APPROVED BY
BUREAU OF EXPLOSIVES

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DATE 4-27-95

LOADING AND BRACING● WITH WOODEN DUNNAGE IN SIDE OPENING ISO CONTAINERS OF 750 POUND BOMB, PACKED TWO PER WOODEN PALLET

INDEX

● 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

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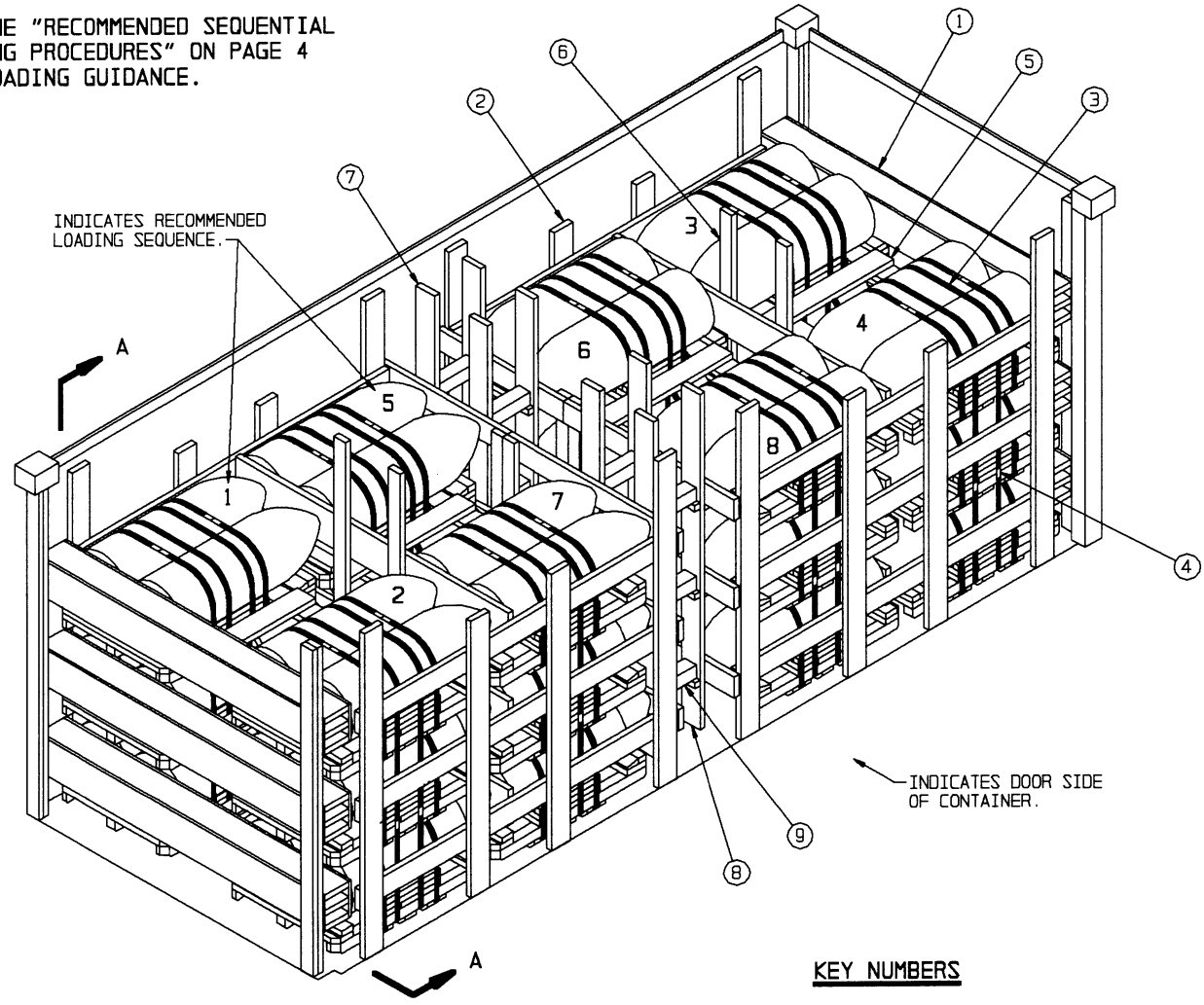
19	48	8615	SP15PB8

