APPROVED BY
BUREAU OF EXPLOSIVES

DATE 8/8/2006

LOADING AND BRACING* IN END OPENING ISO CONTAINERS OF HARPOON GUIDED MISSILE, RGM-84 PACKED IN MK694 MOD 0 SHIPPING AND STORAGE CONTAINER

INDEX

*THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY CONTAINER-ON-FLATCAR (COFC) RAIL, MOTOR, OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

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DO NOT SCALE

JUNE 2006

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PROJECT SP 452-02

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 HARPOON MISSILE (RGM-84) PACKED IN MK694 MOD 0 CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS CONTAINER WITH AMMUNITION ITEMS. SEE NAVY SEA SYSTEMS COMMAND DRAWING DL5167322 AND PAGE 4 FOR DETAILS OF THE CONTAINER. CAUTION: REGARDLESS OF THE QUANTITY OF CONTAINERS 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 LOADS 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). 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 CENTER BLOCKING 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 CENTER BLOCKING ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE CONTAINERS.

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, ON TO, OR RIGHT BESIDE A NAIL IN A LOWER PIECE.

G. IN SOME ISO 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. WHETHER AN ISO 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.

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

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

L. THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOAD IS DELINEATED IN THE LOAD VIEW, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOAD 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.

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

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 CONTAINERS SHOWN IN THE LOAD ON PAGE 3 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE DETAILS ON PAGES 6 AND 7.

Q. AS REQUIRED BY THE ASSOCIATION OF AMERICAN RAILROADS (AAR), ALL 1-1/4" AND 2" STEEL STRAPPING USED FOR LOAD RESTRAINT MUST BE MARKED AS SPECIFIED WITHIN THE APPLICABLE AAR RULES GOVERNING LOADING, BLOCKING AND BRACING OF FREIGHT WITHIN THE CONVEYANCE. FOR THE SPECIFIC MARKING SIZE, FREQUENCY, ETC., REQUIRED, REFER TO THE APPROPRIATE AAR LOADING RULES.

R. UNIVERSAL LOAD RETAINERS ARE DEPICTED IN THE LOADS ON PAGES 3, 6 AND 7. FOUR UNIVERSAL LOAD RETAINERS ARE REQUIRED WHEN LOADING TWO LAYERS OF CONTAINERS, AND TWO UNIVERSAL LOAD RETAINERS ARE REQUIRED WHEN LOADING ONE LAYER OF CONTAINERS. THIS IS AN EXCEPTION TO THE ESTABLISHED PROCEDURES; HOWEVER, THE EXCEPTION IS PERMITTED FOR THE AMMUNITION PACK COVERED BY THIS DRAWING. REFER TO DAC DRAWING ACV00682 FOR DETAILS OF THE UNIVERSAL LOAD RETAINER CONSTRUCTION, AND TO DEPARTMENT OF THE ARMY DRAWING DA-116 FOR DETAILS OF THE INSTALLATION TO THE DOOR POST VERTICAL, PLACEMENT INTO THE CONTAINER, AND FOR OTHER METHODS OF REAR-OF-LOAD RESTRAINT.

S. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN CONTAINERS, BETWEEN CONTAINERS AND THE END OPENING CONTAINER, AND BETWEEN CONTAINERS AND STEEL STRAPPING, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.

T. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:

