

APPROVED BY  
BUREAU OF EXPLOSIVES

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# LOADING AND BRACING\* IN SIDE OPENING ISO CONTAINERS OF COMPLETE ROUNDS PACKED IN CYLINDRICAL METAL CONTAINERS

## PA98 SERIES CONTAINERS

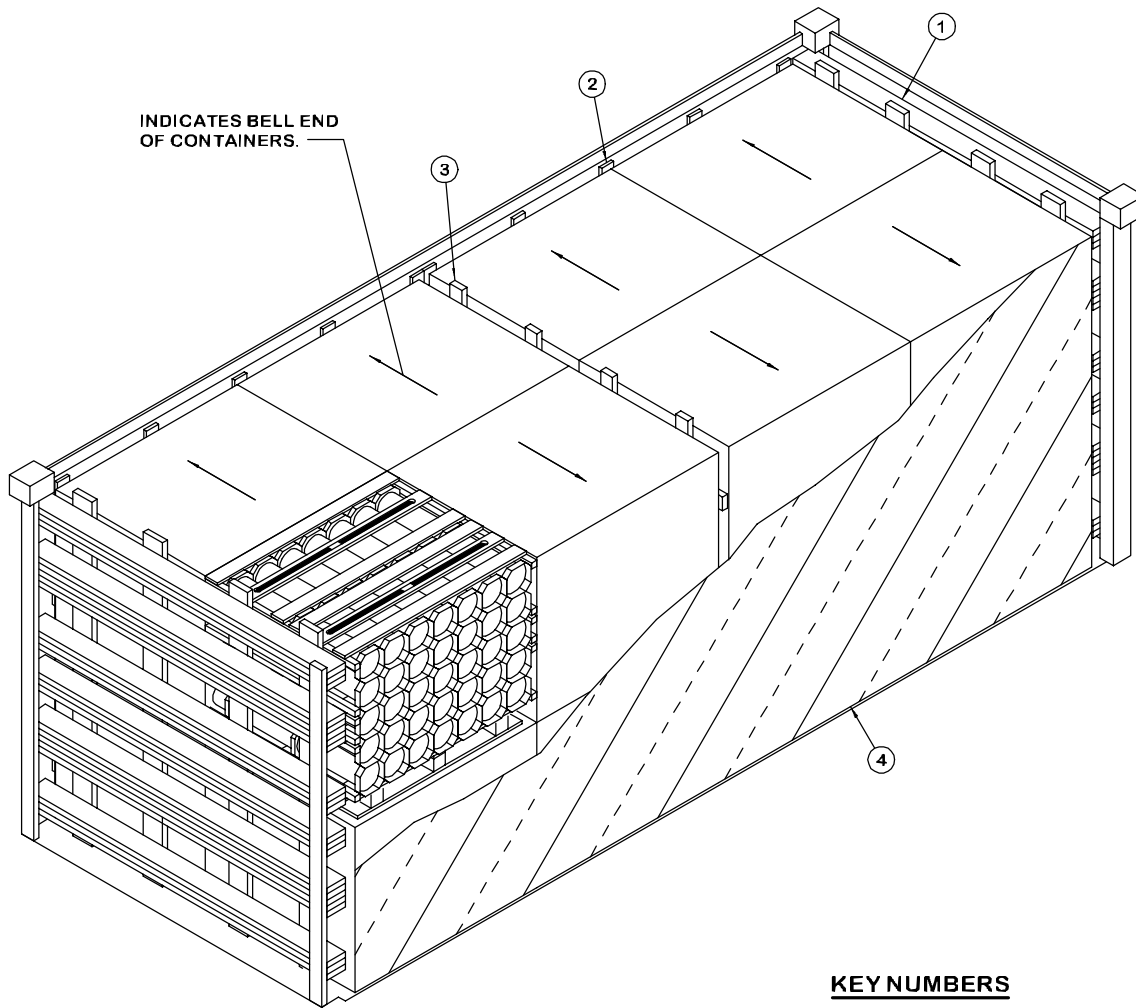
### INDEX

ITEM	PAGE(S)
TYPICAL LOADING PROCEDURES - - - - -	2
GENERAL NOTES AND MATERIAL SPECIFICATIONS - - - - -	3
PALLET UNIT DETAIL - - - - -	4
DETAILS - - - - -	5, 6