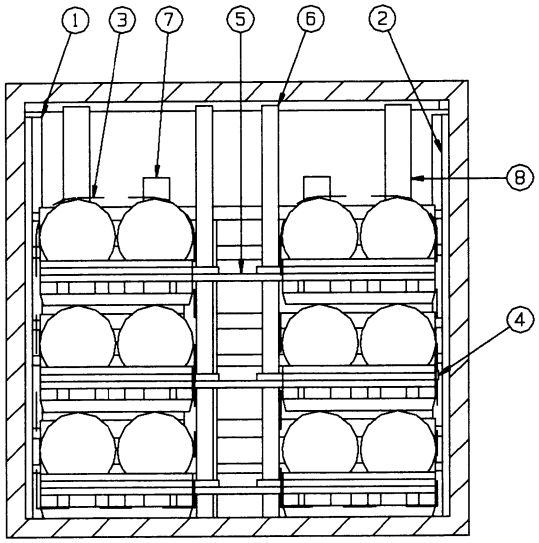
DO NOT SCALE

PROJECT SP 313-95

SEE THE "RECOMMENDED SEQUENTIAL LOADING PROCEDURES" ON PAGE 4 FOR LOADING GUIDANCE.



ISOMETRIC VIEW



SECTION A-A

KEY NUMBERS

(1) END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.

(2) SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 6.

(3) STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" X 16'-0" LONG STEEL STRAPPING (16 REQD, 2 PER STACK). INSTALL TO ENCIRCLE A STACK OF THREE PALLET UNITS AS SHOWN.

(4) SEAL FOR 1-1/4" STRAPPING (16 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.

(5) ANTI-SWAY BRACE (12 REQD). SEE THE DETAIL ON PAGE 6.

(6) LOAD BEARING GATE (2 REQD). SEE THE DETAIL ON PAGE 5.

(7) FAR SIDE CENTER GATE (2 REQD, ONE LEFT HAND, ONE RIGHT HAND). SEE THE DETAIL ON PAGE 7.

(8) DOOR SIDE CENTER GATE (2 REQD, ONE LEFT HAND, ONE RIGHT HAND). SEE THE DETAIL ON PAGE 7.

(9) STRUT, 4" X 4" BY CUT-TO-FIT (REF: 12-1/2") (12 REQD). TOENAIL TO THE VERTICAL PIECES OF THE CENTER GATES W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 4.

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(GENERAL NOTES CONTINUED)

K. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.

L. 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.

M. 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.

N. 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.

O. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL-LOAD" DETAIL ON PAGE 8. WHEN A CONTAINER IS TO BE 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.

P. 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 SEALER 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.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
M117 BOMB PALLET	24	37,800 LBS
DUNNAGE		1,745 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		45,595 LBS (APPROX)

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	16	6
2" X 4"	107	72
2" X 6"	459	459
2" X 8"	129	172
2" X 10"	41	69
4" X 4"	13	18
NAILS	**NO. REQD**	**POUNDS**
6d (2")	264	1-3/4
10d (3")	504	8
12d (3-1/4")	48	1
16d (3-1/2")	36	1
PLYWOOD, 3/4"	68.09 SQ FT REQD	140.43 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 PALLETIZED M117 750 POUND BOMBS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNITS WITH BOMBS. SEE PAGE 4 FOR DETAIL OF THE PALLET UNIT. 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 LOADS AS SHOWN ARE 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 PALLET 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 VERTICAL PIECE 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 PALLET UNIT.

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. A PIECE OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES OF THE END BLOCKING ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THE 2" X 4" 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 ENDWALL OF THE CONTAINER IS SMOOTH AND FLAT.

H. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.

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 25.4 MM AND ONE POUND EQUALS 0.454 KG.

(CONTINUED AT LEFT)

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.

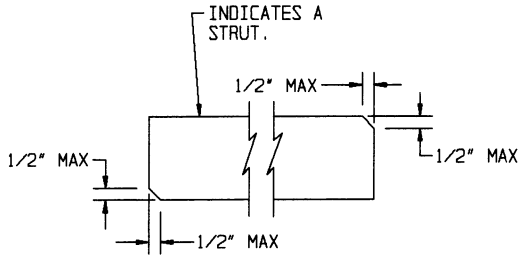
STRAPPING, STEEL: ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.

SEAL, STRAP: ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.

WIRE, CARBON STEEL: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.

