

REVISION NO. 1
 APPROVED BY
 BUREAU OF EXPLOSIVES

D. Healy

DATE 1-4-95

LOADING AND BRACING WITH WOODEN DUNNAGE IN SIDE OPENING ISO CONTAINERS OF MK-84 (2,000 POUND) BOMBS, COMPLETE ROUND

- 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 ARMAMENT, MUNITIONS AND CHEMICAL COMMAND <i>Timothy Fore</i>	DRAFTSMAN	TECHNICIAN	ENGINEER
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APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND <i>William F Ernst</i>	VALIDATION ENGINEERING DIVISION	TRANSPORTATION ENGINEERING DIVISION	LOGISTICS ENGINEERING OFFICE
	<i>JMK W. French W Ernst</i> JANUARY 1993		
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL			
REVISION NO. 1	DECEMBER 1994	CLASS	DIVISION
SEE THE REVISION LISTING ON PAGE 2		DRAWING	FILE
		19	48
		7107	SP15M3

DO NOT SCALE

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 SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF MK-84 (2,000 POUND) BOMBS, COMPLETE ROUND. SEE PAGE 3 FOR DETAILS OF THE ITEMS TO BE SHIPPED. 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 6,050 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH SIDE OPENING INTERMODAL COMMERCIAL CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 89" WIDE BY 88" HIGH. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLAT-CAR (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 CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). ALTHOUGH A TOTAL OF 1-1/2" OF UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS PERMITTED, LATERAL VOIDS WITHIN THE LOAD ARE TO BE HELD TO A MINIMUM. EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE HORIZONTAL PIECES ON THE CENTER GATE ASSEMBLY. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND/OR QUANTITY OF THE VERTICAL AND HORIZONTAL PIECES IN THE CENTER GATE ASSEMBLY MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE CONTAINER SIZE.
- 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" 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". THIS PIECE IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER ENDWALLS ARE SMOOTH AND FLAT.
- 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 SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

- LUMBER** - - - - -: SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS** - - - - -: FED SPEC FF-N-105; COMMON.
- PLYWOOD** - - - - -: COMMERCIAL ITEM DESCRIPTION A-A-55057, TYPE A, CONSTRUCTION AND 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.
- WIRE, CARBON STEEL** -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1005 OR BETTER.

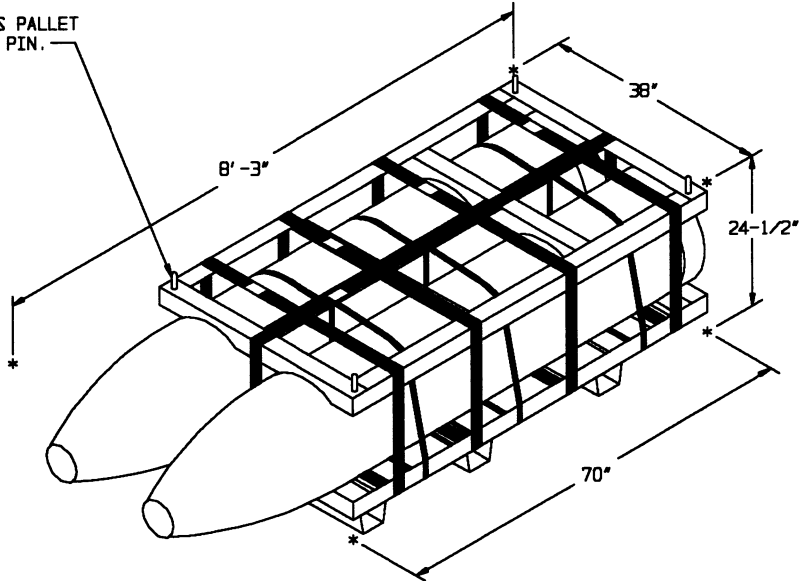
(GENERAL NOTES CONTINUED)

- K. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C 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 25.4 MM AND ONE POUND EQUALS 0.454 KG.
- N. 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, AND EXEMPTION OR WAIVER MUST BE OBTAINED FROM THE APPROPRIATE REGULATORY AGENCY OR AGENCIES.

REVISION

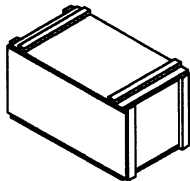
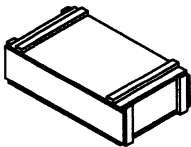
REVISION NO. 1, DATED DECEMBER 1994, CONSISTS OF:
ADDING PROCEDURES FOR A 16-UNIT LOAD.

INDICATES PALLET
STACKING PIN.

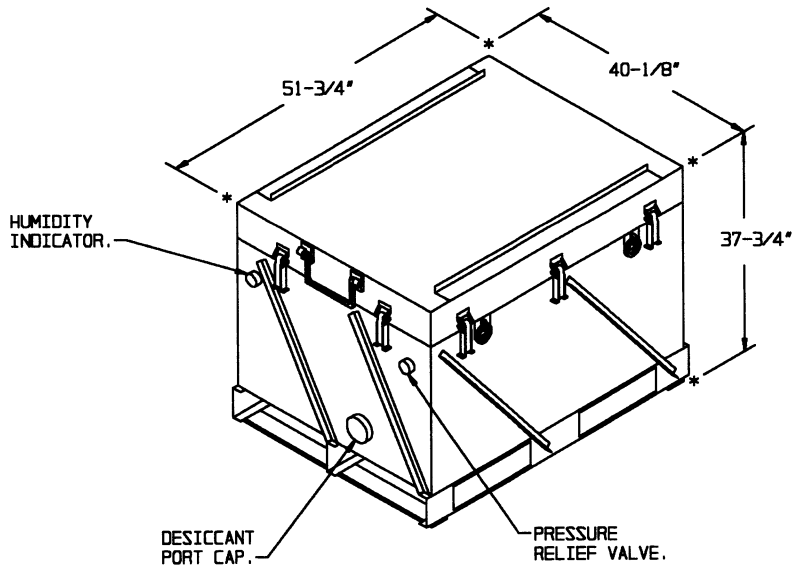


2000 POUND, MK84

BOMB - - - - - 2 EACH @ 1,930 LBS (APPROX)
 CUBE - - - - - 55.5 CU. FT. (APPROX)
 GROSS WEIGHT - - - 4,133 LBS (APPROX)

