

*J. Fleishman*  
DATE 1/29/93

# LOADING AND BRACING<sup>●</sup> IN MILVAN CONTAINERS<sup>⊕</sup> OF COMPLETE ROUNDS PACKED IN CYLINDRICAL METAL CONTAINERS

## PA117 SERIES CONTAINERS

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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.

⊕ 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. CAUTION: OTHER REQUIREMENTS OF PAMPHLET 6C ALSO APPLY.

### U.S. ARMY MATERIEL COMMAND DRAWING

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MAY 1993

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DRAWING

FILE

19

48

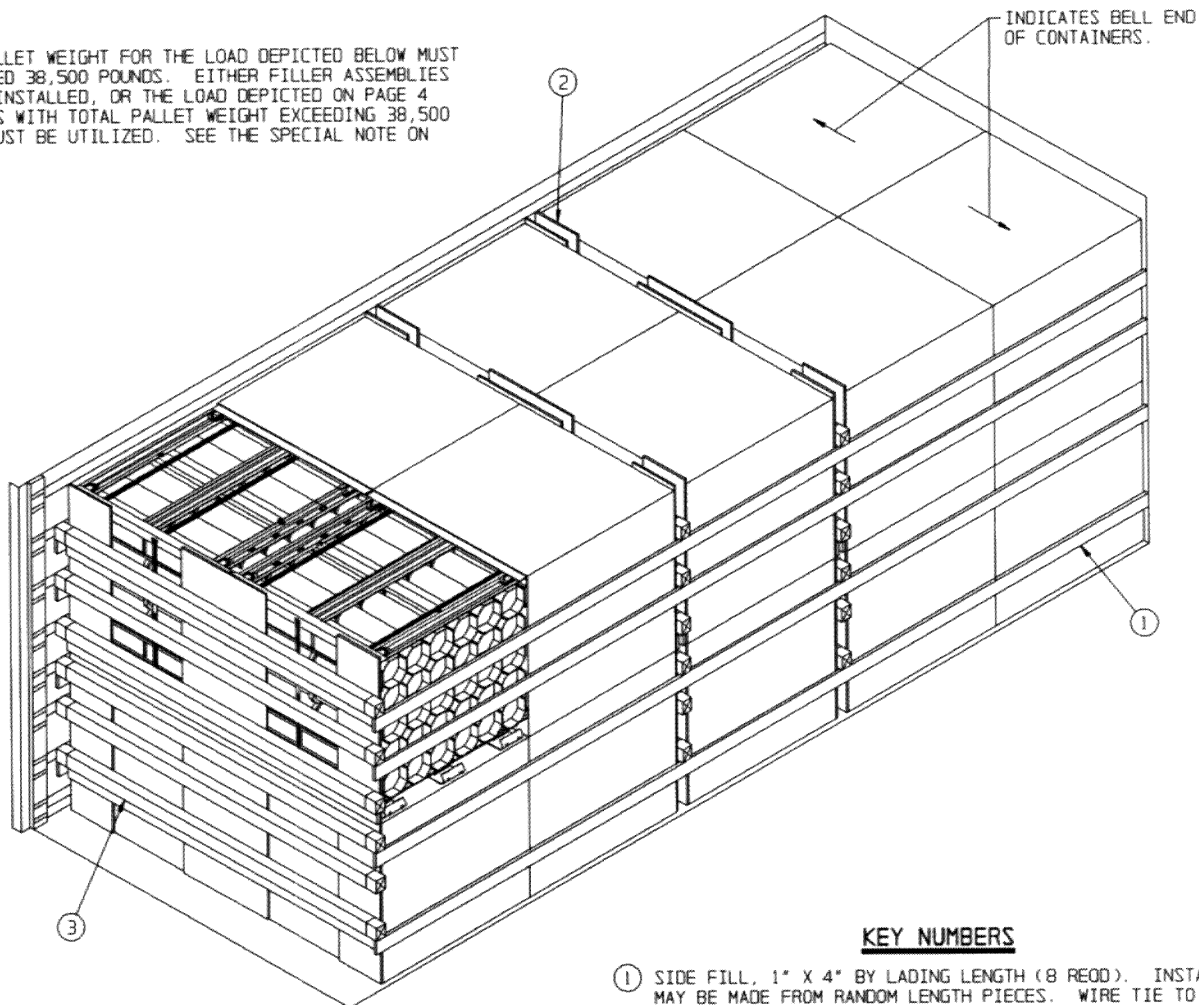
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DO NOT SCALE

