

APPROVED BY
BUREAU OF EXPLOSIVES

J. H. ...

DATE *5/13/94*

DRAGON




LOADING AND BRACING • WITH WOODEN DUNNAGE IN SIDE OPENING ISO CONTAINERS OF GUIDED MISSILE AND LAUNCHER, SURFACE ATTACK, M222 OR PRACTICE, M223, PACKED ONE PER SHIPPING AND STORAGE CONTAINER, PALLETIZED AND UNPALLETIZED

INDEX

<u>ITEM</u>	<u>PAGE(S)</u>
GENERAL NOTES AND MATERIAL SPECIFICATIONS - - - - -	2
CONTAINER AND PALLET UNIT DETAILS - - - - -	3
UNPALLETIZED LOAD - - - - -	4, 5
PALLETIZED LOAD - - - - -	6, 7
DETAILS - - - - -	8-12

- 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. SEE GENERAL NOTE "L" ON PAGE 2.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY MISSILE COMMAND 	DRAFTSMAN	TECHNICIAN	ENGINEER
		G. GUAY	
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL	VALIDATION ENGINEERING DIVISION	TRANSPORTATION ENGINEERING DIVISION	LOGISTICS ENGINEERING OFFICE
			
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CLASS	DIVISION	DRAWING	FILE
19	48	8202	GM15DR3

DO NOT SCALE

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 OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO LOADS OF THE DRAGON MISSILE AND LAUNCHER PACKED ONE PER SHIPPING AND STORAGE CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE SHIPPING AND STORAGE CONTAINER WITH CONTENTS AND SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH TWENTY (20) SHIPPING AND STORAGE CONTAINERS WITH CONTENTS. SEE PAGE 3 FOR CONTAINER AND PALLET UNIT DETAILS. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOADS AS SHOWN ARE BASED ON 6,050 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH SIDE OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 89" WIDE BY 88" HIGH AND A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT, HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY MOTOR OR WATER CARRIERS. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN ALSO BE USED.
- D. WHEN LOADING THE 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 SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE VERTICAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND QUANTITY OF THE DUNNAGE LUMBER USED MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE LADING UNIT.
- E. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK 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 THERE IS A SLOT AT THE CORNERS OF THE ENDWALLS. A PIECE OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES OF THE END BLOCKING ASSEMBLY DEPICTED IN THE LOAD VIEW ON PAGE 6 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 ENDWALL 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 THE SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.
- K. 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.

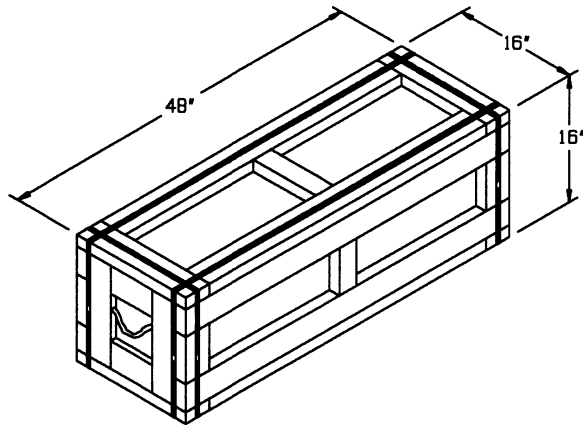
(CONTINUED AT RIGHT)

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.

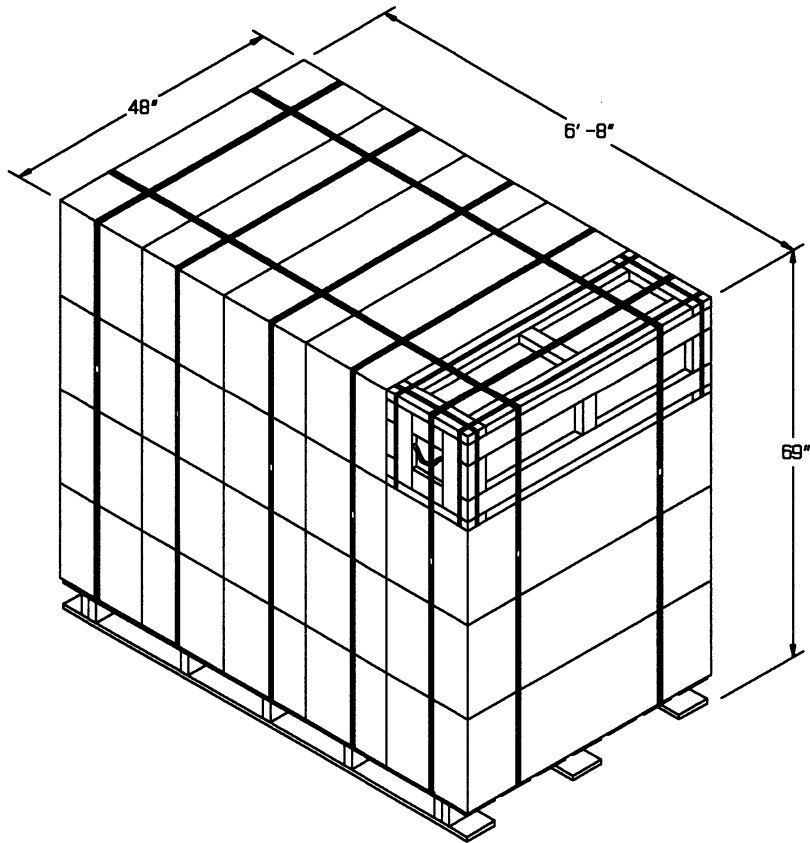
(GENERAL NOTES CONTINUED)