1. PREFABRICATE TWO FORWARD/REAR BLOCKING ASSEMBLIES, TWO CENTER BLOCKING ASSEMBLIES, AND TWO DOOR POST VERTICALS.

2. INSTALL THE FORWARD BLOCKING ASSEMBLY.

3. LOAD DOUBLE-STACKED CONTAINERS AGAINST LEFT AND RIGHT SIDE WALLS.

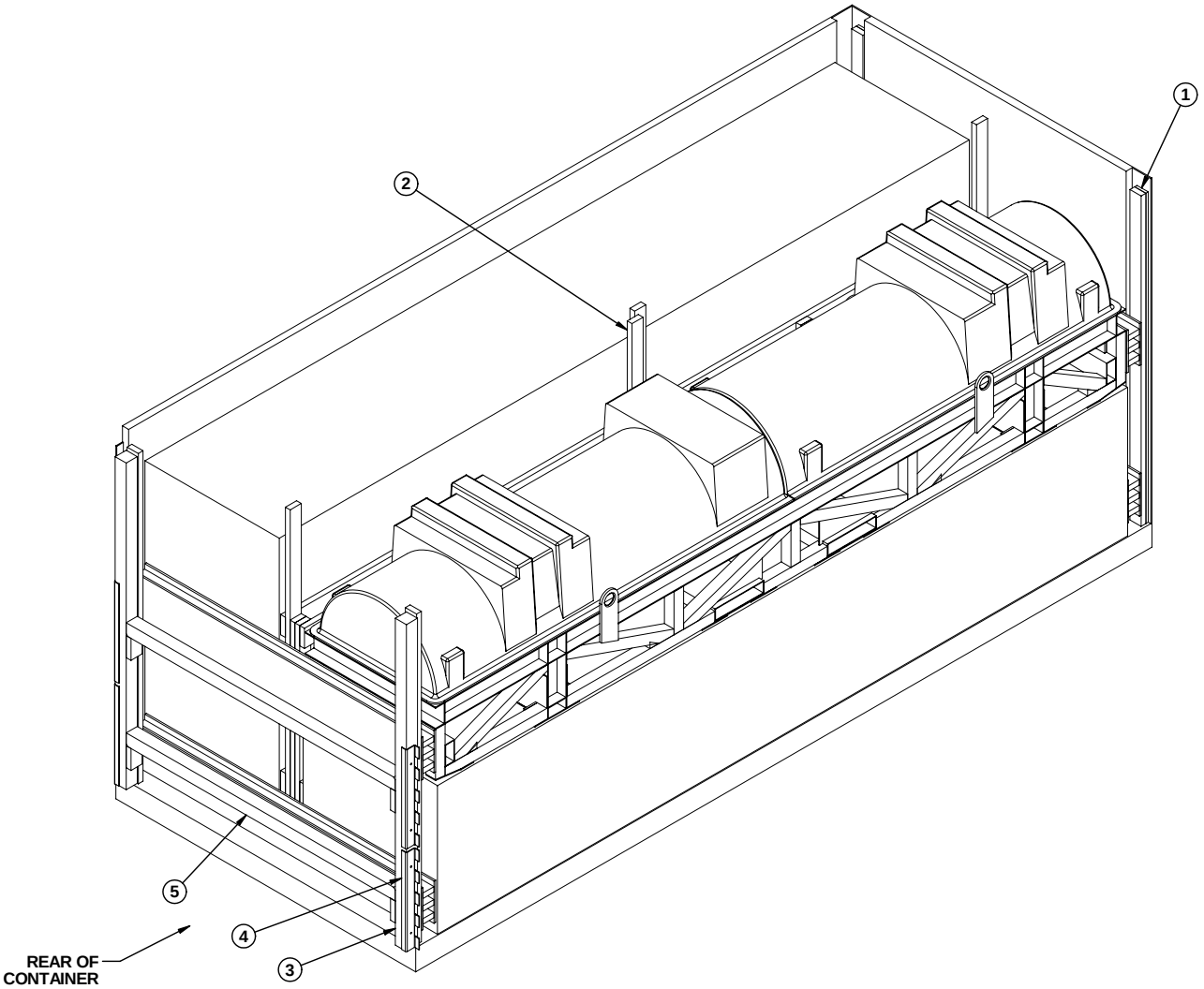
4. INSTALL TWO CENTER BLOCKING ASSEMBLIES IN GAP BETWEEN LEFT AND RIGHT STACK OF CONTAINERS.

5. INSTALL THE REAR BLOCKING ASSEMBLY.

6. INSTALL THE LOAD RETAINER ASSEMBLY, INCLUDING THE DOOR POST VERTICALS, UNIVERSAL LOAD RETAINERS, FILL MATERIAL, AND DOOR SPANNERS.

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.
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, 0.0800" DIA, GRADE 1006 OR BETTER.
ANTI-CHAFING MATERIAL	MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
STEEL, STRUCTURAL	ASTM A36; 36,000 PSI MINIMUM YIELD OR BETTER.



ISOMETRIC VIEW

KEY NUMBERS

1. FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 5.
2. CENTER BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 4.
3. DOOR POST VERTICAL (2 REQD). SEE DETAIL ON PAGE 5, "DETAIL A" ON PAGE 8, AND GENERAL NOTE "R" ON PAGE 2.
4. UNIVERSAL LOAD RETAINER (4 REQD, 2 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPARTMENT OF ARMY DRAWING DA-116, DAC DRAWING ACV00682, "DETAIL A" ON PAGE 8, AND GENERAL NOTE "R" ON PAGE 2.
5. DOOR SPANNER, 4" X 4" BY CUT TO A LENGTH THAT PROVIDES A DRIVE FIT (REF: 7'-1 1/4") (2 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE "BEVEL CUT" DETAIL ON PAGE 8, AND "DETAIL A" ON PAGE 8.
6. FILL MATERIAL (IF REQD), 1" X 4" OR 2" X 4" X 50 -1/2" (AS REQD). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/1 NAIL OF A SUITABLE SIZE EVERY 12" (6d FOR 1" THICK AND 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 8.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	15	5
2" X 4"	226	151
2" X 6"	72	72
4" X 4"	29	39
NAILS	**NO. REQD**	**POUNDS**
6d (2")	280	1-1/2
10d (3")	208	3-1/4
12d (3-1/4")	8	NIL
PLYWOOD, 1/2" – 58.00 SQ FT REQD - -		79.75 LBS
UNIVERSAL LOAD RETAINER - 4 REQD - - - -		26 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MK694	4	23,032 LBS
DUNNAGE		645 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		28,377 LBS

