

APPROVED BY
BUREAU OF EXPLOSIVES

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DATE 4.27.95

LOADING AND BRACING WITH WOODEN DUNNAGE IN SIDE OPENING ISO CONTAINERS OF CBU ITEMS PACKED IN CNU-147/E (TWIN PACK) SHIPPING AND STORAGE 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			
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DO NOT SCALE

PROJECT SP 316-95

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 CBU ITEMS PACKED IN CNU-147/E (TWIN PACK) CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH CBU ITEMS. SEE PAGE 3 FOR DETAILS OF THE CONTAINER. 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 LONGITUDINAL PIECE W/1 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. A PIECE OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES OF THE END BLOCKING ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THE 2" X 4" 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". THIS PIECE IS NOT REQUIRED WHEN THE ENDWALL OF THE CONTAINER IS SMOOTH AND FLAT.
- 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)

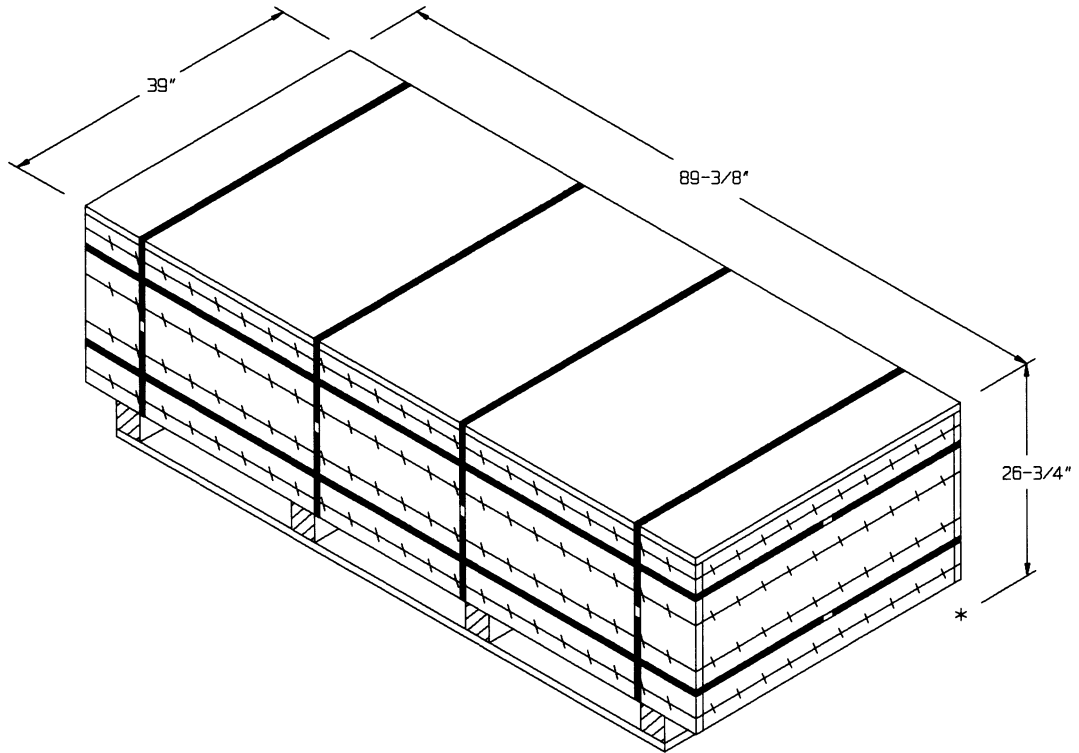
L. MAXIMUM LOAD WEIGHT CRITERIA:

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. THE QUANTITY OF CONTAINERS SHOWN IN THE LOADS ON PAGES 4 AND 6 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL-LOAD" DETAILS ON PAGES 9 AND 10. WHEN A CONTAINER IS TO BE 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. SIDE OPENING ISO CONTAINER WIDTHS MUST BE CHECKED AGAINST THE LENGTH OF THE CNU-147/E CONTAINER PRIOR TO LOADING CONTAINERS IN THE PATTERN DEPICTED ON PAGE 4. IF THE CNU CONTAINER IS TOO LONG TO FIT ACROSS THE WIDTH OF THE SIDE OPENING CONTAINER, THE PATTERN ON PAGE 4 CANNOT BE USED, AND THE PATTERN DEPICTED ON PAGE 6 MUST BE USED INSTEAD.

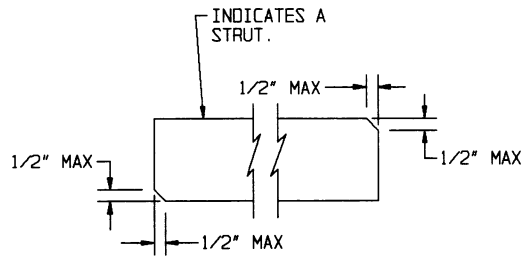
MATERIAL SPECIFICATIONS

- 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.
- WIRE, CARBON STEEL - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.



