

*Jan - 14*

DATE 8/7/04

# LOADING AND BRACING\* IN SIDE OPENING ISO CONTAINERS OF OF 500 POUND GUIDED BOMB UNITS (GBU-12/MK82 ON MHU-149/E PALLETS) COMPLETE ROUND

## INDEX

ITEM	PAGE(S)
TYPICAL LOADING PROCEDURES - - - - -	2
GENERAL NOTES AND MATERIAL SPECIFICATIONS - - - - -	3
PALLET UNIT AND CONTAINER DETAIL - - - - -	4
DETAILS - - - - -	5-8

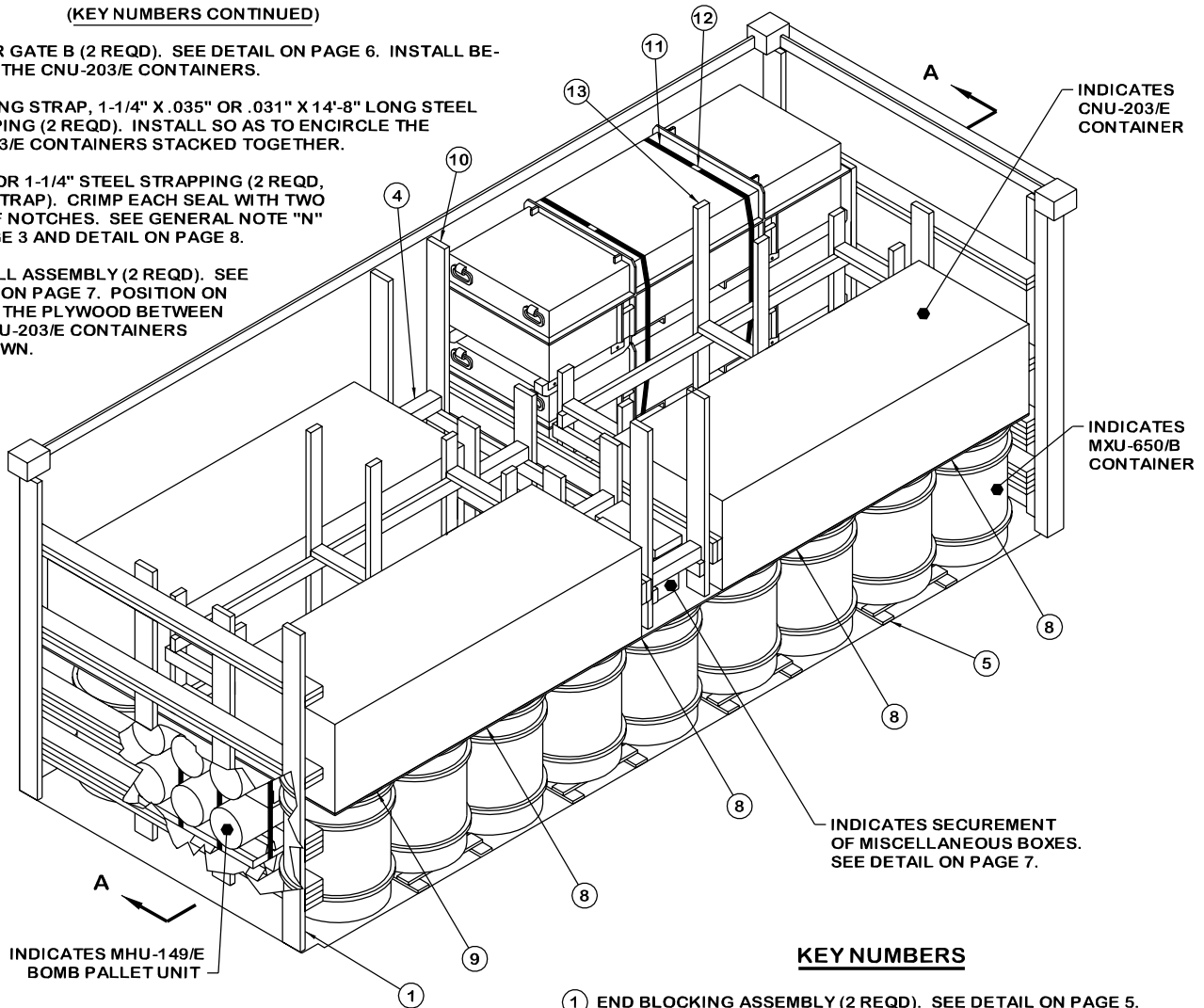
\* LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY OPERATIONS SUPPORT COMMAND		CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL/DET THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.							
<i>Richard Haynes</i>		DO NOT SCALE			NOVEMBER 1994				
		ENGINEER OR TECHNICIAN	BASIC REV.	RICHARD HAYNES		REVISION NO. 1		JULY 2004	
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND		TRANSPORTATION ENGINEERING DIVISION		<i>G. L. Willis</i>		SEE THE REVISION LISTING ON PAGE 5			
		VALIDATION ENGINEERING DIVISION		<i>Patrick Dougherty</i>		CLASS	DIVISION	DRAWING	FILE
		ENGINEERING DIRECTORATE		<i>Patrick Dougherty</i>		19	48	7112	SP15M4
		U.S. ARMY DEFENSE AMMUNITION CENTER							