\* CAUTION:

TOTAL PALLET WEIGHT FOR THE LOAD DEPICTED BELOW MUST NOT EXCEED 38,500 POUNDS. EITHER FILLER ASSEMBLIES MUST BE INSTALLED, OR THE LOAD DEPICTED ON PAGE 4 FOR LOADS WITH TOTAL PALLET WEIGHT EXCEEDING 38,500 POUNDS MUST BE UTILIZED. SEE THE SPECIAL NOTE ON PAGE 5.



REAR OF MILVAN. →

ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE FILL, 1" X 4" BY LADING LENGTH (8 REOD). INSTALLATION MAY BE MADE FROM RANDOM LENGTH PIECES. WIRE TIE TO THE 16", 38", 60" AND 72" HIGH BELT RAILS ON EACH SIDE OF THE MILVAN. SEE THE "SIDE FILL" DETAIL ON PAGE 6.
- ② LOAD BEARING GATE (5 REOD). SEE THE DETAIL ON PAGE 6.
- ③ CROSS MEMBER (18 REOD). POSITION AS SHOWN IN THE DETAIL ABOVE, AT THE 16", 28" 38", 48", 60" AND 72" HEIGHTS. SEE THE "FILL DETAIL" ON PAGE 6.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	264	88
NAILS	NO. REOD	POUNDS
6d (2")	150	1
10d (3")	16	1/4
PLYWOOD, 1/2"	140.00 SQ FT REOD	192.50 LBS
WIRE, NO. 14 GAGE	72' REOD	1.20 LBS
CROSS MEMBER		18 REOD

LOAD AS SHOWN \*

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	20	38,380 LBS
DUNNAGE		372 LBS
CONTAINER		5,700 LBS
<b>TOTAL WEIGHT</b>		<b>44,452 LBS (APPROX)</b>

M. MAXIMUM LOAD WEIGHT CRITERIA:

THE ITEMIZED LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALSO, THESE LISTED LOAD WEIGHTS IDENTIFY THE COMBINED WEIGHT OF AMMUNITION LADING UNITS AND DUNNAGE THAT CAN BE PLACED INTO ONE MILVAN CONTAINER WITHOUT VIOLATING ONE OR MORE OF THE "CAPABILITY FACTORS". SEE NOTES 1 AND 2.

- 39,100 LBS IN 20-FT CONTAINER (W/O CHASSIS) ABOARD CONTAINERSHIP.
- 39,100 LBS IN CONTAINER ON 20-FT CHASSIS WITH DOUBLE BOGIE. SEE NOTE 3.
- 25,300 LBS IN CONTAINER ON 20-FT CHASSIS WITH SINGLE BOGIE. SEE NOTE 4.
- 21,300 LBS IN EACH CONTAINER ON 40-FT CHASSIS (COUPLED WITH DOUBLE BOGIE). SEE NOTE 3.

NOTE 1: DUNNAGE INCLUDES MATERIALS, OTHER THAN COMPONENTS OF THE MECHANICAL LOAD BRACING SYSTEM, USED TO BLOCK AND BRACE A LOAD.

NOTE 2: 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.

NOTE 3: 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 MILVAN SYSTEM.

NOTE 4: BY SPECIAL AUTHORITY, IT MAY BE POSSIBLE TO MOVE HEAVIER LOADS ON SINGLE BOGIE CHASSIS WITHIN AN INSTALLATION.

N. SPECIAL T/COFC NOTES:

1. 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.
  2. 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.
  3. CHASSIS/CONTAINERS COUPLED INTO A 40-FOOT TRAILER CONFIGURATION MUST BE PLACED AT THE B-END OF A TOFC RAIL CAR. 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.
- O. THE QUANTITY OF CONTAINERS SHOWN IN THE LOADS ON PAGES 2 AND 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE DETAILS ON PAGE 7. WHEN A MILVAN 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 MILVAN.

1. IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT (ONE OR TWO LADING UNITS), LADING UNITS NORMALLY MAY BE ELIMINATED FROM THE REAR OF THE LOAD.
2. 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.