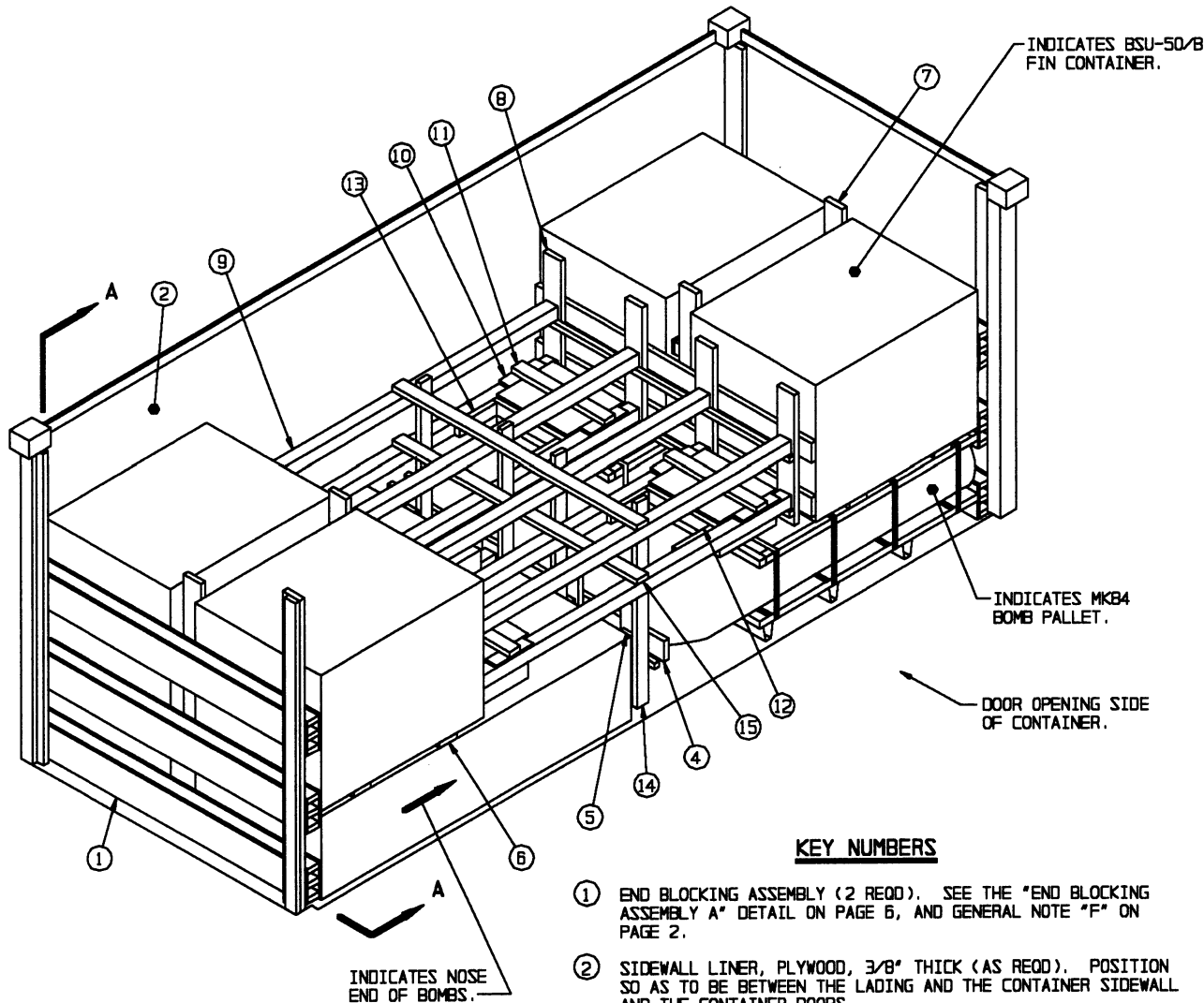


TYPICAL COMPONENT BOXES
 VARIOUS SIZES AND WEIGHTS.

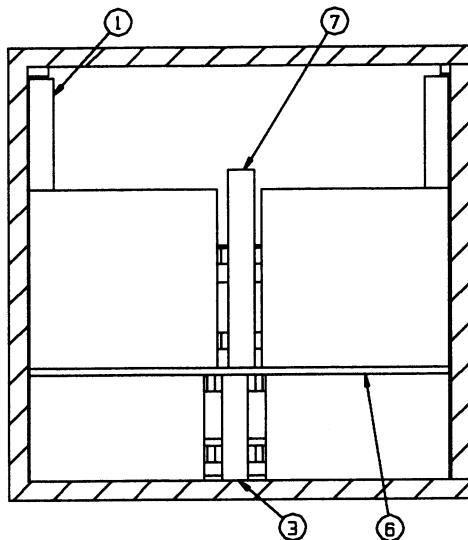


ISOMETRIC VIEW

(CNU-335 A/E CNTR) - - 1,038 LBS (APPROX)
 CUBE - - - - - 45.4 CU FT (APPROX)



