REVISION NO. 1 APPROVED BY BUREAU OF EXPLOSIVES

DATE 11/4/92

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

# PA104 SERIES CONTAINERS

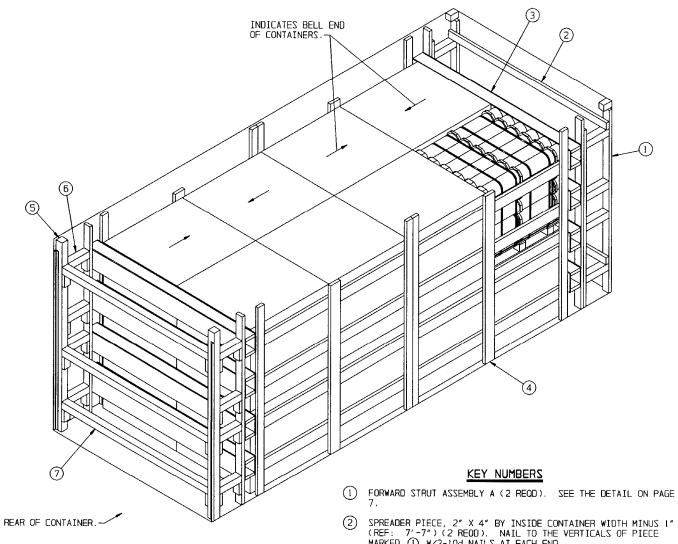
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ITEM	<u>P</u> A	(GE(S)
TYPICAL LOADING PROCEDURES		3

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				
APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND	DRAFT	NAMZ	TECHNICIAN	ENGINEER
CHEMICAL COMMAND				L. FIEFFER
Smoothy K. fre				
	VALIDAT ENGINEE	ERING	TRANSPORTATION ENGINEERING	ENGINEERING
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND	DIVIS	ION	DIVIZION	OFFICE
William FErnst	pm 1	MIL	W. Frenk	e W7 Emst
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL			JUNE 1986	o e
	CLASS	DIVISIO	ON DRAWING	FILE
REVISION NO. 1 JANUARY 1993			12.1	
SEE THE REVISION LISTING ON PAGE 3	19	48	4215/7	15PM1013

DO NOT SCALE



#### ISOMETRIC VIEW

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4" 2" X 6" 4" X 4"	150 270 55	100 270 74
NAILS	NO. REQD	POUNDS
6d (2°) 10d (3°) 12d (3-1/4°)	352 308 44	2-1/4 4-3/4 3/4
PLYWOOD, 1/2" 96.06 SO FT REOD 132.09 LBS		

- SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS L" (REF: 7'-7") (2 REOD). NAIL TO THE VERTICALS OF PIECE MARKED ① W/2-10d NAILS AT EACH END.
- FORWARD/REAR BLOCKING ASSEMBLY A (2 REQD). SEE THE DETAIL ON PAGE 6 AND THE "ALTERNATIVE FORWARD/REAR BLOCKING ASSEMBLY A" ON PAGE 10. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECES OF PIECE MARKED (1) W/8-10d NAILS.
- (4) SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 6.
- DOOR POST VERTICAL A (2 REOD, 1 LEFT HAND AND 1 RIGHT HAND). SEE THE DETAIL ON PAGE 7, AND DETAILS A AND B ON PAGE 11.
- (6) STRUT, 4" X 4" BY CUT-TO-FIT (REF: 12-3/4") (8 REQD). TOENAIL TO THE BUFFER PIECE 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 7.
- DOOR SPANNER, 4" X 4" MATERIAL CUT TO A LENGTH THAT WILL PROVIDE FOR A DRIVE FIT (REF: 7'-1-3/8'') (3 REOD). TOENAIL TO THE DOOR POST VERTICALS W/2-12d NAILS AT EACH END. SEE THE BEVEL CUT DETAIL ON PAGE 7.

#### LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT DUNNAGE		1.028 LBS

TOTAL WEIGHT - - - - - - 45,152 LBS (APPROX)

#### (GENERAL NOTES CONTINUED)

- N. 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.
  - 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.

RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD DEPICTED ON PAGE 2:

- PREFABRICATE TWO FORWARD STRUT ASSEMBLIES, TWO FORWARD/REAR BLOCKING ASSEMBLIES, FOUR SIDE FILL ASSEMBLIES, AND TWO DOOR POST VERTICALS.
- INSTALL THE TWO FORWARD STRUT ASSEMBLIES AND THE TWO SPREADER PIECES.
- INSTALL THE FORWARD BLOCKING ASSEMBLY.
- 4. INSTALL TWO SIDE FILL ASSEMBLIES.
- LOAD EIGHT PALLET UNITS.
- 6. REPEAT STEPS 4 AND 5.
- 7. INSTALL THE REAR BLOCKING ASSEMBLY.
- 8. INSTALL THE TWO DOOR POST VERTICALS.
- INSTALL THE THREE DOOR SPANNER PIECES.
- 10. INSTALL THE EIGHT STRUTS.

#### REVISION

REVISION NO. 1, DATED JANUARY 1993, CONSISTS OF: STREAMLINING DUNNAGING METHODS.

# MATERIAL SPECIFICATIONS

LUMBER - - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.

NAILS ----: FED SPEC FF-N-105; COMMON.

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 DE SUBSTITUTED

MAY BE SUBSTITUTED.

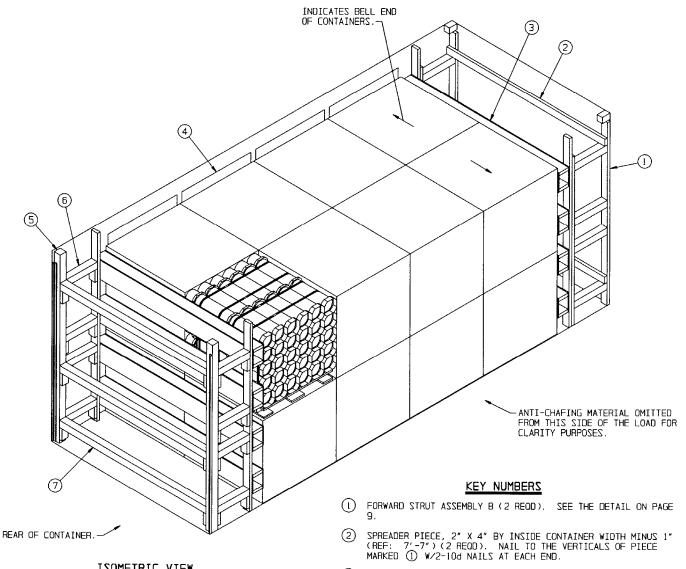
WIRE, CARBON STEEL -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006

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).
- THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF COMPLETE ROUNDS PACKED IN PA104 SERIES METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 5 AND AMC DRAWING 19-48-4079/6A-20PM1002 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. SEE PAGE 5
- 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. NATI FACH ADDITIONAL PIECE W/I APPROPRIATELY SIZED NATI 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
- 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 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.
- CAUTION: 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.
- 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:
  - 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.
- 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.
- 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.

(CONTINUED AT LEFT)



#### ISOMETRIC VIEW

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2* X 4* 2* X 6* 4* X 4*	87 122 62	58 122 83
NAILS	NO. REOD	POUNDS
6d (2°) 10d (3°) 12d (3-1/4°)	352 164 44	2-1/4 2-3/4 3/4
PLYW00D, 1/2" 96.06 SO FT REOD 132.09 LBS		

