APPROVED BY BUREAU OF EXPLOSIVES

JA Fleshman DATE 1/29/93

LOADING AND BRACING IN END
OPENING ISO CONTAINERS OF
COMPLETE ROUNDS PACKED IN
CYLINDRICAL METAL CONTAINERS

PA117 SERIES CONTAINERS

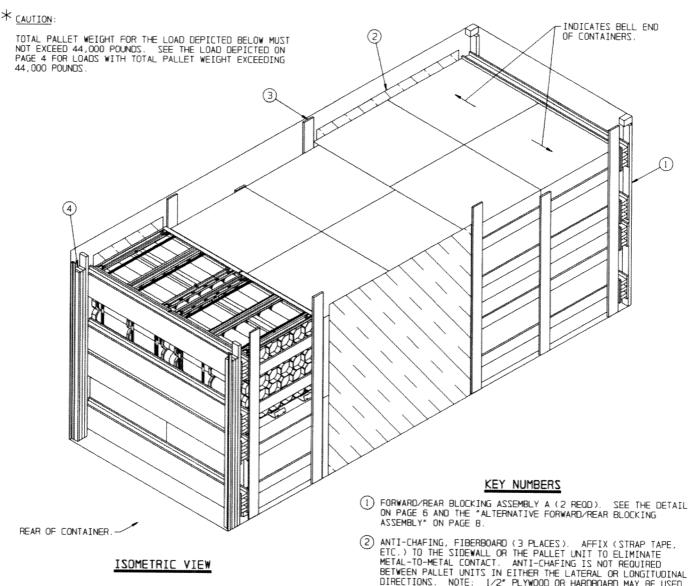
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LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE
TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL
CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE
MOVED BY MOTOR OR WATER CARRIERS.

U.S. ARMY MATERI	EL C	OMM	AND DE	RAWING	
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CHEMICAL COMMAND				L. FIEFFER	
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DO NOT SCALE



- (2) ANTI-CHAFING, FIBERBOARD (3 PLACES). AFFIX (STRAP TAPE, ETC.) TO THE SIDEWALL OR THE PALLET UNIT TO ELIMINATE METAL-TO-METAL CONTACT. ANTI-CHAFING IS NOT REQUIRED BETWEEN PALLET UNITS IN EITHER THE LATERAL OR LONGITUDINAL DIRECTIONS. NOTE: 1/2" PLYWOOD OR HARDBOARD MAY BE USED IN PLACE OF THE FIBERBOARD, IF DESIRED AND IF SPACE PERMITS.
- 3 SIDE FILL ASSEMBLY (3 REOD, TWO ASSEMBLIES TWO PALLET UNITS LONG, ONE ASSEMBLY ONE PALLET UNIT LONG). SEE THE DETAIL
- (4) FILL MATERIAL, 4" WIDE BY 7'-4" LONG MATERIAL (AS REOD). TOENAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/7 NAILS OF A SUITABLE SIZE (10d NAILS FOR 2" THICK MATERIAL). TOENAIL EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR MANNER. NOTE: MULTIPLE PIECES MAY BE LAMINATED TOGETHER FIRST AND THEN TOENAILED TO THE REAR BLOCKING ASSEMBLY. SEE DETAILS A AND B ON PAGE 9.

BILL OF MATERIAL										
LUMBER	LINEAR FEET	BOARD FEET								
1" X 6" 2" X 4"	131 257	66 172								
NAILS	NO. REQD	POUNDS								
6d (2*) 10d (3*)	624 138	3-3/4 2-1/4								
PLYWOOD, 3/4" 116.28 SO FT REOD 239.83 LBS FIBERBOARD AS REOD NIL										

* NWOHZ ZA DAOL

ITEM		QUANTITY												WEIGHT	(APPROX)
PALLET UNIT DUNNAGE		-		-	_	-2	20	_	-				-	43,940 722	FB2 FB2
CONTAINER -	_	-	_		-	-	-	_	_				-	4,700	LB2

TOTAL WEIGHT - - - - - - 49,362 LBS (APPROX)

(GENERAL NOTES CONTINUED)

