BUREAU OF EXPLOSIVES

DATE 11/4/01

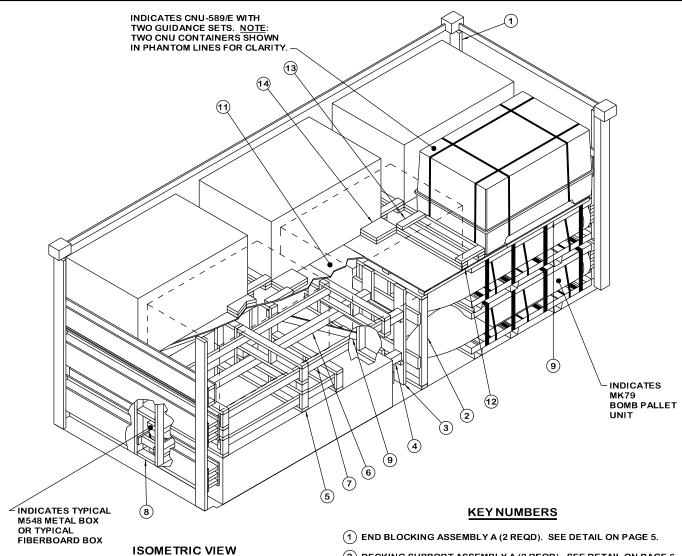
# LOADING AND BRACING IN SIDE OPENING ISO CONTAINERS OF 2,000 POUND GUIDED BOMB UNITS GBU-31(V) 1/B, COMPLETE ROUND

## **INDEX**

<u>ITEM</u>	PAGE(S)
TYPICAL LOADING PROCEDURES (12 COMPLETE ROUNDS)	2
GENERAL NOTES AND MATERIAL SPECIFICATIONS	3
PALLET UNIT AND CONTAINER DETAILS	
DETAILS (12 COMPLETE ROUNDS)	
TYPICAL LOADING PROCEDURES (8 COMPLETE ROUNDS)	8
DETAILS (8 COMPLETE ROUNDS)	9-12

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 BASIC DO NOT SCALE OPERATIONS SUPPORT COMMAND ENGINEER REV WEBSITE: HTTP://WWW.DAC.ARMY.MIL BASIC PATRICK DOUGHERTY TECHNICIAN REV **APRIL 2001** BASIC DRAFTSMAN APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND TRANSPORTATION ENGINEERING DIVISION CLASS DIVISION DRAWING VALIDATION FILE ENGINEERING DIVISION SP15M16 19 48 8722 **ENGINEERING** William R. Frerich DIRECTORATE U.S. ARMY DEFENSE AMMUNITION CENTER



#### (KEY NUMBERS CONTINUED)

- 10 DECKING ASSEMBLY A (4 REQD). SEE DETAIL ON PAGE 7. POSITION ON TOP OF MK79 BOMB PALLET UNITS AND DECKING SUPPORT ASSEMBLIES. NAIL THROUGH THE DECKING STRINGERS INTO THE DECKING SUPPORT ASSEMBLIES W/1-12d NAIL AT EACH LOCATION AND NAIL TO THE CRIB FILL ASSEMBLIES W/2-12d NAILS AS APPLICABLE
- (1) DECKING ASSEMBLY B (1 REQD). SEE DETAIL ON PAGE 7. POSITION ON TOP OF DECKING SUPPORT ASSEMBLIES BETWEEN DECKING ASSEMBLIES "A". NAIL THROUGH THE DECKING STRINGERS INTO THE DECKING SUPPORT ASSEMBLIES W/1-12d NAIL AT EACH LOCATION.
- (12) STOP PIECE, 2" X 4" X 40" (DOUBLED) (8 REQD). POSITION AGAINST THE BASE OF THE CNU-589/E CONTAINERS AS SHOWN. NAIL THE FIRST PIECE THROUGH DECKING ASSEMBLY INTO THE STRINGERS W/2-12 NAILS AT EACH LOCATION. LAMINATE THE SECOND BOARD TO THE FIRST W/4-10d NAILS. NOTE: THE CNU-589/E CONTAINERS MUST BE POSITIONED AGAINST THE END BLOCKING ASSEMBLIES AT EACH END OF THE CONTAINER. THE TWO CNU CONTAINERS IN THE MIDDLE OF THE LOAD MUST BE CENTERED. THE CONTAINERS MAY BE PRE-POSITIONED FOR LOCATING STOP PIECES AND THEN REMOVED FOR EASE OF NAILING.
- 13 TIE PIECE, 2" X 4" BY CUT TO FIT (REF: 17-1/2") (8 REQD). POSITION LONGITUDINALLY ON TOP OF THE STOP PIECES AND NAIL W/2-10d NAILS AT EACH END.
- (14) SPACER PIECE, 2" X12" X12" (DOUBLED) (6 REQD). POSITION THE FIRST BOARD AGAINST THE FOOT OF THE CNU-589/E CONTAINER AND NAIL THROUGH DECKING ASSEMBLY INTO THE STRINGER W/3-124 NAILS. LAMINATE THE SECOND BOARD TO THE FIRST W/3-104 NAILS.