ISOMETRIC VIEW



SECTION A-A

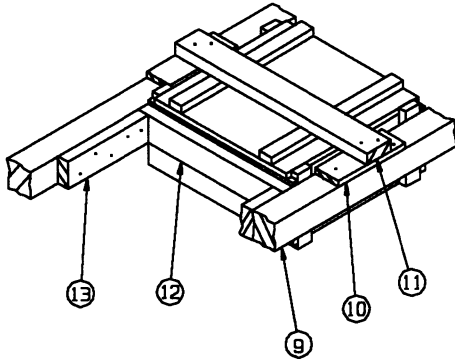
KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE "END BLOCKING ASSEMBLY A" DETAIL ON PAGE 6, AND GENERAL NOTE "F" ON PAGE 2.
- ② SIDEWALL LINER, PLYWOOD, 3/8" THICK (AS REQD). POSITION SO AS TO BE BETWEEN THE LADING AND THE CONTAINER SIDEWALL AND THE CONTAINER DOORS.
- ③ CRIB FILL (2 REQD). SEE THE "CRIB FILL A" DETAIL ON PAGE 6. POSITION BETWEEN THE PALLET UNITS OF BOMBS. SEE GENERAL NOTE "D" ON PAGE 2.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 7. POSITION BETWEEN THE PALLET UNITS OF BOMBS.
- ⑤ STRUT "A", 4" X 4" BY CUT TO FIT (REF: 12-3/4") (8 REQD). POSITION SO AS TO BE BETWEEN THE CENTER GATES, PIECES MARKED ④. TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑥ DECKING, 2" X 6" BY LENGTH TO SUIT (REF: 7'-4") (4 REQD). WIRE TIE TO THE TOP FRAME OF THE BOMB PALLET UNITS.
- ⑦ CRIB FILL (2 REQD). SEE THE "CRIB FILL B" DETAIL ON PAGE 6. POSITION BETWEEN THE CONTAINERS IN THE SECOND LAYER.
- ⑧ CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 7. POSITION AS SHOWN AGAINST THE CONTAINERS IN THE SECOND LAYER.
- ⑨ STRUT "B", 4" X 4" BY CUT TO FIT (REF: 9'-0-1/4") (8 REQD). POSITION SO AS TO BE BETWEEN THE CENTER GATES, PIECES MARKED ⑧. TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑩ FILLER, 1" X 4" X 12" (AS REQD). POSITION ON TOP OF AND NAIL TO THE STRUT W/2-6d NAILS. SEE SPECIAL NOTE 2 ON PAGE 5.
- ⑪ HOLD DOWN, 2" X 4" X 30" (AS REQD, 1 PER BOX). CENTER ON BOX AND NAIL THROUGH PIECE MARKED ⑩ INTO STRUT W/2-10d NAILS AT EACH END.

(CONTINUED ON PAGE 5)

(KEY NUMBERS CONTINUED FROM PAGE 4)

- ⑫ CROSS BLOCKING, 2" X 4" BY CUT TO FIT BETWEEN STRUTS (1 REQD PER BOX).
- ⑬ CLEAT, 2" X 4" X 12" (2 REQD PER BOX). POSITION AS SHOWN AND NAIL TO THE STRUT, PIECE MARKED ⑨, W/4-10d NAILS. TOENAIL TO CROSS BLOCKING W/1-12d NAIL.
- ⑭ VERTICAL STRUT BRACING, 2" X 4" BY LENGTH TO SUIT (4 REQD). NAIL TO THE STRUTS, PIECES MARKED ⑨, W/2-10d NAILS AT EACH JOINT.
- ⑮ HORIZONTAL STRUT BRACING, 2" X 4" BY LENGTH TO SUIT (2 REQD). NAIL TO THE STRUTS, PIECES MARKED ⑨, W/2-10d NAILS AT EACH JOINT.



SECUREMENT OF MISCELLANEOUS BOXES

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	44	15
2" X 2"	41	14
2" X 4"	173	115
2" X 6"	292	292
4" X 4"	81	108
NAILS	NO. REQD	POUNDS
6d (2")	464	2-3/4
10d (3")	376	5-3/4
12d (3-1/4")	8	NIL
16d (3-1/2")	64	1-1/4
WIRE, NO. 14 GAGE	12' REQD	NIL
PLYWOOD, 3/4"	56 SQ FT REQD	116 LBS
PLYWOOD, 3/8"	277 SQ FT REQD	285 LBS

SPECIAL NOTES:

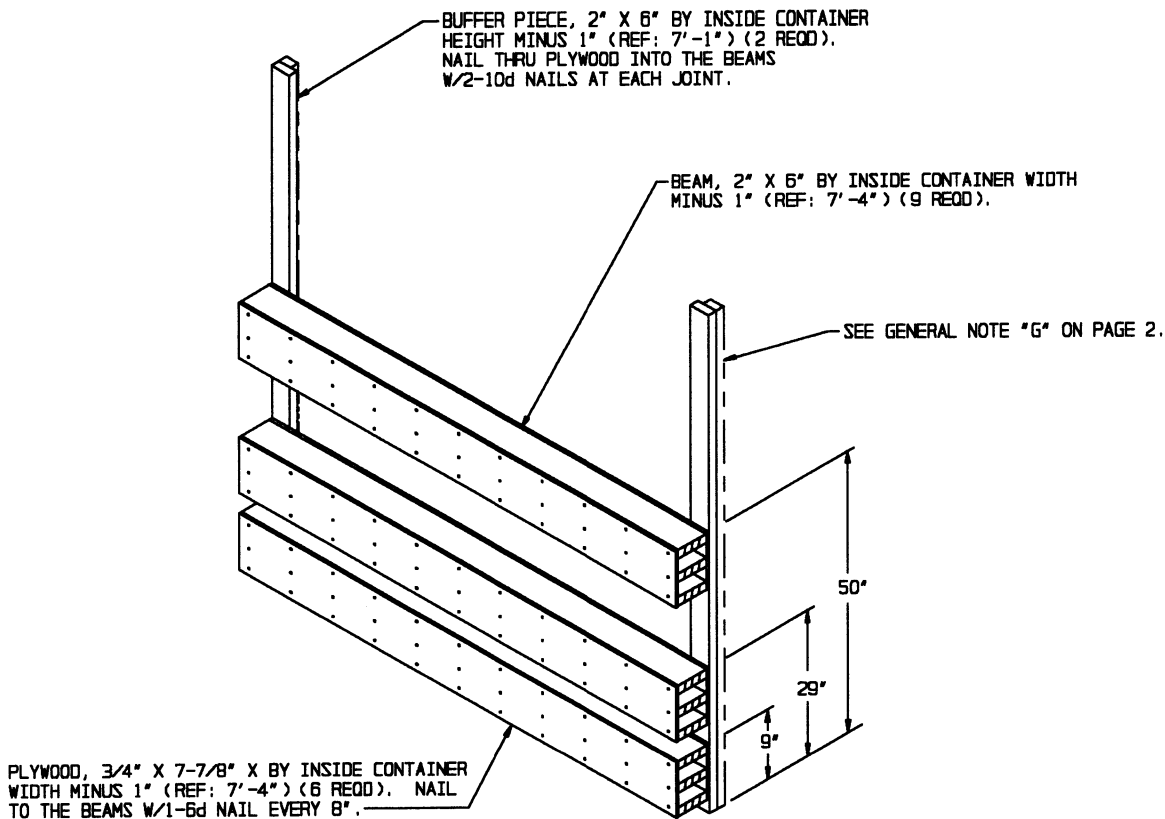
1. THE LOAD AS SHOWN ON PAGE 4 DEPICTS A COMPLETE ROUND LOAD OF 2,000 POUND MK-84 BOMBS, INCLUDING FOUR PALLETTS OF BOMBS, FOUR CNU-335A/E CONTAINERS WITH BSU-50/B FINS, FOUR BOXES CONTAINING MISCELLANEOUS ITEMS SUCH AS FUZES, ADAPATORS, AND COUPLERS.
2. WHEN INSTALLING THE DUNNAGE THAT APPLIES TO THE MISCELLANEOUS BOXES, ADJUSTMENTS TO THE QUANTITY AND SIZE OF MATERIAL MAY BE ADJUSTED AS NECESSARY.

