APPROVED BY
BUREAU OF EXPLOSIVES

DATE 9/7/2001

LOADING AND BRACING● WITH WOODEN DUNNAGE IN SIDE OPENING ISO CONTAINERS OF JSOW (AGM-154) MISSILES PACKED IN CNU-575/E 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

APPROVED, U.S. ARMY OPERATIONS SUPPORT COMMAND

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CLASS	DIVISION	DRAWING	FILE
19	48	8695	SP15J111

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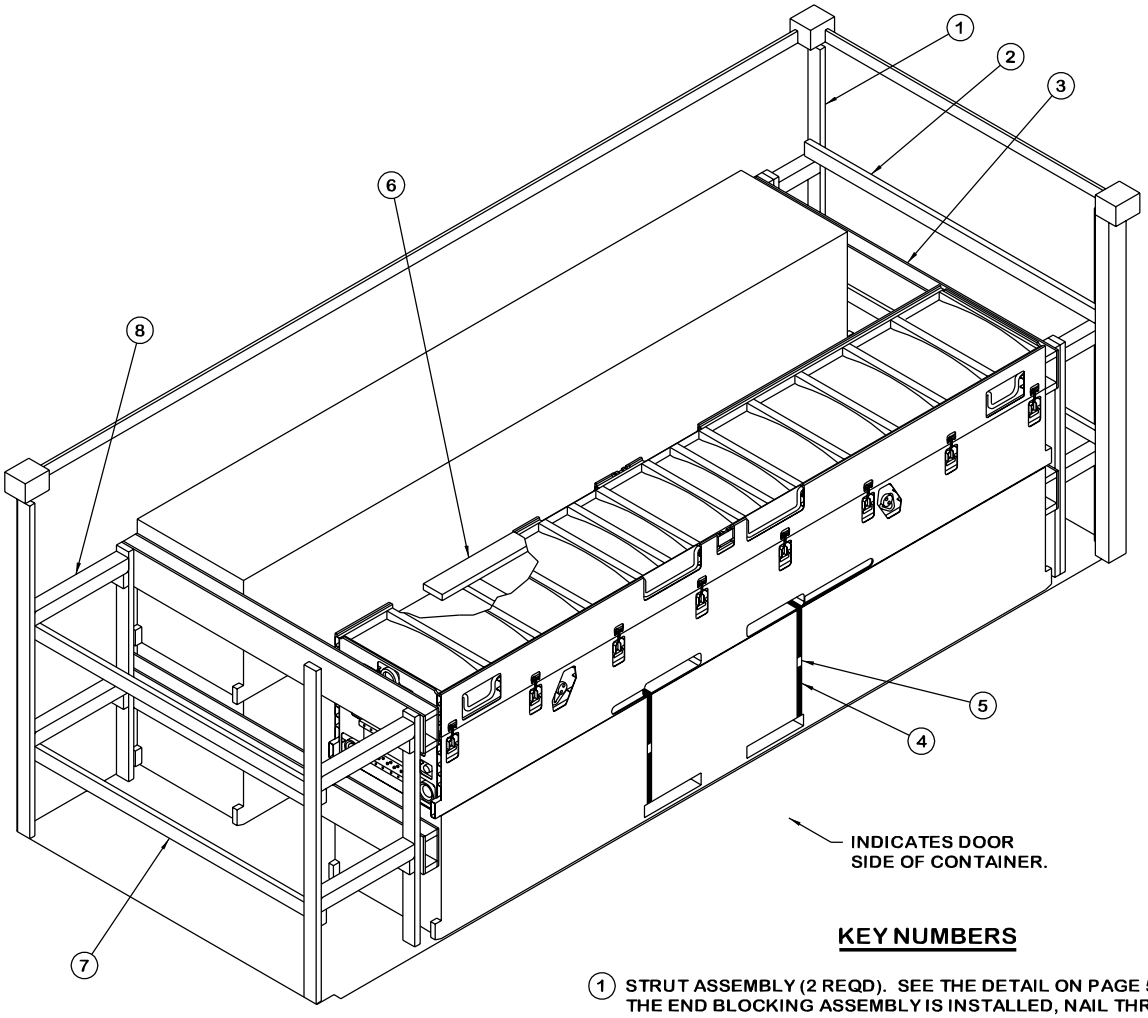

ISOMETRIC VIEW

KEY NUMBERS

(1) STRUT ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5. AFTER THE END BLOCKING ASSEMBLY IS INSTALLED, NAIL THROUGH THE VERTICAL PIECE OF THE STRUT ASSEMBLY INTO THE VERTICAL PIECE OF THE END BLOCKING ASSEMBLY W/4-10d NAILS.

(2) SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-2") (2 REQD). NAIL TO THE BUFFER PIECES OF THE STRUT ASSEMBLIES W/2-10d NAILS AT EACH END.

(3) END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.

(4) STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" X 11'-3" LONG STEEL STRAPPING (4 REQD, 2 PER STACK). INSTALL THROUGH THE FORKLIFT OPENINGS OF TWO CONTAINERS AND POSITION AS FAR APART AS THE FORKLIFT OPENINGS PERMIT.