- 2 DECKING SUPPORT ASSEMBLY A (2 REQD). SEE DETAIL ON PAGE 6. POSITION AT THE FRONT END OF TWO HIGH STACK OF MK79 BOMB PALLET UNITS AS SHOWN.
- (3) CENTER GATE A (2 REQD). SEE DETAIL ON PAGE 6.
- (4) STRUT A, 4" X 4" BY CUT TO FIT (REF: 12-1/2") (4 REQD). POSITION BETWEEN THE CENTER GATES. TOENAIL TO THE CENTER GATES W/2-12d NAILS AT EACH END. SEE THE "BEVEL CUT" DETAIL ON PAGE 7.
- (5) STRUT SUPPORT ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 6. PO-SITION ASSEMBLY ON TOP OF ONE HIGH STACK OF MK79 BOMB PALLET UNITS AGAINST THE END BLOCKING ASSEMBLY. TOENAIL TO THE END BLOCKING ASSEMBLY W/4-12d NAILS.
- (6) STRUT B, 4" X 4" BY CUT TO FIT (REF: 9'-8") (4 REQD). POSITION BETWEEN THE CENTER GATE AND THE END BLOCKING ASSEMBLY. TOENAIL TO THE CENTER GATE, STRUT SUPPORT ASSEMBLY AND THE END BLOCKING ASSEMBLY W/2-12d NAILS AT EACH LOCATION. SEE THE "BEVEL CUT" DETAIL ON PAGE 7.
- (7) DECKING SUPPORT ASSEMBLY B (2 REQD). SEE DETAIL ON PAGE 7. POSITION ON TOP OF STRUT "B". THE SUPPORT ASSEMBLY WILL BE POSITIONED AGAINST THE END BLOCKING ASSEMBLY AS SHOWN. TOENAIL TO THE STRUTS AND THE END BLOCKING ASSEMBLY W/2-12d NAILS AT EACH LOCATION.
- (8) CRIB FILL A (2 REQD). SEE DETAIL ON PAGE 7. POSITION AGAINST THE END BLOCKING ASSEMBLY. TOENAIL TO THE END BLOCKING ASSEMBLY AND THE STRUT SUPPORT ASSEMBLY W/2-12d NAILS AT EACH LOCATION AS APPLICABLE.
- 9 BRACE, 2" X 4" BY CUT TO FIT (REF: 43-1/2") (2 REQD). POSITION DIAGONALLY BETWEEN CRIB FILL "A" ASSEMBLY AND DECKING SUPPORT ASSEMBLY "A". NAIL W/2-10d NAILS AT EACH END.

(CONTINUED AT LEFT)

PAGE 2

12 COMPLETE ROUND LOAD

#### (GENERAL NOTES CONTINUED)

- 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.

