

LOADING AND BRACING* IN END OPENING ISO CONTAINER OF 2.75” HYDRA ROCKET IN M643 CONTAINER ON METAL PALLETS

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

U.S. ARMY MATERIEL COMMAND DRAWING

<p>APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND</p> <p>RUS.ALLEN.J .1230354282</p> <p><small>Digitally signed by RUS.ALLEN.J.1230354282 DN: c=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=RUS.ALLEN.J.1230354282 Date: 2017.10.17 10:11:17 -0500</small></p>	<p>CAUTION: VERIFY PRIOR TO USE AT HTTPS://MHP.REDSTONE.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 10.</p>				
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	<p>ENGINEERING DIVISON</p>	<p>REV.</p>	<p>FIEFFER.LAUR A.A.1230375727</p> <p><small>Digitally signed by FIEFFER.LAURA.A.1230375727 DN: c=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FIEFFER.LAURA.A.1230375727 Date: 2017.09.19 09:32:52 -0500</small></p>		
	<p>TEST ENGINEER</p>	<p>TEST REPORT</p>	<p>NA</p>	<p>FELICIANO.AD IN.1259200373</p> <p><small>Digitally signed by FELICIANO.ADN.1259200373 DN: c=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FELICIANO.ADN.1259200373 Date: 2017.09.28 07:48:28 -0500</small></p>	<p>CLASS</p>
	<p>EXPLOSIVE SAFETY DIRECTORATE</p>	<p>THOMAS.CARL.AN THONY.1104621372</p> <p><small>Digitally signed by THOMAS.CARL.ANTHONY.1104621372 DN: c=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=THOMAS.CARL.ANTHONY.1104621372 Date: 2017.10.02 10:34:48 -0500</small></p>	<p>19</p>	<p>DIVISION</p>	<p>48</p>
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GENERAL NOTES

(GENERAL NOTES CONTINUED)

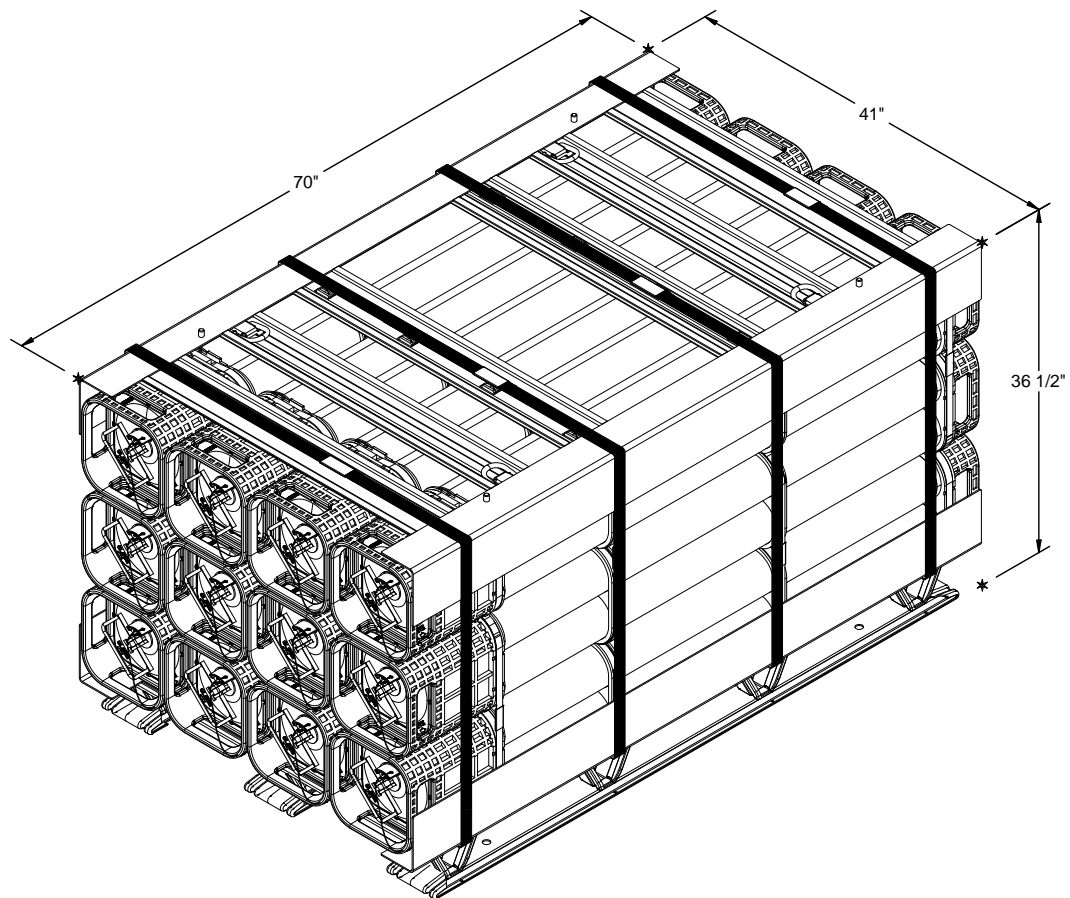
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO LOADS OF 2.75" HYDRA ROCKET PACKED IN M643 CONTAINER ON METAL PALLET. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS 2.75" HYDRA ROCKET PACKED IN M643 CONTAINER ON METAL PALLET. SEE PAGE 3 AND AMC DRAWING 19-48-4231/62-20PM1006 FOR DETAILS OF THE PALLET UNIT.
- 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, WITH 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 LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT. HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. **NOTICE:** OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.
- D. 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.
- E. WHEN LOADING 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 LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE HORIZONTAL PIECES ON THE CENTER FILL ASSEMBLY. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE QUANTITY OF THE FILL MATERIAL IN THE CENTER FILL ASSEMBLY MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE PALLET UNITS.
- 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 BUFFER PIECES OF THE FORWARD BLOCKING ASSEMBLY OR FORWARD STRUT 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 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 SIDE WALLS AND ROOF, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- L. THE APPROVED METHODS SHOWN HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING AND STAYING OF THE DESIGNATED ITEM. **NOTICE:** A SHIPMENT WILL BE POSITIONED ON A TRAILER CONSISTENT WITH STATE WEIGHT LAWS.
- M. THESE PROCEDURES CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE PALLET UNITS WHEN THEY ARE LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM IDENTIFIED IN THE DRAWING TITLE, OR WHEN THEY ARE EMPTY.
- N. 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.

