

APPROVED BY  
BUREAU OF EXPLOSIVES

*D m Healy*

DATE 8/6/96

# LOADING AND BRACING<sup>●</sup> IN MILVAN CONTAINERS<sup>⊕</sup> OF 25MM CARTRIDGES PACKED IN PA125 METAL BOXES, UNITIZED ON A METAL PALLET

● 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.

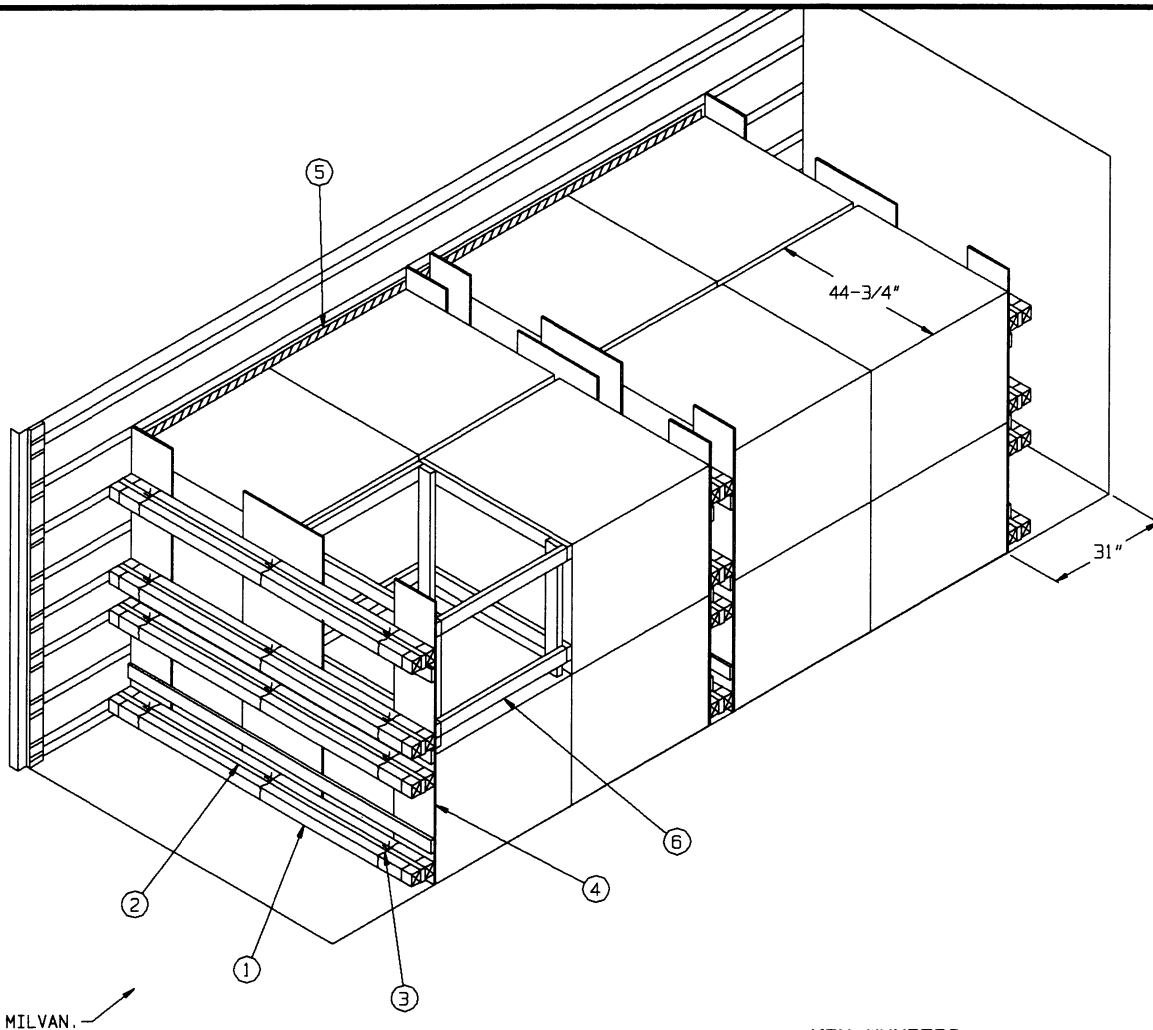
⊕ ONLY MILVAN CONTAINERS WHICH HAVE BEEN MODIFIED TO INCLUDE A MECHANICAL LOAD-BRACING SYSTEM THAT SATISFIES THE REQUIREMENTS OF THE BUREAU OF EXPLOSIVES PAMPHLET 6C WILL BE USED FOR THE MOVEMENT OF AMMUNITION BY T/COFC SERVICE.  
CAUTION: OTHER REQUIREMENTS OF PAMPHLET 6C ALSO APPLY.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND  <i>Daniel E. Stuckwick</i>	DRAFTSMAN	TECHNICIAN	ENGINEER	
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APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  <i>William F. Ernst</i> U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL	VALIDATION ENGINEERING DIVISION	TRANSPORTATION ENGINEERING DIVISION	LOGISTICS ENGINEERING OFFICE	
	<i>William F. Ernst</i> JULY 1996			
	CLASS	DIVISION	DRAWING	FILE
	19	48	4248/ 17	15PM1010