ANTI-CHAFING MATERIAL - - - AS REOD - - - - - NIL

- FORWARD/REAR BLOCKING ASSEMBLY B (2 REOD). SEE THE DETAIL ON PAGE 8 AND THE "ALTERNATIVE FORWARD/REAR BLOCKING ASSEMBLY B" ON PAGE 10. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECES OF PIECE MARKED ① W/8-10d NAILS.
- ETC.) TO THE SIDEWALL OR PALLET UNIT TO ELIMINATE METAL-TO-METAL CONTACT.
- DOOR POST VERTICAL B (2 REOD, 1 LEFT HAND AND 1 RIGHT HAND). SEE THE DETAIL ON PAGE 9, AND DETAILS A AND B ON PAGE 11.
- STRUT, 4" X 4" BY CUT-TO-FIT (REF: 18-1/4") (8 REOD). TOENAIL TO THE BUFFER PIECE 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 7.
- DOOR SPANNER, 4" X 4" MATERIAL CUT TO A LENGTH THAT WILL PROVIDE FOR A DRIVE FIT (REF: 7'-1-3/8") (3 REOD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE BEVEL CUT DETAIL ON PAGE 7.

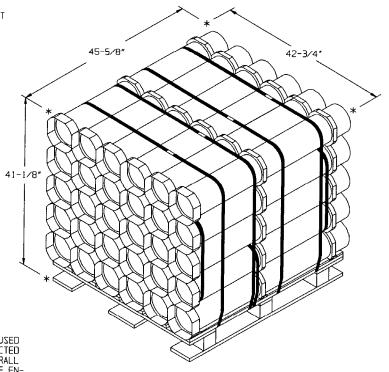
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ITEM	QUANTITY	WEIGHT (APPROX)
DUNNAGE		- 664 LBS

TOTAL WEIGHT - - - - - - 44,788 LBS (APPROX)

RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD DEPICTED ON PAGE  $4\colon$ 

- PREFABRICATE TWO FORWARD STRUT ASSEMBLIES, TWO FORWARD/REAR BLOCKING ASSEMBLIES, AND TWO DOOR POST VERTICALS.
- 2. INSTALL THE TWO FORWARD STRUT ASSEMBLIES AND THE TWO SPREADER PIECES.
- 3. INSTALL THE FORWARD BLOCKING ASSEMBLY.
- 4. INSTALL THE ANTI-CHAFING PIECES.
- 5. LOAD EIGHT PALLET UNITS.
- 6. INSTALL THE REAR BLOCKING ASSEMBLY.
- 7. INSTALL THE TWO DOOR POST VERTICALS.
- 8. INSTALL THE THREE DOOR SPANNER PIECES.
- 9. INSTALL THE EIGHT STRUTS.

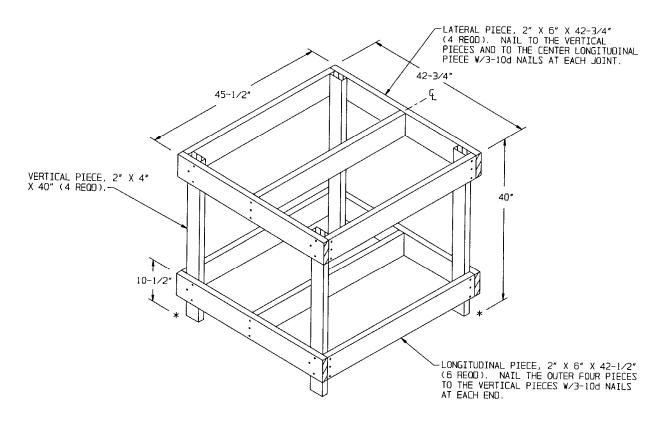


#### SPECIAL NOTE:

THE ALTERNATIVE LOAD PATTERN DEPICTED ON PAGE 4 MAY BE USED IF DEEMED MORE ECONOMICAL TO LOAD THAN THE PATTERN DEPICTED ON PAGE 2. IT MUST BE NOTED, HOWEVER, THAT WITH AN OVERALL LOAD WIDTH OF APPROXIMATELY 91-1/2", DIFFICULTIES MAY BE ENCOUNTERED IN LOADING CONTAINERS HAVING AN INSIDE WIDTH OF 92".