\* 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 INDUSTRIAL OPERATIONS COMMAND  <i>Stanley P. Fine</i>	ENGINEER	BASIC	MICHAEL SARDONE	DO NOT SCALE				
		REV.		WEBSITE: HTTP://WWW.DAC.ARMY.MIL				
	TECHNICIAN	BASIC		AUGUST 1997				
	REV.							
	DRAFTSMAN	BASIC						
		REV.						
APPROVED BY ORDER OF COMMANDING GENERAL U.S. ARMY MATERIEL COMMAND  <i>William F. Ernst</i> DEFENSE AMMUNITION CENTER	TRANSPORTATION ENGINEERING DIVISION		<i>W.R. Jenkins</i>					
	VALIDATION ENGINEERING DIVISION		<i>W.R. Jenkins</i>	TESTED	CLASS	DIVISION	DRAWING	FILE
	LOGISTICS ENGINEERING OFFICE		<i>William F. Ernst</i>		19	48	4265/5	15PM1014



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.
- ② SIDE FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.
- ③ CENTER FILL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 6.
- ④ ANTI-CHAFING, FIBERBOARD (AS REQD). AFFIX (STRAP TAPE, ETC.) TO THE CONTAINER, DOORS, OR PALLET UNITS TO ELIMINATE METAL-TO-METAL CONTACT. ANTI-CHAFING IS NOT REQUIRED BETWEEN PALLET UNITS IN EITHER THE LATERAL OR LONGITUDINAL DIRECTIONS. NOTE: PLYWOOD OR HARDBOARD MAY BE USED IN PLACE OF THE FIBERBOARD, IF DESIRED AND IF SPACE PERMITS, AS LONG AS THE PLYWOOD OR HARDBOARD IS SECURED TO PREVENT UNDUE MOVEMENT.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	71	24
1" X 6"	72	36
2" X 4"	87	58
2" X 6"	374	374
NAILS	NO. REQD	POUNDS
6d (2")	120	3/4
10d (3")	616	9-1/2
ANTI-CHAFING, FIBERBOARD - - AS REQD		NIL

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT - - - - -	16 - - - - -	44,720 LBS
DUNNAGE - - - - -	- - - - -	995 LBS
CONTAINER - - - - -	- - - - -	6,050 LBS

TOTAL WEIGHT - - - - - 51,765 LBS (APPROX)

(GENERAL NOTES CONTINUED)

GENERAL NOTES

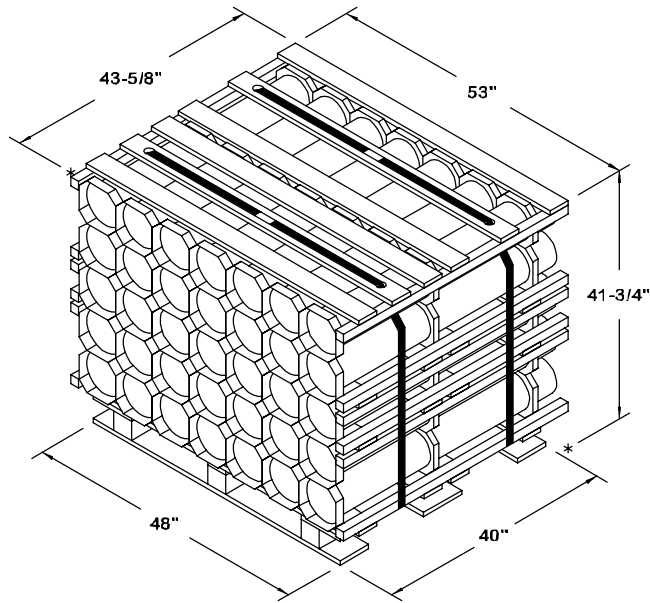
- J. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.
- K. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4 MM AND ONE POUND EQUALS 0.454 KG.
- 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. 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.
- P. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FILLER ASSEMBLY ON PAGE 4.
- Q. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN CONTAINERS AND THE SIDE OPENING CONTAINER, AND BETWEEN CONTAINERS AND STEEL STRAPPING, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.
- R. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:
  - 1. PREFABRICATE TWO END BLOCKING ASSEMBLIES AND TWO SIDE FILL ASSEMBLIES. ONE CENTER FILL ASSEMBLY MAY BE PARTIALLY ASSEMBLED AT THIS TIME, BUT CANNOT BE COMPLETED UNTIL THE REQUIRED NUMBER OF VERTICAL PIECES IS DETERMINED.
  - 2. INSTALL ONE END BLOCKING ASSEMBLY.
  - 3. INSTALL ONE SIDE FILL ASSEMBLY.
  - 4. LOAD EIGHT PALLET UNITS.
  - 5. REPEAT STEPS 2 THRU 4.
  - 6. MEASURE THE VOID BETWEEN THE PALLET UNITS AT THE CENTER OF THE CONTAINER AND COMPLETE THE ASSEMBLY AND INSTALLATION OF THE CENTER FILL ASSEMBLY.
  - 7. INSTALL THE ANTI-CHAFING MATERIAL BETWEEN THE PALLET UNITS AND THE DOORS.

