APPROVED BY
BUREAU OF EXPLOSIVES

DATE 6/11/02

LOADING AND BRACING● IN END OPENING ISO CONTAINERS OF UNPALLETIZED FUZES PACKED IN MK2 MOD 0 METAL BOXES

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● 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

APPROVED BY ORDER OF COMMANDING GENERAL,
U.S. ARMY MATERIEL COMMAND

U.S. ARMY DEFENSE AMMUNITION CENTER

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 6.

DO NOT SCALE

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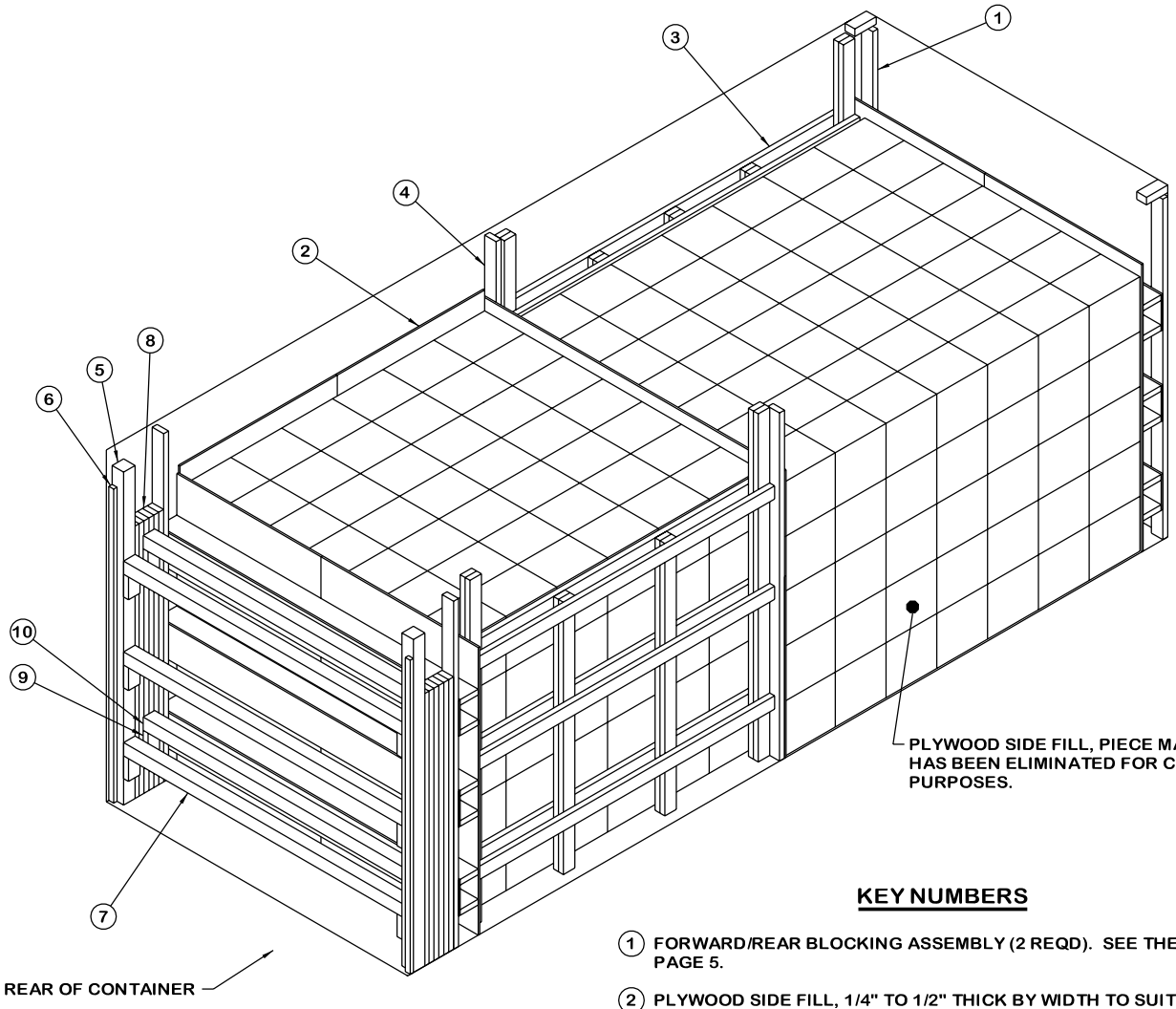
JUNE 2002

