

APPROVED BY
BUREAU OF EXPLOSIVES

J.A. Ashman

DATE 10/27/92

DRAGON

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

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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. SEE GENERAL NOTE "N" ON PAGE 2.

U. S. ARMY MATERIEL COMMAND DRAWING

| | | | |
|--|---------------------------------------|---|------------------------------------|
| APPROVED, U. S. ARMY MISSILE COMMAND <i>Carl A. Honea</i> | DRAFTSMAN | TECHNICIAN | ENGINEER |
| | | G. GUAY | G. WILLIS |
| APPROVED BY ORDER OF COMMANDING GENERAL, U. S. ARMY MATERIEL COMMAND <i>William F Ernst</i> | VALIDATION ENGINEERING DIVISION | TRANSPORTATION ENGINEERING DIVISION | LOGISTICS ENGINEERING OFFICE |
| | <i>AM</i> | <i>W. Friedrich</i> | <i>W.F Ernst</i> |
| U. S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL | MAY 1993 | | |
| | CLASS | DIVISION | DRAWING |
| | 19 | 48 | 8187 |
| | | | FILE |
| | | | GM15DR2 |

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 SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF THE DRAGON GUIDED 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. CAUTION: REGARDLESS OF THE QUANTITY OF CONTAINERS OR PALLET UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE EXCEEDED.
- C. FOR DETAILS OF THE CONTAINER, SEE PACKAGING DATA SHEET NO. 10695149 OR 10695150 AND "CONTAINER" DETAIL ON PAGE 3.

CONTAINER DIMENSIONS - - - 48" LONG X 16" WIDE X 16" HIGH.
GROSS WEIGHT - - - - - 67 POUNDS (APPROX).
CUBE - - - - - 7.0 CUBIC FEET.
- D. FOR DETAILS OF THE PALLET UNIT, SEE US ARMY DARCOM DRAWING NO. 19-48-5218-GM20DR1 AND "PALLET UNIT" DETAIL ON PAGE 3.

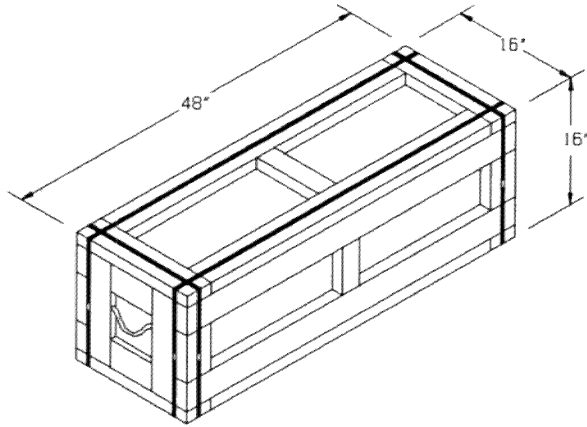
PALLET UNIT
DIMENSIONS - - - - - 48" LONG X 6'-8" WIDE X
69" HIGH.
GROSS WEIGHT - - - - - 1,451 POUNDS (APPROX).
CUBE - - - - - 151.7 CUBIC FEET.
- E. THESE PROCEDURES CAN ALSO BE UTILIZED FOR THE SHIPMENT OF CONTAINERS WHEN THEY ARE LOADED WITH AN ITEM OTHER THAN THE SPECIFIED MISSILE ITEMS, OR WHEN THEY ARE EMPTY.
- F. 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 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 BE USED.
- G. WHEN LOADING CONTAINERS OR 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 SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL 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 ITEM BEING LOADED.
- H. 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" BY 5-1/2" WIDE.

- J. 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.
- K. 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 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 ENDWALL OF THE CONTAINER IS SMOOTH AND FLAT.
- L. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- M. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS ONE OF SIDE WALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- N. 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.
- O. 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.
- P. 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)

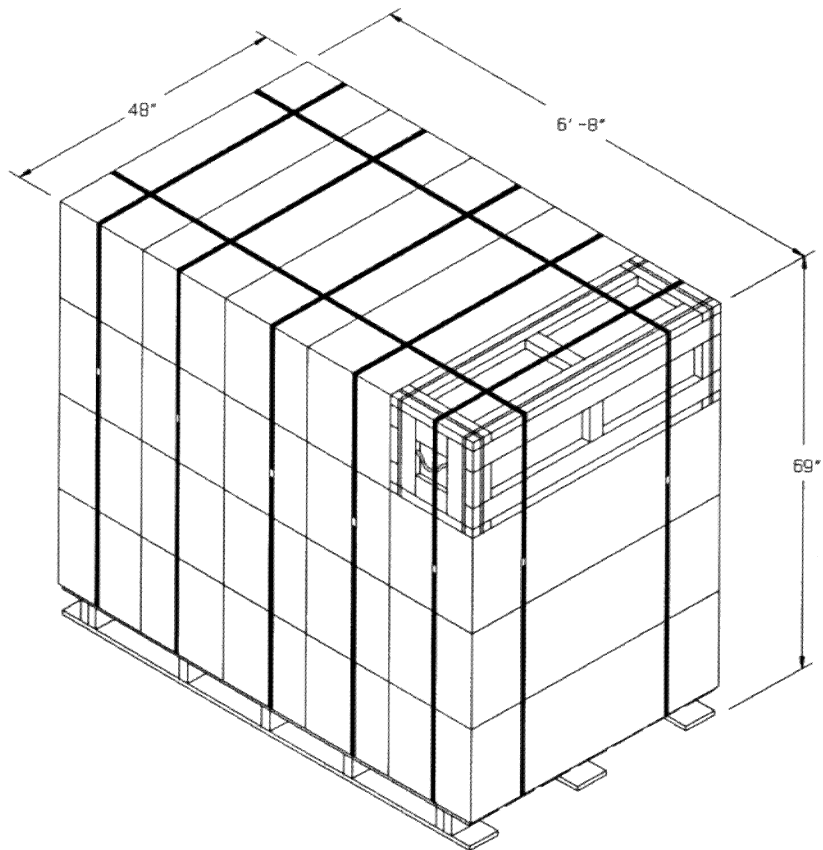
MATERIAL SPECIFICATIONS

- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.