- L. 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 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.
- M. 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.
- N. THE QUANTITY OF LADING UNITS SHOWN IN THE LOADS MAY BE REDUCED FOR SHIPMENT, IF DESIRED. 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 THE LOAD ON PAGE 4 IS TO BE REDUCED, SEE THE "OMITTED CONTAINER ASSEMBLY" DETAIL ON PAGE 12. UNITS MUST BE OMITTED FROM THE TOP LAYER ONLY.
 2. IF THE LOAD ON PAGE 6 IS TO BE REDUCED, PALLET UNITS SHOULD BE ELIMINATED FROM THE CENTER OF THE LOAD 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.



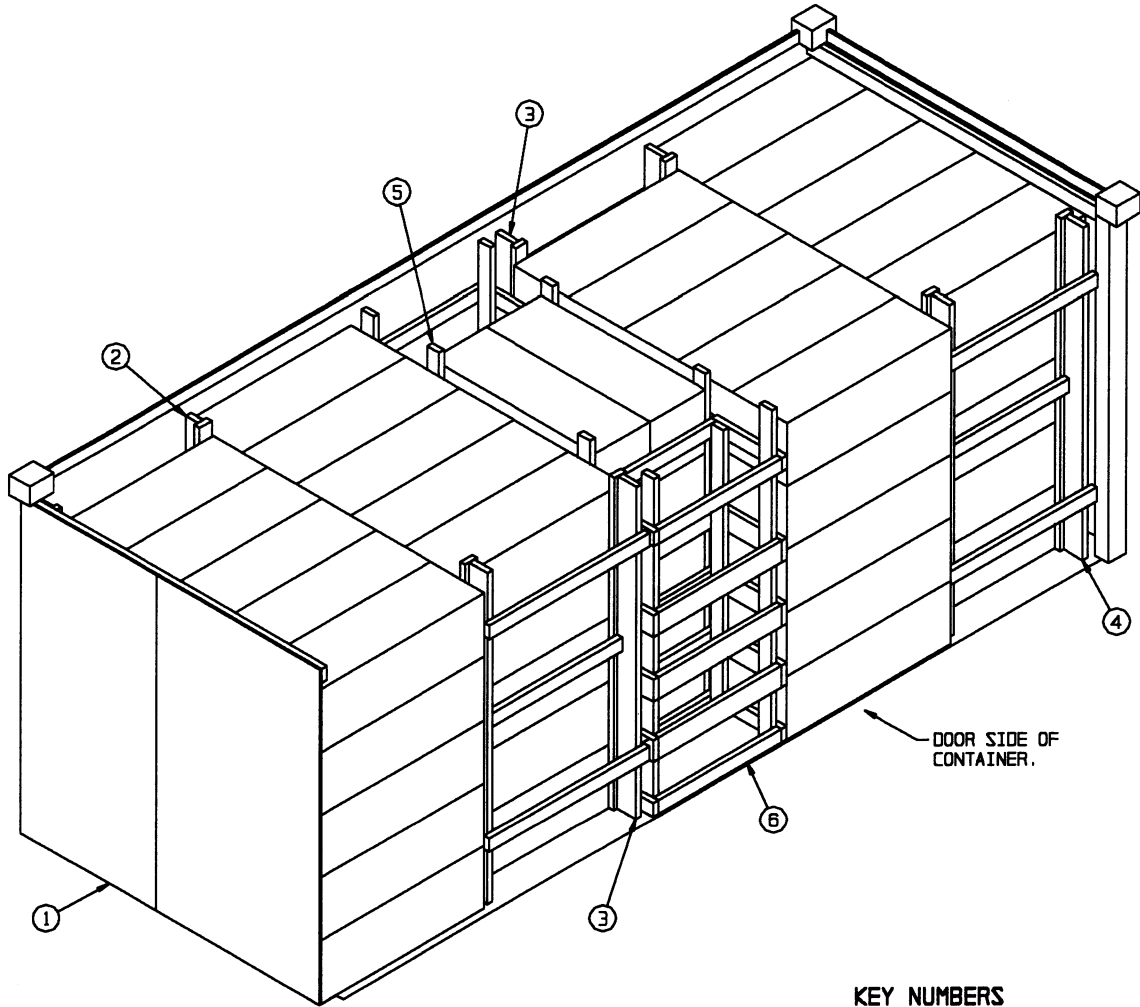
CONTAINER

GROSS WEIGHT - - - - - 67 LBS (APPROX)
 CUBE - - - - - 7.0 CUBIC FEET



PALLET UNIT

NUMBER OF CONTAINERS - - - - - TWENTY (20)
 GROSS WEIGHT - - - - - 1,451 POUNDS (APPROX)
 CUBE - - - - - 151.7 CUBIC FEET



ISOMETRIC VIEW

KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE "END BLOCKING ASSEMBLY A" DETAIL ON PAGE 8.
- ② SIDE FILL ASSEMBLY (1 REQD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 9.
- ③ SIDE FILL ASSEMBLY (2 REQD). SEE THE "SIDE FILL ASSEMBLY B" DETAIL ON PAGE 9.
- ④ SIDE FILL ASSEMBLY C (1 REQD). SEE THE "NOTE ▲" ON PAGE 9.