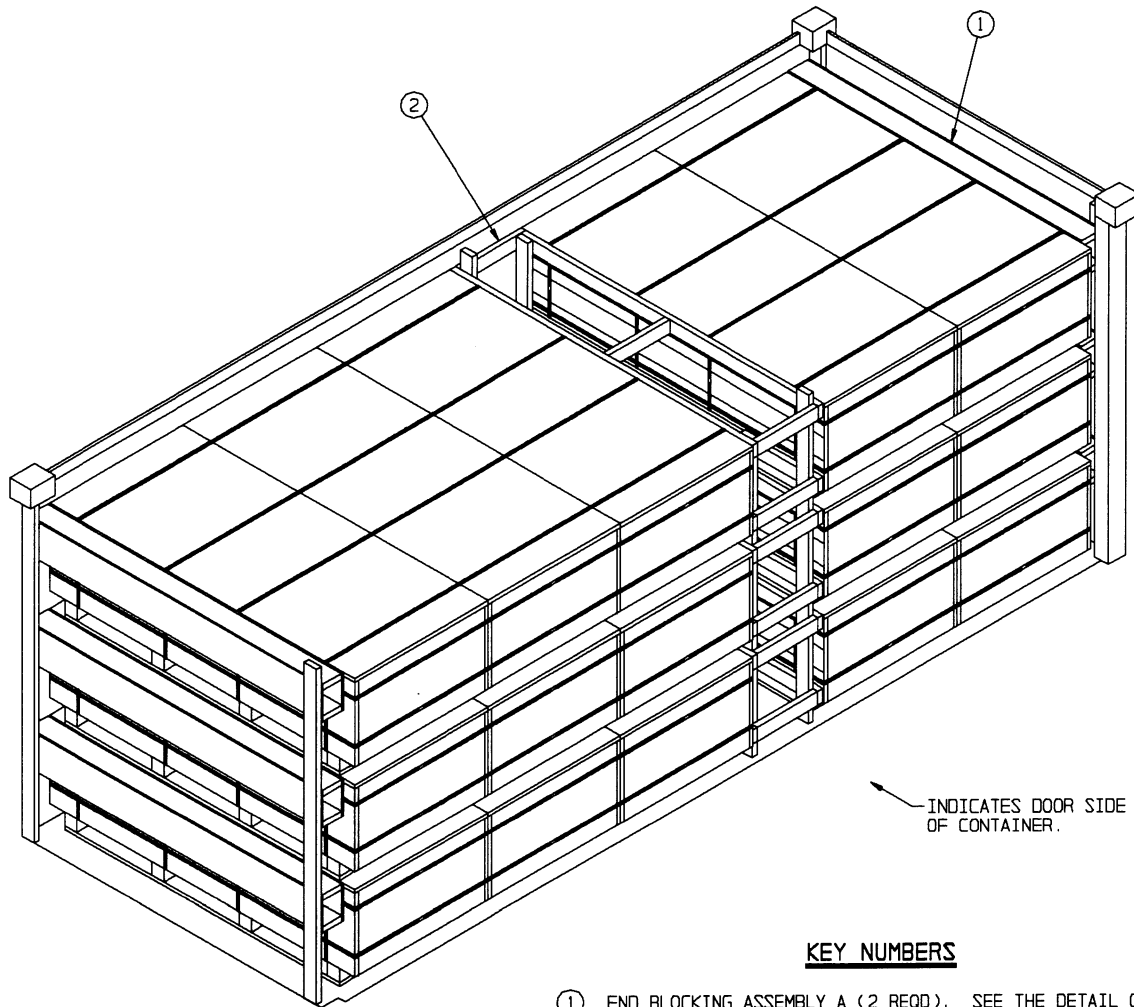
CNU-147/E (TWIN PACK) CONTAINER

GROSS WEIGHT ----- 1,855 LBS (APPROX)
 CUBE ----- 54.0 CUBIC FEET (APPROX)



BEVEL-CUT

IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT CENTER OF LOAD FIT.



INDICATES DOOR SIDE OF CONTAINER.

KEY NUMBERS

- ① END BLOCKING ASSEMBLY A (2 REQD). SEE THE DETAIL ON PAGE 5.
- ② CENTER FILL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 5.

ISOMETRIC VIEW

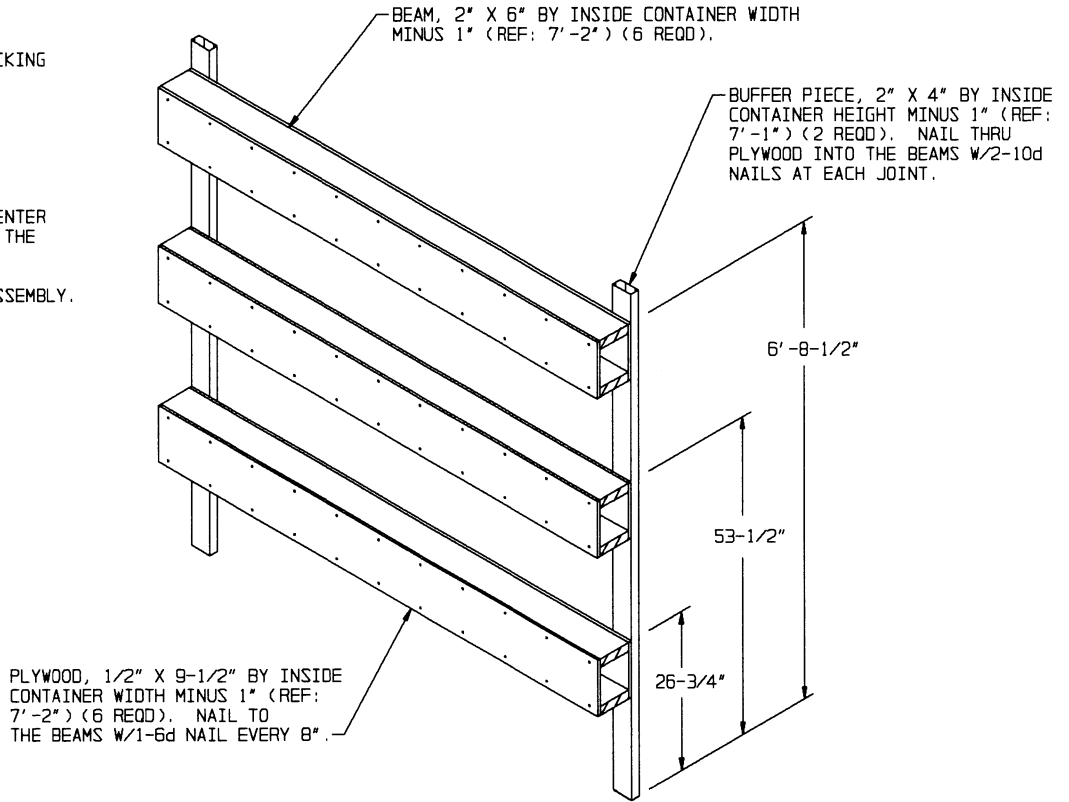
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	171	114
2" X 6"	86	86
NAILS	NO. REQD	POUNDS
6d (2")	264	1-3/4
10d (3")	168	2-3/4
PLYWOOD, 1/2"	68.09 SQ FT REQD	93.63 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-147/E	15	27,825 LBS
DUNNAGE		499 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		34,374 LBS (APPROX)