#### **LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
MK79 BOMB PALLET UNI WITH F275 CNU-589/E CONTAINER		25,728 LBS
WITH EA69	6	2,718 LBS
M548 CAN WITH G119	2	78 LBS
▲ BY30	6	180 LBS
▲ FW26 BOX	2	(52 LBS)
▲ G008 BOX	2	(72 LBS)
DUNNAGE		1,501 LBS
CONTAINER		6,050 LBS
TOTAL WEIG	GHT	36, 255 LBS (APPROX)

BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
1" X 4" 2" X 2" 2" X 4" 2" X 6" 2" X 12" 4" X 4"	47 17 466 166 12 45	16 6 311 166 24 59	
NAILS	NO. REQD	POUNDS	
6d (2") 10d (3") 12d (3-1/4")	430 502 82	2-3/4 7-3/4 1-1/2	
PLYWOOD, 1/2" - 152.52 SQ FT REQD 209.72 LBS PLYWOOD, 3/4" - 55.59 SQ FT REQD 114.56 LBS			

#### **GENERAL NOTES**

- 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 2,000 LB GBU-31(V) 1/B BOMBS AND ASSOCIATED COMPONENTS IN A SIDE OPENING CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINERS WITH THE GBU-31(V) 1/B COMPONENTS. SEE PAGE 4 FOR DETAILS OF THE COMPONENTS. A FULL LOAD OF 12 COMPLETE ROUNDS IS SHOWN ON PAGE 2. A REDUCED CAPACITY LOAD OF EIGHT COMPLETE ROUNDS IS SHOWN ON PAGE 8. 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 CRIB FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE VERTICAL OR HORIZONTAL PIECE AS APPLICABLE 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 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 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.

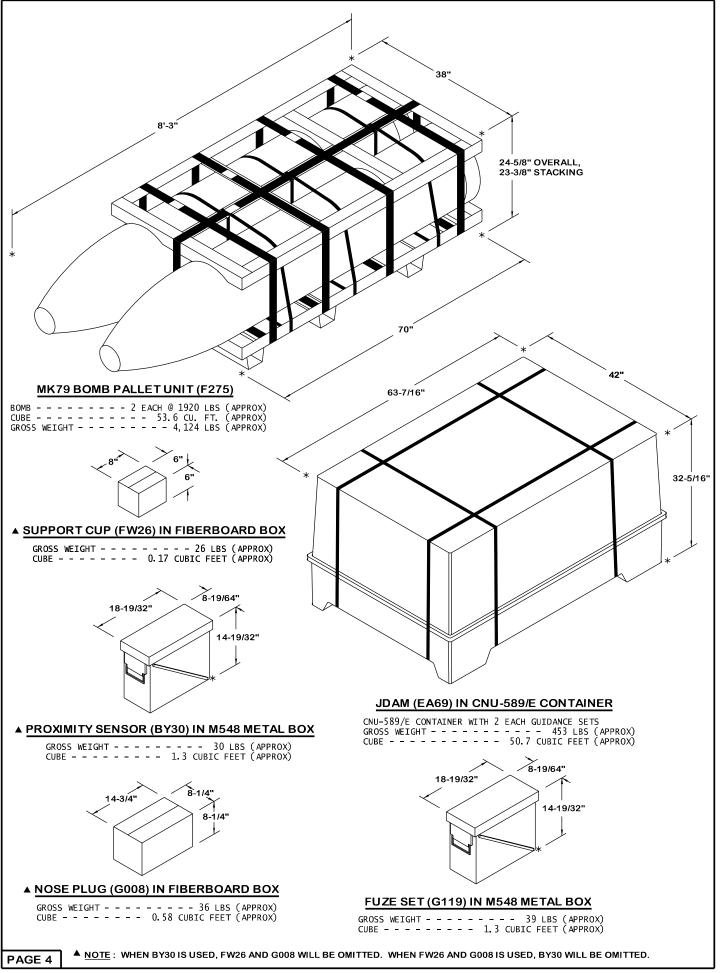
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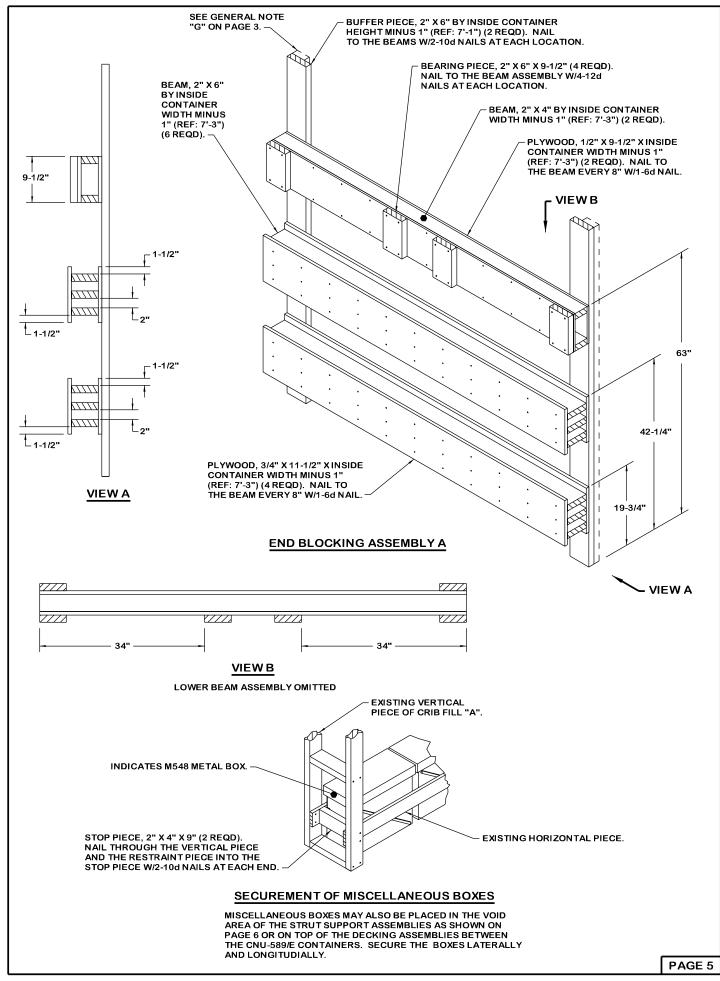
# **MATERIAL SPECIFICATIONS**