- THE QUANTITY OF PALLET UNITS SHOWN IN THE LOADS ON PAGES 2 AND 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FILLER ASSEMBLY ON PAGE 5. WHEN A 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
 - 1. IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT (ONE OR TWO LADING UNITS), LADING UNITS NORMALLY MAY BE ELIMINATED FROM THE CENTER OF THE LOAD.
 - IF A LOAD IS REDUCED BY A LARGE AMOUNT (MORE THAN TWO LADING UNITS), LADING UNITS SHOULD BE ELIMINATED AS REQUIRED AND THE TOTAL LOAD SHIFTED FORE OR AFT, AS NECESSARY, TO ACHIEVE A SYMMETRICAL WEIGHT DISTRIBUTION. THE DEPICTED PROCEDURES WILL BE FOLLOWED AS CLOSELY AS POSSIBLE, MAKING ONLY THOSE ADJUSTMENTS TO THE DUNNAGE WHICH ARE REQUIRED TO ACCOMMODATE THE NUMBER OF UNITS TO BE SHIPPED.
- 0. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:
 - 1. PREFABRICATE TWO FORWARD/REAR BLOCKING ASSEMBLIES A, AND THREE SIDE FILL ASSEMBLIES
 - INSTALL THE FORWARD BLOCKING ASSEMBLY.
 - INSTALL ANTI-CHAFING MATERIAL ON ONE SIDE OF THE CONTATNER
 - 4. LOAD EIGHT PALLET UNITS.
 - 5. INSTALL ONE SIDE FILL ASSEMBLY.
 - 6. REPEAT STEPS 3 THROUGH 5.
 - 7. REPEAT STEP 3.
 - 8. INSTALL FOUR PALLET UNITS.
 - 9. INSTALL THE SIDE FILL ASSEMBLY.
 - 10. INSTALL THE REAR BLOCKING ASSEMBLY.
 - 11. INSTALL THE FILL MATERIAL.

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

FIBERBOARD - - - - -: FED SPEC PPP-F-320; TYPE SF (SOLID FIBERBOARD), CLASS DOMESTIC, ALL

WIRE, CARBON STEEL -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006

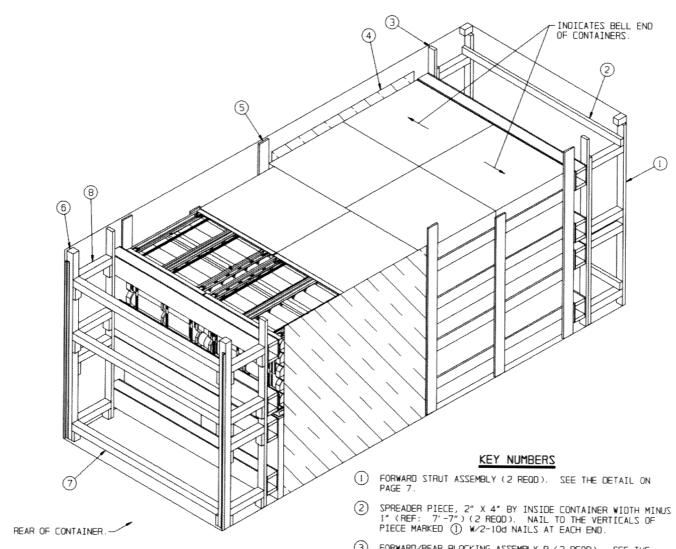
OR BETTER.

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 SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO THE SPELIFIED OUTCOADING PHOLEDURES ARE APPLICABLE TO LOADS OF COMPLETE ROUNDS PACKED IN PAIL? SERIES METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 5 AND AMC DRAWING 19-48-4231/45-20PM1006 FOR DETAILS OF THE PALLET UNIT. 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 95" (93" CLEAR HEIGHT). 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 PALLET UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). ALTHOUGH A TOTAL OF 1-1/2" OF UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS PERMITTED, LATERAL VOIDS WITHIN THE LOAD ARE TO BE HELD TO A MINIMUM. EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE VERTICAL PIECES ON THE SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL NAIL EACH ADDITIONAL PIECE W/I APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND/OR QUANTITY OF THE VERTICAL OR HORIZONTAL PIECES IN THE SIDE FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE PALLET UNIT SIZE.
- 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" BY 5-1/2" WIDE.
- 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 FORWARD WALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE FORWARD BLOCKING LAMINATED TO THE BUFFER FIELES ON THE FURNARD BLOCKING 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".