- O. 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.
- P. 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.
- Q. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN PALLET UNIT AND SIDE WALLS, IF DESIRED, TO PREVENT CHAFING DAMAGE TO PALLET UNIT PAINT AND MARKINGS.
- R. SIX UNIVERSAL LOAD RETAINERS, AS DEPICTED IN THE LOAD ON PAGE 4, ARE REQUIRED WHEN LOADING THE PALLET UNITS. 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.
- S. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOAD ON PAGE 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FILLER ASSEMBLY ON PAGE 6, THE FORWARD STRUT ASSEMBLY ON PAGE 7, AND THE "LESS-THAN-FULL-LOAD PROCEDURE" ON PAGES 8 AND 9.
- T. RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD ON PAGE 4:
1. PREFABRICATE FORWARD/REAR BLOCKING ASSEMBLIES, DOOR POST VERTICALS, AND CENTER FILL ASSEMBLIES.
 2. INSTALL FORWARD BLOCKING ASSEMBLY.
 3. LOAD THE 12 PALLET UNITS, TIGHT AGAINST FORWARD BLOCKING ASSEMBLY AND SIDE WALLS, AND LOAD THE THREE CENTER BLOCKING ASSEMBLIES.
 4. INSTALL REAR BLOCKING ASSEMBLY.
 5. INSTALL THE TWO DOOR POST VERTICAL ASSEMBLIES WITH UNIVERSAL LOAD RETAINERS ATTACHED.
 6. INSTALL THE THREE DOOR SPANNER PIECES.
 7. INSTALL THE FILL MATERIAL FOR A TIGHT LOAD.

MATERIAL SPECIFICATIONS

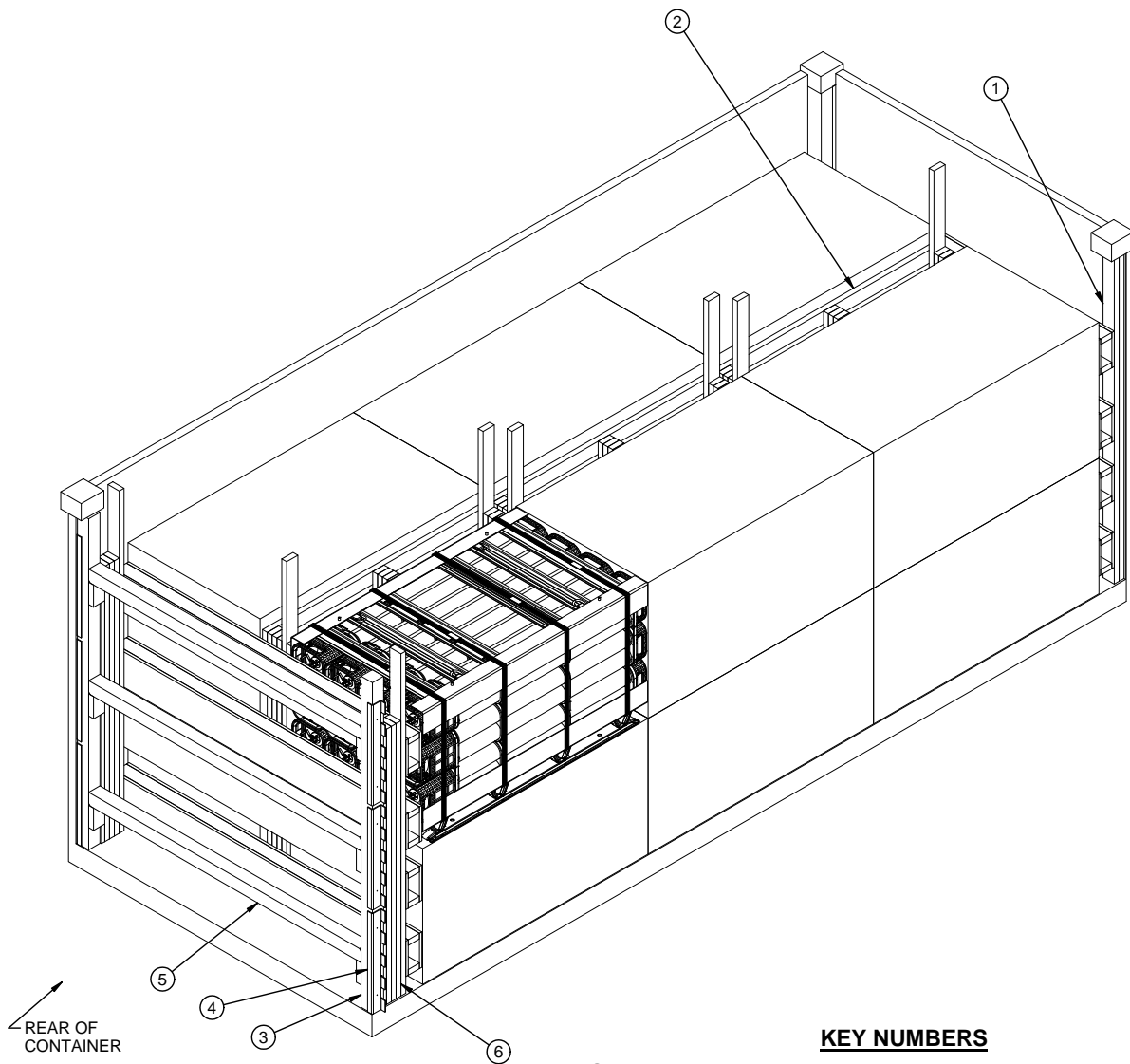
- LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL NLCMS OR NLCMMS).
- PLYWOOD** - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- ANTI-CHAFING MATERIAL** - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
- WIRE, CARBON STEEL** - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.
- STEEL STRUCTURAL** - - - - - : ASTM A36; 36,000 PSI MINIMUM YIELD OR BETTER.