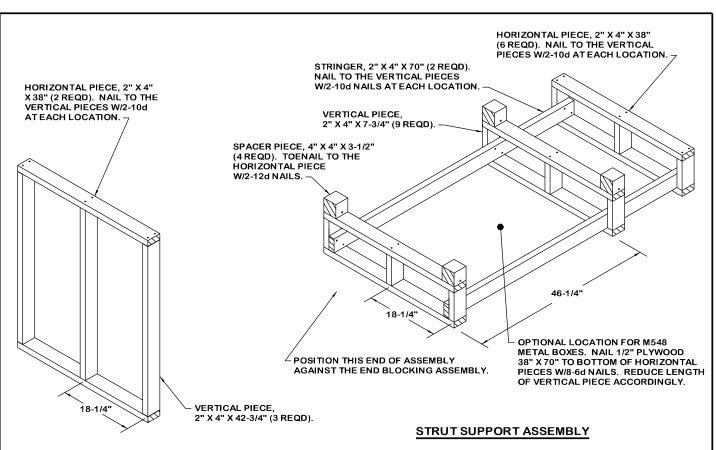
<u>LUMBER</u> :	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
<u>NAILS</u> :	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
<u>PLYWOOD</u> :	COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
ANTI-CHAFING MATERIAL:	MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.

▲ NOTE: WHEN BY30 IS USED, FW26 AND G008 WILL BE OMITTED. WHEN FW26 AND G008 IS USED, BY30 WILL BE OMITTED. WEIGHT IN "LOAD AS SHOWN" INDICATES USE OF BY30 WITH FW26 AND G008 OMITTED.

HARDBOARD - - - - -: ANSI/AHA A135.4, CLASS 1.