TYPICAL ITEMS AS DEPICTED ON PAGE 4		
DDIC	NOMENCLATURE	QUANTITY
G212	M9 NON DELAY FUZE	8
F989	M905 TAIL FUZE	8
M187	CTG, ARD 446-1	8
M189	CTG, ARD 863-1	8
F491	MAU-86/B/3 SHAFT	8
F387	ADAPTER, BOOST TAIL	8
F275	MK84 BOMB, 2000 LB	8
BY31	ARM WIRE BULK	64'
EY21	FERRULE	16
BY29	ATU-35/B DRIVE ASSY	8
CY72	SWIVEL & LINK ASSY	16
EY91	MAU-87 DRIVE COUPLER	8
F746	FMU 113 FUZE	8
GY26	BSU-50/B FIN	8

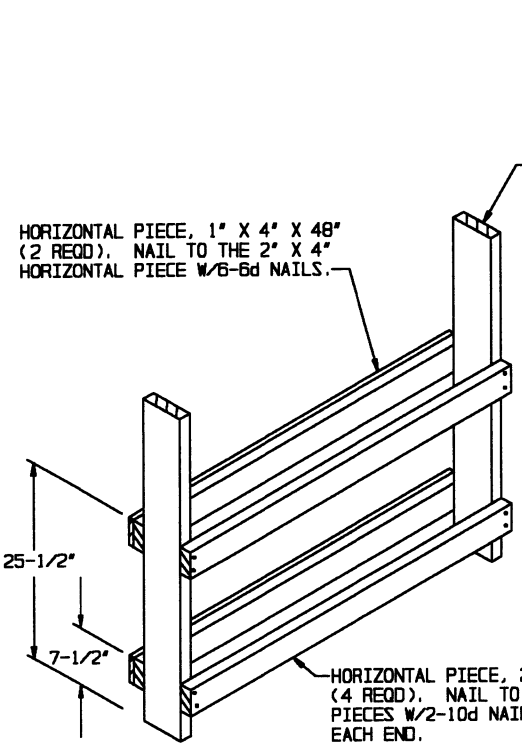
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MK 84 BOMB PALLET	4	16,532 LBS
BSU-50/B FIN	8	2,236 LBS
MISCELLANEOUS ITEMS	4 BOXES	200 LBS
DUNNAGE		1,500 LBS
CONTAINER		6,050 LBS

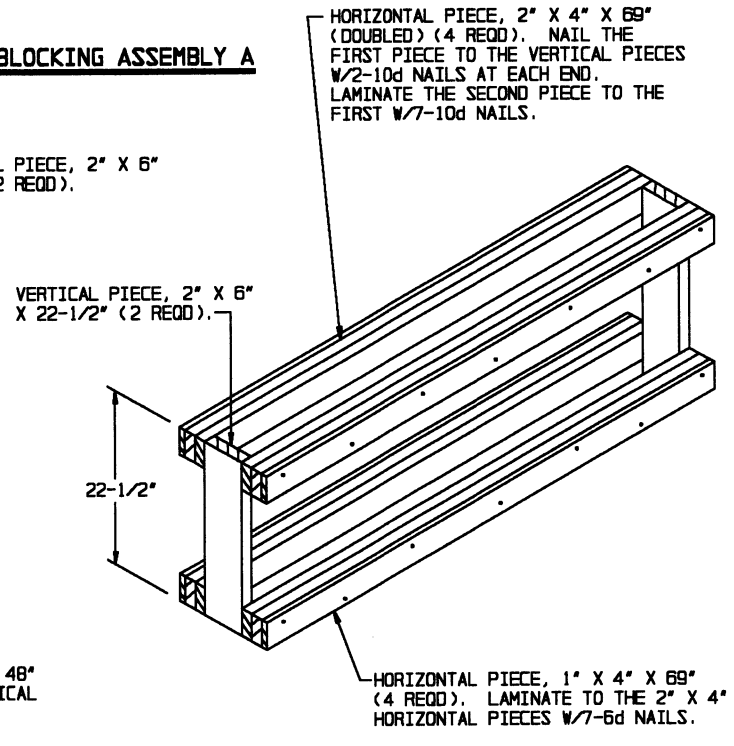
TOTAL WEIGHT - - - - - 26,518 LBS (APPROX)