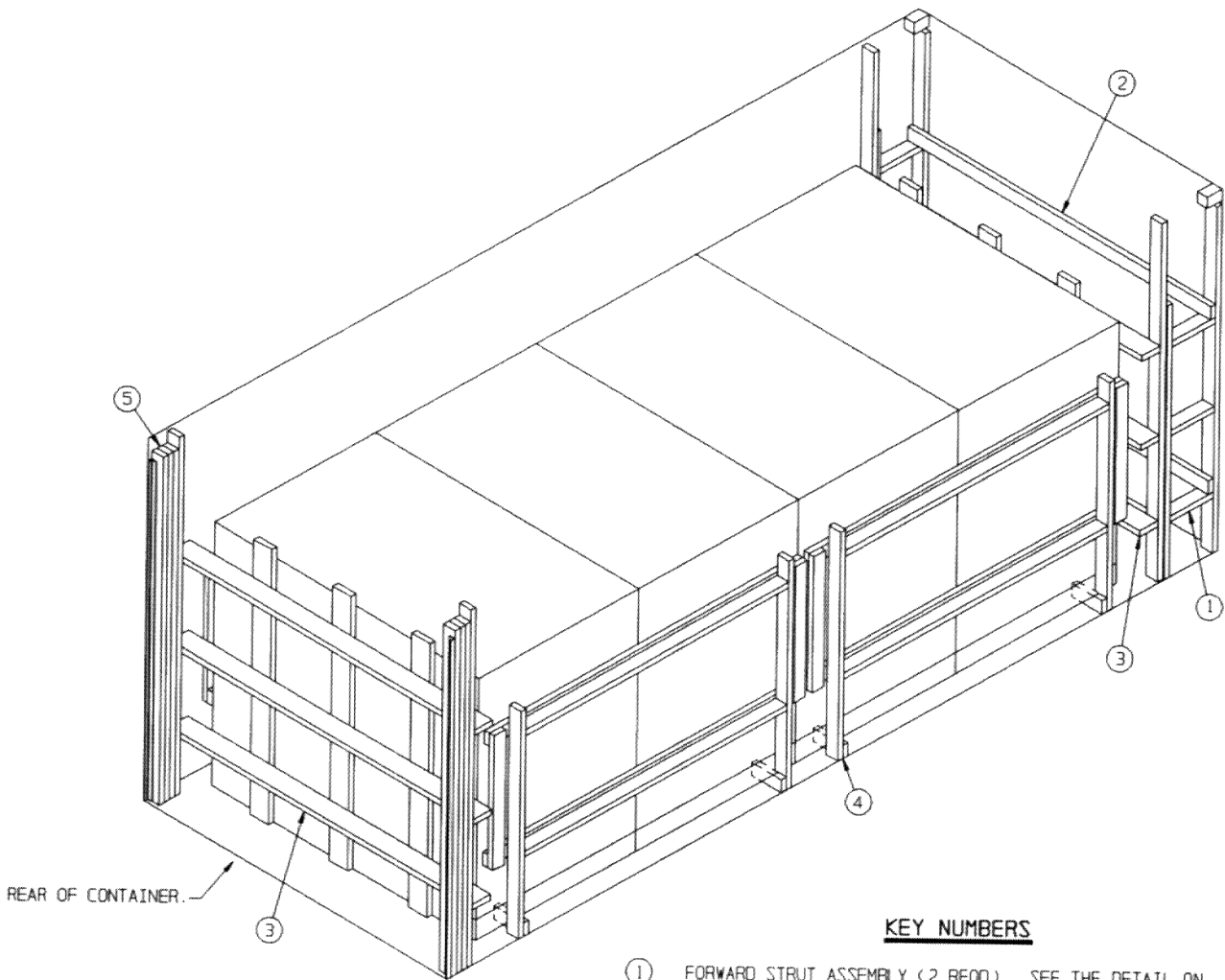
CONTAINER

GROSS WEIGHT - - - - 67 POUNDS (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 FORWARD STRUT ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 9.
- ② SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (2 REQD). NAIL TO THE BUFFER PIECE OF PIECE MARKED ① W/2-10d NAILS AT EACH END.
- ③ FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 9. NAIL TO EACH FORWARD STRUT ASSEMBLY, PIECE MARKED ①, W/5-10d NAILS.
- ④ SIDE FILL ASSEMBLY (4 REQD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 8.
- ⑤ FILL MATERIAL, 4" WIDE BY 7'-0" LONG MATERIAL (AS REQUIRED). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/7 NAILS OF A SUITABLE SIZE (10d FOR 2" THICK MATERIAL). LAMINATE EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR MANNER.