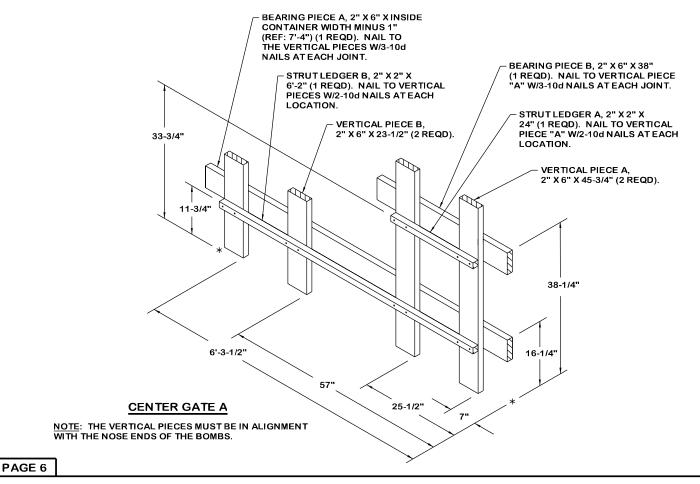


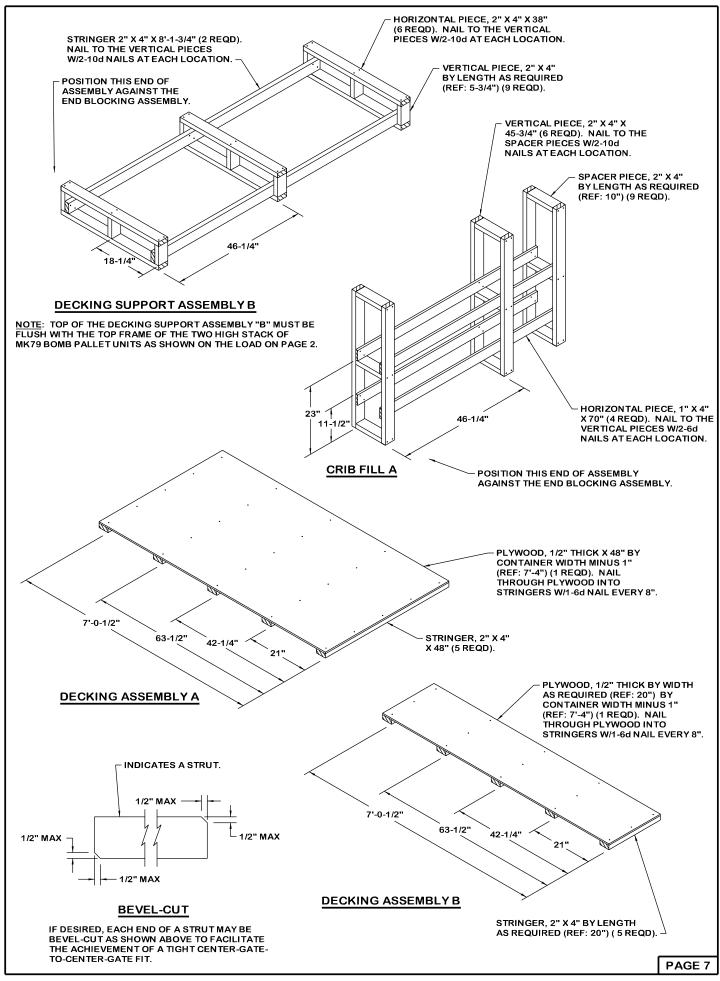


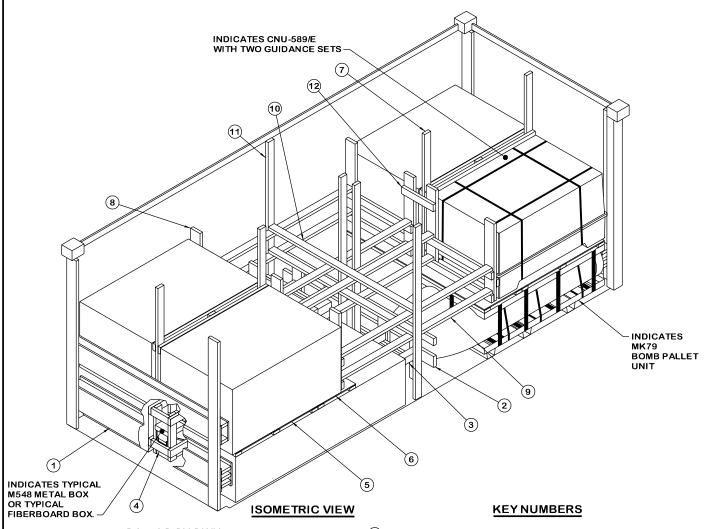


# DECKING SUPPORT ASSEMBLY A

NOTE: THE DECKING SUPPORT ASSEMBLY "A" MUST BE POSITIONED PRIOR TO INSTALLING THE CENTER GATE.







# **LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (	(APPROX)
MK79 BOMB PALLET U WITH F275 CNU-589/E CONTAINE	4	16, 496 ເ	_BS
WITH EA69	4	1, 812 ι	_BS
M548 CAN WITH G119	2	78 l	_BS
