

APPROVED BY
BUREAU OF EXPLOSIVES

O. H. Hays

DATE 11-10-96

LOADING AND BRACING IN SIDE OPENING ISO CONTAINERS OF PROPELLING CHARGES PACKED IN CYLINDRICAL METAL CONTAINERS

PA106 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 INDUSTRIAL OPERATIONS COMMAND	DRAFTSMAN	TECHNICIAN	ENGINEER
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U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL	OCTOBER 1996		
	CLASS	DIVISION	DRAWING
	19	48	4264/ 23
			FILE
			15PM1003

DO NOT SCALE

GENERAL NOTES

(GENERAL NOTES CONTINUED)

- 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 PROPELLING CHARGES PACKED IN PA106 SERIES CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 3 AND AMC DRAWING 19-48-4042A/23-20PM1001 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 THE 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 CRIB FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE VERTICAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND QUANTITY OF THE DUNNAGE LUMBER USED IN THE CRIB FILL ASSEMBLY MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE PALLET UNIT.
- 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 END 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.
- 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.

(CONTINUED AT RIGHT)

L. MAXIMUM LOAD WEIGHT CRITERIA:

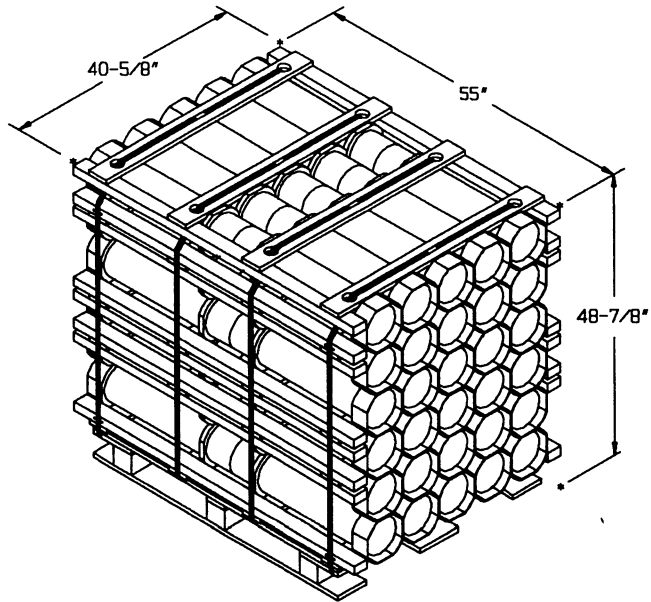
THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION 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 LOADS ON PAGE 4 AND 8 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE OMITTED UNIT ASSEMBLY ON PAGE 12.

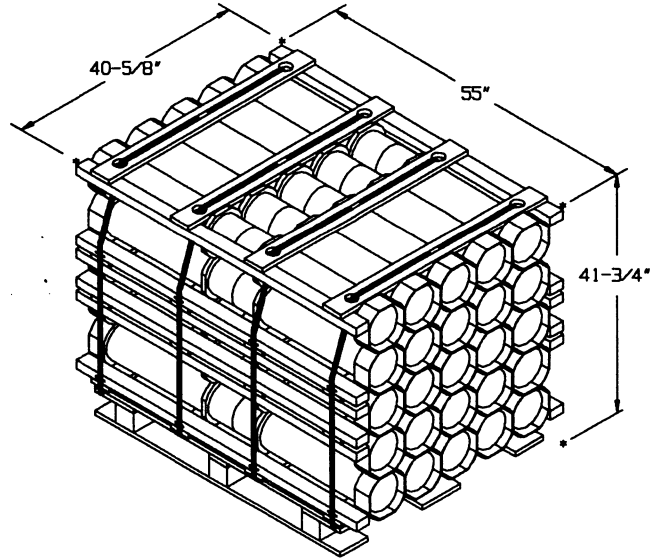
MATERIAL SPECIFICATIONS

- 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.



