

APPROVED BY
BUREAU OF EXPLOSIVES

O n 12

DATE 8-2-2005

LOADING AND BRACING* IN END OPENING ISO CONTAINERS OF PHOENIX MISSILES (AIM-54A) PACKED 2 PER CNU-242/E OR CNU-242A/E SHIPPING AND STORAGE CONTAINER

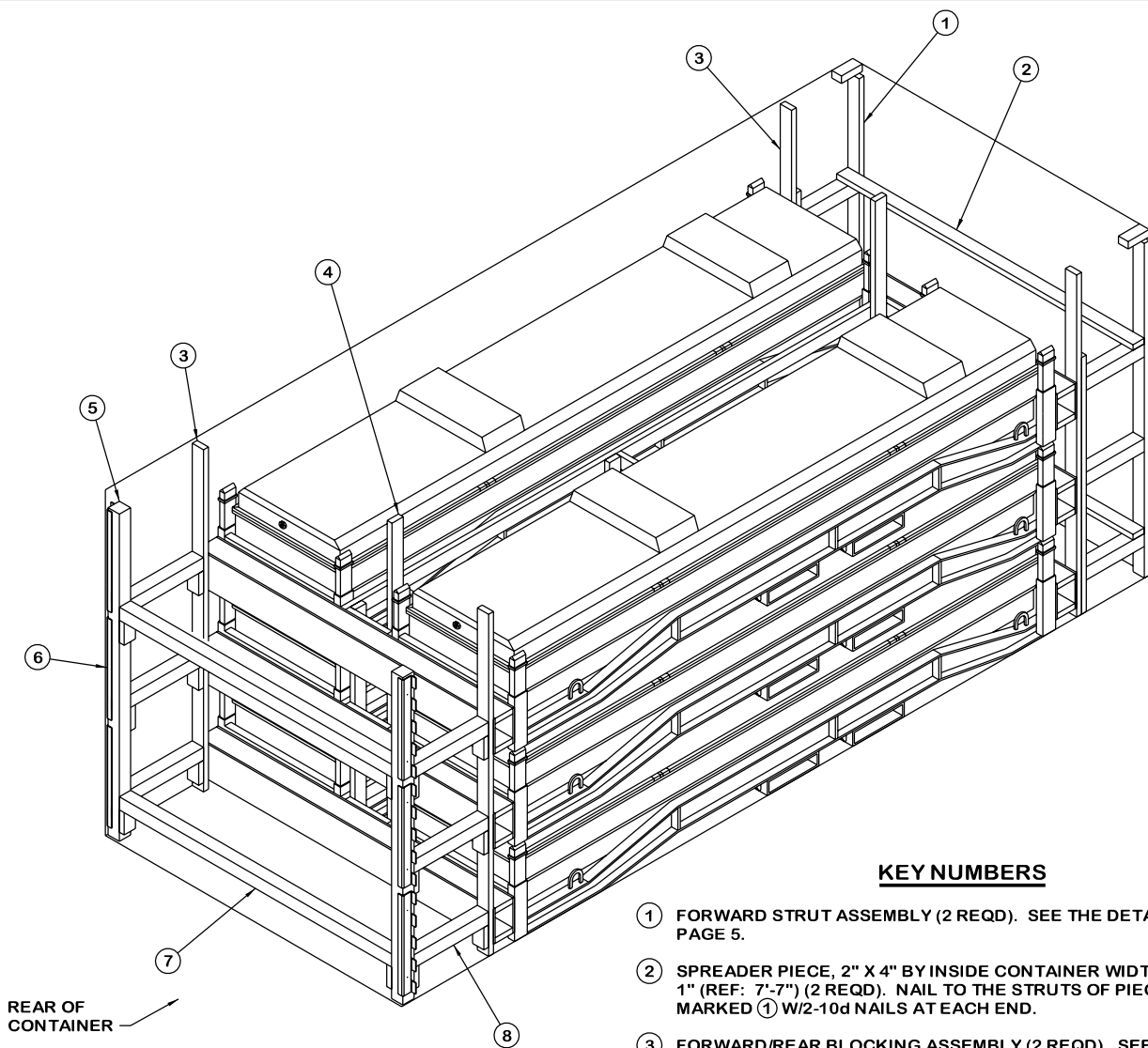
INDEX

ITEM	PAGE(S)
6-UNIT LOAD - - - - -	2
GENERAL NOTES AND MATERIAL SPECIFICATIONS - - - - -	3
CONTAINER DETAIL - - - - -	4
DETAILS - - - - -	4-6
LESS-THAN-FULL-LOAD PROCEDURE - - - - -	6