(KEY NUMBERS CONTINUED)

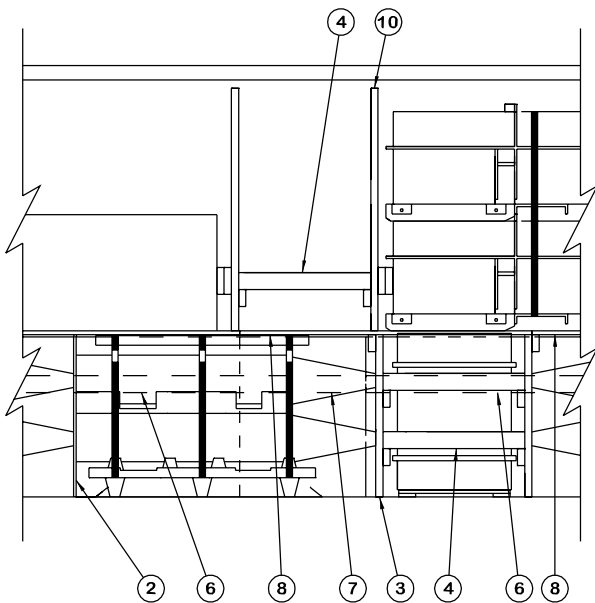
- ⑩ CENTER GATE B (2 REQD). SEE DETAIL ON PAGE 6. INSTALL BETWEEN THE CNU-203/E CONTAINERS.
- ⑪ UNITIZING STRAP, 1-1/4" X .035" OR .031" X 14'-8" LONG STEEL STRAPPING (2 REQD). INSTALL SO AS TO ENCIRCLE THE CNU-203/E CONTAINERS STACKED TOGETHER.
- ⑫ SEAL FOR 1-1/4" STEEL STRAPPING (2 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "N" ON PAGE 3 AND DETAIL ON PAGE 8.
- ⑬ CRIB FILL ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 7. POSITION ON TOP OF THE PLYWOOD BETWEEN THE CNU-203/E CONTAINERS AS SHOWN.



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① END BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 5.
- ② PLYWOOD, 1/2" X 35-1/2" X 33" (1 REQD). INSTALL BETWEEN THE BOMB PALLET THAT ARE NOSE END TO BASE END.
- ③ CENTER GATE A (2 REQD). SEE DETAIL ON PAGE 6. INSTALL BETWEEN THE BOMB PALLET THAT ARE NOSE END TO NOSE END.
- ④ STRUT, 4" X 4" BY LENGTH TO SUIT (REF: 29-1/4" BETWEEN CENTER GATES "A" OR 24-1/4" BETWEEN CENTER GATES "B") (4 REQD BETWEEN CENTER GATES "A" OR 2 REQD BETWEEN CENTER GATES "B"). POSITION THE STRUTS BETWEEN THE CENTER GATES. TOE-NAIL TO THE CENTER GATES W/2-12d NAILS AT EACH END. SEE "BEVEL-CUT" DETAIL ON PAGE 8.
- ⑤ RISER ASSEMBLY (8 REQD). SEE DETAIL ON PAGE 6. PRE-POSITION ON THE FLOOR BENEATH ALTERNATING MXU-650/B CONTAINERS AT THE FAR SIDE AND THE DOOR SIDE OF THE CONTAINER.
- ⑥ BUFFER ASSEMBLY A (4 REQD). SEE DETAIL ON PAGE 6. PLACE AGAINST THE BOMB PALLET UNITS AT EACH END OF THE LOAD ON THE FAR SIDE AND THE DOOR SIDE OF THE CONTAINER WITH THE SPACER PIECE AGAINST THE MXU-650/B CONTAINERS.
- ⑦ BUFFER ASSEMBLY B (2 REQD). SEE DETAIL ON PAGE 6. PLACE AGAINST THE BOMB PALLET UNITS BETWEEN BUFFER ASSEMBLIES "A" ON THE FAR SIDE AND THE DOOR SIDE OF THE CONTAINER WITH THE SPACER PIECE AGAINST THE MXU-650/B CONTAINERS.
- ⑧ PLYWOOD, 3/4" X 7'-4" X 48" (4 REQD). POSITION LATERALLY ON TOP OF THE BOMB PALLET UNITS AND THE DRUMS. NAIL TO THE DECKING SUPPORT PIECE OF CENTER GATE "A" W/4-6d NAILS AT EACH LOCATION.
- ⑨ PLYWOOD, 3/4" X 7'-4" BY LENGTH TO SUIT (REF: 26") (1 REQD). POSITION ON TOP OF THE BOMB PALLET UNITS AND THE DRUMS. THIS PIECE SHALL BUTT UP TO THE PLYWOOD MARKED PIECE ⑧ TO PROVIDE DECKING FOR THE CNU-203/E CONTAINERS.