(5) SEAL FOR 1-1/4" UNITIZING STRAP (4 REQD, 1 PER STRAP). CRIMP ONE SEAL WITH TWO PAIR OF NOTCHES OR CRIMP TWO SEALS, EACH WITH TWO PAIR OF CRIMPS. SEE GENERAL NOTE "Q" ON PAGE 3.

(6) ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 6. INSTALL ONE ANTI-SWAY BRACE FOR EACH LAYER OF CONTAINERS.

(7) LEDGER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 6.

(8) STRUT, 4" X 4" BY CUT-TO-FIT (REF: 27-1/2") (4 REQD). TOENAIL TO THE END BLOCKING ASSEMBLY AND THE LEDGER ASSEMBLY W/2-12d NAILS AT EACH END. SEE THE SPECIAL NOTE ON PAGE 5 AND THE "BEVEL-CUT" DETAIL ON PAGE 7.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	159	106
2" X 6"	20	20
4" X 4"	13	18
NAILS	**NO. REQD**	**POUNDS**
6d (2")	224	1-1/3
10d (3")	104	1-1/2
12d (3-1/4")	16	1/3

STEEL STRAPPING, 1-1/4" - 45.00' REQD - - - 6.43 LBS
SEAL FOR 1-1/4" STRAPPING - - 4 REQD - - - - - NIL
PLYWOOD, 1/2" - - - 46.44 SQ FT REQD - - 63.86 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-575/E CONTAINER	4	8,868 LBS
DUNNAGE		362 LBS
ISO CONTAINER		6,050 LBS
TOTAL WEIGHT		15,280 LBS (APPROX)

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(GENERAL NOTES CONTINUED)

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 25.4MM 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 LOAD IS DELINEATED IN THE LOAD VIEW ON PAGE 2, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOAD 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 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.

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 LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL-LOAD" PROCEDURE ON PAGE 8. WHEN AN ISO 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. ANTI-CHAFING MATERIAL, CONSISTING OF NEUTRAL BARRIER MATERIAL, PLYWOOD, OR HARDBOARD, MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN THE LADING AND THE SIDE OPENING CONTAINER TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.

Q. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 4 FOR GUIDANCE.

R. AS REQUIRED BY THE ASSOCIATION OF AMERICAN RAILROADS (AAR), ALL 1-1/4" AND 2" STEEL STRAPPING USED FOR LOAD RESTRAINT MUST BE MARKED AS SPECIFIED WITHIN THE APPLICABLE AAR RULES GOVERNING LOADING, BLOCKING AND BRACING OF FREIGHT WITHIN THE CONVEYANCE. FOR THE SPECIFIC MARKING SIZE, FREQUENCY, ETC., REQUIRED, REFER TO THE APPROPRIATE AAR LOADING RULES.

S. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:

1. PREFABRICATE TWO STRUT ASSEMBLIES, TWO END BLOCKING ASSEMBLIES, AND ONE LEDGER ASSEMBLY.

2. INSTALL TWO STRUT ASSEMBLIES, THE TWO SPREADER PIECES, AND ONE END BLOCKING ASSEMBLY.

3. UNITIZE TWO STACKS OF TWO CONTAINERS AND LOAD.

4. INSTALL TWO ANTI-SWAY BRACES.

5. INSTALL THE REMAINING END BLOCKING ASSEMBLY AND THE LEDGER ASSEMBLY.

6. INSTALL FOUR STRUTS.

GENERAL NOTES

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 JSOW (AGM-154) MISSILES PACKED IN CNU-575/E CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CNU-575/E CONTAINER WITH MISSILE INSTALLED. SEE PAGE 4 FOR DETAILS OF THE CONTAINER. CAUTION: REGARDLESS OF THE QUANTITY OF CONTAINERS 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 A 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 CNU-575/E 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". FOR LOADS UTILIZING A CENTER FILL ASSEMBLY, EXCESSIVE SLACK CAN BE ELIMINATED BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE LONGITUDINAL PIECES ON THE CENTER FILL ASSEMBLY. NAIL EACH ADDITIONAL PIECE TO THE LONGITUDINAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE LATERAL PIECES IN THE CENTER FILL ASSEMBLY MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE ISO CONTAINER SIZE.

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 OF THE STRUT ASSEMBLIES OR TO THE BUFFER PIECES OF THE LEDGER ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THESE 2" X 4" 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.

