

APPROVED BY
BUREAU OF EXPLOSIVES

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LOADING AND BRACING WITH WOODEN DUNNAGE IN END OPENING ISO CONTAINERS OF 155MM COPPERHEAD SEPARATE LOADING PROJECTILES, PACKED ONE PER METAL CONTAINER, UNITIZED 6 CONTAINERS PER SPECIAL 4-WAY ENTRY PALLET

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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-FLAT CAR (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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U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL			
FEBRUARY 1993			
CLASS	DIVISION	DRAWING	FILE
19	48	4273	15PE1009

DO NOT SCALE

GENERAL NOTES

(GENERAL NOTES CONTINUED)

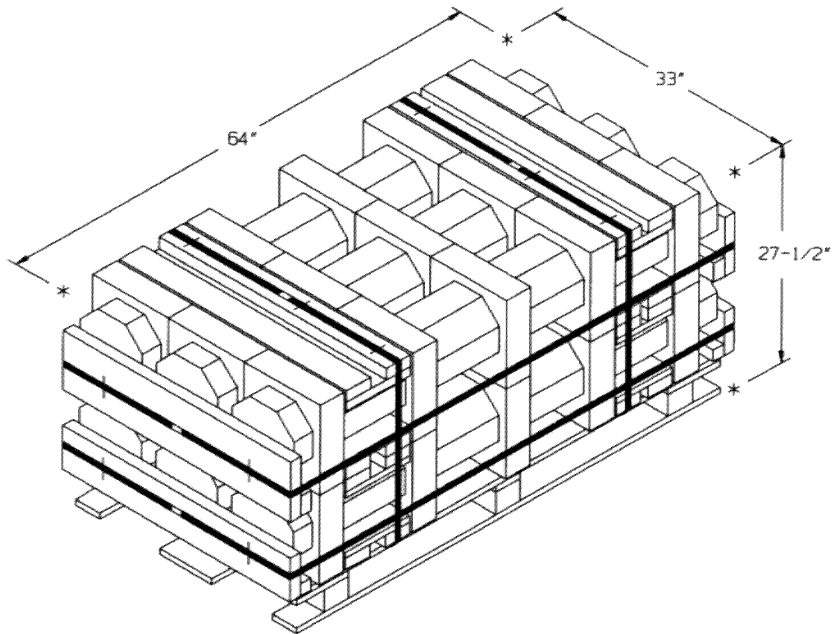
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE UNLOADING PROCEDURE SPECIFIED IN THIS DRAWING IS APPLICABLE TO A LOAD OF 18 PALLET UNITS OF COPPERHEAD SEPARATE LOADING PROJECTILES. SUBSEQUENT REFERENCE TO A PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4 FOR DETAILS OF THE PALLET UNIT. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE ISO CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOAD AS SHOWN IS BASED ON 4,700 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH INTERMODAL ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 95" HIGH. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLAT-CAR (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 ALSO BE USED.
- D. WHEN LOADING PALLET UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD AGAINST THE FORWARD BLOCKING ASSEMBLY AND ANTI-CHAFING PIECES. THE UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS NOT TO EXCEED 1-1/2".
- 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" 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, SUCH AS SOME ALL STEEL CONTAINERS, THERE IS A SLOT AT THE CORNERS OF THE FORWARD WALL. A PIECE OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE FORWARD BUFFER PIECES OF THE FORWARD STRUT ASSEMBLIES 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 FRONT WALL 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 ONE OF THE SIDEWALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.

- K. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLAT-CAR (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.
- L. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLAT BED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.
- M. 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 0.454KG.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