**SECTION A-A**

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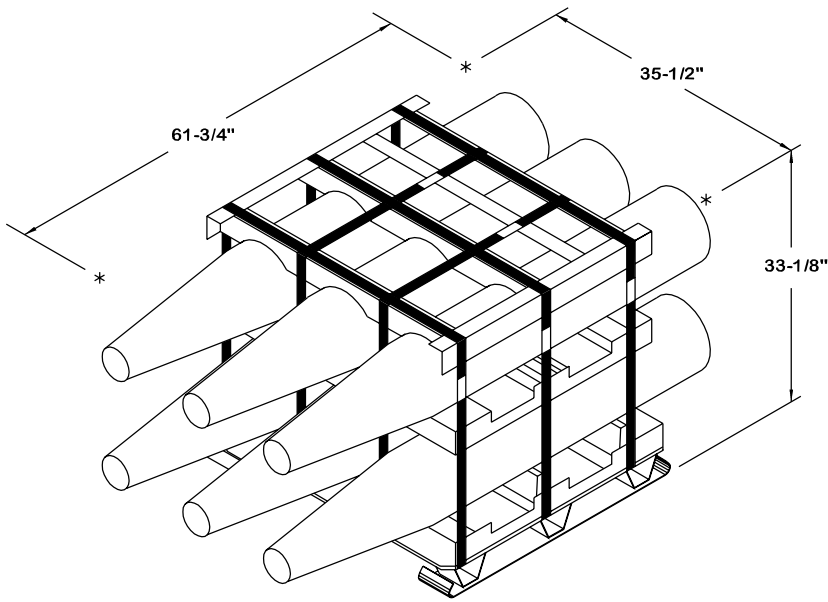
- G. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE ENDWALLS. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE END BLOCKING ASSEMBLIES TO PROVIDE A FLAT SURFACE FOR THE BUFFER PIECES. A PIECE OF 2" X 4", 2" X 3" OR A SPECIAL WIDTH PIECE CUT-TO-FIT CAN BE USED. THIS FILL 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.
- 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. 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.
- L. 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.
- M. 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.
- N. 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 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 THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 8 FOR GUIDANCE.
- O. NOTICE: ALL LOADS SHIPPED IN ACCORDANCE WITH THE PROCEDURES DELINEATED HEREIN MUST CONFORM TO THE REQUIREMENTS SET FORTH WITHIN TITLE 49 CODE OF FEDERAL REGULATIONS FOR THE SHIPMENT OF HAZARDOUS MATERIALS. SHOULD THE LOAD TO BE SHIPPED CONSIST OF INCOMPATIBLE ITEMS, AN EXEMPTION OR WAIVER MUST BE OBTAINED FROM THE APPROPRIATE REGULATORY AGENCY OR AGENCIES.
- 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. BEVELING ONE OR BOTH ENDS OF THE STRUTS WILL FACILITATE INSTALLATION. SEE THE "BEVEL CUT" DETAIL ON PAGE 8 FOR BEVELING INSTRUCTIONS AND "THE STRUT INSTALLATION" DETAIL ON THAT PAGE FOR A PICTORIAL VIEW SHOWING THE PROPER POSITIONING OF A BEVELED STRUT FOR INSTALLATION. NOTE THAT THE UPPER CORNER NEEDS TO BE BEVELED ONLY IF THE STRUTS ARE VERY SHORT. IF ONLY ONE END IS BEVEL CUT, THE BEVELED EDGE WILL BE PLACED IN THE DOWNWARD POSITION SO THAT IT WILL ALLOW THE STRUT TO SLIDE MORE FREELY DOWN THE FACE OF THE VERTICAL PIECE ON THE ADJACENT CENTER GATE AS THE STRUT IS DRIVEN DOWN INTO ITS FINAL BLOCKING POSITION.
- R. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN THE LADING AND THE SIDE OPENING CONTAINER IF DESIRED, 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 SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF GBU-12 (500 POUND MK82 BOMBS ON MHU-149/E METAL PALLET) COMPLETE ROUNDS. SUBSEQUENT REFERENCE TO THE CONTAINER HEREIN MEANS THE CONTAINER 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'-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 DUNNAGE ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND/OR 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 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.