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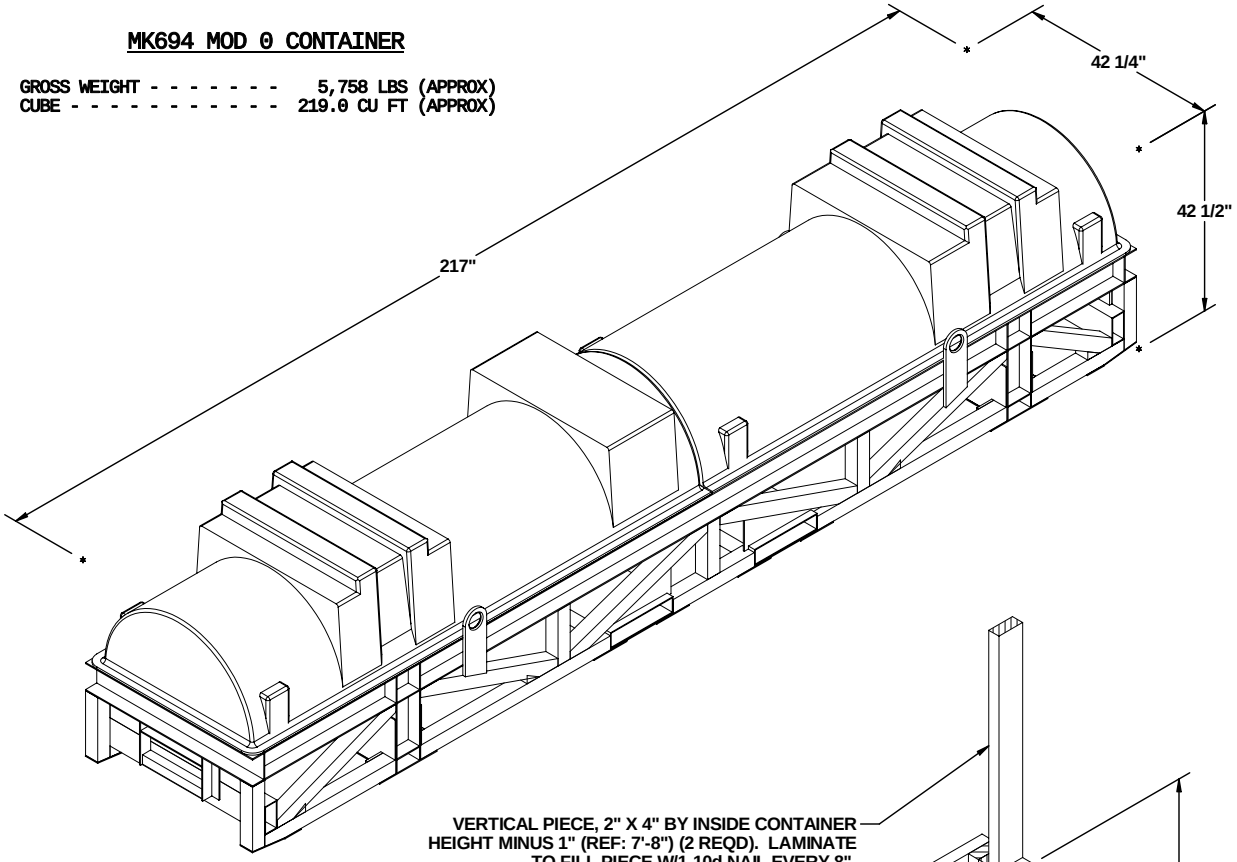
