

APPROVED BY
BUREAU OF EXPLOSIVES

[Signature]

DATE 1-18-2008

LOADING AND BRACING* IN END OPENING ISO CONTAINERS OF BLU-122 BOMBS PACKED IN CNU-658 CONTAINERS

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*THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL, MOTOR, OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND <i>[Signature]</i>	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		AUGUST 2007		
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND <i>[Signature]</i> U.S. ARMY DEFENSE AMMUNITION CENTER	ENGINEER OR TECHNICIAN	BASIC REV.	RICHARD GARSIDE		
	TRANSPORTATION ENGINEERING DIVISION	<i>[Signature]</i>	TESTED	CLASS	
	VALIDATION ENGINEERING DIVISION	<i>[Signature]</i>	DIVISION	DRAWING	FILE
ENGINEERING DIRECTORATE	<i>[Signature]</i>	19	48	8851	SP15PB20

GENERAL NOTES

(GENERAL NOTES CONTINUED)

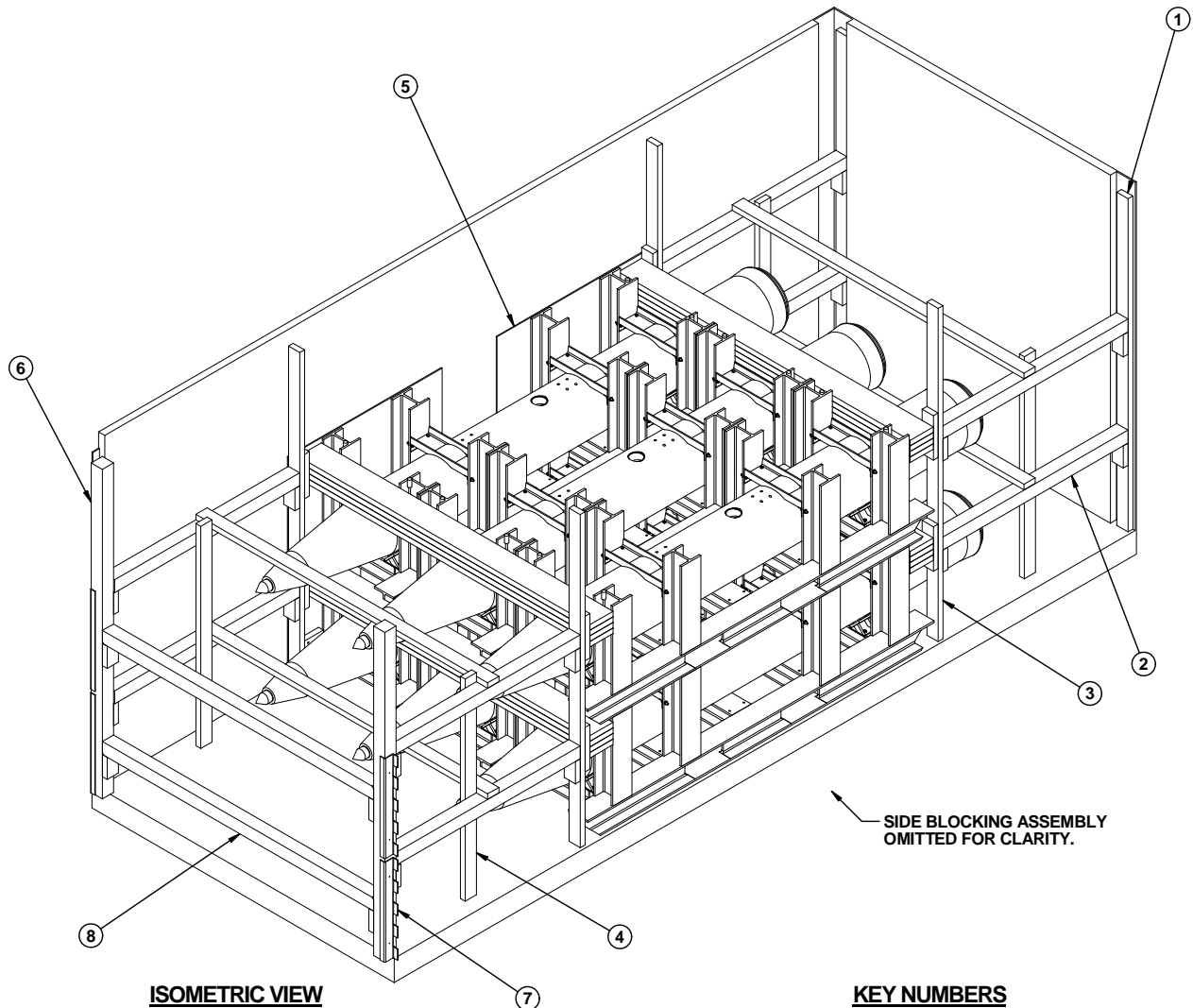
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF BLU-122 BOMBS PACKED IN CNU-658 CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS CONTAINER WITH BOMB INSTALLED. SEE AIR FORCE DRAWING X20065101 AND PAGE 4 FOR DETAILS OF THE CONTAINER. **CAUTION:** REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOADS AS SHOWN ARE BASED ON A 4,700 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH END OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 93" HIGH AND A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. OLDER/OTHER CONTAINERS MAY HAVE A TOTAL INSIDE HEIGHT OF 95", BUT A CLEAR HEIGHT UNDER THE ROOF BOWS OF 93". VERIFY INSIDE CONTAINER HEIGHT PRIOR TO FABRICATING DUNNAGE. THE LOADS ARE DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT. HOWEVER, THE LOADS AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. **NOTICE:** OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.
- D. WHEN LOADING 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". EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE HORIZONTAL PIECES ON THE FILLER ASSEMBLY OR THE SIDE BLOCKING ASSEMBLY. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE STRUTS IN THE FILLER ASSEMBLY MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE CONTAINERS.
- E. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" 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, ON TO, OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- G. IN SOME ISO CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE FORWARD WALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE VERTICAL PIECE OF THE VERTICAL ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THE VERTICAL ASSEMBLY. 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 FORWARD WALL ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER FORWARD WALL. ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR FORWARD LONGITUDINAL BLOCKING.