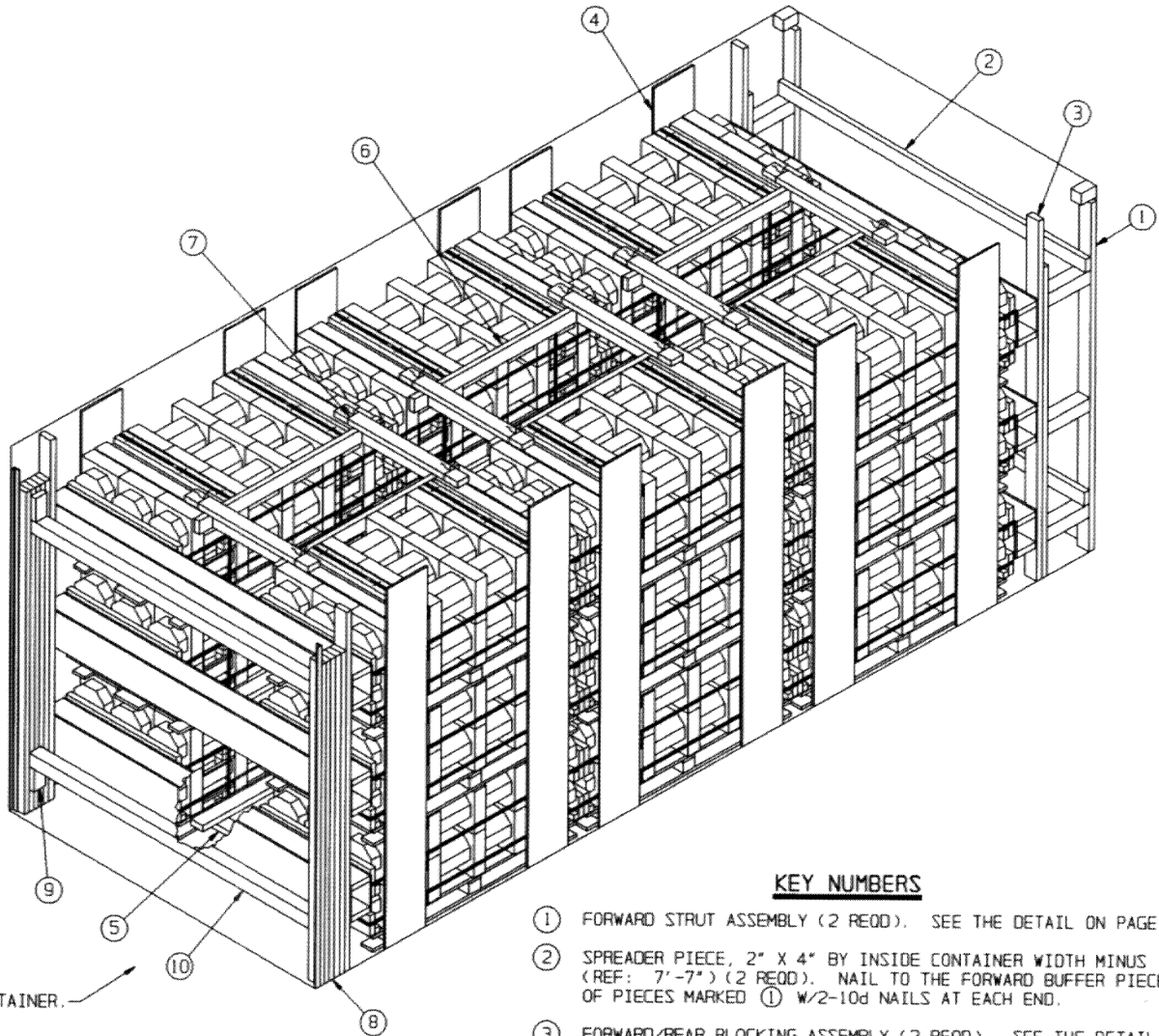
- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- PLYWOOD - - - - - : COMMERCIAL ITEM DESCRIPTION, A-A-55057, TYPE A, CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, 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
- HARDBOARD - - - - - : ANSI/AHA A135.4, CLASS 1.



PALLET UNIT

COPPERHEAD CONTAINER	---	6 EACH AT 206 LBS	---	1,236 LBS (APPROX)
DUNNAGE	---		---	107 LBS
PALLET	---		---	54 LBS

TOTAL WEIGHT	---	---	---	1,397 LBS (APPROX)
CUBE	---	---	---	33.6 CU FT (APPROX)