PALLET UNIT - 6 LAYERS

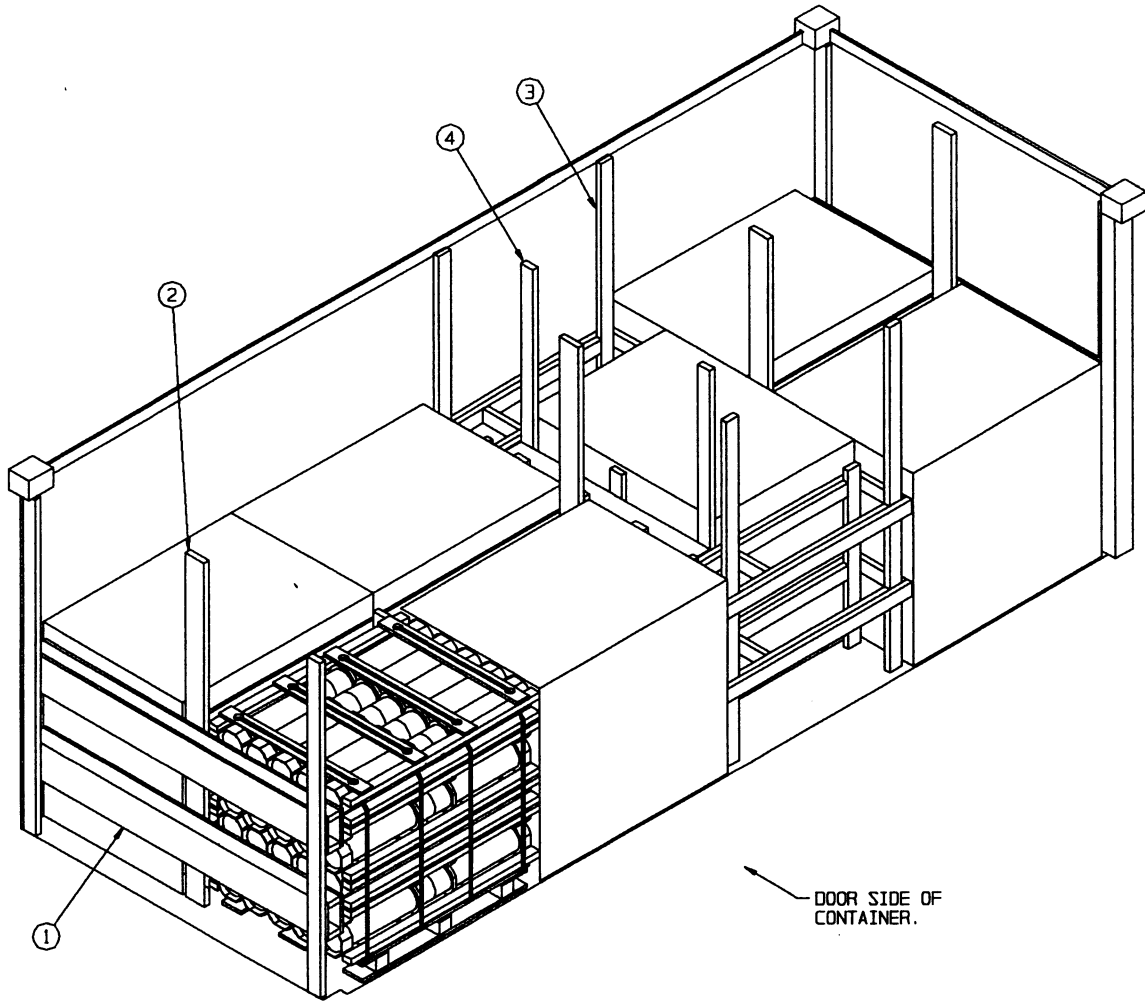
UNIT WEIGHT - - - - - 2,006 POUNDS (APPROX)
 CUBE - - - - - 63.2 CUBIC FEET



PALLET UNIT - 5 LAYERS

UNIT WEIGHT - - - - - 1,672 POUNDS (APPROX)
 CUBE - - - - - 54.0 CUBIC FEET

PALLET UNIT DETAILS



KEY NUMBERS

- ① END BLOCKING ASSEMBLY A (2 REQD). SEE THE DETAIL ON PAGE 6.
- ② CRIB FILL ASSEMBLY A (2-REQD, 1 TWO UNITS LONG, 1 ONE-UNIT LONG). SEE THE DETAIL ON PAGE 6.
- ③ FILLER ASSEMBLY A (2 REQD). SEE THE DETAIL ON PAGE 7.
- ④ CENTER FILL ASSEMBLY A (1 REQD). SEE THE DETAIL ON PAGE 7.

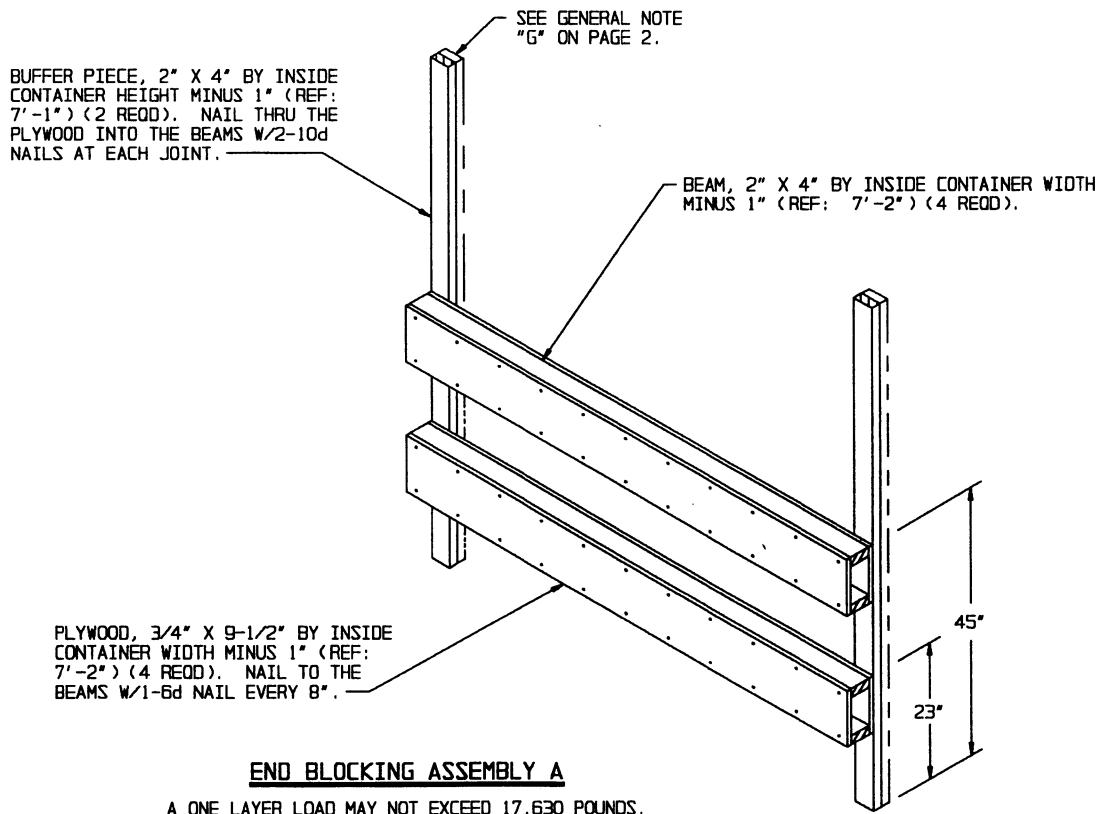
RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PRE-FABRICATE TWO END BLOCKING ASSEMBLIES A, TWO FILLER ASSEMBLIES A, AND TWO CRIB FILL ASSEMBLIES A (ONE TWO-UNITS LONG AND ONE ONE-UNIT LONG). ONE CENTER FILL ASSEMBLY A 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 A.
3. LOAD TWO PALLET UNITS AND INSTALL ONE CRIB FILL ASSEMBLY A (ONE-UNIT LONG).
4. REPEAT STEP 2.
5. LOAD FOUR PALLET UNITS AND INSTALL ONE CRIB FILL ASSEMBLY A (TWO-UNITS LONG).
6. INSTALL ONE FILLER ASSEMBLY A.
7. LOAD ONE PALLET UNIT.
8. MEASURE THE VOID BETWEEN THE PALLET UNITS AT THE CENTER OF THE CONTAINER AND COMPLETE THE ASSEMBLY AND INSTALLATION OF THE CENTER FILL ASSEMBLY A.
9. INSTALL THE REMAINING FILLER ASSEMBLY A.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	41	14
2" X 4"	269	180
2" X 6"	33	33
2" X 10"	10	17
NAILS	NO. REQD	POUNDS
6d (2")	211	1-1/4
10d (3")	204	3-1/4
16d (3-1/2")	16	1/2
PLYWOOD, 3/4"	46 SQ FT REQD	93-3/4 LBS