- 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 COMPLETE ROUNDS PACKED IN PA98 SERIES METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4 AND AMC DRAWING 19-48-4079/5-20PM1002 FOR DETAILS 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 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 WITH 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 CONTAINER.
- 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. 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 ENDWALLS ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER ENDWALLS, ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR LONGITUDINAL BLOCKING.
- H. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.

(CONTINUED AT LEFT)

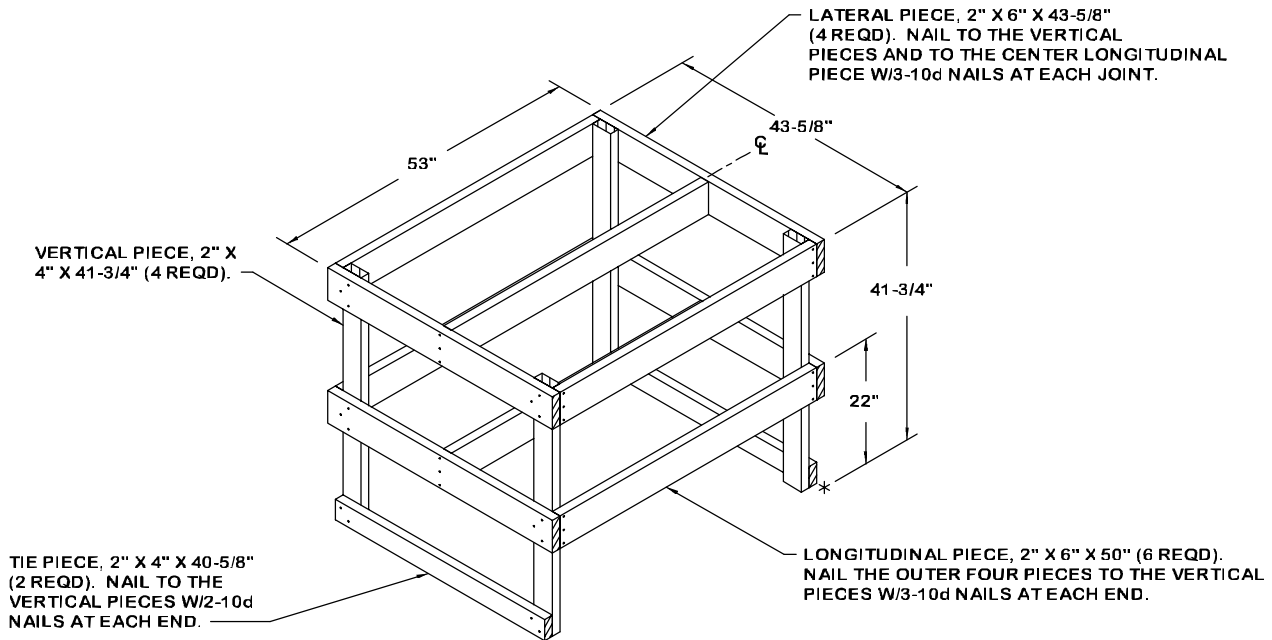
MATERIAL SPECIFICATIONS

- 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.
- ANTI-CHAFING MATERIAL - - - - - : MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.