- 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 FIELD SUPPORT COMMAND		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 6.						
<i>Paul Nesbitt</i>		DO NOT SCALE			JULY 2005			
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APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND		TRANSPORTATION ENGINEERING DIVISION	<i>G. L. Willis</i>					
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U.S. ARMY DEFENSE AMMUNITION CENTER								



ISOMETRIC VIEW

KEY NUMBERS

- ① FORWARD STRUT ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.
- ② SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (2 REQD). NAIL TO THE STRUTS OF PIECES MARKED ① W/2-10d NAILS AT EACH END.
- ③ FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECE OF PIECES MARKED ① W/5-10d NAILS. **NOTE:** STRUT LEDGERS ARE ONLY REQUIRED ON THE REAR BLOCKING ASSEMBLY. DO NOT INSTALL STRUT LEDGERS ON THE FORWARD BLOCKING ASSEMBLY.
- ④ CENTER FILL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 4.
- ⑤ DOOR POST VERTICAL (2 REQD). SEE THE DETAIL ON PAGE 5, "DETAIL A" ON PAGE 6, AND GENERAL NOTE "O" ON PAGE 3.
- ⑥ UNIVERSAL LOAD RETAINER (6 REQD, 3 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPARTMENT OF THE ARMY DRAWING DA-116, "DETAIL A" ON PAGE 6, AND GENERAL NOTE "O" ON PAGE 3.
- ⑦ DOOR SPANNER, 4" X 4" MATERIAL 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 THE "BEVEL-CUT" DETAIL ON PAGE 6.
- ⑧ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 23") (6 REQD). TOENAIL TO THE BUFFER PIECES OF THE REAR BLOCKING ASSEMBLY AND TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 6.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	208	139
2" X 6"	91	91
4" X 4"	50	66
NAILS	NO. REQD	POUNDS
6d (2")	264	1-3/4
10d (3")	182	3
12d (3-1/4")	32	3/4
PLYWOOD, 1/2"	72.04 SQ FT REQD	99-1/4 LBS
UNIVERSAL LOAD RETAINER	6 REQD	39 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-242/E	6	18,696 LBS
DUNNAGE		733 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		24,129 LBS (APPROX)

(GENERAL NOTES CONTINUED)

GENERAL NOTES

- G. 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.
- H. 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.
- J. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- K. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- 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 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. SIX UNIVERSAL LOAD RETAINERS, AS DEPICTED IN THE LOADS ON PAGES 2 AND 6, ARE REQUIRED WHEN LOADING SIX OR FIVE CONTAINERS, FOUR ARE REQUIRED WHEN LOADING FOUR OR THREE CONTAINERS, AND TWO ARE REQUIRED WHEN LOADING TWO OR ONE CONTAINER. 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 CONTAINER, AND FOR OTHER METHODS OF REAR-OF-LOAD RESTRAINT.
- P. 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 6.
- 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 AND THE END OPENING CONTAINER, AND BETWEEN CONTAINERS AND STEEL STRAPPING, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.
- S. 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.

- 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 PHOENIX MISSILES (AIM-54A) (WITH WINGS AND FINS), IN CNU-242/E OR CNU-242A/E METAL SHIPPING AND STORAGE CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS CONTAINER WITH AMMUNITION ITEMS. SEE 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 LOAD AS SHOWN IS 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. 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 LONGITUDINAL PIECES ON THE CENTER FILL ASSEMBLY. NAIL EACH ADDITIONAL 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 SIZE OF THE CONTAINER.
- 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. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE FORWARD WALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE FORWARD STRUT ASSEMBLIES 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.