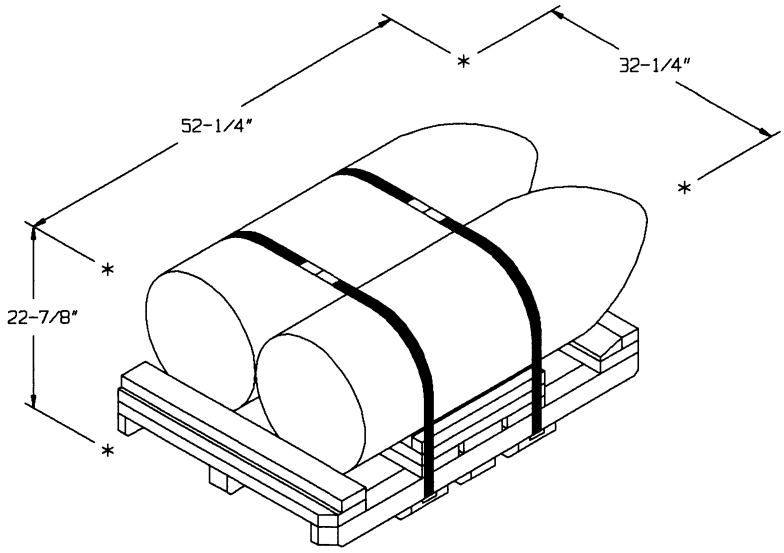
RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PREFABRICATE TWO END BLOCKING ASSEMBLIES, FOUR SIDE FILL ASSEMBLIES, TWO LOAD BEARING GATES, TWO DOOR SIDE CENTER GATES (ONE RIGHT HAND AND ONE LEFT HAND), TWO FAR SIDE CENTER GATES (ONE RIGHT HAND AND ONE LEFT HAND) AND AND PARTIALLY PREFABRICATE 12 ANTI-SWAY BRACES.
2. INSTALL ONE END BLOCKING ASSEMBLY AND ONE SIDE FILL ASSEMBLY.
3. LOAD ONE STACK OF THREE PALLET UNITS AND UNITIZE WITH TWO STRAPS.
4. INSTALL THREE ANTI-SWAY BRACES.
5. REPEAT STEP 3.
6. FINISH FABRICATING THREE ANTI-SWAY BRACES.
7. REPEAT STEPS 3 THROUGH 6.
8. INSTALL ONE LOAD BEARING GATE.
9. LOAD TWO STACKS OF THREE PALLET UNITS AND UNITIZE WITH TWO STRAPS PER STACK.
10. INSTALL SIX ANTI-SWAY BRACES.
11. INSTALL TWO FAR SIDE CENTER GATES AND SIX STRUTS.
12. REPEAT STEPS 3 AND 6 TWICE EACH.
13. INSTALL TWO DOOR SIDE CENTER GATES AND SIX STRUTS.
14. INSTALL TWO SIDE FILL ASSEMBLIES.



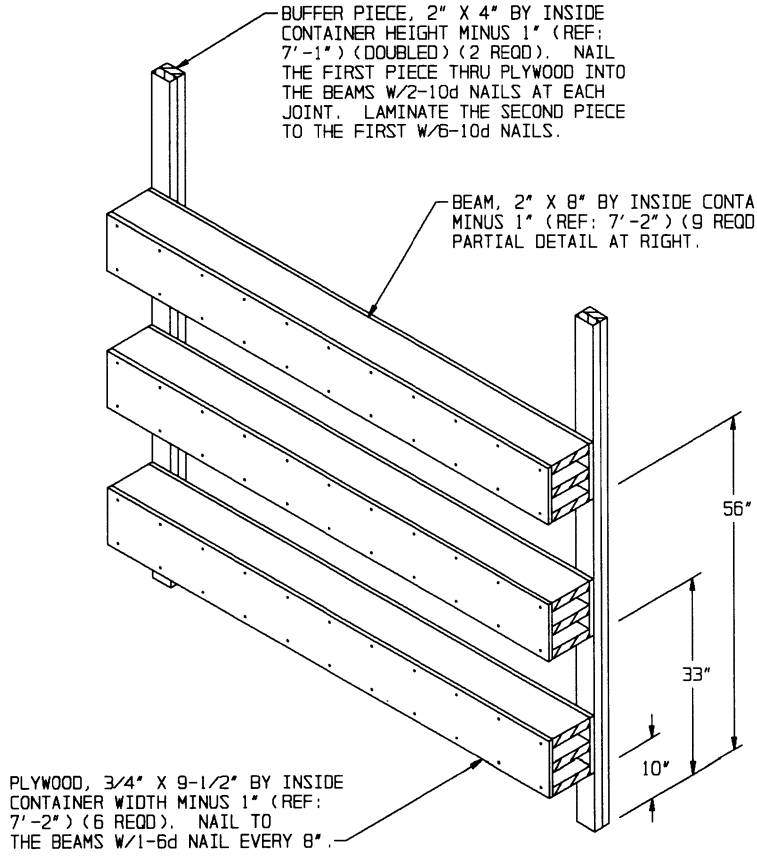
BEVEL-CUT

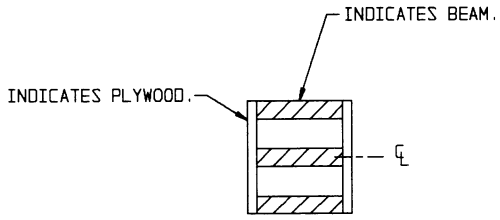
IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT CENTER OF LOAD FIT.