**PALLET UNIT**

UNIT WEIGHT ---- 2,795 POUNDS (APPROX)  
 CUBE ----- 55.9 CUBIC FEET



**FILLER ASSEMBLY**

THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT. NO MORE THAN FOUR FILLER ASSEMBLIES MAY BE USED PER LOAD. DO NOT INSTALL A FILLER ASSEMBLY IMMEDIATELY ADJACENT TO ANOTHER FILLER ASSEMBLY.

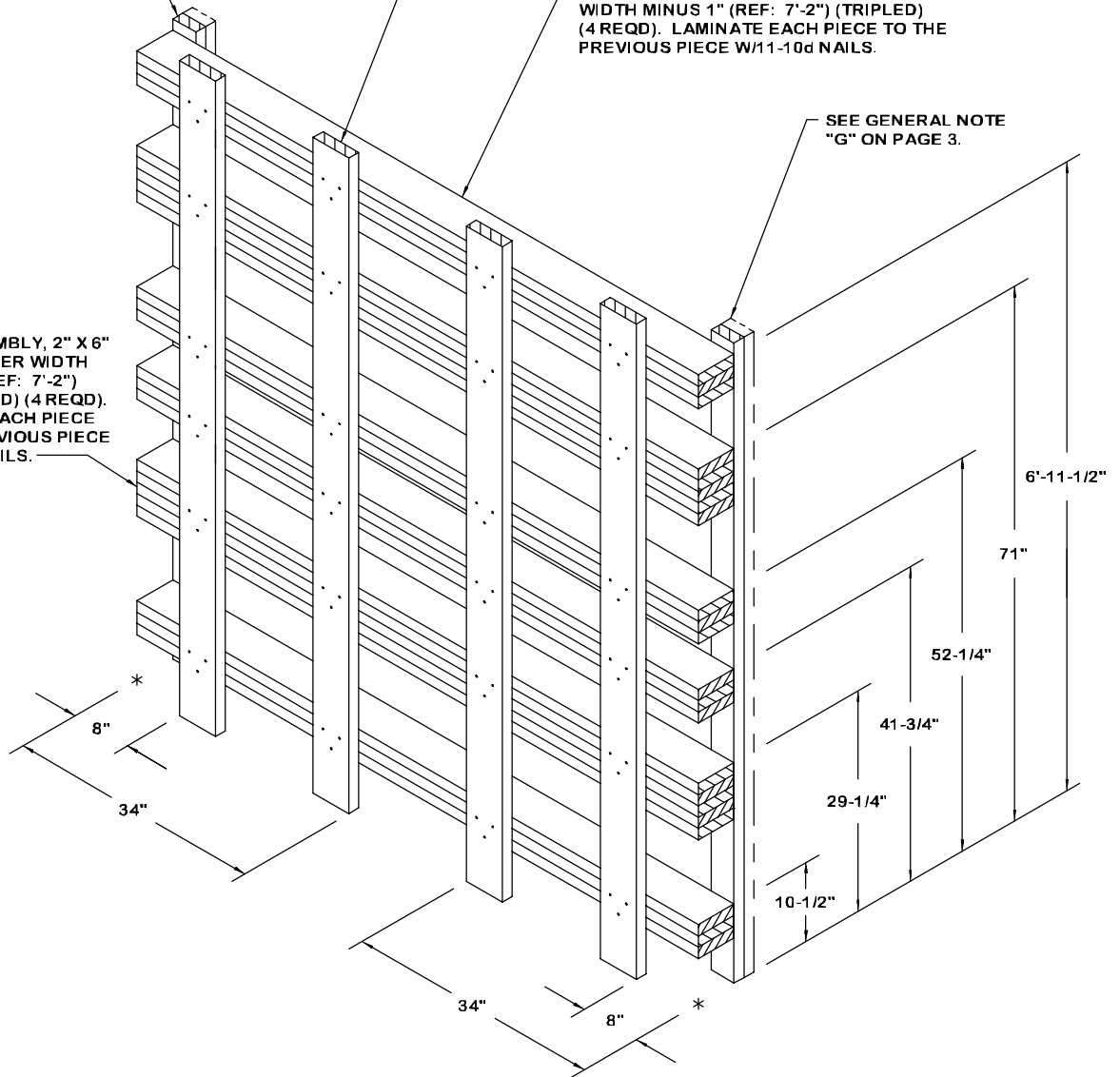
BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1") (2 REQD). NAIL TO THE BEAM ASSEMBLIES W/3-10d NAILS AT EACH JOINT.

