

APPROVED BY  
BUREAU OF EXPLOSIVES

*[Signature]*

DATE 12/30/02

# LOADING AND BRACING IN END OPENING ISO CONTAINERS OF HARPOON GUIDED MISSILE, RGM-84, PACKED 1 PER MK631 MOD 0 SHIPPING AND STORAGE CONTAINER

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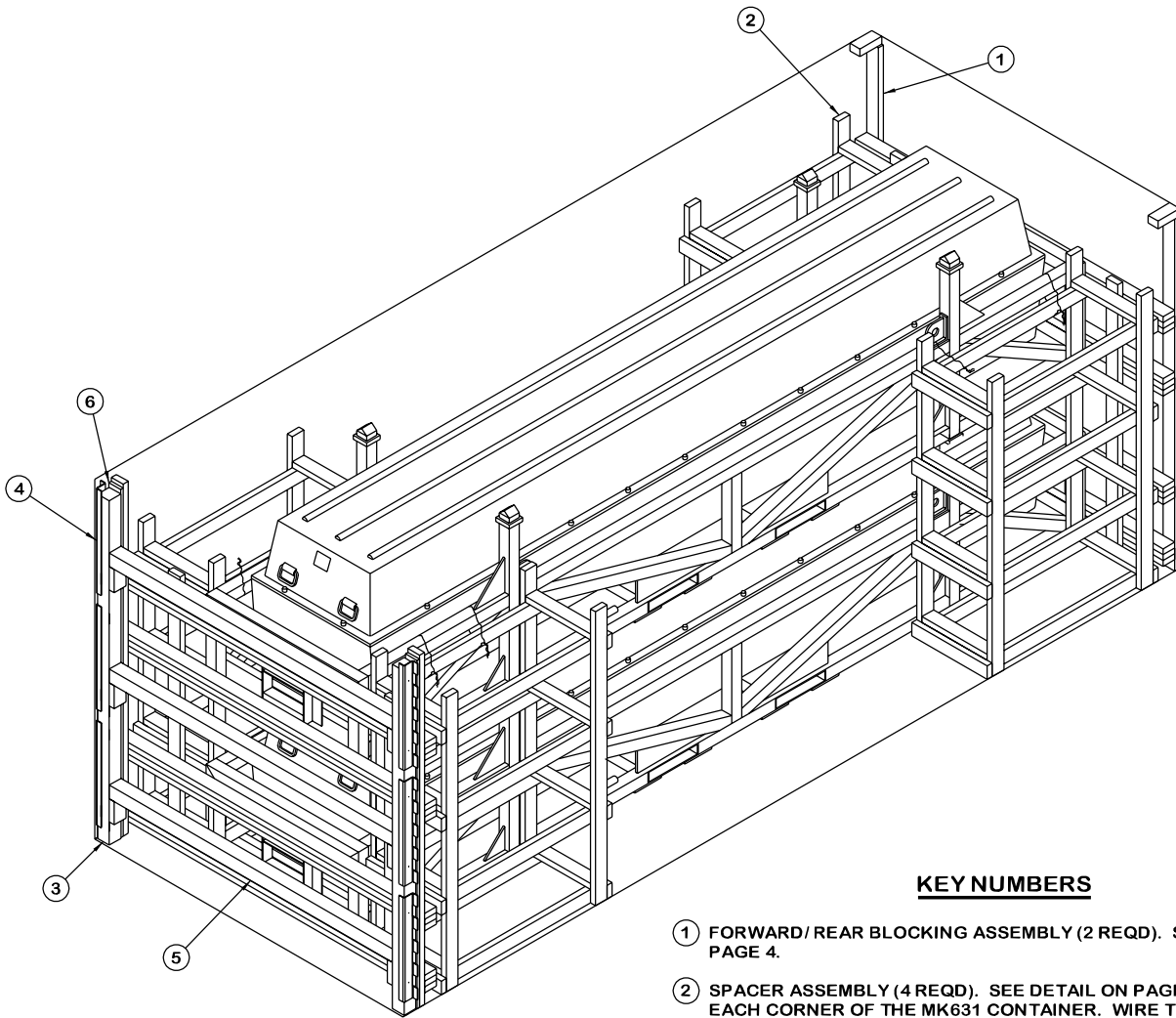
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- LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY OPERATIONS SUPPORT COMMAND		<b>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.</b>			
<i>[Signature]</i>		<b>DO NOT SCALE</b>		<b>JULY 2002</b>	
		ENGINEER OR TECHNICIAN	BASIC REV.	PATRICK DOUGHERTY	
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND		TRANSPORTATION ENGINEERING DIVISION	<i>[Signature]</i>		
<i>[Signature]</i> U.S. ARMY DEFENSE AMMUNITION CENTER		VALIDATION ENGINEERING DIVISION	TESTED	CLASS	DIVISION
		LOGISTICS ENGINEERING OFFICE	<i>[Signature]</i>	19	48
				DRAWING	FILE
				8732	SP15J122