M117 BOMB PALLET UNIT

GROSS WEIGHT - - - - - - - - - 1,575 LBS (APPROX)
CUBE - - - - - - - - - - - - - 22.4 CU FT (APPROX)

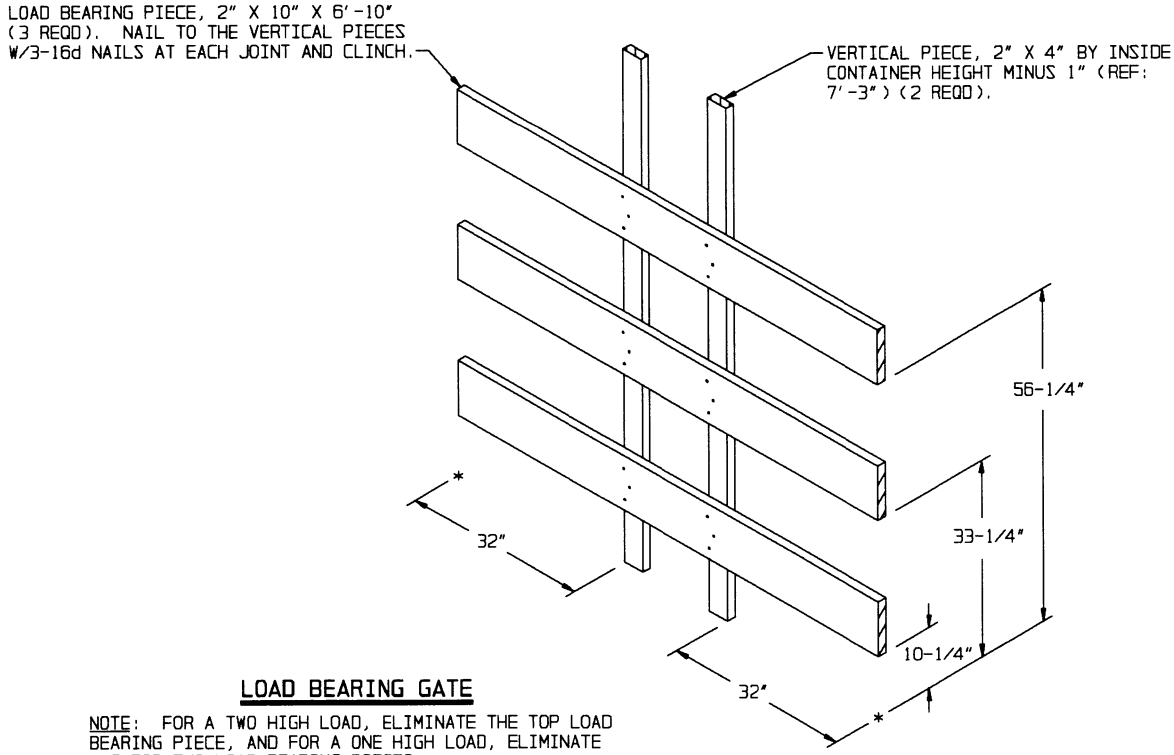




PARTIAL DETAIL

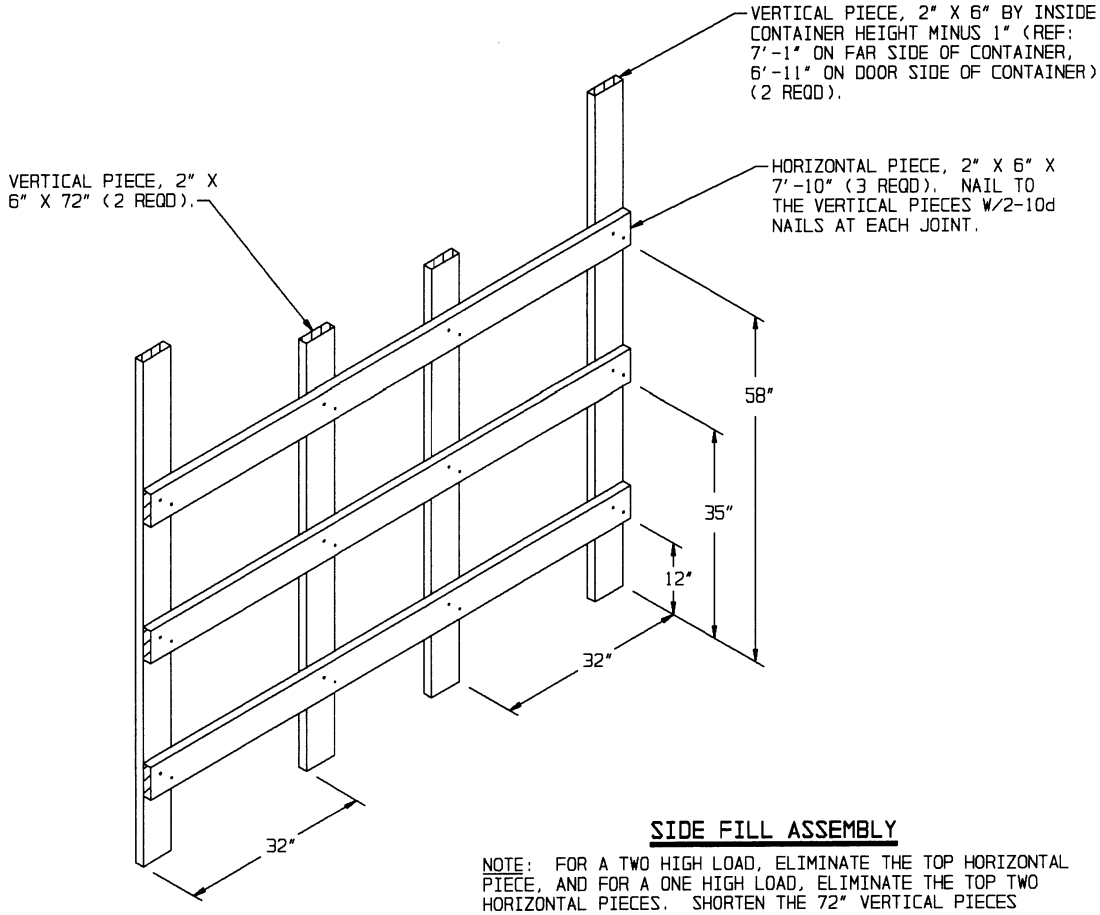
END BLOCKING ASSEMBLY

NOTE: FOR A TWO HIGH LOAD, ELIMINATE THE TOP BOX