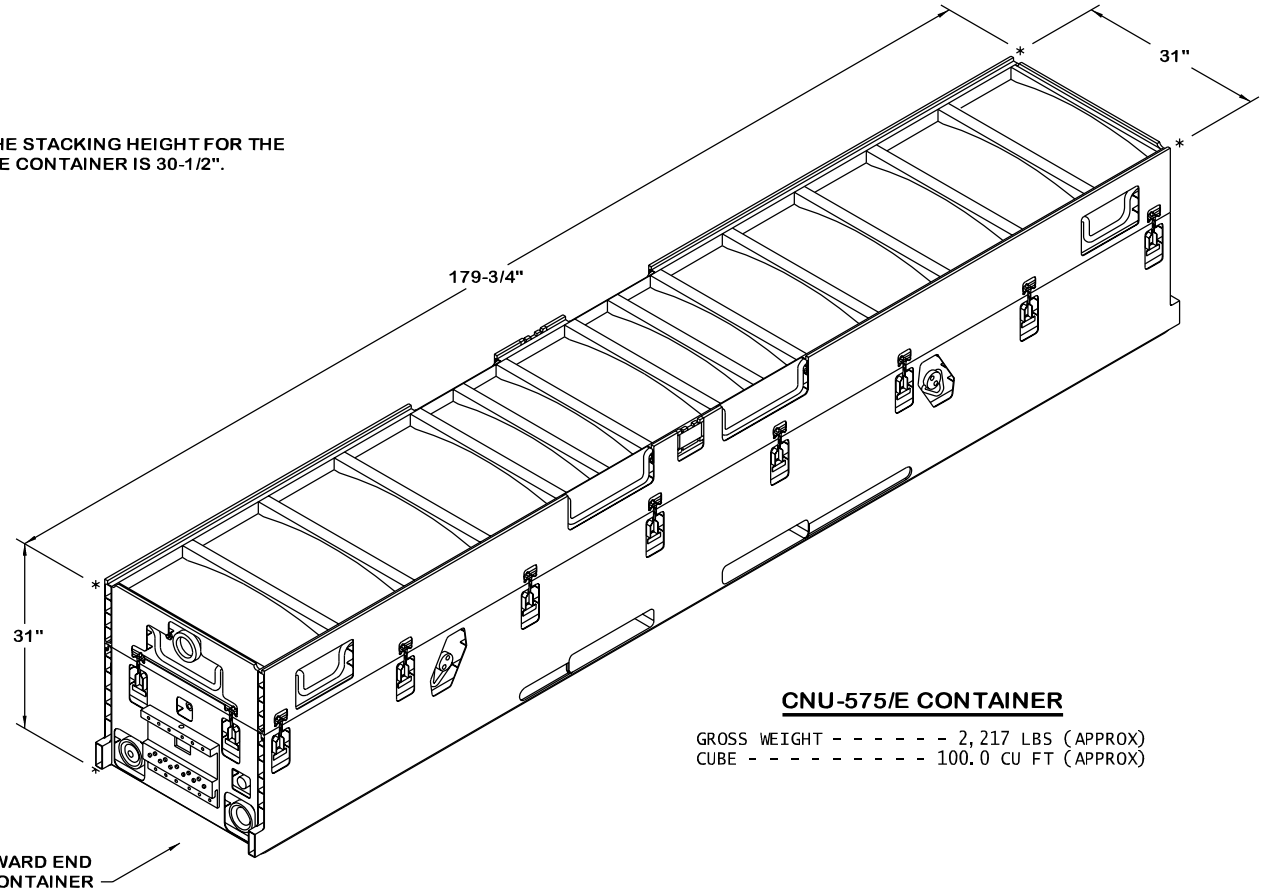
H. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.

(CONTINUED AT LEFT)

MATERIAL SPECIFICATIONS

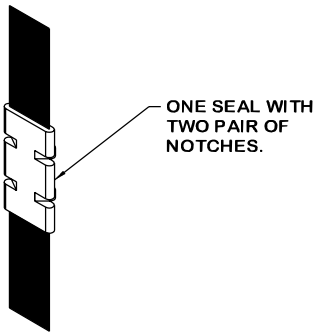
LUMBER - - - - - - - -:	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
NAILS - - - - - - - -:	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
STRAPPING, STEEL - -:	ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
SEAL, STRAP - - - -:	ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
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.
ANTI-CHAFING MATERIAL - - - - - -:	MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.

NOTE: THE STACKING HEIGHT FOR THE CNU-575/E CONTAINER IS 30-1/2".



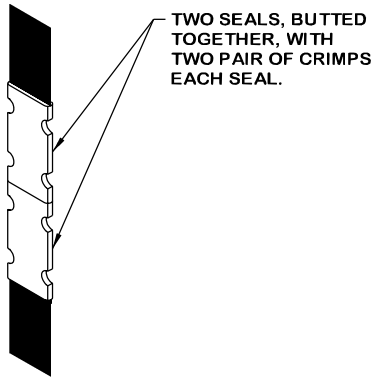
CNU-575/E CONTAINER

GROSS WEIGHT - - - - - - 2,217 LBS (APPROX)
CUBE - - - - - - - - - - 100.0 CU FT (APPROX)



STRAP JOINT A

METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.