**RECOMMENDED SEQUENTIAL
LOADING PROCEDURES**

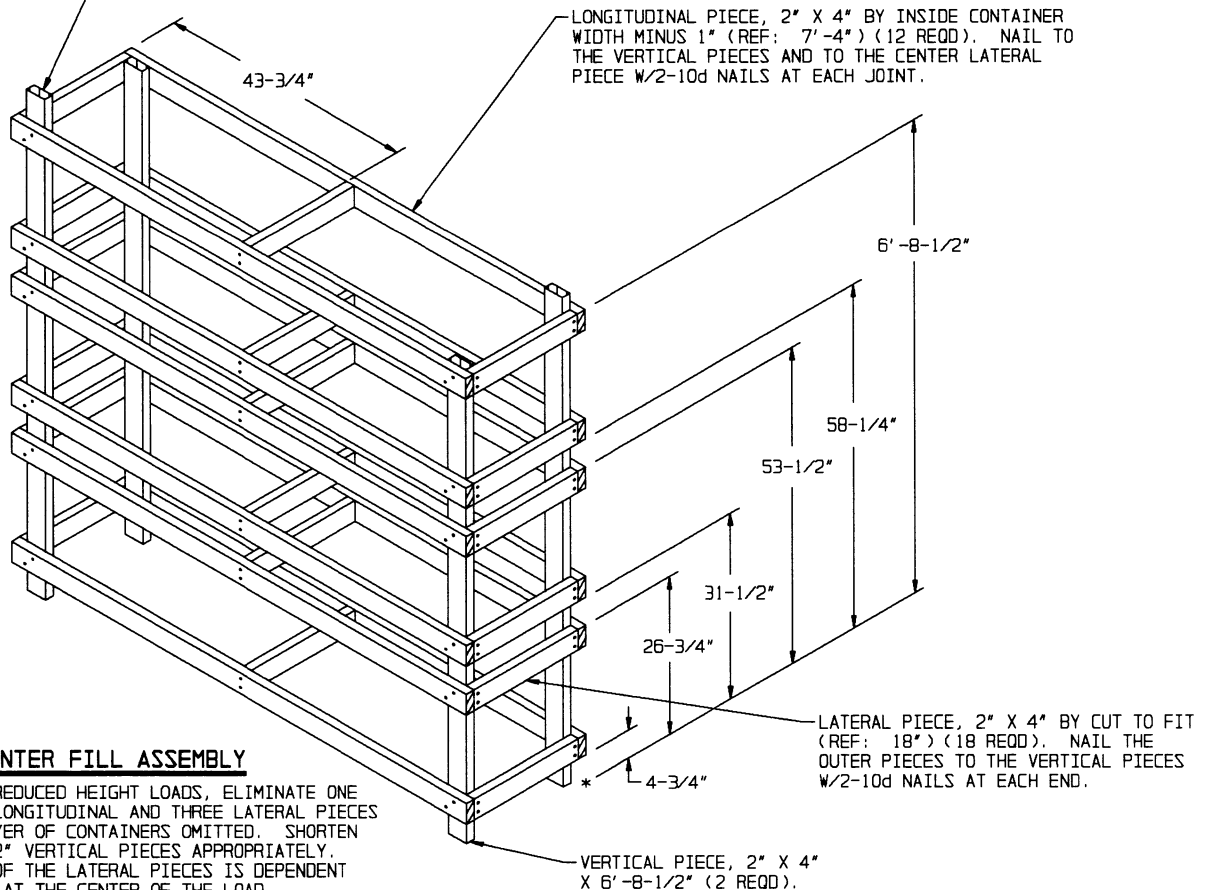
1. PRE-FABRICATE TWO END BLOCKING ASSEMBLIES "A".
2. INSTALL BOTH END BLOCKING ASSEMBLIES "A".
3. LOAD 15 CONTAINERS.
4. MEASURE THE VOID AT THE CENTER OF THE LOAD AND FABRICATE THE CENTER FILL ASSEMBLY.
6. INSTALL THE CENTER FILL ASSEMBLY.