PROJECT SP 431-02



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① FORWARD/ REAR BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 4.
- ② SPACER ASSEMBLY (4 REQD). SEE DETAIL ON PAGE 5. INSTALL AT EACH CORNER OF THE MK631 CONTAINER. WIRE TO THE MK631 CONTAINER AT TWO LOCATIONS PER ASSEMBLY. WRAP THE WIRE AROUND THE HORIZONTAL PIECE OF THE SPACER ASSEMBLY AND THE HORIZONTAL PIECE OF THE MK631 CONTAINER. TWIST THE ENDS OF THE WIRE TOGETHER WITH THREE FULL TWISTS.
- ③ DOOR POST VERTICAL (2 REQD). SEE DETAIL ON PAGE 5, "DETAIL A" ON PAGE 6, AND GENERAL NOTE "L" ON PAGE 3.
- ④ UNIVERSAL LOAD RETAINER (6 REQD, 3 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPARTMENT OF ARMY DRAWING DA-116, "DETAIL A" ON PAGE 6, AND GENERAL NOTE "L" ON PAGE 3.
- ⑤ DOOR SPANNER, 4" X 4" MATERIAL CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF: 7'-1-1/4") (3 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE "BEVEL CUT" DETAIL ON PAGE 6.
- ⑥ FILL MATERIAL, 4" WIDE BY 6'-2" LONG MATERIAL (AS REQD). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/6 NAILS OF APPROPRIATE 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 END BLOCKING ASSEMBLY.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	15	5
2" X 4"	613	409
4" X 4"	37	49
NAILS	NO. REQD	POUNDS
6d (2")	14	1/4
10d (3")	704	10-3/4
12d (3-1/4")	12	1/4
UNIVERSAL LOAD RETAINER	6 REQD	39 LBS
WIRE, 0.0800" DIA.	12' REQD	NIL

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
MK631 CONTAINER	2	6,400 LBS
DUNNAGE		975 LBS
CONTAINER		4,700 LBS

TOTAL WEIGHT - - - - - 12,075 LBS (APPROX)

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 25.4MM AND ONE POUND EQUALS 0.454 KG.

N. **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.

O. 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.

P. THE QUANTITY OF CONTAINERS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FORWARD/REAR BLOCKING ASSEMBLY ON PAGE 4 AND THE SPACER ASSEMBLY ON PAGE 5.

Q. **RECOMMENDED SEQUENTIAL LOADING PROCEDURES:**

- 1. PREFABRICATE TWO FORWARD/REAR BLOCKING ASSEMBLIES AND FOUR SPACER ASSEMBLIES.
- 2. INSTALL THE FORWARD BLOCKING ASSEMBLY.
- 3. INSTALL ONE SPACER ASSEMBLY.
- 4. LOAD TWO CONTAINERS.
- 5. INSTALL THREE SPACER ASSEMBLIES.
- 6. INSTALL THE REAR BLOCKING ASSEMBLY.
- 7. INSTALL THE TWO DOOR POST VERTICAL ASSEMBLIES (ONE RIGHT HAND AND ONE LEFT HAND).
- 8. INSTALL THE THREE DOOR SPANNER PIECES.
- 9. INSTALL THE SOLID FILL MATERIAL.