ISOMETRIC VIEW

KEY NUMBERS

- ① FORWARD STRUT ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 6.
- ② SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (2 REOD). NAIL TO THE FORWARD BUFFER PIECES OF PIECES MARKED ① W/2-10d NAILS AT EACH END.
- ③ FORWARD/REAR BLOCKING ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 7. NAIL THROUGH BUFFER PIECES INTO THE REAR BUFFER PIECES OF PIECES MARKED ① W/5-10d NAILS.
- ④ ANTI-CHAFING PIECE, TEMPERED HARDBOARD OR PLYWOOD, 1/4" X 12" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-10") (12 REOD). POSITION SO AS TO CONTACT THE PALLET UNIT DUNNAGE ASSEMBLIES. ANTI-CHAFING PIECES MUST BE SECURED TO PREVENT EXCESSIVE MOVEMENT. EITHER TAPE PIECES TO THE CONTAINER WALL, OR INSTALL A 1" X 4" X 64" TIE PIECE ACROSS THE TOP OF TWO ANTI-CHAFING PIECES, NAILING W/2-6d NAILS AT EACH JOINT.
- ⑤ LOWER ANTI-SWAY BRACE (9 REOD). FABRICATE IN PLACE BETWEEN LATERALLY ADJACENT PALLET UNITS. SEE THE DETAIL ON PAGE 8.
- ⑥ TOP ANTI-SWAY BRACE (3 REOD). SEE THE DETAIL ON PAGE 8.
- ⑦ TIE WIRE, NO. 14 GAGE WIRE 18" LONG (12 REOD). INSTALL TO FORM A COMPLETE LOOP AROUND THE TOP ANTI-SWAY BRACE AND THE OUTER PIECE OF THE TOP DUNNAGE ASSEMBLY OF THE PALLET UNIT, BRING ENDS TOGETHER AND TWIST TAUT.
- ⑧ FILL MATERIAL, 4" WIDE BY 7'-0" LONG MATERIAL (AS REOD). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/8 NAILS OF A SUITABLE SIZE (10d FOR 2" THICK MATERIAL). LAMINATE EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR MANNER. SEE THE "DETAIL A" ON PAGE 6.
- ⑨ STRUT LEDGER, 2" X 4" X 6" (4 REOD). NAIL TO FILL MATERIAL W/2-10d NAILS. LEDGERS ARE TO BE LOCATED SUCH THAT THE TOP OF THE UPPER SPANNER PIECE IS IN LINE WITH THE TOP SURFACE OF THE UPPER BOX BEAM ASSEMBLY OF PIECE MARKED ③, AND THE BOTTOM OF THE LOWER SPANNER PIECE IS IN LINE WITH THE BOTTOM SURFACE OF THE LOWER BOX BEAM ASSEMBLY.
- ⑩ SPANNER PIECE, 4" X 4" MATERIAL, CUT TO A LENGTH THAT WILL PROVIDE FOR A DRIVE FIT (REF: 7'-1-3/8") (2 REOD). TOENAIL TO THE FILL MATERIAL W/2-12d NAILS AT EACH END.

RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PREFABRICATE TWO FORWARD STRUT ASSEMBLIES, TWO FORWARD/REAR BLOCKING ASSEMBLIES AND THREE TOP ANTI-SWAY BRACES.
2. INSTALL THE TWO FORWARD STRUT ASSEMBLIES.
3. INSTALL THE TWO SPREADER PIECES.
4. INSTALL THE FORWARD BLOCKING ASSEMBLY.
5. INSTALL TWO ANTI-CHAFING PIECES AND LOAD THREE PALLET UNITS.
6. REPEAT STEP 5.
7. INSTALL THREE LOWER ANTI-SWAY BRACES AND ONE TOP ANTI-SWAY BRACE WITH TIE WIRE.
8. REPEAT STEPS 5 THROUGH 7 TWO TIMES EACH.
9. INSTALL THE REAR BLOCKING ASSEMBLY.
10. INSTALL THE FILL MATERIAL BETWEEN THE REAR BLOCKING ASSEMBLY AND THE LOAD RETAINER.
11. INSTALL THE FOUR STRUT LEDGERS.
12. INSTALL THE TWO SPANNER PIECES.

SPECIAL NOTES:

1. THE LOAD SHOWN ON PAGE 2 MAY BE REDUCED BY ONE OR TWO LAYERS FOR A SHIPMENT OF TWELVE OR SIX PALLET UNITS. IF THE LOAD MUST BE REDUCED BY A QUANTITY THAT IS NOT A MULTIPLE OF SIX, A FILLER ASSEMBLY OR ASSEMBLIES MUST BE INSTALLED WITHIN THE LOAD. SEE THE DETAIL ON PAGE 7. REGARDLESS OF THE QUANTITY OF OMITTED PALLET UNITS, THE LONGITUDINAL CENTER OF GRAVITY OF THE LOADED CONTAINER MUST BE WITHIN 12" IN EITHER DIRECTION OF THE CONTAINER MIDPOINT.
2. IF PALLET UNITS DO NOT HAVE BUFFER ASSEMBLIES INSTALLED, AS DEPICTED IN REVISION 1 OF AMC DRAWING 19-48-4159-20PM1003, ALTERNATIVE SEPARATOR GATES, AS DEPICTED ON PAGE 6, MUST BE INSTALLED BETWEEN EACH LONGITUDINALLY ADJACENT SET OF PALLET UNITS TO PRECLUDE DAMAGE TO THE COPPERHEAD CONTAINERS.