LOAD BEARING PIECE, 2" X 6" BY CONTAINER HEIGHT MINUS 1" (REF: 7'-3") (4 REQD). NAIL TO THE BEAM ASSEMBLIES W/3-10d NAILS AT EACH JOINT.

BEAM ASSEMBLY, 2" X 6" BY CONTAINER WIDTH MINUS 1" (REF: 7'-2") (TRIPLED) (4 REQD). LAMINATE EACH PIECE TO THE PREVIOUS PIECE W/1-10d NAILS.

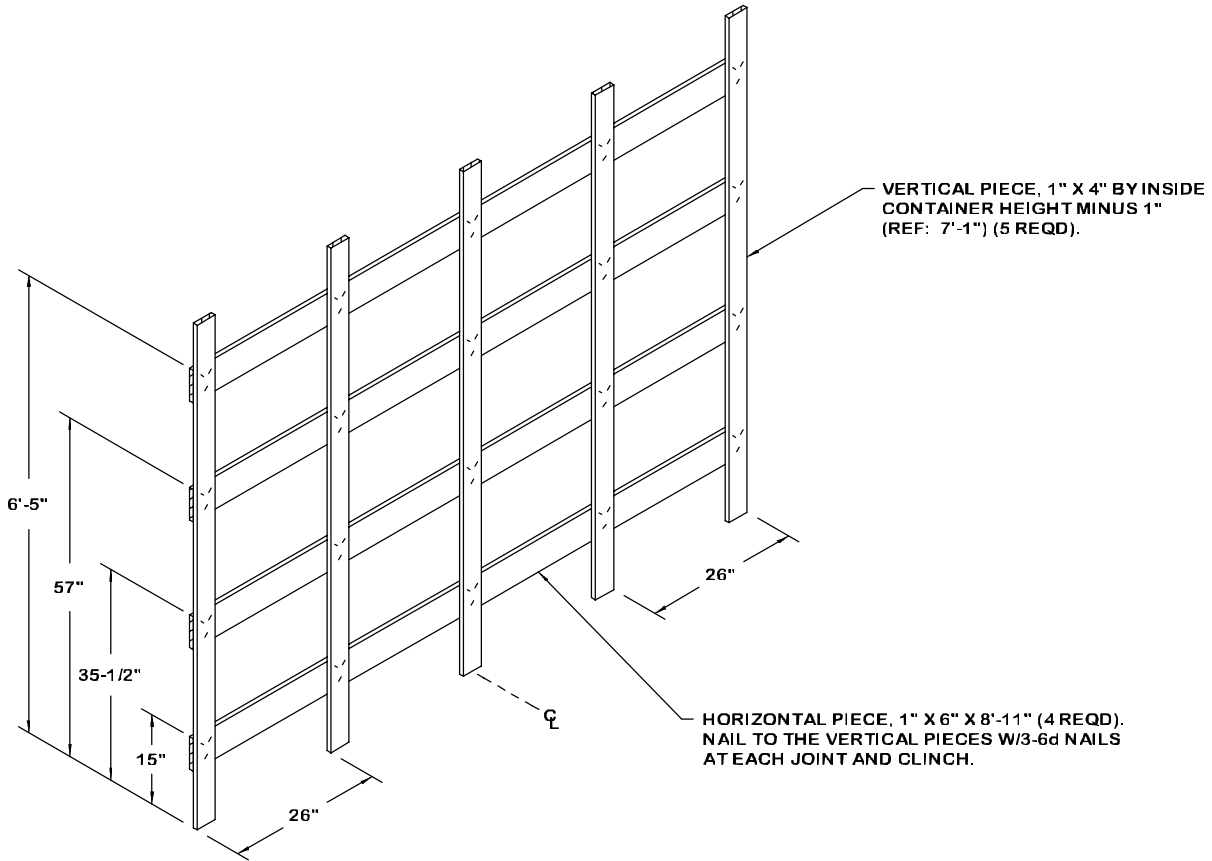
SEE GENERAL NOTE "G" ON PAGE 3.

