

APPROVED BY  
BUREAU OF EXPLOSIVES

*Don - 12*

DATE 1-30-06

# LOADING AND BRACING\* IN SIDE OPENING ISO CONTAINERS OF 105MM CARTRIDGES PACKED IN CYLINDRICAL METAL CONTAINERS

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## PA117 SERIES CONTAINERS

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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  
FIELD SUPPORT COMMAND

**CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.**

**DO NOT SCALE**

**DECEMBER 2005**

*[Signature]*

ENGINEER OR TECHNICIAN	BASIC REV.	MELVIN SIX
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APPROVED BY ORDER OF COMMANDING GENERAL,  
U.S. ARMY MATERIEL COMMAND

TRANSPORTATION ENGINEERING DIVISION	<i>[Signature]</i>
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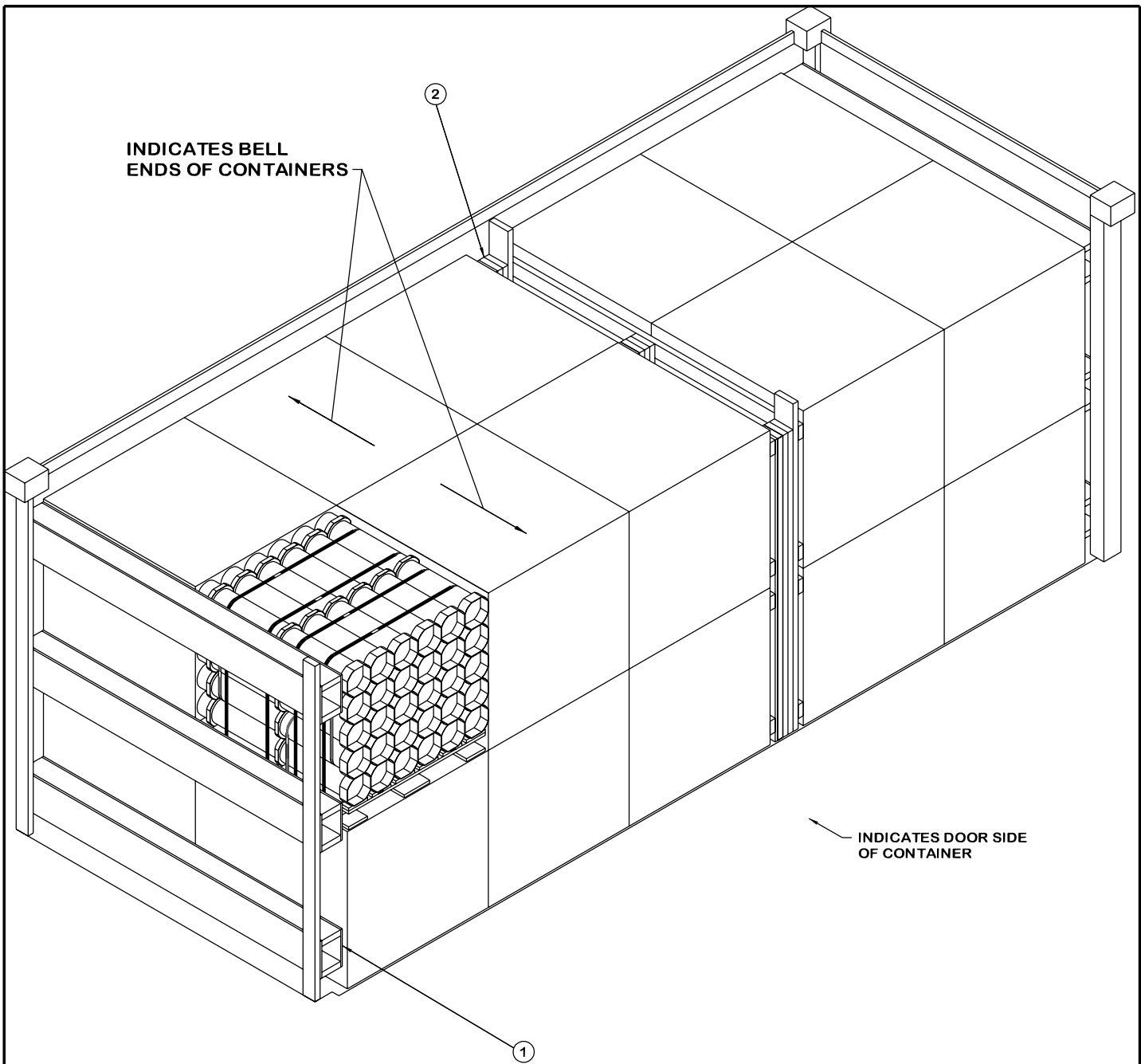
VALIDATION ENGINEERING DIVISION	<i>[Signature]</i>	TESTED
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CLASS	DIVISION	DRAWING	FILE
19	48	4265/9A	15PM1014