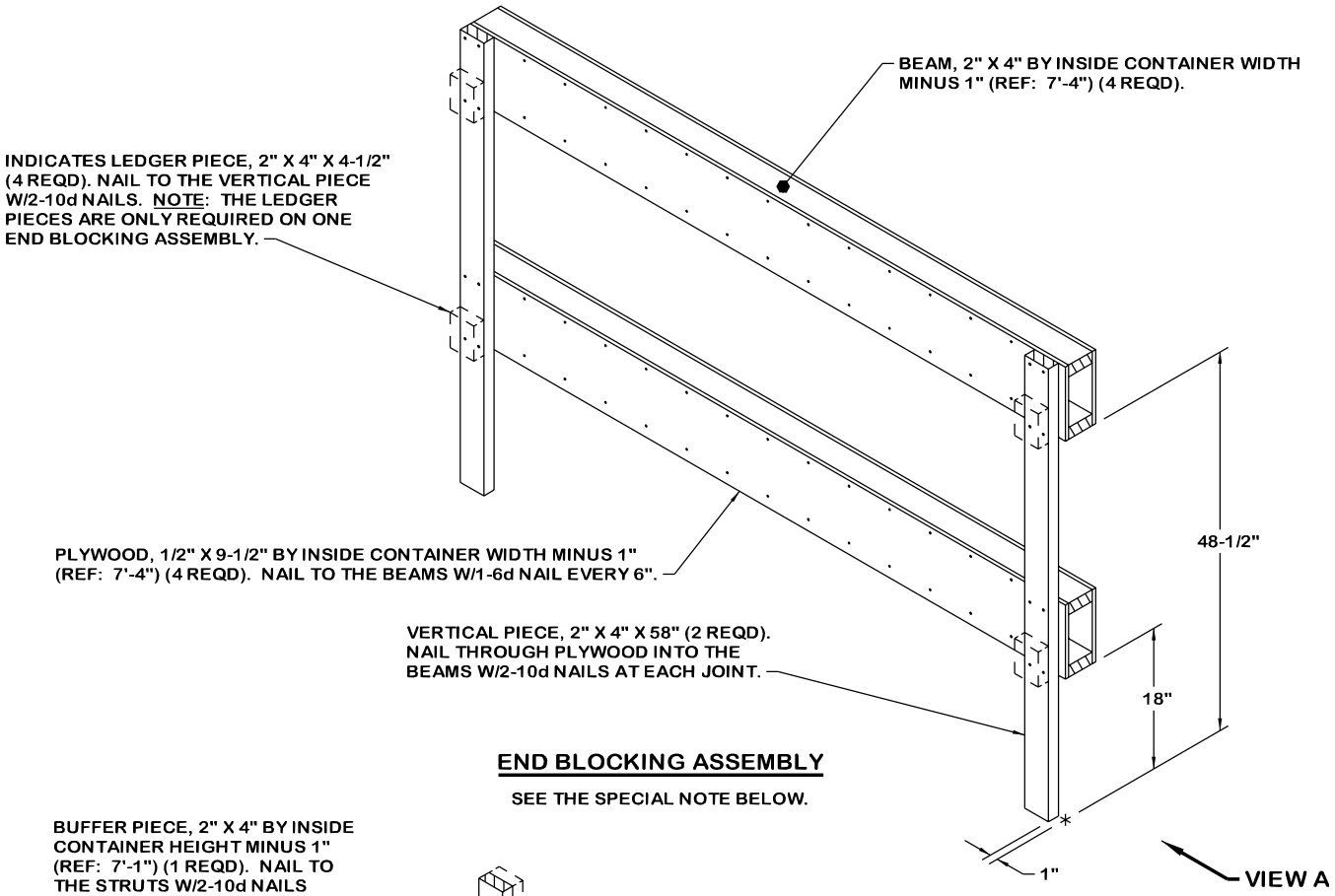


STRAP JOINT B

METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

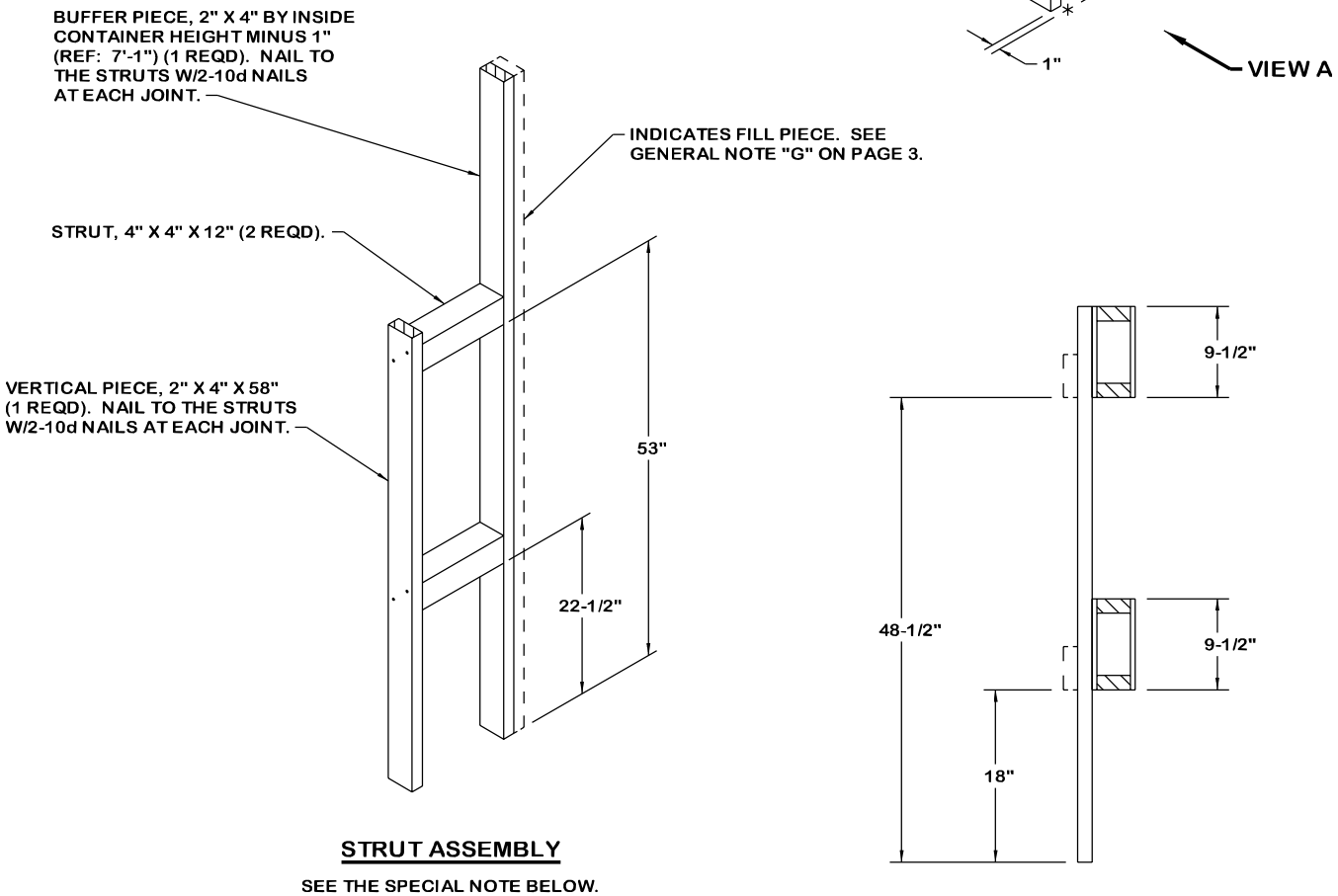
END-OVER-END LAP JOINT DETAILS

SEE GENERAL NOTE "Q" ON PAGE 3.



END BLOCKING ASSEMBLY

SEE THE SPECIAL NOTE BELOW.

