

APPROVED BY  
BUREAU OF EXPLOSIVES

*Q ~ H*

DATE 6/4/2000

# LOADING AND BRACING IN SIDE OPENING ISO CONTAINERS OF PROPELLING CHARGES PACKED IN CYLINDRICAL METAL CONTAINERS

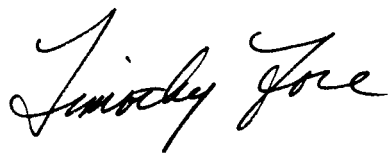
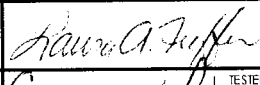

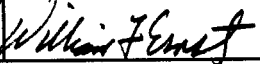
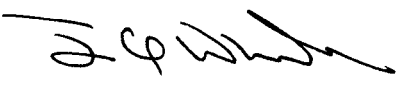
## M460 SERIES CONTAINERS (W/ PROTECTIVE COVER)

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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 MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND  	ENGINEER BASIC REV.  TECHNICIAN BASIC REV.  DRAFTSMAN BASIC REV.	MICHAEL SARDONE      TRANSPORTATION ENGINEERING DIVISION  VALIDATION ENGINEERING DIVISION  TESTED LOGISTICS ENGINEERING OFFICE 	DO NOT SCALE  WEBSITE: <a href="http://www.dac.army.mil">HTTP://WWW.DAC.ARMY.MIL</a>  <b>DECEMBER 1998</b>  <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">CLASS</td> <td style="width: 25%;">DIVISION</td> <td style="width: 25%;">DRAWING</td> <td style="width: 25%;">FILE</td> </tr> <tr> <td style="text-align: center;">19</td> <td style="text-align: center;">48</td> <td style="text-align: center;">4264/ 8</td> <td style="text-align: center;">15PM1003</td> </tr> </table>	CLASS	DIVISION	DRAWING	FILE	19	48	4264/ 8	15PM1003
CLASS	DIVISION	DRAWING	FILE								
19	48	4264/ 8	15PM1003								
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND    U.S. ARMY DEFENSE AMMUNITION CENTER											

**GENERAL NOTES**

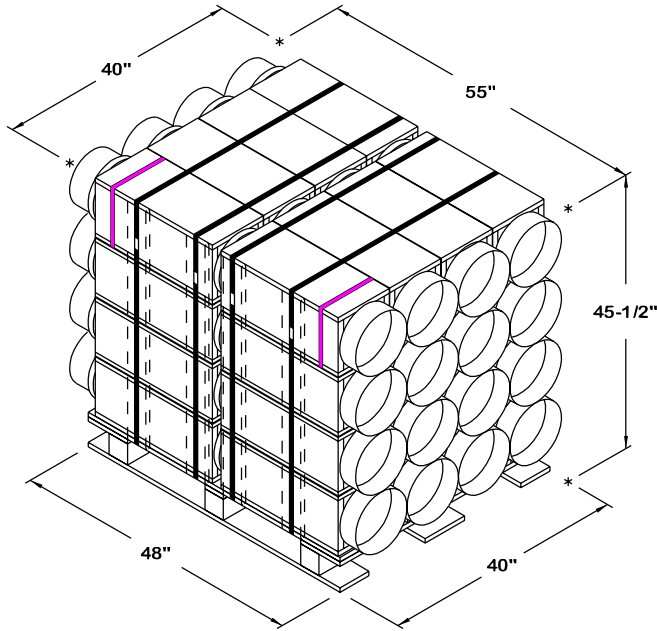
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE FOR THE M460 SERIES PROPELLING CHARGE CONTAINER (W/ PROTECTIVE COVER) ASSEMBLED ON THE 40" X 48" 4-WAY ENTRY PALLET. SEE THE PICTORIAL VIEWS ON PAGE 3 FOR SIZES AND WEIGHTS. SEE U. S. ARMY MATERIEL COMMAND DRAWING 19-48-4042A/8-20PM1001 FOR UNITIZATION PROCEDURES FOR THE M460 SERIES CONTAINERS. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE SIDE OPENING ISO 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 CRIB FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE HORIZONTAL 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 CONTAINER.
- 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" 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. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE END BLOCKING ASSEMBLIES 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". NOTE THAT SOME CONTAINERS ARE EQUIPPED WITH "TIE-BARS" IN THE CORNER SLOT, WHICH PRECLUDE THE USE OF A FULL HEIGHT FILL PIECE. WHEN "TIE-BARS" ARE PRESENT, THE FILL PIECE MUST BE INSTALLED IN SEGMENTS DESIGNED TO FIT BETWEEN THE "TIE-BARS" VERTICALLY. THE FILL PIECE(S) IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER ENDWALLS ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER ENDWALLS, ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR LONGITUDINAL BLOCKING.
- H. 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 SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.
- J. 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.