- ⑤ CENTER FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 10.
- ⑥ FILLER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 11.

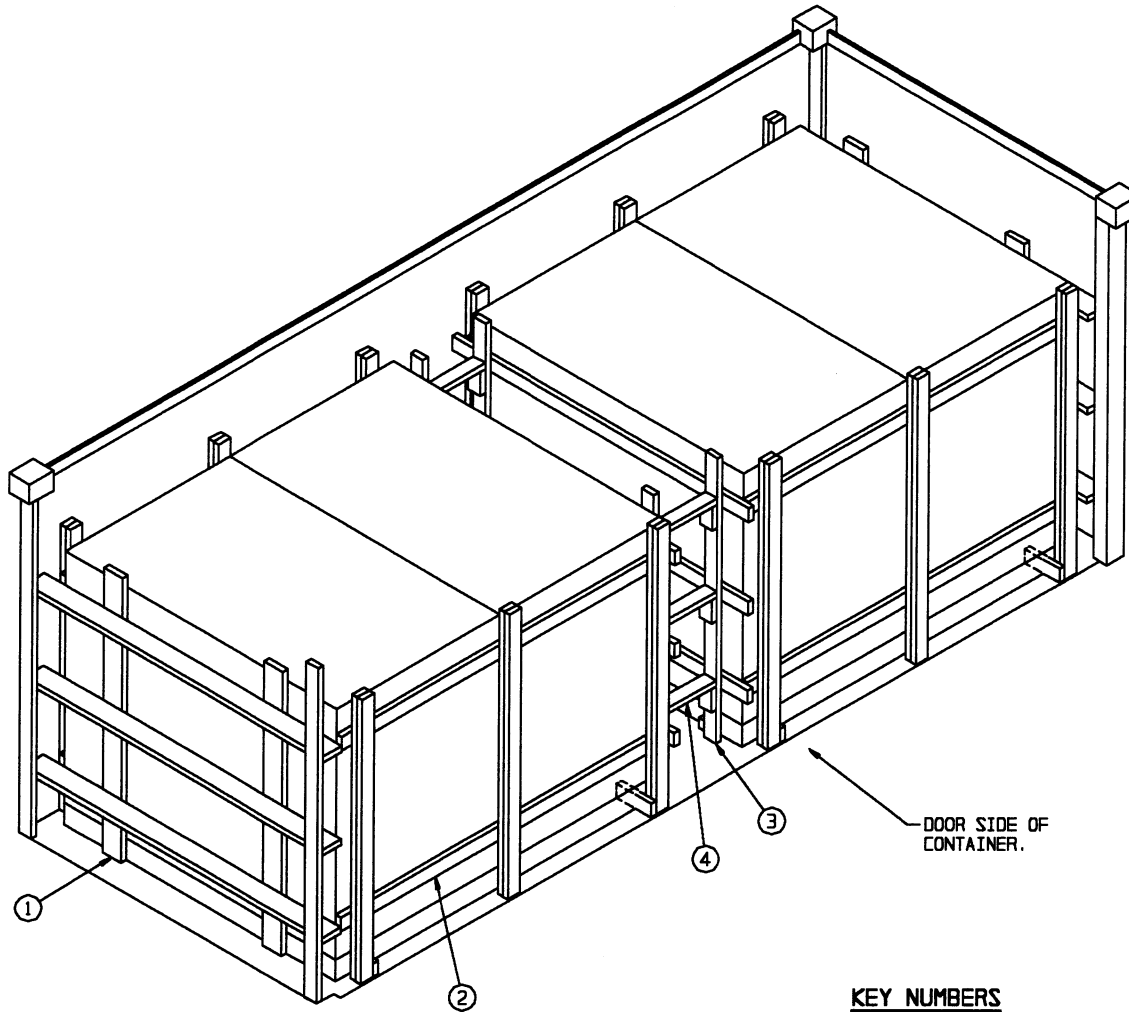
RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PREFABRICATE TWO END BLOCKING ASSEMBLIES "A", ONE SIDE FILL ASSEMBLY "A", TWO SIDE FILL ASSEMBLIES "B", ONE SIDE FILL ASSEMBLY "C" TWO CENTER FILL ASSEMBLIES AND TWO FILLER ASSEMBLIES.
2. INSTALL ONE END BLOCKING ASSEMBLY, THE SIDE FILL ASSEMBLY "A", AND LOAD TWENTY-FIVE CONTAINERS.
3. LOAD TWENTY-FIVE CONTAINERS AND INSTALL ONE SIDE FILL ASSEMBLY "B".
4. INSTALL ONE END BLOCKING ASSEMBLY, LOAD TWENTY-FIVE CONTAINERS, AND INSTALL THE SIDE FILL ASSEMBLY "C".
5. INSTALL ONE SIDE FILL ASSEMBLY "B" AND LOAD TWENTY-FIVE CONTAINERS.
6. INSTALL ONE FILLER ASSEMBLY, LOAD TEN CONTAINERS, INSTALL TWO CENTER FILL ASSEMBLIES AND THE REMAINING FILLER ASSEMBLY.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	262	175
2" X 6"	98	98
NAILS	NO. REQD	POUNDS
6d (2")	22	1/4
10d (3")	312	5
PLYWOOD, 1/2" - - - - 101.53 SQ FT REQD - - 139.60 LBS		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER - - - - -	110 - - - - -	7,370 LBS
DUNNAGE - - - - -	- - - - -	691 LBS
CONTAINER - - - - -	- - - - -	6,050 LBS
TOTAL WEIGHT - - - - -		14,111 LBS (APPROX)