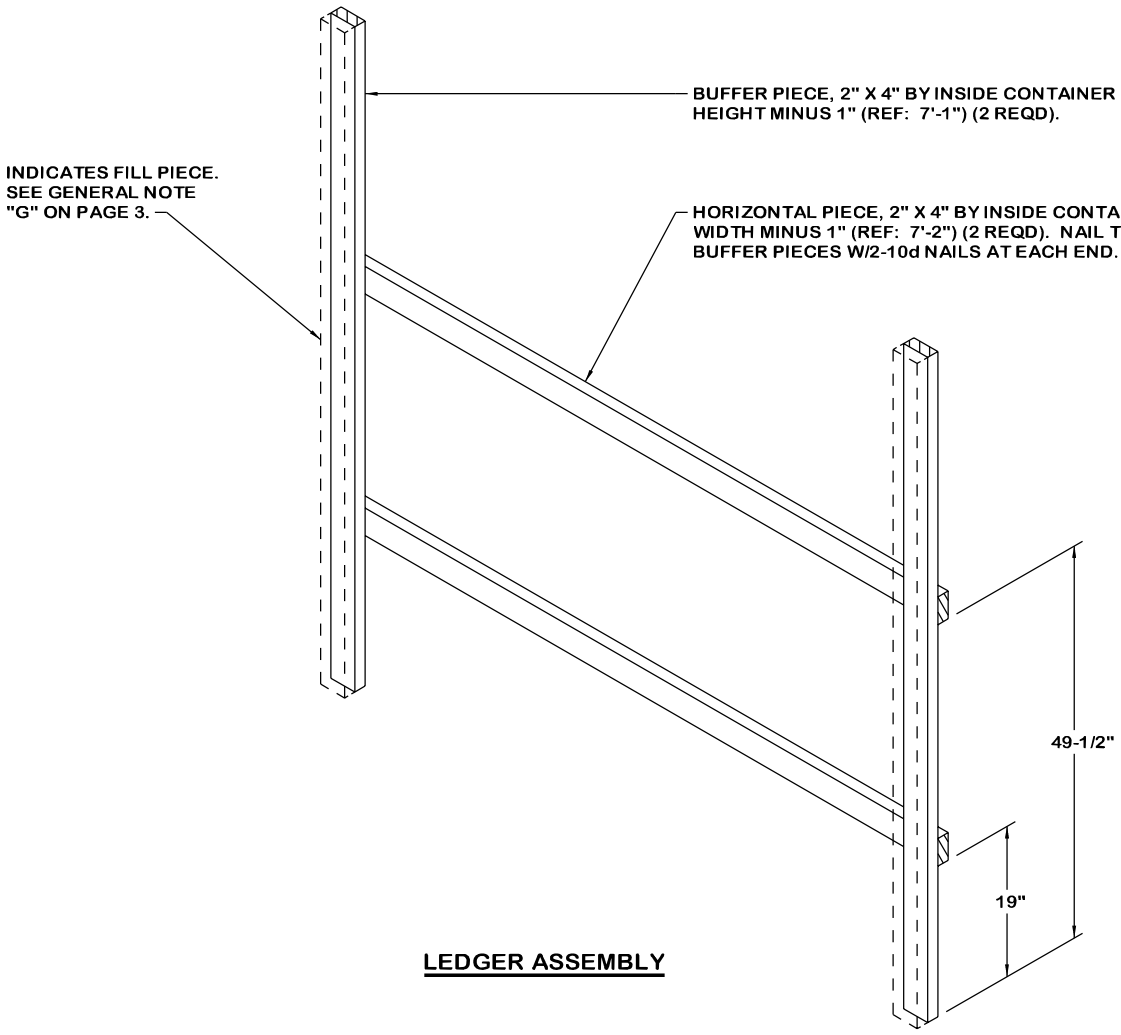


STRUT ASSEMBLY

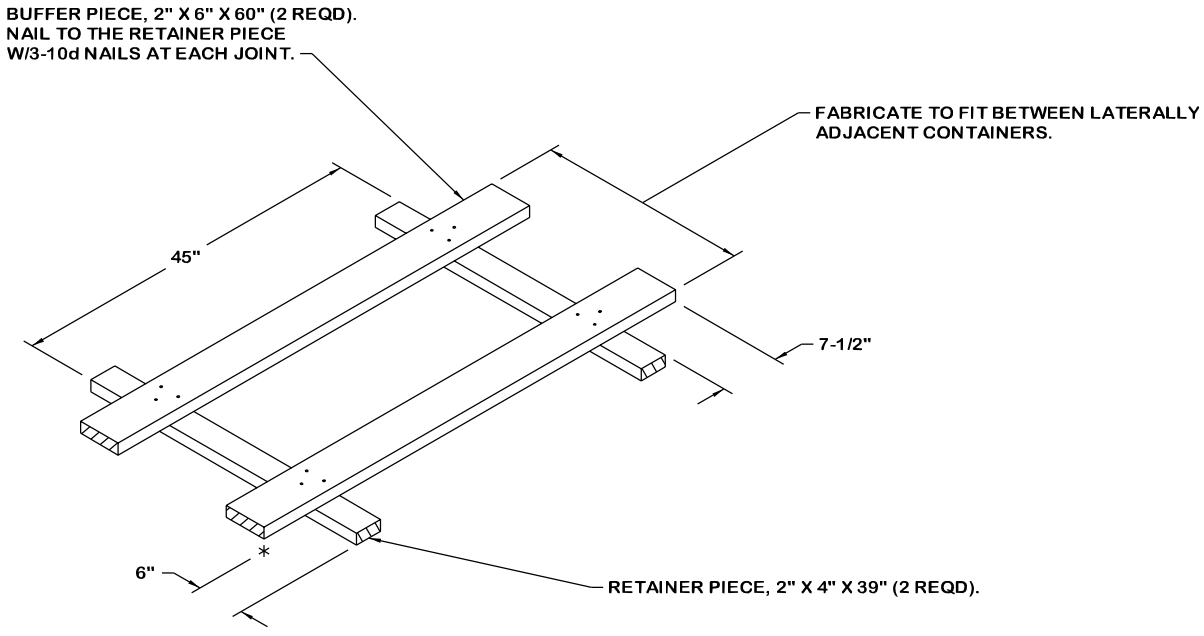
SEE THE SPECIAL NOTE BELOW.