**MATERIAL SPECIFICATIONS**

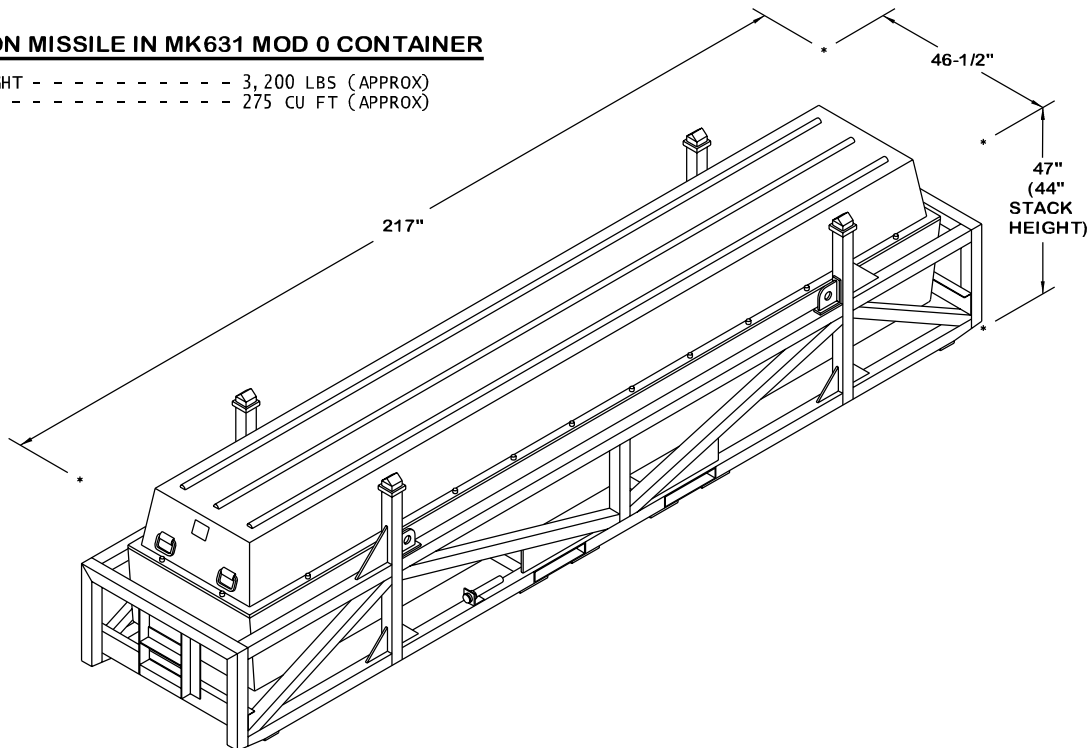
<u>LUMBER</u> - - - - -	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
<u>NAILS</u> - - - - -	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMS).
<u>PLYWOOD</u> - - - - -	COMMERCIAL ITEM DESCRIPTION A- A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D, IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR EXTERIOR GRADE MAY BE SUBSTITUTED.
<u>WIRE, CARBON STEEL</u> -	ASTM A853; ANNEALED AT FINNISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.
<u>STEEL, STRUCTURAL</u> -	ASTM A36; 36,000 PSI MINIMUM YIELD OR BETTER.

- 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 MK631 MOD 0 CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH AMMUNITION ITEMS. SEE NAVAL SEA SYSTEMS COMMAND DRAWING OR-4/238 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 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). 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 VERTICAL PIECES ON THE SPACER ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND/OR QUANTITY OF THE VERTICAL PIECES IN THE SPACER ASSEMBLIES 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 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. 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 SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- K. 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.
- L. SIX UNIVERSAL LOAD RETAINERS ARE DEPICTED IN THE LOAD ON PAGE 2. SIX UNIVERSAL LOAD RETAINERS ARE REQUIRED WHEN LOADING TWO MK631 MOD 0 CONTAINERS, FOUR UNIVERSAL LOAD RETAINERS ARE REQUIRED WHEN LOADING ONE MK631 MOD 0 CONTAINER. REFER TO DEPARTMENT OF THE ARMY DRAWING DA-116 FOR DETAILS OF THE UNIVERSAL LOAD RETAINER CONSTRUCTION, INSTALLATION TO THE DOOR POST VERTICAL, PLACEMENT INTO THE CONTAINER, AND FOR OTHER METHODS OF REAR OF LOAD RESTRAINT.