## PALLET UNIT

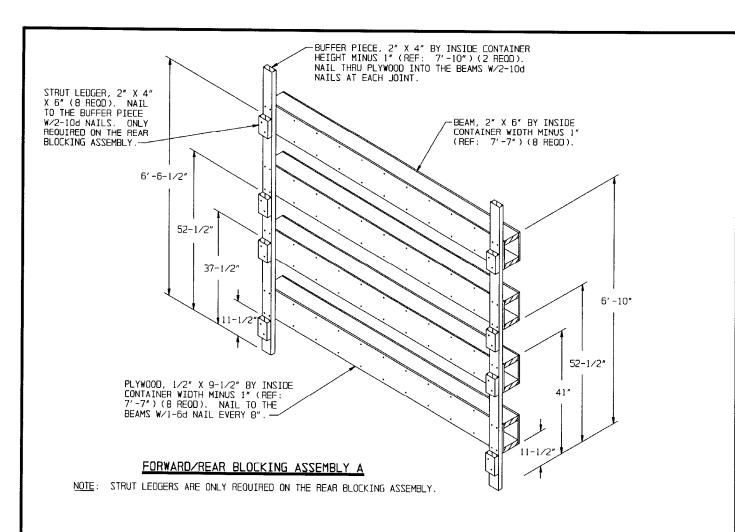
UNIT WEIGHT - - - - - - - 2,464 LBS (APPROX)
CUBE - - - - - - - - - 46.5 CU FT (APPROX)