**(GENERAL NOTES CONTINUED)**

- K. MAXIMUM LOAD WEIGHT CRITERIA:  
 THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY "WEIGHT LAWS" OF CERTAIN STATES. ALSO, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY OTHER WEIGHT RESTRICTIONS IMPOSED ON THE INTERMODAL CONTAINER SYSTEM.
- L. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE 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. WHETHER A CONTAINER IS FULL OR IS 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.
- O. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOAD ON PAGES 4 AND 6 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE OMITTED UNIT ASSEMBLY ON PAGE 3.

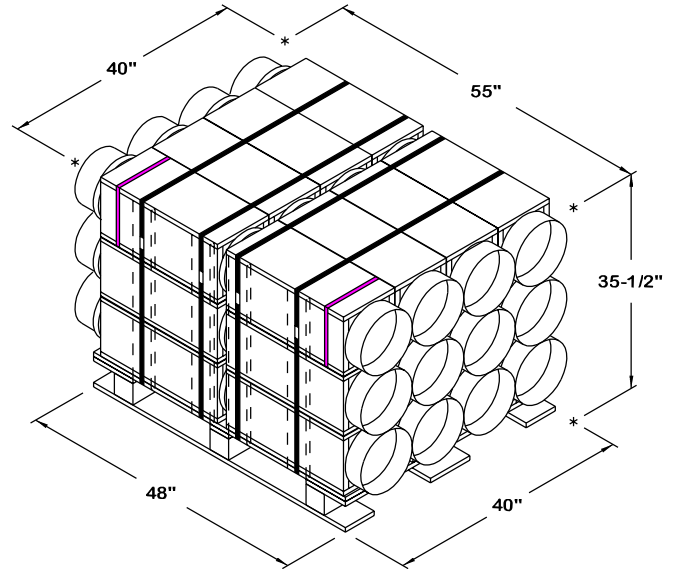
**MATERIAL SPECIFICATIONS**

<u>LUMBER</u>	- - - - -	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
<u>NAILS</u>	- - - - -	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
<u>PLYWOOD</u>	- - - - -	COMMERCIAL ITEM DESCRIPTION A-A-55057, 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.



**PROTECTIVE COVER METHOD UNIT (BASIC HEIGHT)**

CONTAINER - - - - - 16 EACH @ 120 LBS (APPROX)  
 CUBE - - - - - 57.9 CUBIC FEET (APPROX)  
 GROSS WEIGHT - - - - - 2,005 LBS (APPROX)

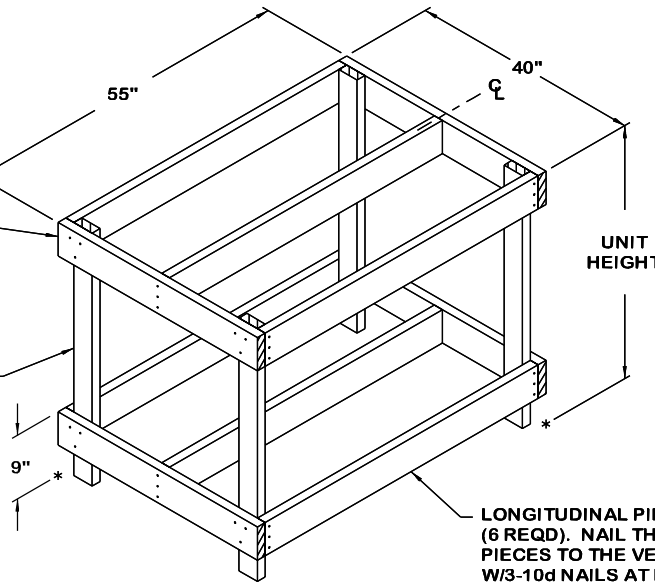


**PROTECTIVE COVER METHOD UNIT (DECREASED HEIGHT)**

CONTAINER - - - - - 12 EACH @ 120 LBS (APPROX)  
 CUBE - - - - - 45.2 CUBIC FEET (APPROX)  
 GROSS WEIGHT - - - - - 1,524 LBS (APPROX)

LATERAL PIECE, 2" X 6" X 40-5/8"  
 (4 REQD). NAIL TO THE VERTICAL  
 PIECES AND TO THE CENTER  
 LONGITUDINAL PIECE W/3-10d  
 NAILS AT EACH JOINT.