- H. WHETHER AN ISO 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.
- J. **CAUTION:** DO NOT NAIL DUNNAGE MATERIAL TO THE ISO CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- K. PORTIONS OF THE ISO CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- L. THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOAD IS DELINEATED IN THE LOAD VIEW, 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. 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.
- P. THE QUANTITY OF CONTAINERS SHOWN IN THE LOAD ON PAGE 3 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE DETAILS ON PAGES 6 AND 7.
- Q. 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.
- R. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN CONTAINERS, BETWEEN CONTAINERS AND THE ISO END OPENING CONTAINER, AND BETWEEN CONTAINERS AND STEEL STRAPPINGS, IF DESIRED, TO PREVENT CHAFING DAMAGE TO ISO END OPENING CONTAINER PAINT AND MARKINGS.
- S. FOUR UNIVERSAL LOAD RETAINERS, AS DEPICTED IN THE LOADS ON PAGES 3 AND 6, ARE REQUIRED WHEN LOADING SIX, FIVE OR FOUR CNU-658 CONTAINERS. TWO UNIVERSAL LOAD RETAINERS, AS DEPICTED IN THE LOAD ON PAGE 7, ARE REQUIRED WHEN LOADING THREE, TWO OR ONE CNU-658 CONTAINER(S). THIS IS AN EXCEPTION TO THE ESTABLISHED PROCEDURES; HOWEVER, THE EXCEPTION IS PERMITTED FOR THE AMMUNITION PACK COVERED BY THIS DRAWING. REFER TO DAC DRAWING ACV00682 FOR DETAILS OF THE UNIVERSAL LOAD RETAINER CONSTRUCTION, AND TO DEPARTMENT OF THE ARMY DRAWING DA-116 FOR DETAILS FOR INSTALLATION TO THE DOOR POST VERTICAL, PLACEMENT INTO THE ISO CONTAINER, AND FOR OTHER METHODS OF REAR-OF-LOAD RESTRAINT.
- T. RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD ON PAGE 3:
 - 1. PREFABRICATE TWO END BLOCKING ASSEMBLIES, TWO VERTICAL ASSEMBLIES, TWO DOOR POST VERTICAL ASSEMBLIES, AND FOUR SIDE BLOCKING ASSEMBLIES.
 - 2. INSTALL THE TWO VERTICAL ASSEMBLIES AND ONE END BLOCKING ASSEMBLY WITH FOUR STRUTS AT THE END OF THE ISO CONTAINER.
 - 3. LOAD SIX CNU-658 CONTAINERS TIGHT AGAINST BLOCKING ASSEMBLY, WITH THE FOUR SIDE BLOCKING ASSEMBLIES INSTALLED BEFORE THE CNU-658 CONTAINERS ARE PUSHED INTO PLACE.
 - 4. INSTALL LAST END BLOCKING ASSEMBLY TIGHT AGAINST THE CNU-658 CONTAINERS.
 - 5. INSTALL THE TWO DOOR POST VERTICAL ASSEMBLIES AND THE REMAINING STRUTS TO CREATE A TIGHT LOAD.

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).
- 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.
- 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.
- WIRE, CARBON STEEL - - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.
- ANTI-CHAFING MATERIAL - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.