MATERIAL SPECIFICATIONS

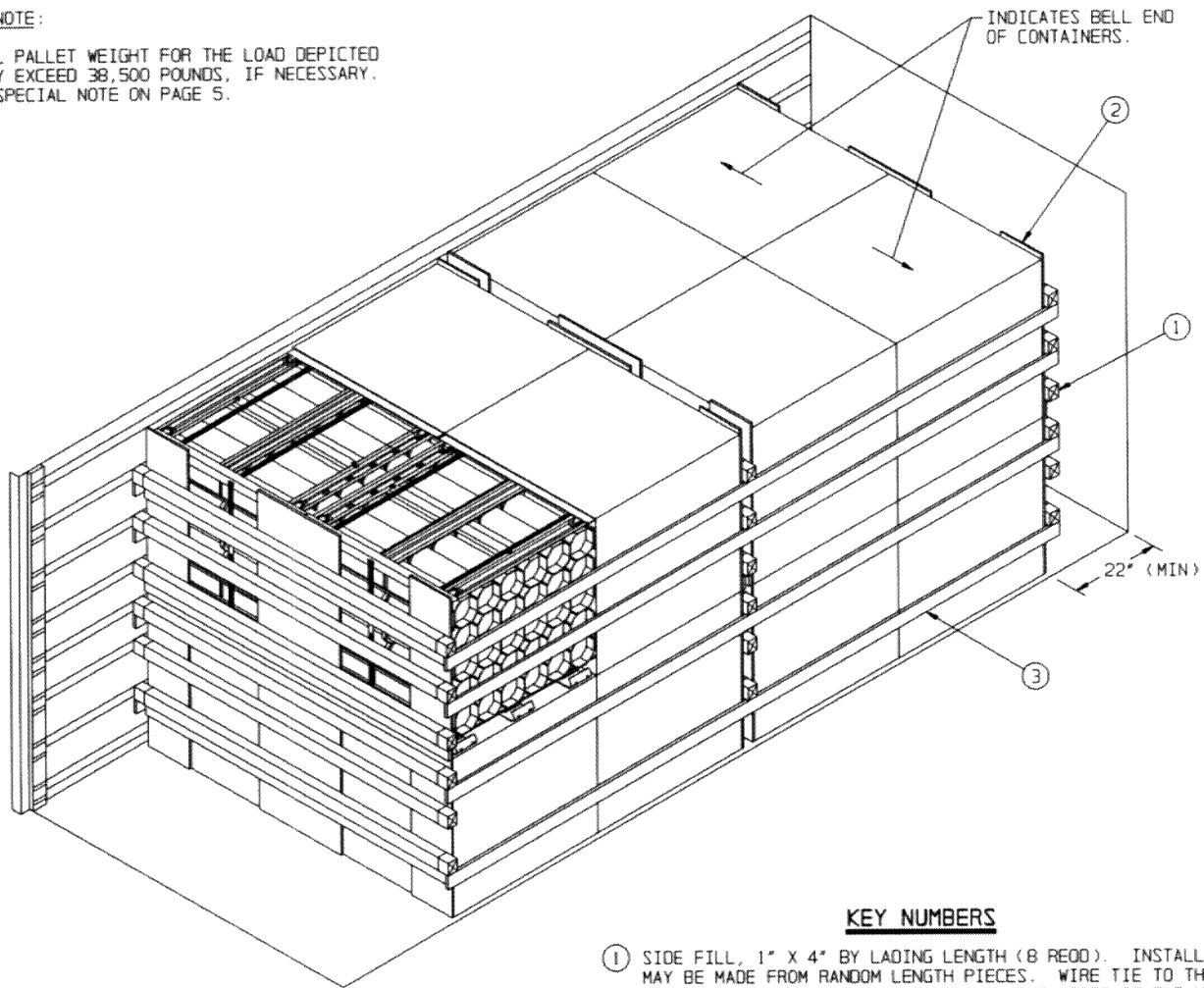
- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- PLYWOOD - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, TYPE A, CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- WIRE, CARBON STEEL - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.

