

APPROVED BY  
BUREAU OF EXPLOSIVES

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# LOADING AND BRACING<sup>●</sup> IN MILVAN CONTAINERS<sup>⊕</sup> OF CBU ITEMS PACKED IN MK427 CONTAINERS

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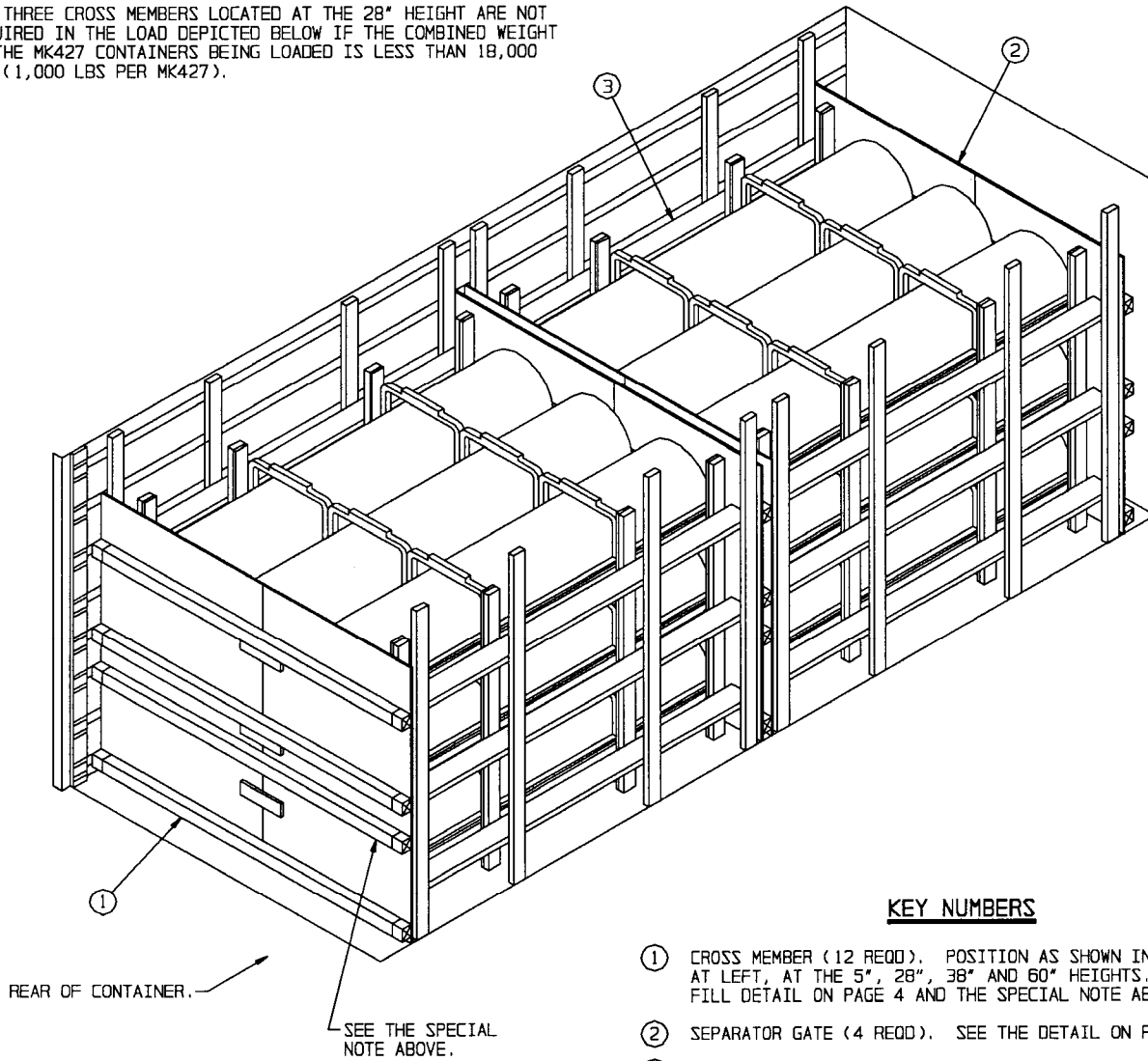
- LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.
- ⊕ ONLY MILVAN CONTAINERS 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			
APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND  <i>Joseph E. Heubrich</i>  APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  <i>John L. Byrd Jr.</i> U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL	DRAFTSMAN   VALIDATION ENGINEERING DIVISION	TECHNICIAN   TRANSPORTATION ENGINEERING DIVISION	ENGINEER  L. FIEFFER  LOGISTICS ENGINEERING OFFICE
DECEMBER 1993			
CLASS	DIVISION	DRAWING	FILE
19	48	8532	15J31

DO NOT SCALE

SPECIAL NOTE:

THE THREE CROSS MEMBERS LOCATED AT THE 28" HEIGHT ARE NOT REQUIRED IN THE LOAD DEPICTED BELOW IF THE COMBINED WEIGHT OF THE MK427 CONTAINERS BEING LOADED IS LESS THAN 18,000 LBS (1,000 LBS PER MK427).