U.S. ARMY DEFENSE AMMUNITION CENTER

ENGINEERING DIRECTORATE	<i>[Signature]</i>
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PROJECT CA 278/9A-92



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 8.
- ② CENTER FILL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 7.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	20	10
2" X 4"	88	59
2" X 6"	164	164
NAILS	NO. REQD	POUNDS
6d (2")	288	1-3/4
10d (3")	168	2-3/4
PLYWOOD, 1/2"	68.08 SQ FT REQD	93.61 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	20	36,080 LBS
DUNNAGE		562 LBS
ISO CONTAINER		6,050 LBS
<b>TOTAL WEIGHT</b>		<b>42,692 LBS (APPROX)</b>

(GENERAL NOTES CONTINUED)

GENERAL NOTES

- 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 25.4MM AND ONE POUND EQUALS 0.454 KG.
- K. 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.
- L. 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 ST THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.
- M. 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.
- N. WHETHER A SIDE OPENING 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.
- O. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOADS ON PAGES 2 OR 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED.
- P. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN THE PALLET UNITS AND BETWEEN THE PALLET UNITS AND THE SIDE OPENING CONTAINER.

- 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 PALLETIZED LOADS OF 105MM CONTAINERS PACKAGED IN A PA117 CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS PALLET UNIT WITH CONTAINERS. SEE PAGE 4 FOR DETAILS OF THE PALLET UNITS. SEE U. S. ARMY MATERIEL COMMAND DRAWING 19-48-4079/8A-20PM1002 FOR UNITIZATION PROCEDURES FOR THE COMPLETE ROUND PACKAGED IN PA117 CONTAINERS. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE SIDE OPENING ISO CONTAINER MUST NOT BE EXCEEDED.

THE LOADS AS SHOWN ARE BASED ON A 6,050 POUND 20' LONG BY 8' 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 PLACING PLYWOOD BETWEEN THE PALLET UNITS AND/OR ALONG WALLS.

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.

IN SOME ISO CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE ENDWALLS. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE END BLOCKING ASSEMBLIES 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. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.

(CONTINUED AT LEFT)