BILL OF MATERIAL

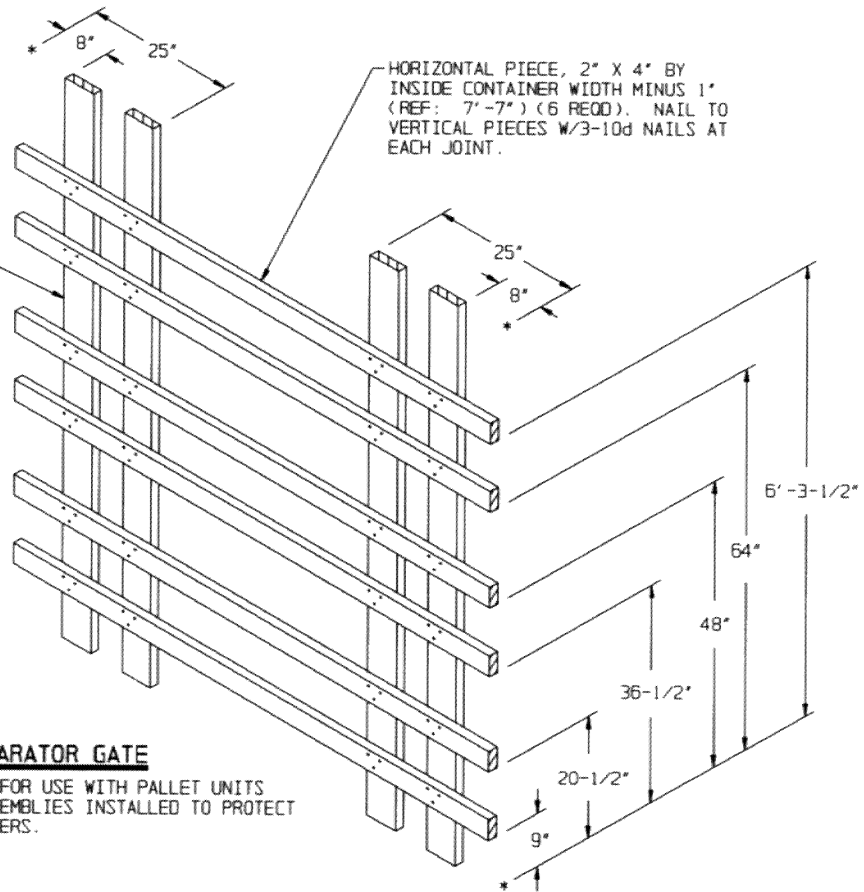
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	342	228
2" X 6"	91	91
4" X 4"	21	28
NAILS	NO. REQD	POUNDS
6d (2")	264	1-3/4
10d (3")	288	4-1/2
12d (3-1/4")	8	1/4
WIRE, NO. 14 GAGE	18' REQD	1/4 LBS
PLYWOOD, 1/2"	166.04 SQ FT REQD	228.31 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	18	25,146 LBS
DUNNAGE		930 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		30,776 LBS (APPROX)

VERTICAL PIECE, 2" X 6"
BY INSIDE CONTAINER
HEIGHT MINUS 1" (REF:
7'-10") (4 REOD).

HORIZONTAL PIECE, 2" X 4" BY
INSIDE CONTAINER WIDTH MINUS 1"
(REF: 7'-7") (6 REOD). NAIL TO
VERTICAL PIECES W/3-10d NAILS AT
EACH JOINT.



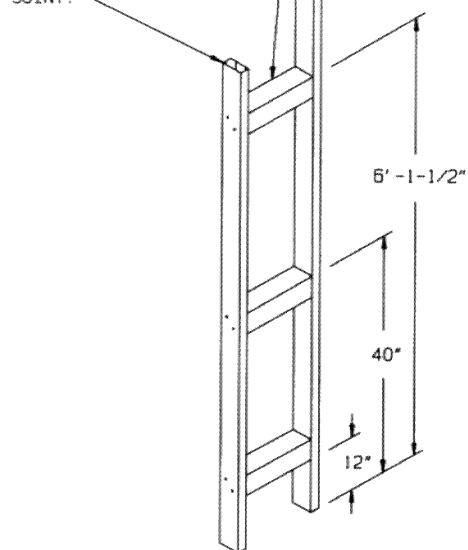
ALTERNATIVE SEPARATOR GATE

THE ALTERNATIVE SEPARATOR GATE IS FOR USE WITH PALLET UNITS THAT DO NOT HAVE WOODEN BUFFER ASSEMBLIES INSTALLED TO PROTECT THE ENDS OF THE COPPERHEAD CONTAINERS.

STRUT, 4" X 4" X
12-1/2" (3 REOD).

REAR BUFFER PIECE, 2" X 4" X 6'-9" (1 REOD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

