

LOADING AND BRACING* IN MILVAN CONTAINERS[⊗] OF MODULAR ARTILLERY CHARGE SYSTEM (MACS), M231, PACKED IN PA161 CYLINDRICAL METAL CONTAINERS ON WOODEN PALLETS WITH METAL TOP LIFT

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*THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY CONTAINER-ON-FLATCAR (COFC) RAIL, MOTOR, OR WATER CARRIERS.

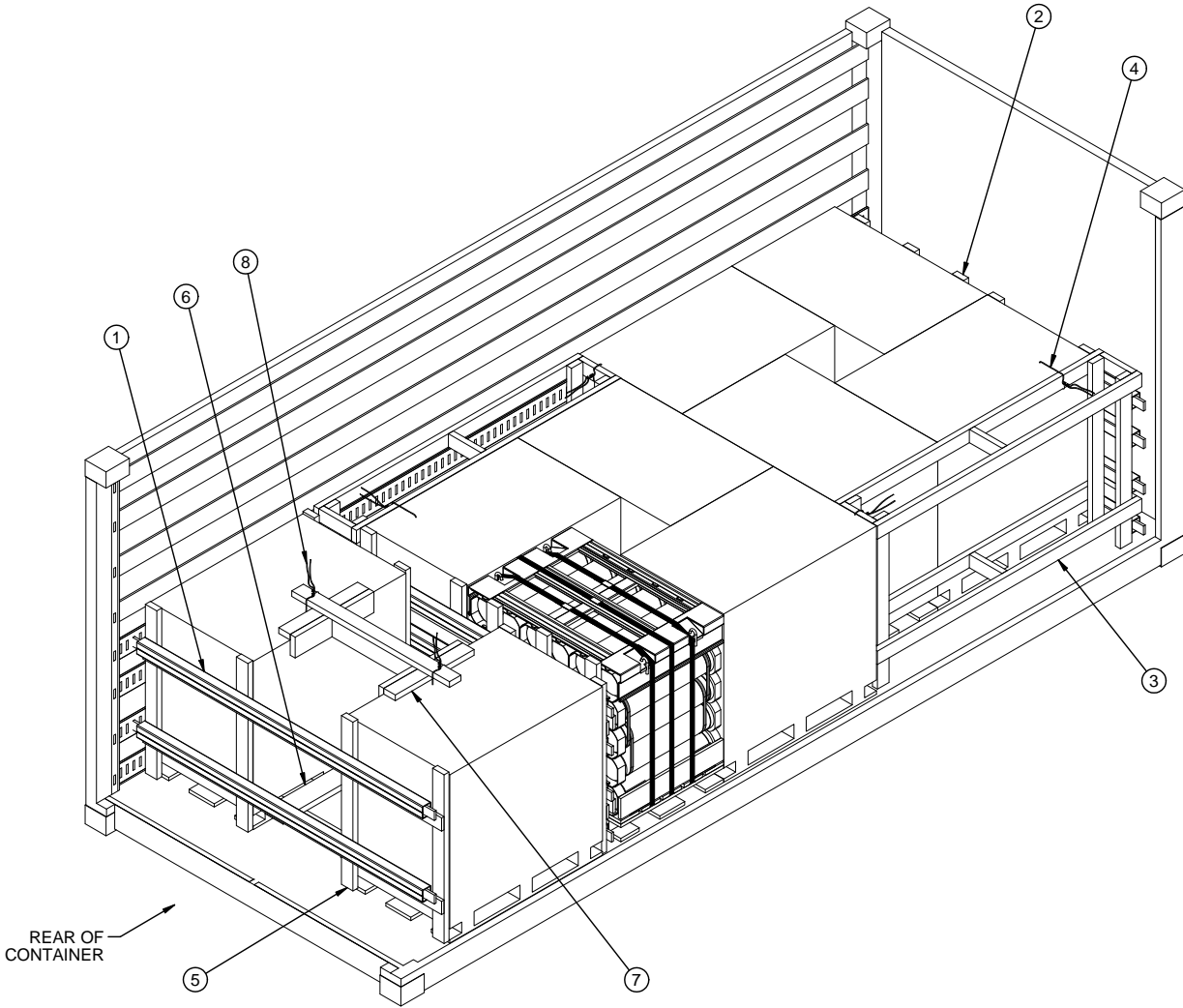
⊗ ONLY MILVAN CONTAINERS WHICH HAVE BEEN MODIFIED TO INCLUDE A MECHANICAL LOAD BRACING SYSTEM THAT SATISFIES THE REQUIREMENTS OF THE BUREAU OF EXPLOSIVES PAMPHLET 6C WILL BE USED FOR THE MOVEMENT OF AMMUNITION BY T/COFC SERVICE.