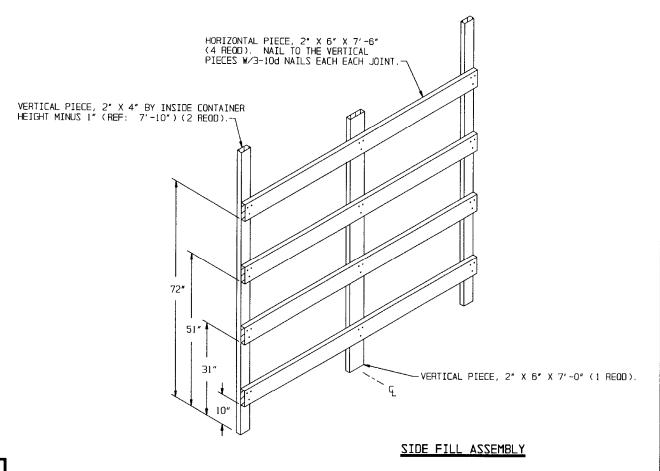


# FILLER ASSEMBLY

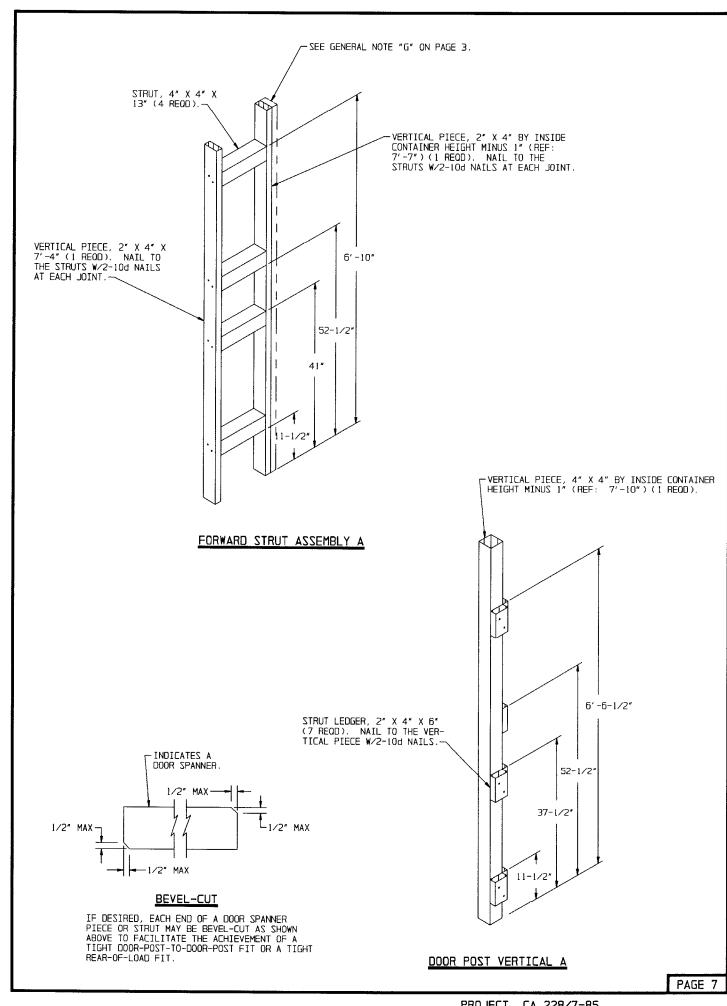
THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT IN THE LOAD ON PAGE 2. FILLER ASSEMBLIES MUST BE WIRE TIED TO ADJACENT PALLET UNITS TO PREVENT UNDUE MOVEMENT. NO MORE THAN FOUR FILLER ASSEMBLIES MAY BE USED PER LOAD. DO NOT INSTALL A FILLER ASSEMBLY IMMEDIATELY ADJACENT TO ANOTHER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

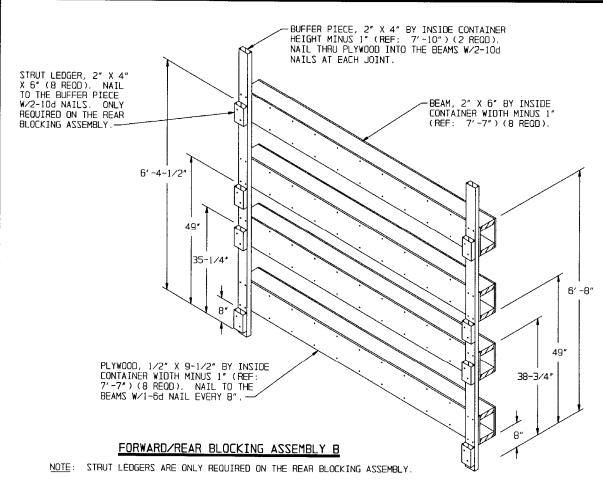
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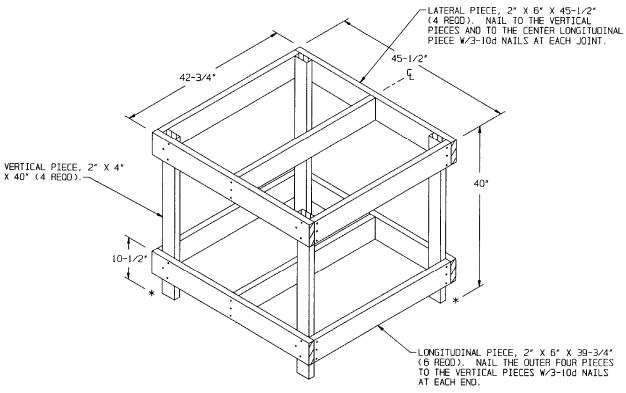