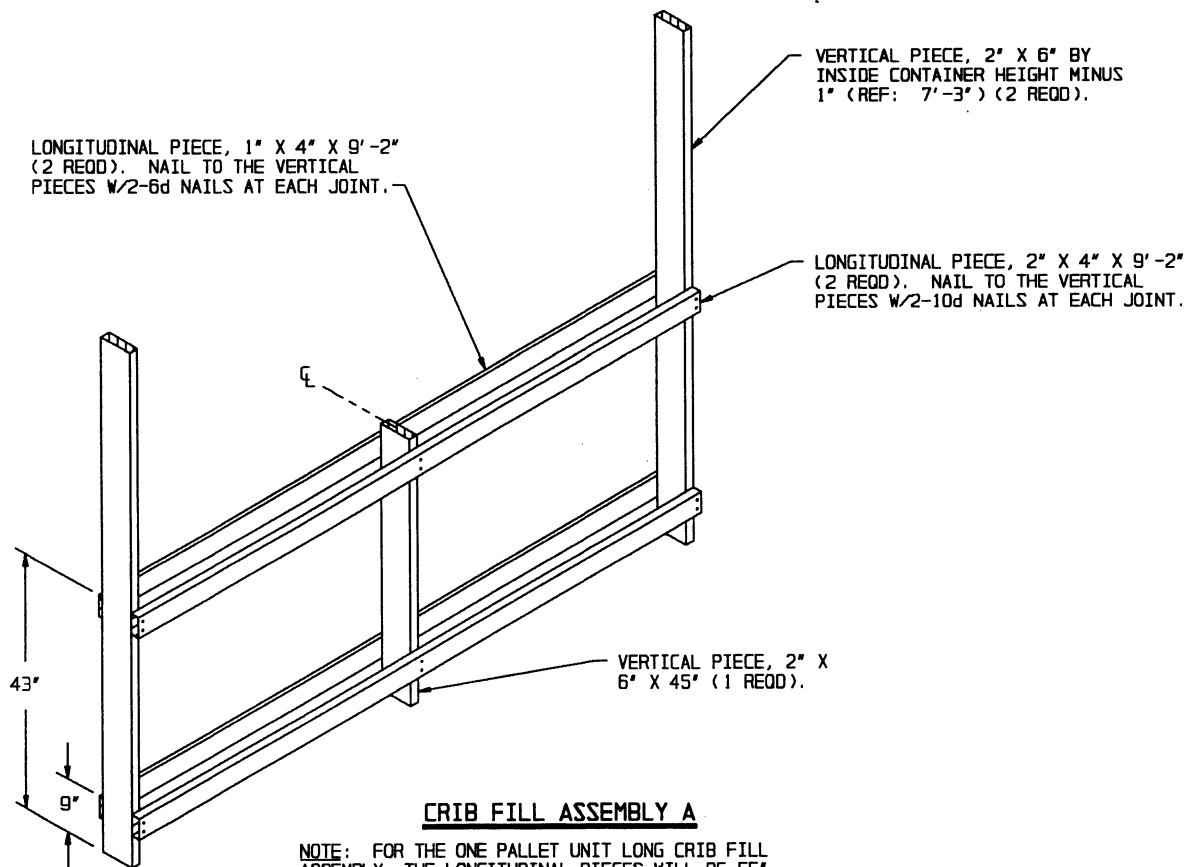
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	7	14,042 LBS
DUNNAGE		587 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		20,679 LBS (APPROX)



END BLOCKING ASSEMBLY A

A ONE LAYER LOAD MAY NOT EXCEED 17,630 POUNDS.