SPECIAL DRAWING

DET 0207

PROJECT DET 0207



ISOMETRIC VIEW

LOAD AS SHOWN*

ITEM	QUANTITY	WEIGHT (APPROX)
MK2 MOD 0 BOX	455	31,850 LBS
DUNNAGE		1,042 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		37,592 LBS (APPROX)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4" 2" X 6" 4" X 4"	343 91 51	229 91 67
NAILS	NO. REQD	POUNDS
6d (2") 10d (3") 12d (3-1/4")	282 344 20	1-3/4 5-1/2 1/2
PLYWOOD, 1/2" - - 287.35 SQ FT REQD		395.11 LBS
DOOR POST VERTICAL RETAINER - 2 REQD		64 LBS

* SEE GENERAL NOTE "S" ON PAGE 3.

KEY NUMBERS

(1) FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.

(2) PLYWOOD SIDE FILL, 1/4" TO 1/2" THICK BY WIDTH TO SUIT X 6'-6" LONG (AS REQD, 2 PLACES). INSTALL PLYWOOD AGAINST THE SIDE WALL OPPOSITE WHERE THE SIDE FILL ASSEMBLY IS INSTALLED.

(3) SIDE FILL ASSEMBLY (2 REQD, ONE SIX BOXES LONG AND ONE SEVEN BOXES LONG). SEE THE DETAIL ON PAGE 6.

(4) SEPARATOR ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 5. INSTALL WITH THE VERTICAL PIECES ADJACENT TO THE SIDE FILL ASSEMBLIES, NOT TO THE PLYWOOD SIDE FILL.

(5) DOOR POST VERTICAL (2 REQD). SEE THE DETAIL ON PAGE 6, "DETAIL A" ON PAGE 4, AND GENERAL NOTE "R" ON PAGE 3.

(6) DOOR POST VERTICAL RETAINER (2 REQD). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/4-10d NAILS. SEE DEPARTMENT OF ARMY DRAWING DA-116, "DETAIL A" ON PAGE 4, AND GENERAL NOTE "R" ON PAGE 3.

(7) DOOR SPANNER, 4" X 4" MATERIAL CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF:7'-1-3/8") (3 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 4.

(8) FILL MATERIAL, 4" WIDE BY 72" LONG MATERIAL (AS REQD). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/6 NAILS OF A SUITABLE SIZE (10d FOR 2" THICK MATERIAL). NAIL EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR MANNER. NOTE: MULTIPLE PIECES MAY BE LAMINATED TOGETHER FIRST AND THEN TOENAILED TO THE REAR BLOCKING ASSEMBLY. SEE "DETAIL A" ON PAGE 4.

(9) SPANNER PIECE CLEAT, 2" X 4" X 6" (4 SHOWN - OPTIONAL). INSTALL IF DESIRED TO AID IN THE INSTALLATION OF FILL SPANNER PIECES. NAIL TO THE FILL MATERIAL W/2-10d NAILS.

(10) FILL SPANNER, 4" X 4" MATERIAL, CUT TO A LENGTH THAT WILL PROVIDE FOR A DRIVE FIT (REF: 7'-1-3/8") (2 REQD). TOENAIL TO THE FILL MATERIAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 4. NOTE THAT THESE PIECES ARE NOT REQUIRED IF 6" OR LESS OF FILL MATERIAL IS NEEDED IN THE LOAD.

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(GENERAL NOTES CONTINUED)

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

K. 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.

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 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.

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. 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.