(CONTINUED AT RIGHT)



PALLET UNIT DATA

GROSS WEIGHT - - - - - 2,378 LBS
CUBE - - - - - 60.6 CU FT



ISOMETRIC VIEW

KEY NUMBERS

- ① FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 5.
- ② CENTER FILL ASSEMBLY (3 REQD). SEE DETAIL ON PAGE 5.
- ③ DOOR POST VERTICAL (2 REQD). SEE DETAIL ON PAGE 6, GENERAL NOTE "R" ON PAGE 2, AND "DETAIL A" ON PAGE 10.
- ④ UNIVERSAL LOAD RETAINER (6 REQD, 3 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPARTMENT OF ARMY DRAWING DA-116, GENERAL NOTE "R" ON PAGE 2, AND "DETAIL A" ON PAGE 10.
- ⑤ DOOR SPANNER, 4" X 4" BY CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF: 7'-1 1/4") (3 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE "BEVEL CUT" DETAIL ON PAGE 7.
- ⑥ FILL MATERIAL, 1" X 4" OR 2" X 4" X 6'-2" (AS REQD). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/1 NAIL OF A SUITABLE SIZE EVERY 12" (6d FOR 1" AND 10d FOR 2" THICK MATERIAL). NAIL EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR MANNER. THE PIECES MAY BE LAMINATED TOGETHER FIRST AND THEN TOENAILED TO THE REAR BLOCKING ASSEMBLY.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	12	4
2" X 4"	565	377
4" X 4"	36	48
NAILS	NO. REQD	POUNDS
6d (2")	352	2-1/4
10d (3")	501	7-3/4
12d (3 1/4")	12	1/4
PLYWOOD, 3/4"	96.10 SQ FT REQD	198.11 LBS
UNIVERSAL LOAD RETAINER	6 REQD	39 LBS

LOAD AS SHOWN

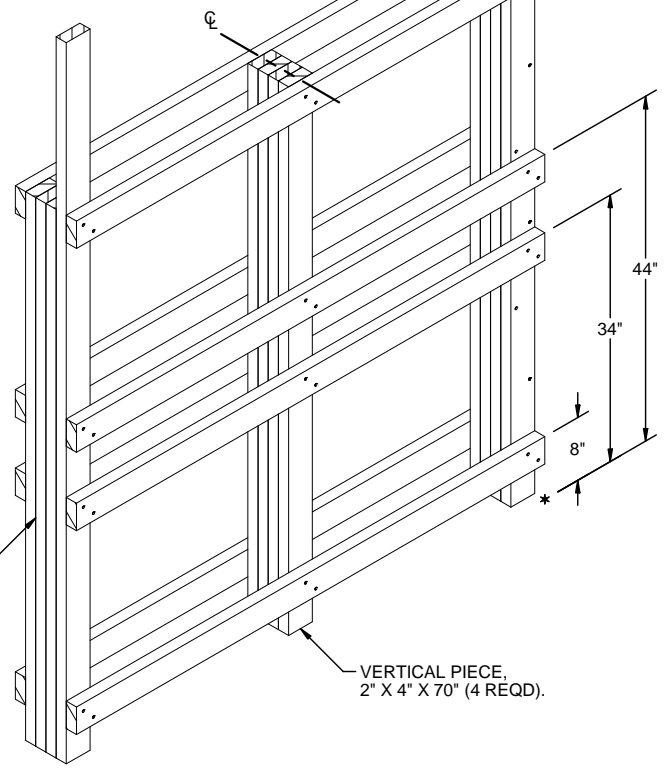
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	12	28,536 LBS
DUNNAGE		1,105 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		34,341 LBS

VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-8") (2 REQD).