(CONTINUED AT LEFT)

**HARPOON MISSILE IN MK631 MOD 0 CONTAINER**

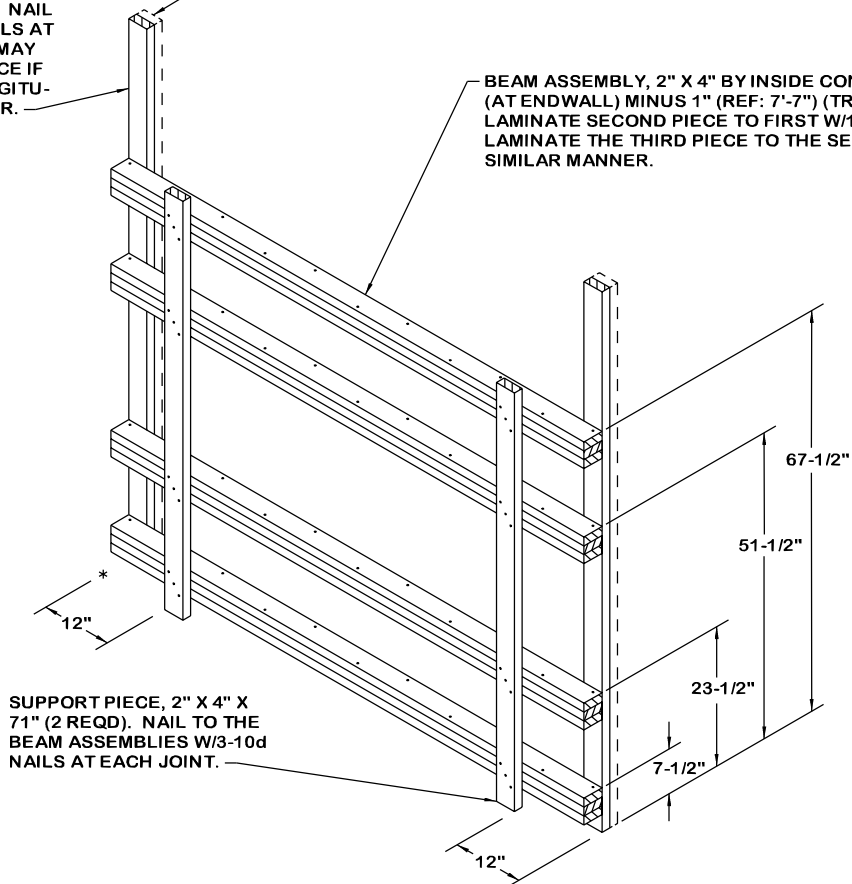
GROSS WEIGHT - - - - - 3,200 LBS (APPROX)  
 CUBE - - - - - 275 CU FT (APPROX)



SEE GENERAL NOTE  
 "G" ON PAGE 3.

BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER  
 HEIGHT MINUS 1" (REF: 7'-8") (2 REQD). NAIL  
 TO THE BEAM ASSEMBLIES W/3-10d NAILS AT  
 EACH JOINT. NOTE: 1" X 4" MATERIAL MAY  
 BE SUBSTITUTED FOR THE BUFFER PIECE IF  
 NEEDED TO PROVIDE ADDITIONAL LONGITU-  
 DINAL SPACING WITHIN THE CONTAINER.