- 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 COMPLETE ROUNDS PACKED IN PA117 SERIES METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 5 AND AMC DRAWING 19-48-4231/45-20PM1006 FOR DETAILS OF THE PALLET UNIT. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE MILVAN 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 WITHIN BUREAU OF EXPLOSIVES PAMPHLET 6C. CROSS MEMBER ATTACHMENT FACILITIES WITHIN THESE CONTAINERS MUST PROVIDE FOR THE INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED. THE WEIGHT DIMENSIONS SPECIFIED WITHIN THIS DRAWING FOR THE INSTALLATION OF CROSS MEMBERS CONFORM WITH THE BUREAU OF EXPLOSIVES PAMPHLET 6C, WITH THE EXCEPTION THAT TWO ADDITIONAL BELT RAILS HAVE BEEN SHOWN: ONE AT 72" AND ONE AT 83" HIGH FROM THE CONTAINER FLOOR. 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. EACH CROSS MEMBER WILL BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHT 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. SEE THE "FILL DETAIL" ON PAGE 6 FOR THE DUNNAGING METHOD REQUIRED TO ELIMINATE AN EXCESSIVE LENGTHWISE VOID WITHIN A LOAD. 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. DUNNAGE LUMBER SPECIFIED IS OF A 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 5-1/2" WIDE.
- F. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- 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. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS ONE OF THE SIDEWALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS 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.
- K. 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 AND/OR CONTAINERS 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.
- L. WHEN LOADING PALLET UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD Laterally AND LONGITUDINALLY WITHIN THE MILVAN. ALTHOUGH A TOTAL OF 1-1/2" OF UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS PERMITTED, LONGITUDINAL VOIDS WITHIN THE LOAD ARE TO BE KEPT TO A MINIMUM.

(CONTINUED AT LEFT)

\* SPECIAL NOTE:

THE TOTAL PALLET WEIGHT FOR THE LOAD DEPICTED BELOW MAY EXCEED 38,500 POUNDS, IF NECESSARY. SEE THE SPECIAL NOTE ON PAGE 5.



REAR OF MILVAN. →

ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE FILL, 1" X 4" BY LADING LENGTH (8 REOD). INSTALLATION MAY BE MADE FROM RANDOM LENGTH PIECES. WIRE TIE TO THE 16", 38", 60" AND 72" HIGH BELT RAILS ON EACH SIDE OF THE MILVAN. SEE THE "SIDE FILL" DETAIL ON PAGE 6.
- ② LOAD BEARING GATE (5 REOD). SEE THE DETAIL ON PAGE 6.
- ③ CROSS MEMBER (18 REOD). POSITION AS SHOWN IN THE DETAIL ABOVE, AT THE 16", 28", 38", 48", 60" AND 72" HEIGHTS. SEE THE "FILL DETAIL" ON PAGE 6.

BILL OF MATERIAL

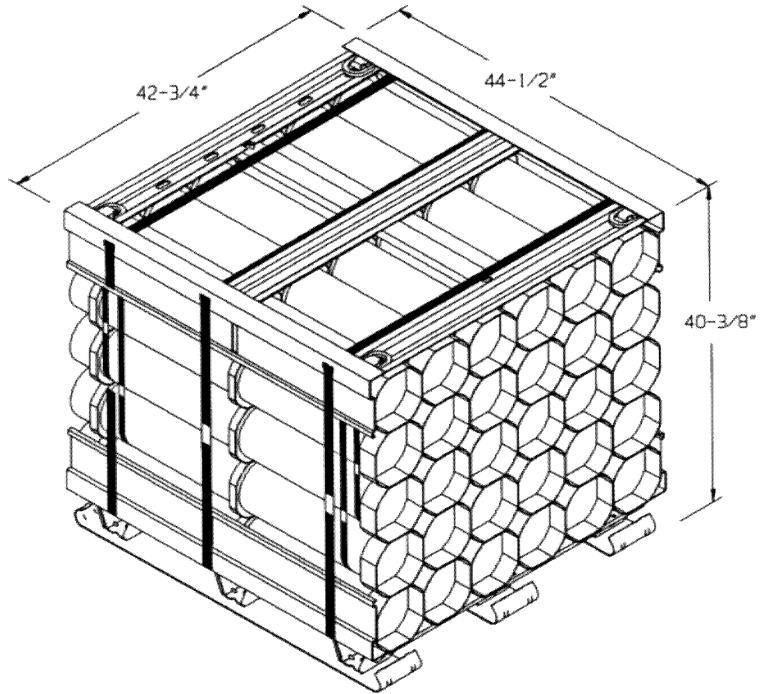
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	212	71
NAILS	NO. REOD	POUNDS
6d (2")	120	3/4
10d (3")	16	1/4
PLYWOOD, 1/2"	112.00 SQ FT REOD	154.00 LBS
WIRE, NO. 14 GAGE	60' REOD	1.00 LBS
CROSS MEMBER	18 REOD	