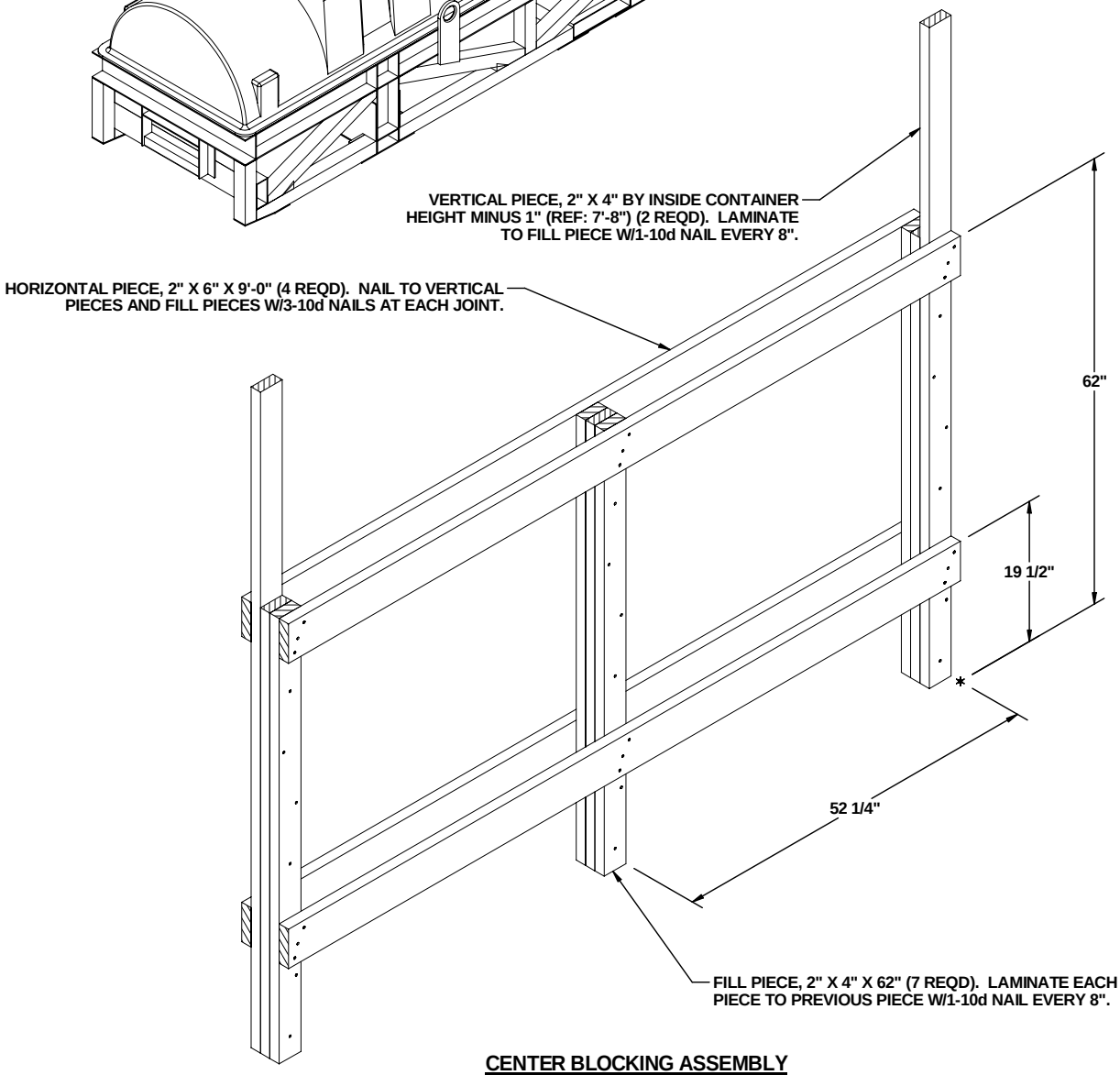
MK694 MOD 0 CONTAINER