(CONTINUED AT RIGHT)



ISOMETRIC VIEW

KEY NUMBERS

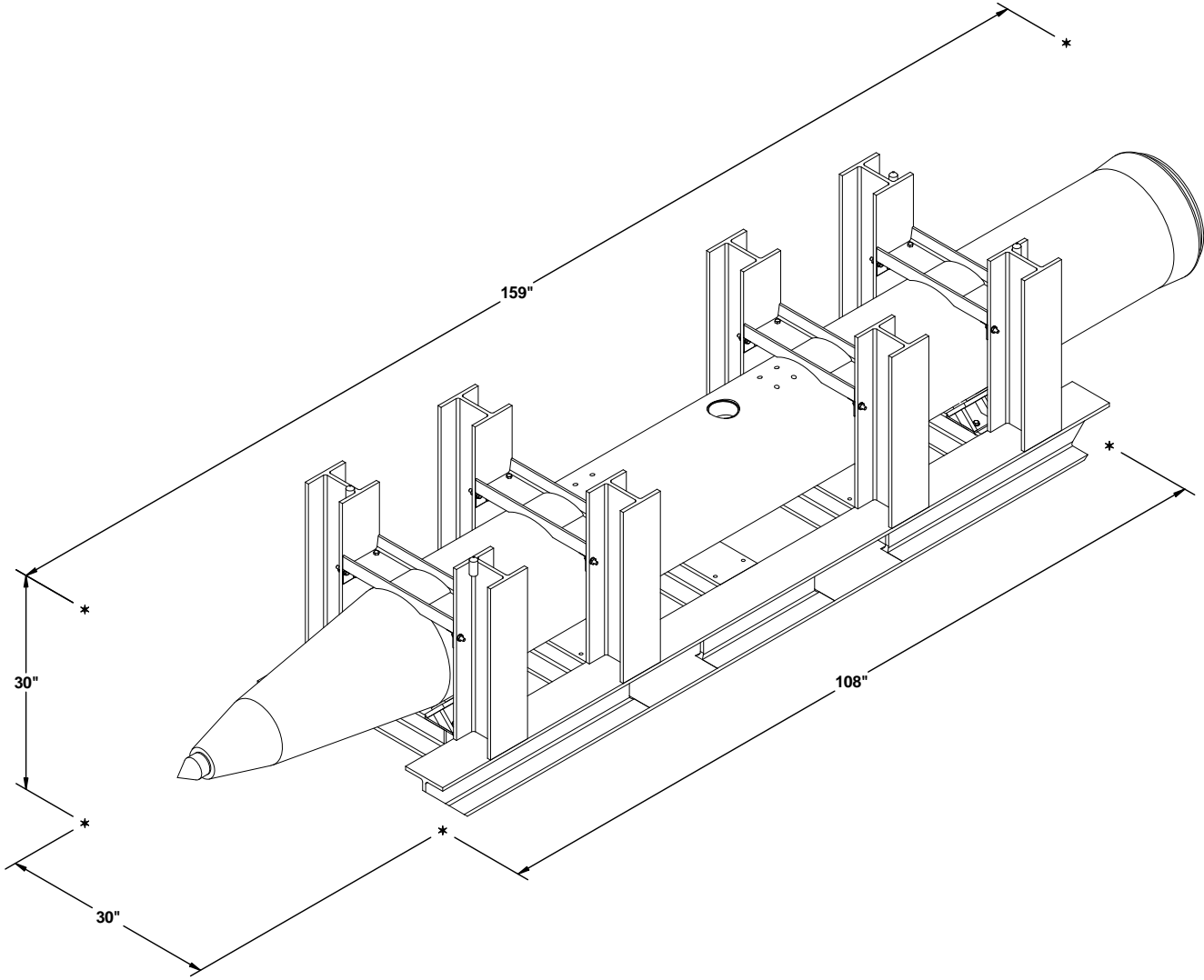
- ① VERTICAL ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 5.
- ② STRUT, 4" X 4" BY CUT-TO-FIT (REF: 57 3/4") (8 REQD). TOENAIL TO THE END BLOCKING ASSEMBLY, VERTICAL ASSEMBLY, AND DOOR POST VERTICAL W/2-12d NAILS AT EACH END OF STRUT. SEE "BEVEL CUT" DETAIL ON PAGE 8.
- ③ END BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 5.
- ④ STRUT BRACING (2 REQD). SEE DETAIL ON PAGE 7.
- ⑤ SIDE BLOCKING ASSEMBLY (4 REQD). SEE DETAIL ON PAGE 8.
- ⑥ DOOR POST VERTICAL (2 REQD). SEE DETAIL ON PAGE 5.
- ⑦ UNIVERSAL LOAD RETAINER (4 REQD, 2 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPARTMENT OF ARMY DRAWING DA-116, DAC DRAWING ACV00682, AND GENERAL NOTE "S" ON PAGE 2.
- ⑧ DOOR SPANNER, 4" X 4" BY CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF: 7-1 1/4") (2 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE "BEVEL CUT" DETAIL ON PAGE 8.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	120	80
2" X 8"	121	162
4" X 4"	53	71
NAILS	NO. REQD	POUNDS
6d (2")	32	1/4
10d (3")	276	4-1/4
12d (3-1/4")	32	1/2
PLYWOOD, 1/4" - 80.00 SQ FT REQD		55.00 LBS