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ISOMETRIC VIEW

KEY NUMBERS

- ① CROSS MEMBER (10 REQD). POSITION AS SHOWN IN THE DETAIL ABOVE AT THE 5", 16", 28", AND 38" HEIGHTS. SEE THE "FILL DETAIL" ON PAGE 8.
- ② LOAD BEARING GATE A (2 REQD). SEE THE DETAIL ON PAGE 5.
- ③ SIDE FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.
- ④ TIE WIRE, 0.0800" DIAMETER BY 24" LONG (4 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND A PALLET UNIT STRAP AND THE SIDE FILL ASSEMBLY. BRING ENDS TOGETHER AND TWIST TAUT.
- ⑤ LOAD BEARING GATE B (2 REQD). SEE THE DETAIL ON PAGE 5.
- ⑥ ANTI-SWAY BRACE (1 REQD). SEE THE DETAIL ON PAGE 7.
- ⑦ TOP ANTI-SWAY BRACE (1 REQD). SEE THE DETAIL ON PAGE 7.
- ⑧ TIE WIRE, 0.0800" DIAMETER BY 24" LONG (2 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND CENTER SUPPORT OF PALLET UNIT TOP LIFT ADAPTER AND THE TOP ANTI-SWAY BRACE. BRING ENDS TOGETHER AND TWIST TAUT.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	56	19
2" X 4"	175	117
2" X 6"	13	13
NAILS	NO. REQD	POUNDS
6d (2")	72	0.42
10d (3")	110	1.69
WIRE, 0.0800" DIA	12' REQD	1/4 LB
CROSS MEMBER	10 REQD	10 REQD

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	10	12,970 LBS
DUNNAGE		298 LBS
CONTAINER		5,700 LBS
TOTAL WEIGHT		18,968 LBS (APPROX)

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 LOADS OF MODULAR ARTILLERY CHARGE SYSTEM (MACS), M231, PACKED IN PA161 CYLINDRICAL METAL CONTAINERS ON WOODEN PALLETS WITH METAL TOP LIFT. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH MACS. SEE AMC DRAWING 19-48-4326/50-20PM1012 AND PAGE 4 FOR DETAILS OF THE PALLET UNIT. **CAUTION:** REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE MILVAN CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOADS AS SHOWN ARE BASED ON A 20' LONG BY 8' WIDE BY 8' HIGH MILVAN CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 87" HIGH. THE LOADS ARE DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT.
- D. THE SPECIFIED OUTLOADING PROCEDURES ARE FOR CONTAINERS EQUIPPED WITH SELF-CONTAINED MECHANICAL BRACING DEVICES AS DESCRIBED IN MIL-C-52661. CROSS MEMBER ATTACHMENT FACILITIES WITHIN THESE CONTAINERS MUST PROVIDE FOR THE INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM. CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE HOLE SPACING IN THE CROSS MEMBER ATTACHMENT FACILITY PERMITS. SEE THE "FILL DETAIL" ON PAGE 8 FOR ADDITIONAL GUIDANCE. EACH CROSS MEMBER WILL BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHTS, AND AT EQUAL DISTANCES FROM THE END OF THE CONTAINER). CROSS MEMBERS IN EMPTY CONTAINERS AND THOSE NOT USED IN LOADED CONTAINERS MUST BE FASTENED INTO BELT RAILS FOR SHIPMENT. COMPONENTS ASSIGNED TO EACH CONTAINER MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS. THE LOAD BLOCKING COMPONENT DESIGNATED AS "CROSS MEMBER" HEREIN IS IDENTIFIED AS "BEAM ASSEMBLY" WITHIN TM 55-8115-200-23&P, DATED DECEMBER 1979. THE BEAM ASSEMBLY IS FURTHER IDENTIFIED AS NSN 8115-00-165-6623.
- E. WHEN LOADING PALLET 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 BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE LONGITUDINAL PIECES ON THE SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE LONGITUDINAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE LATERAL PIECES IN THE SIDE FILL ASSEMBLY MAY BE ADJUSTED, AS NECESSARY, TO FACILITATE VARIANCE IN THE PALLET UNIT SIZE.
- F. 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" THICK BY 5-1/2" WIDE.
- G. 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.
- H. **CAUTION:** DO NOT NAIL DUNNAGE MATERIAL TO THE MILVAN WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- J. PORTIONS OF THE MILVAN DEPICTED WITHIN THIS DRAWING, SUCH AS ONE OF THE SIDEWALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- 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:
- CAUTION:** LOADED CONTAINERS MUST BE ON CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE, REGARDLESS OF THE LOAD WEIGHT WITHIN THE CONTAINER.
 - LOAD LIMITS OF T/COFC RAIL CARS 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.
 - CHASSIS/CONTAINERS COUPLED INTO A 40-FOOT TRAILER CONFIGURATION MUST BE PLACED AT THE B-END OF A TOFC RAILCAR. THE REAR END OF THE 40-FOOT UNIT WILL OVERHANG THE END OF THE CAR IF IT IS PLACED AT THE A-END. TWENTY-FOOT AND 40-FOOT UNITS CAN BE LOADED ON THE SAME CAR.