CRIB FILL ASSEMBLY A

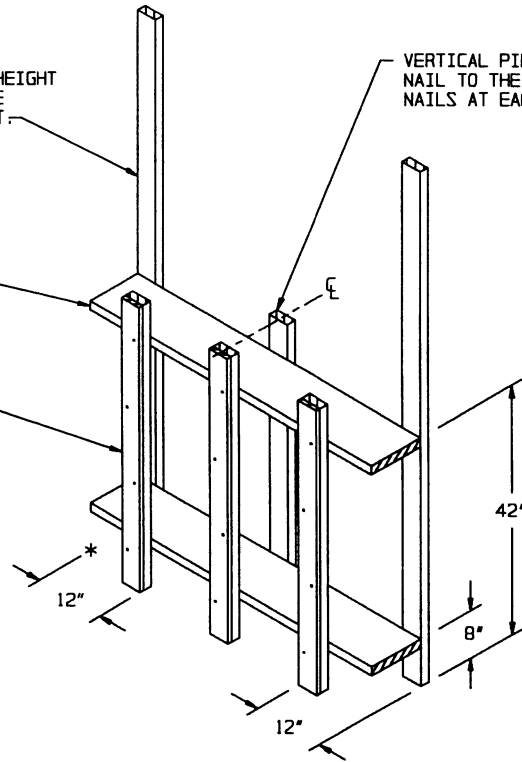
NOTE: FOR THE ONE PALLET UNIT LONG CRIB FILL ASSEMBLY, THE LONGITUDINAL PIECES WILL BE 55" AND THE SHORTER VERTICAL PIECE WILL BE ELIMINATED.

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

VERTICAL PIECE, 2" X 4" X 48" (AS REQD). NAIL TO THE HORIZONTAL PIECES W/2-10d NAILS AT EACH JOINT.

HORIZONTAL PIECE, 2" X 10" X 48" (2 REQD).

FILL MATERIAL, 1" X 4" OR 2" X 4" X 48" (AS REQD). NAIL TO THE VERTICAL PIECES W/1 APPLICABLY SIZED NAIL EVERY 12".



CENTER FILL ASSEMBLY A

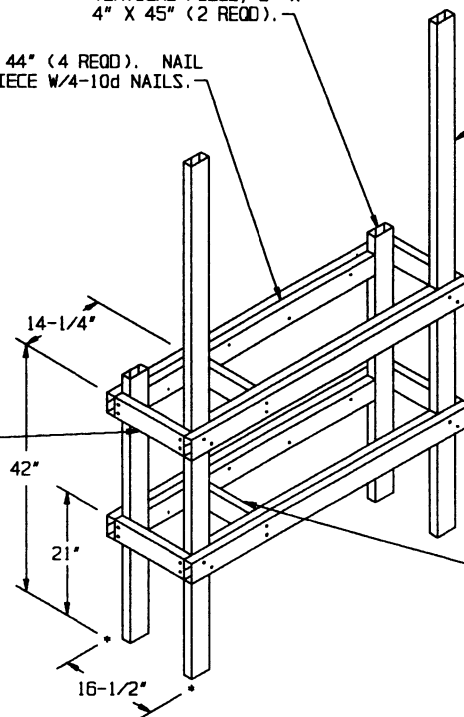
VERTICAL PIECE, 2" X 4" X 45" (2 REQD).

FILL PIECE, 2" X 4" X 44" (4 REQD). NAIL TO THE LONGITUDINAL PIECE W/4-10d NAILS.

VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-3") (2 REQD).

LONGITUDINAL PIECE, 2" X 4" X 54" (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT. NAIL TO THE SUPPORT PIECES W/2-16d NAILS AT EACH JOINT.

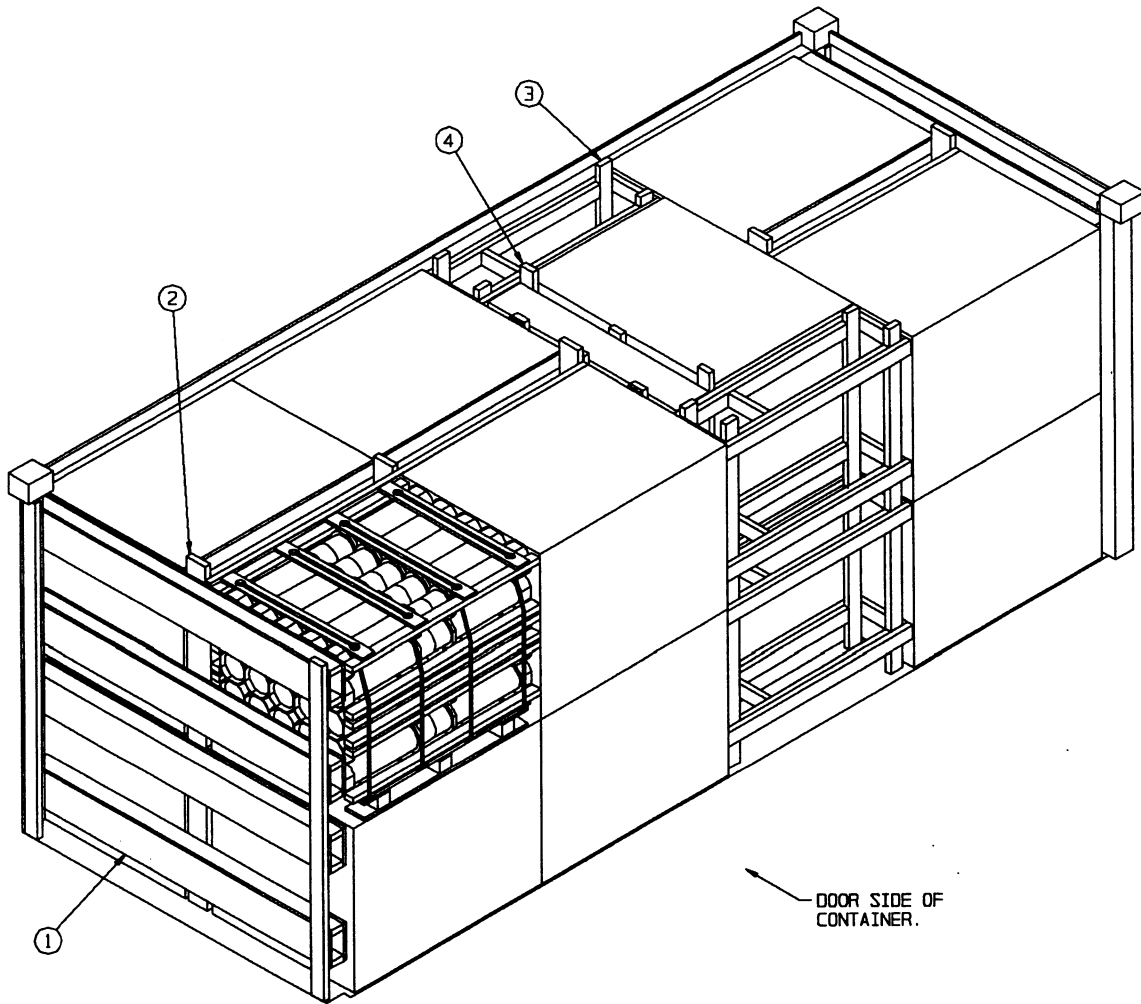
LATERAL PIECE, 2" X 4" X 13-1/2" (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END, AS APPLICABLE.