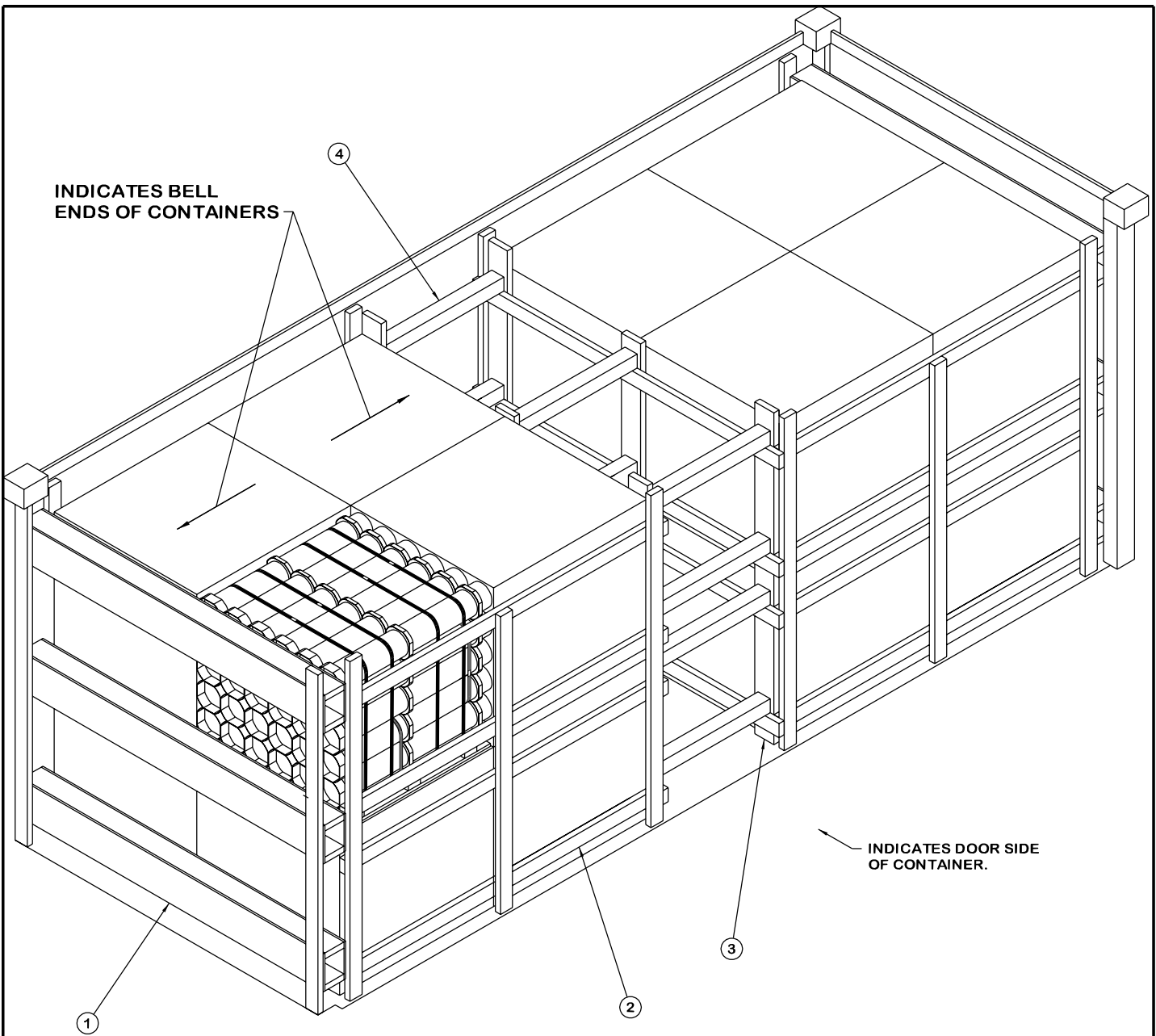
MATERIAL SPECIFICATIONS

LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.

NAILS - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMS).

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

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.



**ISOMETRIC VIEW**

**KEY NUMBERS**

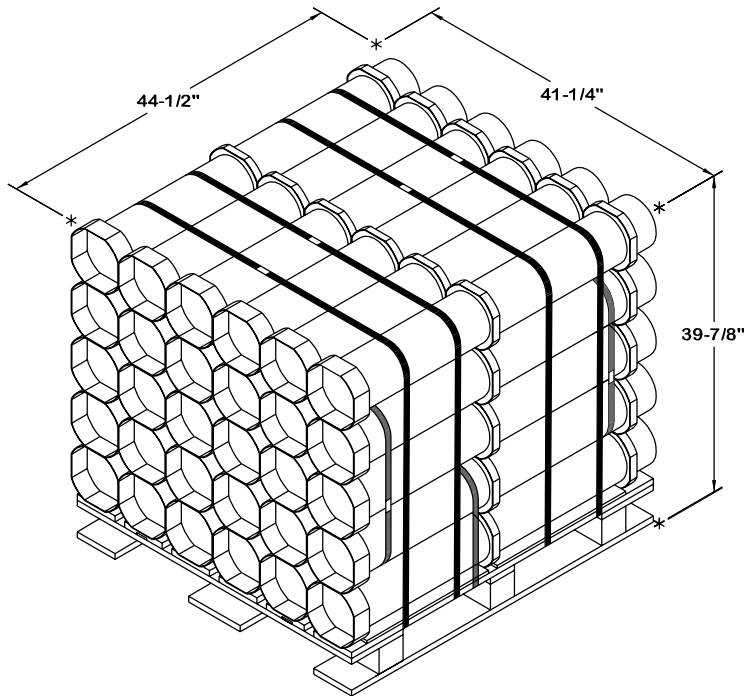
- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 8.
- ② SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 6.
- ③ CENTER GATE (2 REQD). SEE THE DETAIL ON PAGE 6.
- ④ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 35") (12 REQD). TOENAIL TO CENTER GATES W/2-16d NAILS AT EACH END. SEE BEVEL-CUT DETAIL ON PAGE 8.