M548 CAN WITH  A BY30  FW26 BOX  DUNNAGE  CONTAINER	1	120 I (26 I (36 I 1,136 I 6,050 I	_BS) _BS) _BS
	_	25 622	

TOTAL WEIGHT - - - - - - 25,692 LBS (APPROX)

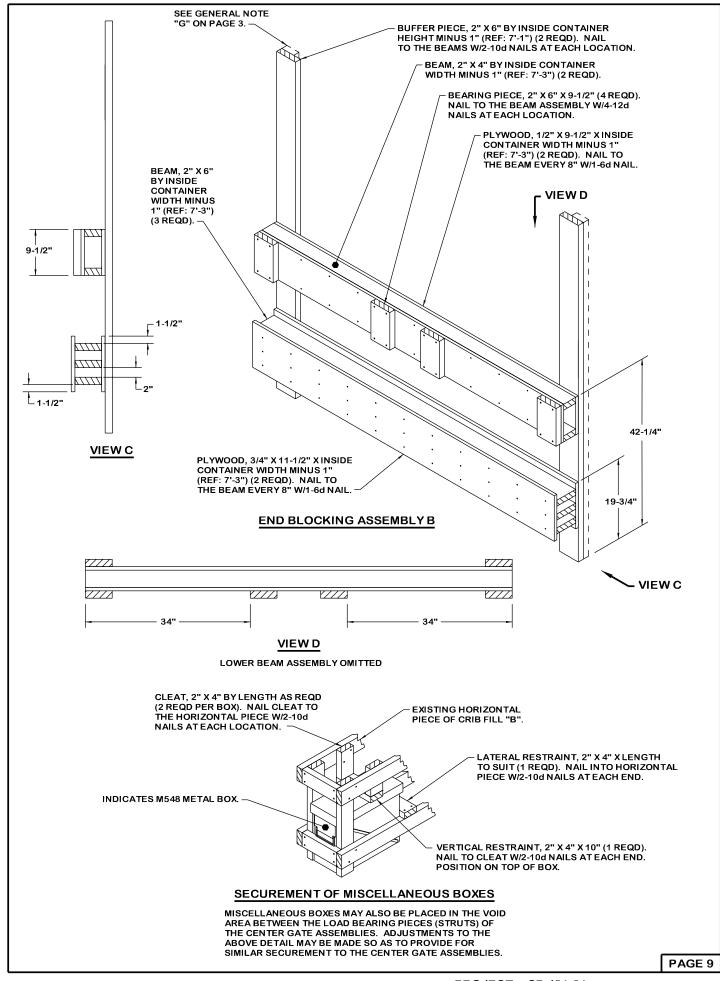
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4" 2" X 2" 2" X 4" 2" X 6" 4" X 4"	14 7 465 136 5	5 3 310 136 6
NAILS	NO. REQD	POUNDS
6d (2") 10d (3") 12d (3-1/4")	346 428 16	2-1/4 6-3/4 1/4
PLYWOOD, 1/2" - 108.52 SQ FT REQD 149.22 LBS PLYWOOD, 3/4" - 27.80 SQ FT REQD 57.34 LBS		