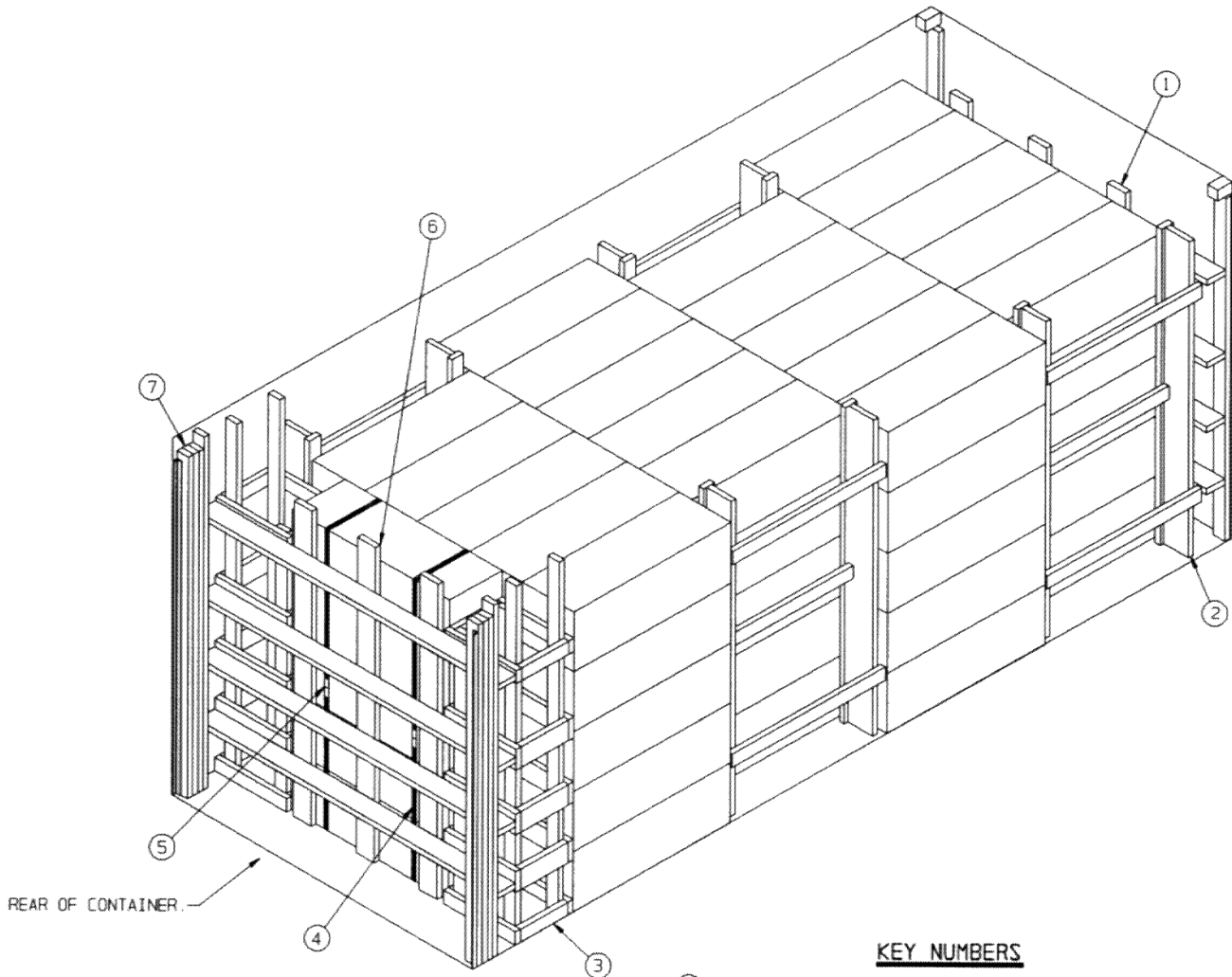
RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PREFABRICATE TWO FORWARD STRUT ASSEMBLIES, ONE FORWARD BLOCKING ASSEMBLY, ONE REAR BLOCKING ASSEMBLY AND FOUR SIDE FILL ASSEMBLIES "A".
2. INSTALL THE FORWARD STRUT ASSEMBLIES.
3. INSTALL THE SPREADER PIECES.
4. INSTALL THE FORWARD BLOCKING ASSEMBLY.
5. INSTALL ONE SIDE FILL ASSEMBLY.
6. LOAD TWO PALLET UNITS AND INSTALL ONE SIDE FILL ASSEMBLY.
7. REPEAT STEPS 5 AND 6.
8. INSTALL THE REAR BLOCKING ASSEMBLY.
9. INSTALL THE FILL MATERIAL BETWEEN THE REAR BLOCKING ASSEMBLY AND THE LOAD RETAINER.

| BILL OF MATERIAL | | |
|------------------|-------------|------------|
| LUMBER | LINEAR FEET | BOARD FEET |
| 2" X 4" | 308 | 205 |
| 2" X 6" | 82 | 82 |
| NAILS | NO. REQD | POUNDS |
| 10d (3") | 306 | 4-3/4 |

LOAD AS SHOWN

| <u>ITEM</u> | <u>QUANTITY</u> | <u>WEIGHT (APPROX)</u> |
|--------------|-----------------|------------------------|
| PALLET UNIT | 4 | 5,804 LBS |
| DUNNAGE | | 579 LBS |
| CONTAINER | | 4,700 LBS |
| TOTAL WEIGHT | | 11,083 LBS (APPROX) |



ISOMETRIC VIEW

KEY NUMBERS

- ① FORWARD BLOCKING ASSEMBLY (1 REOD). SEE THE DETAIL ON PAGE 10.
- ② SIDE FILL ASSEMBLY (4 REOD). SEE THE "SIDE FILL ASSEMBLY B" DETAIL ON PAGE 11.
- ③ FILLER ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 11.
- ④ UNITIZING STRAP, 1-1/4" X .035" OR .031" X 18'-0" LONG STEEL STRAPPING (2 REOD).
- ⑤ SEAL FOR 1-1/4" STEEL STRAPPING (4 REOD, 2 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ⑥ REAR BLOCKING ASSEMBLY (1 REOD). SEE THE DETAIL ON PAGE 10.
- ⑦ FILL MATERIAL, 4" WIDE BY 7'-0" LONG MATERIAL (AS REQUIRED). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/7 NAILS OF A SUITABLE SIZE (10d FOR 2" THICK MATERIAL). LAMINATE EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR MANNER.

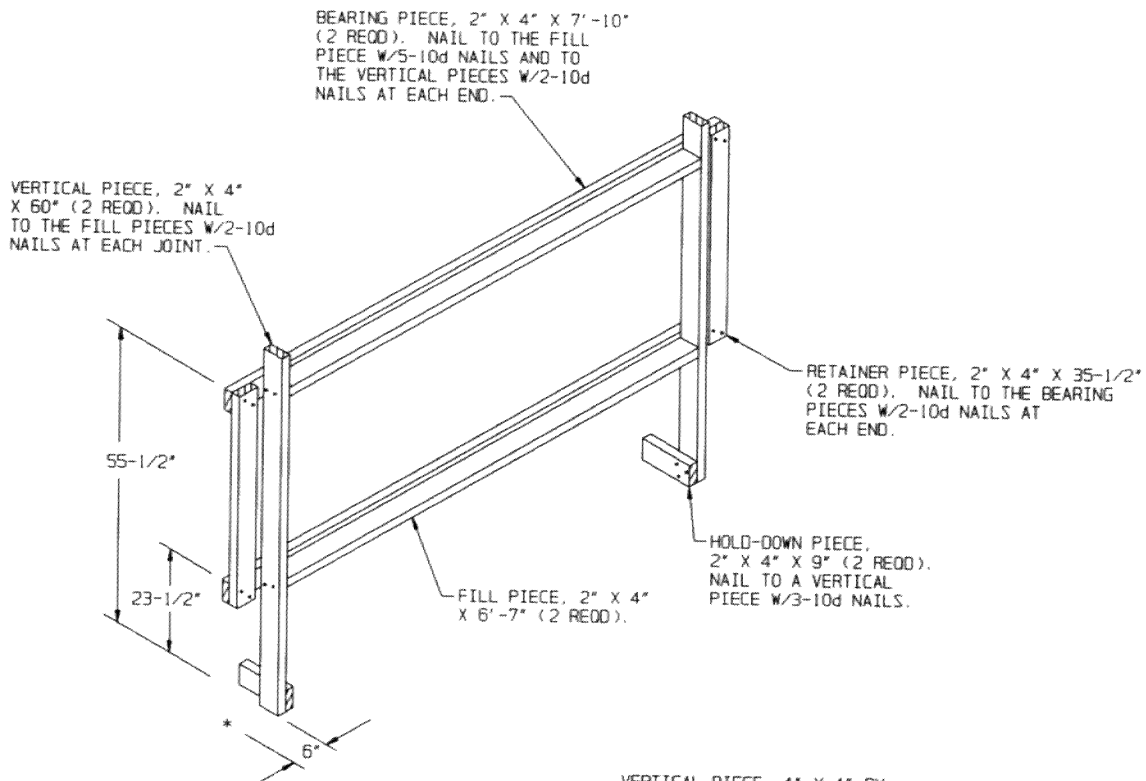
RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PREFABRICATE ONE FORWARD BLOCKING ASSEMBLY, ONE REAR BLOCKING ASSEMBLY, FOUR SIDE FILL ASSEMBLIES "B" AND TWO FILLER ASSEMBLIES.
2. INSTALL THE FORWARD BLOCKING ASSEMBLY.
3. LOAD TWENTY-FIVE CONTAINERS AND INSTALL ONE SIDE FILL ASSEMBLY.
4. REPEAT STEP 3 THREE TIMES.
5. LOAD REAR STACK OF FIVE CONTAINERS AND INSTALL TWO FILLER ASSEMBLIES.
6. INSTALL THE REAR BLOCKING ASSEMBLY.
7. INSTALL THE FILL MATERIAL BETWEEN THE REAR BLOCKING ASSEMBLY AND THE DOOR LOAD RETAINERS.