**LOAD AS SHOWN**

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	207	138
2" X 6"	215	215
4" X 4"	35	47
NAILS	NO. REQD	POUNDS
6d (2")	264	1-3/4
10d (3")	232	3-3/4
12d (3-1/4")	48	1
PLYWOOD, 1/2"	68.08 SQ FT REQD	93.61 LBS

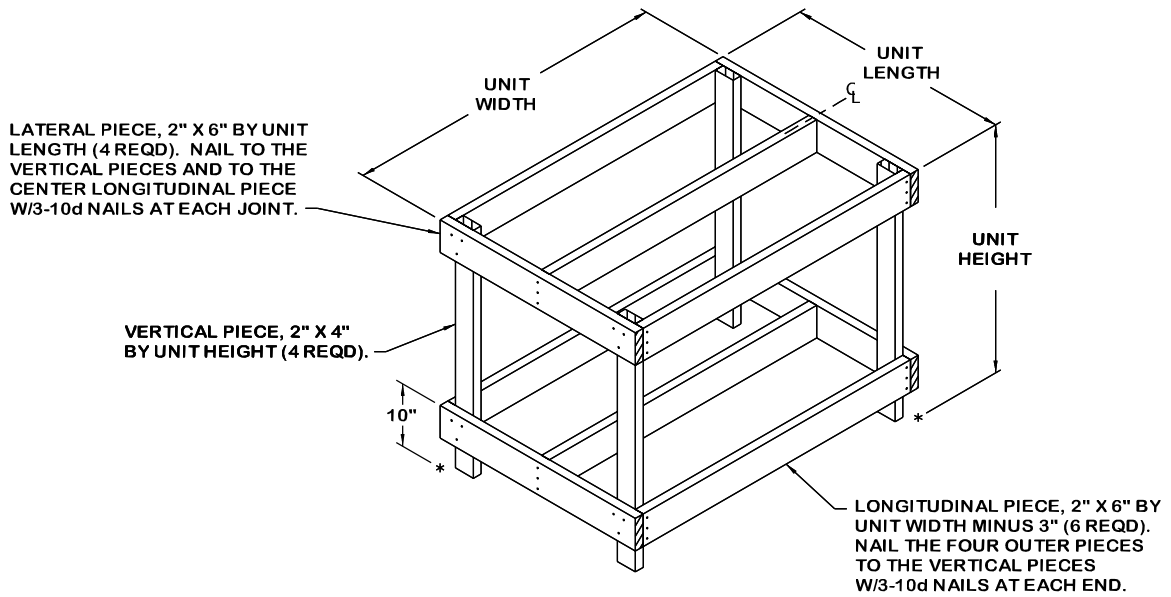
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT - - - - -	16	28,864 LBS
DUNNAGE - - - - -		898 LBS
ISO CONTAINER - - - - -		6,050 LBS

TOTAL WEIGHT - - - - - 35,812 LBS (APPROX)