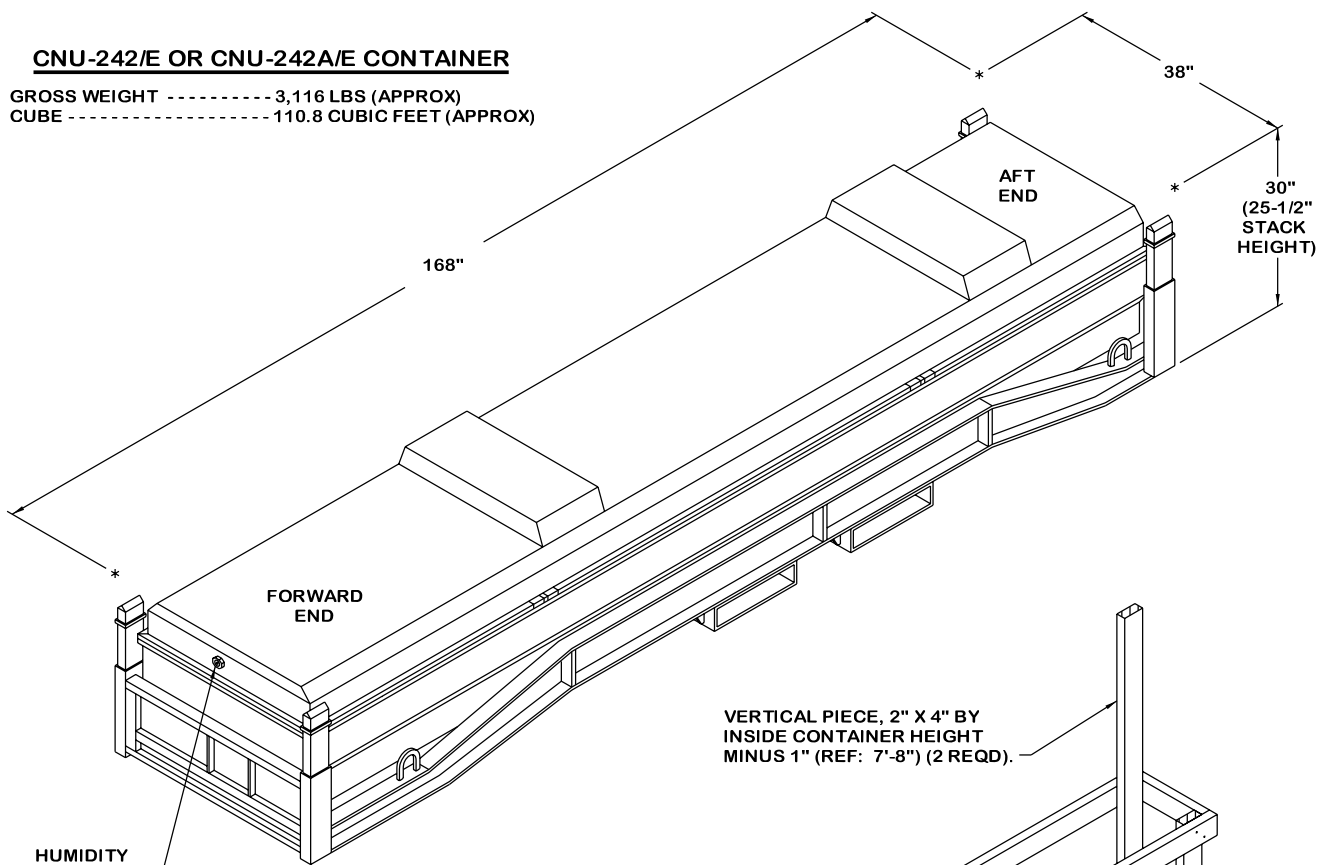
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MATERIAL SPECIFICATIONS