HORIZONTAL PIECE, 2" X 4" X 69" (8 REQD). NAIL TO THE VERTICAL OR FILL PIECES W/2-10d NAILS AT EACH JOINT.

CENTER FILL ASSEMBLY

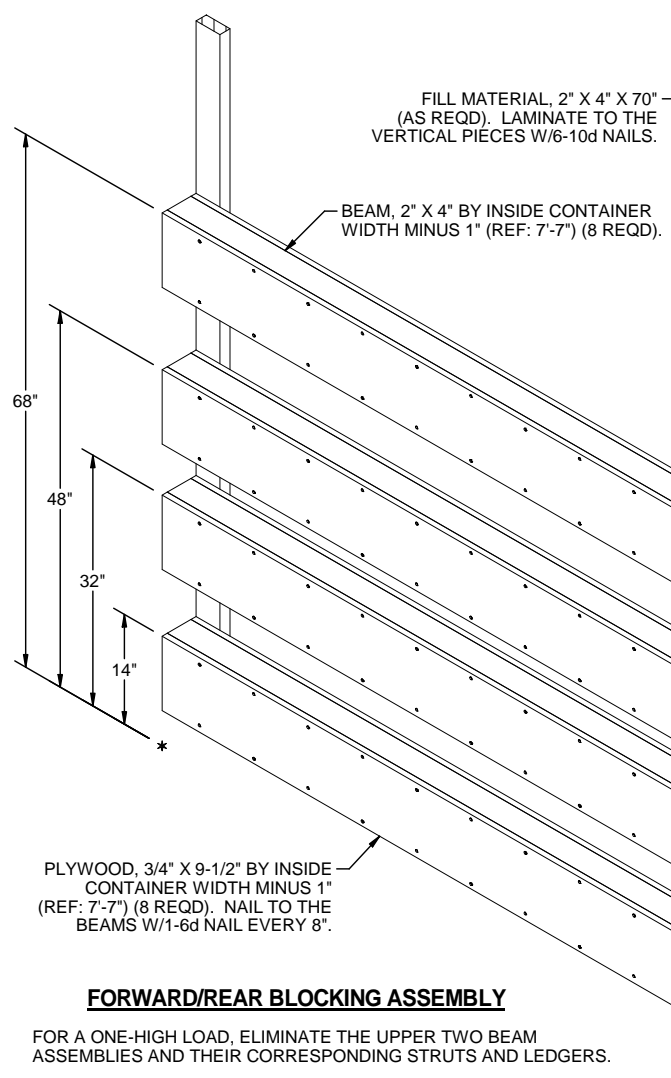
THIS DETAIL IS FOR USE WITH A 2-PALLET HIGH LOAD. FOR A 1-HIGH LOAD, ELIMINATE THE FOUR UPPER HORIZONTAL PIECES AND REDUCE THE HEIGHT OF THE SHORT VERTICAL PIECES AND FILL MATERIAL TO 34".



FILL MATERIAL, 2" X 4" X 70" (AS REQD). LAMINATE TO THE VERTICAL PIECES W/6-10d NAILS.

BEAM, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (8 REQD).

VERTICAL PIECE, 2" X 4" X 70" (4 REQD).



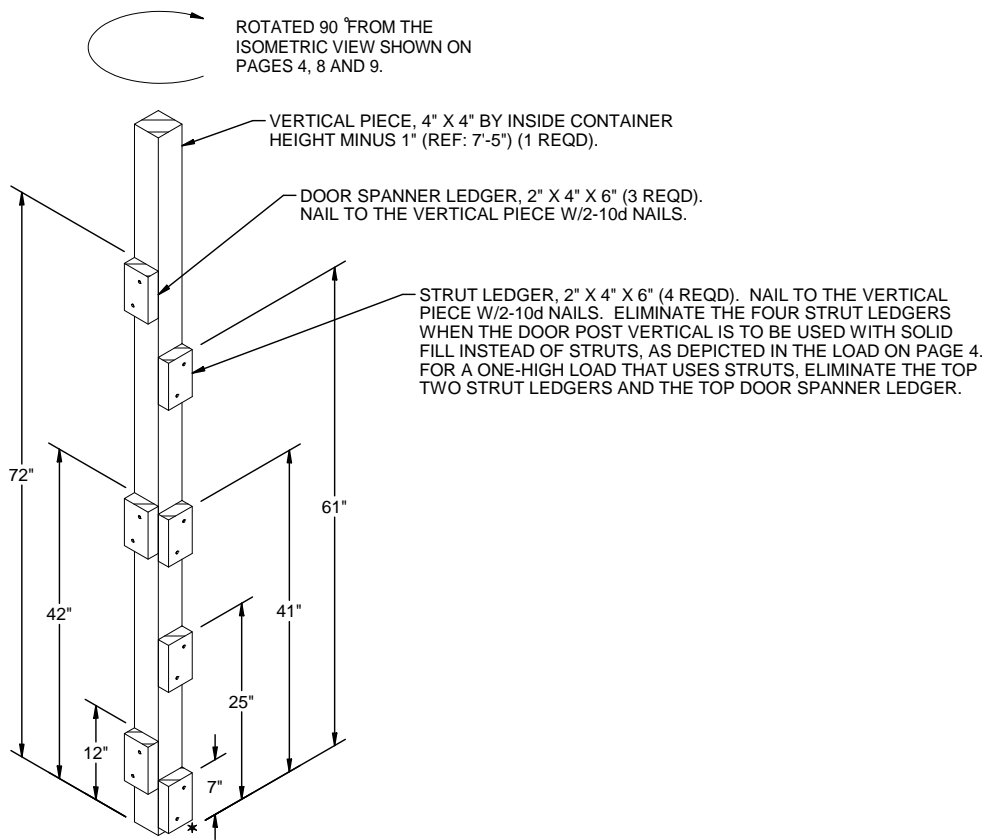
BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-6" FOR FORWARD BLOCKING ASSEMBLY, 7'-8" FOR REAR BLOCKING ASSEMBLY) (2 REQD). NAIL TO THE BEAMS W/2-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "G" ON PAGE 2.