LOAD AS SHOWN

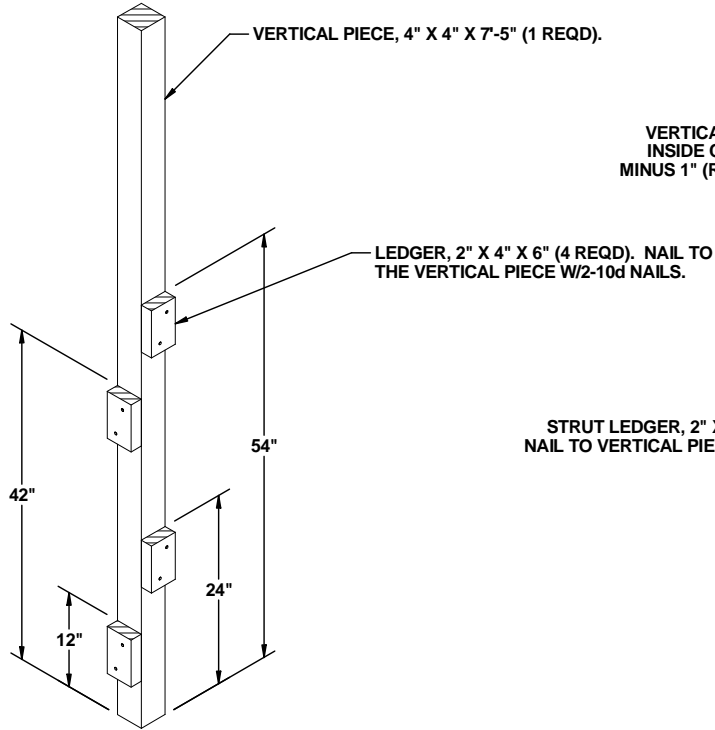
ITEM	QUANTITY	WEIGHT (APPROX)
CNU-658	6	29,490 LBS
DUNNAGE		686 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		34,876 LBS



CNU-658 CONTAINER

GROSS WEIGHT - - - - - 4,915 LBS (APPROX)
 CUBE - - - - - 82.8 CU FT (APPROX)

ROTATED 90° FROM THE ISOMETRIC VIEWS SHOWN ON PAGES 3, 6, AND 7.



DOOR POST VERTICAL

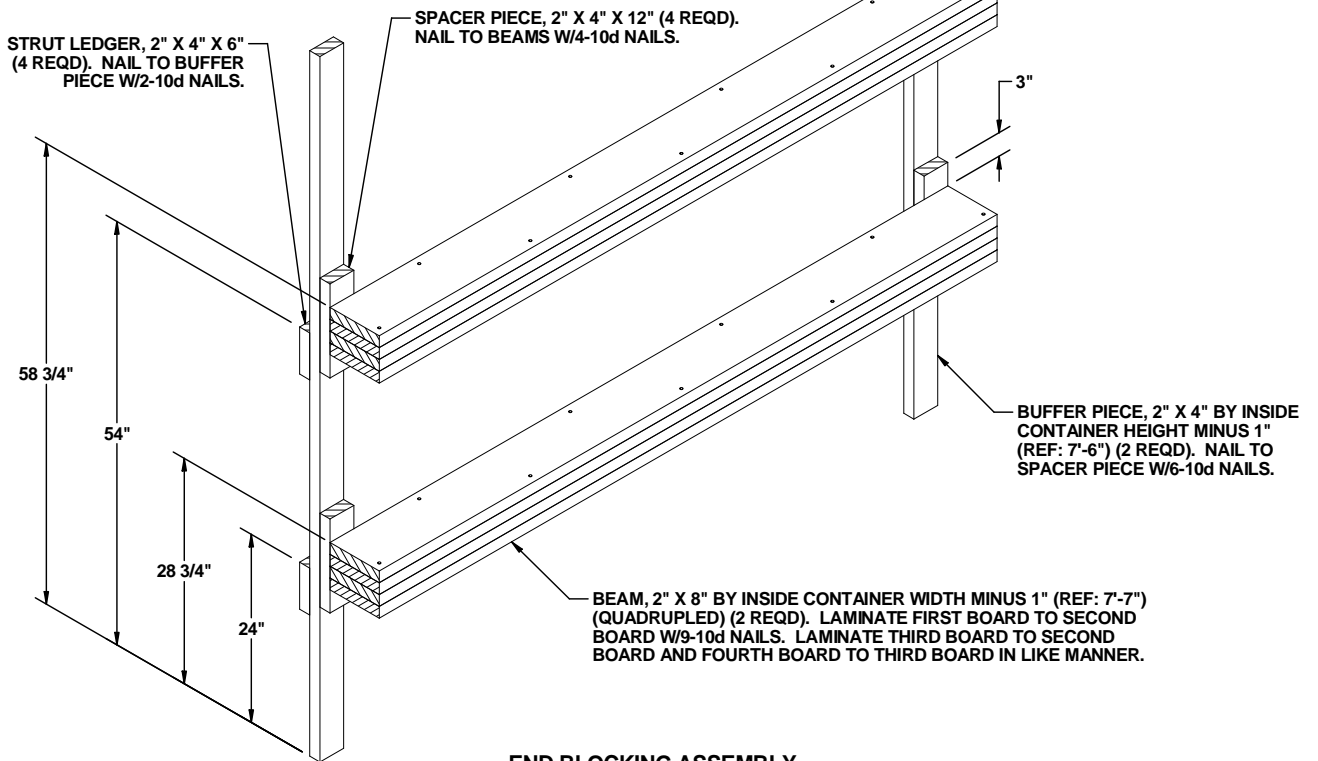
A LEFT-HAND ASSEMBLY IS DEPICTED ABOVE, A RIGHT-HAND ASSEMBLY IS ALSO REQUIRED. NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP STRUT LEDGER.

VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-6") (1 REQD).

STRUT LEDGER, 2" X 4" X 6" (2 REQD). NAIL TO VERTICAL PIECE W/2-10d NAILS.

VERTICAL ASSEMBLY

NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP STRUT LEDGER.

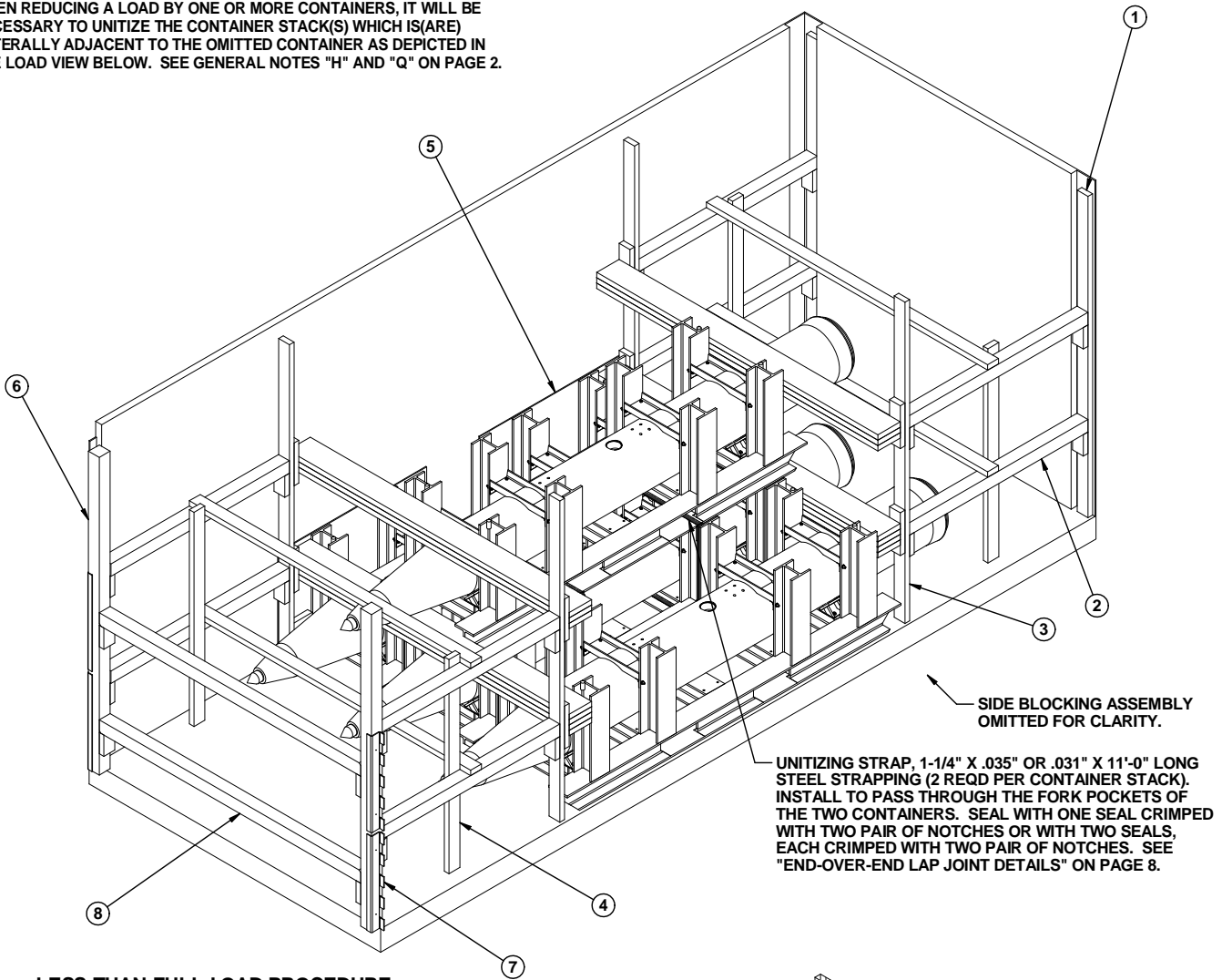


END BLOCKING ASSEMBLY

NOTE: FOR A ONE-HIGH LOAD, ELIMINATE THE TOP BEAM ASSEMBLY, TOP TWO SPACER PIECES, AND TOP TWO STRUT LEDGERS. FOR A LESS-THAN-FULL-LOAD, WHERE