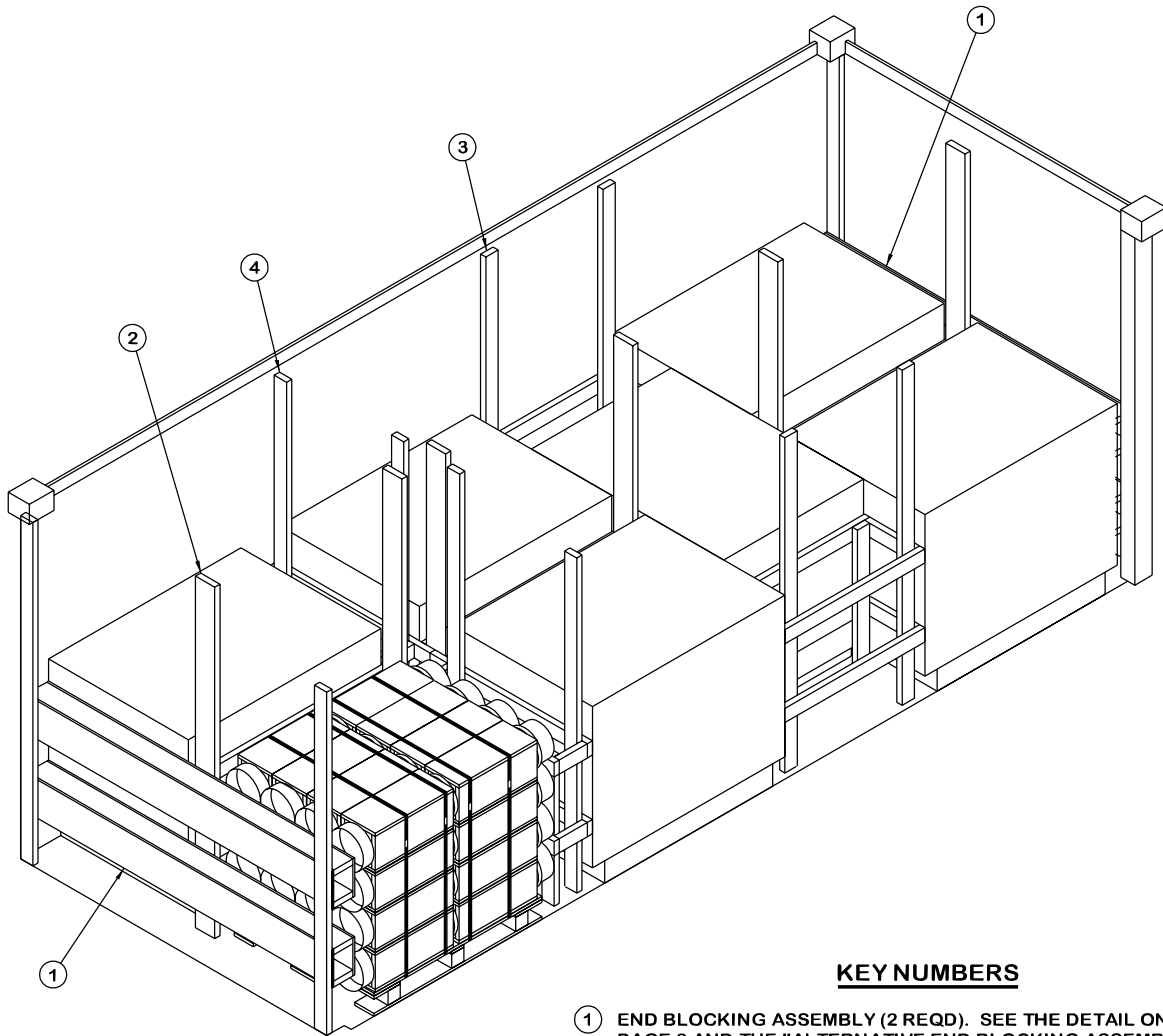
VERTICAL PIECE, 2" X 4"  
 BY UNIT HEIGHT (4 REQD).