STRUT LEDGER, 2" X 4" X 6" (8 REQD). NAIL TO BUFFER PIECES W/2-10d NAILS. STRUT LEDGERS ARE ONLY REQUIRED ON A REAR BLOCKING ASSEMBLY WHEN STRUTS ARE USED IN A LOAD.

PLYWOOD, 3/4" X 9-1/2" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (8 REQD). NAIL TO THE BEAMS W/1-6d NAIL EVERY 8".

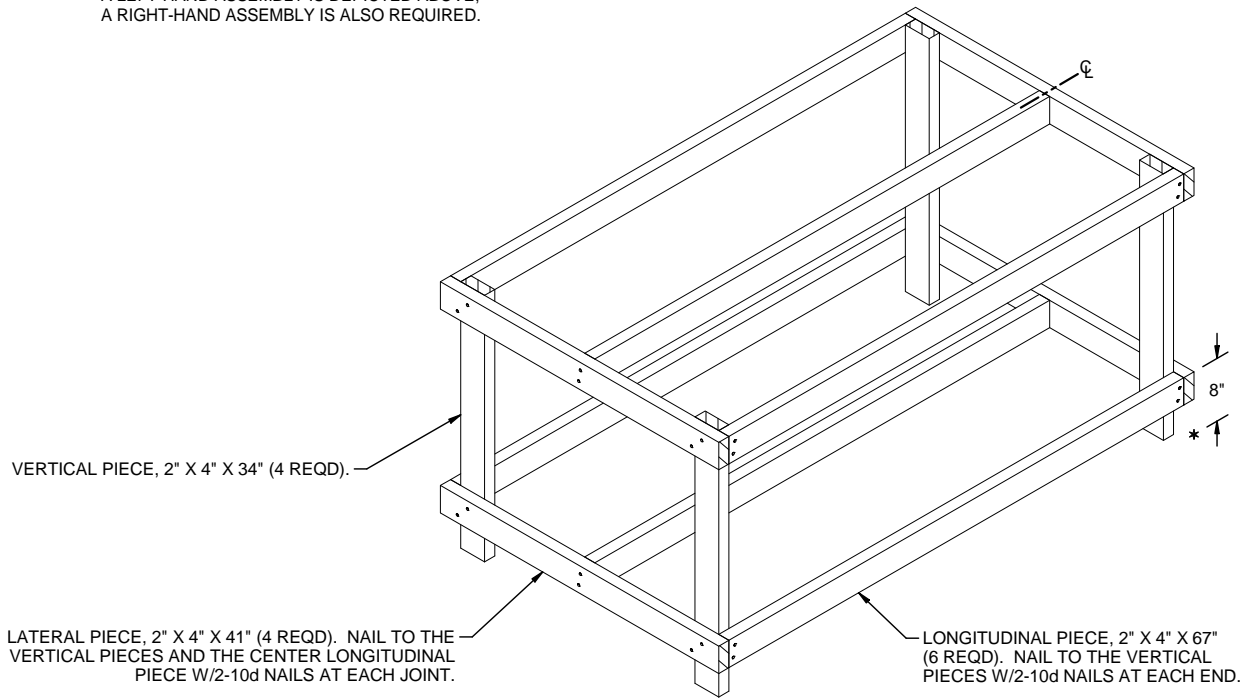
FORWARD/REAR BLOCKING ASSEMBLY

FOR A ONE-HIGH LOAD, ELIMINATE THE UPPER TWO BEAM ASSEMBLIES AND THEIR CORRESPONDING STRUTS AND LEDGERS.