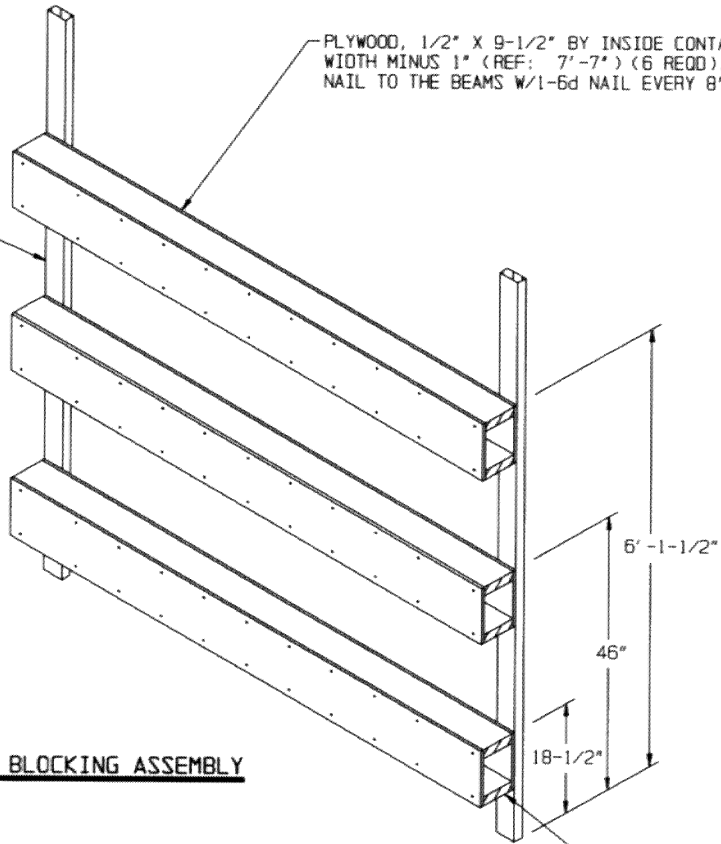
FORWARD BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-7") (1 REOD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.



FORWARD STRUT ASSEMBLY

BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-10") (2 REQD). NAIL THRU PLYWOOD INTO THE BEAMS 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".

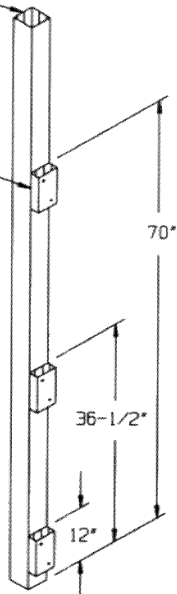


FORWARD/REAR BLOCKING ASSEMBLY

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

VERTICAL PIECE, 4" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-10-1/2") (1 REQD).

STRUT LEDGER, 2" X 4" X 6" (3 REQD). NAIL TO THE VERTICAL PIECE W/2-10d NAILS.



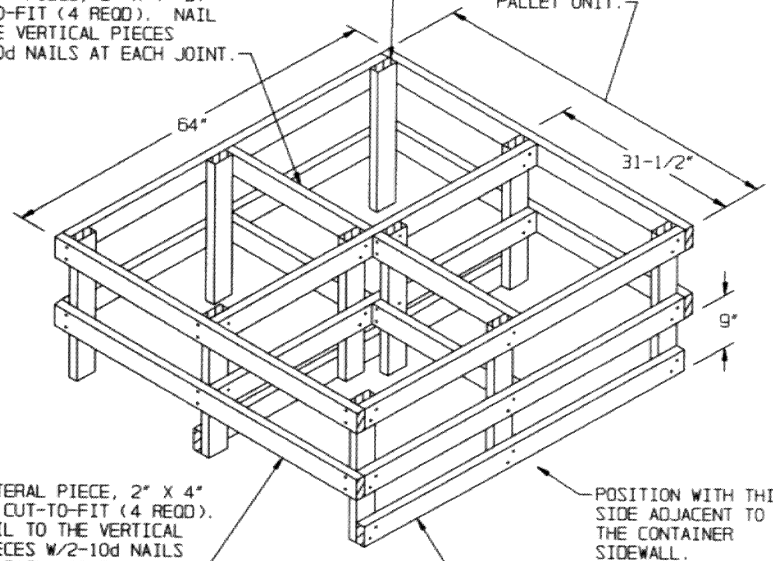
DOOR POST VERTICAL

TWO DOOR POST VERTICALS ARE REQUIRED WITHIN THE LOAD SHOWN ON PAGE 4 WHEN THE ISO CONTAINER IS NOT EQUIPPED WITH PRE-WELDED LOAD RETAINERS. THE DOOR POST VERTICALS MUST BE NAILED TO THE DOOR POST VERTICAL RETAINER. NAIL THROUGH THE HOLES IN THE DOOR POST VERTICAL RETAINER INTO THE DOOR POST VERTICAL W/4-10d NAILS. SEE "DETAIL B" AND THE SPECIAL NOTE ON PAGE 9.

VERTICAL PIECE, 2" X 4" X 23-1/2" (10 REQD).

SUPPORT PIECE, 2" X 4" BY CUT-TO-FIT (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

FABRICATE TO FIT BETWEEN THE ANTI-CHAFING PIECES AND THE LATERALLY ADJACENT PALLET UNIT.