| BILL OF MATERIAL | | |
|------------------|-------------|------------|
| LUMBER | LINEAR FEET | BOARD FEET |
| 2" X 4" | 258 | 172 |
| 2" X 6" | 139 | 139 |
| 2" X 8" | 56 | 75 |
| NAILS | NO. REQD | POUNDS |
| 10d (3") | 452 | 7 |

LOAD AS SHOWN

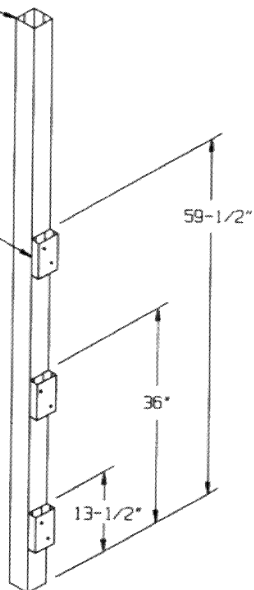
| <u>ITEM</u> | <u>QUANTITY</u> | <u>WEIGHT (APPROX)</u> |
|------------------------|-----------------|------------------------|
| CONTAINER - - - - - | 105 - - - - - | 7,035 LBS |
| DUNNAGE - - - - - | - - - - - | 779 LBS |
| CONTAINER - - - - - | - - - - - | 4,700 LBS |
| TOTAL WEIGHT - - - - - | | 12,514 LBS (APPROX) |



SIDE FILL ASSEMBLY A

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

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

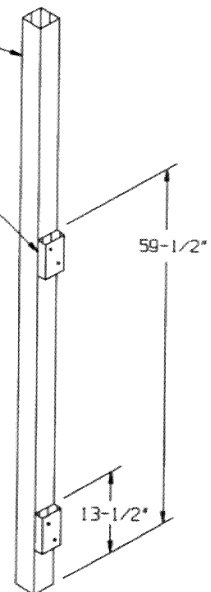


DOOR POST VERTICAL B

TWO DOOR POST VERTICALS "B" ARE REQUIRED WITHIN THE
LOAD ON PAGE 6 WHEN THE ISO CONTAINER IS NOT EQUIPPED
WITH PRE-WELDED LOAD RETAINERS. SEE "DETAIL B" ON
PAGE 12 AND NOTE "⊕" AT RIGHT.

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

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



DOOR POST VERTICAL A

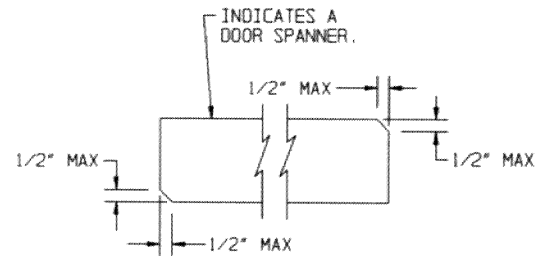
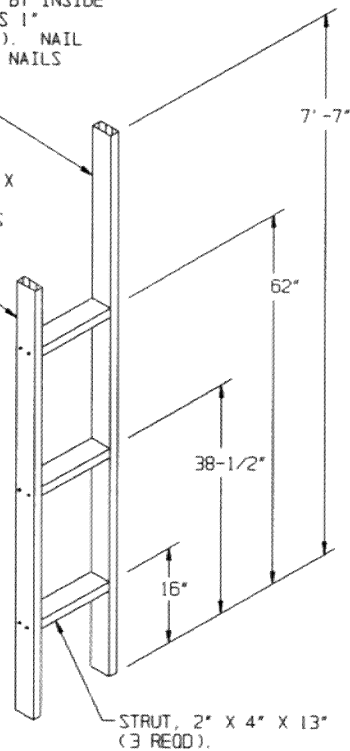
TWO DOOR POST VERTICALS "A" ARE REQUIRED WITHIN THE
LOAD ON PAGE 4 WHEN THE ISO CONTAINER IS NOT EQUIPPED
WITH PRE-WELDED LOAD RETAINERS. SEE "DETAIL B" ON
PAGE 12 AND NOTE "⊕" BELOW.

NOTE ⊕:

IF THE ISO CONTAINER TO BE LOADED IS NOT EQUIPPED WITH PRE-WELDED
LOAD RETAINERS, THE DOOR POST VERTICAL 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.

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.

VERTICAL PIECE, 2" X 4" X
72" (1 REOD). NAIL TO
THE STRUTS W/2-10d NAILS
AT EACH JOINT.