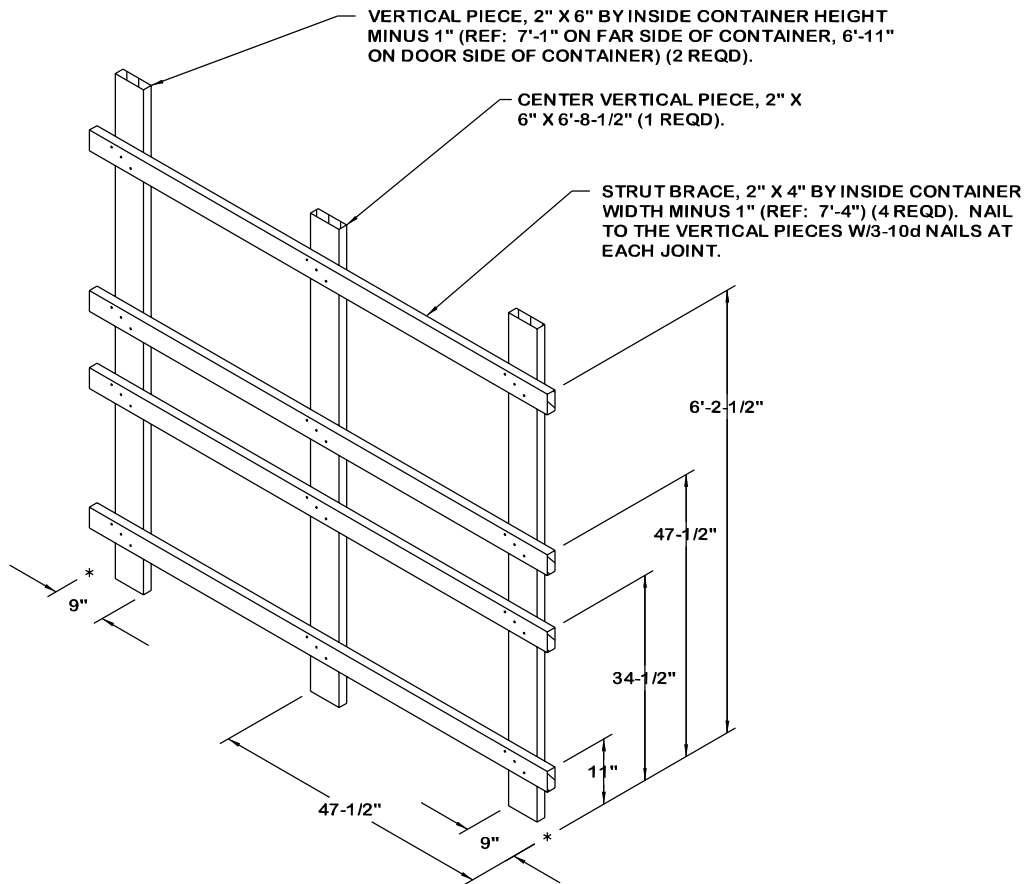
**PALLET UNIT**

GROSS WEIGHT - - - - - 1,804 LBS (APPROX)  
 CUBE - - - - - 42.4 CU FT (APPROX)