BEAM ASSEMBLY, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO BOX BEAM ASSEMBLIES.



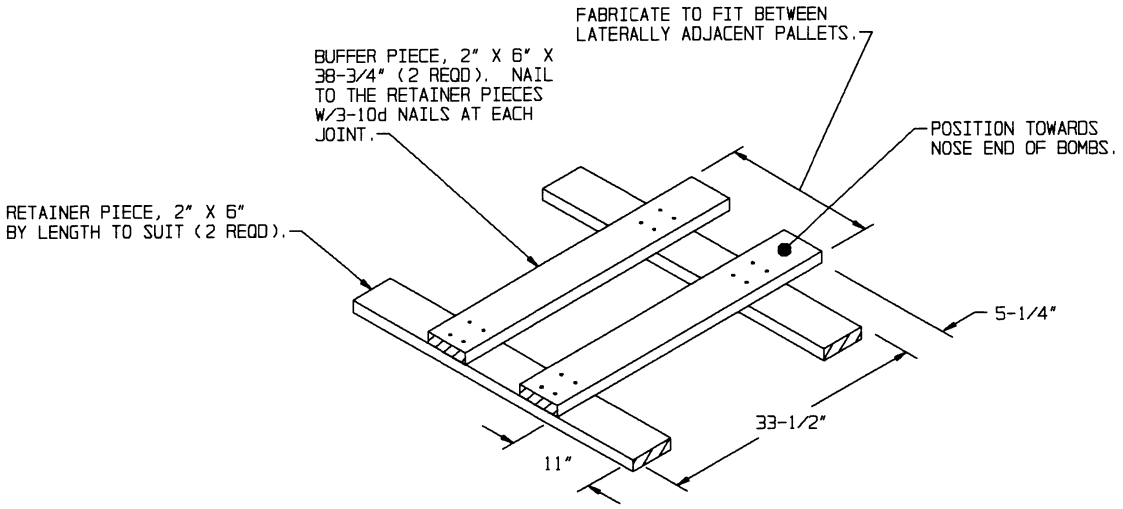
LOAD BEARING GATE

NOTE: FOR A TWO HIGH LOAD, ELIMINATE THE TOP LOAD BEARING PIECE, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO LOAD BEARING PIECES.