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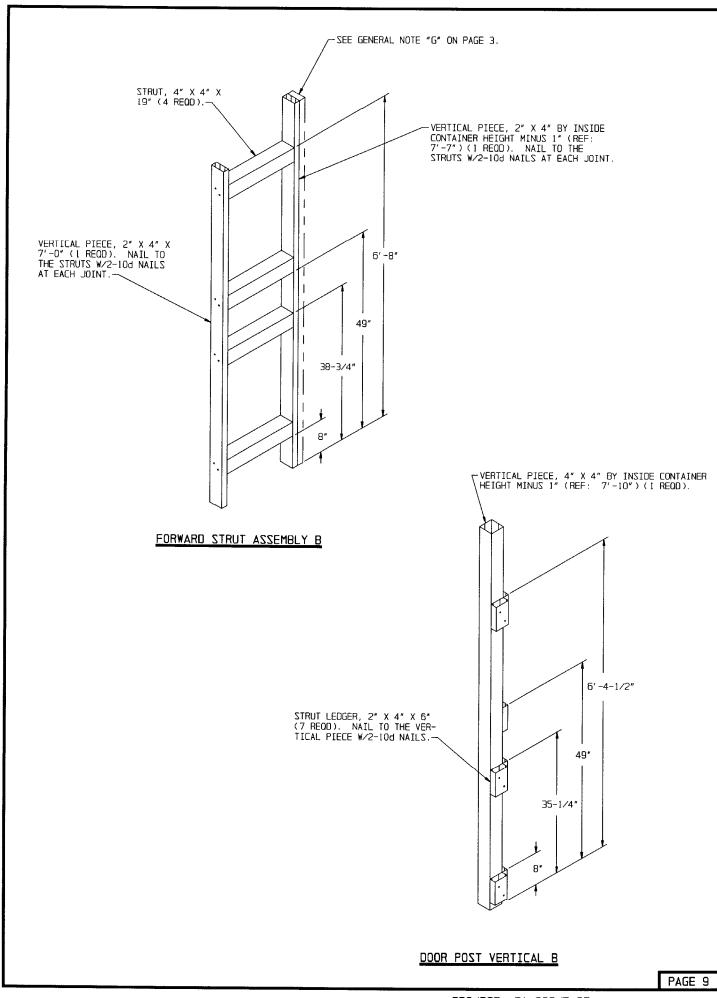