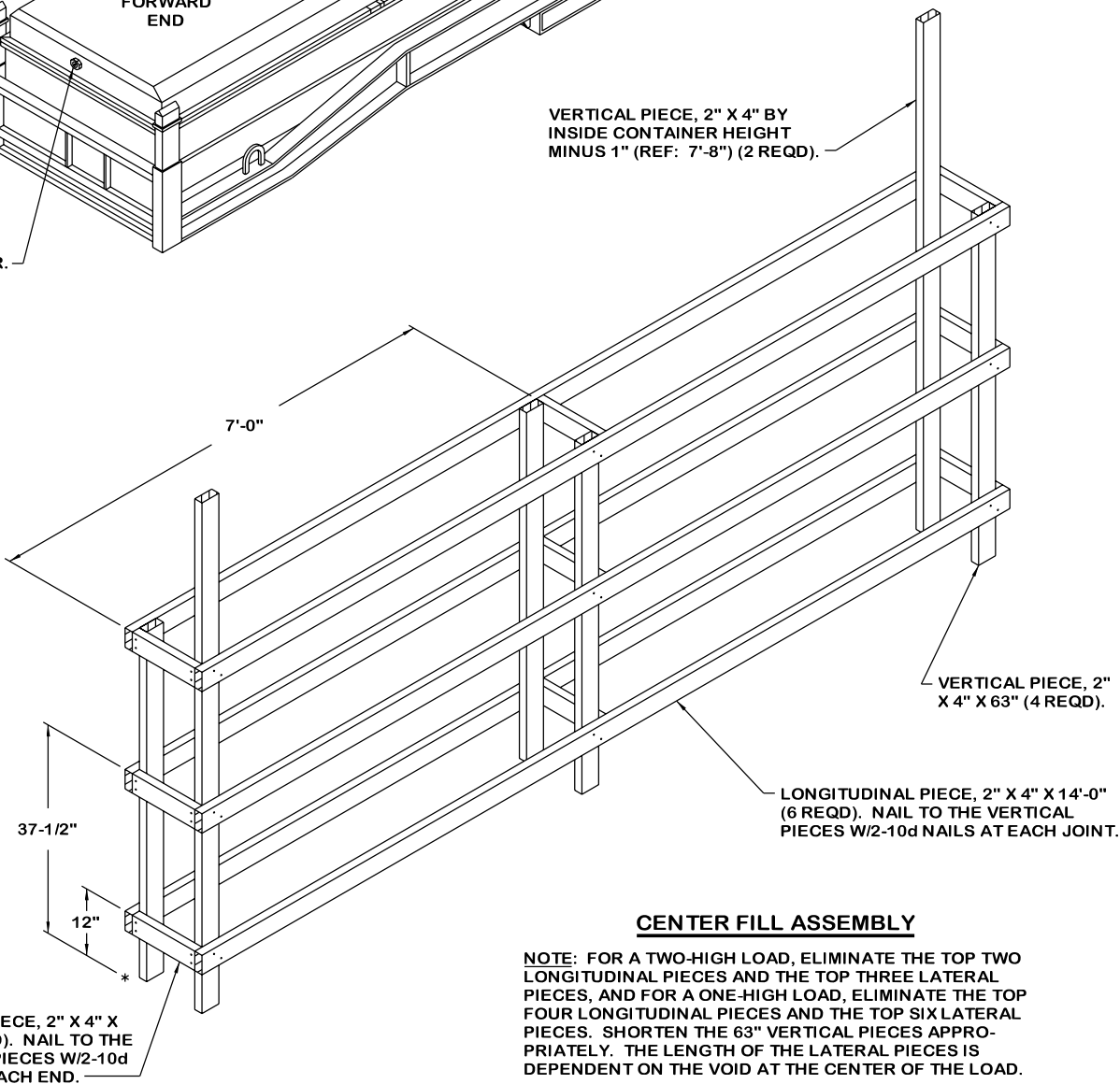
- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
- PLYWOOD - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE 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.
- ANTI-CHAFING MATERIAL - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
- STEEL, STRUCTURAL - - - - - : ASTM A36; 36,000 PSI MINIMUM YIELD OR BETTER.