LONGITUDINAL PIECE, 2" X 6" X 52"  
 (6 REQD). NAIL THE FOUR OUTER  
 PIECES TO THE VERTICAL PIECES  
 W/3-10d NAILS AT EACH END.

**OMITTED UNIT ASSEMBLY**

THIS ASSEMBLY IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT.  
 NO MORE THAN THREE OMITTED UNIT ASSEMBLIES MAY BE USED  
 PER LOAD. DO NOT INSTALL AN OMITTED UNIT ASSEMBLY  
 IMMEDIATELY ADJACENT TO ANOTHER OMITTED UNIT ASSEMBLY.



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 8 AND THE "ALTERNATIVE END BLOCKING ASSEMBLY" ON PAGE 10.
- ② CRIB FILL ASSEMBLY (3 REQD). SEE THE DETAIL ON PAGE 8.
- ③ FILLER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 9.
- ④ CENTER FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 9.

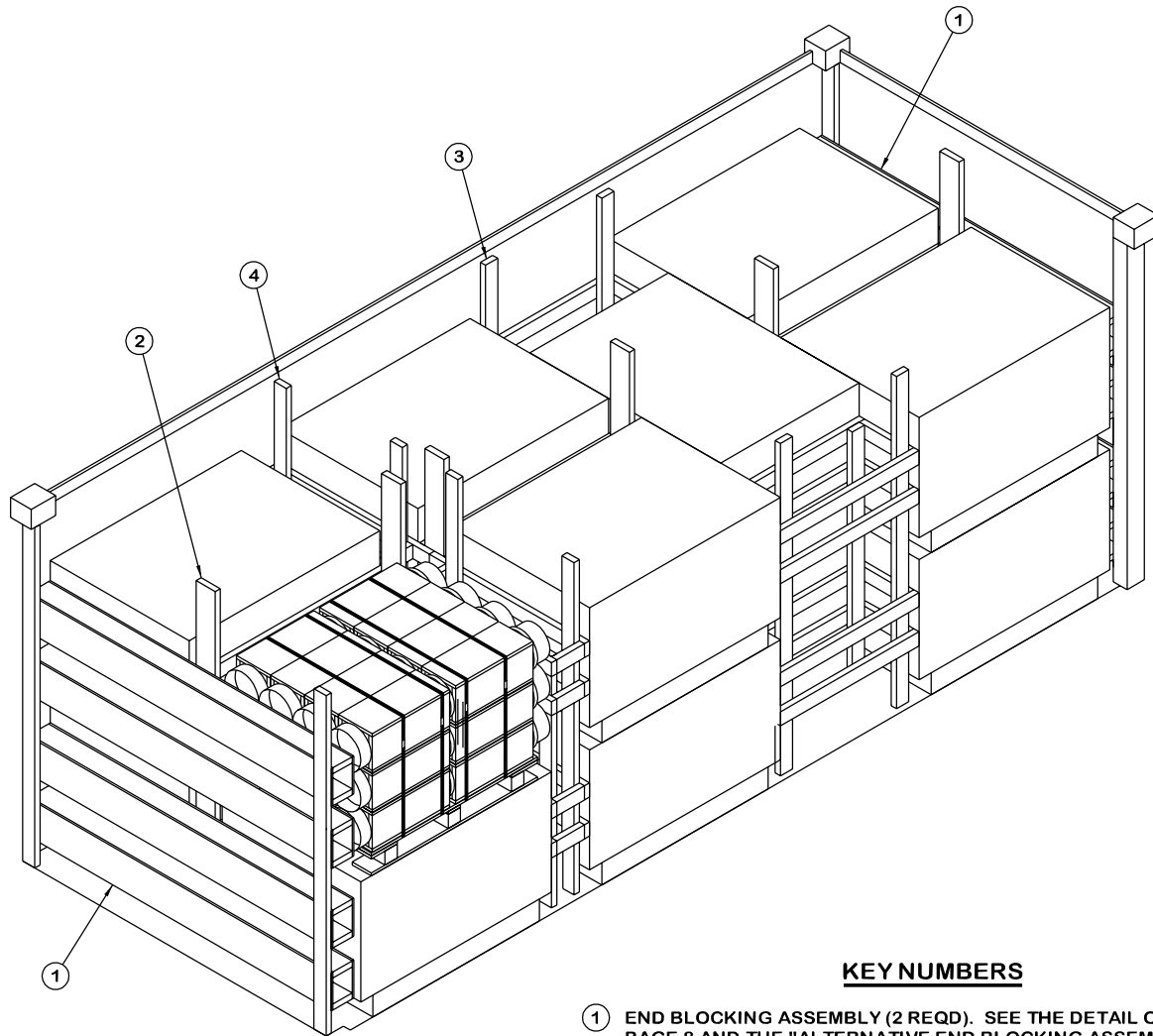
**RECOMMENDED SEQUENTIAL LOADING PROCEDURES**