 THIS PIECE IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER FORWARD WALL ARE SMOOTH AND FLAT.
- DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- K. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C 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
 - 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 FLATBED 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 CONVERSION TO METHIL EUDIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EOUTVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCHEDUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

(CONTINUED AT LEFT)



ISOMETRIC VIEW

L	BILL OF MATERIAL											
L	LUMBER	LINEAR FEET	BOARD FEET									
	1" X 6" 2" X 4" 2" X 6" 4" X 4"	101 90 122 62	51 60 122 83									
L	NAILS	NO. REQD	POUNDS									
6d (2") 424 2-1/2 10d (3") 178 2-3/4 12d (3-1/4") 44 3/4												
	PLYWOOD, 1/2" 96.06 SO FT REOD 132.09 LBS FIBERBOARD AS REOD NIL											

- 3 FORWARD/REAR BLOCKING ASSEMBLY B (2 REOD). SEE THE DETAIL AND THE "ALTERNATIVE FORWARD/REAR BLOCKING ASSEMBLY" ON PAGE B. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECES OF PIECE MARKED ① W/7-10d NATIS
- 4) ANTI-CHAFING FIBERBOARD (2 PLACES). AFFIX (STRAP TAPE, ETC.) TO THE SIDEWALL OR THE PALLET UNIT TO ELIMINATE METAL-TO-METAL CONTACT. ANTI-CHAFING IS NOT REQUIRED BETWEEN PALLET UNITS IN EITHER THE LATERAL OR LONGITUDINAL DIRECTIONS. NOTE: PLYWOOD OR HARDBOARD MAY BE USED IN PLACE OF THE FIBERBOARD, AS LONG AS IT IS SECURED TO PREVENT UNDUE MOVEMENT.
- (5) SIDE FILL ASSEMBLY (2 REOD, BOTH ASSEMBLIES TWO PALLET UNITS LONG). SEE THE DETAIL ON PAGE 6.
- 6 DOOR POST VERTICAL (2 REOD). SEE THE DETAIL ON PAGE 7, AND DETAILS A AND B ON PAGE 9.
- 7 DOOR SPANNER PIECE, 4" X 4" MATERIAL, CUT TO A LENGTH THAT WILL PROVIDE FOR A DRIVE FIT (REF: 7'-1-3/8") (3 REQD). TOENAIL TO THE DOOR POST VERTICAL PIECES W/2-12d MAILS AT EACH END. SEE THE BEVEL-CUT DETAIL ON PAGE 7
- (B) STRUT, 4" X 4" BY CUT-TO-FIT (REF: 19-1/4") (8 REOD). TOENAIL TO THE BUFFER PIECES OF THE REAR BLOCKING ASSEMBLY AND THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE BEVEL-CUT DETAIL ON PAGE 7.

NWOHZ ZA DAOL

ITEM			QUANTITY									WEIGHT	(APPROX)		
PALLET UNIT		***	-	-	-	-	16			-				36,112	
CONTAINER -		-	_			-	***		***	-	***	-	***	. //1	LB2
CUNTAINER -	-		_		_				_					4,700	LB2

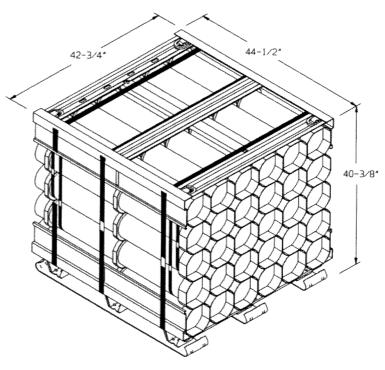
TOTAL WEIGHT - - - - - - 41,583 LBS (APPROX)

RECOMMENDED SEQUENTIAL LOADING PROCEDURES:

- PREFABRICATE TWO FORWARD STRUT ASSEMBLIES, TWO FORWARD/REAR BLOCKING ASSEMBLIES B, TWO SIDE FILL ASSEMBLIES, AND TWO DOOR POST VERTICALS.
- INSTALL THE FORWARD STRUT ASSEMBLIES AND THE TWO SPREADER PIECES.
- 3. INSTALL THE FORWARD BLOCKING ASSEMBLY.
- INSTALL ANTI-CHAFING MATERIAL ON ONE SIDE OF THE CONTAINER.
- 5. LOAD EIGHT PALLET UNITS.
- 6. INSTALL ONE SIDE FILL ASSEMBLY.
- 7. REPEAT STEPS 4 THROUGH 6.
- INSTALL THE REAR BLOCKING ASSEMBLY.
- 9. INSTALL THE DOOR POST VERTICALS.
- 10. INSTALL THE DOOR SPANNER PIECES.
- 11. INSTALL THE STRUTS.