DO NOT SCALE

PROJECT CA 260/17-88



REAR OF MILVAN. →

**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① CROSS MEMBER (24 REQD). POSITION AS SHOWN ABOVE, AT THE 5", 28", 38", AND 60" HEIGHTS. SEE THE "FILL DETAIL" ON PAGE 4. SEE GENERAL NOTE "D" ON PAGE 3.
- ② FILL MATERIAL, 1-3/8" X 3-1/2" BY INSIDE CONTAINER WIDTH MINUS 1" (12 REQD). SEE THE "FILL MATERIAL INSTALLATION" DETAIL ON PAGE 4.
- ③ TIE WIRE, NO. 14 GAGE WIRE 24" LONG (36 REQD). SEE THE "FILL MATERIAL INSTALLATION" DETAIL ON PAGE 4.
- ④ LOAD BEARING GATE (4 REQD). SEE THE DETAIL ON PAGE 4.
- ⑤ ANTI-CHAFING FIBERBOARD (AS REQD). AFFIX (STRAP, TAPE, ETC.) TO THE SIDEWALL OR THE PALLET UNIT TO ELIMINATE METAL-TO-METAL CONTACT. ANTI-CHAFING MATERIAL IS NOT REQUIRED BETWEEN PALLET UNITS IN EITHER THE LATERAL OR LONGITUDINAL DIRECTIONS. NOTE: PLYWOOD OR HARDBOARD MAY BE USED IN PLACE OF THE FIBERBOARD AS LONG AS IT IS SECURED TO PREVENT UNDUE MOVEMENT.
- ⑥ OMITTED-UNIT ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 6.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	91	30
2" X 4"	134	89
NAILS	NO. REQD	POUNDS
6d (2")	120	3/4
10d (3")	88	1-1/4
WIRE, NO. 14 GAGE	--- 72' REQD	--- 1-1/4 LB
PLYWOOD, 1/2"	--- 96 SQ FT REQD	--- 132 LBS
ANTI-CHAFING MATERIAL	--- AS REQD	--- NIL

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	15	37,125 LBS
DUNNAGE		373 LBS
CONTAINER		5,700 LBS
TOTAL WEIGHT		43,198 LBS (APPROX)

L. 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.

M. 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. TWENTYFOOT AND 40-FOOT UNITS CAN BE LOADED ON THE SAME CAR.

N. WHEN LOADING CONTAINERS, 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".

P. THE QUANTITY OF CONTAINERS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN- FULL LOAD" DETAIL ON PAGE 5. WHEN A MILVAN IS TO BE LOADED WITH EITHER A FULL OR REDUCED QUANTITY OF PALLET 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.
- FIBERBOARD - - - - - : FED SPEC PPP-F-320; TYPE SF (SOLID FIBERBOARD), CLASS DOMESTIC, ALL GRAD.
- WIRE, CARBON STEEL - - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH. .0800" DIA 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 OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO LOADS OF 25MM CARTRIDGES PACKED IN PA125 SERIES METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 6 AND AMC DRAWING 19-48-4232/17-20PM1007 FOR DETAILS OF THE PALLET UNIT. CAUTION: REGARDLESS OF THE QUANTITY PALLET UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE MILVAN 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 4 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 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.

F. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE MILVAN 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 MILVAN 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 25.4 MM AND ONE POUND EQUALS 0.454 KG.

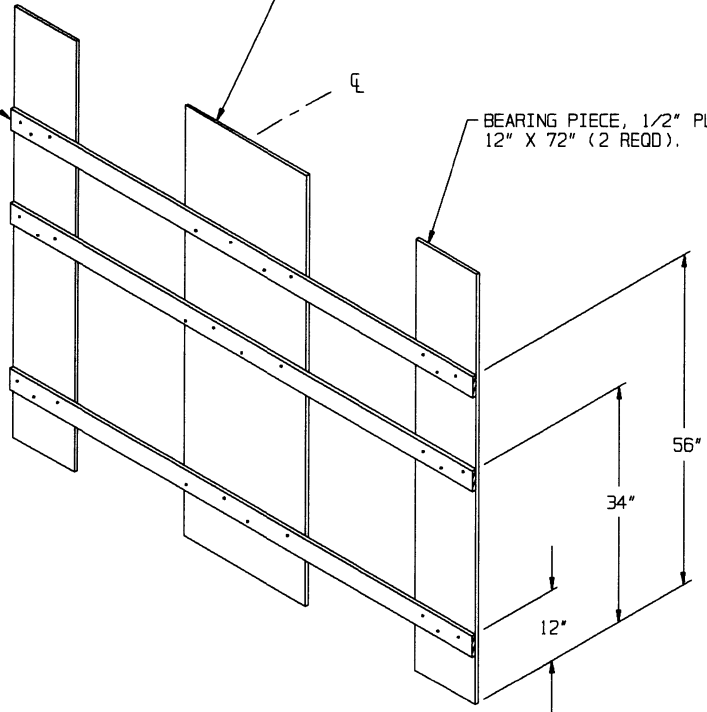
K. TO MAKE LOADING EASIER, TO HELP ACHIEVE A TIGHT LOAD ACROSS A CONTAINER, AND TO PREVENT UNACCEPTABLE DAMAGE TO LADING UNITS WHEN LOADING A MILVAN, A SLIP-SHEET CAN BE USED EFFECTIVELY AS A "SHOEHORN" TYPE DEVICE. THE SLIP-SHEET WILL PROVIDE A SMOOTH SURFACE THAT WILL PREVENT UNIT STRAPS AND/OR CONTAINERS 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.

(CONTINUED AT LEFT)

TIE PIECE, 1" X 4" BY INSIDE CONTAINER WIDTH MINUS 1/2" (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 72" (1 REOD).

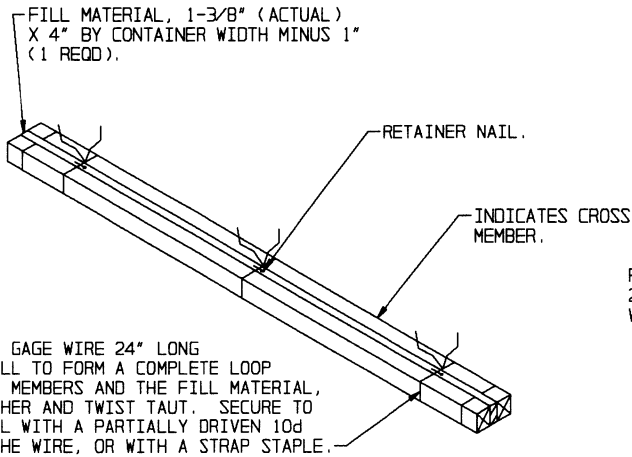
BEARING PIECE, 1/2" PLYWOOD, 12" X 72" (2 REOD).