GROSS WEIGHT - - - - - - - - 5,758 LBS (APPROX)
CUBE - - - - - - - - - - - - 219.0 CU FT (APPROX)





CENTER BLOCKING ASSEMBLY

NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND MAKE THE FILL PIECES 19-1/2" LONG.

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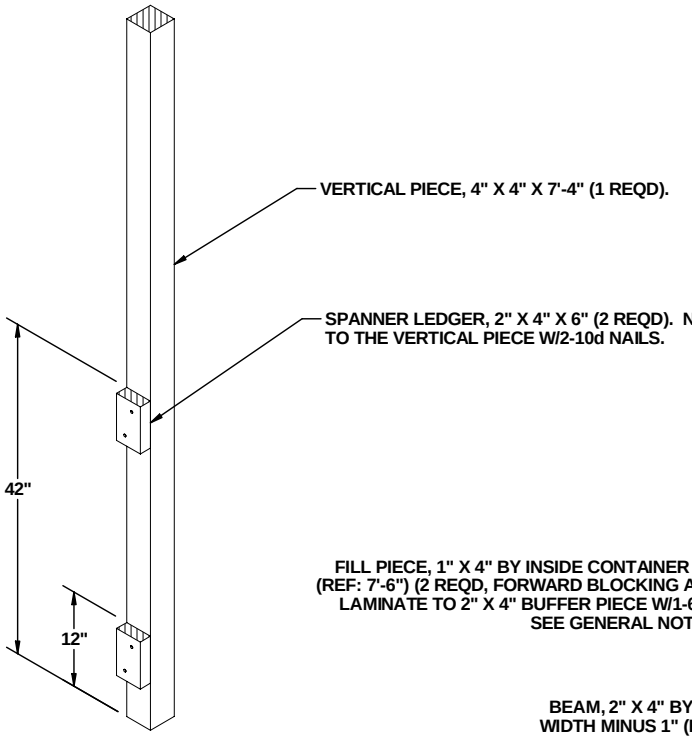
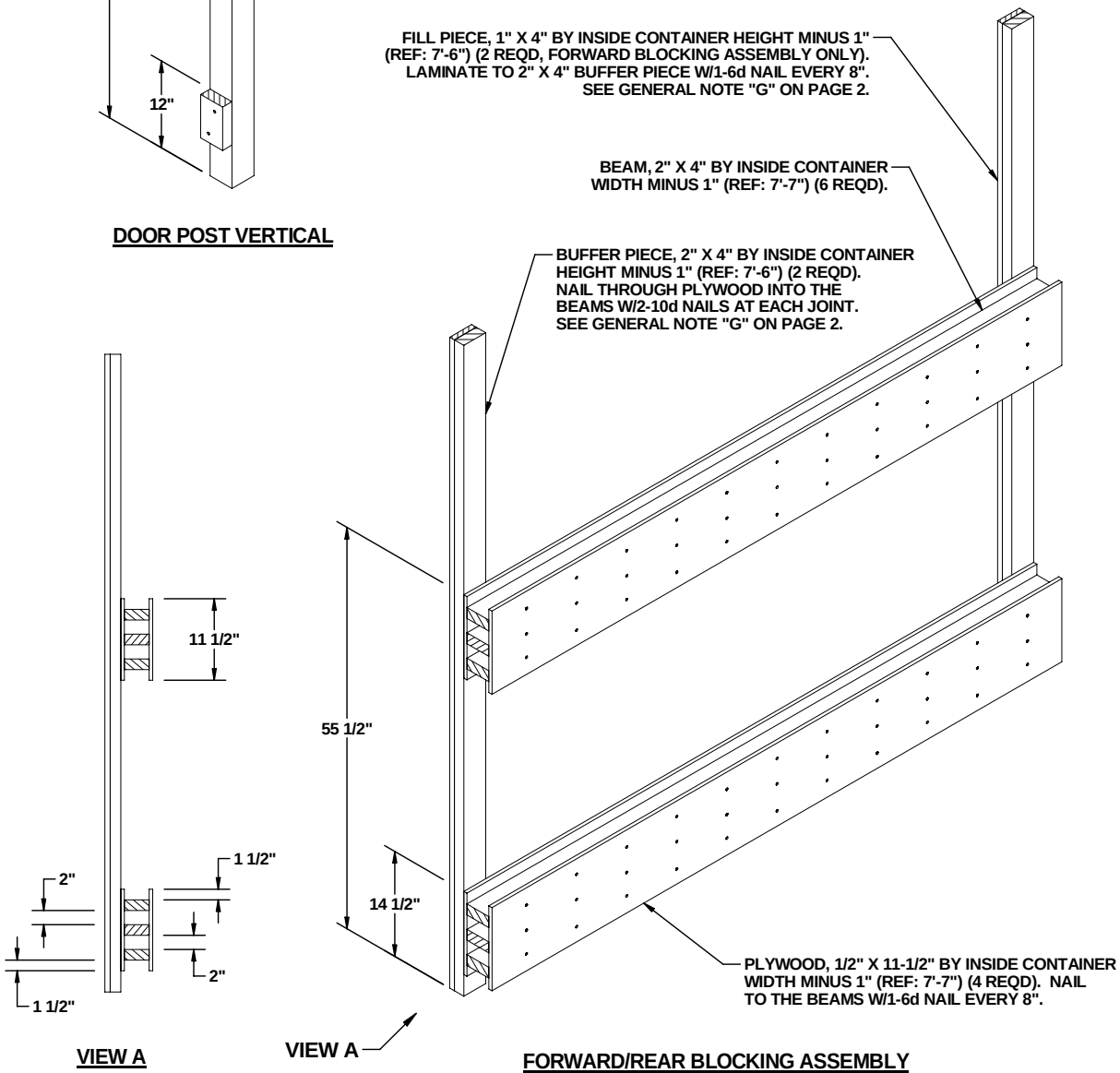
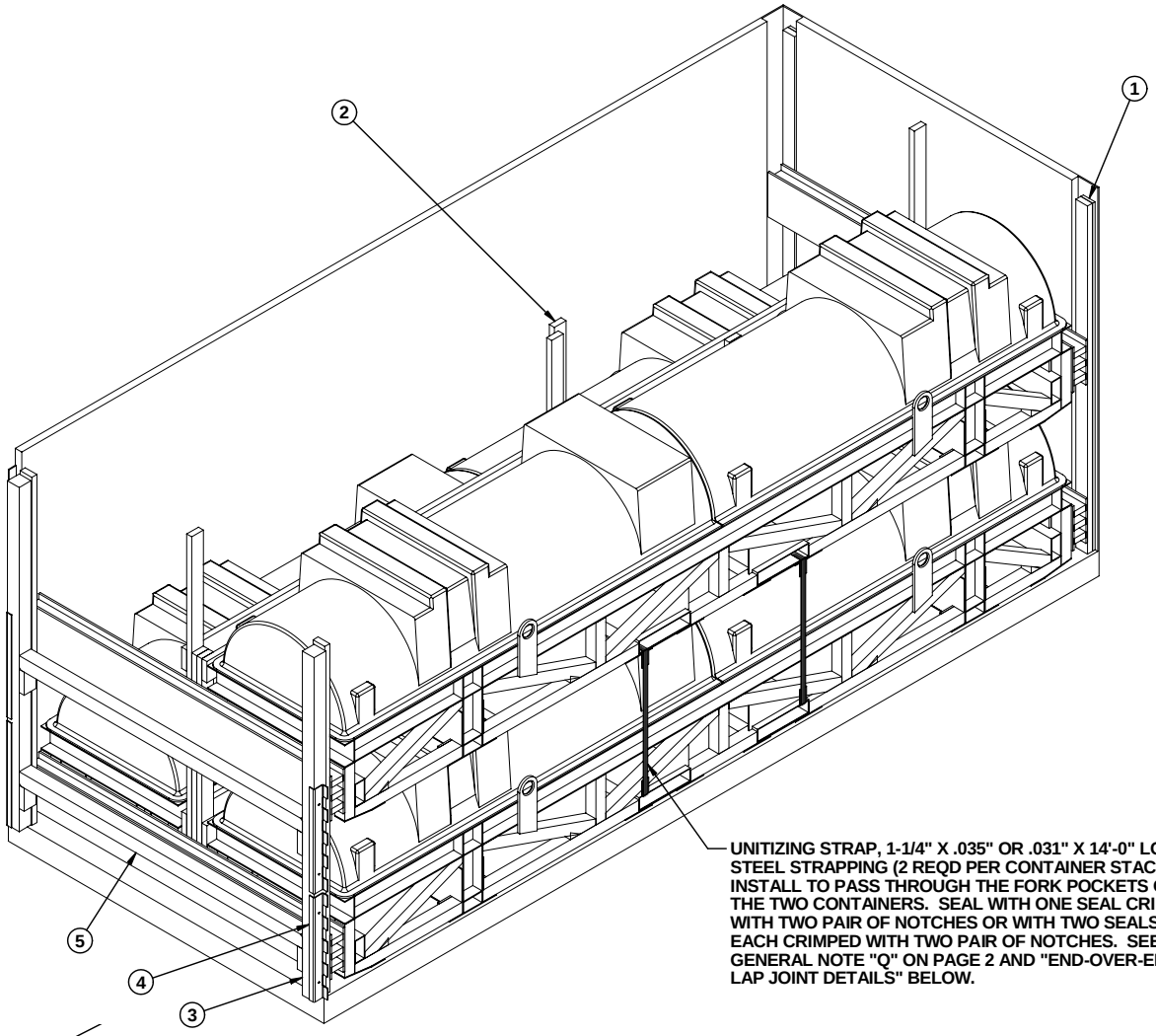