A LAYER OF CNU-658 CONTAINERS CONTAINS LESS THAN THREE CONTAINERS, THE 2" X 8" BEAMS CAN BE TRIPLE LAMINATED (ONE BEAM REMOVED).

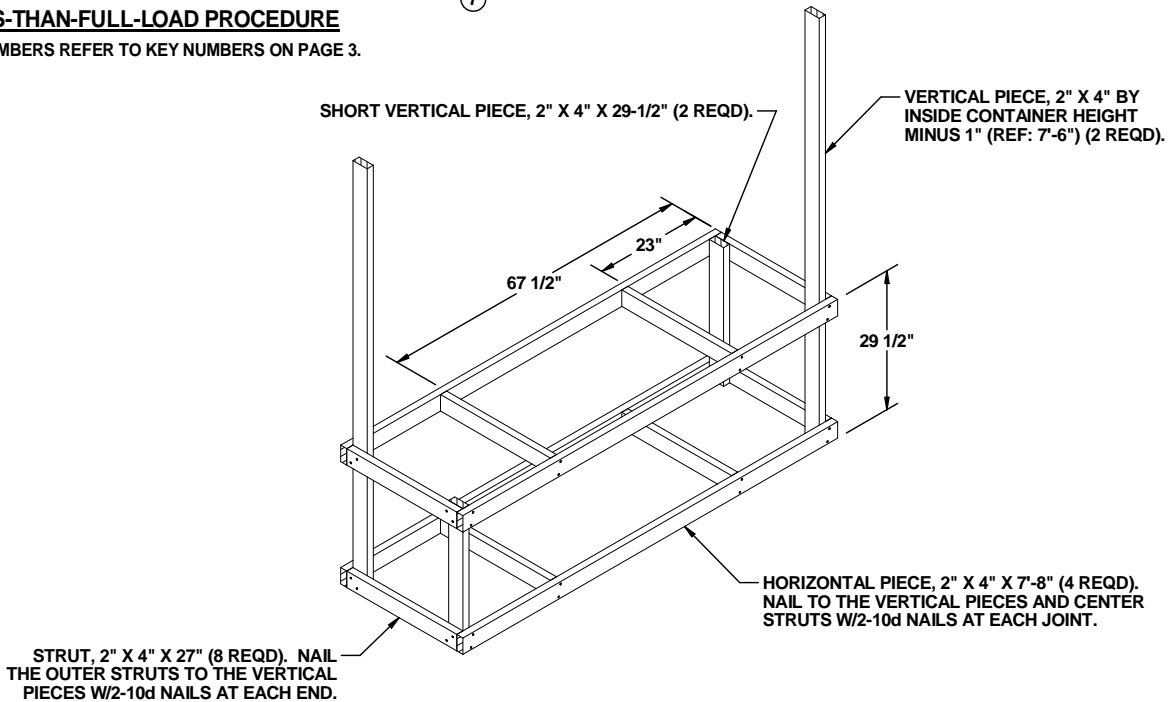
SPECIAL NOTE:

WHEN REDUCING A LOAD BY ONE OR MORE CONTAINERS, IT WILL BE NECESSARY TO UNITIZE THE CONTAINER STACK(S) WHICH IS(ARE) LATERALLY ADJACENT TO THE OMITTED CONTAINER AS DEPICTED IN THE LOAD VIEW BELOW. SEE GENERAL NOTES "H" AND "Q" ON PAGE 2.