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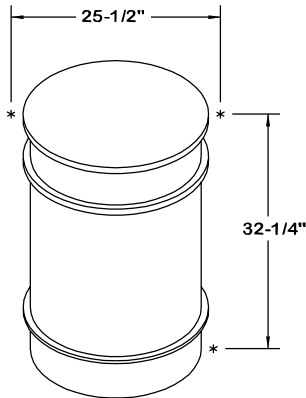
MATERIAL SPECIFICATIONS

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



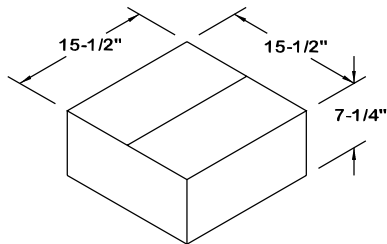
**MK82 BOMBS ON MHU-149/E PALLET**

GROSS WEIGHT - - - - - 3,035 LBS (APPROX)  
 CUBE - - - - - 42.0 CUBIC FEET (APPROX)



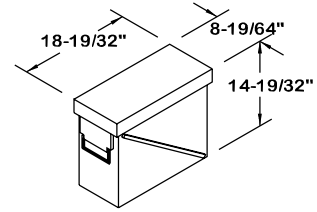
**MXU-650/B FIN ASSEMBLY (F763) IN DRUM**

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



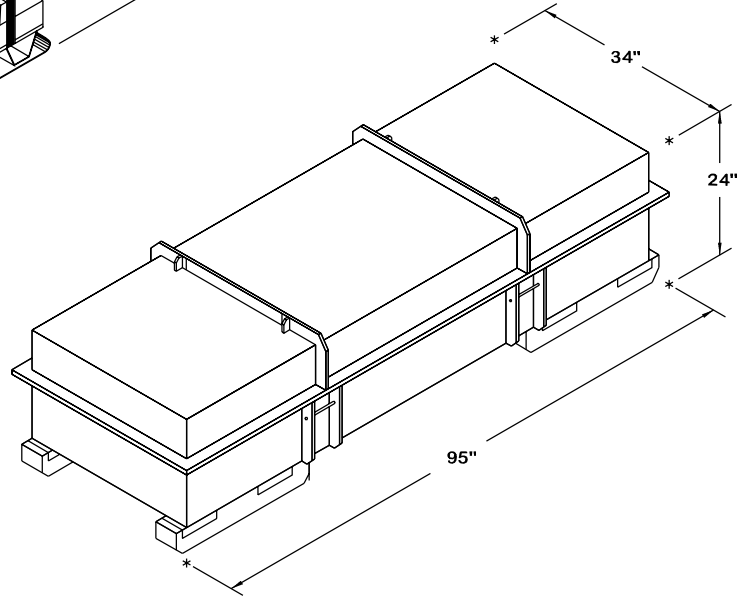
**SWIVEL AND LINK ASSEMBLY (CY72) IN FIBERBOARD BOX**