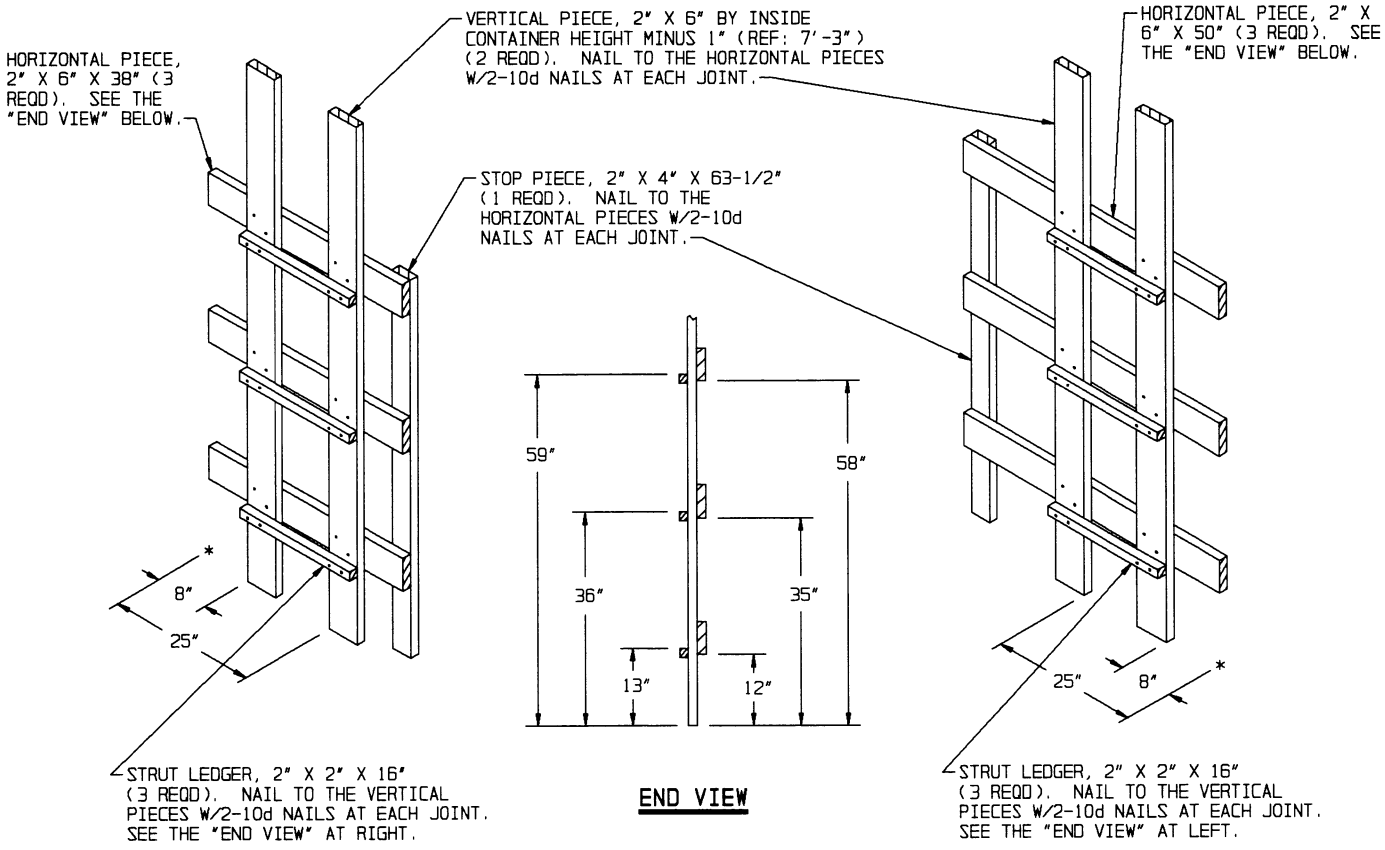
SIDE FILL ASSEMBLY

NOTE: FOR A TWO HIGH LOAD, ELIMINATE THE TOP HORIZONTAL PIECE, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES. SHORTEN THE 72" VERTICAL PIECES APPROPRIATELY.



ANTI-SWAY BRACE

IF DESIRED, THE ANTI-SWAY BRACE CAN BE PARTIALLY PRE-ASSEMBLED; ONE BUFFER PIECE CAN BE NAILED TO BOTH RETAINER PIECES. THE LONG ENDS OF THE ASSEMBLY CAN THEN BE INSTALLED UNDER THE BOMBS ON A LOADED PALLET PRIOR TO POSITIONING THE LATERALLY ADJACENT PALLET UNIT.