ISOMETRIC VIEW

KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE "END BLOCKING ASSEMBLY B" DETAIL ON PAGE 8.
- ② SIDE FILL ASSEMBLY (4 REQD). SEE THE "SIDE FILL ASSEMBLY D" DETAIL ON PAGE 10.
- ③ CENTER GATE (2 REQD). SEE THE DETAIL ON PAGE 11.
- ④ STRUT, 2" X 4" LENGTH TO SUIT (REF: 17") (6 REQD). TOENAIL TO PIECE MARKED ③ W/2-10d NAILS AT EACH END.

RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PREFABRICATE TWO END BLOCKING ASSEMBLIES "B", FOUR SIDE FILL ASSEMBLIES "D", AND TWO CENTER GATES.
2. INSTALL ONE END BLOCKING ASSEMBLY, ONE SIDE FILL ASSEMBLY, LOAD TWO PALLET UNITS, AND INSTALL ONE SIDE FILL ASSEMBLY.
3. REPEAT STEP 2.
4. INSTALL TWO CENTER GATES WITH STRUTS.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	323	216
2" X 6"	67	67
NAILS	NO. REQD	POUNDS
10d (3")	276	4-1/4

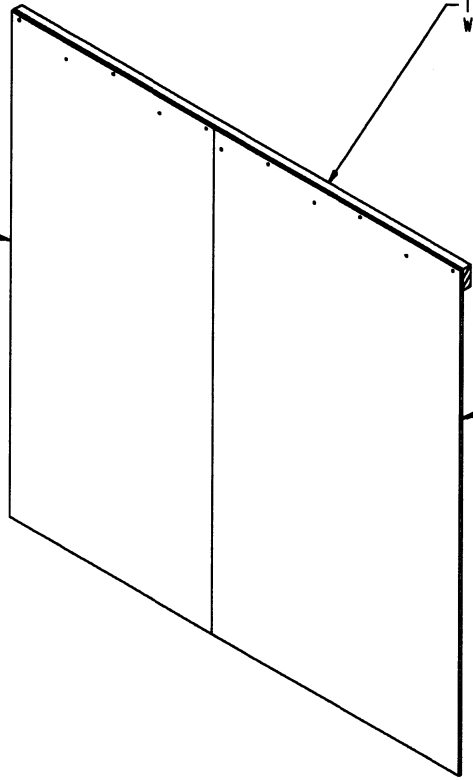
LOAD AS SHOWN

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLET UNIT	4	5,804 LBS
DUNNAGE		571 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		12,425 LBS (APPROX)

PLYWOOD, 1/2" X 38" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1") (1 REQD). NAIL TO THE TIE PIECE W/1-6d NAIL EVERY 8".

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

PLYWOOD, 1/2" X 48" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1") (1 REQD). NAIL TO THE TIE PIECE W/1-6d NAIL EVERY 8".