CNU-242/E OR CNU-242A/E CONTAINER

GROSS WEIGHT -----3,116 LBS (APPROX)
 CUBE -----110.8 CUBIC FEET (APPROX)



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

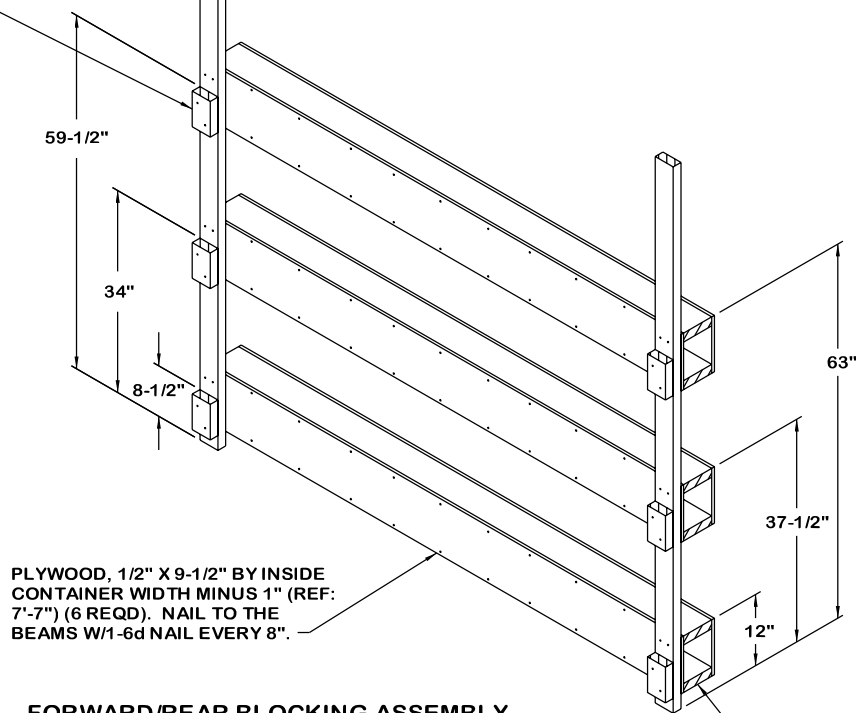


CENTER FILL ASSEMBLY

NOTE: FOR A TWO-HIGH LOAD, ELIMINATE THE TOP TWO LONGITUDINAL PIECES AND THE TOP THREE LATERAL PIECES, AND FOR A ONE-HIGH LOAD, ELIMINATE THE TOP FOUR LONGITUDINAL PIECES AND THE TOP SIX LATERAL PIECES. SHORTEN THE 63" VERTICAL PIECES APPROPRIATELY. THE LENGTH OF THE LATERAL PIECES IS DEPENDENT ON THE VOID AT THE CENTER OF THE LOAD.

STRUT LEDGER, 2" X 4" X 6" (6 REQD). NAIL TO THE VERTICAL PIECE W/2-10d NAILS. NOTE: STRUT LEDGERS ARE ONLY REQUIRED ON THE REAR BLOCKING ASSEMBLY. DO NOT INSTALL STRUT LEDGERS ON THE FORWARD BLOCKING ASSEMBLY.

BUFFER PIECE, 2" X 4" BY CONTAINER HEIGHT MINUS 1" (REF: 7'-8") (2 REQD). NAIL TO THE BEAM ASSEMBLIES W/2-10d NAILS AT EACH JOINT.



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

FORWARD/REAR BLOCKING ASSEMBLY

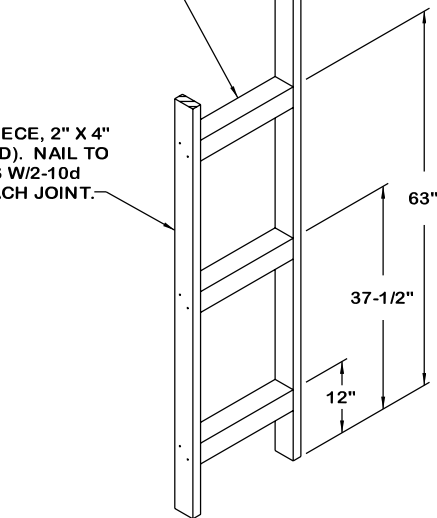
NOTE: FOR A TWO-HIGH LOAD, ELIMINATE THE TOP BOX BEAM ASSEMBLY AND THE TOP TWO STRUT LEDGERS (ON THE REAR BLOCKING ASSEMBLY ONLY). FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO BOX BEAM ASSEMBLIES AND THE TOP SIX STRUT LEDGERS (ON THE REAR BLOCKING ASSEMBLY ONLY).