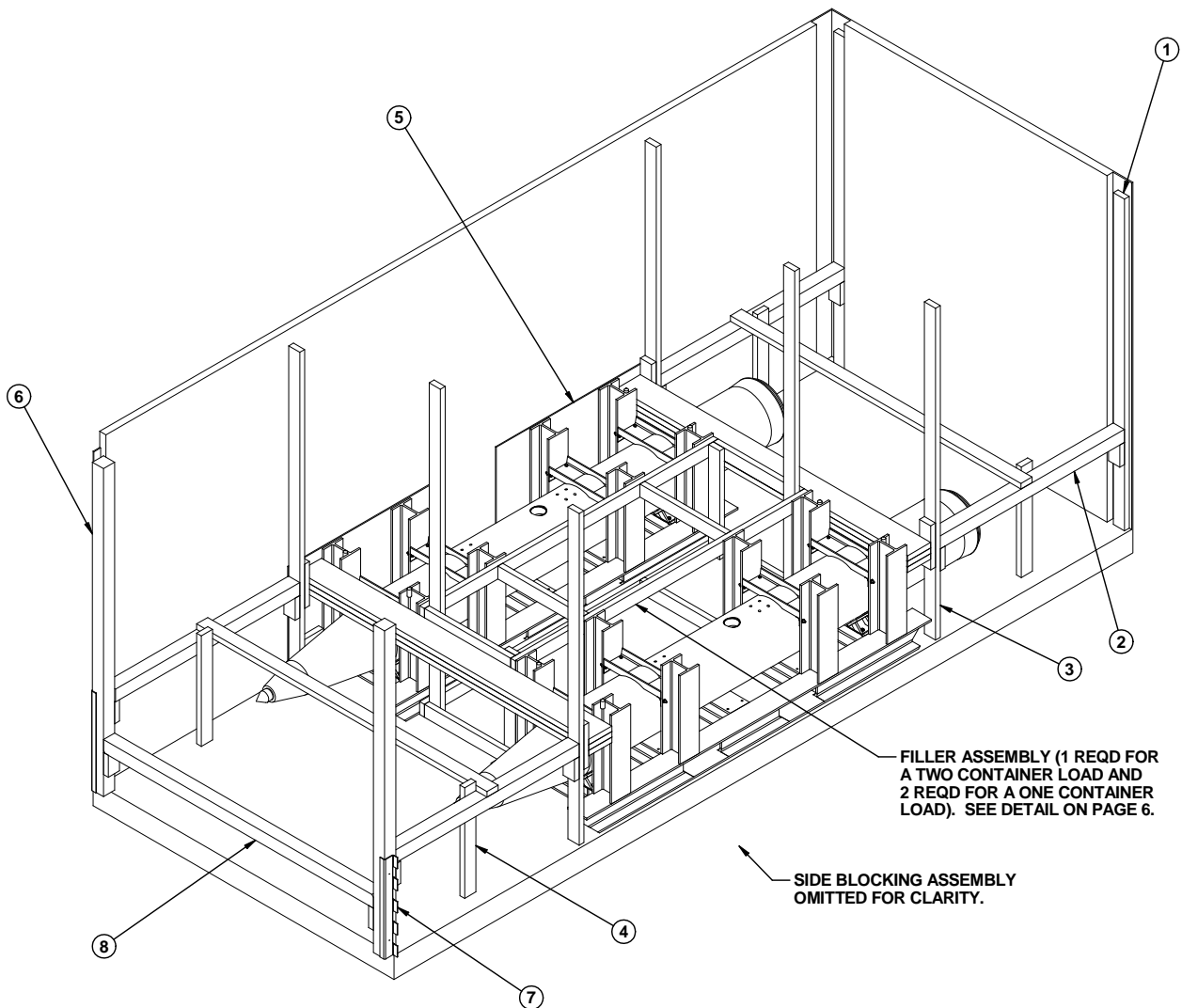


LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 3.