VIEW A

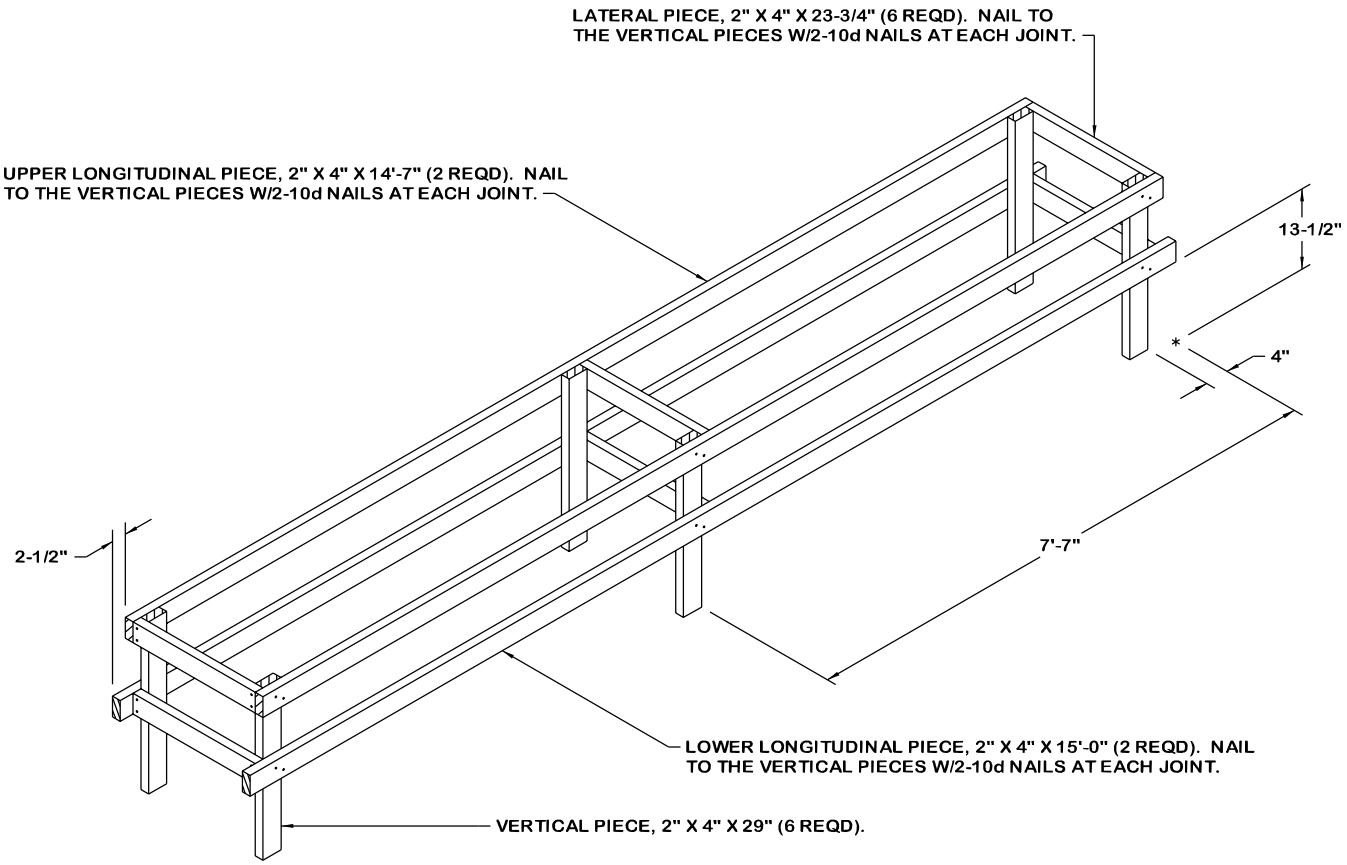
SPECIAL NOTE: FOR A ONE-LAYER LOAD, ELIMINATE THE TOP STRUTS, THE TOP BEAM AND PLYWOOD ASSEMBLIES, THE TOP LEDGER PIECES, AND THE TOP ANTI-SWAY BRACE. SHORTEN THE VERTICAL PIECES (NOT THE BUFFER PIECES) TO 27-1/2".