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



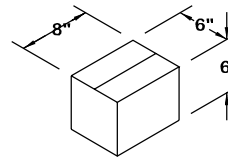
**FUZE SET (G119) IN M548 METAL BOX**

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



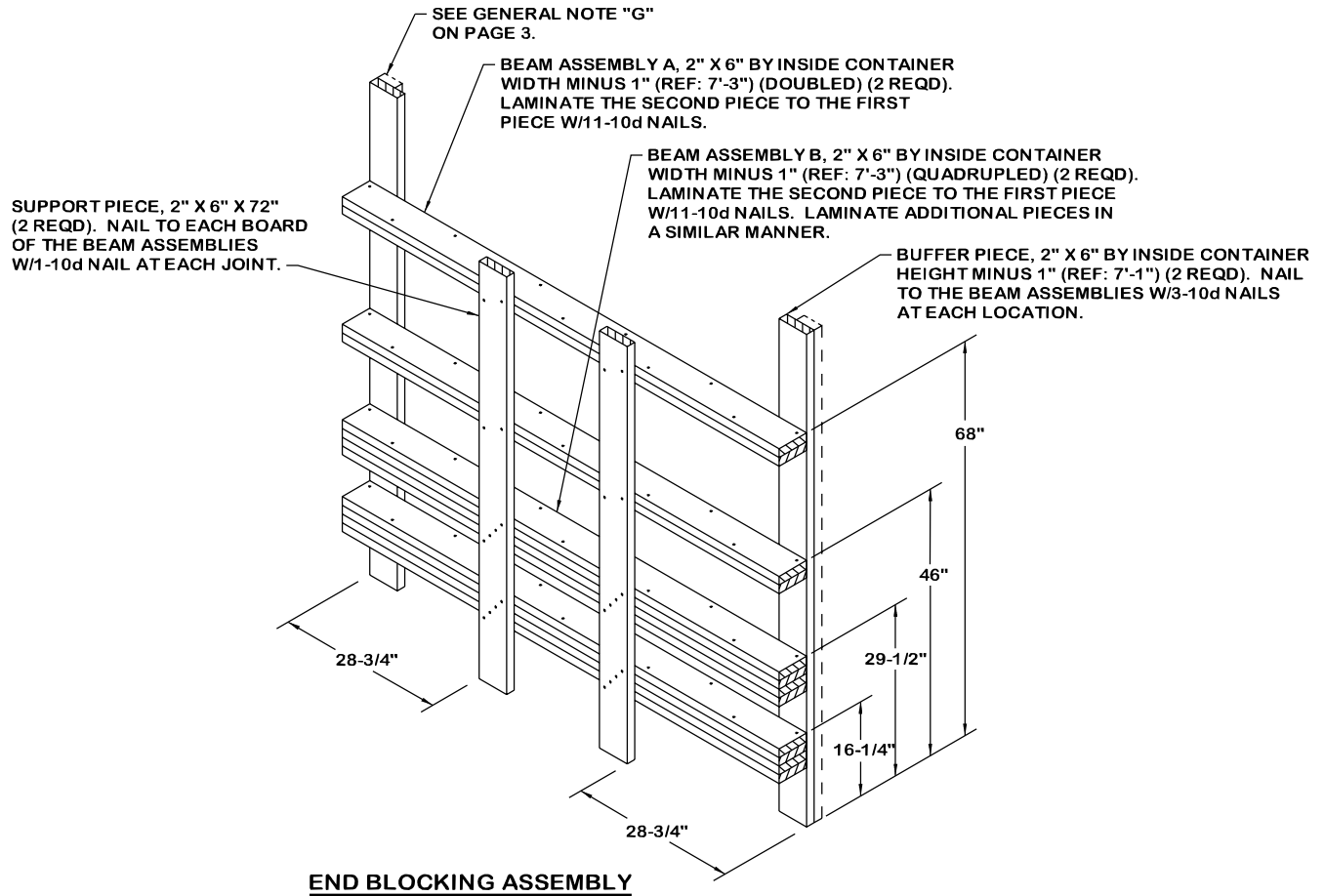
**MAU-169 (EA65) IN CNU-203/E CONTAINER**

GROSS WEIGHT - - - - - 672 LBS (APPROX)  
 CUBE - - - - - 44.9 CUBIC FEET (APPROX)



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

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



**REVISION**

REVISION NO. 1, DATED JULY 2004, CONSISTS OF:

1. CHANGING THE QUANTITY OF ALL ITEMS.
2. ADDING GENERAL NOTES "P", "Q", AND "R".
3. COMPLETE REDESIGN OF LOAD AND DUNNAGE.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	66	22
2" X 4"	191	127
2" X 6"	299	299
4" X 4"	14	19
NAILS	NO. REQD	POUNDS
6d (2")	126	3/4
10d (3")	556	8-1/2
12d (3-1/4")	24	1/2
STEEL STRAPPING, 1-1/4"	- 29.33' REQD	- - - 4.19 LBS
SEAL FOR 1-1/4" STRAPPING	- 4 REQD	- - - NIL
PLYWOOD, 1/2"	- - - 108.06 SQ FT REQD	- - 148.59 LBS
PLYWOOD, 3/4"	- - - 133.23 SQ FT REQD	- - 274.79 LBS

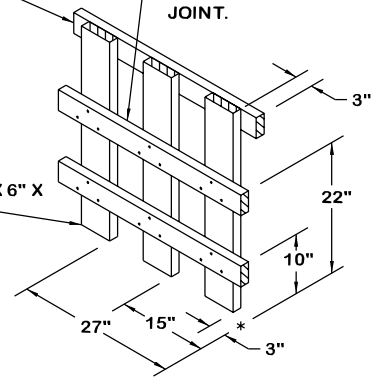
**LOAD AS SHOWN ON PAGE 2**

ITEM	QUANTITY	WEIGHT (APPROX)
MK82 BOMBS (E485) ON		
MHU-149/E PALLET	- - - - 3	- - - - - 9,105 LBS
GUIDANCE SECTION (E069)		
IN CNU-203/E CONTAINER	- - 5	- - - - - 3,360 LBS
FIN ASSEMBLY (F763) IN		
MXU-650/B DRUM	- - - - 18	- - - - - 2,700 LBS
FW26 BOX	- - - - 2	- - - - - 52 LBS
CY72 BOX	- - - - 1	- - - - - 5 LBS
GI19 BOX	- - - - 3	- - - - - 117 LBS
DUNNAGE	- - - - -	- - - - - 1,506 LBS
ISO CONTAINER	- - - - -	- - - - - 6,050 LBS
TOTAL WEIGHT	- - - - -	- - - - - 22,895 LBS (APPROX)