END BLOCKING ASSEMBLY A

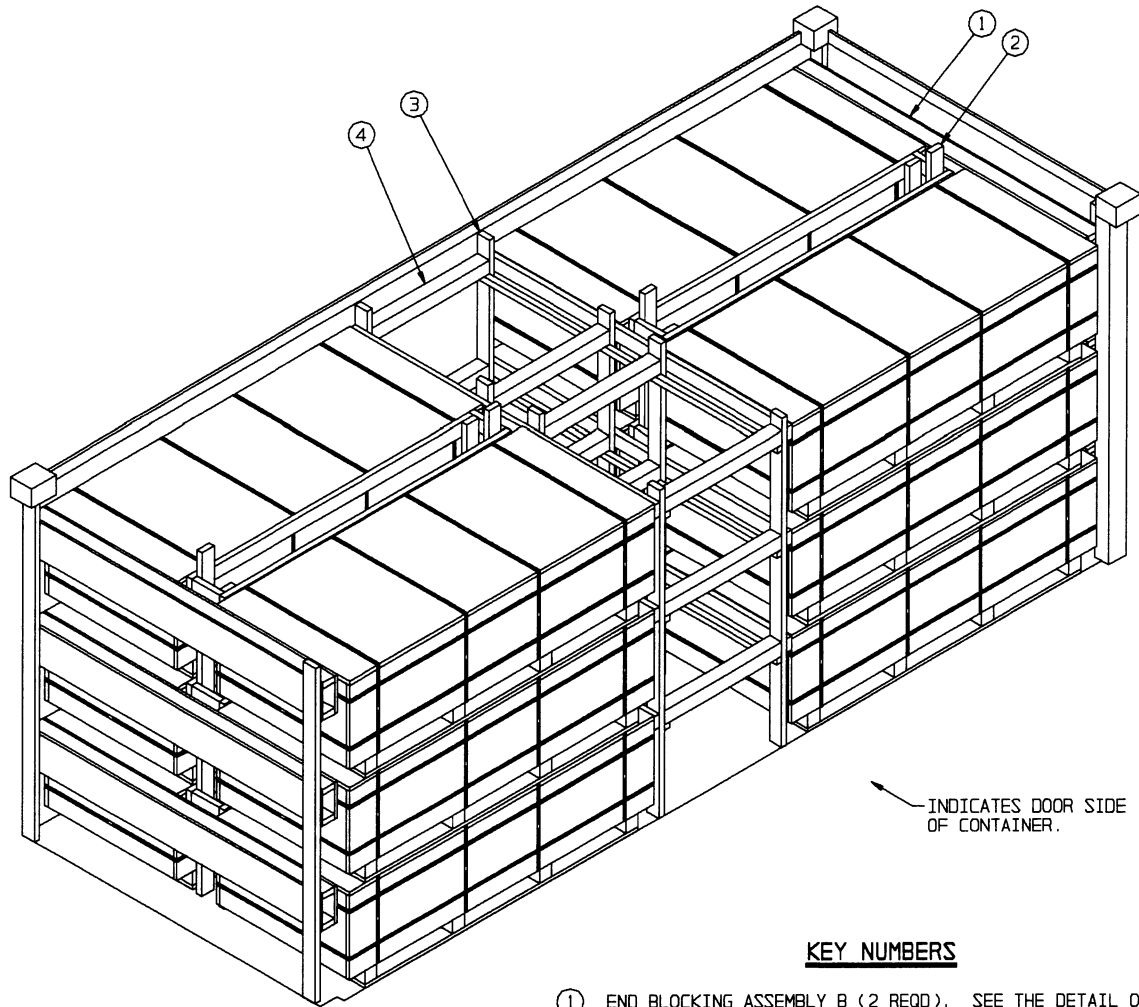
VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1" ON FAR SIDE OF CONTAINER AND 6'-11" ON DOOR SIDE OF CONTAINER) (2 REQD).

NOTE: FOR REDUCED HEIGHT LOADS, ELIMINATE ONE BOX BEAM ASSEMBLY (TWO BEAMS AND TWO PIECES OF PLYWOOD) FOR EACH LAYER OF CONTAINERS OMITTED.



CENTER FILL ASSEMBLY

NOTE: FOR REDUCED HEIGHT LOADS, ELIMINATE ONE SET OF TWO LONGITUDINAL AND THREE LATERAL PIECES FOR EACH LAYER OF CONTAINERS OMITTED. SHORTEN THE 6'-8-1/2" VERTICAL PIECES APPROPRIATELY. THE LENGTH OF THE LATERAL PIECES IS DEPENDENT ON THE VOID AT THE CENTER OF THE LOAD.



ISOMETRIC VIEW

KEY NUMBERS

- ① END BLOCKING ASSEMBLY B (2 REQD). SEE THE DETAIL ON PAGE 7.
- ② CRIB FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 8.
- ③ CENTER GATE (2 REQD). SEE THE DETAIL ON PAGE 7.
- ④ STRUT, 4" X 4" BY CUT TO FIT (REF: 34-1/4") (12 REQD). TOENAIL TO PIECES MARKED ③ W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 3.