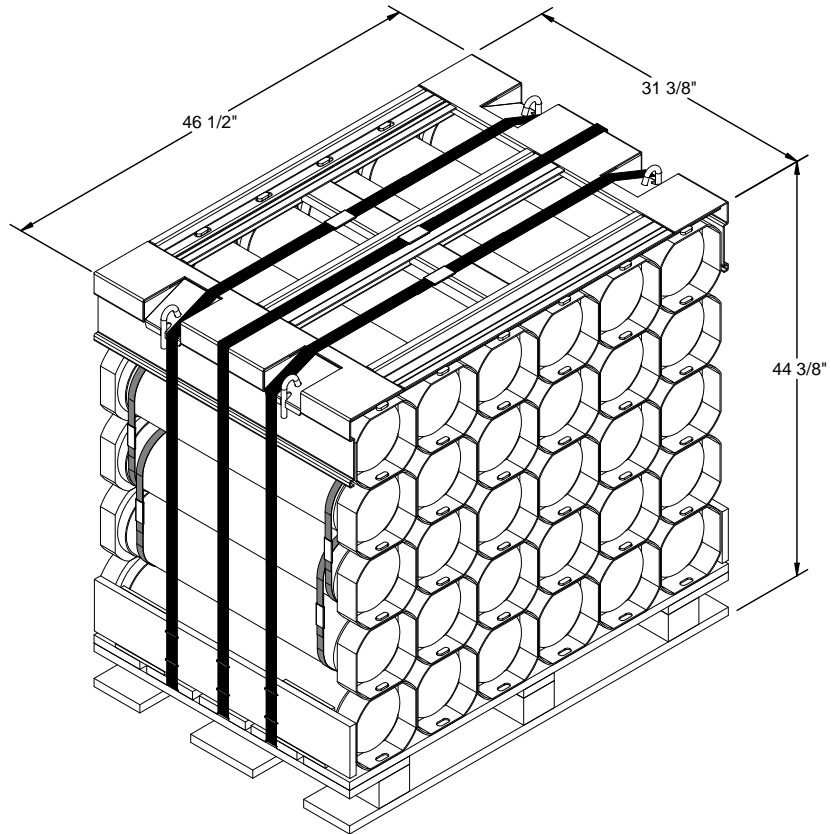
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(GENERAL NOTES CONTINUED)