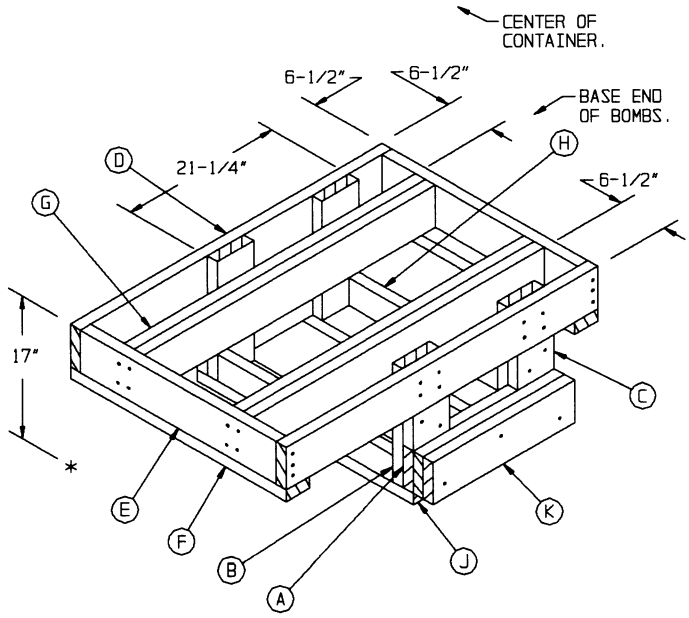
END VIEW

FAR SIDE CENTER GATE

NOTE: A RIGHT HAND GATE IS DEPICTED, A LEFT HAND GATE IS ALSO REQUIRED. FOR A TWO HIGH LOAD, ELIMINATE THE TOP HORIZONTAL PIECE AND THE TOP STRUT LEDGER, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND THE TOP TWO STRUT LEDGERS.

DOOR SIDE CENTER GATE

NOTE: A RIGHT HAND GATE IS DEPICTED, A LEFT HAND GATE IS ALSO REQUIRED. FOR A TWO HIGH LOAD, ELIMINATE THE TOP HORIZONTAL PIECE AND THE TOP STRUT LEDGER, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND THE TOP TWO STRUT LEDGERS.



FILLER ASSEMBLY

KEY LETTERS

(A) SPANNER PIECE, 2" X 6" X 21-1/4" (2 REQD). NAIL TO THE SUPPORT LEGS W/3-10d NAILS AT EACH END.

(B) SUPPORT LEG, 2" X 6" X 15-1/2" (4 REQD).

(C) FILL PIECE, 2" X 6" X 4-1/2" (4 REQD). NAIL TO A SUPPORT LEG W/2-10d NAILS.

(D) LONGITUDINAL PIECE, 2" X 6" X 46-3/4" (2 REQD). NAIL TO THE SUPPORT LEGS W/4-16d NAILS AT EACH JOINT AND CLINCH. NAIL TO THE LATERAL PIECES W/3-16d NAILS AT EACH END.

(E) LATERAL PIECE, 2" X 6" X 29-1/4" (2 REQD). NAIL TO THE LAMINATED STRUTS, PIECE MARKED (G), W/4-12d NAILS AT EACH JOINT.