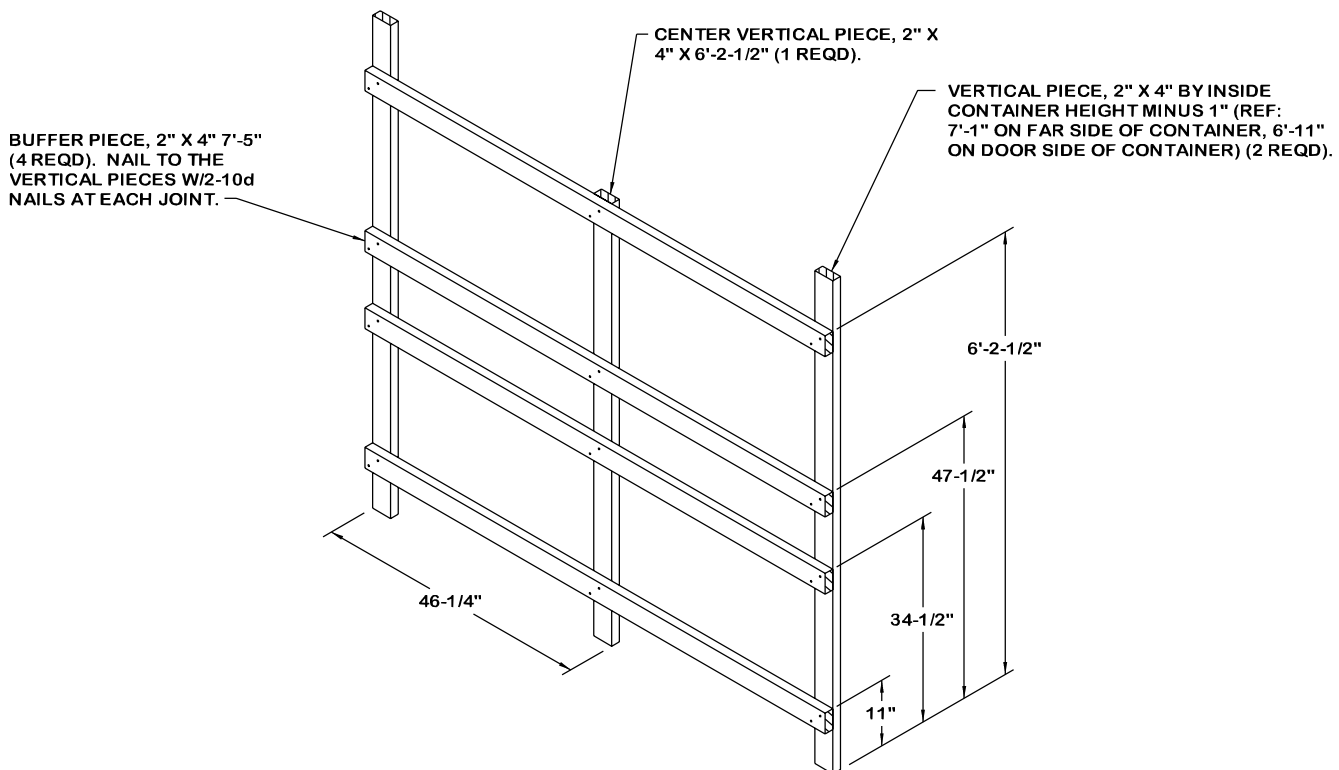
**OMITTED UNIT ASSEMBLY**

THIS ASSEMBLY IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT. NO MORE THAN THREE OMITTED UNIT ASSEMBLIES MAY BE USED PER LOAD. DO NOT INSTALL AN OMITTED UNIT ASSEMBLY IMMEDIATELY ADJACENT TO ANOTHER OMITTED UNIT ASSEMBLY.