LATERAL PIECE, 2" X 4" BY CUT-TO-FIT (4 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

HORIZONTAL PIECE, 2" X 4" X 61" (8 REQD). NAIL TO THE VERTICAL PIECE W/2-10d NAILS AT EACH JOINT.

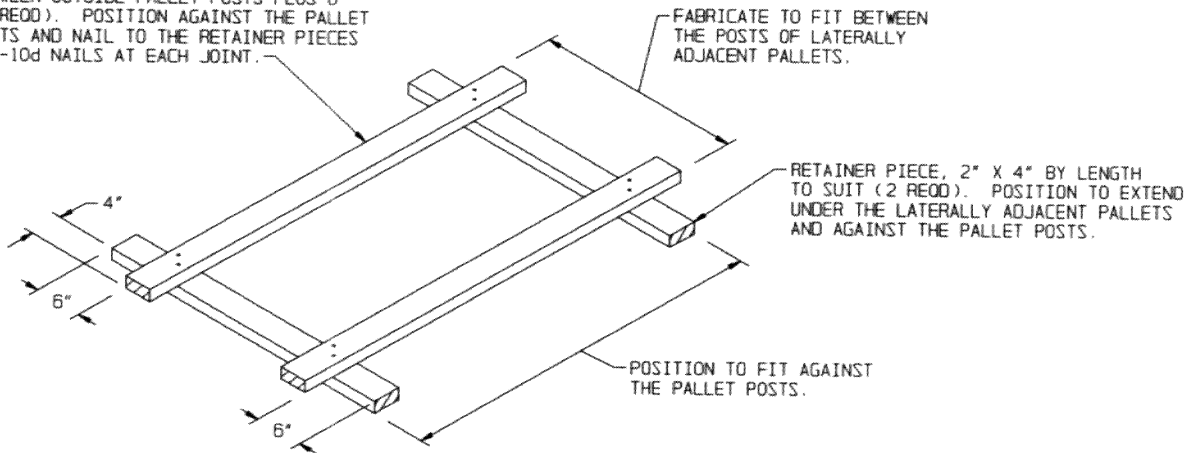
POSITION WITH THIS SIDE ADJACENT TO THE CONTAINER SIDEWALL.

FILLER ASSEMBLY

THE FILLER ASSEMBLY DEPICTED ABOVE IS DESIGNED TO REPLACE ONE OMITTED PALLET UNIT.

DETAILS

BUFFER PIECE, 2" X 4" BY THE DISTANCE BETWEEN OUTSIDE PALLET POSTS PLUS 8" (2 REOD). POSITION AGAINST THE PALLET POSTS AND NAIL TO THE RETAINER PIECES W/2-10d NAILS AT EACH JOINT.

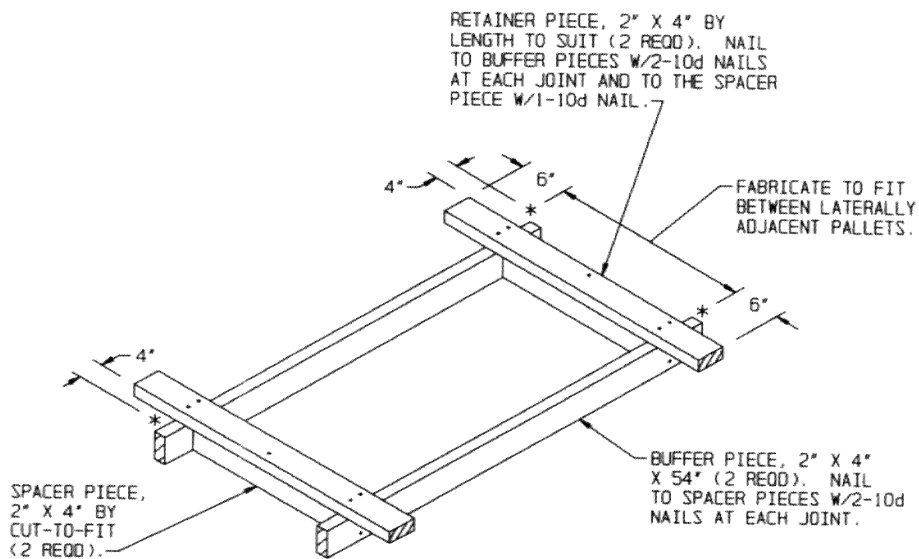


LOWER ANTI-SWAY BRACE
SEE THE SPECIAL NOTES AT RIGHT.