DOOR POST VERTICAL



FORWARD/REAR BLOCKING ASSEMBLY

NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP BOX BEAM ASSEMBLY.

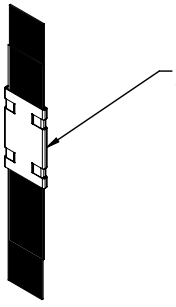


LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 3.

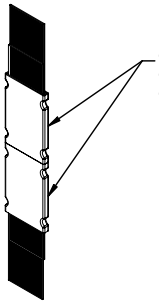
SPECIAL NOTE:

WHEN REDUCING A LOAD BY ONE OR MORE CONTAINERS, IT WILL BE NECESSARY TO UNITIZE THE CONTAINER STACK WHICH IS LATERALLY ADJACENT TO THE OMITTED CONTAINER AS DEPICTED IN THE LOAD VIEW ABOVE. SEE GENERAL NOTE "H" ON PAGE 2.



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

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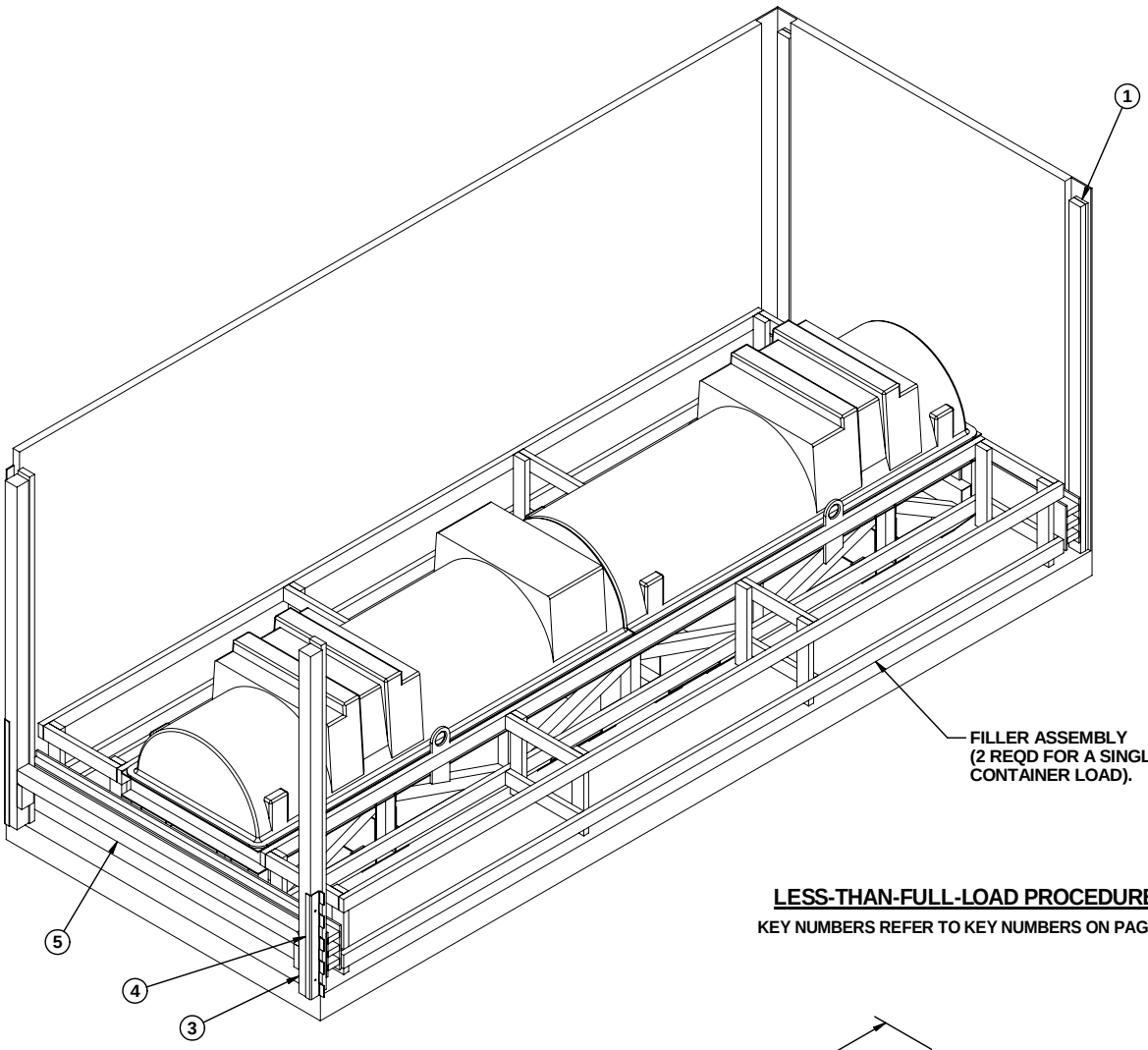