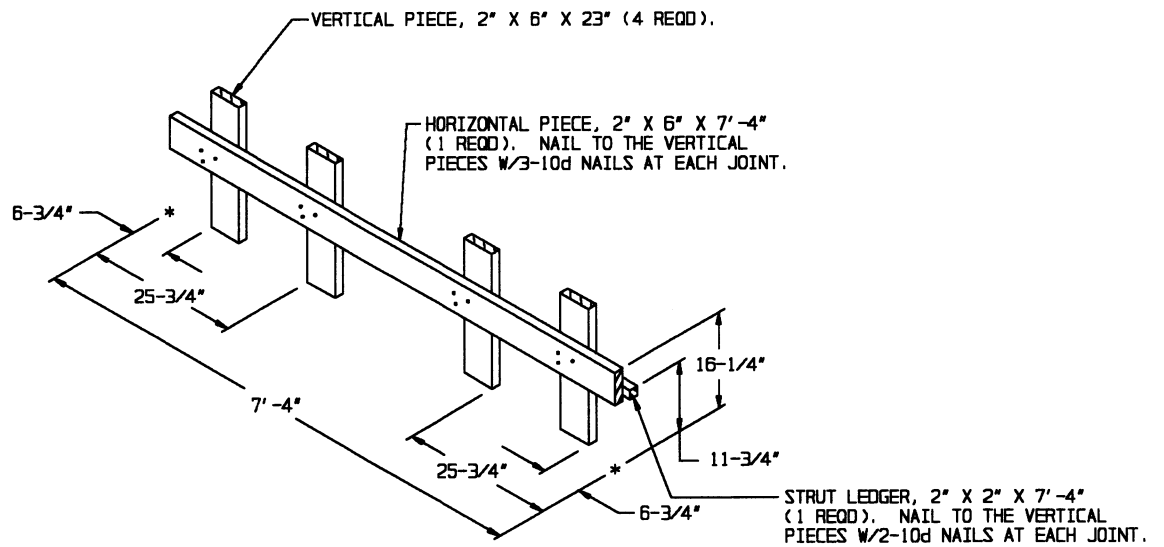
END BLOCKING ASSEMBLY A



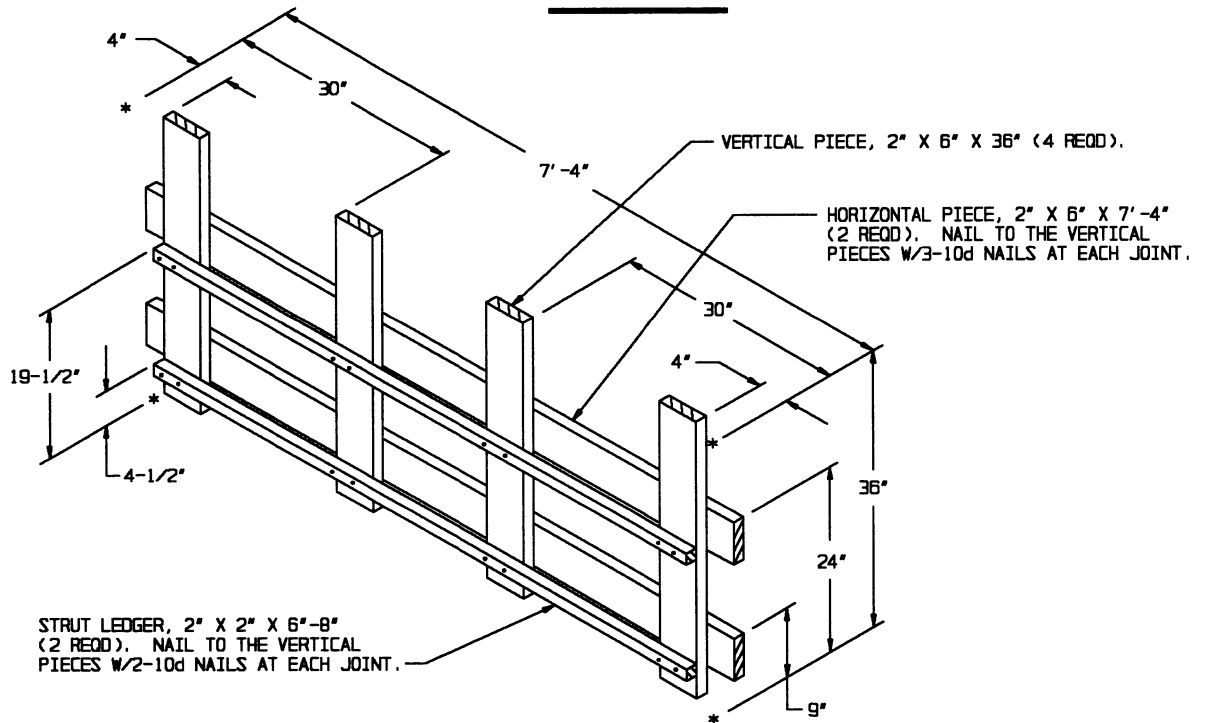
CRIB FILL B



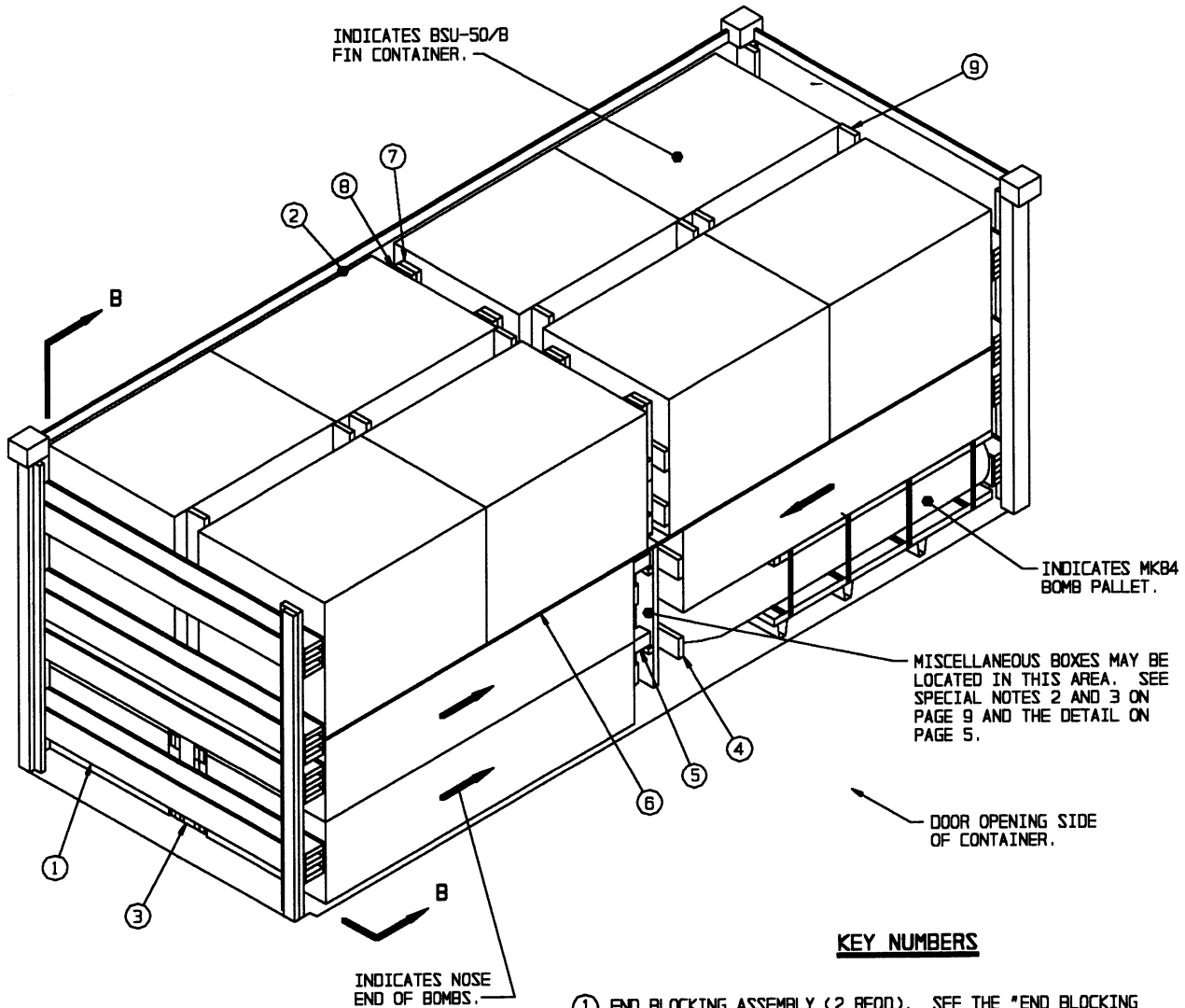
CRIB FILL A



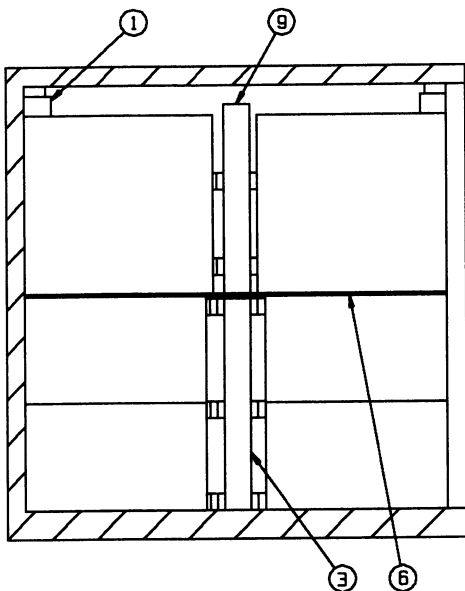
CENTER GATE A



CENTER GATE B



ISOMETRIC VIEW



SECTION B-B

KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE "END BLOCKING ASSEMBLY B" DETAIL ON PAGE 12, AND GENERAL NOTE "F" ON PAGE 2.
- ② SIDEWALL LINER, PLYWOOD, 3/8" THICK (AS REQD). POSITION SO AS TO BE BETWEEN THE LOADING AND THE CONTAINER SIDEWALL AND THE CONTAINER DOORS.
- ③ CRIB FILL (2 REQD). SEE THE "CRIB FILL C" DETAIL ON PAGE 11. POSITION BETWEEN THE PALLET UNITS OF BOMBS. SEE GENERAL NOTE "D" ON PAGE 2.
- ④ CENTER GATE (4 REQD). SEE THE "CENTER GATE C" DETAIL ON PAGE 10. POSITION BETWEEN THE PALLET UNITS OF BOMBS.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (REF: 12-3/4") (8 REQD). POSITION SO AS TO BE BETWEEN THE CENTER GATES, PIECES MARKED ④. TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑥ DECKING, PLYWOOD, 1/2" THICK BY 44" WIDE BY 8'-0" LONG (4 REQD). POSITION ON TOP OF THE BOMB PALLET UNITS. NOTE THAT HOLES MAY BE DRILLED OR CUT TO ALLOW FOR THE PALLET STACKING PINS.
- ⑦ CENTER GATE (4 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 10. POSITION BETWEEN THE CONTAINERS IN THE THIRD LAYER.