**NOTE:**

TO CONSTRUCT A GATE TO SUPPORT THREE PALLET UNITS, AS SHOWN ON PAGE 5, 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 38", 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 38" HIGH BY 41" WIDE PLYWOOD, ELIMINATE THE MIDDLE TIE PIECE, SHORTEN THE REMAINING TIE PIECES TO 41", AND LOCATE THE UPPER TIE PIECE AT 34".

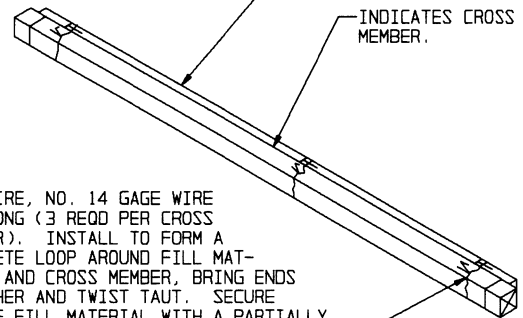
**LOAD BEARING GATE**



**FILL MATERIAL INSTALLATION**

TIE WIRE, NO. 14 GAGE WIRE 24" LONG (3 REOD). INSTALL TO FORM A COMPLETE LOOP AROUND THE CROSS MEMBERS AND THE FILL MATERIAL, 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.

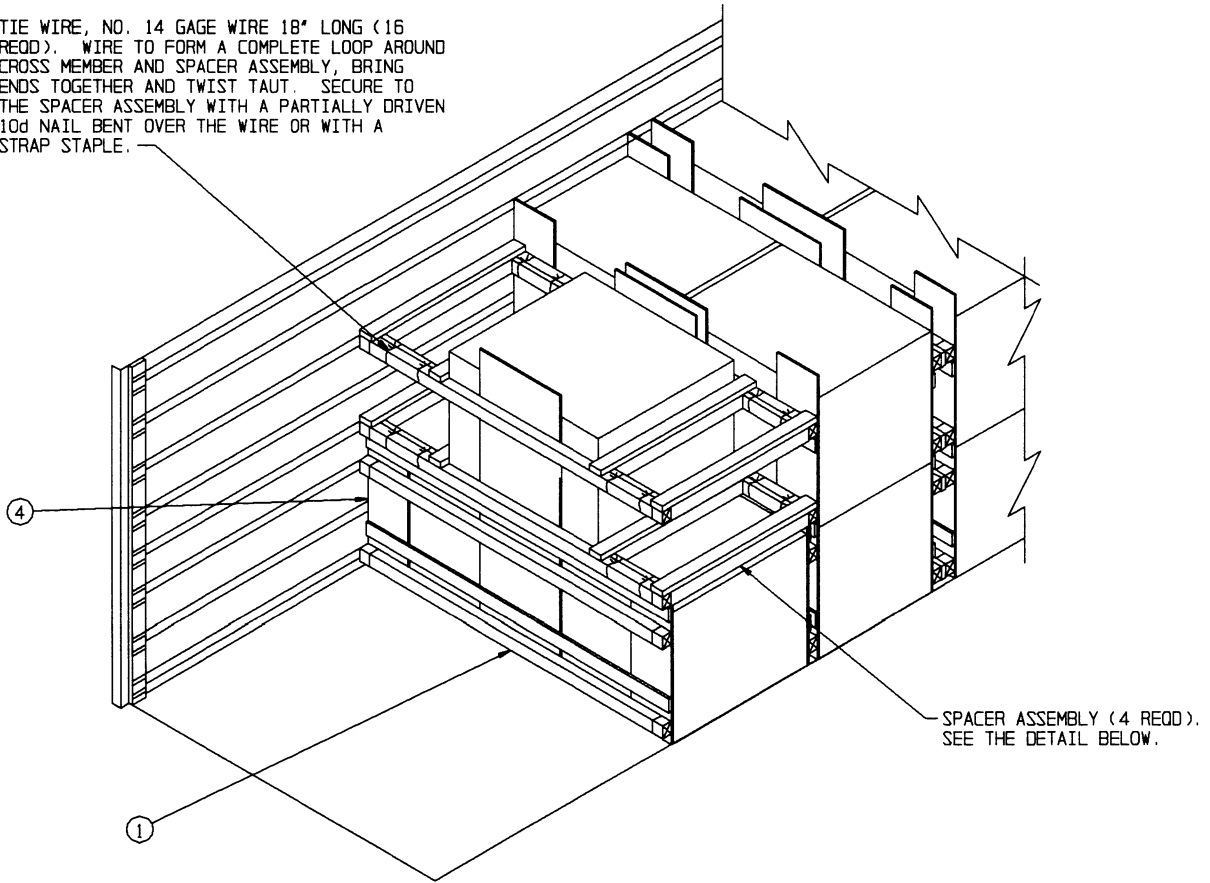
FILL MATERIAL, 1" X 4" OR 2" X 4" MATERIAL BY CONTAINER WIDTH MINUS 1" (AS REOD).