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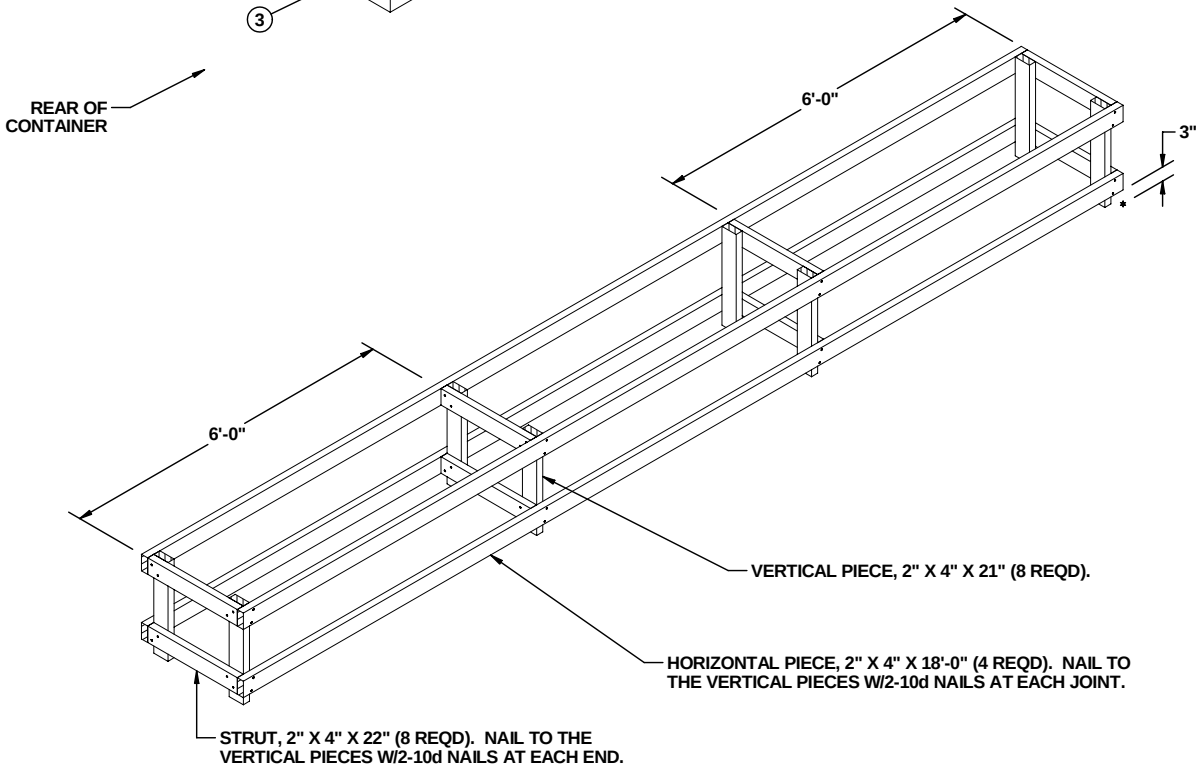
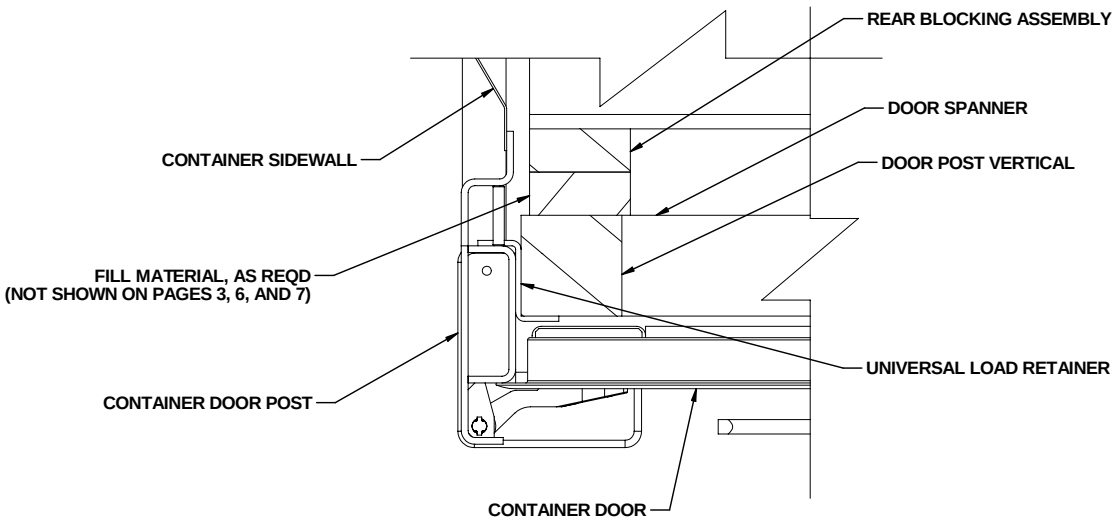
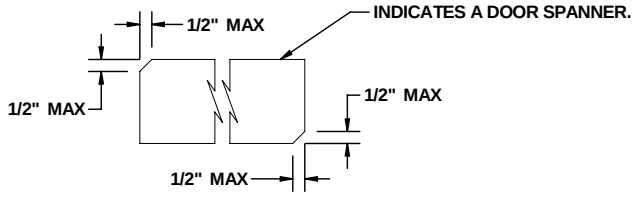


FILLER ASSEMBLY



DETAIL A

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE UNIVERSAL LOAD RETAINER AND ADJACENT DUNNAGE PIECES.



BEVEL CUT

IF DESIRED, EACH END OF A DOOR SPANNER MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT FIT BETWEEN VERTICAL DOOR POST ASSEMBLIES.