LOAD AS SHOWN \*

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	16	36,112 LBS
DUNNAGE		299 LBS
CONTAINER		5,700 LBS
<b>TOTAL WEIGHT</b>		<b>42,111 LBS (APPROX)</b>

SPECIAL NOTE:

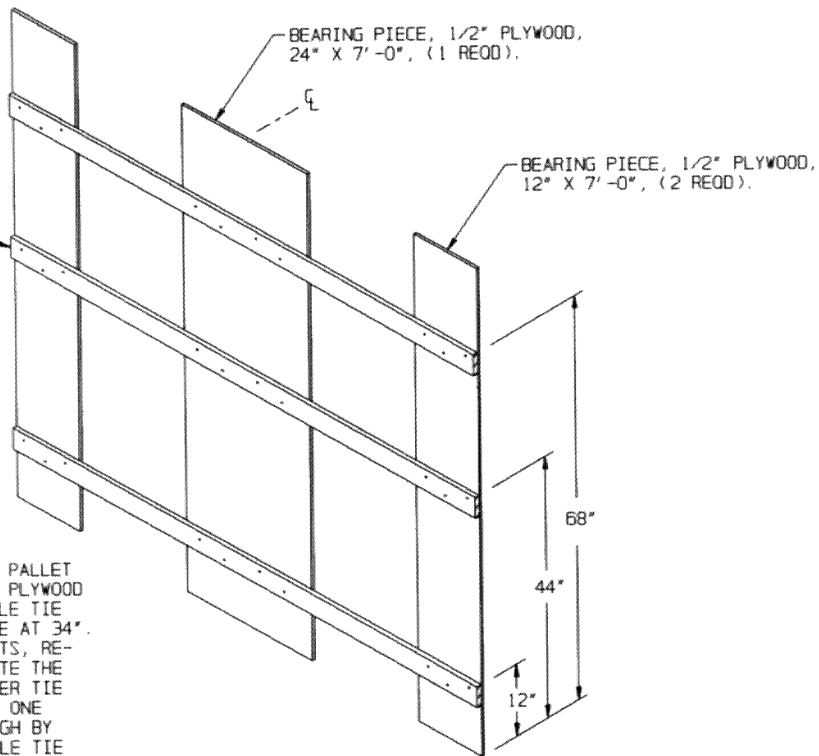
COMBINATIONS OF THE LOADING PATTERNS DEPICTED ON PAGES 2, 4 AND 7 MAY BE USED TO SATISFY THE NUMBER OF UNITS TO BE SHIPPED, HOWEVER, EACH LOAD BAY WILL BE INDEPENDENTLY BLOCKED AS A SEPARATE LOAD BAY IN ACCORDANCE WITH THE DEPICTED PROCEDURES FOR THAT SPECIFIC LOADING PATTERN. THE CONDITIONS SET FORTH IN GENERAL NOTE "O" MUST ALSO BE MET.



PALLET UNIT

UNIT WEIGHT - - - - - 1,919 TO 2,257 LBS (APPROX)  
CUBE - - - - - 44.5 CU FT (APPROX)

TIE PIECE, 1" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7") (3 REOD). NAIL W/3-6d NAILS TO EACH 12" PIECE OF PLYWOOD, AND W/4-6d NAILS TO THE 24" PIECE OF PLYWOOD AND CLINCH.



BEARING PIECE, 1/2" PLYWOOD, 24" X 7'-0", (1 REOD).

BEARING PIECE, 1/2" PLYWOOD, 12" X 7'-0", (2 REOD).