- ⑧ SOLID FILL, 6" WIDE MATERIAL BY 36" LONG BY THICKNESS AS REQUIRED SO AS TO PROVIDE FOR A TIGHT LOAD. SEE GENERAL NOTE "D" ON PAGE 2.
- ⑨ CRIB FILL (4 REQD). SEE THE "CRIB FILL D" DETAIL ON PAGE 11. POSITION BETWEEN THE CNU-335 A/E CONTAINERS.

SPECIAL NOTES:

1. THE LOAD AS SHOWN ON PAGE 8 DEPICTS A COMPLETE ROUND LOAD OF 2,000 POUND MK-84 BOMBS, INCLUDING 8 PALLETS OF BOMBS, 8 CNU 335 A/E CONTAINERS WITH BSU-50 FINS, 5 BOXES CONTAINING MISCELLANEOUS ITEMS SUCH AS FUZES, ADAPTORS, AND ECT. SEE THE CHARTS BELOW FOR TYPICAL ITEMS.
2. MISCELLANEOUS BOXES MAY BE PLACED IN THE AREA BETWEEN THE CENTER GATES A AND SECURED AS SHOWN IN THE "SECUREMENT OF MISCELLANEOUS BOXES" DETAIL ON PAGE 5.
3. WHEN INSTALLING THE DUNNAGE THAT APPLIES TO THE MISCELLANEOUS BOXES, ADJUSTMENTS TO THE QUANTITY AND SIZE OF MATERIAL MAY BE ADJUSTED AS NECESSARY.

TYPICAL ITEMS AS DEPICTED ON PAGE 8		
DODIC	NOMENCLATURE	QUANTITY
F275	MK84 BOMB PALLET	8
GY26	BSU 50 FIN	16
F835	M904 FUZE	30
G119	FMU 139 FUZE	18
F372	T-45 ADAPTOR	30
G212	M9 NON-DELAY FUZE	240

TYPICAL ITEMS FOR MK84 AIR BURST (NOT SHOWN)*		
DODIC	NOMENCLATURE	QUANTITY
F275	MK84 BOMB PALLET	8
GY26	BSU 50 FIN	16
F746	FMU 113 FUZE	16
F989	M905 FUZE	30
BY29	ATU-35 DRIVE	120
EY91	MAU 87 COUPLER	120
F491	MAU 86 B3 SHAFT	316
F387	M147 ADAPTOR	30
G212	M-9 NON-DELAY FUZE	240