SUPPORT PIECE, 2" X 4" X 10-1/2" (2 REQD).

FILLER ASSEMBLY A

A "RIGHT-HAND" FILLER ASSEMBLY IS DEPICTED ABOVE.
A "LEFT HAND" ASSEMBLY IS ALSO REQUIRED.



KEY NUMBERS

- ① END BLOCKING ASSEMBLY B (2 REOD). SEE THE DETAIL ON PAGE 10.
- ② CRIB FILL ASSEMBLY B (2 REOD, 1 TWO-UNITS LONG, 1 ONE-UNIT LONG). SEE THE DETAIL ON PAGE 10.
- ③ FILLER ASSEMBLY B (2 REOD). SEE THE DETAIL ON PAGE 11.
- ④ CENTER FILL ASSEMBLY B (1 REOD). SEE THE DETAIL ON PAGE 11.

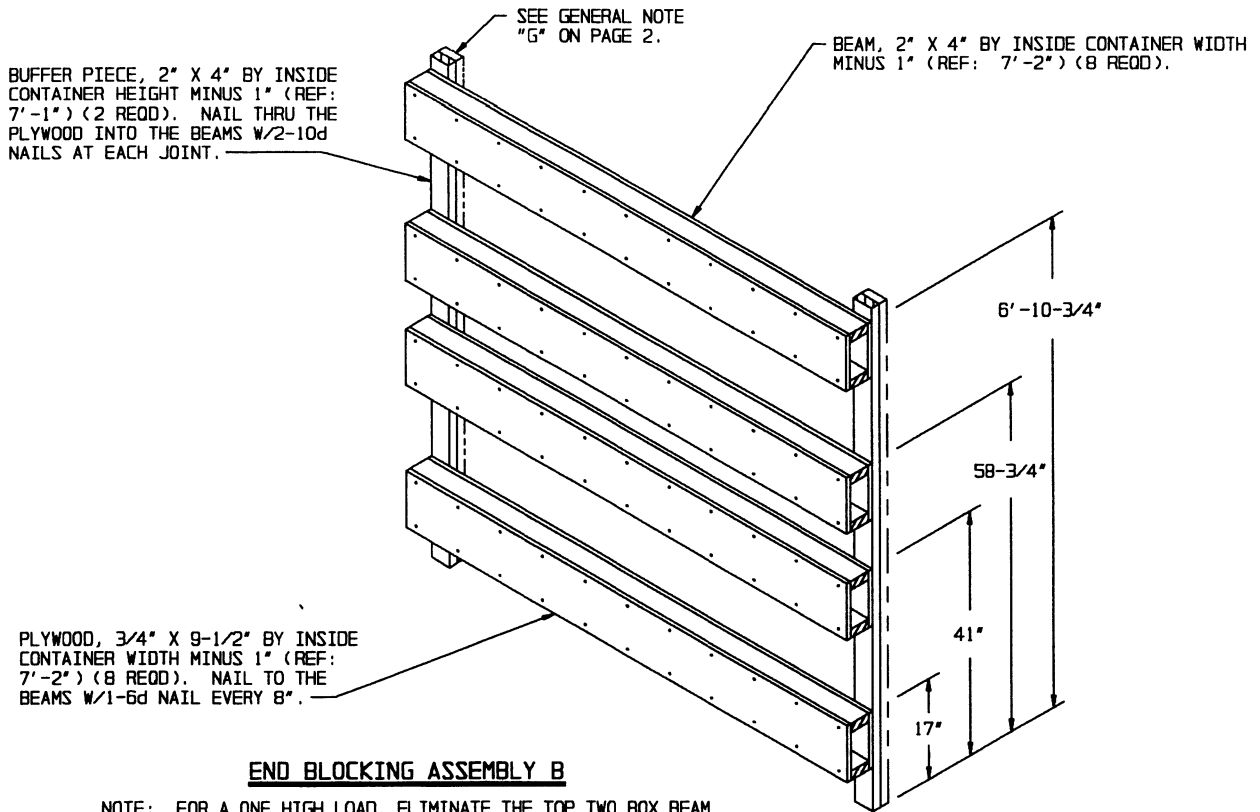
RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PRE-FABRICATE TWO END BLOCKING ASSEMBLIES B, TWO FILLER ASSEMBLIES B, AND TWO CRIB FILL ASSEMBLIES B (ONE TWO-UNITS LONG AND ONE ONE-UNIT LONG). ONE CENTER FILL ASSEMBLY B 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 B.
3. LOAD FOUR PALLET UNITS AND INSTALL ONE CRIB FILL ASSEMBLY B (ONE-UNIT LONG).
4. REPEAT STEP 2.
5. LOAD EIGHT PALLET UNITS AND INSTALL ONE CRIB FILL ASSEMBLY B (TWO-UNITS LONG).
6. INSTALL ONE FILLER ASSEMBLY B.
7. LOAD TWO PALLET UNITS.
8. MEASURE THE VOID BETWEEN THE PALLET UNITS AT THE CENTER OF THE CONTAINER AND COMPLETE THE ASSEMBLY AND INSTALLATION OF THE CENTER FILL ASSEMBLY B.
9. INSTALL THE REMAINING FILLER ASSEMBLY B.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	77	26
2" X 4"	456	304
2" X 6"	37	37
2" X 10"	19	32
NAILS	NO. REQD	POUNDS
6d (2")	416	2-1/2
10d (3")	376	6
16d (3-1/2")	32	3/4
PLYWOOD, 3/4"	91 SQ FT REQD	187-1/4 LBS