68"

44"

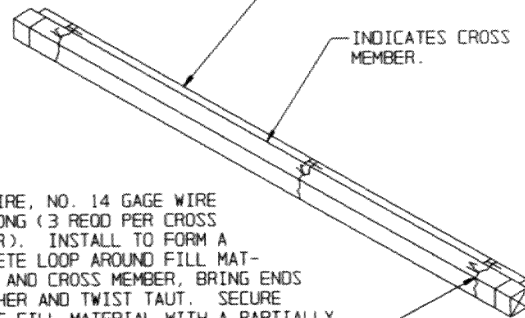
12"

**NOTE:**

TO CONSTRUCT A GATE TO SUPPORT THREE PALLET UNITS, REDUCE THE 12" WIDE PIECES OF PLYWOOD TO 38" IN HEIGHT, ELIMINATE THE MIDDLE TIE PIECE, AND LOCATE THE UPPER TIE PIECE AT 34". FOR A GATE TO SUPPORT TWO PALLET UNITS, REDUCE ALL THE PLYWOOD TO 40", ELIMINATE THE MIDDLE TIE PIECE, AND LOCATE THE UPPER TIE PIECE AT 34". FOR A GATE TO SUPPORT ONE PALLET UNIT, USE ONE PIECE OF 40" HIGH BY 44" WIDE PLYWOOD, ELIMINATE THE MIDDLE TIE PIECE, SHORTEN THE REMAINING TIE PIECES TO 44", AND LOCATE THE UPPER TIE PIECE AT 34"

**LOAD BEARING GATE**

FILL MATERIAL, 1" X 4" OR 2" X 4" MATERIAL BY CONTAINER WIDTH MINUS 1" (AS REOD).

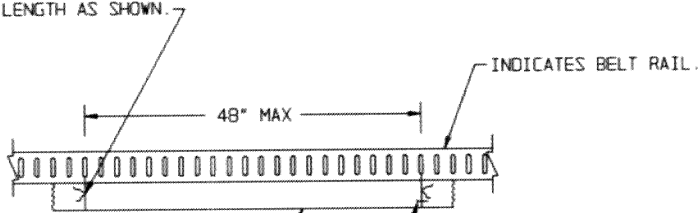


INDICATES CROSS MEMBER.

TIE WIRE, NO. 14 GAGE WIRE 18" LONG (3 REOD PER CROSS MEMBER). INSTALL TO FORM A COMPLETE LOOP AROUND FILL MATERIAL AND CROSS MEMBER, BRING ENDS TOGETHER AND TWIST TAUT. SECURE TO THE FILL MATERIAL WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE, OR WITH A STRAP STAPLE.

**FILL DETAIL**

TIE WIRE, NO. 14 GAGE WIRE 18" LONG. WIRE TO FORM A COMPLETE LOOP THROUGH HOLE IN BELT RAIL AND AROUND FILL PIECE, BRING ENDS TOGETHER AND TWIST TAUT. REQUIRED NEAR EACH END OF FILL PIECE AND EVERY 48" OF FILL PIECE LENGTH AS SHOWN.