1. PRE-FABRICATE TWO END BLOCKING ASSEMBLIES, TWO FILLER ASSEMBLIES, AND THREE CRIB FILL ASSEMBLIES. TWO CENTER FILL ASSEMBLIES MAY BE PARTIALLY ASSEMBLED AT THIS TIME BUT CANNOT BE COMPLETED UNTIL THE REQUIRED LENGTH OF THE LONGITUDINAL PIECES IS DETERMINED.
2. INSTALL ONE END BLOCKING ASSEMBLY.
3. LOAD TWO PALLET UNITS AND INSTALL ONE CRIB FILL ASSEMBLY.
4. REPEAT STEPS 2 AND 3.
5. INSTALL ONE FILLER ASSEMBLY.
6. LOAD TWO PALLET UNITS.
7. MEASURE THE VOID BETWEEN THE PALLET UNITS AT THE CENTER OF THE CONTAINER AND COMPLETE THE ASSEMBLY AND INSTALLATION OF ONE CENTER FILL ASSEMBLY.
8. INSTALL THE SECOND FILLER ASSEMBLY AND LOAD ONE PALLET UNIT.
9. REPEAT STEP 7.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	236	158
2" X 6"	101	101
NAILS	NO. REQD	POUNDS
6d (2")	176	1-1/4
10d (3")	208	3-1/4
PLYWOOD, 1/2" - - - 45.39 SQ FT REQD - - - 62-1/2 LBS		

**LOAD AS SHOWN**

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLET UNIT - - - - -	7 - - - - -	14,035 LBS
DUNNAGE - - - - -	- - - - -	585 LBS
CONTAINER - - - - -	- - - - -	6,050 LBS
TOTAL WEIGHT - - - - -		20,670 LBS (APPROX)



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 8 AND THE "ALTERNATIVE END BLOCKING ASSEMBLY" ON PAGE 10.
- ② CRIB FILL ASSEMBLY (3 REQD). SEE THE DETAIL ON PAGE 8.
- ③ FILLER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 9.
- ④ CENTER FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 9.

**RECOMMENDED SEQUENTIAL LOADING PROCEDURES**

1. PRE-FABRICATE TWO END BLOCKING ASSEMBLIES, TWO FILLER ASSEMBLIES, AND THREE CRIB FILL ASSEMBLIES. TWO CENTER FILL ASSEMBLIES MAY BE PARTIALLY ASSEMBLED AT THIS TIME BUT CANNOT BE COMPLETED UNTIL THE REQUIRED LENGTH OF THE LONGITUDINAL PIECES IS DETERMINED.
2. INSTALL ONE END BLOCKING ASSEMBLY.
3. LOAD FOUR PALLET UNITS AND INSTALL ONE CRIB FILL ASSEMBLY.
4. REPEAT STEPS 2 AND 3.
5. INSTALL ONE FILLER ASSEMBLY.
6. LOAD FOUR PALLET UNITS.
7. MEASURE THE VOID BETWEEN THE PALLET UNITS AT THE CENTER OF THE CONTAINER AND COMPLETE THE ASSEMBLY AND INSTALLATION OF ONE CENTER FILL ASSEMBLY.
8. INSTALL THE SECOND FILLER ASSEMBLY AND LOAD TWO PALLET UNITS.
9. REPEAT STEP 7.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	379	253
2" X 6"	159	159
NAILS	NO. REQD	POUNDS
6d (2")	352	2-1/4
10d (3")	416	6-1/2
PLYWOOD, 1/2" - - - 90.78 SQ FT REQD - - - -		125 LBS