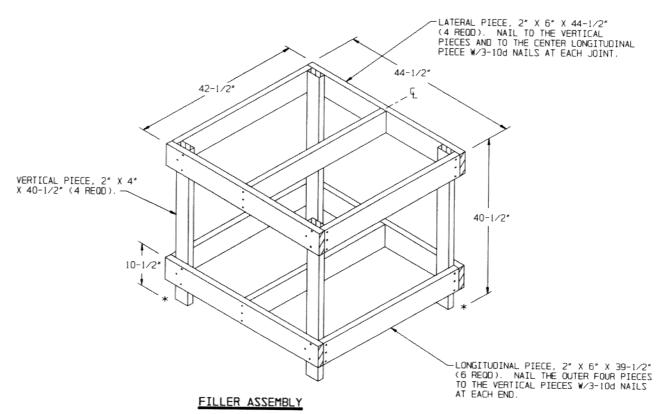
SPECIAL NOTE:

THE ALTERNATIVE LOAD PATTERN DEPICTED ON PAGE 4 MAY BE USED IF DEEMED MORE ECONOMICAL TO LOAD THAN THE PATTERN DEPICTED ON PAGE 2. THE LOAD DEPICTED ON PAGE 4 IS THE ONLY LOAD THAT CAN BE USED WHEN LOADING PALLETS WITH TOTAL PALLET WEIGHT EXCEEDING 44,000 POUNDS.