**FILL DETAIL**

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.

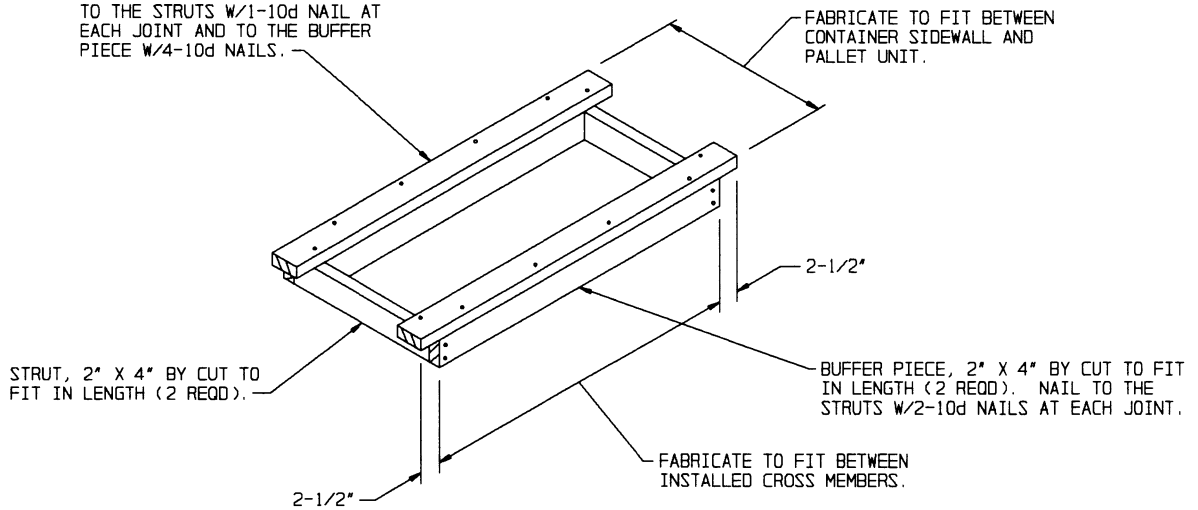
TIE WIRE, NO. 14 GAGE WIRE 18" LONG (16 REQD). WIRE TO FORM A COMPLETE LOOP AROUND CROSS MEMBER AND SPACER ASSEMBLY, BRING ENDS TOGETHER AND TWIST TAUT. SECURE TO THE SPACER ASSEMBLY WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE OR WITH A STRAP STAPLE.