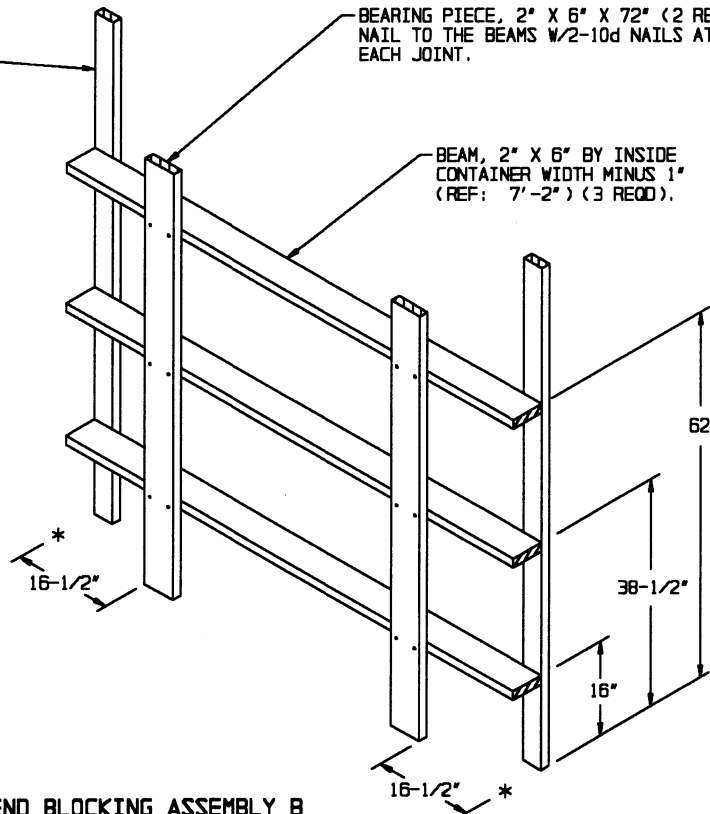


END BLOCKING ASSEMBLY A

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

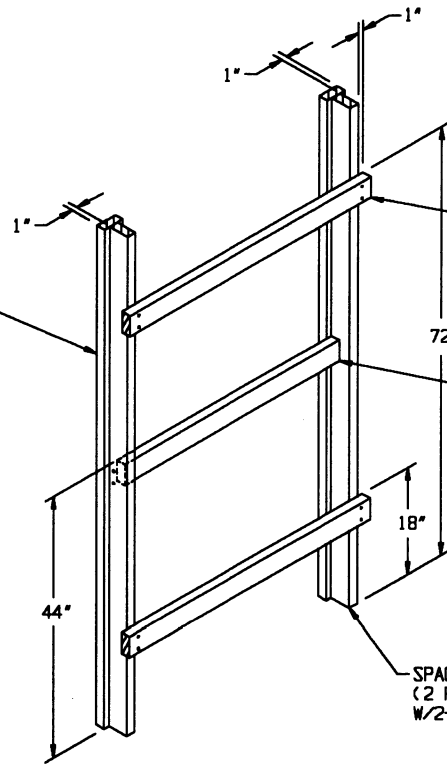
BEARING PIECE, 2" X 6" X 72" (2 REQD). NAIL TO THE BEAMS W/2-10d NAILS AT EACH JOINT.

BEAM, 2" X 6" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-2") (3 REQD).



END BLOCKING ASSEMBLY B

BEARING PIECE, 2" X 4" X 7'-0"
(2 REQD). NAIL TO THE SPACER
PIECE W/6-10d NAILS.



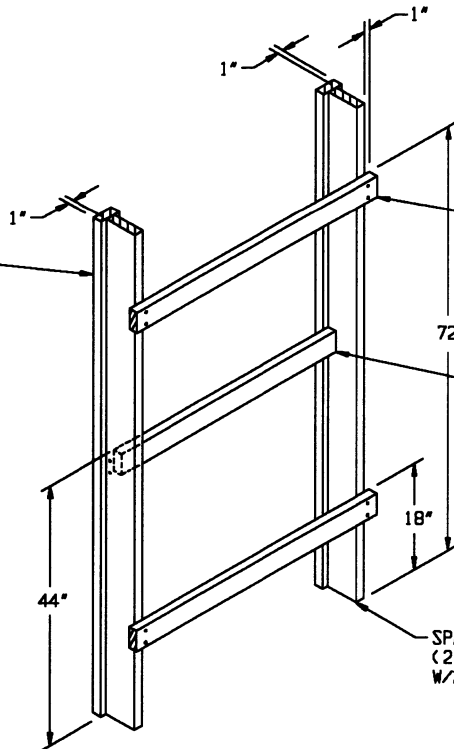
BUFFER PIECE, 2" X 4" X 47"
(2 REQD). NAIL TO THE SPACER
PIECES W/2-10d NAILS AT EACH
JOINT.