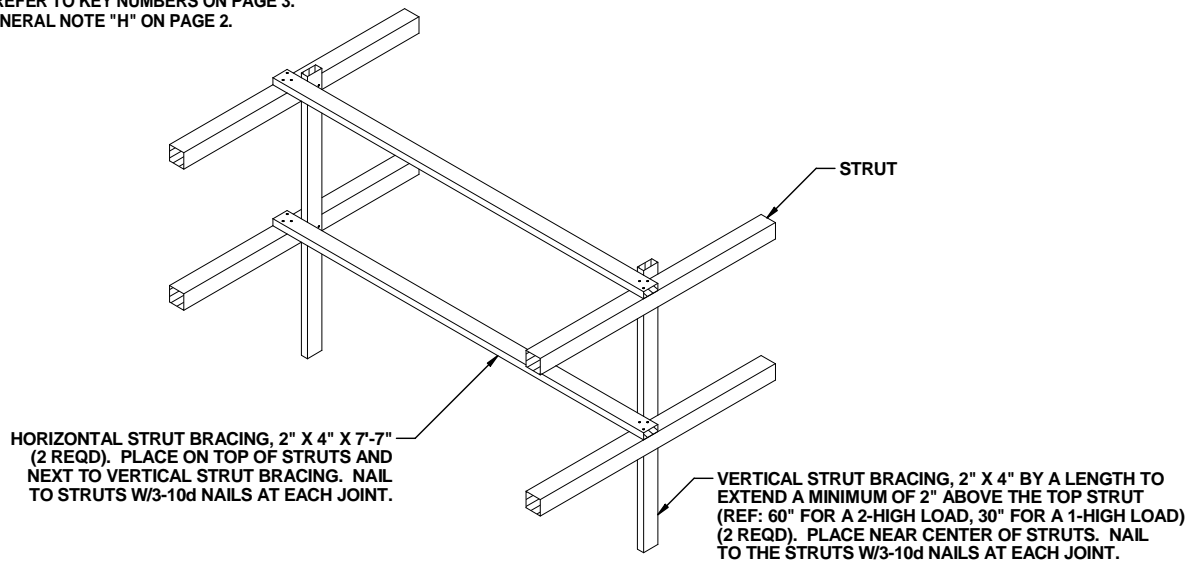


FILLER ASSEMBLY

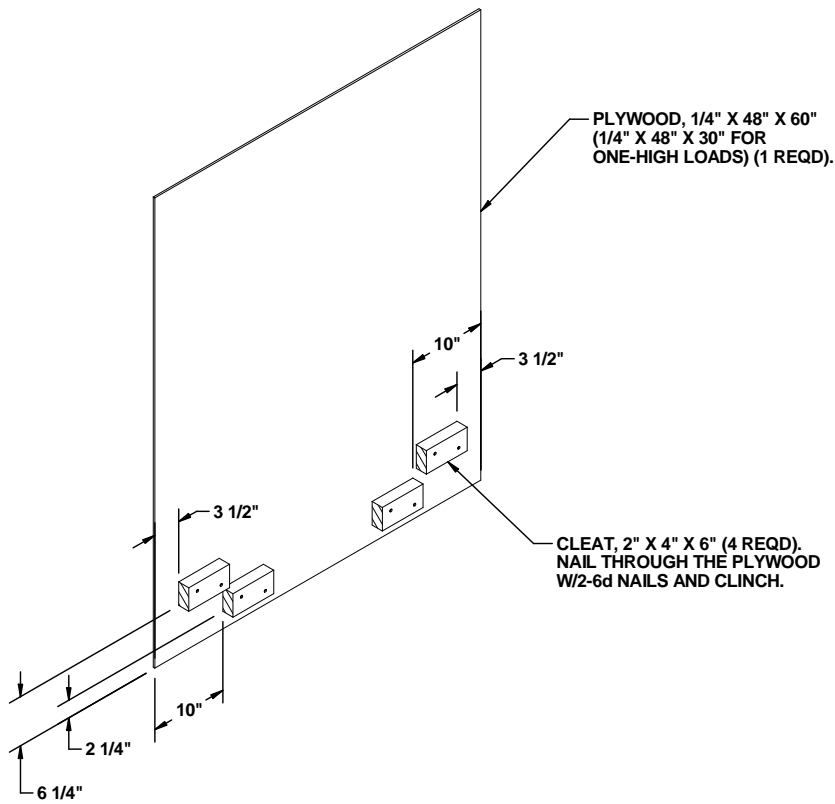


LESS-THAN-FULL-LOAD PROCEDURE

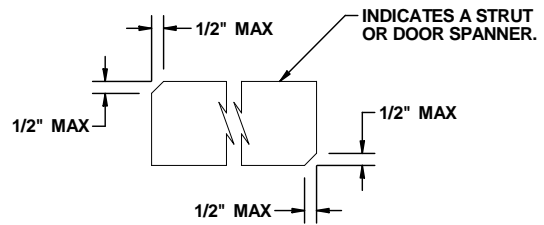
KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 3.
SEE GENERAL NOTE "H" ON PAGE 2.



NOTE: STRUT BRACING REQUIRED FOR STRUTS 48" OR LONGER. FOR A ONE-HIGH LOAD, ELIMINATE THE TOP HORIZONTAL STRUT BRACE AND REDUCE THE VERTICAL STRUT BRACE LENGTH TO 30".

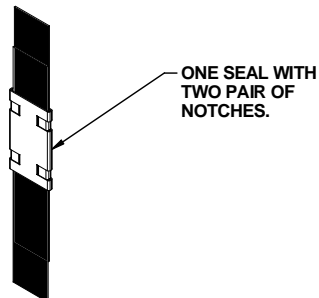


SIDE BLOCKING ASSEMBLY



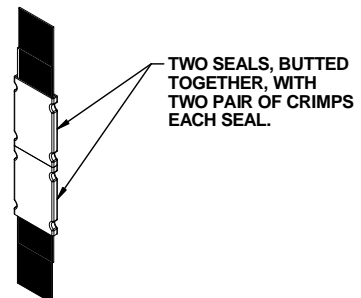
BEVEL CUT

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



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