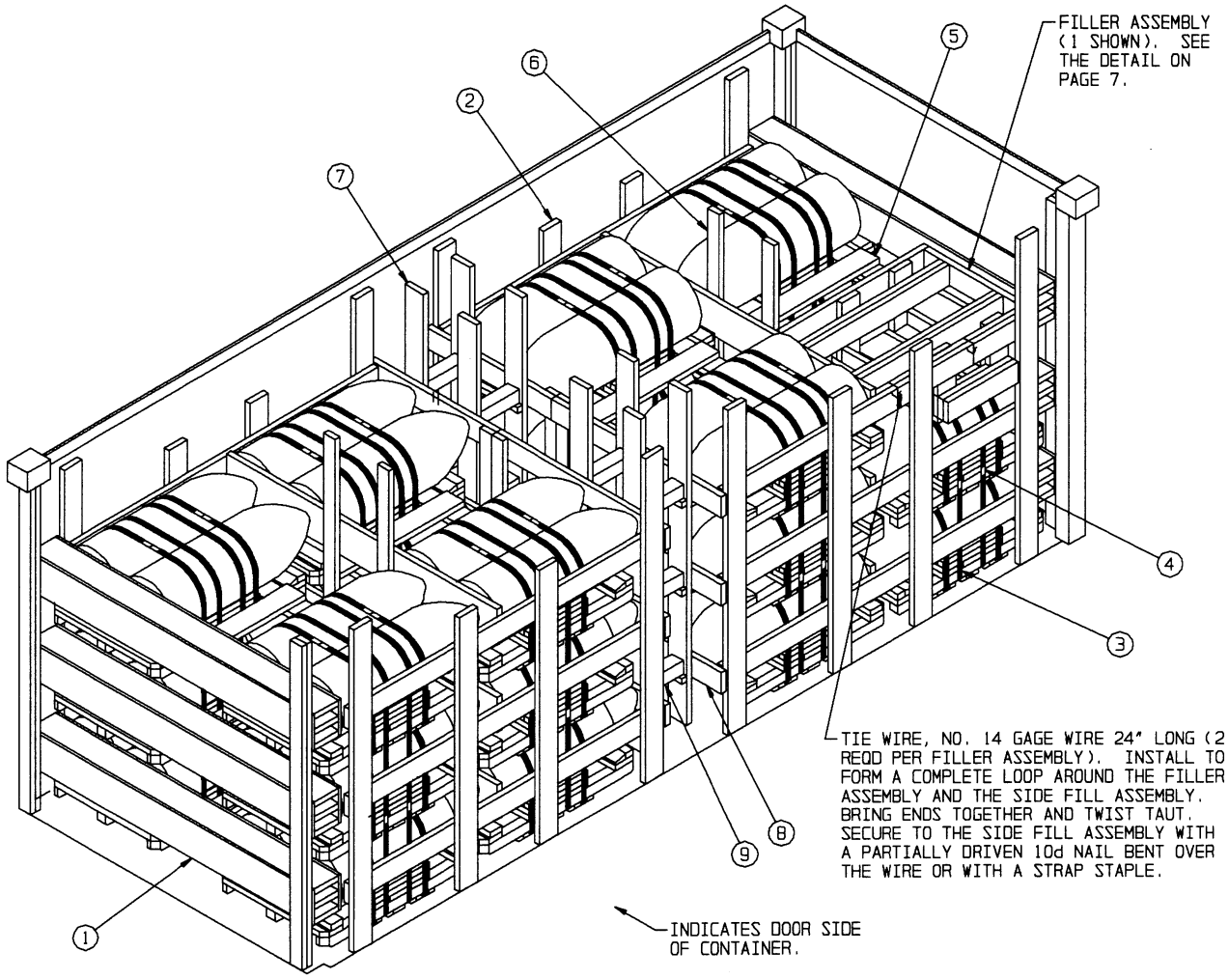
(F) LEDGER PIECE, 2" X 4" X 32-1/4" (2 REQD). NAIL TO A LATERAL PIECE W/3-10d NAILS. NAIL TO THE LONGITUDINAL PIECES W/2-10d NAILS AT EACH END AND TO THE LAMINATED STRUTS, PIECE MARKED (G), W/2-10d NAILS AT EACH JOINT.

(G) STRUT, 2" X 6" X 43-3/4" (DOUBLED) (2 REQD). LAMINATE THE SECOND PIECE TO THE FIRST W/4-10d NAILS.

(H) LATERAL STRUT, 2" X 4" BY CUT TO FIT (2 REQD). ALIGN WITH THE OUTER EDGES OF THE SUPPORT LEGS. TOENAIL TO THE SUPPORT LEGS W/2-10d NAILS AT EACH END.

(J) SUPPORT PIECE, 2" X 6" X 29-1/4" (2 REQD). NAIL TO THE SPANNER PIECES AND THE SUPPORT LEGS W/2-10d NAILS AT EACH JOINT AND TO THE LATERAL STRUT W/3-10d NAILS.

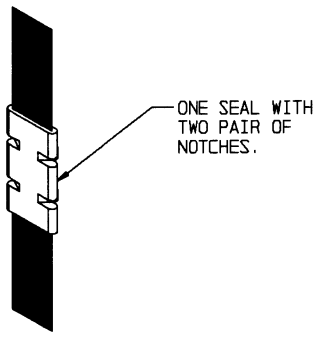
(K) FILL PIECE, 2" X 6" X 21-1/4" (DOUBLED) (1 REQD). LAMINATE THE FIRST PIECE TO THE SPANNER PIECE W/3-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. NOTE: THESE PIECES ARE ONLY REQUIRED ON ONE SIDE OF THE FILLER ASSEMBLY, THE SIDE THAT WILL BE ADJACENT TO EITHER THE DOOR OR THE FAR WALL.



ISOMETRIC VIEW

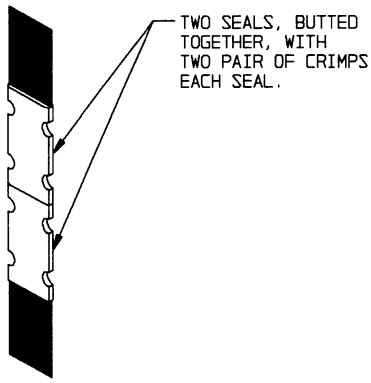
LESS-THAN-FULL-LOAD PROCEDURE

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (LESS THAN 24 UNITS). KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. SEE GENERAL NOTE "O" ON PAGE 3.



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