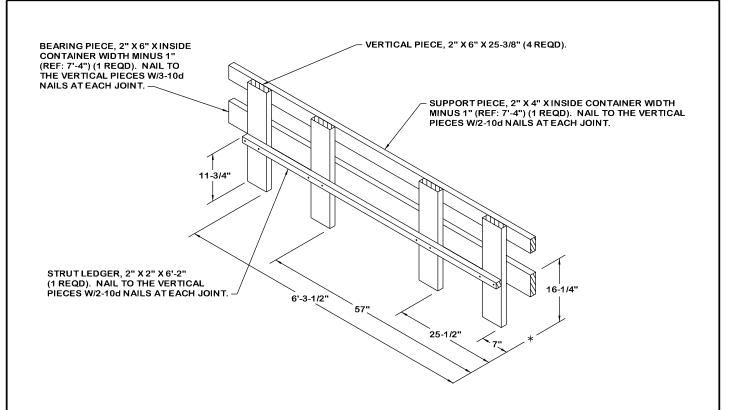
PAGE 8

- (1) END BLOCKING ASSEMBLY B (2 REQD). SEE DETAIL ON PAGE 9.
- (2) CENTER GATE B (2 REQD). SEE DETAIL ON PAGE 10.
- (3) STRUT, 4" X 4" BY CUT TO FIT (REF: 12-3/4") (4 REQD). POSITION BETWEEN THE CENTER GATES. TOENAIL TO THE CENTER GATES W2-12d NAILS AT EACH END. SEE THE "BEVEL CUT" DETAIL ON PAGE 7.
- (4) CRIB FILL B (2 REQD). SEE DETAIL ON PAGE 10. POSITION BETWEEN MK79 BOMB PALLET UNITS
- (5) DECKING ASSEMBLY C (2 REQD). SEE DETAIL ON PAGE 11. POSITION ON TOP OF MK79 BOMB PALLET UNITS.
- (6) DECKING ASSEMBLY D (2 REQD). SEE DETAIL ON PAGE 11. POSITION ON TOP OF MK79 BOMB PALLET UNITS.
- (7) CRIB FILL C (2 REQD). SEE DETAIL ON PAGE 12. POSITION BETWEEN THE CNU-589/E CONTAINERS.
- (8) CENTER GATE C (4 REQD). SEE DETAIL ON PAGE 12. POSITION AGAINST CNU-589/E CONTAINER WITH THE RESTRAINT PIECE POSITIONED UNDER THE FLARED LIFTING EDGE OF THE CONTAINER.
- (9) STRUT, 2" X 4" BY CUT TO FIT (REF: 7'-6") (8 REQD). NAIL TO THE LEDGER BOARD AT EACH END W/2-10d NAILS.
- (10) HORIZONTAL SUPPORT, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-4") (2 REQD). POSITION ON TOP OF STRUTS AS SHOWN. NAIL TO STRUTS W/2-10d NAILS AT EACH LOCATION.
- (1) VERTICAL SUPPORT, 2' X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-3") (4 REQD). POSITION AGAINST THE STRUTS AS SHOWN AND NAIL TO THE STRUTS W/2-10d NAILS AT EACH LOCATION.
- (2) RESTRAINT PIECE, 2" X 4" BY CUT TO FIT (REF: 18-1/2") (2 REQD). POSITION AS SHOWN AND NAIL TO CENTER GATE "C" VERTICAL PIECES W/2-10d NAILS AT EACH END.