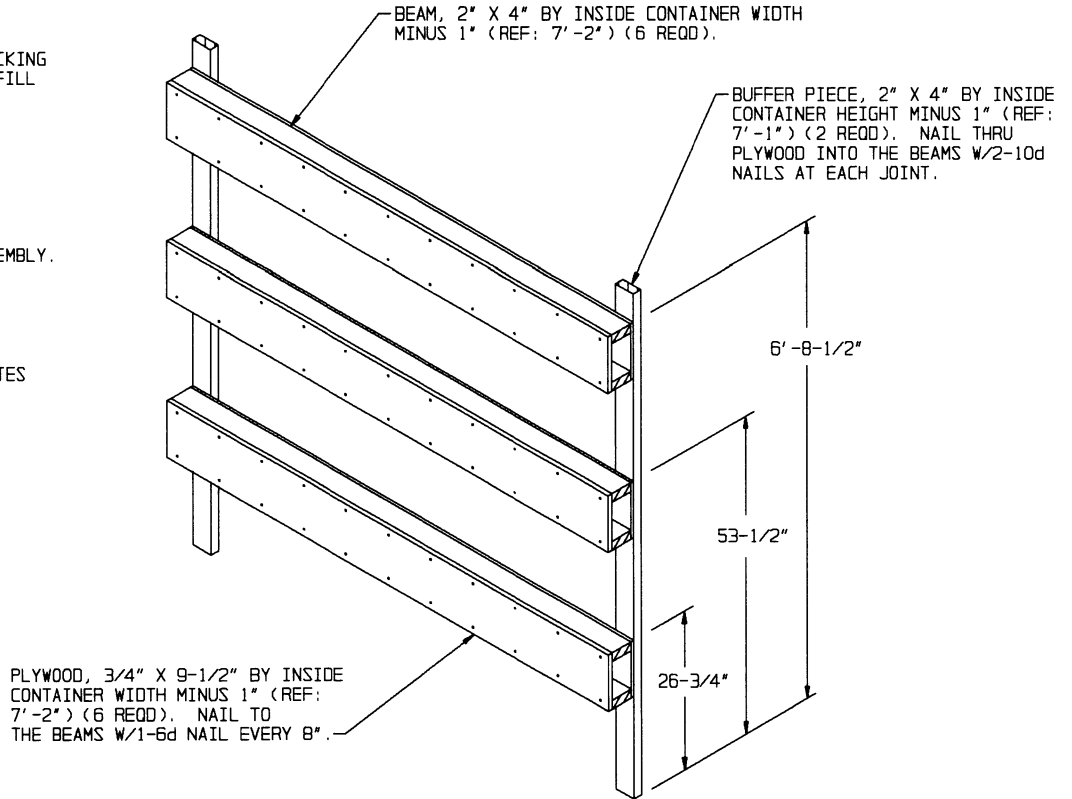
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	44	15
2" X 4"	364	243
4" X 4"	35	47
NAILS	NO. REQD	POUNDS
6d (2")	264	1-3/4
10d (3")	240	3-3/4
12d (3-1/4")	48	1
PLYWOOD, 3/4" - - - - 68.09 SQ FT REQD - - - 140.44 LBS		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-147/E	12	22,260 LBS
DUNNAGE		757 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		29,067 LBS (APPROX)

**RECOMMENDED SEQUENTIAL
LOADING PROCEDURES**

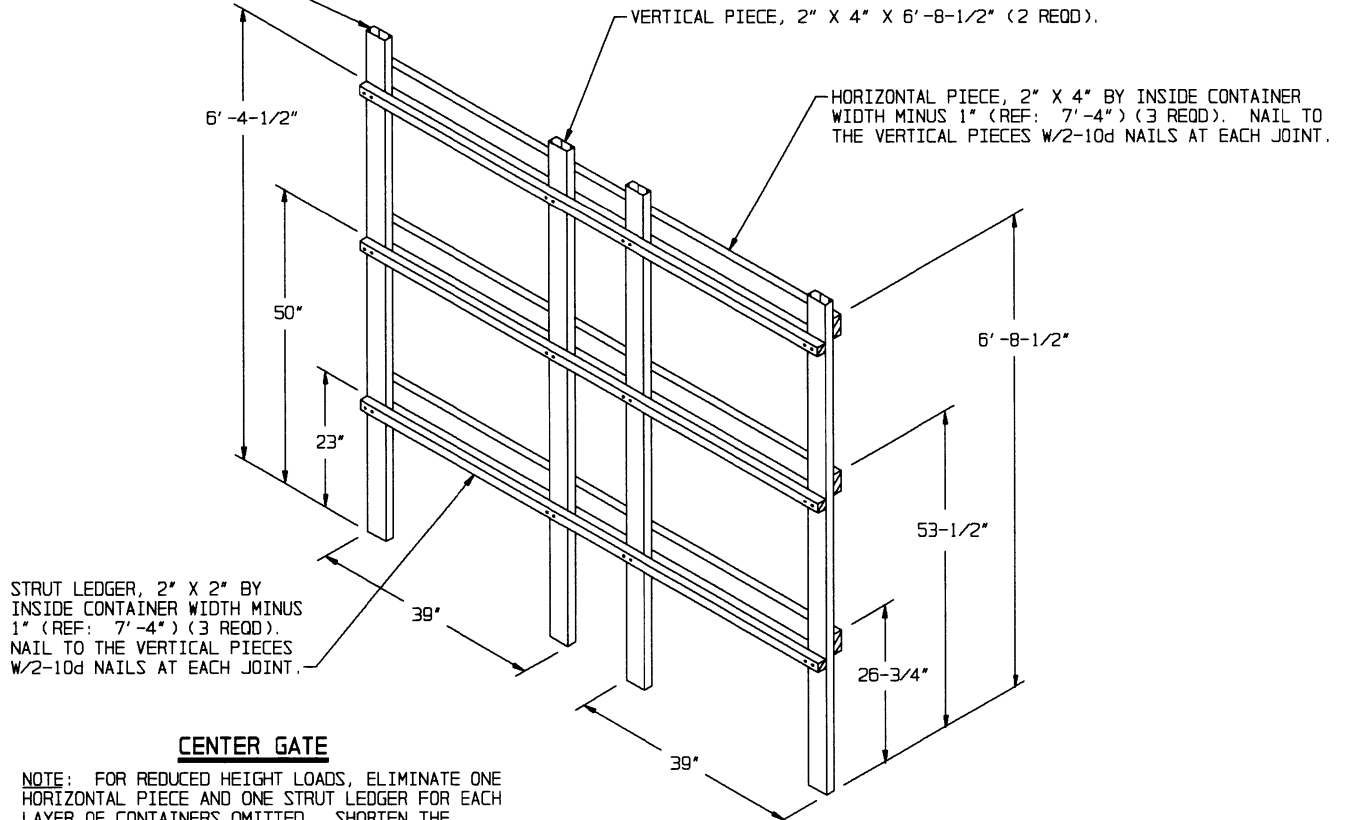
1. PRE-FABRICATE TWO END BLOCKING ASSEMBLIES "B", TWO CRIB FILL ASSEMBLIES AND TWO CENTER GATES.
2. INSTALL ONE END BLOCKING ASSEMBLY "B".
3. LOAD THREE CONTAINERS.
4. INSTALL ONE CRIB FILL ASSEMBLY.
5. LOAD THREE CONTAINERS.
6. REPEAT STEPS 2 THRU 5.
7. INSTALL THE TWO CENTER GATES AND THE 12 STRUTS.