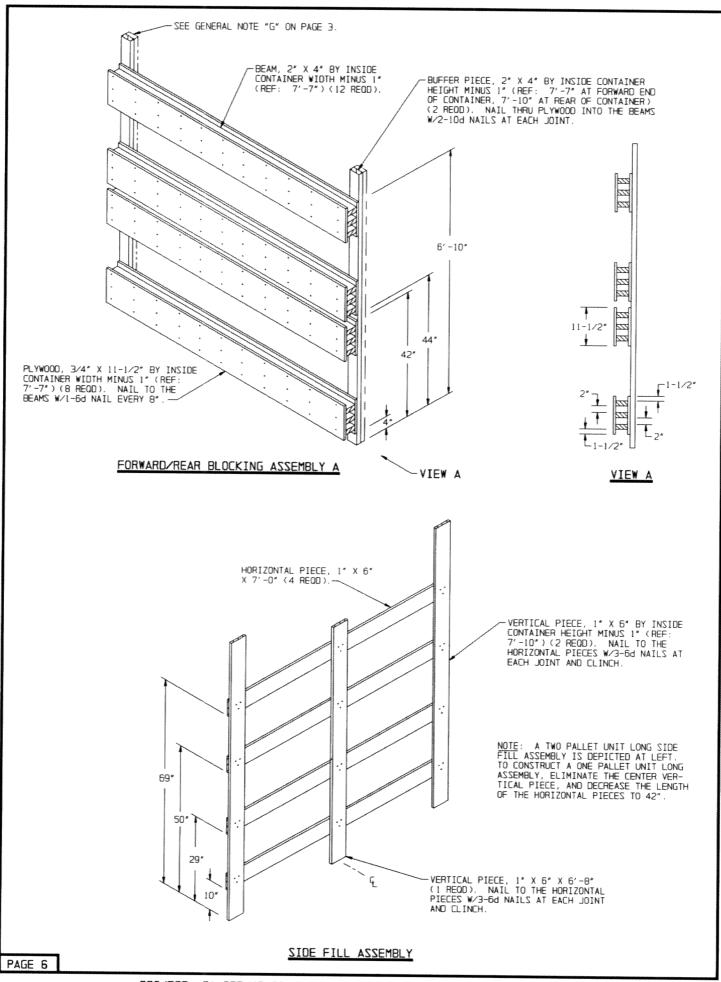
PALLET UNIT

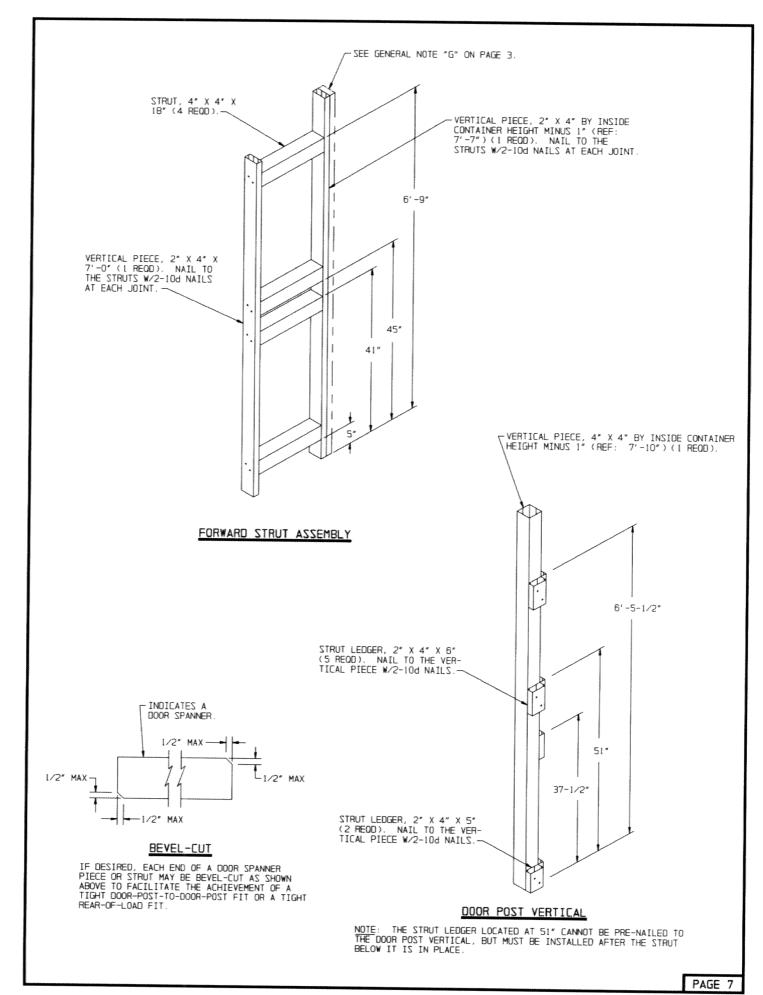
UNIT WEIGHT - - - - - - - 1,919 TO 2,257 LBS (APPROX)
CUBE - - - - - - - - - 44.5 CU FT (APPROX)

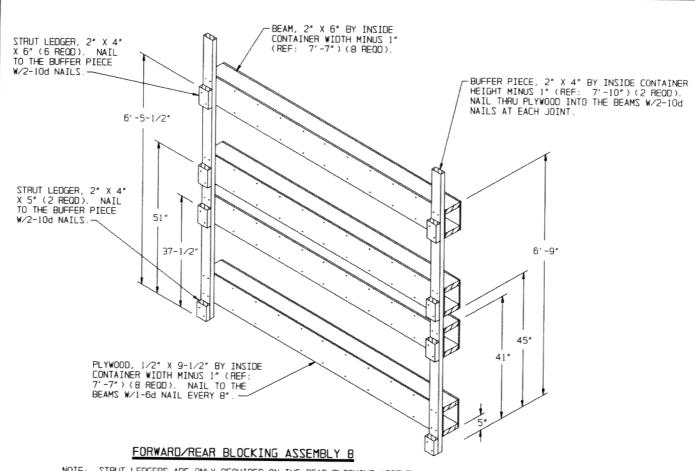


THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT. FILLER ASSEMBLIES MUST BE WIRE TIED TO ADJACENT PALLET UNITS TO PREVENT UNDUE MOVEMENT. NO MORE THAN FIVE FILLER ASSEMBLIES MAY BE USED IN THE LOAD DEPICTED ON PAGE 2, AND NO MORE THAN FOUR ASSEMBLIES MAY BE USER IN THE LOAD DEPICTED ON PAGE 4. DO NOT INSTALL A FILLER ASSEMBLY IMMEDIATELY ADJACENT TO ANOTHER FILLER ASSEMBLY.