BEVEL-CUT

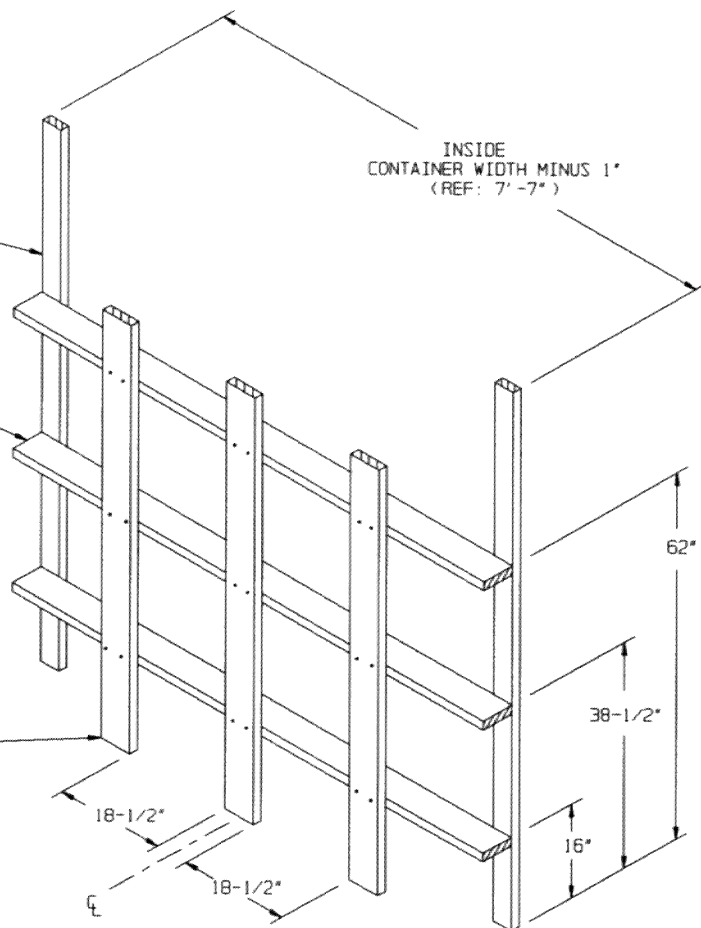
IF DESIRED, EACH END OF A DOOR SPANNER
PIECE MAY BE BEVEL-CUT AS SHOWN ABOVE
TO FACILITATE THE ACHIEVEMENT OF A
TIGHT DOOR-POST-TO-DOOR-POST FIT.

FORWARD STRUT ASSEMBLY

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

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

LOAD BEARING PIECE,
2" X 6" X 72" (3 REOD).
NAIL TO THE BEAMS
W/2-10 NAILS AT EACH JOINT.