- M. TO MAKE LOADING EASIER, TO HELP ACHIEVE A TIGHT LOAD ACROSS A CONTAINER, AND TO PREVENT UNACCEPTABLE DAMAGE TO LADING UNITS WHEN LOADING A MILVAN, A SLIP-SHEET CAN BE USED EFFECTIVELY AS A "SHOEHORN" TYPE DEVICE. THE SLIP-SHEET WILL PROVIDE A SMOOTH SURFACE THAT WILL PREVENT UNIT STRAPS FROM INTERLOCKING OR CATCHING ON OTHER PROJECTIONS WHEN LATERALLY ADJACENT LADING UNITS ARE BEING LOADED. A SLIP-SHEET WILL BE USED AFTER ONE-HALF OF A STACK IS LOADED WITH ONE OF ITS SIDES IN TIGHT CONTACT AT ONE SIDE OF THE MILVAN. THE SLIP-SHEET IS TO BE PLACED AGAINST THE OTHER SIDE OF THE HALF-STACK BEFORE THE LAST HALF OF THE STACK IS LOADED. AFTER A STACK IS COMPLETED, THE SLIP-SHEET IS TO BE REMOVED FOR SUBSEQUENT USE WITH THE NEXT STACK. A SLIP-SHEET OF SUITABLE SIZE CAN BE MADE FROM A SHEET OF 1/8" TEMPERED HARDBOARD (MASONITE) OR FROM A SHEET OF ANY OTHER MATERIAL THAT WILL SATISFY THE REQUIREMENTS.
- 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 PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN- FULL-LOAD PROCEDURE" ON PAGE 8.
- 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 0.454 KG.

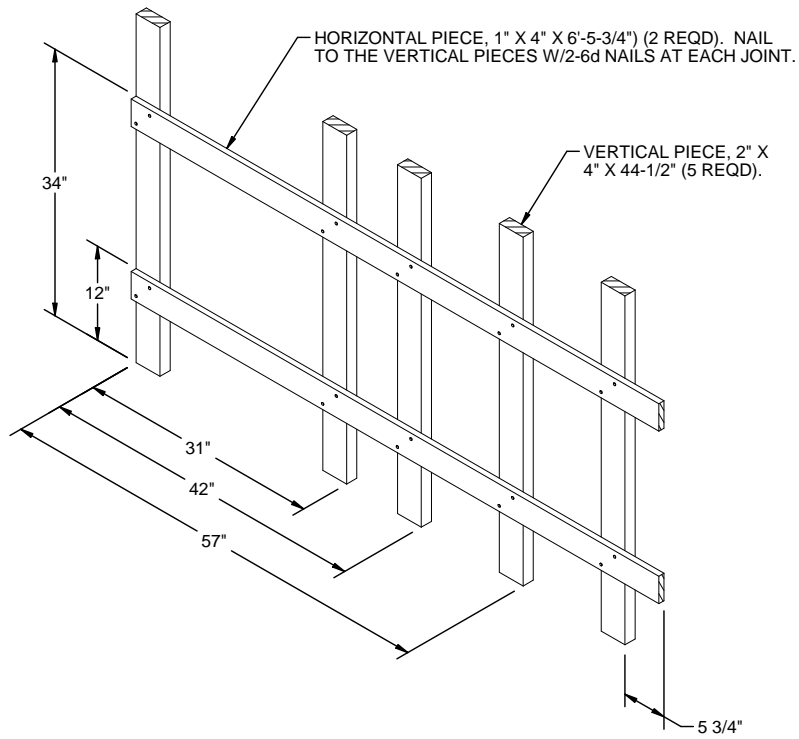
MATERIAL SPECIFICATIONS

LUMBER - - - - -	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
NAILS - - - - -	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
WIRE, CARBON STEEL - - -	ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.
STAPLE, STRAP - - - - -	COMMERCIAL GRADE.