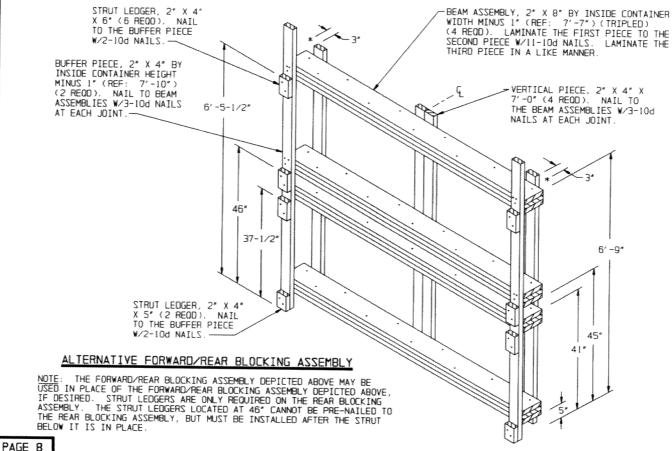
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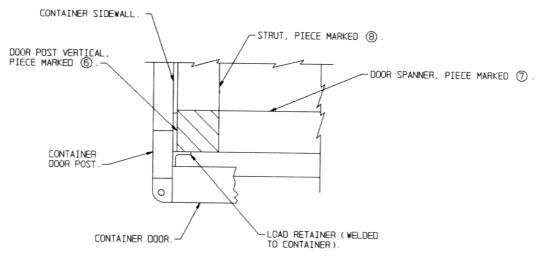






NOTE: STRUT LEDGERS ARE ONLY REQUIRED ON THE REAR BLOCKING ASSEMBLY.
THE STRUT LEDGERS LOCATED AT 51" CANNOT BE PRE-NAILED TO THE REAR BLOCKING ASSEMBLY, BUT MUST BE INSTALLED AFTER THE STRUT BELOW IT IS IN PLACE.



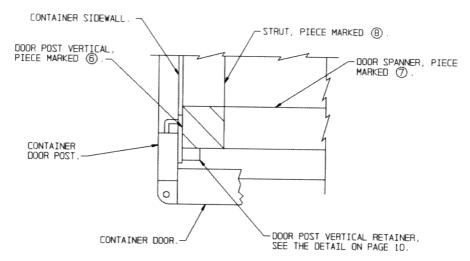


DETAIL A

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

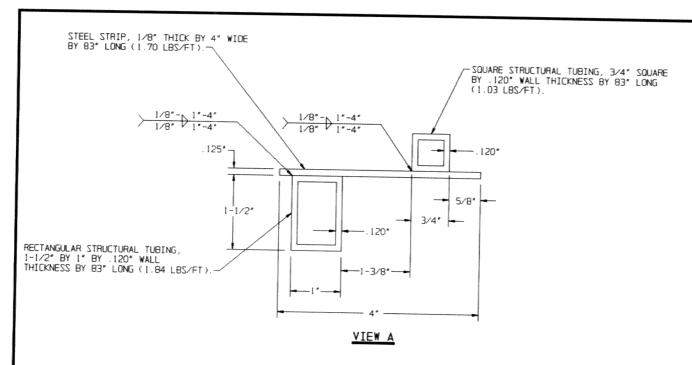
SPECIAL NOTE:

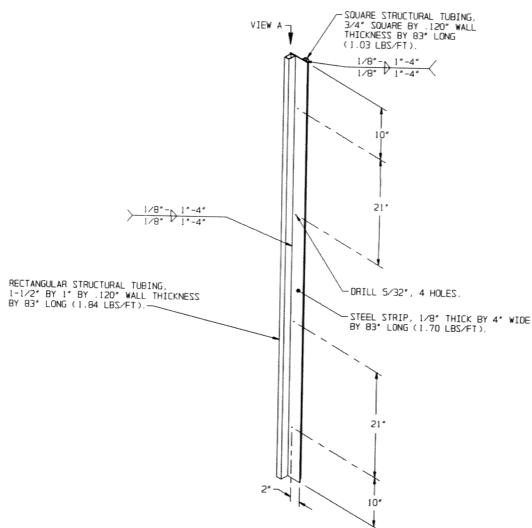
WHEN END OPENING ISO CONTAINERS ARE NOT EQUIPPED WITH PRE-WELDED LOAD RETAINERS, AS DEPICTED IN "DETAIL A" ABOVE, DOOR POST VERTICAL RETAINERS WILL BE REDUIRED FOR THE LOADS DEPICTED ON PAGES 2 AND 4. SEE VARIOUS LOADS WITHIN AMC DRAWING 19-48-4153-15PA1002 FOR EXAMPLES. SEE PAGE 10 FOR DETAILS OF THE 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.





DOOR POST VERTICAL RETAINER

NOTE: THE ABOVE ASSEMBLY HAS BEEN SHOWN ROTATED 90° FROM THE ORIENTATION IN WHICH IT IS INSTALLED IN THE LEFT REAR CORNER OF THE CONTAINER. THE ASSEMBLY HAS BEEN ROTATED FOR HOLE LOCATION CLARITY.