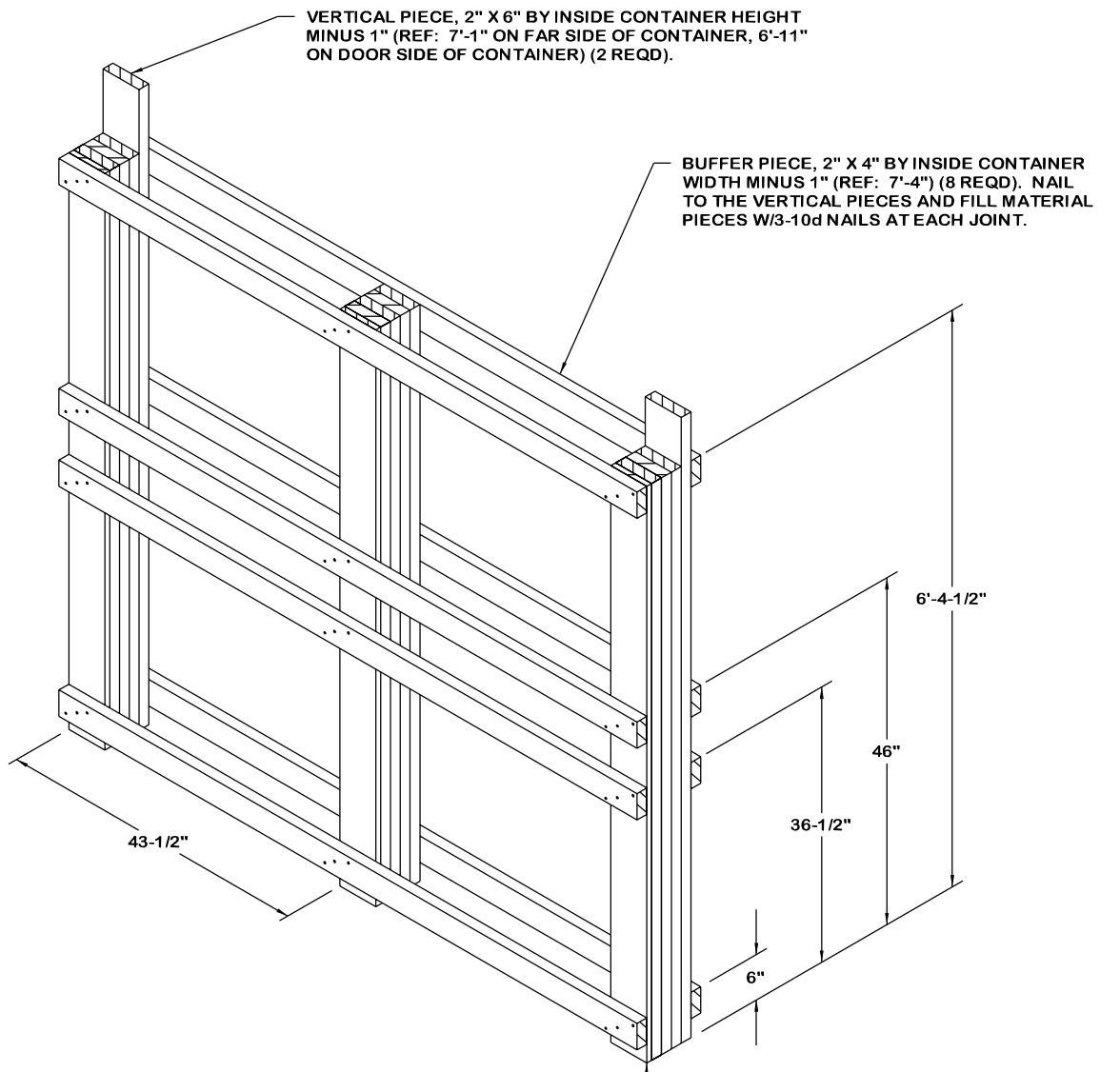
**CENTER GATE**

NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO STRUT BRACES AND REDUCE THE HEIGHT OF THE CENTER VERTICAL PIECES TO 41".



**SIDE FILL ASSEMBLY**

NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO STRUT BRACES AND REDUCE THE HEIGHT OF THE CENTER VERTICAL PIECE TO 34-1/2".