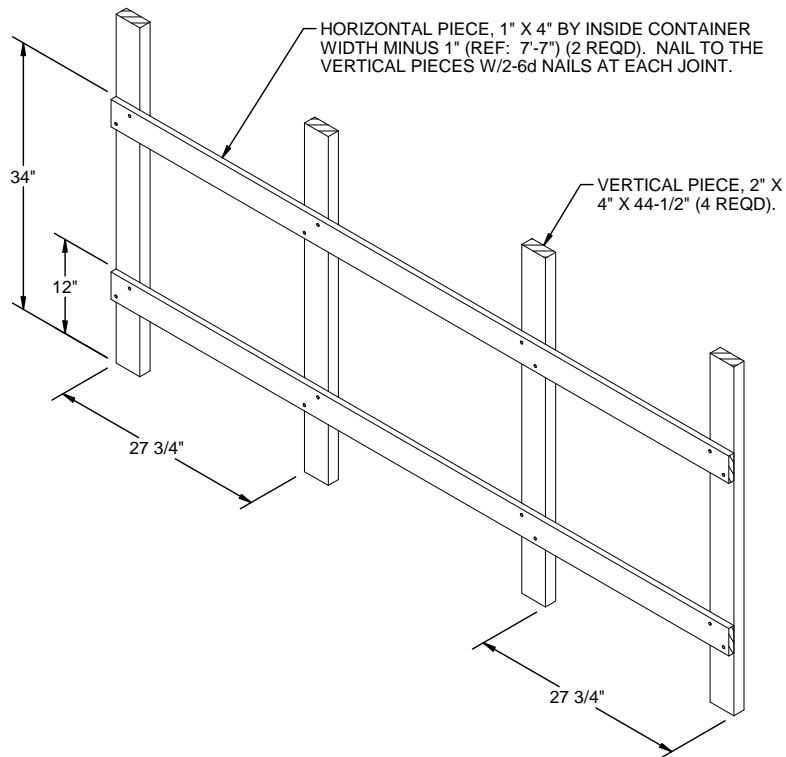


PALLET UNIT

GROSS WEIGHT - - - - - 1,297 LBS (APPROX)
CUBE - - - - - 37.5 CU FT (APPROX)