P. THE QUANTITY OF BOXES SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FILLER ASSEMBLY ON PAGE 4. ONE OR MORE COMPLETE LAYERS MAY BE ELIMINATED FROM THE LOAD, IF REQUIRED.

1. IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT (FEWER THAN 10 LADING UNITS), REPLACE WITH FILLER ASSEMBLIES. ONLY ONE FILLER ASSEMBLY MAY BE USED PER ROW (35) OF BOXES. DO NOT INSTALL A FILLER ASSEMBLY IMMEDIATELY ADJACENT TO ANOTHER FILLER ASSEMBLY OR TO A DUNNAGE ASSEMBLY. A MAXIMUM OF NINE FILLER ASSEMBLIES MAY BE USED IN THE LOAD SHOWN ON PAGE 2.

2. IF A LOAD IS REDUCED BY A LARGE AMOUNT (10 LADING UNITS OR MORE), LADING UNITS SHOULD BE ELIMINATED AS REQUIRED AND THE TOTAL LOAD SHIFTED FORE OR AFT, AS NECESSARY, TO ACHIEVE A SYMMETRICAL WEIGHT DISTRIBUTION. THE DEPICTED PROCEDURES WILL BE FOLLOWED AS CLOSELY AS POSSIBLE, MAKING ONLY THOSE ADJUSTMENTS TO THE DUNNAGE WHICH ARE REQUIRED TO ACCOMMODATE THE NUMBER OF UNITS TO BE SHIPPED.

Q. DOOR SPANNERS AND DOOR SPANNER LEDGERS ARE NOT REQUIRED IF 6" OF LESS OF FILL MATERIAL, PIECE MARKED ③ ON PAGE 2, IS REQUIRED ON EITHER SIDE OF THE REAR OF THE LOAD.

R. IF THE CONTAINER BEING LOADED IS EQUIPPED WITH PRE-WELDED LOAD RETAINERS, THE DOOR POST VERTICAL AND DOOR POST VERTICAL RETAINERS, PIECES MARKED ⑤ AND ⑥ ON PAGE 2, WILL BE OMITTED. ADDITIONAL FILL MATERIAL MAY NEED TO BE ADDED. IF DOOR POST VERTICAL RETAINERS OR CONTAINERS WITH PRE-WELDED LOAD RETAINERS ARE NOT AVAILABLE, REFER TO DEPARTMENT OF THE ARMY DRAWING DA-116 FOR DETAILS ON THE FABRICATION AND INSTALLATION OF UNIVERSAL LOAD RETAINERS.

S. THE LOAD AS SHOWN ON PAGE 2 IS BASED ON THE LIGHTER MK2 MOD 0 BOX, AT 70 POUNDS (12 ROUNDS PER BOX). IF OUTLOADING THE HEAVIER (97 POUNDS, 25 ROUNDS PER BOX) BOX, ONLY FOUR LAYERS, FOR A TOTAL OF 364 BOXES, CAN BE LOADED.

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 FUZES PACKED IN MK2 MOD 0 BOXES. SUBSEQUENT REFERENCE TO BOX HEREIN MEANS THE BOX WITH AMMUNITION ITEMS. SEE PAGE 4 FOR DETAIL OF THE BOX. CAUTION: REGARDLESS OF THE QUANTITY OF BOXES TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE EXCEEDED.

C. THE LOAD AS SHOWN IS BASED ON A 4,700 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH END OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 93" HIGH, WITH A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. OLDER/OTHER CONTAINERS MAY HAVE A TOTAL INSIDE HEIGHT OF 95", BUT A CLEAR HEIGHT UNDER THE ROOF BOWS OF 93", VERIFY INSIDE CONTAINER HEIGHT 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 BOXES, 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 SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND/OR QUANTITY OF THE VERTICAL OR HORIZONTAL PIECES IN THE SIDE FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE BOX.

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.

G. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE FORWARD WALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE FORWARD 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 FORWARD WALL, ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR FORWARD LONGITUDINAL BLOCKING.

H. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

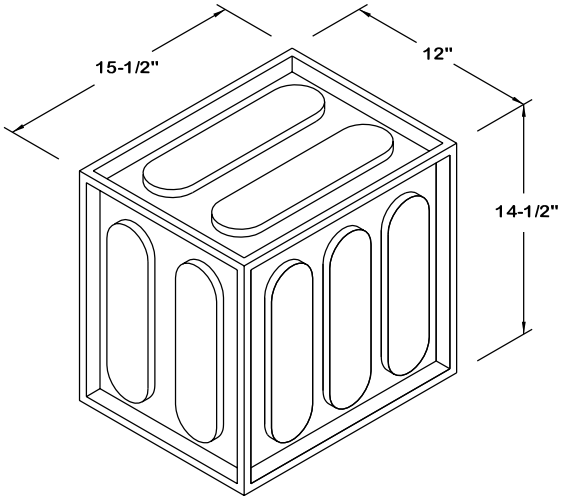
(CONTINUED AT LEFT)

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.
STEEL, STRUCTURAL - - - - -:	ASTM A501, STEEL STRUCTURAL TUBING; AND ASTM A570, STEEL, STRIP, HOT-ROLLED, GRADE 36 (MINIMUM).

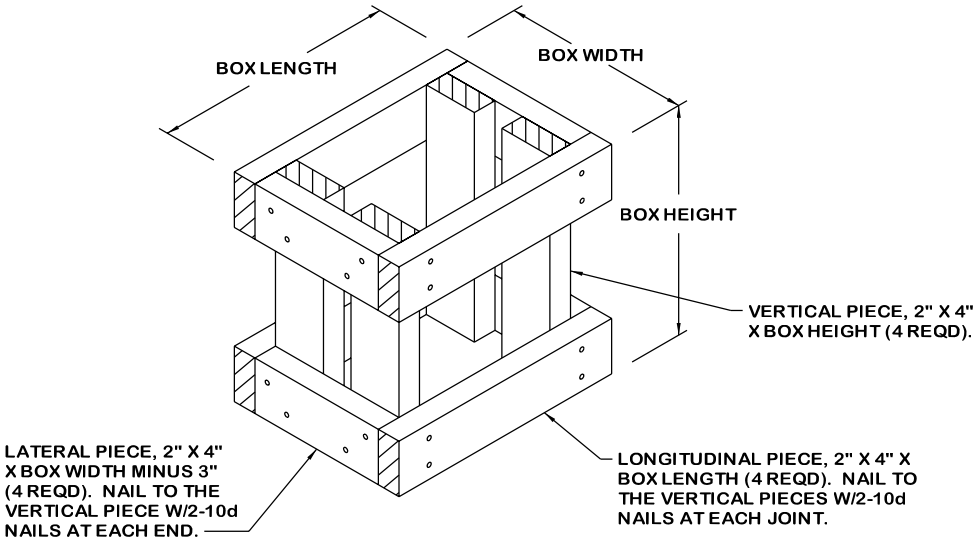
RECOMMENDED SEQUENTIAL LOADING PROCEDURES:

1. PREFABRICATE TWO FORWARD/REAR BLOCKING ASSEMBLIES, TWO SIDE FILL ASSEMBLIES, ONE SEPARATOR ASSEMBLY, TWO DOOR POST VERTICALS, AND NAIL A DOOR POST VERTICAL RETAINER TO EACH DOOR POST VERTICAL.
2. INSTALL THE FORWARD BLOCKING ASSEMBLY.
3. INSTALL ONE SIDE FILL ASSEMBLY AND LINE THE OPPOSITE WALL WITH THE PLYWOOD SIDE FILL.
4. LOAD 245 BOXES.
5. INSTALL THE SEPARATOR ASSEMBLY.
6. REPEAT STEP 3, SWITCHING THE SIDE FILL ASSEMBLY AND THE PLYWOOD SIDE FILL TO THE OPPOSITE SIDES OF THE CONTAINER.
7. LOAD 210 BOXES.
8. INSTALL THE REAR BLOCKING ASSEMBLY.
9. INSTALL THE TWO DOOR POST VERTICAL ASSEMBLIES.
0. INSTALL TWO DOOR SPANNER PIECES (ONE AT THE LOWEST POSITION AND ONE AT THE UPPERMOST POSITION).
11. INSTALL THE SOLID FILL.
12. INSTALL THE SPANNER PIECE CLEATS AND THE FILL SPANNERS, IF NECESSARY.
13. INSTALL THE REMAINING DOOR SPANNER.