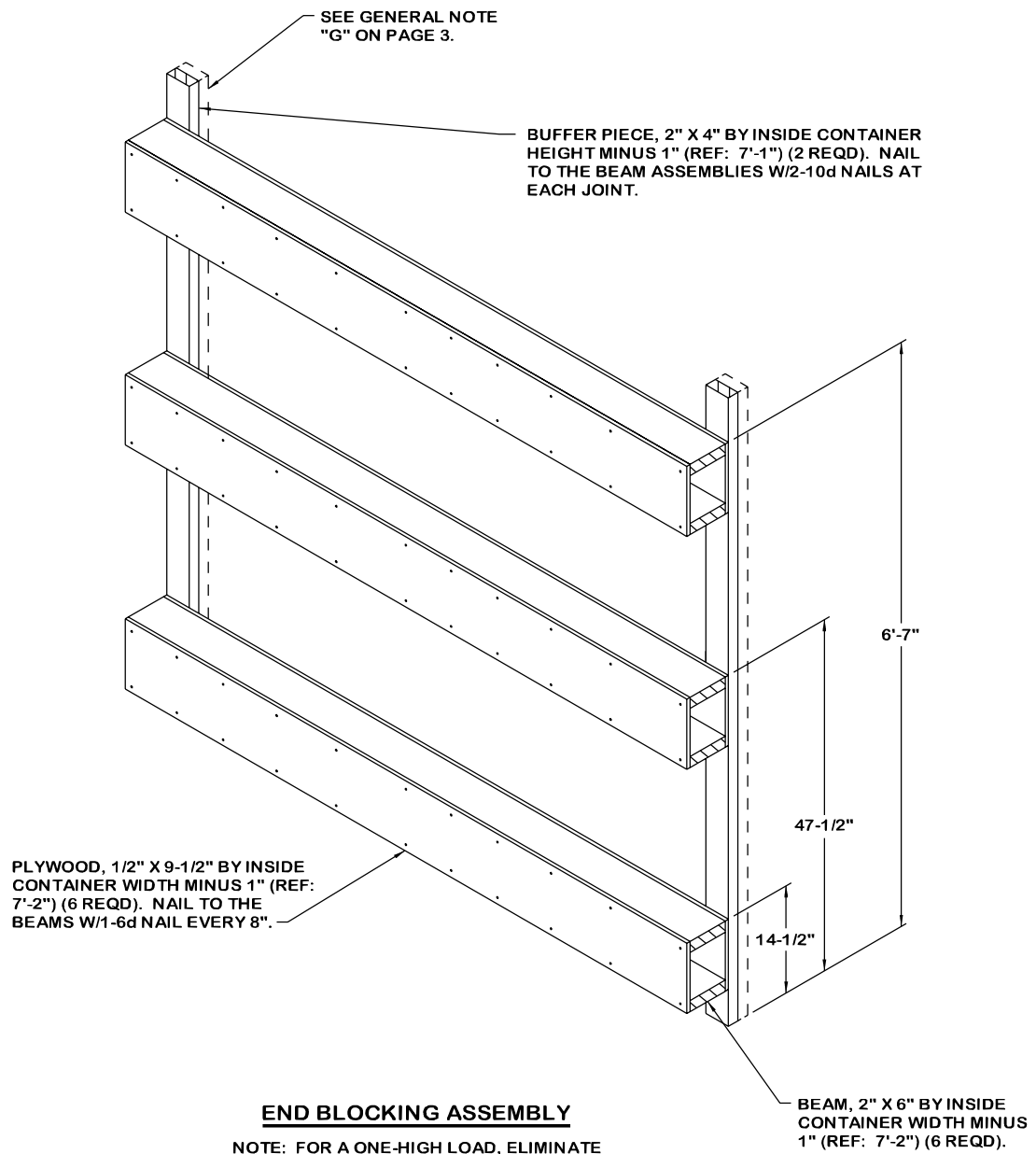
VERTICAL PIECE, 2" X 6" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1" ON FAR SIDE OF CONTAINER, 6'-11" ON DOOR SIDE OF CONTAINER) (2 REQD).

BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-4") (8 REQD). NAIL TO THE VERTICAL PIECES AND FILL MATERIAL PIECES W/3-10d NAILS AT EACH JOINT.

**CENTER FILL ASSEMBLY**

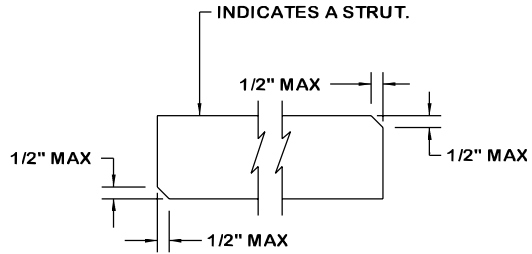
NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP FOUR BUFFER PIECES AND REDUCE THE HEIGHT OF THE CENTER VERTICAL PIECES TO 36-1/2".

FILL MATERIAL PIECE, 1" OR 2" MATERIAL X 6" X 6'-4-1/2" (AS REQD). LAMINATE TO PREVIOUS FILL MATERIAL PIECE W/1-6d NAIL EVERY 8" FOR 1" MATERIAL OR W/1-10d NAIL EVERY 8" FOR 2" MATERIAL. LAMINATE ENOUGH FILL MATERIAL PIECE TOGETHER TO ALLOW SOLID FILL ASSEMBLY TO FILL SPACE BETWEEN PALLET UNITS.



**END BLOCKING ASSEMBLY**

NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP BEAM ASSEMBLY AND LOWER THE CENTER BEAM ASSEMBLY TO 39".



**BEVEL-CUT**

BEVEL CUTTING THE STRUTS AS SPECIFIED WILL FACILITATE INSTALLING THE STRUTS WITH A "DRIVE FIT". CAUTION: DO NOT BEVEL A CORNER MORE THAN 1/2".