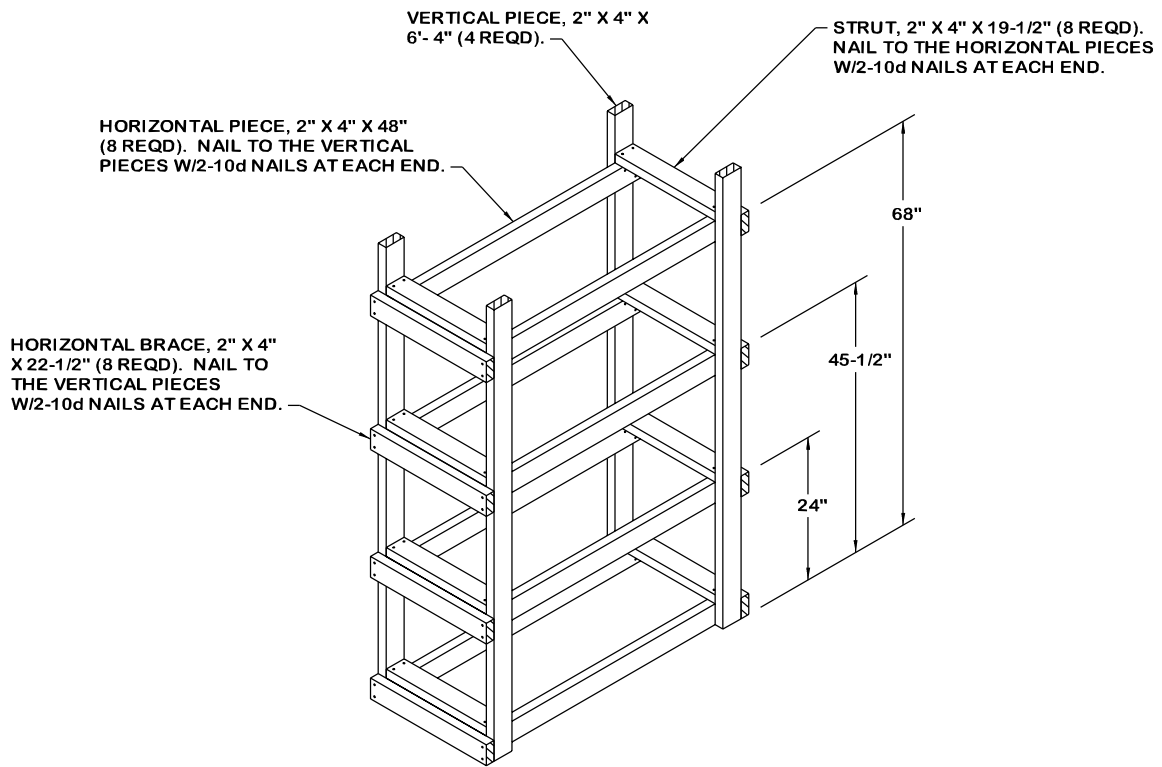
BEAM ASSEMBLY, 2" X 4" BY INSIDE CONTAINER WIDTH  
 (AT ENDWALL) MINUS 1" (REF: 7'-7") (TRIPLED) (4 REQD).  
 LAMINATE SECOND PIECE TO FIRST W/1-10d NAILS.  
 LAMINATE THE THIRD PIECE TO THE SECOND IN A  
 SIMILAR MANNER.



SUPPORT PIECE, 2" X 4" X  
 71" (2 REQD). NAIL TO THE  
 BEAM ASSEMBLIES W/3-10d  
 NAILS AT EACH JOINT.

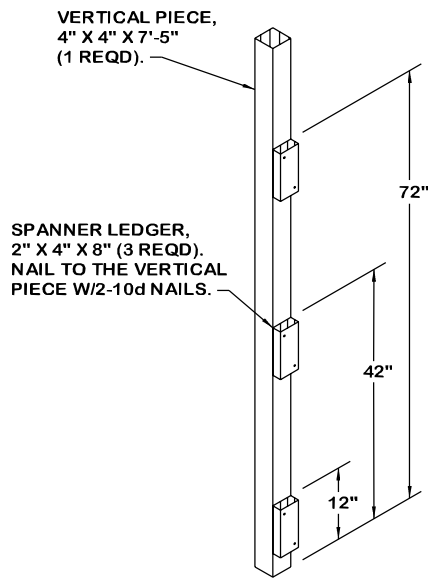
**FORWARD/REAR BLOCKING ASSEMBLY**

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP  
 TWO BEAM ASSEMBLIES AND REDUCE THE LENGTH  
 OF THE SUPPORT PIECES TO 30".