**LOAD AS SHOWN**

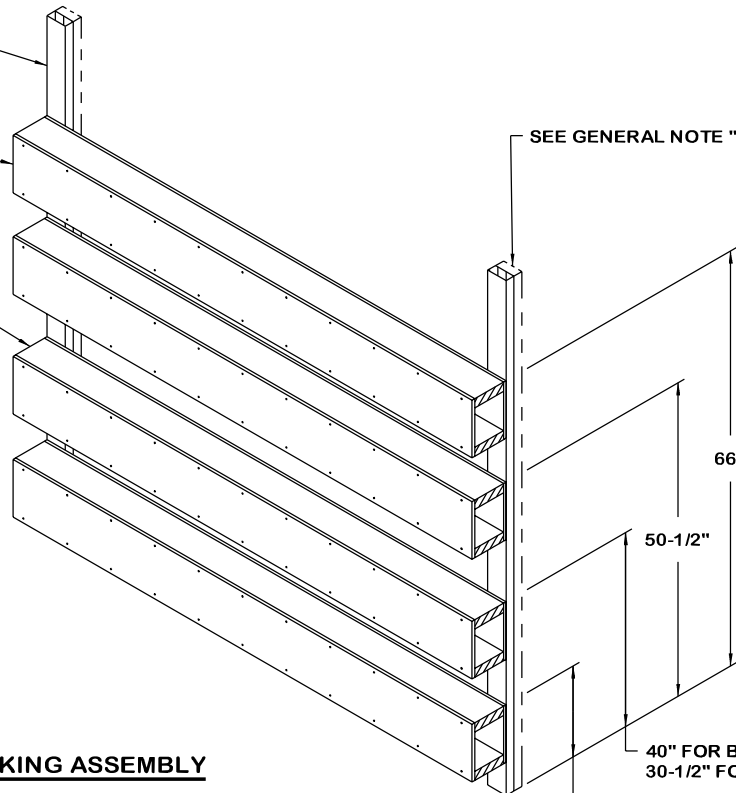
<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLET UNIT - - - - -	14 - - - - -	21,336 LBS
DUNNAGE - - - - -	- - - - -	958 LBS
CONTAINER - - - - -	- - - - -	6,050 LBS
TOTAL WEIGHT - - - - -		28,344 LBS (APPROX)

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

PLYWOOD, 1/2" BY 9-1/2" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-2") (8 REQD). NAIL TO THE BEAMS W/1-6d NAIL EVERY 8".

BEAM, 2" X 6" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-2") (8 REQD).

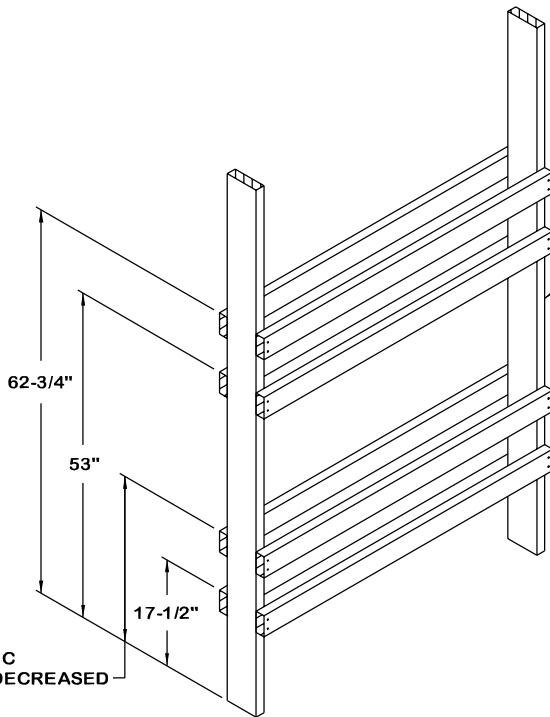
SEE GENERAL NOTE "G" ON PAGE 2.



**END BLOCKING ASSEMBLY**

FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO BOX BEAM ASSEMBLIES.

40" FOR BASIC  
30-1/2" FOR DECREASED  
20-1/2" FOR BASIC  
15" FOR DECREASED



VERTICAL PIECE, 2" X 6" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-3").

HORIZONTAL PIECE, 2" X 4" X 55" (8 SHOWN). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.

37" FOR BASIC  
27-1/4" FOR DECREASED

**CRIB FILL ASSEMBLY**

FOR A ONE-HIGH LOAD, ELIMINATE THE TOP FOUR HORIZONTAL PIECES.