BEAM, 2" X 6" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (6 REQD).

STRUT, 4" X 4" X 18" (3 REQD).

VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-6") (1 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

VERTICAL PIECE, 2" X 4" X 69" (1 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

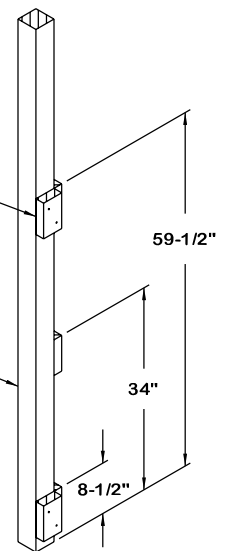


FORWARD STRUT ASSEMBLY

NOTE: FOR A TWO-HIGH LOAD, ELIMINATE THE TOP STRUT, AND FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO STRUTS. SHORTEN THE VERTICAL PIECE APPROPRIATELY.

STRUT LEDGER, 2" X 4" X 6" (5 REQD). NAIL TO THE VERTICAL PIECE W/2-10d NAILS.

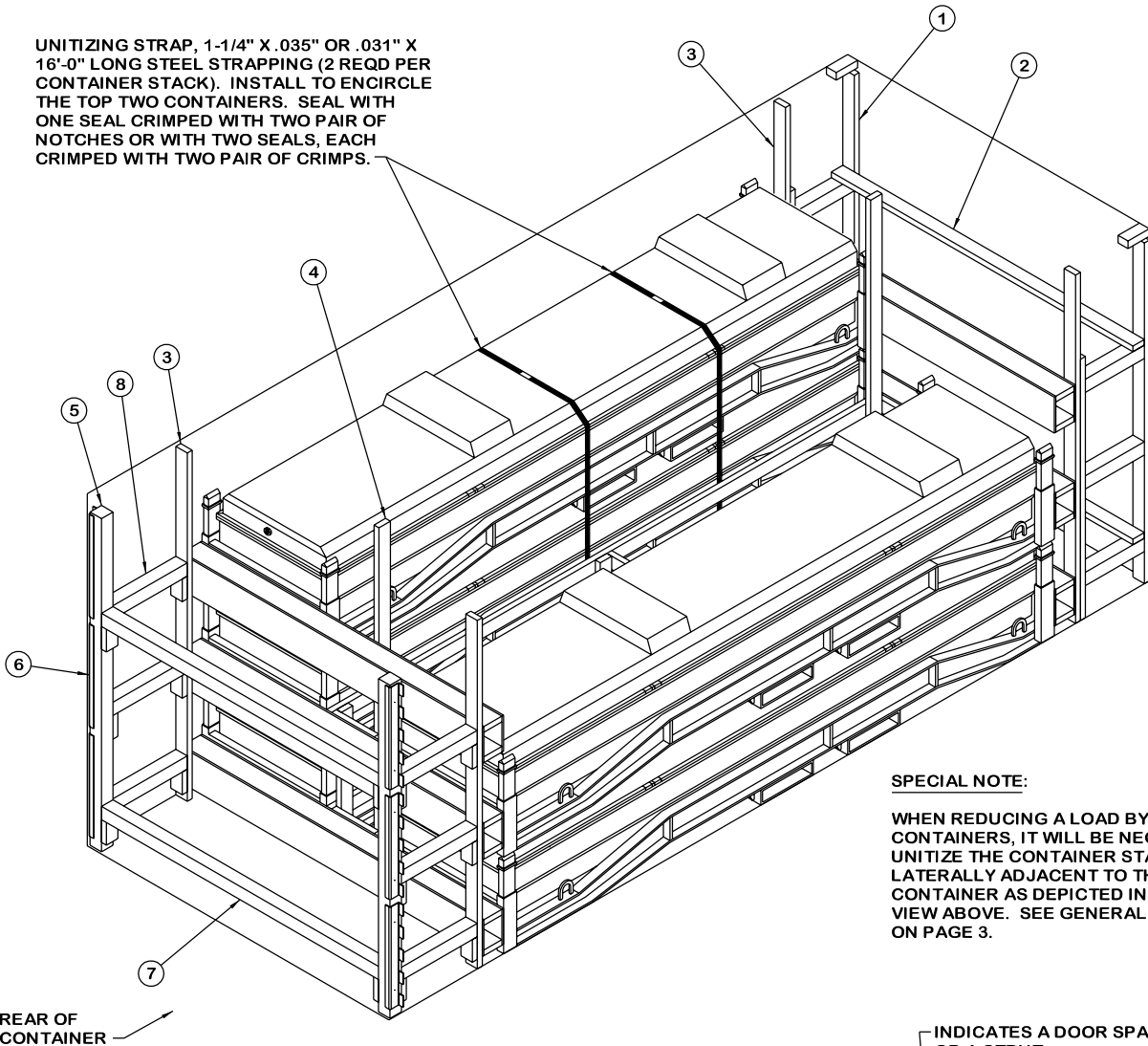
VERTICAL PIECE, 4" X 4" X 7'-4" (1 REQD).