BRACE, 2" X 4" X 42"
(1 REQD).

SPACER PIECE, 2" X 4" X 7'-0"
(2 REQD). NAIL TO THE BRACE
W/2-10d NAILS.

SIDE FILL ASSEMBLY A

BEARING PIECE, 2" X 4" X 7'-0"
(2 REQD). NAIL TO THE SPACER
PIECE W/6-10d NAILS.



BUFFER PIECE, 2" X 4" X 47"
(2 REQD). NAIL TO THE SPACER
PIECES W/2-10d NAILS AT EACH
JOINT.

BRACE, 2" X 4" X 42"
(1 REQD).

SPACER PIECE, 2" X 6" X 7'-0"
(2 REQD). NAIL TO THE BRACE
W/2-10d NAILS.

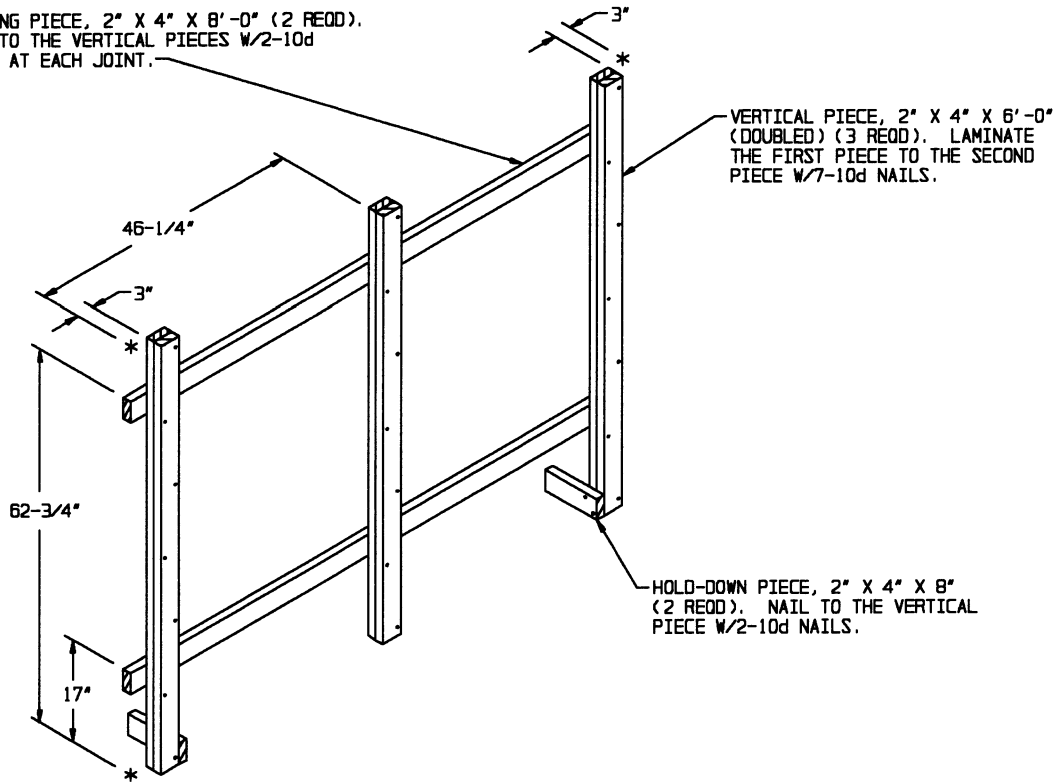
SIDE FILL ASSEMBLY B

NOTE ▲:

SIDE FILL ASSEMBLY C, PIECE MARKED ④
ON PAGE 4, WILL BE IDENTICAL TO *SIDE
FILL ASSEMBLY B* WITH THE EXCEPTION THAT
THE OVERALL LENGTH WILL BE 42-1/2" IN
LIEU OF 47".