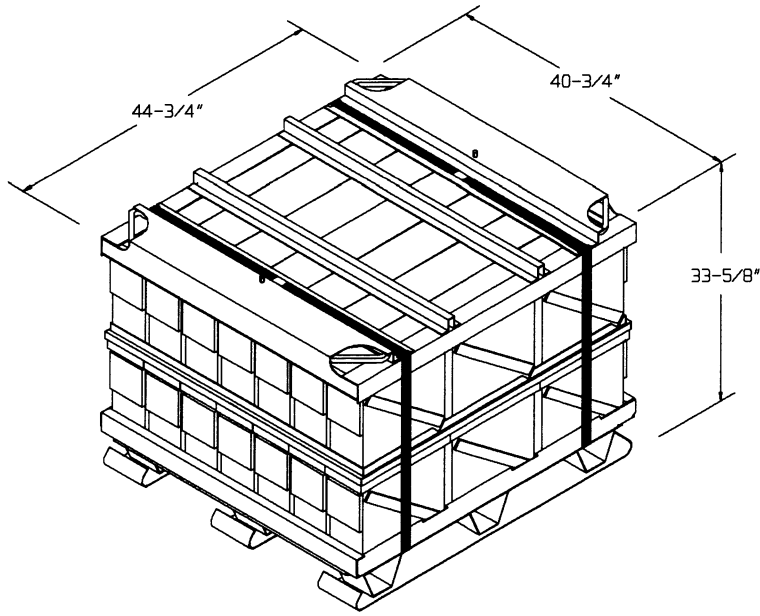
**ALTERNATIVE LOADING PROCEDURE**

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

RETAINER PIECE, 2" X 4" BY CUT TO FIT IN LENGTH (2 REQD). NAIL TO THE STRUTS W/1-10d NAIL AT EACH JOINT AND TO THE BUFFER PIECE W/4-10d NAILS.



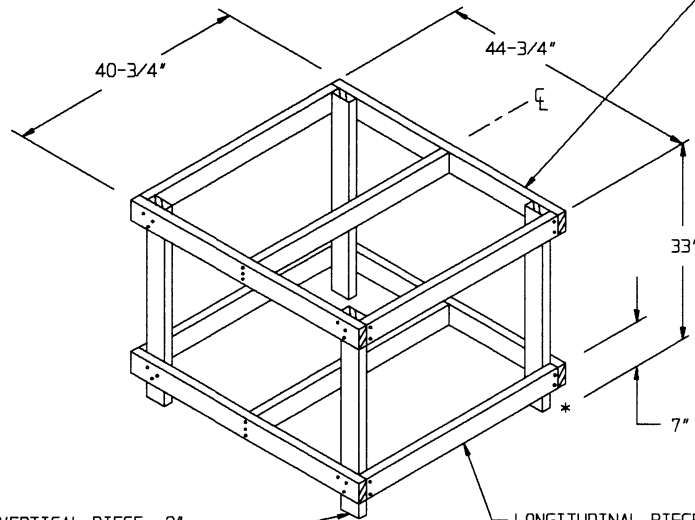
**SPACER ASSEMBLY**



**PALLET UNIT**

UNIT WEIGHT - - - 2,475 LBS (APPROX)  
 CUBE - - - - - 35.48 CU FT (APPROX)

LATERAL PIECE, 2" X 4" X 44-3/4"  
 (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" X 33" (4 REQD).

LONGITUDINAL PIECE, 2" X 4"  
 X 37-3/4" (6 REQD). NAIL THE  
 OUTER FOUR PIECES TO THE VERTICAL  
 PIECES W/2-10d NAILS AT  
 EACH END.

**OMITTED-UNIT ASSEMBLY**

THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN PLACE OF AN  
 OMITTED PALLET UNIT. OMITTED-UNIT ASSEMBLIES MUST BE WIRE  
 TIED TO AN ADJACENT PALLET UNIT TO PREVENT UNDUE MOVEMENT.  
 NO MORE THAN TWO OMITTED-UNIT ASSEMBLIES MAY BE USED IN THE  
 LOAD DEPICTED ON PAGE 2. DO NOT INSTALL AN OMITTED-UNIT  
 ASSEMBLY IMMEDIATELY ADJACENT TO ANOTHER OMITTED-UNIT ASSEMBLY.