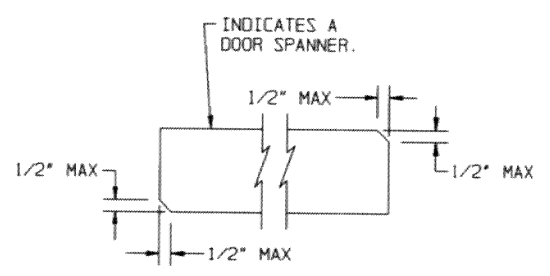
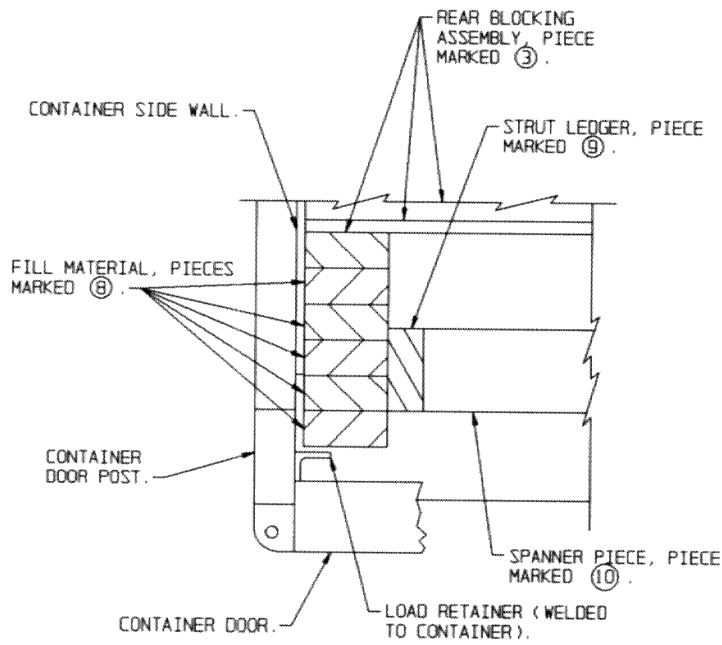
SPECIAL NOTES FOR LOWER ANTI-SWAY BRACE:

1. THE LOWER ANTI-SWAY BRACE IS FOR USE BETWEEN PALLET UNITS THAT ARE PRE-POSITIONED WITH THE PALLET WIDTH PARALLEL TO THE CONTAINER SIDEWALL.
2. THE ASSEMBLY MUST BE FABRICATED IN PLACE BETWEEN PALLETS.
 - A. POSITION THE FIRST RETAINER PIECE BETWEEN THE CENTER PALLET POST AND THE PALLET POST WHICH IS FURTHEST AWAY. THE RETAINER PIECE IS SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
 - B. POSITION THE SECOND RETAINER PIECE AGAINST THE INSIDE OF THE NEAREST PALLET POST SO AS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
 - C. POSITION THE FIRST BUFFER PIECE AGAINST THE PALLET POSTS AND EXTENDING 4" BEYOND THE FURTHEST RETAINER PIECE. NAIL TO THE RETAINER PIECE W/2-10d NAILS. POSITION THE SECOND BUFFER PIECE AGAINST THE PALLET POSTS ON THE OPPOSITE SIDE AND EXTENDING 4" BEYOND THE FURTHEST RETAINER PIECE. NAIL TO THE RETAINER PIECE W/2-10d NAILS.
 - D. PUSH THE PARTIAL ASSEMBLY FORWARD UNTIL THE FIRST RETAINER PIECE CONTACTS THE PALLET POSTS ON THE FAR SIDE OF THE PALLET. NAIL THE BUFFER PIECES TO THE SECOND RETAINER PIECE W/2-10d NAILS AT EACH JOINT.

RETAINER PIECE, 2" X 4" BY LENGTH TO SUIT (2 REOD). NAIL TO BUFFER PIECES W/2-10d NAILS AT EACH JOINT AND TO THE SPACER PIECE W/1-10d NAIL.



TOP ANTI-SWAY BRACE



BEVEL-CUT

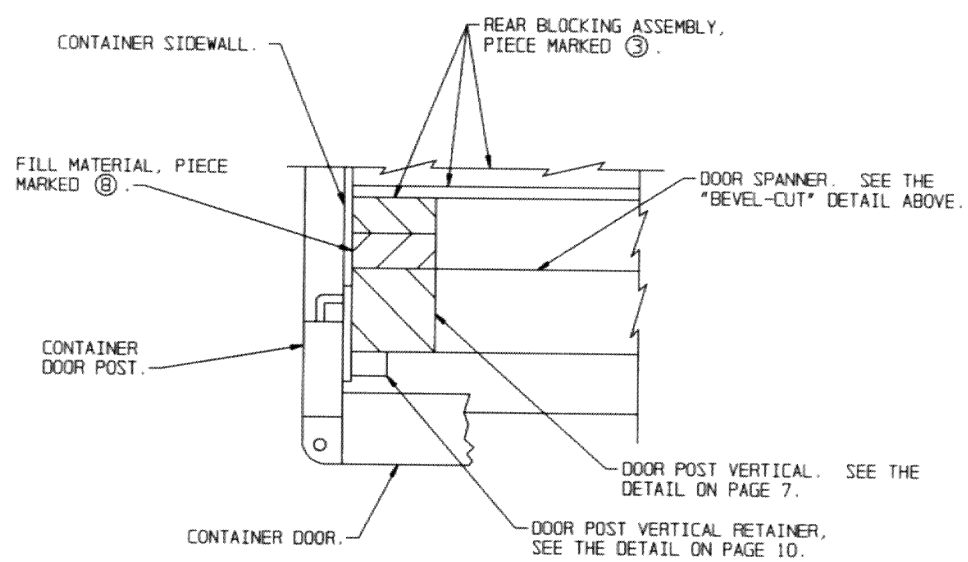
IF DESIRED, EACH END OF A DOOR SPANNER PIECE MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT DOOR-POST-TO-DOOR-POST FIT.