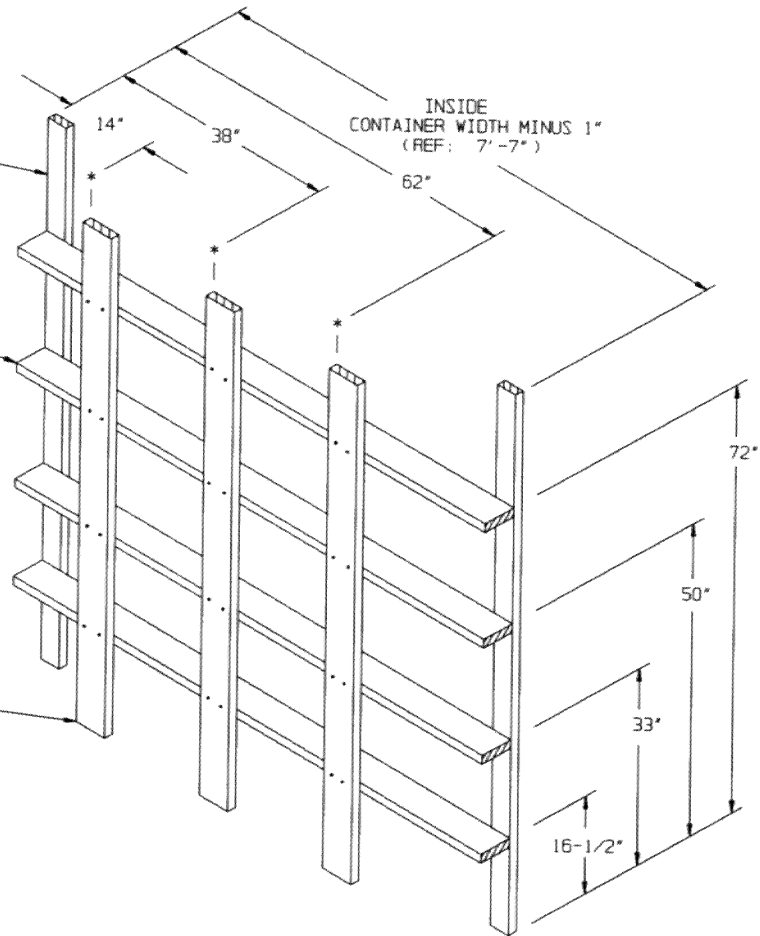


FORWARD/REAR BLOCKING ASSEMBLY

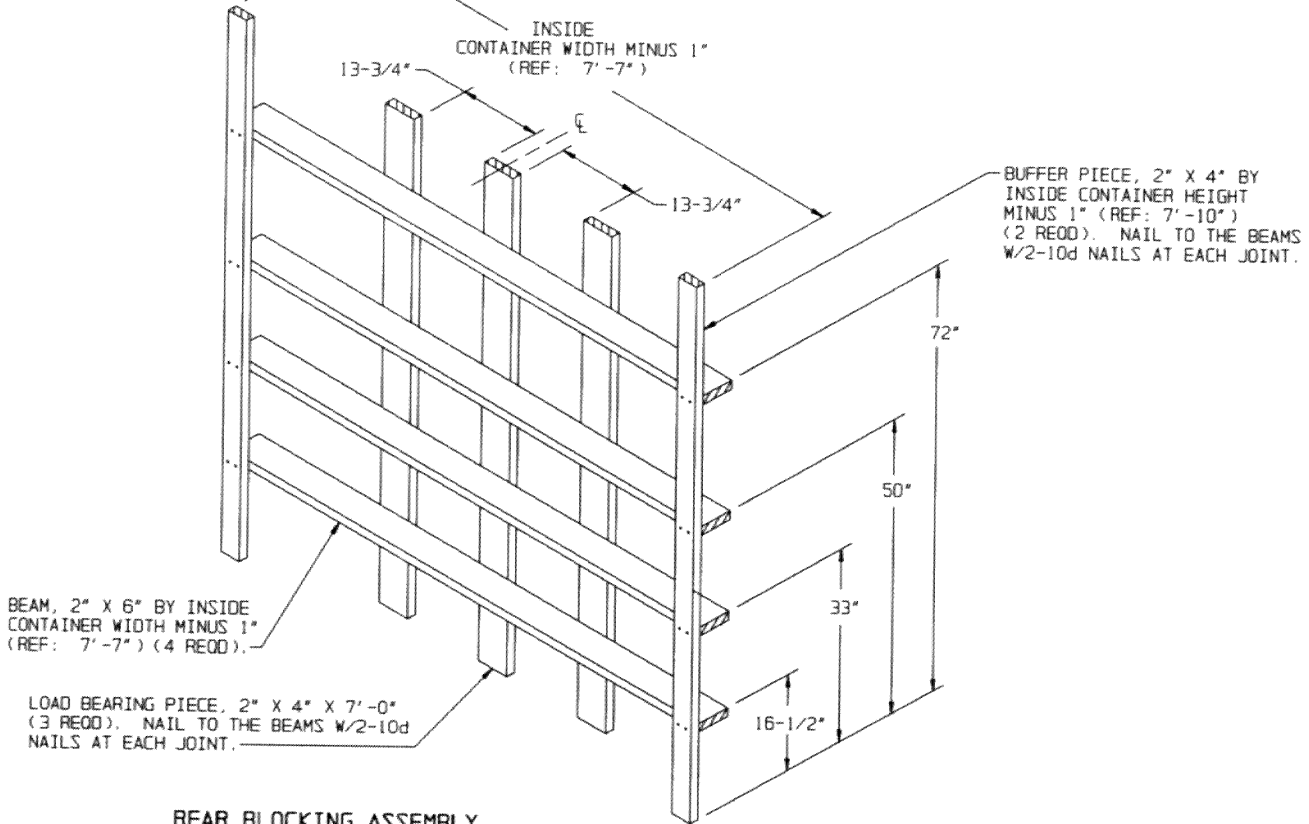
BUFFER PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-7") (2 REOD). NAIL TO THE BEAMS W/2-10d NAILS AT EACH JOINT.

BEAM, 2" X 6" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (4 REOD).

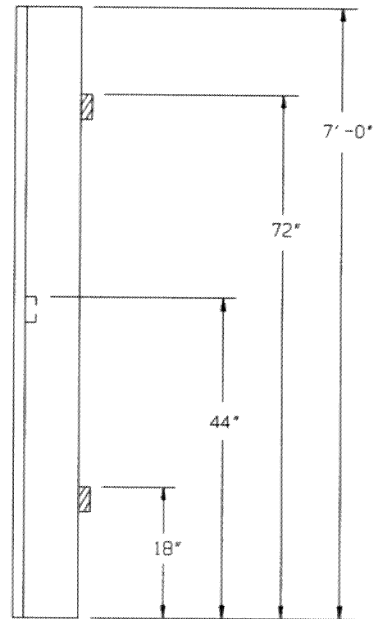
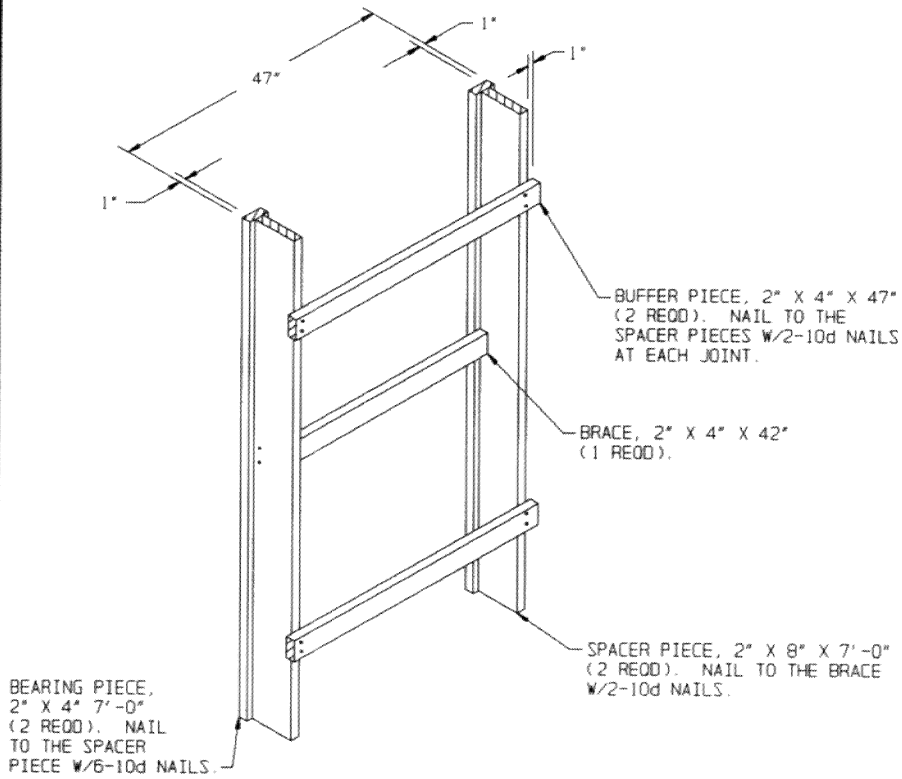
LOAD BEARING PIECE, 2" X 6" X 7'-0" (3 REOD). NAIL TO THE BEAMS W/2-10d NAILS AT EACH JOINT.