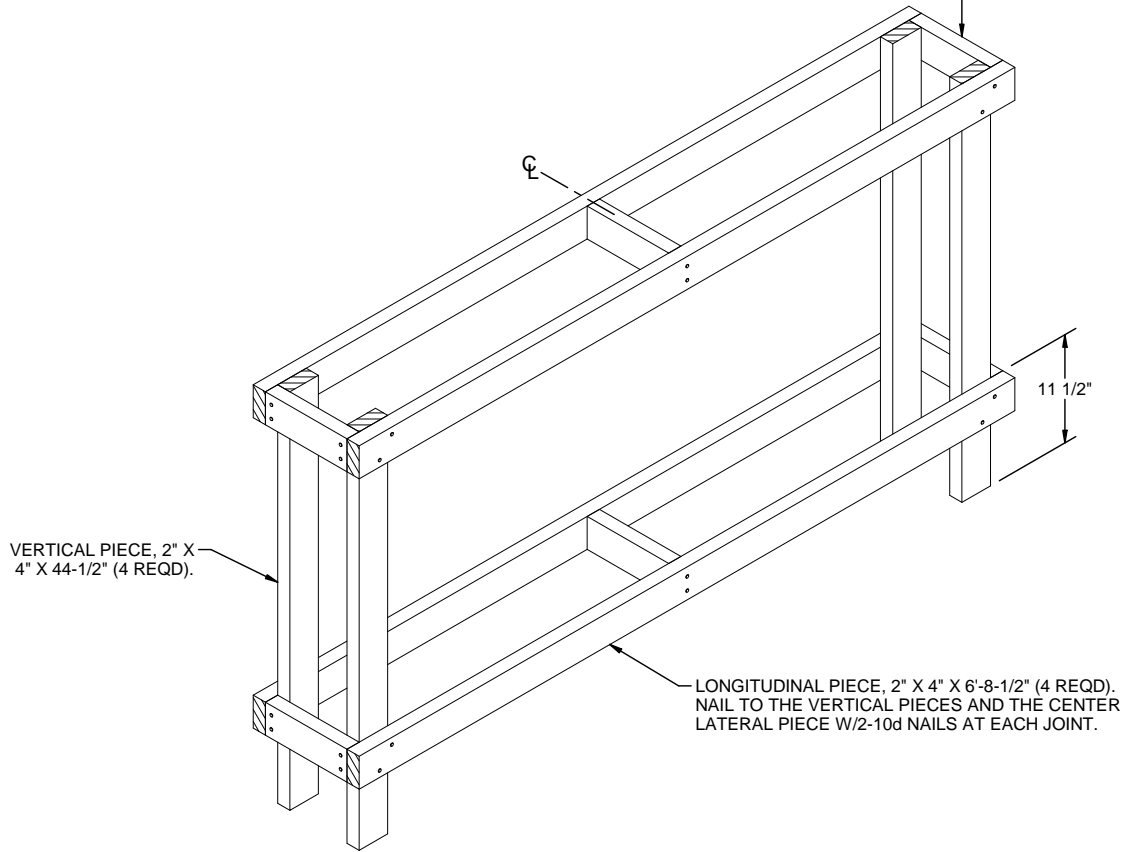


LOAD BEARING GATE A



LOAD BEARING GATE B

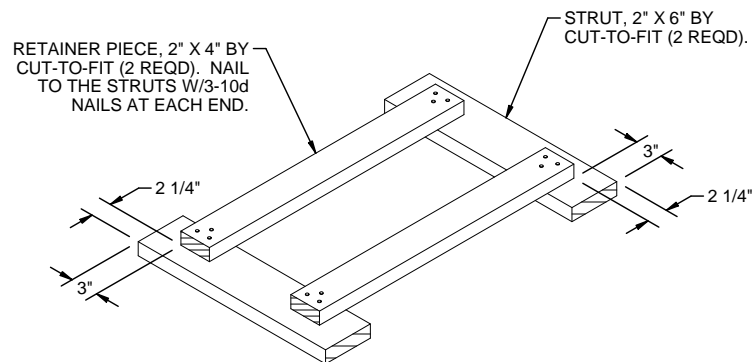
LATERAL PIECE, 2" X 4" X 10"
(6 REQD). NAIL TO THE VERTICAL
PIECES W/2-10d NAILS AT EACH END.



VERTICAL PIECE, 2" X
4" X 44-1/2" (4 REQD).

LONGITUDINAL PIECE, 2" X 4" X 6'-8-1/2" (4 REQD).
NAIL TO THE VERTICAL PIECES AND THE CENTER
LATERAL PIECE W/2-10d NAILS AT EACH JOINT.

SIDE FILL ASSEMBLY



RETAINER PIECE, 2" X 4" BY
CUT-TO-FIT (2 REQD). NAIL
TO THE STRUTS W/3-10d
NAILS AT EACH END.

STRUT, 2" X 6" BY
CUT-TO-FIT (2 REQD).

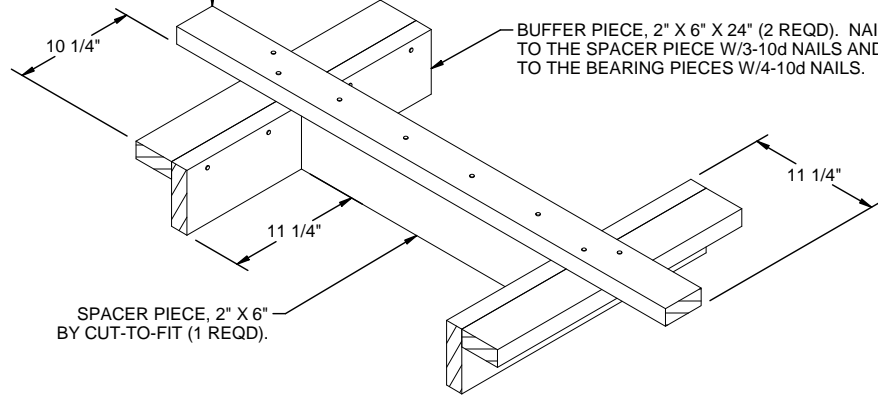
SPACER ASSEMBLY

NOTE: THE ASSEMBLY SHOWN INVERTED
FOR BETTER ASSEMBLY ILLUSTRATION.

RETAINER PIECE, 2" X 4" X 48" (1 REQD).
 NAIL TO THE BEARING PIECES W/2-10d
 NAILS AT EACH JOINT AND NAIL TO THE
 SPACER PIECE W/4-10d NAILS.