END BLOCKING ASSEMBLY B

VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1" ON FAR SIDE OF CONTAINER AND 6'-11" ON DOOR SIDE OF CONTAINER) (2 REQD).

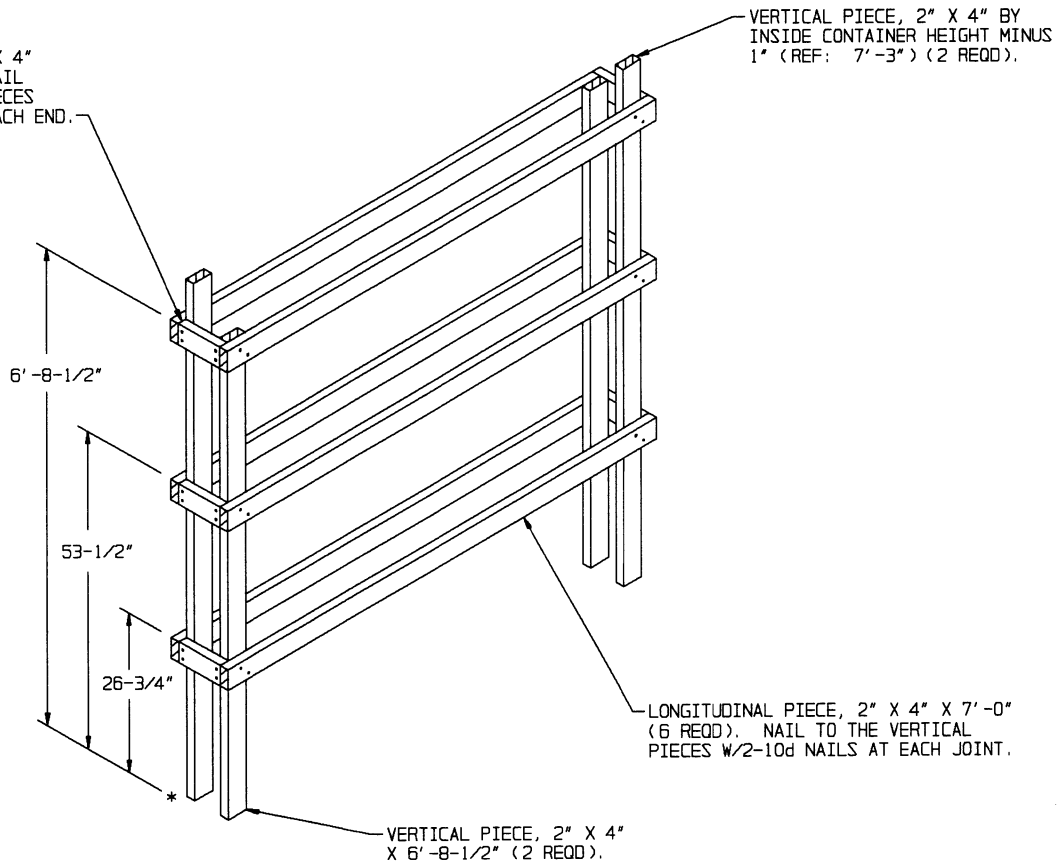
NOTE: FOR REDUCED HEIGHT LOADS, ELIMINATE ONE BOX BEAM ASSEMBLY (TWO BEAMS AND TWO PIECES OF PLYWOOD) FOR EACH LAYER OF CONTAINERS OMITTED.



CENTER GATE

NOTE: FOR REDUCED HEIGHT LOADS, ELIMINATE ONE HORIZONTAL PIECE AND ONE STRUT LEDGER FOR EACH LAYER OF CONTAINERS OMITTED. SHORTEN THE 6'-8-1/2" VERTICAL PIECES APPROPRIATELY.