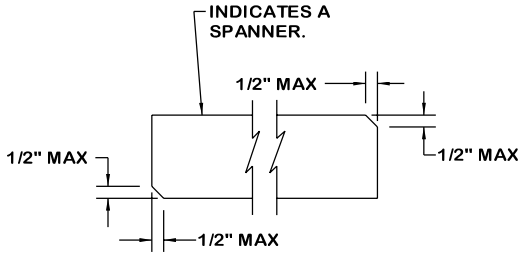
MK2 MOD 0 BOX

GROSS WEIGHT (W/25 ROUNDS) - - - - 97 LBS (APPROX)
GROSS WEIGHT (W/12 ROUNDS) - - - - 70 LBS (APPROX)
CUBE - - - - - - - - - - - - - - - - - 1.6 CUBIC FEET (APPROX)



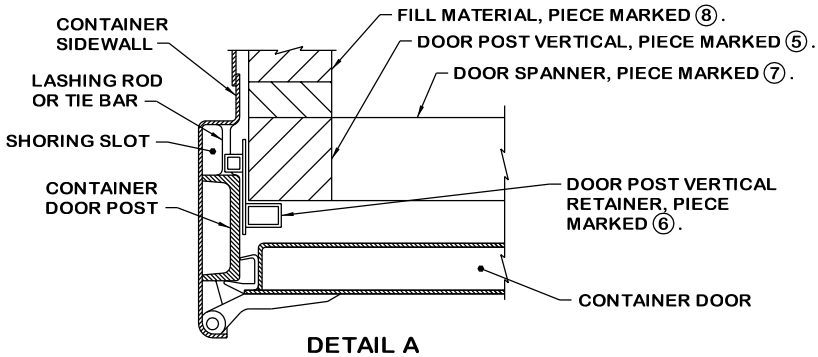
FILLER ASSEMBLY

SEE GENERAL NOTE "P" ON PAGE 2.



BEVEL-CUT

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



DETAIL A

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE DOOR POST VERTICAL RETAINER AND ADJACENT DUNNAGE PIECES. SEE DEPARTMENT OF ARMY DRAWING DA-116 FOR ADDITIONAL DETAILS AND PROCEDURES FOR OTHER TYPES OF RETAINERS THAT MAY BE USED FOR REAR-OF-LOAD RESTRAINT.