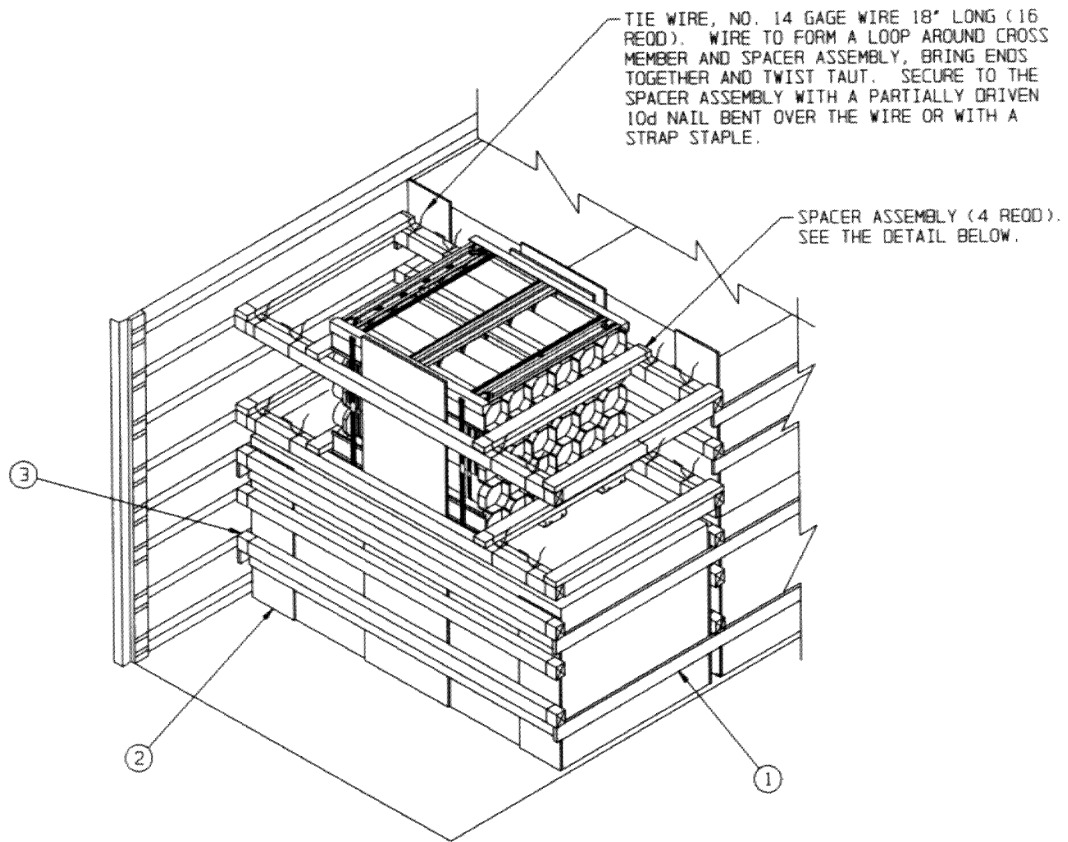


INDICATES BELT RAIL.

FILL PIECE, 1" X 4" BY LADING LENGTH, RANDOM LENGTH PIECES MAY BE USED. REQUIRED AT THE 16", 38", 60" AND 72" HIGH BELT RAILS.

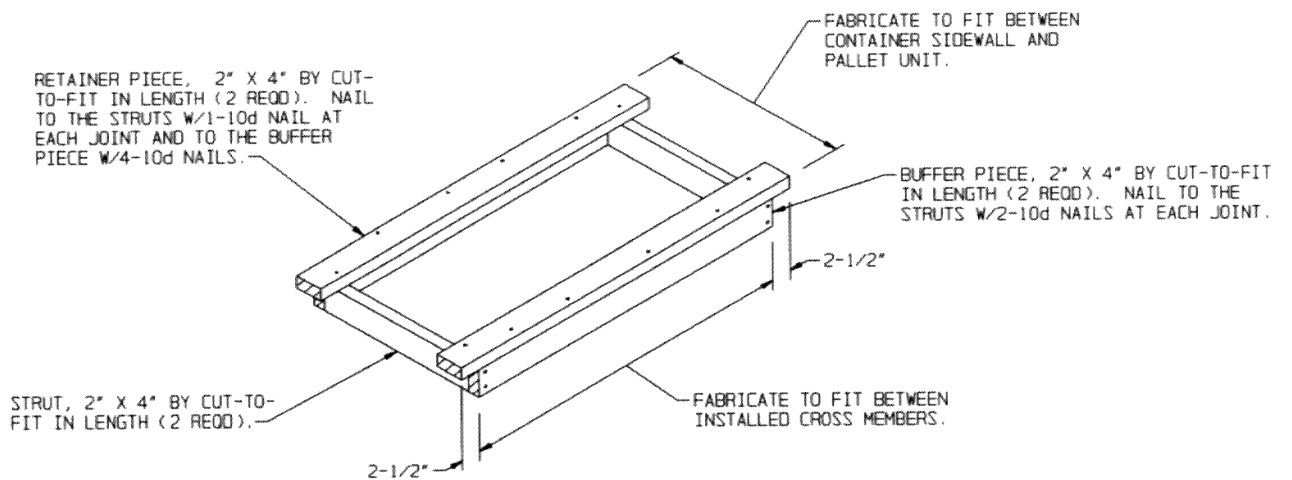
RETAINER NAIL, PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE TO PREVENT LONGITUDINAL MOVEMENT OF FILL PIECES (1 REOD NEAR EACH END OF EACH LENGTH OF SIDE FILL PIECE). A STRAP STAPLE MAY BE USED IN LIEU OF A RETAINER NAIL.

**SIDE FILL DETAIL**



**ALTERNATIVE LOADING PROCEDURE**

KEY NUMBERS REFER TO KEY NUMBERS ON PAGES 2 AND 4. NOTE THAT TWO LOAD BEARING GATES HAVE BEEN MODIFIED AS DESCRIBED ON PAGE 6.



**SPACER ASSEMBLY**