DOOR POST VERTICAL

NOTE: FOR A TWO-HIGH LOAD, ELIMINATE THE TOP STRUT LEDGER USED TO SUPPORT STRUTS. FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO STRUT LEDGERS USED TO SUPPORT STRUTS.

UNITIZING STRAP, 1-1/4" X .035" OR .031" X 16'-0" LONG STEEL STRAPPING (2 REQD PER CONTAINER STACK). INSTALL TO ENCIRCLE THE TOP TWO CONTAINERS. SEAL WITH ONE SEAL CRIMPED WITH TWO PAIR OF NOTCHES OR WITH TWO SEALS, EACH CRIMPED WITH TWO PAIR OF CRIMPS.

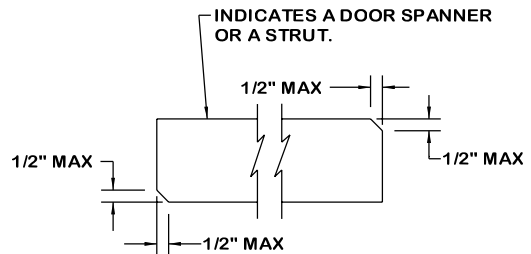


SPECIAL NOTE:

WHEN REDUCING A LOAD BY ONE OR MORE CONTAINERS, IT WILL BE NECESSARY TO UNITIZE THE CONTAINER STACK WHICH IS LATERALLY ADJACENT TO THE OMITTED CONTAINER AS DEPICTED IN THE LOAD VIEW ABOVE. SEE GENERAL NOTE "H" ON PAGE 3.

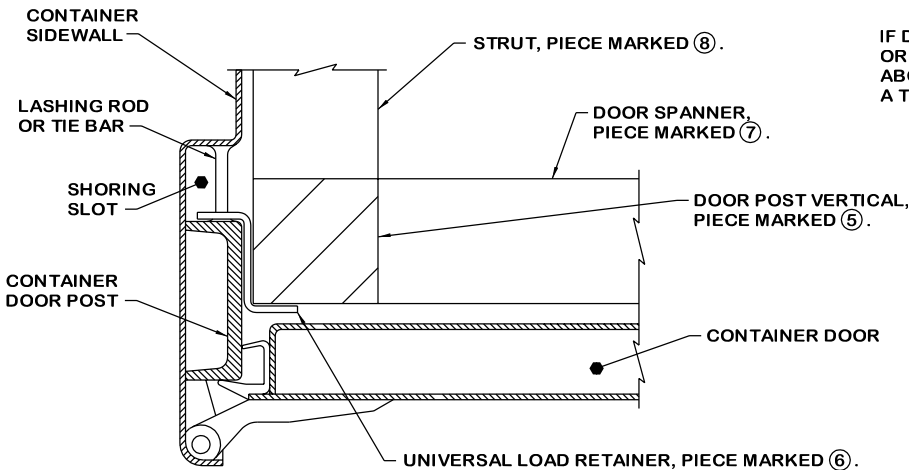
LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. NOTE THAT THE CENTER FILL ASSEMBLY HAS BEEN MODIFIED AS DESCRIBED ON PAGE 4.



BEVEL-CUT

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



DETAIL A