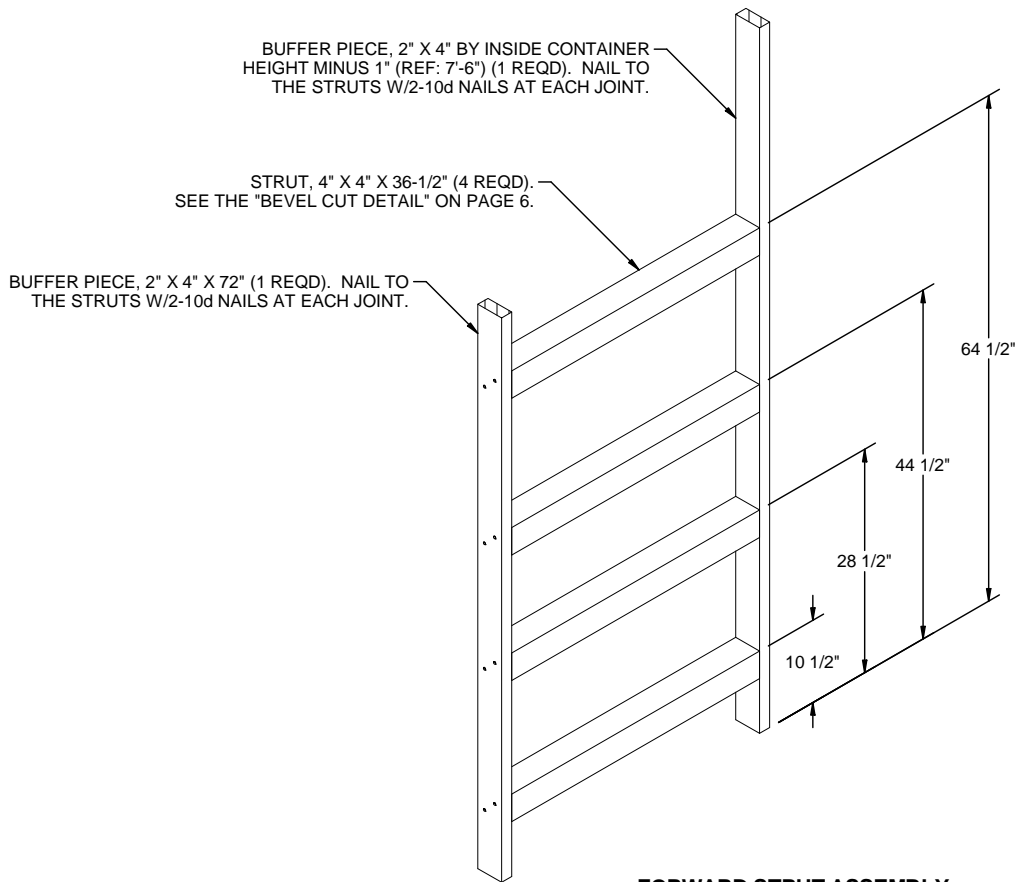
DOOR POST VERTICAL

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



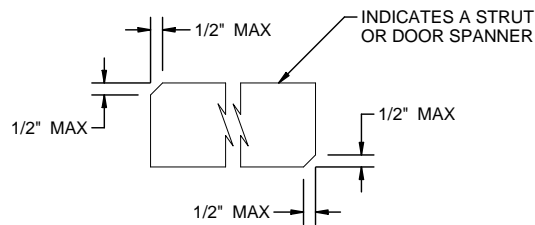
FILLER ASSEMBLY

FOR MINUS ONE PALLET UNIT. NO MORE THAN THREE FILLER ASSEMBLIES MAY BE USED FOR A 2-HIGH LOAD OR ONE FILLER ASSEMBLY MAY BE USED FOR A 1-HIGH LOAD.