DETAIL A

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE FILL MATERIAL AND ADJACENT DUNNAGE PIECES.

SPECIAL NOTE:

WHEN ISO CONTAINERS ARE NOT EQUIPPED WITH PRE-WELDED LOAD RETAINERS, AS DEPICTED IN "DETAIL B" BELOW, DOOR POST VERTICALS, DOOR POST VERTICAL RETAINERS AND DOOR SPANNERS WILL BE REQUIRED FOR THE LOAD DEPICTED ON PAGE 4. SEE VARIOUS LOADS WITHIN AMC DRAWING 19-48-4153-15PA1002 FOR EXAMPLES. SEE PAGE 10 FOR DETAILS OF THE METAL DOOR POST VERTICAL RETAINER.

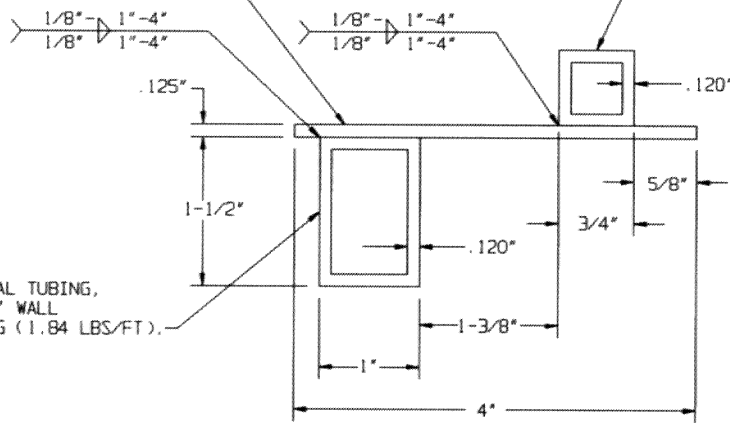


DETAIL B

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

STEEL STRIP, 1/8" THICK BY 4" WIDE
BY 83" LONG (1.70 LBS/FT).

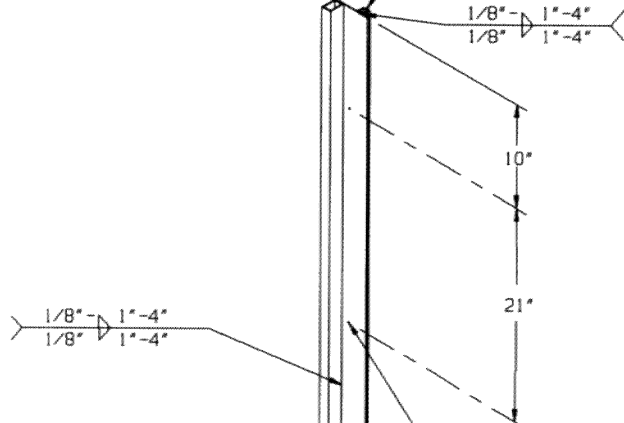
SQUARE STRUCTURAL TUBING, 3/4" SQUARE
BY .120" WALL THICKNESS BY 83" LONG
(1.03 LBS/FT).



RECTANGULAR STRUCTURAL TUBING,
1-1/2" BY 1" BY .120" WALL
THICKNESS BY 83" LONG (1.84 LBS/FT).

VIEW A

VIEW A
SQUARE STRUCTURAL TUBING,
3/4" SQUARE BY .120" WALL
THICKNESS BY 83" LONG
(1.03 LBS/FT).



RECTANGULAR STRUCTURAL TUBING,
1-1/2" BY 1" BY .120" WALL
THICKNESS
BY 83" LONG (1.84 LBS/FT).

DRILL 5/32", 4 HOLES.

STEEL STRIP, 1/8" THICK BY 4" WIDE
BY 83" LONG (1.70 LBS/FT).

DOOR POST VERTICAL RETAINER