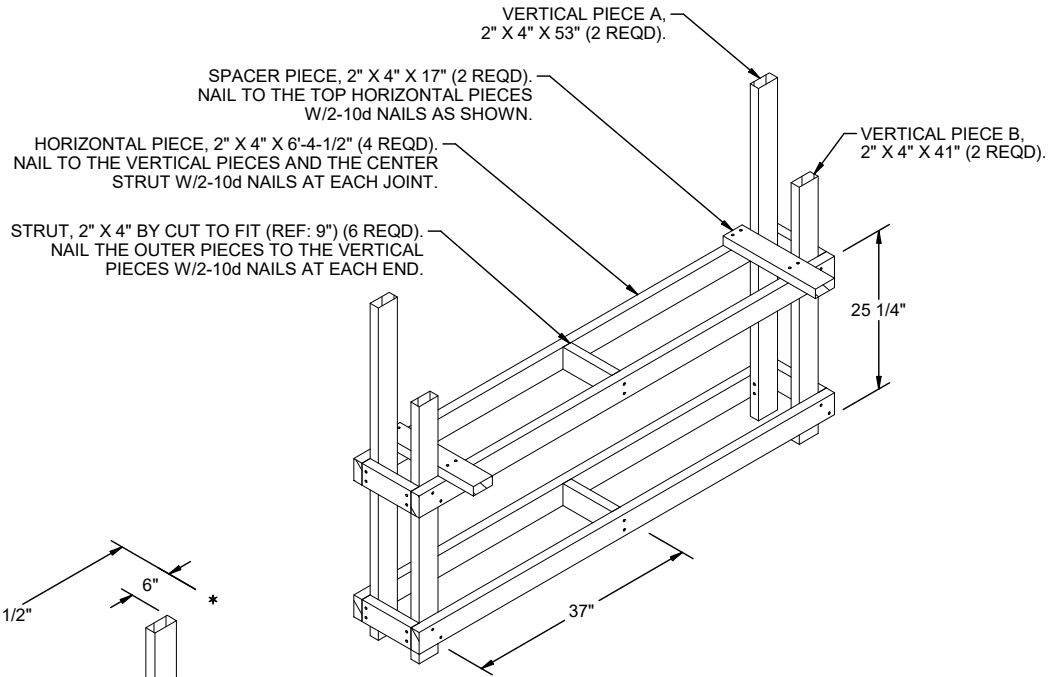


DECKING ASSEMBLY A



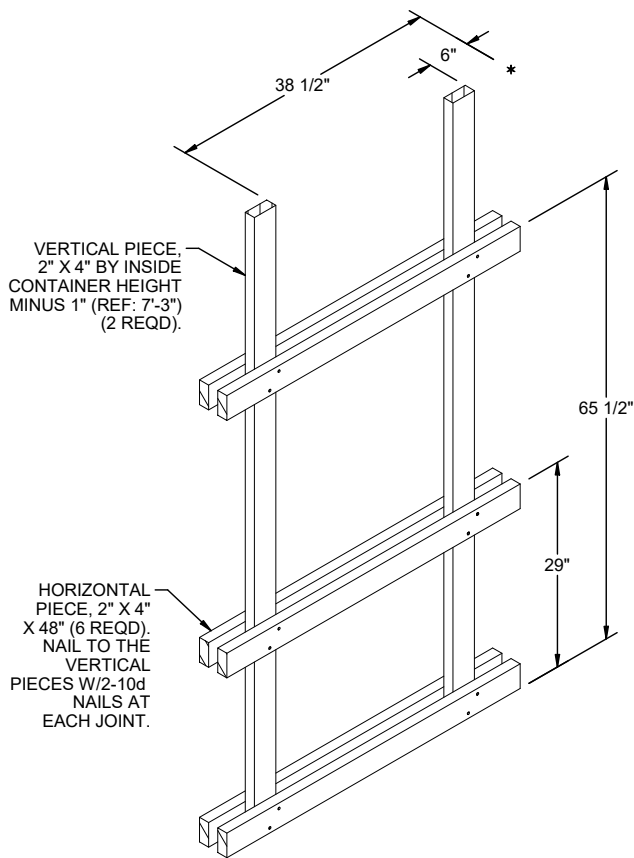
BEVEL CUT

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.

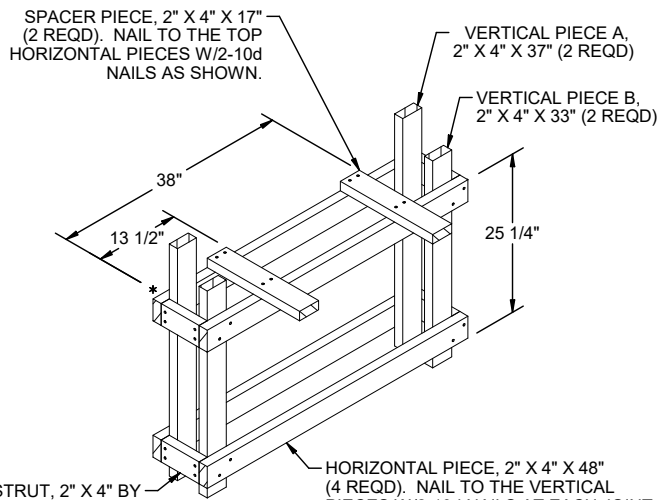


DOOR SIDE FILL ASSEMBLY A

NOTE: SPACER PIECE WILL BEAR UP AGAINST THE DOORS AND SHALL BE CUT TO LENGTH AS NECESSARY IN ORDER TO PRODUCE A TIGHT LOAD LATERALLY.



DOOR SIDE FILL ASSEMBLY C



DOOR SIDE FILL ASSEMBLY B

NOTE: SPACER PIECE WILL BEAR UP AGAINST THE DOORS AND SHALL BE CUT TO LENGTH AS NECESSARY IN ORDER TO PRODUCE A TIGHT LOAD LATERALLY.