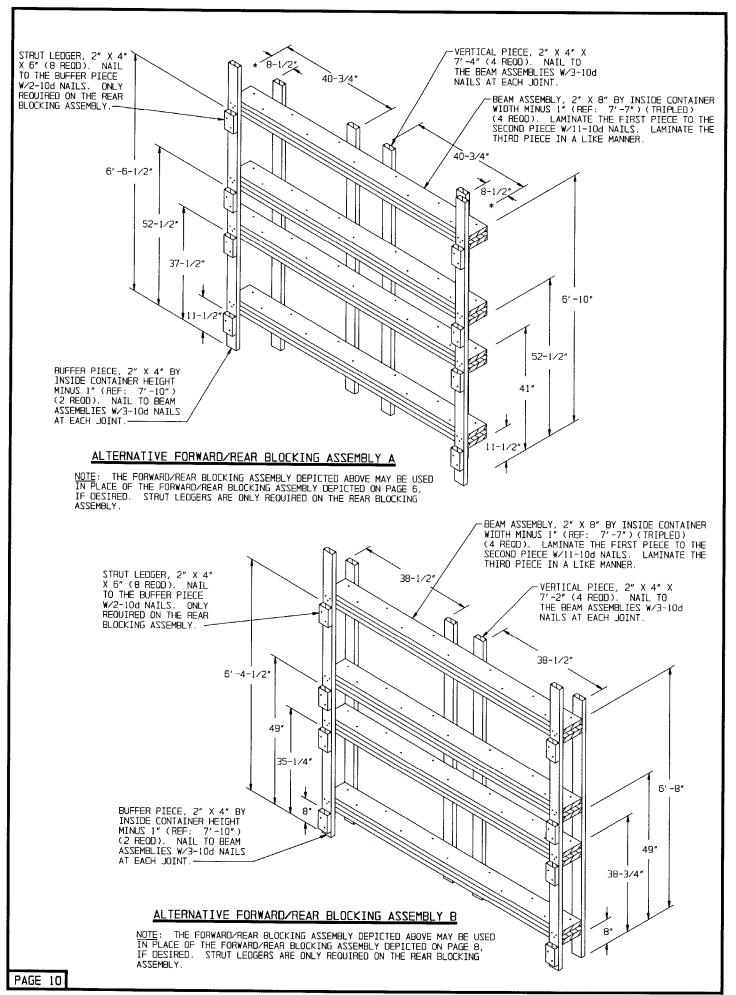


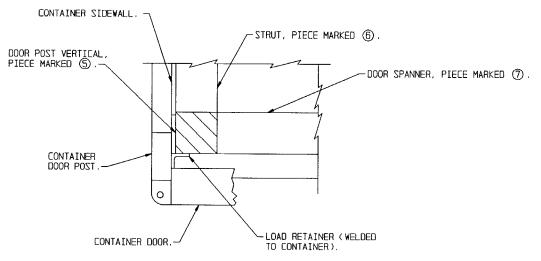


# FILLER ASSEMBLY

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





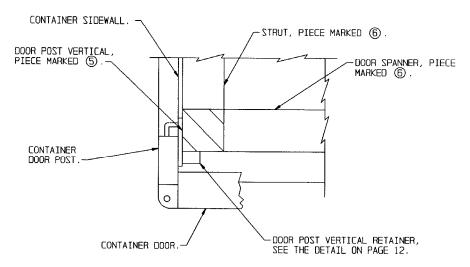


# DETAIL A

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.

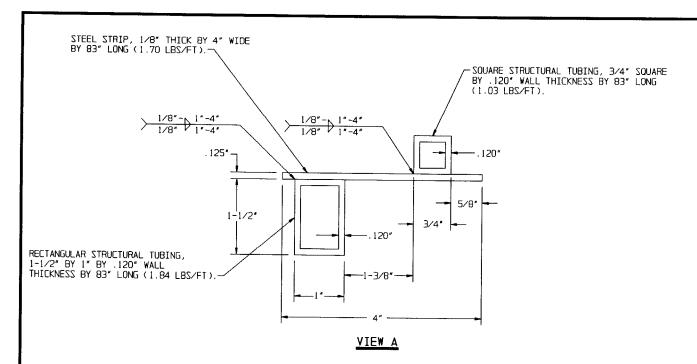
#### SPECIAL NOTE:

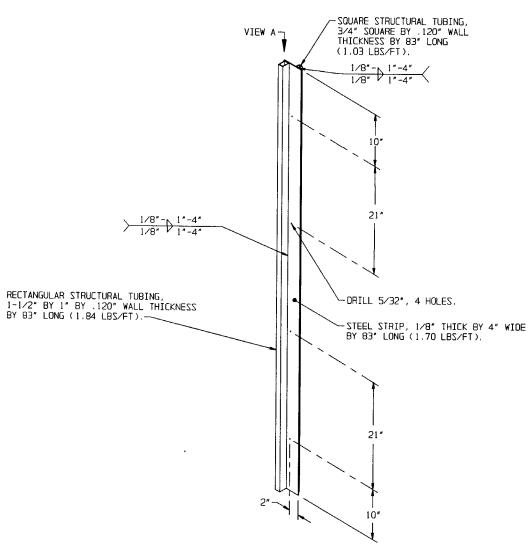
WHEN COMMERCIAL CONTAINERS ARE NOT EQUIPPED WITH PRE-WELDED LOAD RETAINERS, AS DEPICTED IN "DETAIL A" ABOVE, DOOR POST VERTICAL RETAINERS WILL BE BE REQUIRED FOR THE LOADS DEPICTED ON PAGES 2 AND 4. SEE VARIOUS LOADS WITHIN AMC DRAWING 19-48-4153-15PA1002 FOR EXAMPLES. SEE PAGE 12 FOR DETAILS OF THE 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 $^{\rm o}$  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.

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