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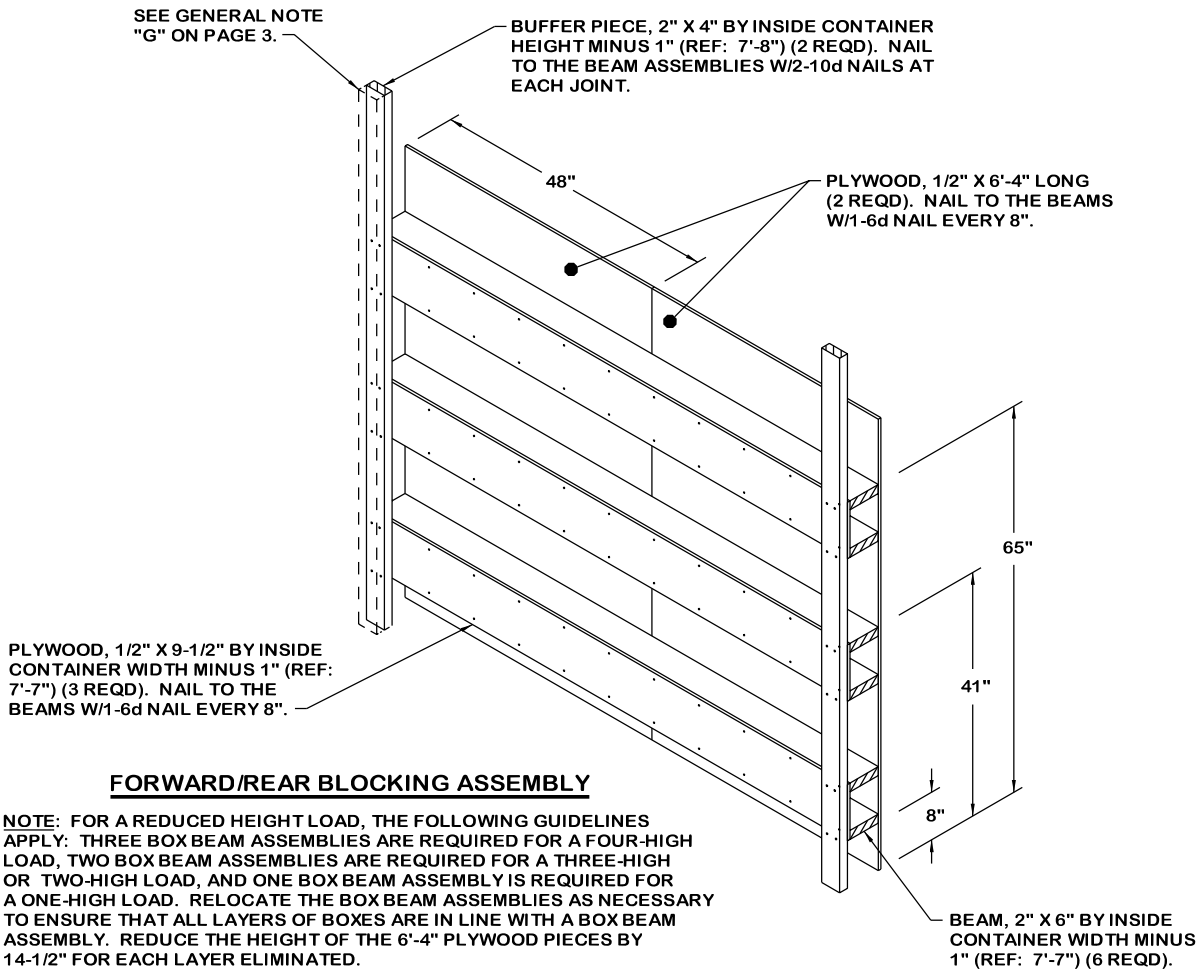
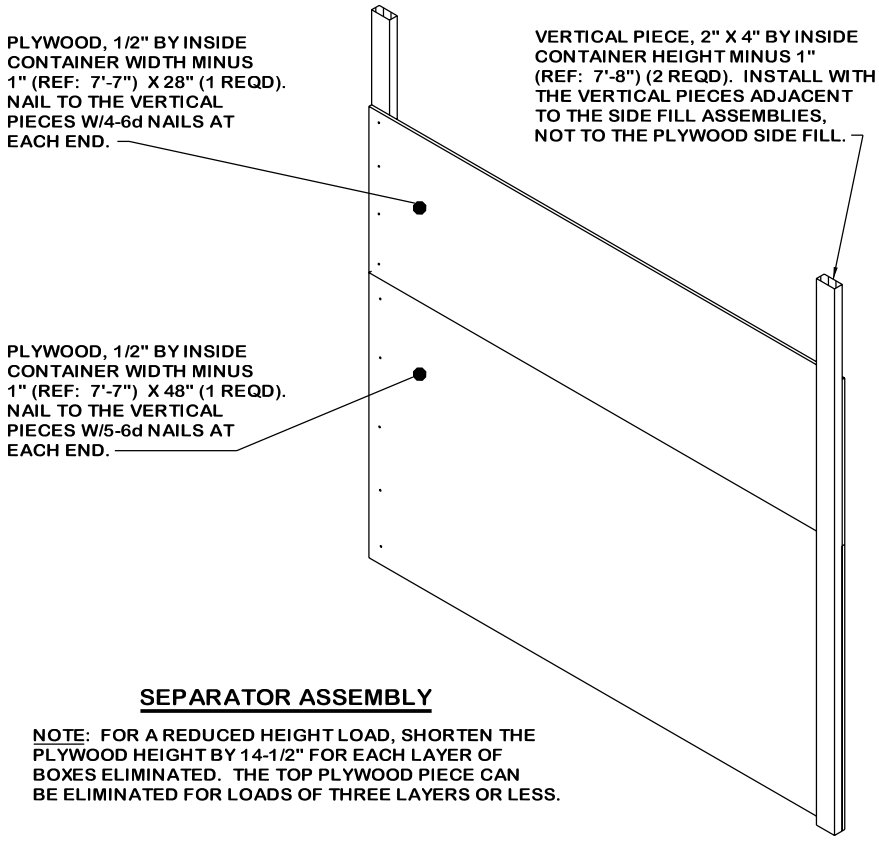