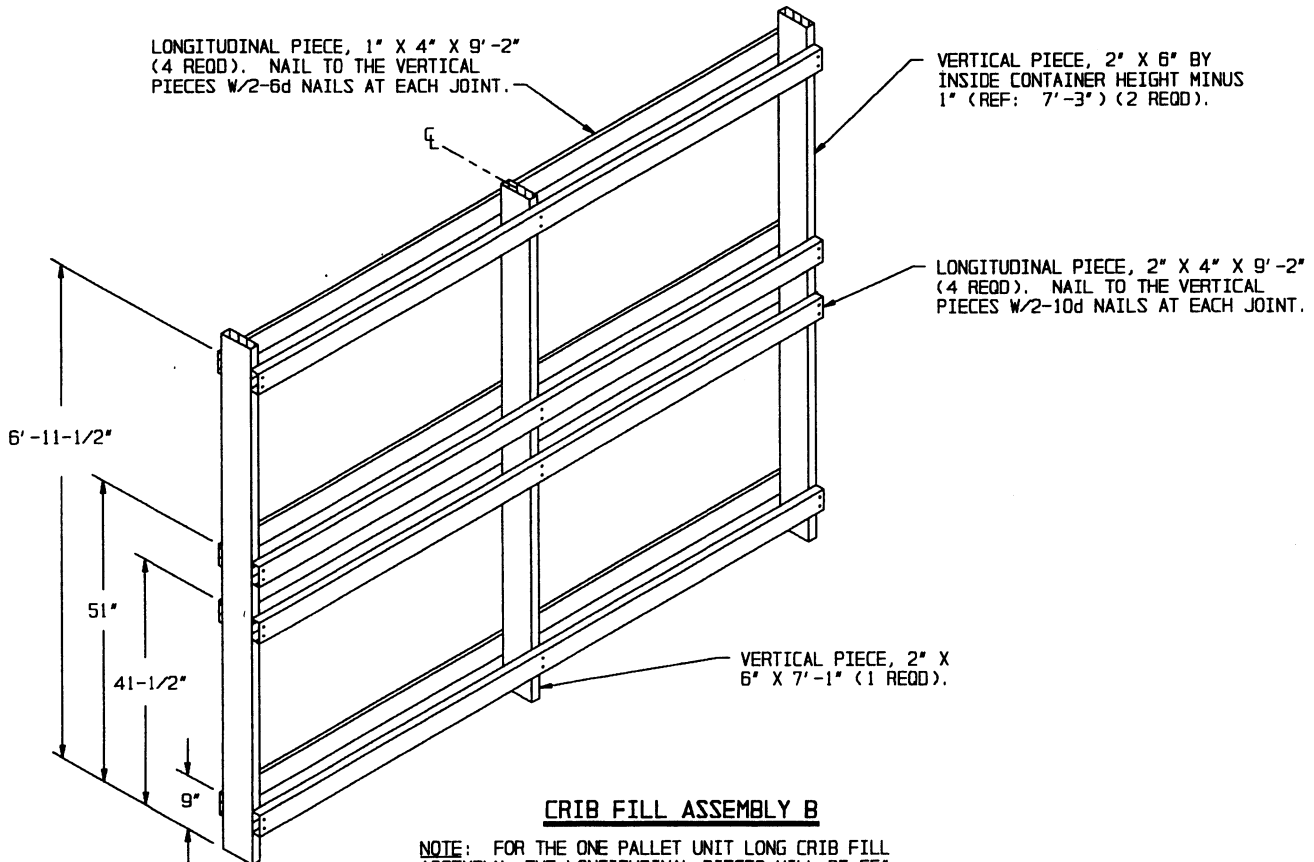
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	14	23,408 LBS
DUNNAGE		995 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		30,453 LBS (APPROX)



END BLOCKING ASSEMBLY B

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO BOX BEAM ASSEMBLIES. A TWO LAYER LOAD MAY NOT EXCEED 35,260 POUNDS AND A ONE LAYER LOAD MAY NOT EXCEED 17,630 POUNDS.