DECKING SUPPORT PIECE, 2" X 4" X 35-1/2" (1 REQD). NAIL TO THE BEARING PIECES W/3-10d NAILS AT EACH JOINT.

STRUT LEDGER, 2" X 4" X 35-1/2" (2 REQD). NAIL TO THE BEARING PIECES W/3-10d NAILS AT EACH JOINT.

BEARING PIECE, 2" X 6" X 33-1/2" (3 REQD).



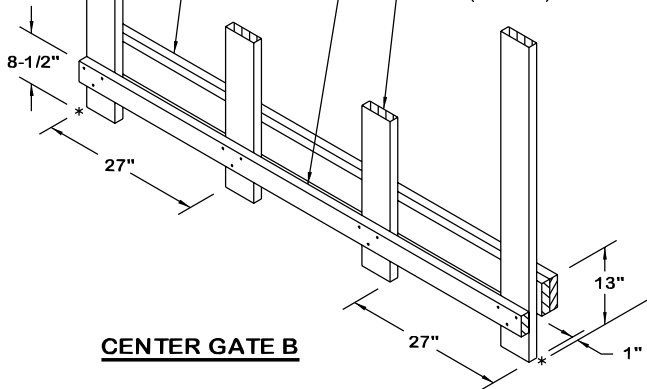
**CENTER GATE A**

VERTICAL PIECE A, 2" X 6" X 53" (2 REQD).

BEARING PIECE, 2" X 6" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-4") (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT. LAMINATE THE SECOND PIECE TO THE FIRST W/11-10d NAILS.

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

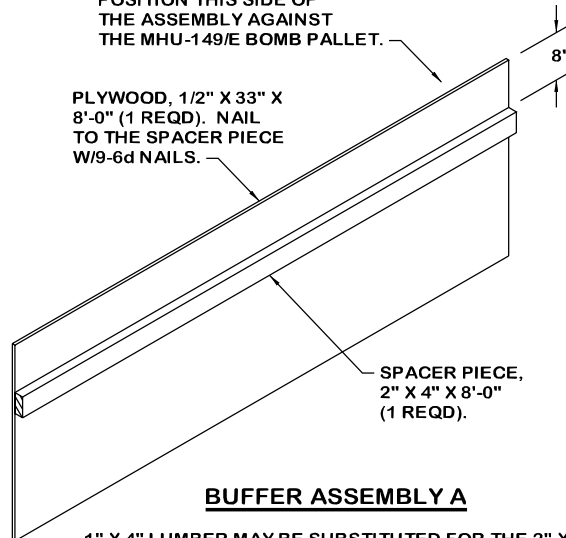
VERTICAL PIECE B, 2" X 6" X 27" (2 REQD).



**CENTER GATE B**

POSITION THIS SIDE OF THE ASSEMBLY AGAINST THE MHU-149/E BOMB PALLET.

PLYWOOD, 1/2" X 33" X 8'-0" (1 REQD). NAIL TO THE SPACER PIECE W/9-6d NAILS.

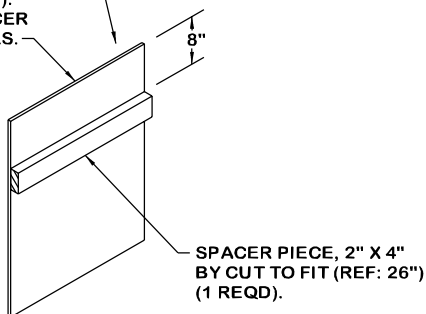


**BUFFER ASSEMBLY A**

1" X 4" LUMBER MAY BE SUBSTITUTED FOR THE 2" X 4" SPACER PIECE IF DESIRED TO PROVIDE CLEARANCE FOR THE MXU-650 DRUMS. CLINCH NAILS IF 1" X 4" LUMBER IS USED.

POSITION THIS SIDE OF THE ASSEMBLY AGAINST THE MHU-149/E BOMB PALLET.

PLYWOOD, 1/2" X 33" BY CUT TO FIT (REF: 26") (1 REQD). NAIL TO THE SPACER PIECE W/4-6d NAILS.