BEARING PIECE, 2"
 X 4" X 24" (2 REQD).

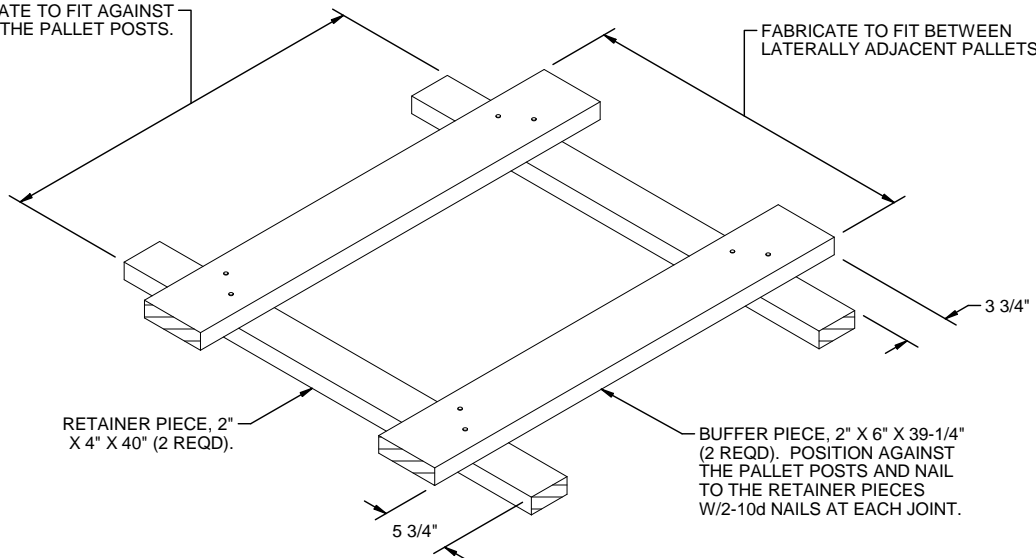
BUFFER PIECE, 2" X 6" X 24" (2 REQD). NAIL
 TO THE SPACER PIECE W/3-10d NAILS AND
 TO THE BEARING PIECES W/4-10d NAILS.



TOP ANTI-SWAY BRACE

FABRICATE TO FIT AGAINST
 THE PALLET POSTS.

FABRICATE TO FIT BETWEEN
 Laterally ADJACENT PALLETS.