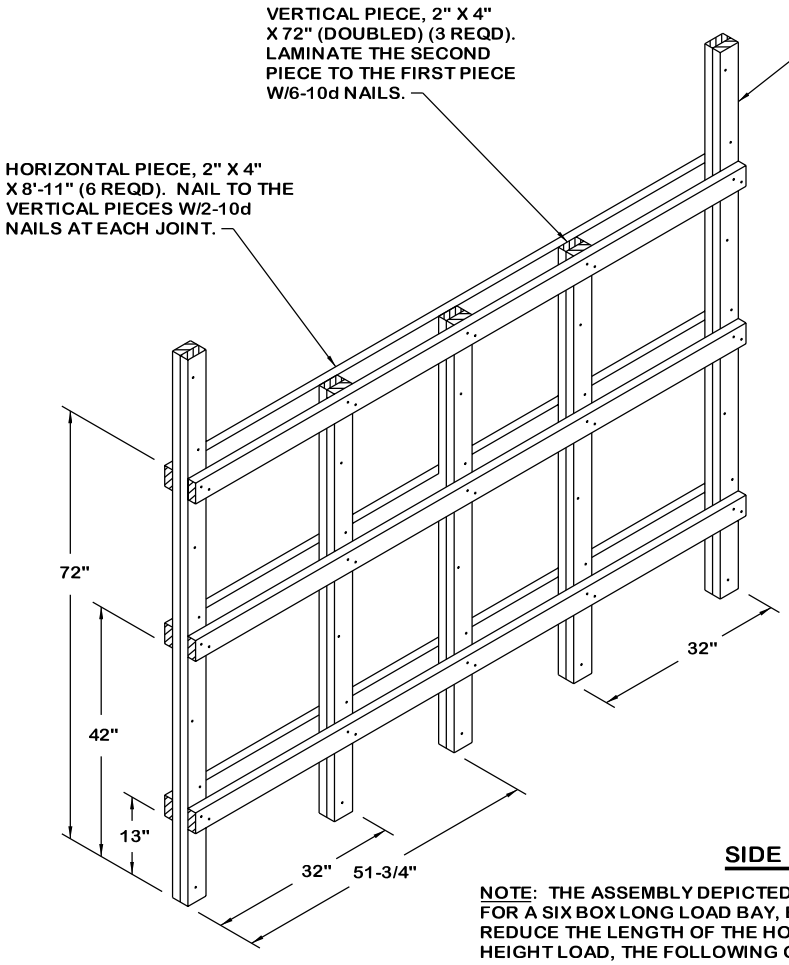
FORWARD/REAR BLOCKING ASSEMBLY

NOTE: FOR A REDUCED HEIGHT LOAD, THE FOLLOWING GUIDELINES APPLY: THREE BOX BEAM ASSEMBLIES ARE REQUIRED FOR A FOUR-HIGH LOAD, TWO BOX BEAM ASSEMBLIES ARE REQUIRED FOR A THREE-HIGH OR TWO-HIGH LOAD, AND ONE BOX BEAM ASSEMBLY IS REQUIRED FOR A ONE-HIGH LOAD. RELOCATE THE BOX BEAM ASSEMBLIES AS NECESSARY TO ENSURE THAT ALL LAYERS OF BOXES ARE IN LINE WITH A BOX BEAM ASSEMBLY. REDUCE THE HEIGHT OF THE 6'-4" PLYWOOD PIECES BY 14-1/2" FOR EACH LAYER ELIMINATED.



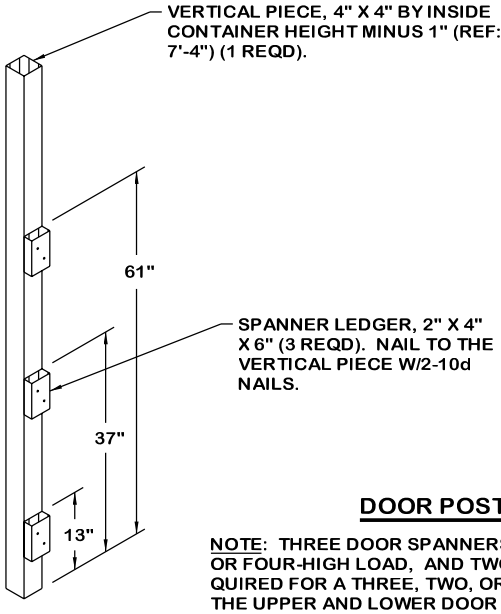
SEPARATOR ASSEMBLY

NOTE: FOR A REDUCED HEIGHT LOAD, SHORTEN THE PLYWOOD HEIGHT BY 14-1/2" FOR EACH LAYER OF BOXES ELIMINATED. THE TOP PLYWOOD PIECE CAN BE ELIMINATED FOR LOADS OF THREE LAYERS OR LESS.



SIDE FILL ASSEMBLY