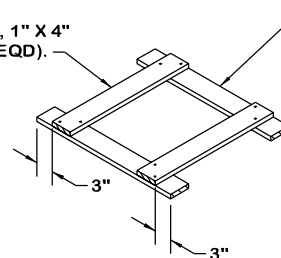


**BUFFER ASSEMBLY B**

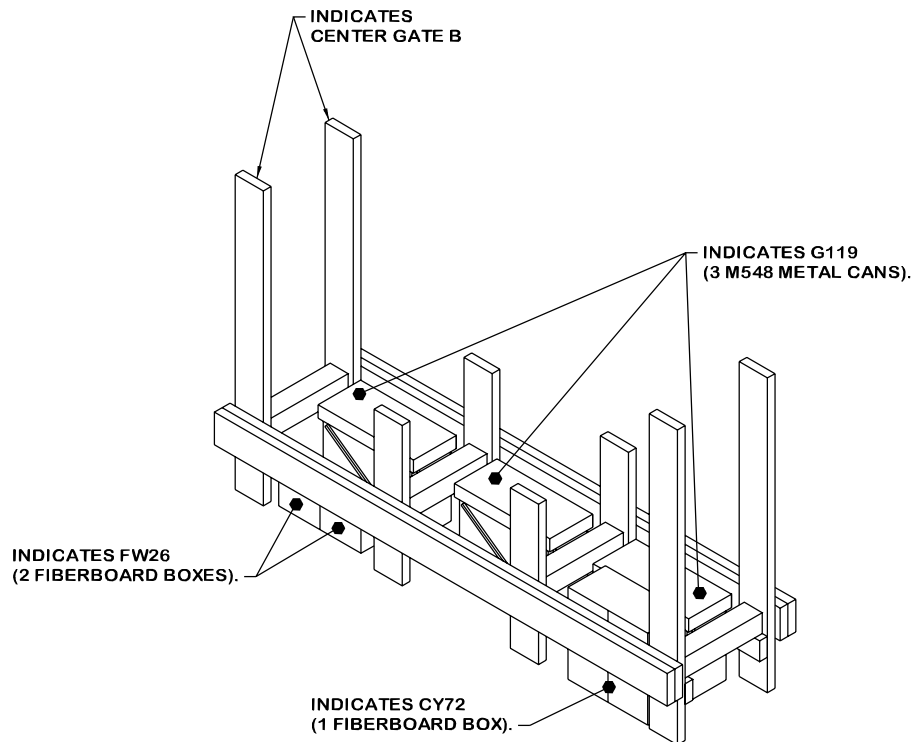
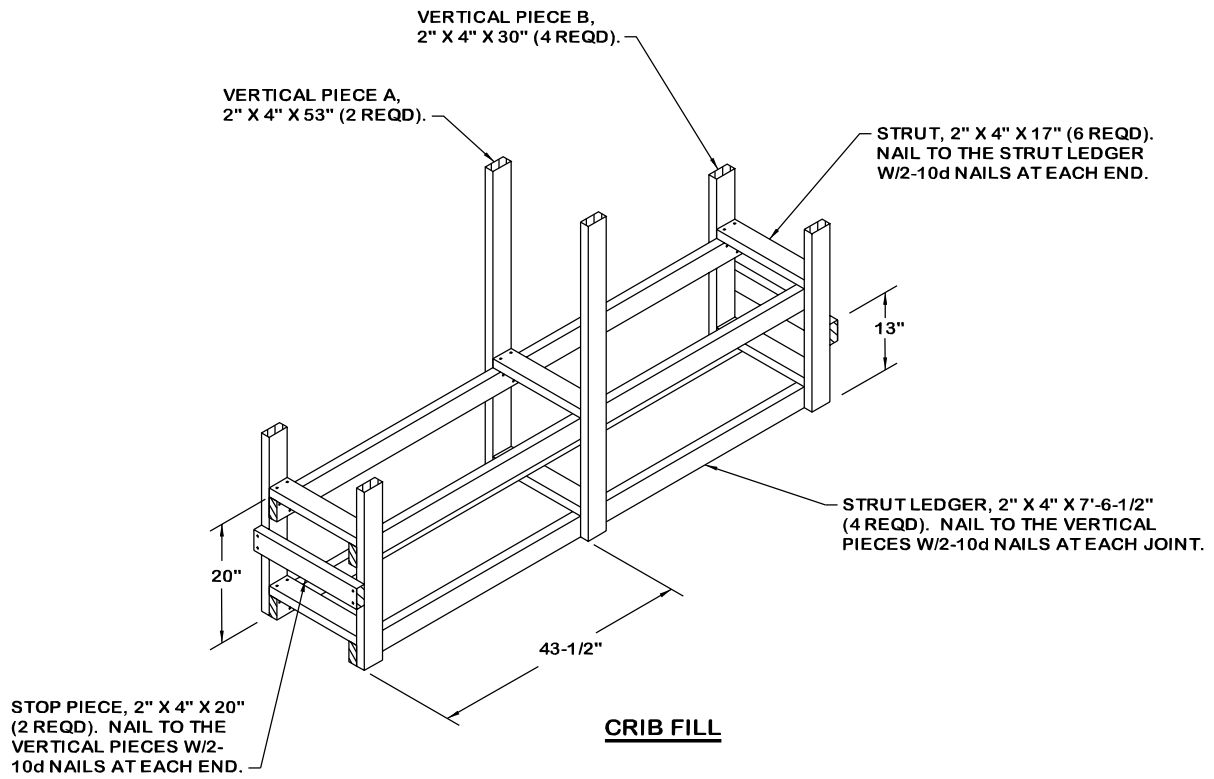
1" X 4" LUMBER MAY BE SUBSTITUTED FOR THE 2" X 4" SPACER PIECE IF DESIRED TO PROVIDE CLEARANCE FOR THE MXU-650/B DRUMS. CLINCH NAILS IF 1" X 4" LUMBER IS USED.