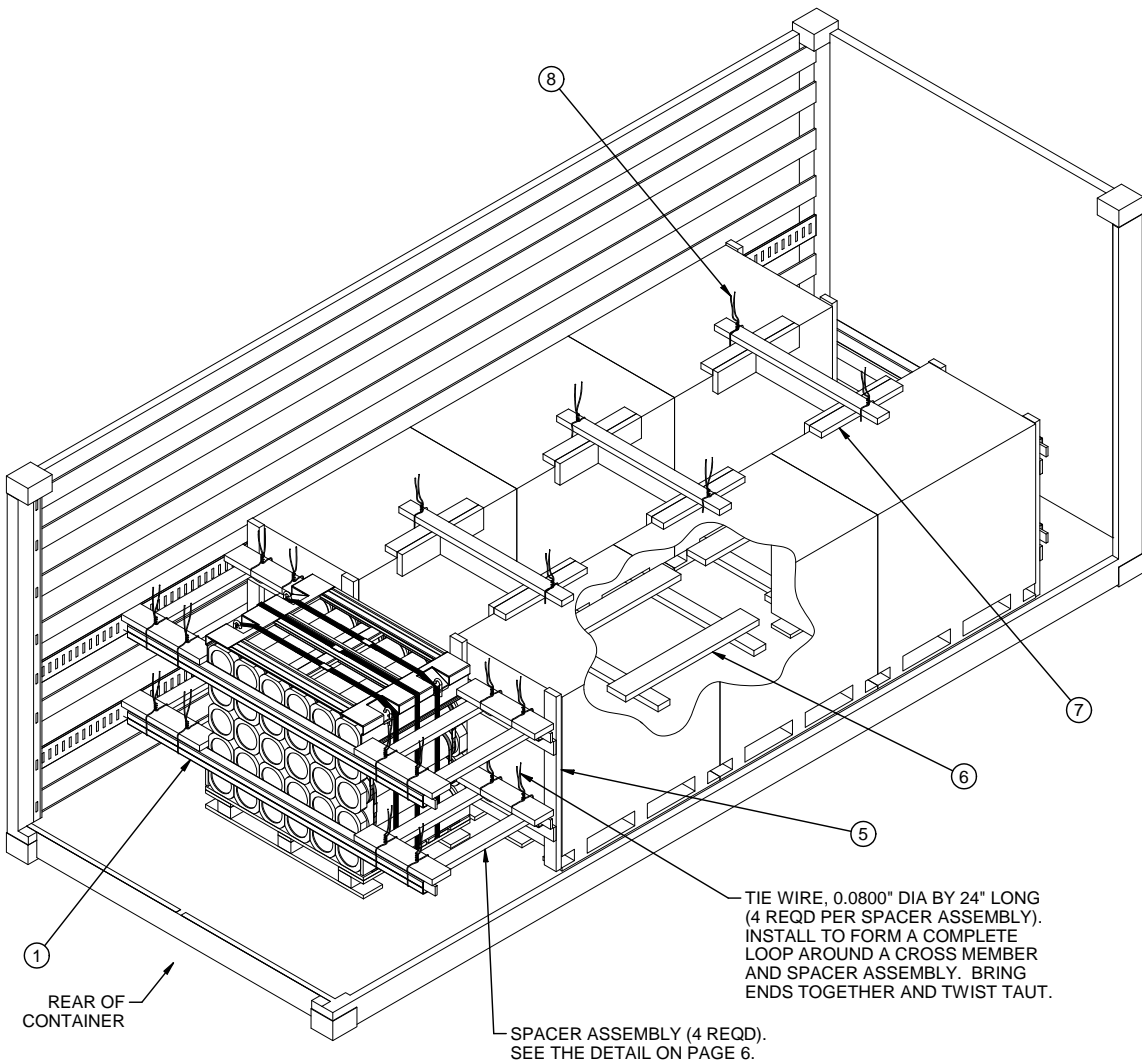


RETAINER PIECE, 2"
 X 4" X 40" (2 REQD).

BUFFER PIECE, 2" X 6" X 39-1/4"
 (2 REQD). POSITION AGAINST
 THE PALLET POSTS AND NAIL
 TO THE RETAINER PIECES
 W/2-10d NAILS AT EACH JOINT.

ANTI-SWAY BRACE

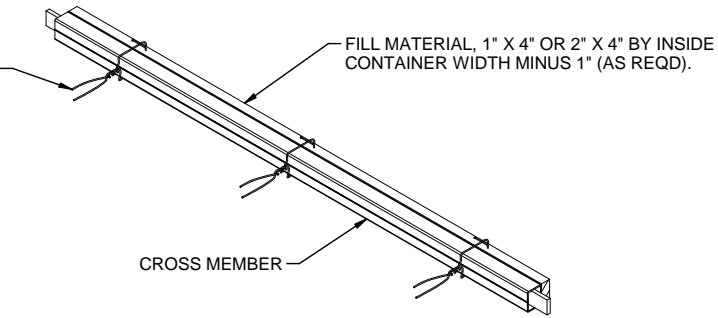
THIS ASSEMBLY MUST BE FABRICATED
 IN PLACE BETWEEN PALLET UNITS.



LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2
SEE GENERAL NOTES "N" AND "O" ON PAGE 3.

TIE WIRE, 0.0800" DIA WIRE 18" LONG (3 REQD PER CROSSMEMBER). INSTALL TO FORM A COMPLETE LOOP AROUND FILL MATERIAL AND CROSS MEMBER, BRING ENDS TOGETHER AND TWIST TAUT. SECURE TO FILL MATERIAL WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE, OR WITH A STRAP STAPLE.



FILL DETAIL

THIS DETAIL DEPICTS THE METHOD OF POSITIONING FILL MATERIAL BETWEEN CROSS MEMBER AND LADING, WHEN THE VOID BETWEEN THE TWO IS GREATER THAN 1".