CRIB FILL ASSEMBLY B

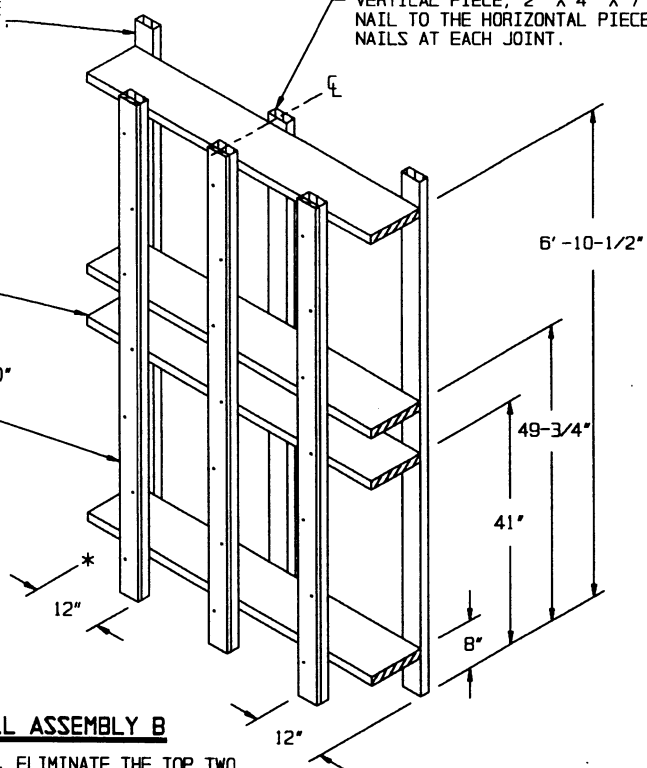
NOTE: FOR THE ONE PALLET UNIT LONG CRIB FILL ASSEMBLY, THE LONGITUDINAL PIECES WILL BE 55" AND THE SHORTER VERTICAL PIECE WILL BE ELIMINATED.

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

VERTICAL PIECE, 2" X 4" X 7'-0" (AS REOD). NAIL TO THE HORIZONTAL PIECES W/2-10d NAILS AT EACH JOINT.

HORIZONTAL PIECE, 2" X 10" X 48" (4 REOD).

FILL MATERIAL, 1" X 4" OR 2" X 4" X 7'-0" (AS REOD). NAIL TO THE VERTICAL PIECES W/1 APPLICABLY SIZED NAIL EVERY 12".



CENTER FILL ASSEMBLY B

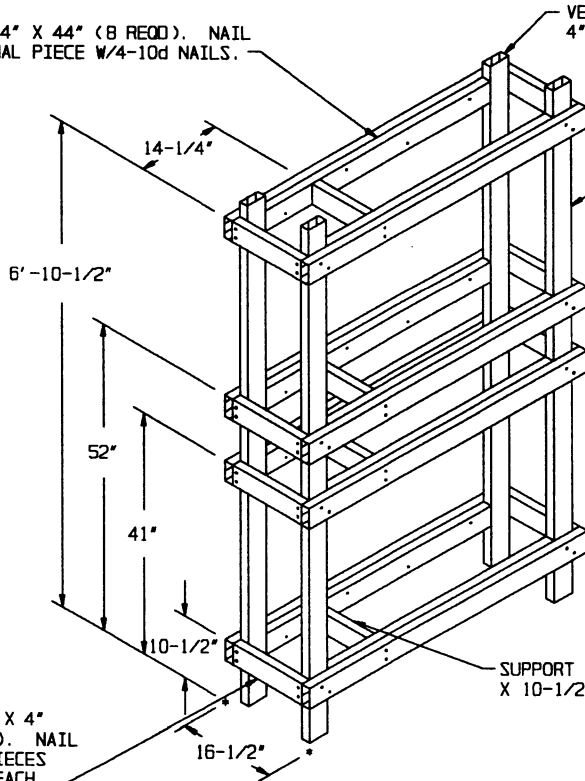
FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND REDUCE THE HEIGHT OF THE SHORTER VERTICAL PIECES TO 44".

FILL PIECE, 2" X 4" X 44" (8 REOD). NAIL TO THE LONGITUDINAL PIECE W/4-10d NAILS.

VERTICAL PIECE, 2" X 4" X 7'-1" (2 REOD).

VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-3") (2 REOD).

LONGITUDINAL PIECE, 2" X 4" X 54" (8 REOD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT. NAIL TO THE SUPPORT PIECES W/2-16d NAILS AT EACH JOINT.



LATERAL PIECE, 2" X 4" X 13-1/2" (12 REOD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END, AS APPLICABLE.

SUPPORT PIECE, 2" X 4" X 10-1/2" (4 REOD).

FILLER ASSEMBLY B

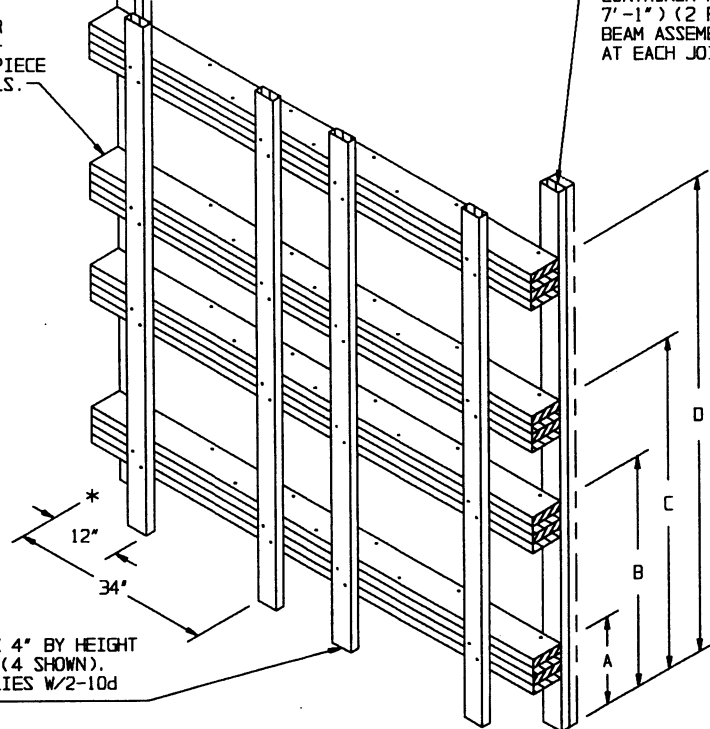
A "RIGHT-HAND" FILLER ASSEMBLY IS DEPICTED ABOVE. A "LEFT HAND" ASSEMBLY IS ALSO REQUIRED. FOR A ONE HIGH LOAD, ELIMINATE THE TOP FOUR LONGITUDINAL PIECES, THE TOP FOUR INTERIOR FILL PIECES, THE TOP FOUR LATERAL PIECES, AND AND THE TOP TWO SUPPORT PIECES. REDUCE THE SHORT VERTICAL PIECES TO 44".