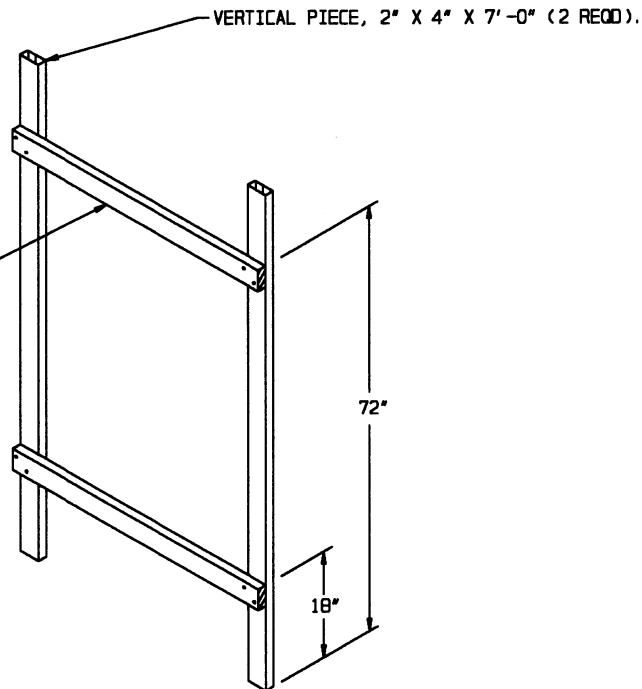
DETAILS

BEARING PIECE, 2" X 4" X 8'-0" (2 REQD).
 NAIL TO THE VERTICAL PIECES W/2-10d
 NAILS AT EACH JOINT.