FORWARD BLOCKING ASSEMBLY

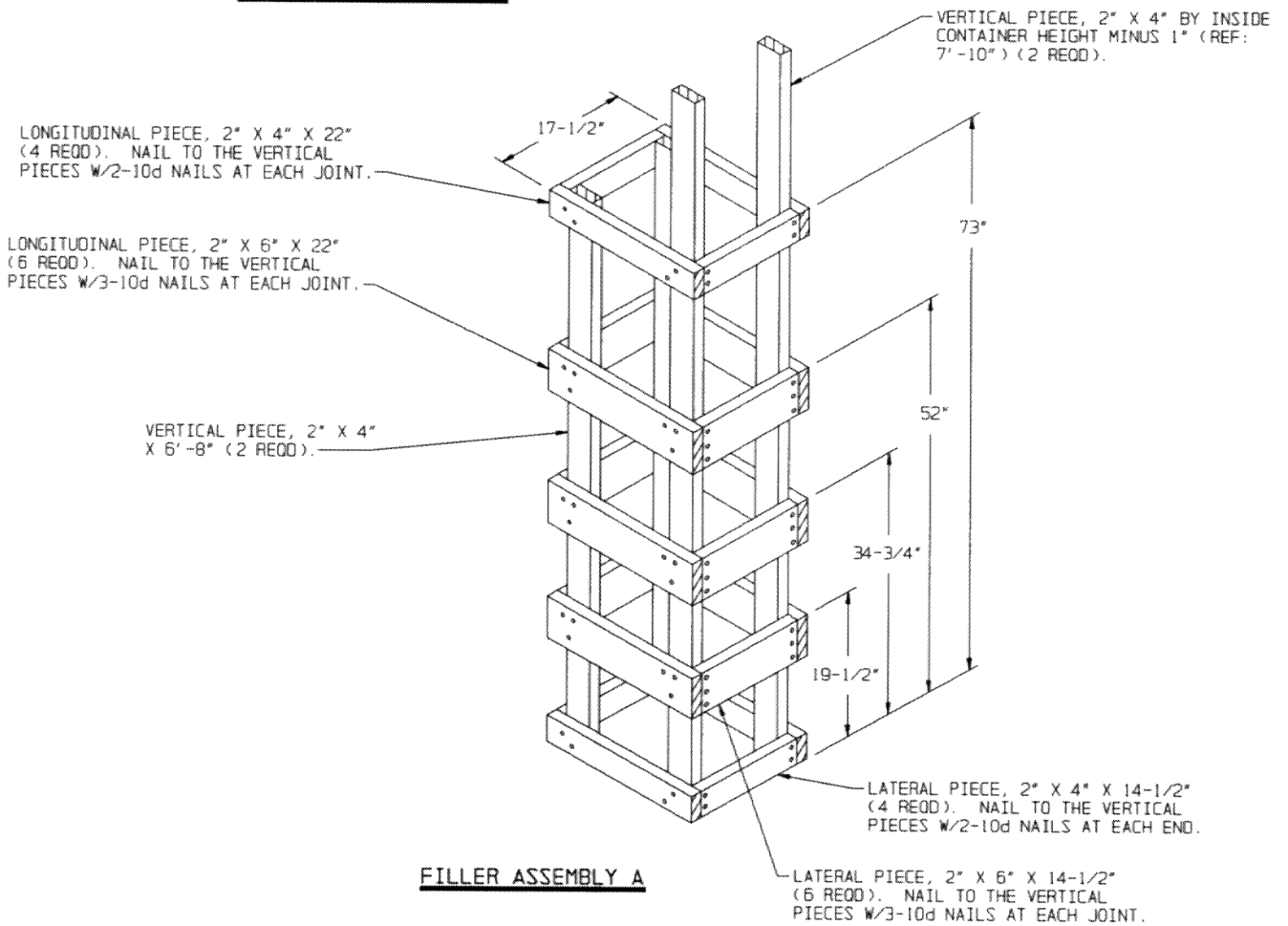


REAR BLOCKING ASSEMBLY



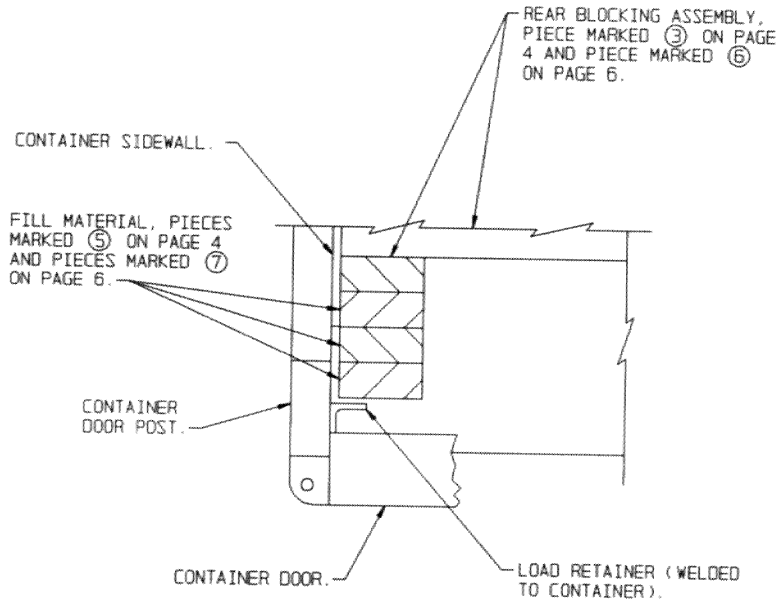
END VIEW

SIDE FILL ASSEMBLY B



FILLER ASSEMBLY A

DETAILS

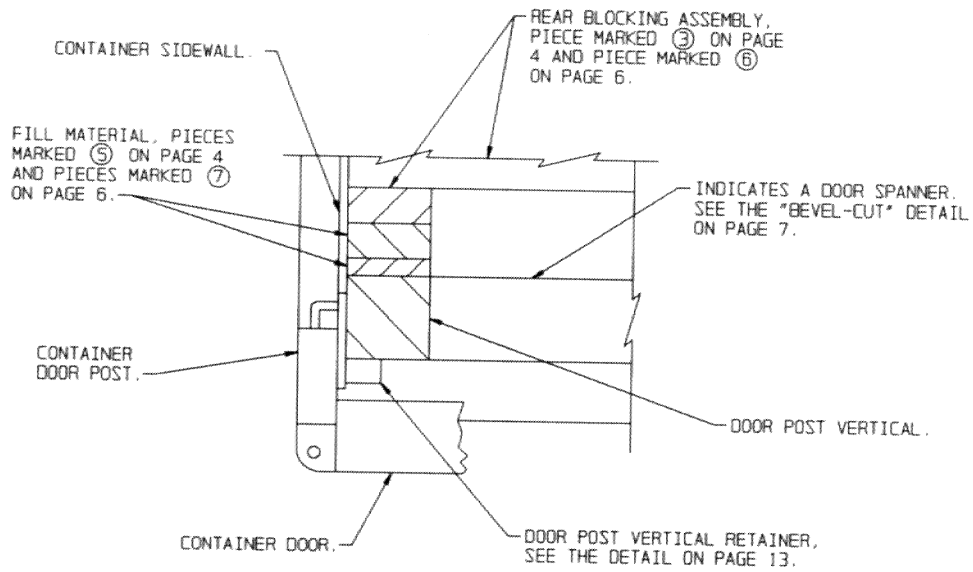


DETAIL A

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.