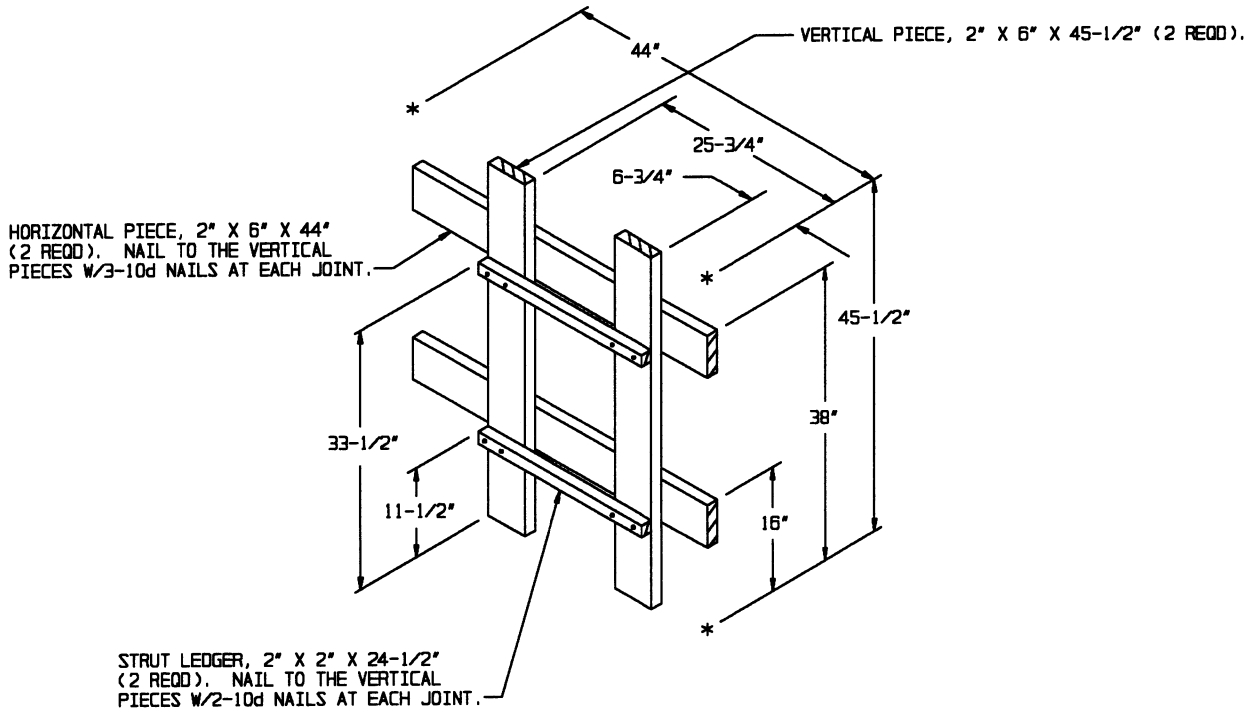
* MK84 AIR BURST LOAD WILL BE LOADED USING THE PROCEDURES SHOWN ON PAGE 8. ADDITIONAL COMPONENTS WILL BE SECURED BETWEEN THE CENTER GATES AND/OR IN VOID AREA BETWEEN LATERALLY ADJACENT PALLET UNITS.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	101	34
2" X 2"	17	6
2" X 4"	202	135
2" X 6"	419	419
4" X 4"	9	12
NAILS	NO. REQD	POUNDS
6d (2")	594	3-1/2
10d (3")	408	6
16d (3-1/2")	32	3/4
PLYWOOD, 3/8"	320 SQ FT REQD	330 LBS
PLYWOOD, 1/2"	118 SQ FT REQD	162 LBS
PLYWOOD, 3/4"	77 SQ FT REQD	159 LBS

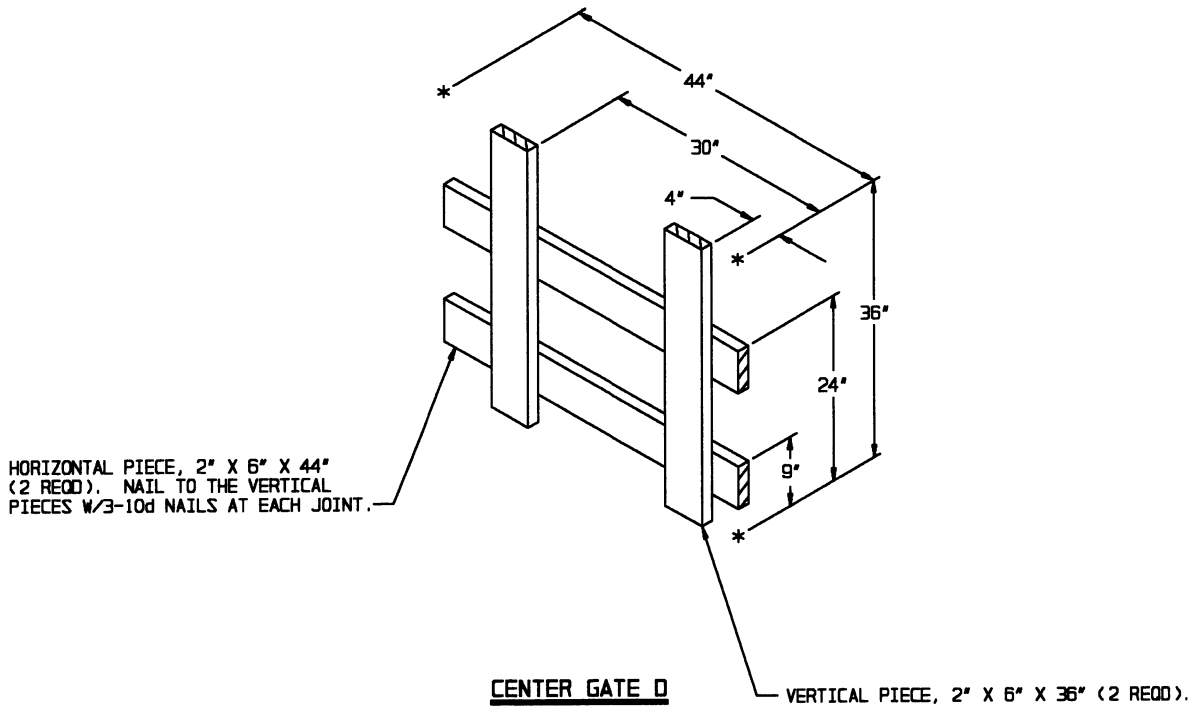
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MK 84 BOMB PALLET	8	33,064 LBS
BSU-50 FIN	16	8,304 LBS
MISCELLANEOUS ITEMS	5 BOXES	300 LBS
DUNNAGE		1,875 LBS
CONTAINER		6,050 LBS