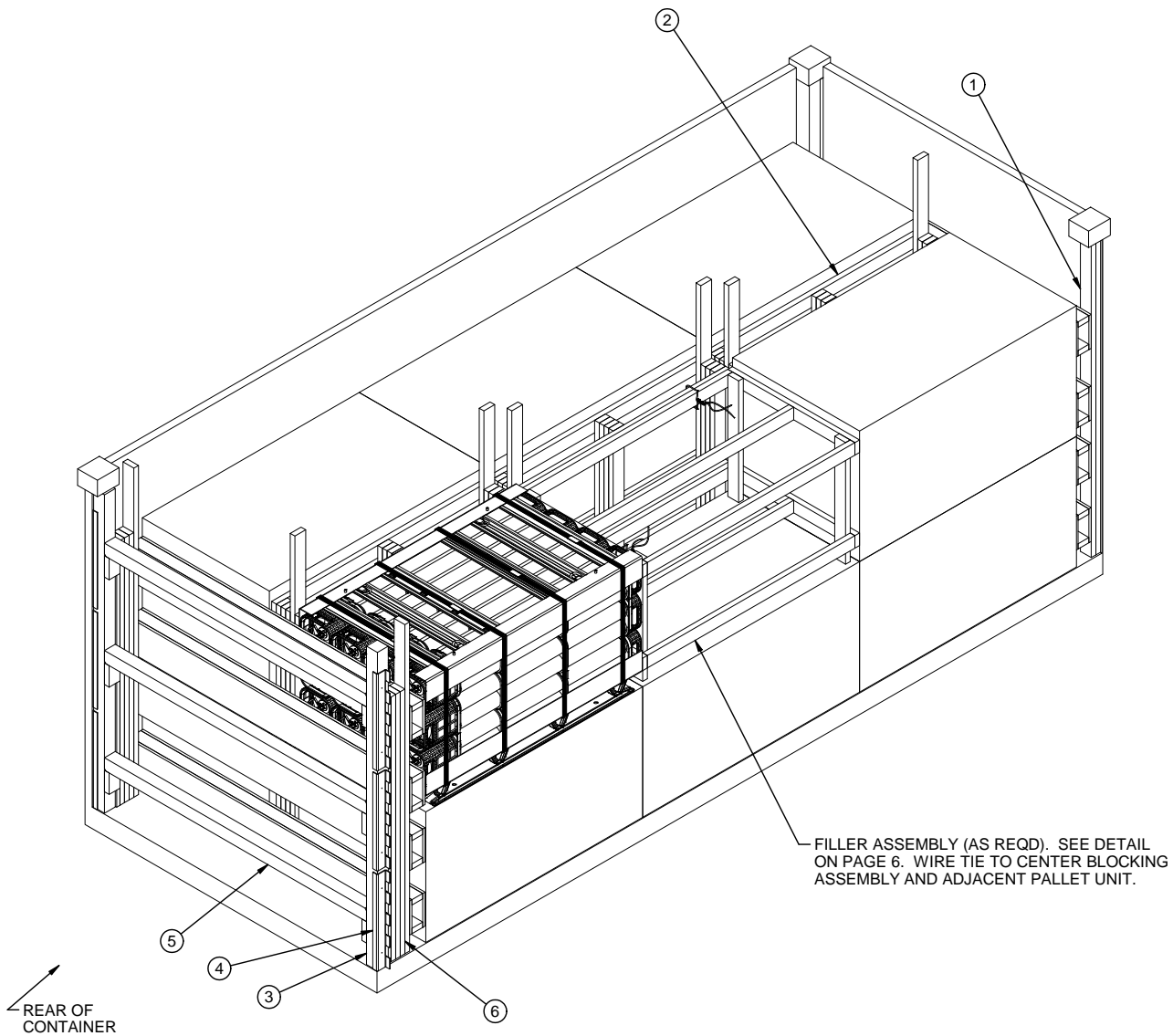
FORWARD STRUT ASSEMBLY

THIS DETAIL IS FOR USE WITH A 2-PALLET HIGH LOAD. FOR A 1-HIGH LOAD, ELIMINATE THE TWO UPPER STRUTS AND REDUCE THE HEIGHT OF THE 72" BUFFER PIECE TO 36".



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.