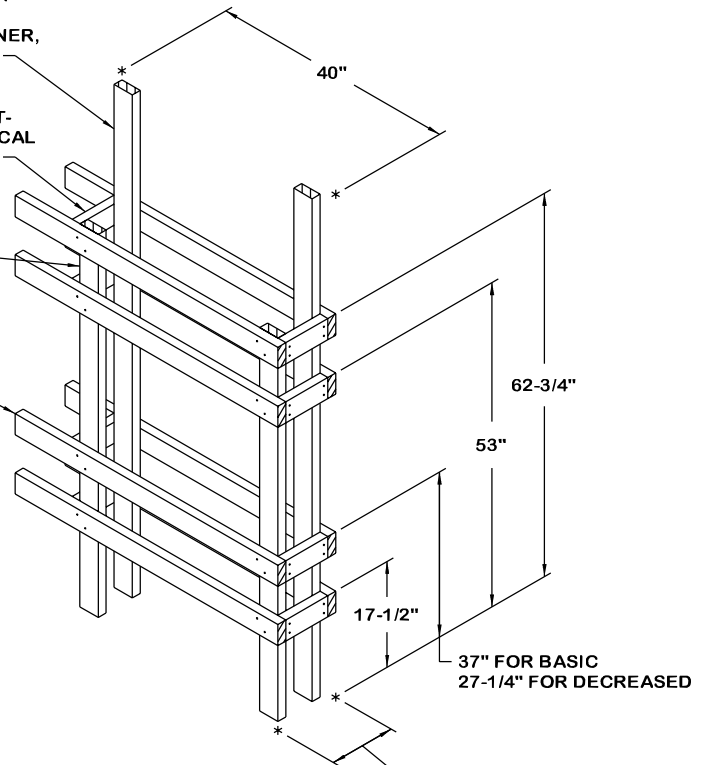


VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1" ON FAR SIDE OF CONTAINER, 6'-11" ON DOOR SIDE OF CONTAINER, AND 7'-3" IN CENTER OF CONTAINER (2 REQD)).

LONGITUDINAL PIECE, 2" X 4" BY CUT-TO-FIT (8 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.

VERTICAL PIECE, 2" X 4" BY HEIGHT OF TOP LATERAL PIECE (2 REQD).

LATERAL PIECE, 2" X 4" X 44" (8 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.



**CENTER FILL ASSEMBLY**

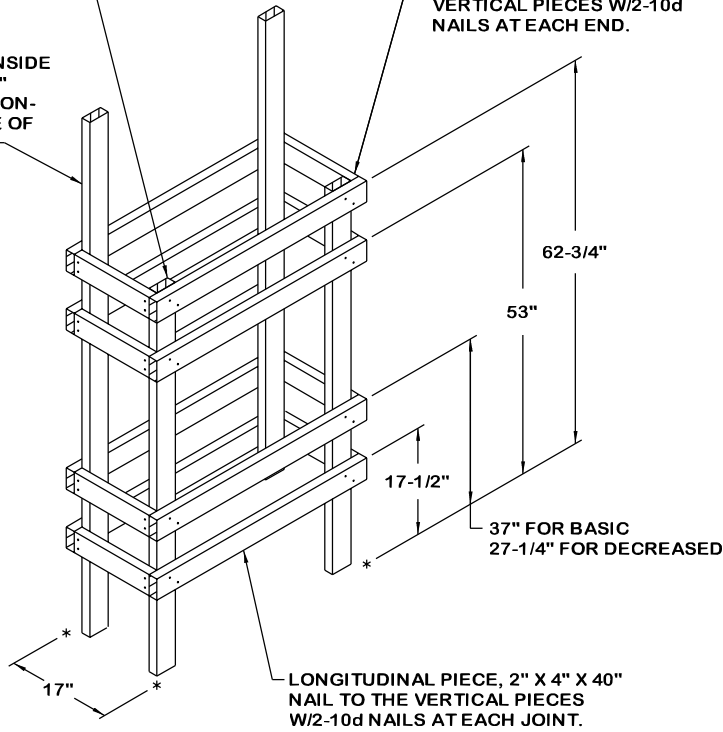
FOR A ONE-HIGH LOAD, ELIMINATE THE TOP FOUR LATERAL AND LONGITUDINAL PIECES AND SHORTEN THE SHORTER VERTICAL PIECES APPROPRIATELY.

FABRICATE TO PROVIDE FOR A TIGHT LONGITUDINAL LOAD.

VERTICAL PIECE, 2" X 4" BY HEIGHT OF TOP LATERAL PIECE (2 REQD).

VERTICAL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1" ON FAR SIDE OF CONTAINER, 6'-11" ON DOOR SIDE OF CONTAINER) (2 REQD).