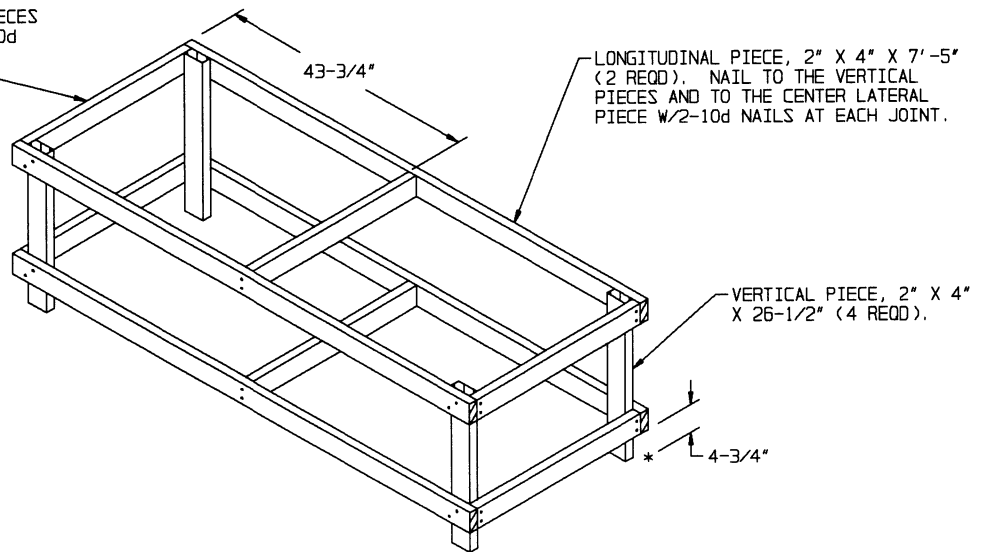
LATERAL PIECE, 2" X 4" X 11" (6 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.



CRIB FILL ASSEMBLY

NOTE: FOR REDUCED HEIGHT LOADS, ELIMINATE ONE SET OF TWO LONGITUDINAL AND TWO LATERAL PIECES FOR EACH LAYER OF CONTAINERS OMITTED. SHORTEN THE 6'-8-1/2" VERTICAL PIECES APPROPRIATELY. THE LENGTH OF THE LATERAL PIECES IS DEPENDENT ON THE VOID BETWEEN CONTAINERS.

LATERAL PIECE, 2" X 4" X 36" (6 REQD). NAIL THE OUTER PIECES TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.