TIE PIECE, 1" X 4" X 23" (2 REQD).

RISER PIECE, 1" X 4" X 26" (2 REQD). NAIL TO THE TIE PIECE W/2-6d NAILS AT EACH JOINT. CLINCH NAILS.

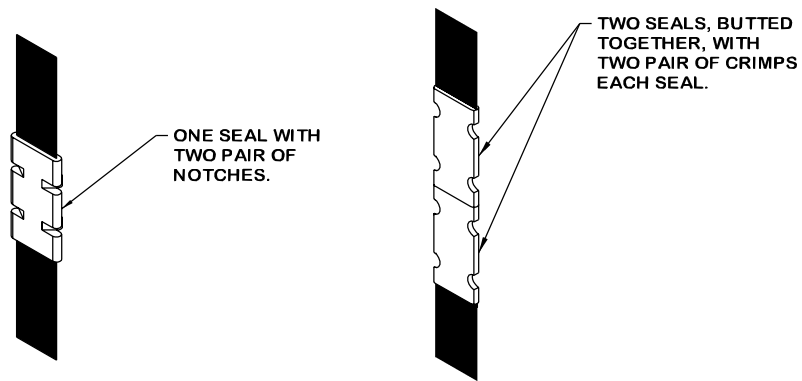


**RISER ASSEMBLY**



**SECUREMENT OF MISCELLANEOUS BOXES**

PLACE THE MISCELLANEOUS BOXES BETWEEN THE  
TWO CENTER GATES "B" AND THE STRUTS.



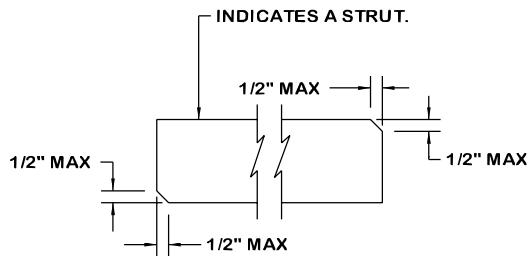
**STRAP JOINT A**

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

**STRAP JOINT B**

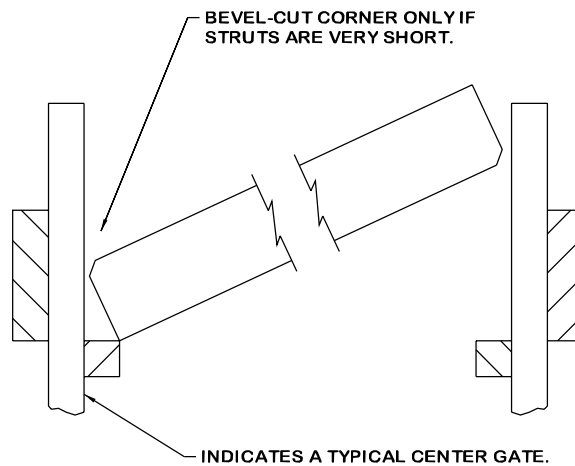
METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

**END-OVER-END LAP JOINT DETAILS**



**BEVEL-CUT**

BEVEL CUTTING THE STRUTS AS SPECIFIED WILL FACILITATE INSTALLING THE STRUTS WITH A "DRIVE FIT". CAUTION: DO NOT BEVEL A CORNER MORE THAN ONE-HALF INCH (1/2").



**STRUT INSTALLATION**

SEE GENERAL NOTE "Q" ON PAGE 3 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.