LEDGER ASSEMBLY

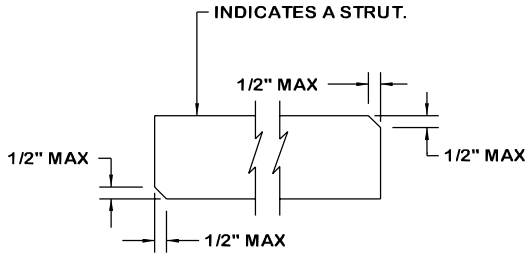


ANTI-SWAY BRACE



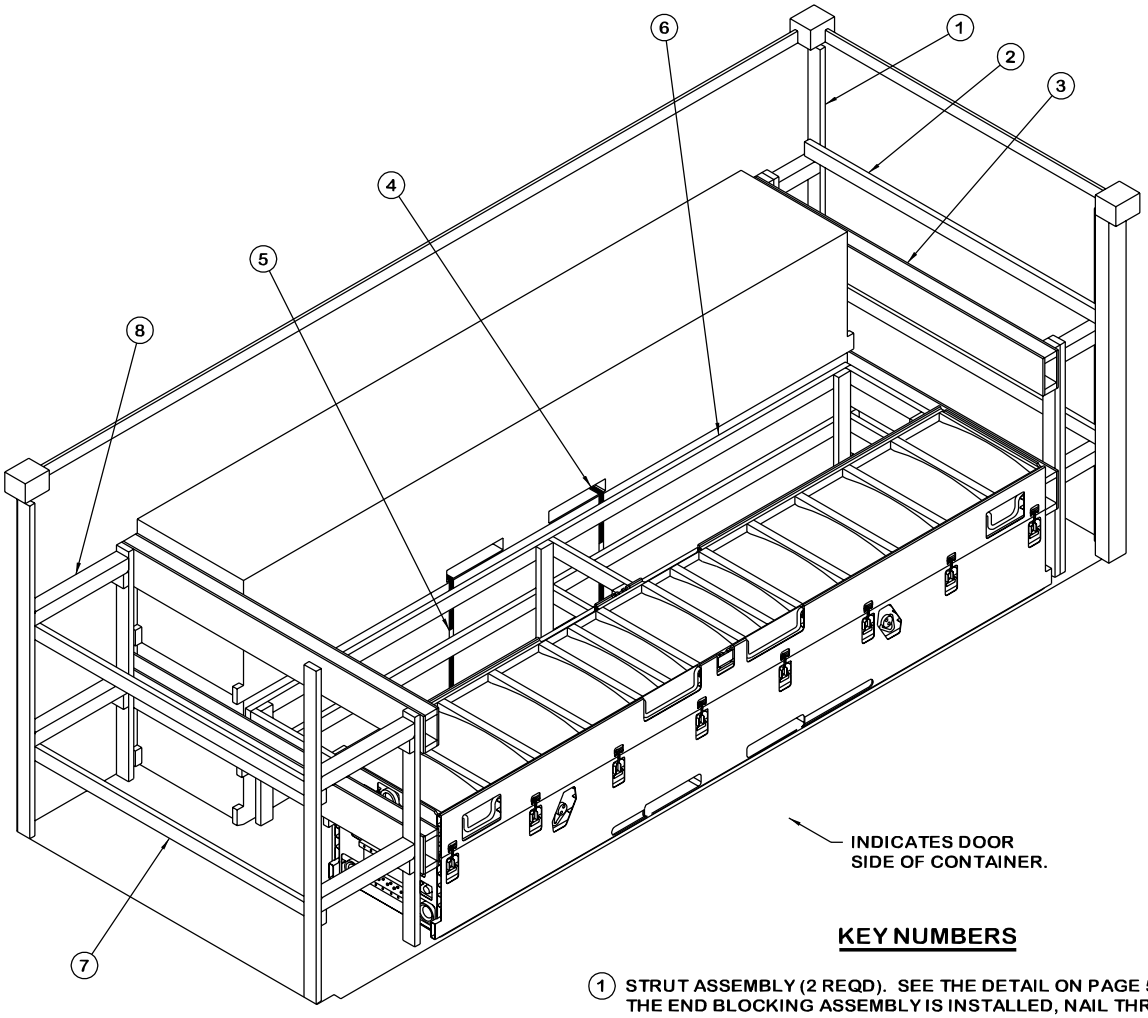
CENTER FILL ASSEMBLY

THIS ASSEMBLY IS FOR USE IN LESS-THAN-FULL LOADS. SEE PAGE 8.



BEVEL-CUT

IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT FIT BETWEEN THE LEDGER ASSEMBLY AND THE END BLOCKING ASSEMBLY.



ISOMETRIC VIEW

SEE GENERAL NOTE "O" ON PAGE 3.

KEY NUMBERS

(1) STRUT ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5. AFTER THE END BLOCKING ASSEMBLY IS INSTALLED, NAIL THROUGH THE VERTICAL PIECE OF THE STRUT ASSEMBLY INTO THE VERTICAL PIECE OF THE END BLOCKING ASSEMBLY W/4-10d NAILS.

(2) SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-2") (2 REQD). NAIL TO THE BUFFER PIECES OF THE STRUT ASSEMBLIES W/2-10d NAILS AT EACH END.

(3) END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.

(4) STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" X 11'-3" LONG STEEL STRAPPING (2 REQD, 2 PER STACK). INSTALL THROUGH THE FORKLIFT OPENINGS OF TWO CONTAINERS AND POSITION AS FAR APART AS THE FORKLIFT OPENINGS PERMIT.

(5) SEAL FOR 1-1/4" UNITIZING STRAP (2 REQD, 1 PER STRAP). CRIMP ONE SEAL WITH TWO PAIR OF NOTCHES OR CRIMP TWO SEALS, EACH WITH TWO PAIR OF CRIMPS. SEE GENERAL NOTE "Q" ON PAGE 3.

(6) CENTER FILL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 7.

(7) LEDGER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 6.

(8) STRUT, 4" X 4" BY CUT-TO-FIT (REF: 27-1/2") (4 REQD). TOENAIL TO THE END BLOCKING ASSEMBLY AND THE LEDGER ASSEMBLY W/2-12d NAILS AT EACH END. SEE THE SPECIAL NOTE ON PAGE 5 AND THE "BEVEL-CUT" DETAIL ON PAGE 7.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	232	155
4" X 4"	13	18
NAILS	**NO. REQD**	**POUNDS**
6d (2")	224	1-1/3
10d (3")	128	2
12d (3-1/4")	16	1/3

STEEL STRAPPING, 1-1/4" - 22.50' REQD - - - 3.21 LBS
SEAL FOR 1-1/4" STRAPPING - - 2 REQD - - - - - NIL
PLYWOOD, 1/2" - - - 46.44 SQ FT REQD - - 63.86 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-575/E CONTAINER	3	6,651 LBS
DUNNAGE		417 LBS
ISO CONTAINER		6,050 LBS
TOTAL WEIGHT		13,118 LBS (APPROX)

LESS-THAN-FULL-LOAD PROCEDURE