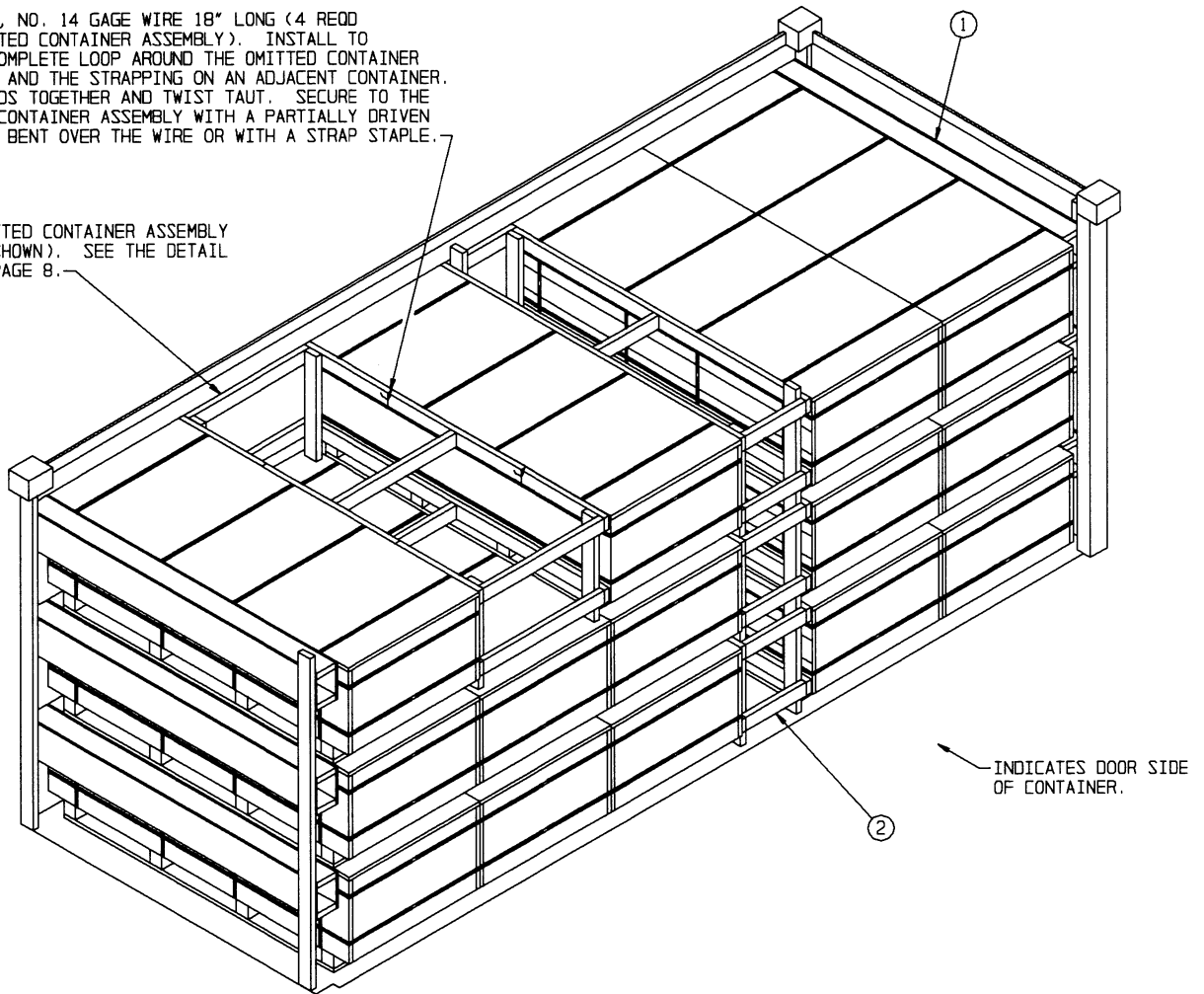


FILLER ASSEMBLY

(FOR MINUS ONE CONTAINER)

TIE WIRE, NO. 14 GAGE WIRE 18" LONG (4 REQD PER OMITTED CONTAINER ASSEMBLY). INSTALL TO FORM A COMPLETE LOOP AROUND THE OMITTED CONTAINER ASSEMBLY AND THE STRAPPING ON AN ADJACENT CONTAINER. BRING ENDS TOGETHER AND TWIST TAUT. SECURE TO THE OMITTED CONTAINER ASSEMBLY WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE OR WITH A STRAP STAPLE.

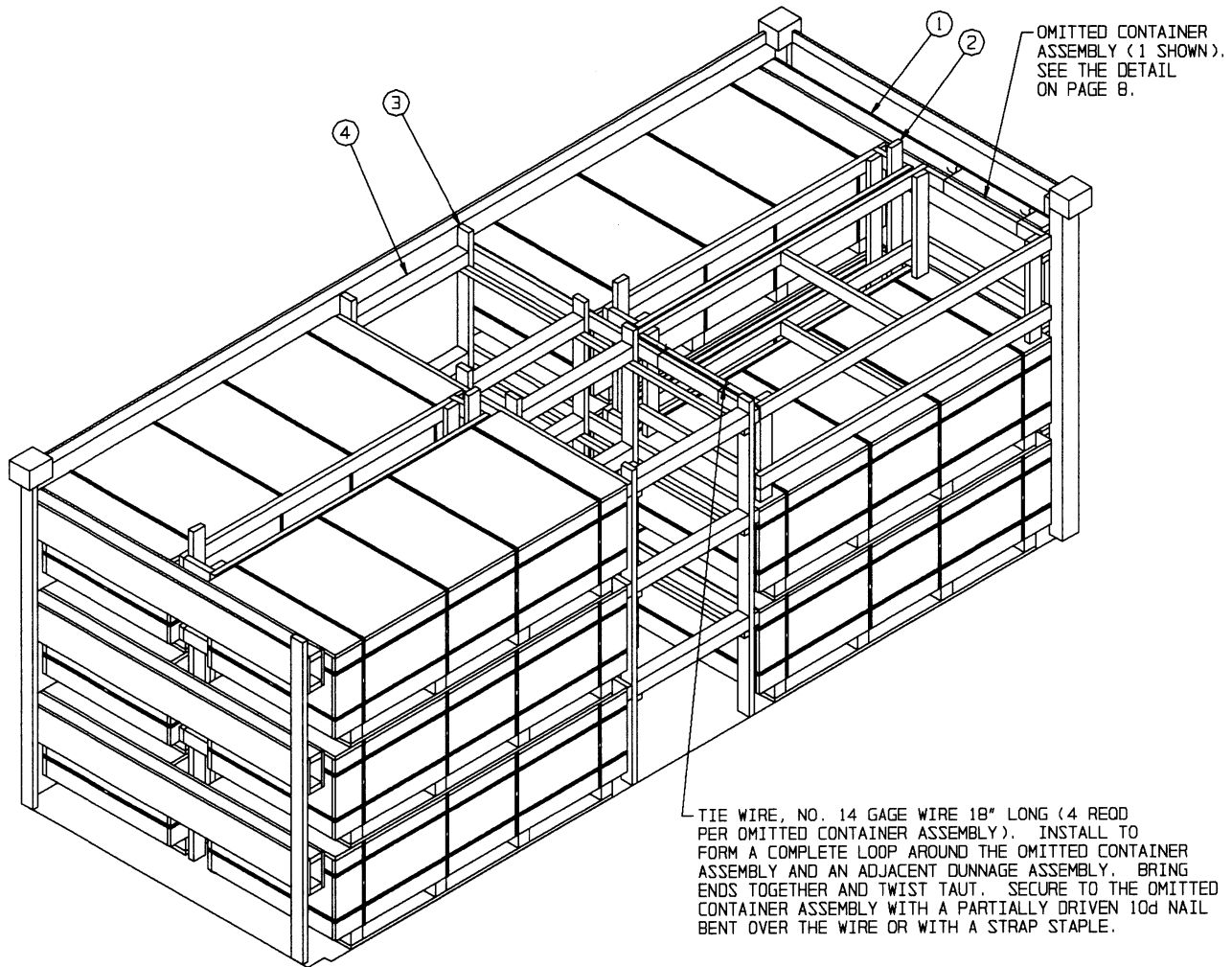
OMITTED CONTAINER ASSEMBLY (1 SHOWN). SEE THE DETAIL ON PAGE 8.



ISOMETRIC VIEW

LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 4.



INDICATES DOOR SIDE OF CONTAINER.

ISOMETRIC VIEW

LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 6.