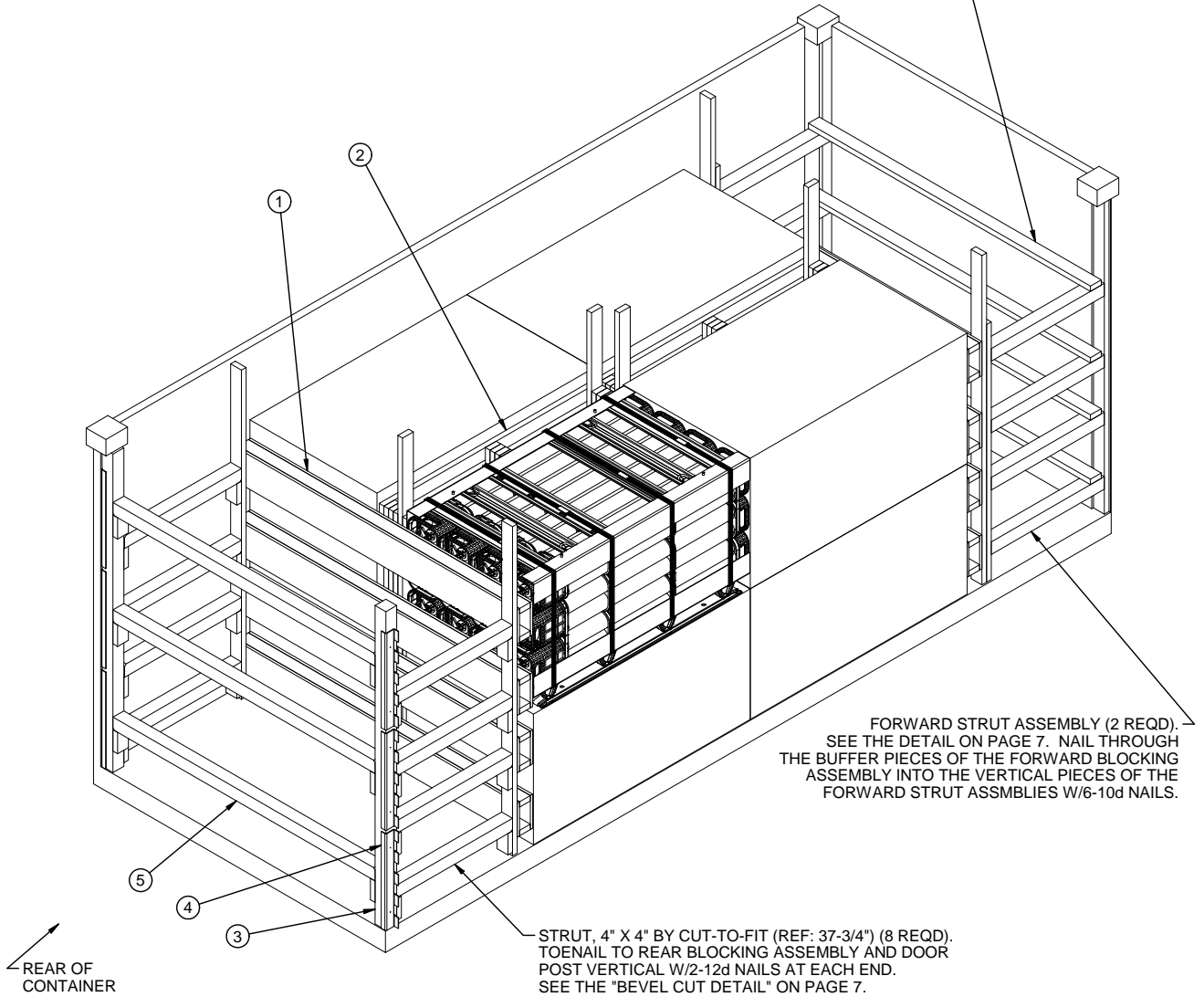


ISOMETRIC VIEW

LESS-THAN-FULL-LOAD PROCEDURE

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL-LOAD. KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 4. SEE GENERAL NOTE "H" AND "S" ON PAGE 2 AND "DETAIL A" ON PAGE 10.

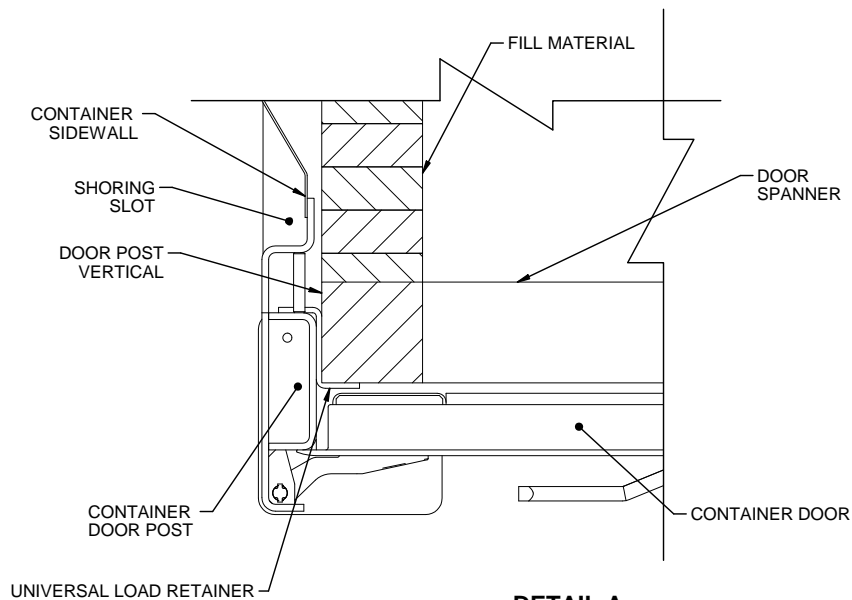
SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (4 REQD). NAIL TO THE STRUTS W/2-12d NAILS AT EACH JOINT.



ISOMETRIC VIEW

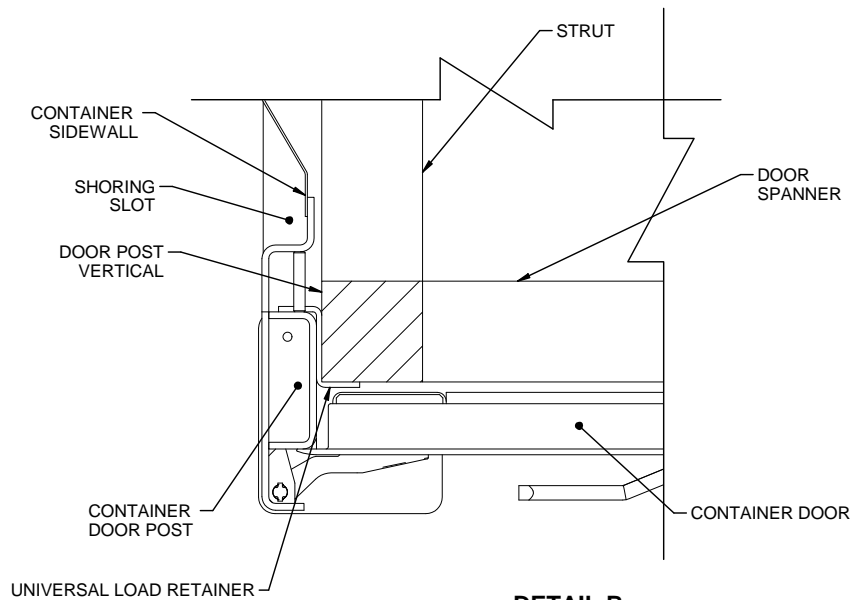
LESS-THAN-FULL-LOAD PROCEDURE

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL-LOAD. KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 4. SEE GENERAL NOTE "H" AND "S" ON PAGE 2 AND "DETAIL B" ON PAGE 10.



DETAIL A

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER ON PAGE 4 IS SHOWN DEPICTING THE PROPER POSITION OF THE DOOR POST VERTICAL, UNIVERSAL LOAD RETAINER, AND ADJACENT DUNNAGE PIECES.



DETAIL B

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER ON PAGE 9 IS SHOWN DEPICTING THE PROPER POSITION OF THE DOOR POST VERTICAL, UNIVERSAL LOAD RETAINER, AND ADJACENT DUNNAGE PIECES.