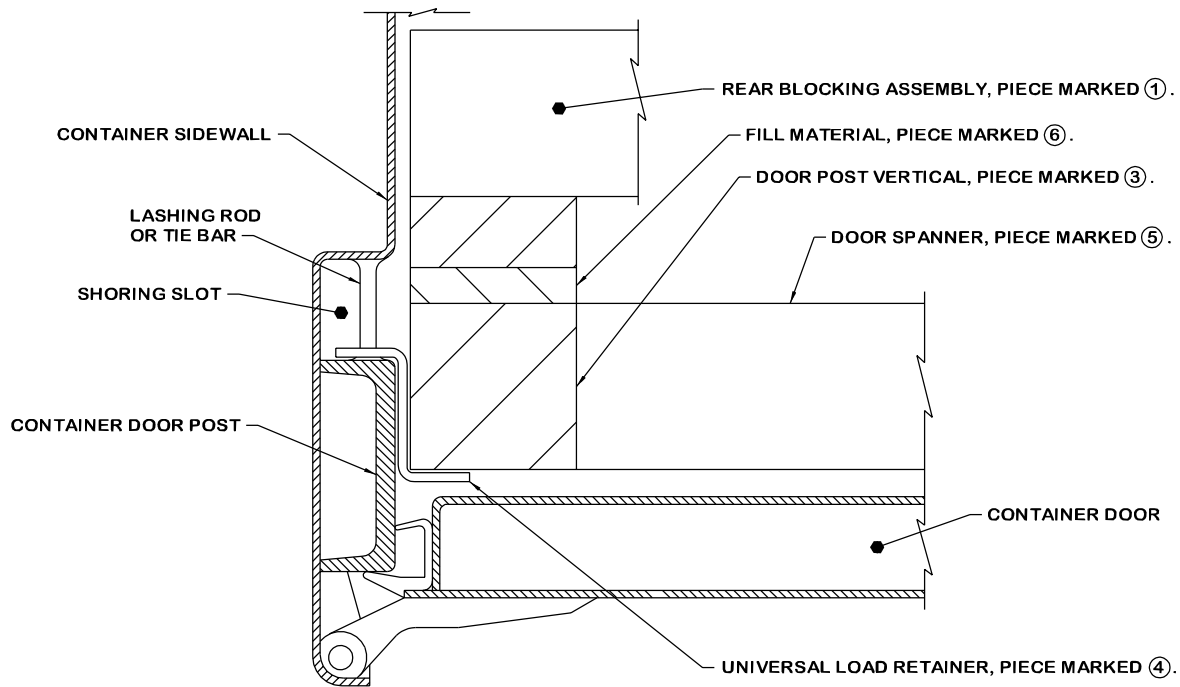
**SPACER ASSEMBLY**

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP FOUR HORIZONTAL PIECES, THE TOP FOUR STRUTS AND THE TOP FOUR HORIZONTAL BRACES. REDUCE THE LENGTH OF THE VERTICAL PIECES TO 32".



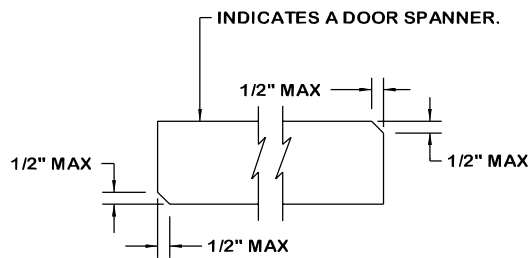
**DOOR POST VERTICAL**

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP SPANNER LEDGER.



**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. 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.



**BEVEL-CUT**

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