TOTAL WEIGHT - - - - - 49,593 LBS (APPROX)



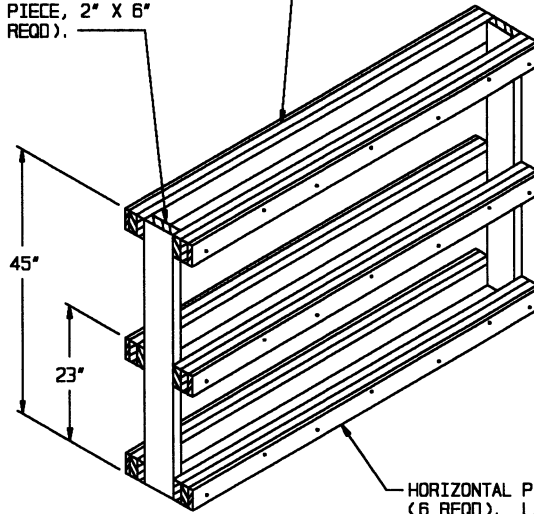
CENTER GATE C



CENTER GATE D

VERTICAL PIECE, 2" X 6"
X 45" (2 REQD).

HORIZONTAL PIECE, 2" X 4" X 69"
(DOUBLED) (6 REQD). NAIL THE
FIRST PIECE TO THE VERTICAL PIECES
W/2-10d NAILS AT EACH END.
LAMINATE THE SECOND PIECE TO THE
FIRST W/7-10d NAILS.

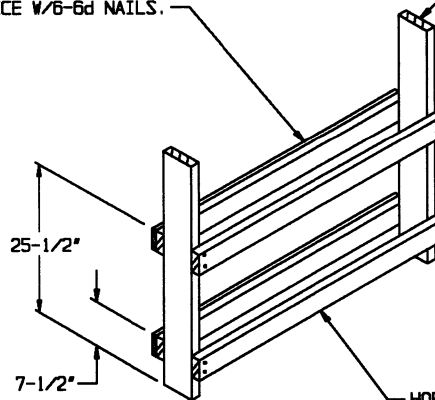


HORIZONTAL PIECE, 1" X 4" X 69"
(6 REQD). LAMINATE TO THE 2" X 4"
HORIZONTAL PIECES W/7-6d NAILS.

CRIB FILL C

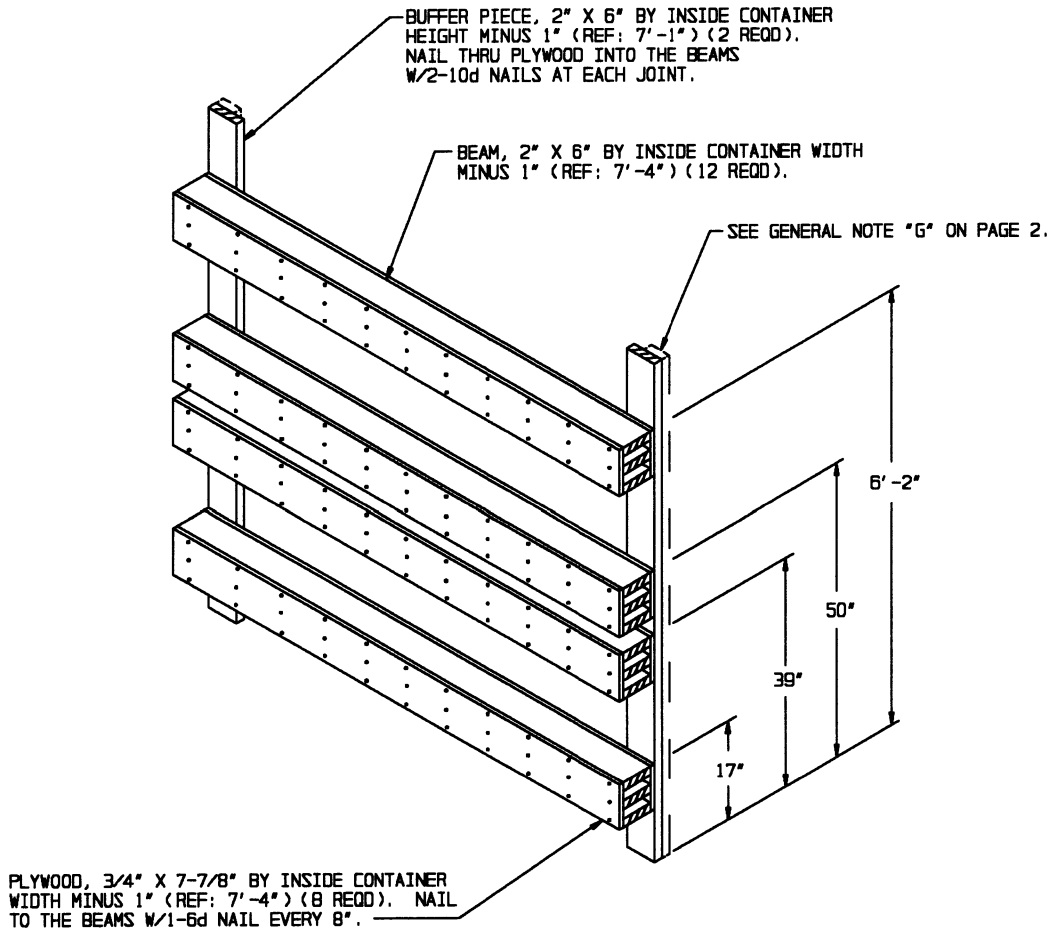
HORIZONTAL PIECE, 1" X 4" X 48"
(2 REQD). NAIL TO THE 2" X 4"
HORIZONTAL PIECE W/6-6d NAILS.

VERTICAL PIECE, 2" X 6"
X 40" (2 REQD).



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

CRIB FILL D



END BLOCKING ASSEMBLY B