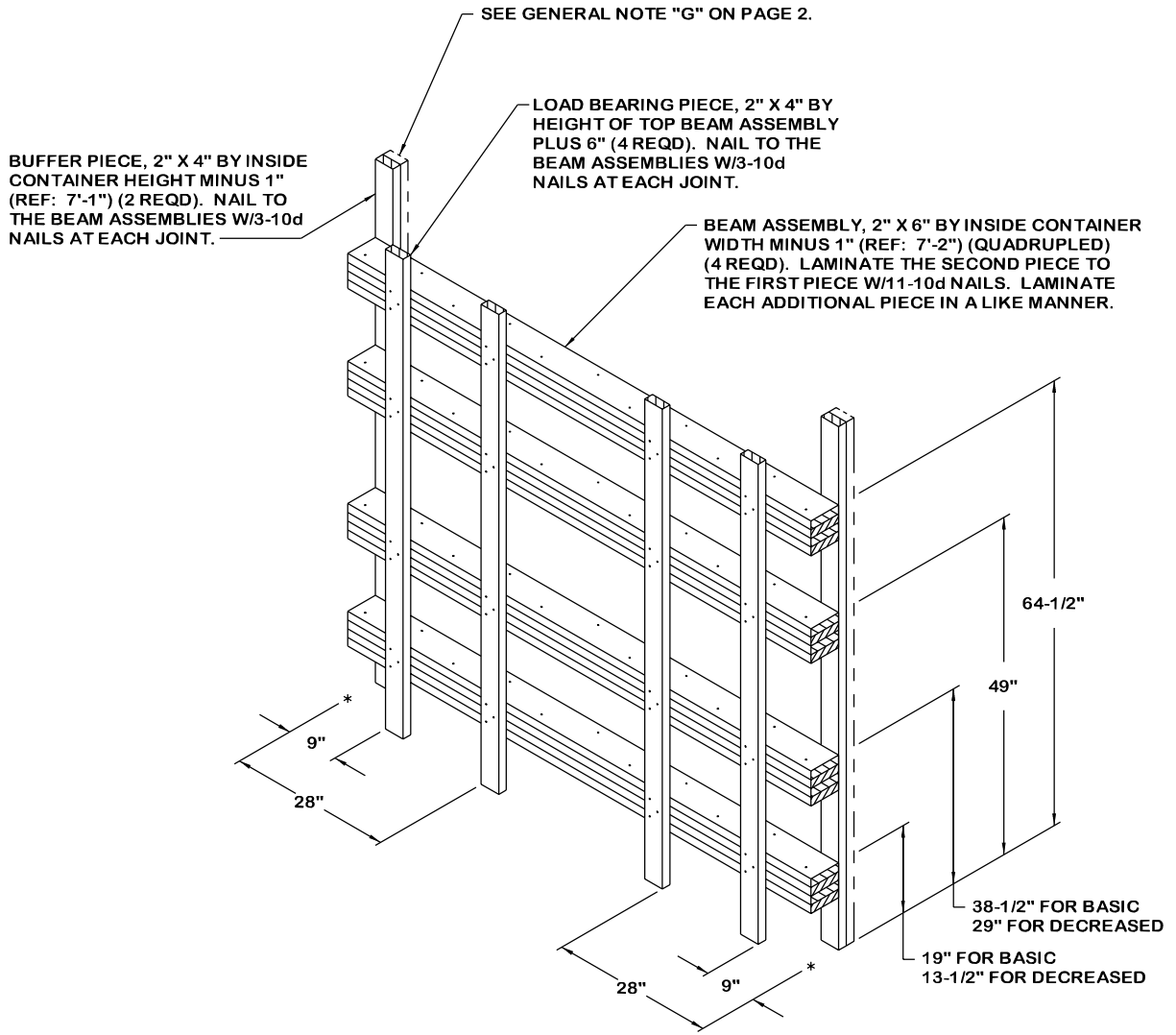
LATERAL PIECE, 2" X 4" X 14" (8 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.



**FILLER ASSEMBLY**

FOR A ONE-HIGH LOAD, ELIMINATE THE TOP FOUR LATERAL AND LONGITUDINAL PIECES AND SHORTEN THE SHORTER VERTICAL PIECES APPROPRIATELY.

**DETAILS**



**ALTERNATIVE END BLOCKING ASSEMBLY**

FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES AND SHORTEN THE LOAD BEARING PIECES APPROPRIATELY.