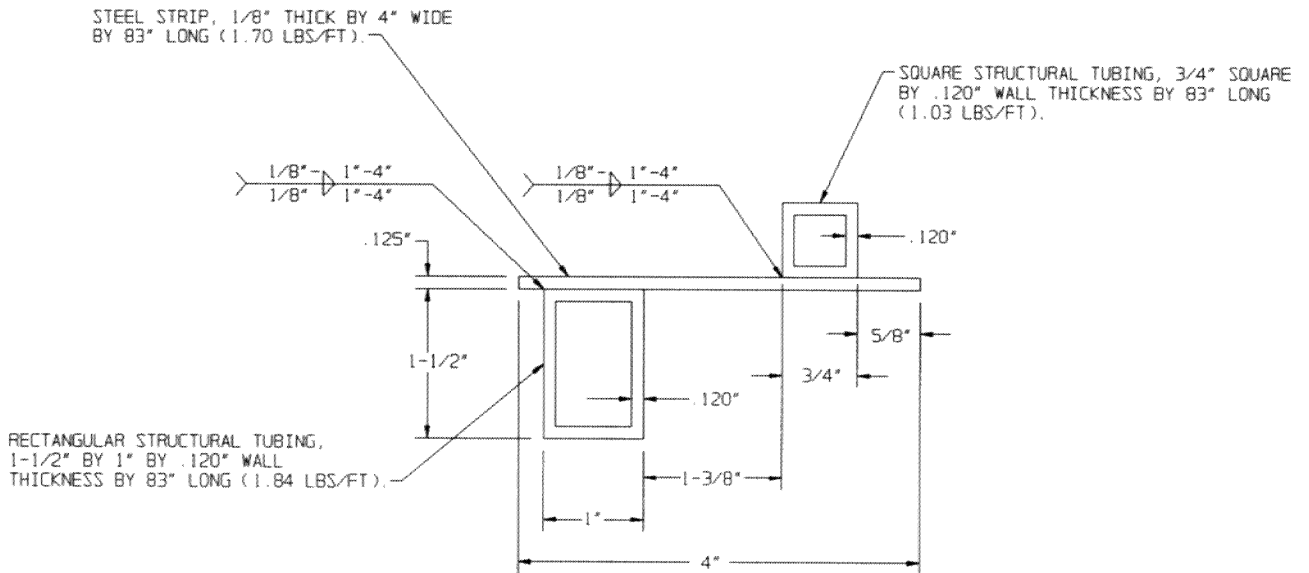
SPECIAL NOTE:

WHEN COMMERCIAL 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 LOADS DEPICTED ON PAGES 4 AND 7. SEE VARIOUS LOADS WITHIN AMC DRAWING 19-48-4153-1SPA1002 FOR EXAMPLES. SEE PAGE 13 FOR DETAILS OF THE METAL DOOR POST VERTICAL RETAINER.

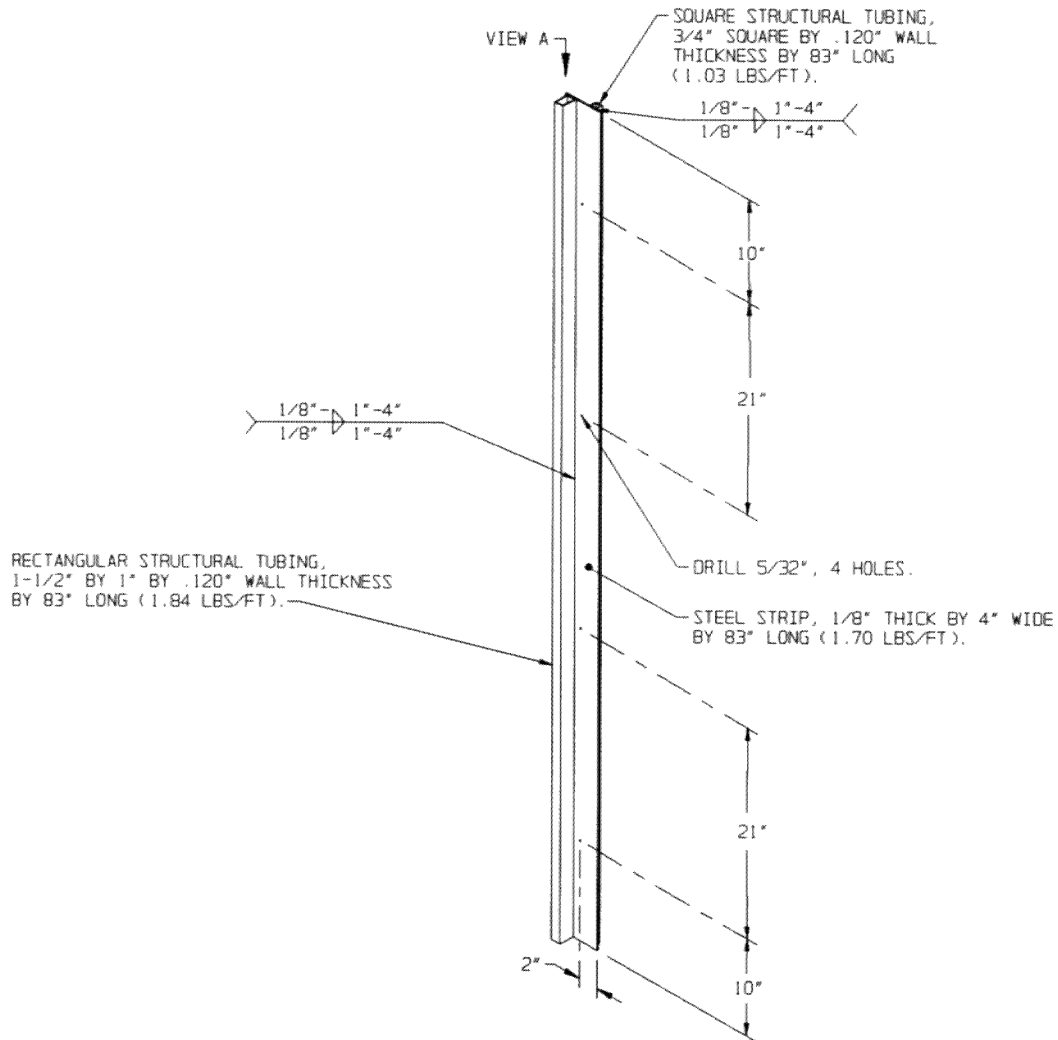


DETAIL B

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.



VIEW A



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.