### **8 COMPLETE ROUND LOAD**

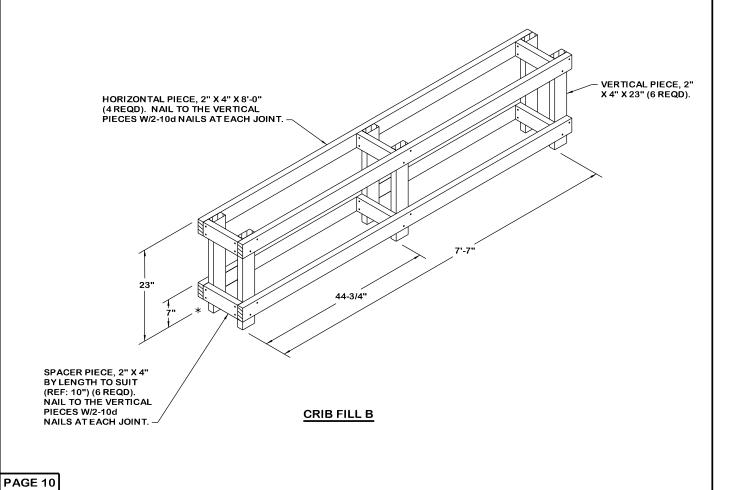
▲ NOTE: WHEN BY30 IS USED, FW26 AND G008 WILL BE OMITTED. WHEN FW26 AND G008 IS USED, BY30 WILL BE OMITTED. WEIGHT IN "LOAD AS SHOWN" INDICATES USE OF BY30 WITH FW26 AND G008 OMITTED.

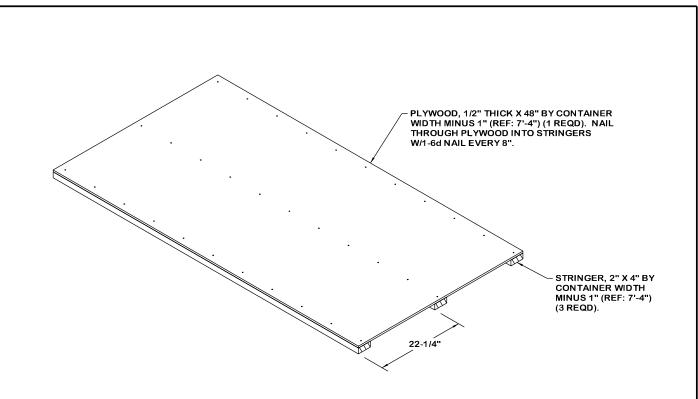




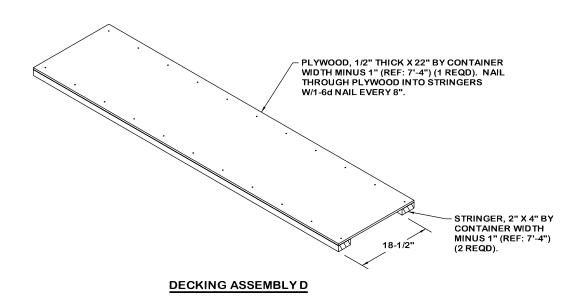
# **CENTER GATE B**

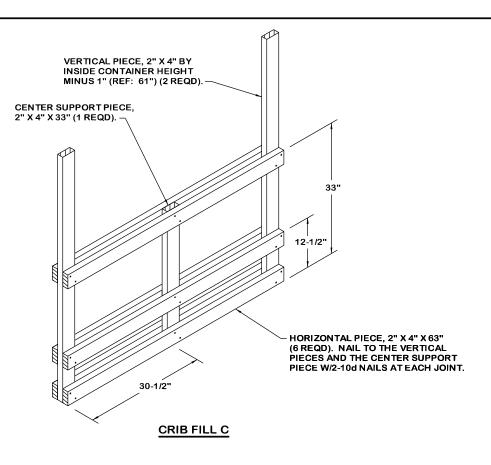
 $\underline{\text{NOTE}}\textsc{:}$  THE VERTICAL PIECES MUST BE IN ALIGNMENT WITH THE NOSE ENDS OF THE BOMBS.

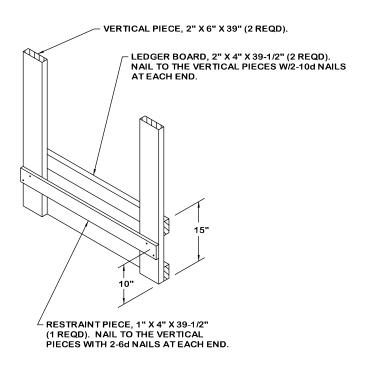




# DECKING ASSEMBLY C







**CENTER GATE C**