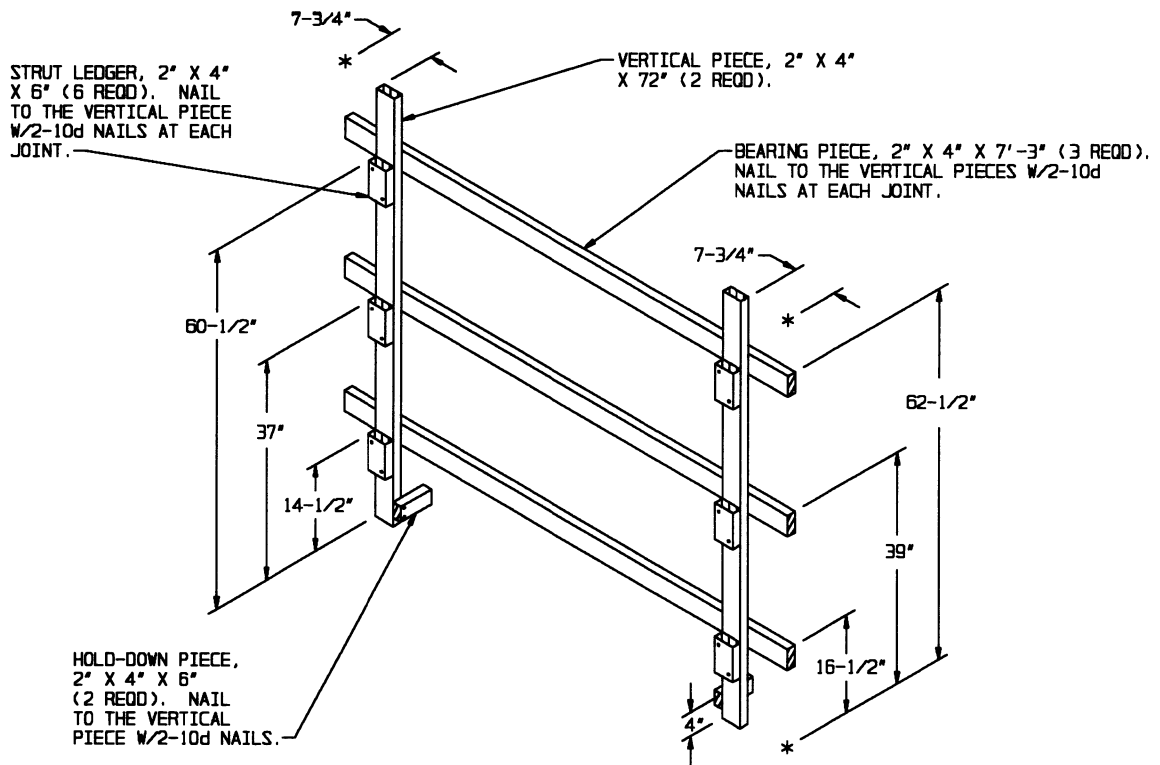


SIDE FILL ASSEMBLY D

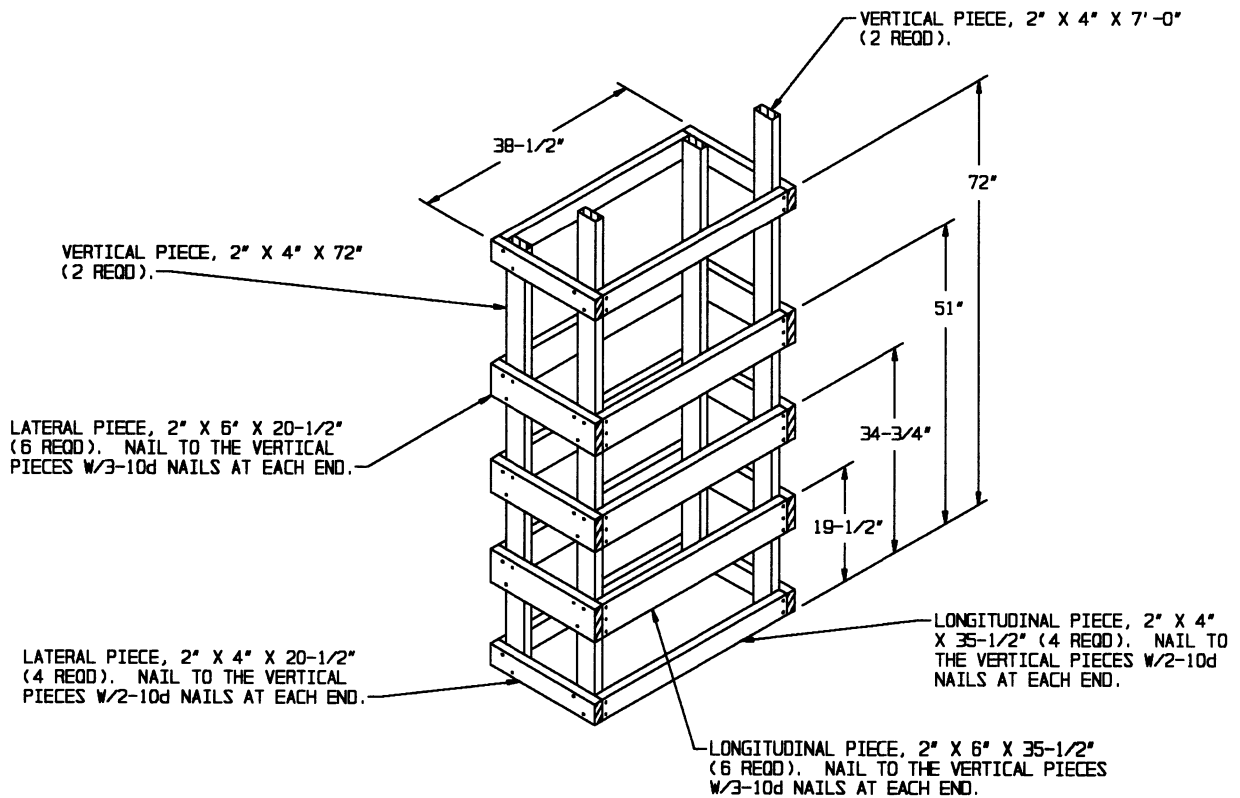
HORIZONTAL PIECE, 2" X 4" X 47"
 (2 REQD). NAIL TO THE VERTICAL
 PIECES W/2-10d NAILS AT EACH JOINT.



CENTER FILL ASSEMBLY



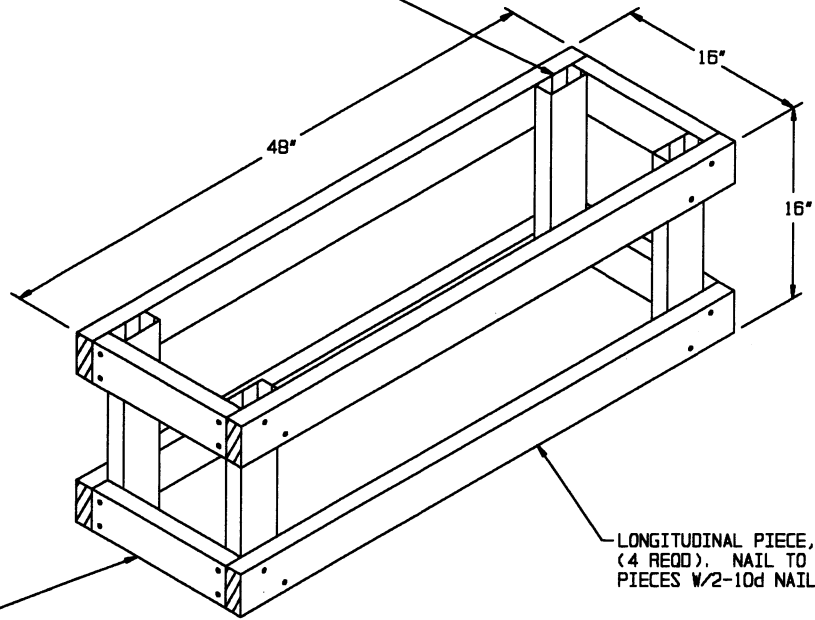
CENTER GATE



FILLER ASSEMBLY

DETAILS

VERTICAL PIECE, 2" X 4" X 16" (4 REQD).



LATERAL PIECE, 2" X 4" X 13" (4 REQD), NAIL TO THE VERTICAL PIECES 1/2-10d NAILS AT EACH END.

LONGITUDINAL PIECE, 2" X 4" X 48" (4 REQD), NAIL TO THE VERTICAL PIECES 1/2-10d NAILS AT EACH JOINT.

OMITTED CONTAINER ASSEMBLY