NOTE: THE ASSEMBLY DEPICTED ABOVE IS FOR A SEVEN BOX LONG LOAD BAY. FOR A SIX BOX LONG LOAD BAY, ELIMINATE THE CENTER VERTICAL PIECES AND REDUCE THE LENGTH OF THE HORIZONTAL PIECES TO 7'-7". FOR A REDUCED HEIGHT LOAD, THE FOLLOWING GUIDELINES APPLY: THREE SETS OF HORIZONTAL PIECES ARE REQUIRED FOR A FOUR-HIGH LOAD, TWO SETS OF HORIZONTAL PIECES ARE REQUIRED FOR A THREE-HIGH OR TWO-HIGH LOAD, AND ONE SET OF HORIZONTAL PIECES IS REQUIRED FOR A ONE-HIGH LOAD. RELOCATE THE SETS OF HORIZONTAL PIECES AS NECESSARY TO ENSURE THAT ALL LAYERS OF BOXES ARE IN CONTACT WITH A HORIZONTAL PIECE. REDUCE THE HEIGHT OF THE 72" VERTICAL PIECES AS APPROPRIATE.



DOOR POST VERTICAL

NOTE: THREE DOOR SPANNERS ARE REQUIRED FOR A FIVE, OR FOUR-HIGH LOAD, AND TWO DOOR SPANNERS ARE REQUIRED FOR A THREE, TWO, OR ONE-HIGH LOAD. INSTALL THE UPPER AND LOWER DOOR SPANNERS NEAR THE TOP AND THE BOTTOM OF THE HEIGHT OF THE FILL PIECES, AND INSTALL THE MIDDLE DOOR SPANNER (WHEN REQUIRED) NEAR THE MIDDLE OF THE HEIGHT OF THE FILL PIECES.