BEAM ASSEMBLY, 2" X 4" BY CONTAINER WIDTH MINUS 1" (REF: 7'-2") (QUADRUPLER) (4 SHOWN). LAMINATE EACH PIECE TO THE PREVIOUS PIECE W/11-10d NAILS.

SEE GENERAL NOTE "G" ON PAGE 2.

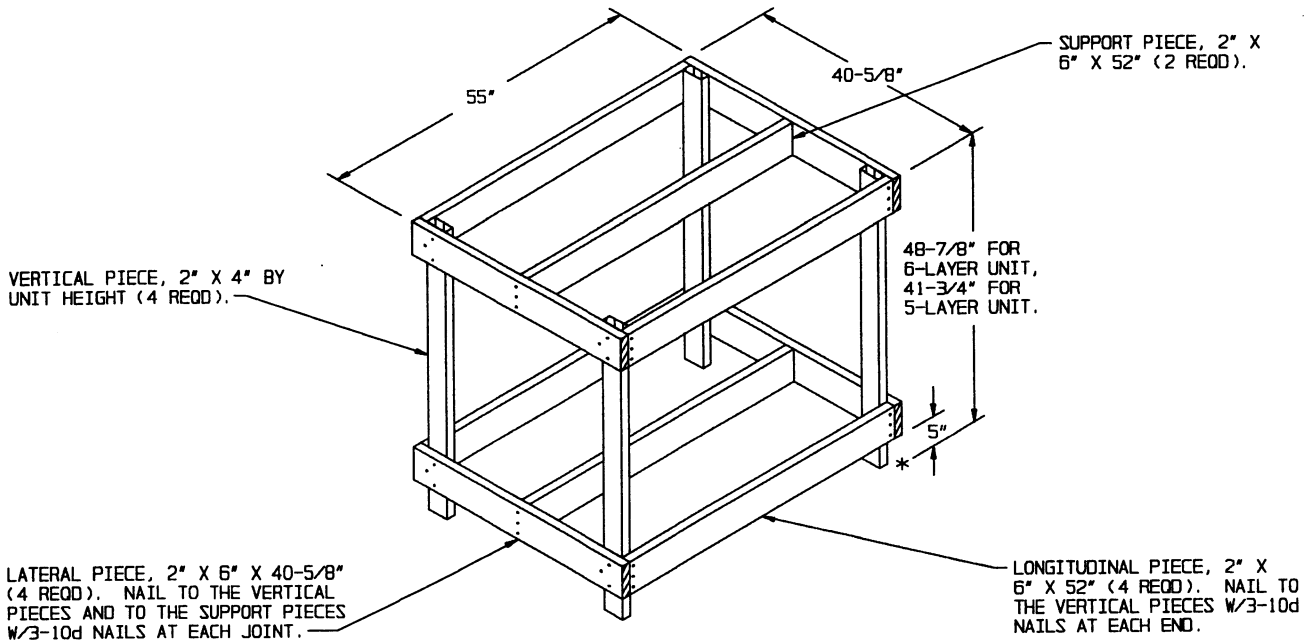
BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1") (2 REQD). NAIL TO THE BEAM ASSEMBLIES W/2-10d NAILS AT EACH JOINT.

END BLOCKING CHART		
DIM	6-LAYER	5-LAYER
A	15"	15"
B	41"	39"
C	-	56"
D	-	6'-7"



LOAD BEARING PIECE, 2" X 4" BY HEIGHT OF THE TOP BEAM PLUS 6" (4 SHOWN). NAIL TO THE BEAM ASSEMBLIES W/2-10d NAILS AT EACH JOINT.

ALTERNATIVE END BLOCKING ASSEMBLY



VERTICAL PIECE, 2" X 4" BY UNIT HEIGHT (4 REQD).

SUPPORT PIECE, 2" X 6" X 52" (2 REQD).

48-7/8" FOR 6-LAYER UNIT, 41-3/4" FOR 5-LAYER UNIT.

LATERAL PIECE, 2" X 6" X 40-5/8" (4 REQD). NAIL TO THE VERTICAL PIECES AND TO THE SUPPORT PIECES W/3-10d NAILS AT EACH JOINT.

LONGITUDINAL PIECE, 2" X 6" X 52" (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.

OMITTED UNIT ASSEMBLY

THE ASSEMBLY AS DEPICTED ABOVE IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT, AND WILL BE REQUIRED TO PROVIDE A TWO-WIDE LOADING PATTERN THROUGHOUT THE LENGTH OF THE LOAD. THE MAXIMUM NUMBER OF OMITTED-UNIT ASSEMBLIES ALLOWED IN A LOAD ARE ONE ASSEMBLY FOR A ONE-HIGH CONFIGURATION AND THREE ASSEMBLIES FOR A TWO-HIGH CONFIGURATION.