BEAM ASSEMBLY, 2" X 6" BY CONTAINER WIDTH MINUS 1" (REF: 7'-2") (QUINTUPLED) (4 REQD). LAMINATE EACH PIECE TO THE PREVIOUS PIECE W/1-10d NAILS.



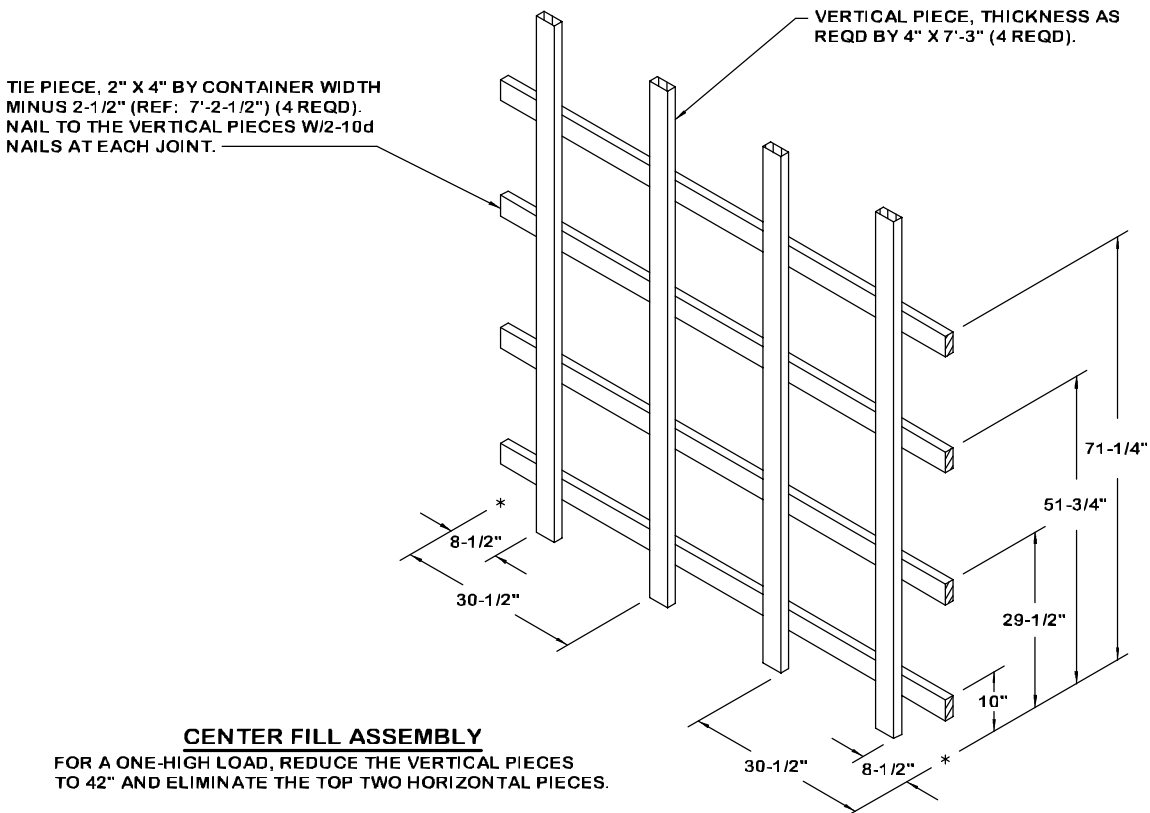
**END BLOCKING ASSEMBLY**

FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO TRIPLED BEAM ASSEMBLIES AND THE TOP QUINTUPLED BEAM ASSEMBLY. ALSO, SHORTEN THE LOAD BEARING PIECES TO 48\".



**SIDE FILL ASSEMBLY**

FOR A ONE-HIGH LOAD, REDUCE THE THREE CENTER VERTICAL PIECES TO 39" AND ELIMINATE THE TOP TWO HORIZONTAL PIECES.



**DETAILS**