ISOMETRIC VIEW

KEY NUMBERS

- ① CROSS MEMBER (12 REQD). POSITION AS SHOWN IN THE DETAIL AT LEFT, AT THE 5", 28", 38" AND 60" HEIGHTS. SEE THE FILL DETAIL ON PAGE 4 AND THE SPECIAL NOTE ABOVE.
- ② SEPARATOR GATE (4 REQD). SEE THE DETAIL ON PAGE 5.
- ③ SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 5.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	106	36
2" X 4"	211	141
2" X 6"	102	102
NAILS	NO. REQD	POUNDS
6d (2")	144	1
10d (3")	192	3
PLYWOOD, 1/2"	180.00 SQ FT REQD	247.50 LBS
CROSS MEMBER		12 REQD

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MK427 CONTAINER	18	20,574 LBS
DUNNAGE		810 LBS
CONTAINER		5,700 LBS
TOTAL WEIGHT		27,084 LBS (APPROX)

L. 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.

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

N. 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 6. 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.

O. 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 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.

STAPLE, STRAP - - - : COMMERCIAL GRADE.

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 CBU ITEMS PACKED IN THE MK427 MOD 0 OR MOD 1 CONTAINER WHEN ONE OF THE FOLLOWING ITEMS IS PACKED THEREIN:  
CBU-MK20 AND MODS (ROCKEYE II)  
CBU-78/B (GATOR)  
CBU-59/B, COMPLETE (APAM)  
CBU (T-1)B, TRAINING

SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE MK427 MOD 0 OR MOD 1 CONTAINER WITH CBU ITEMS INSTALLED. 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 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 6" MATERIAL IS ACTUALLY 1-1/2" THICK 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.

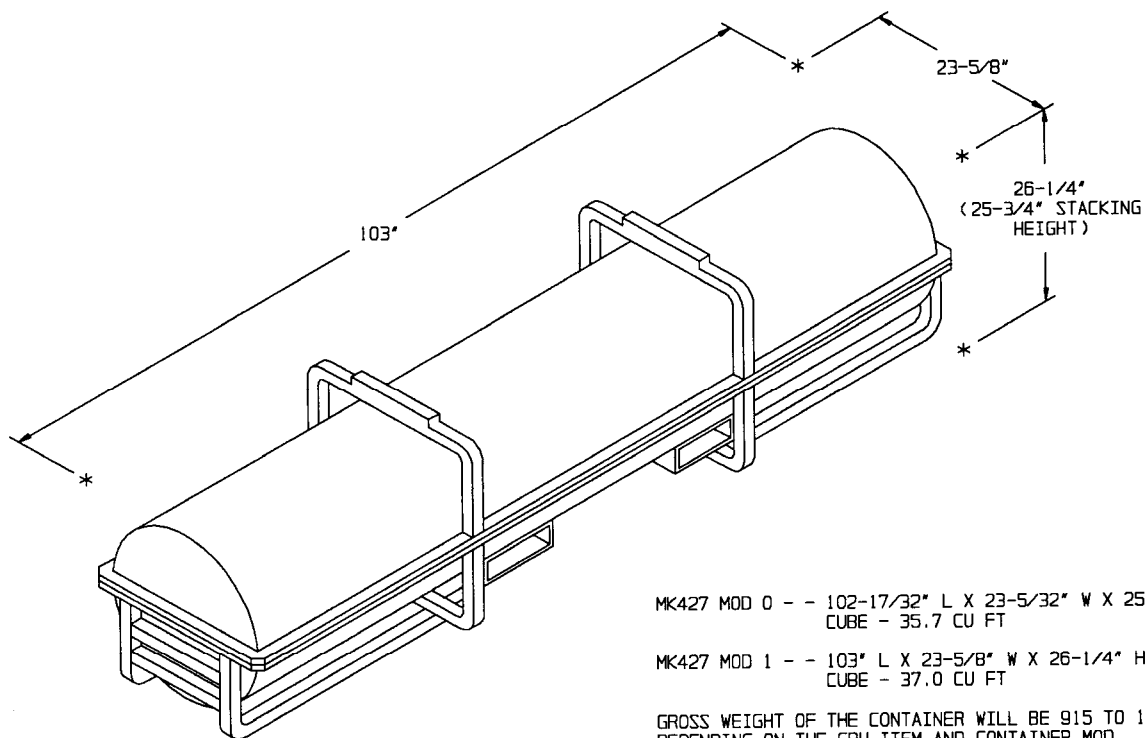
G. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH 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. WHEN LOADING CONTAINERS, 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. ADJUSTMENTS CAN BE MADE BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE BEARING PIECES ON THE SIDE FILL ASSEMBLIES (NAIL EACH ADDITIONAL PIECE TO THE BEARING PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12"). BY ELIMINATING THE BEARING PIECES, OR BY CHANGING THE WIDTH OF THE HORIZONTAL PIECES.

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 CONTAINERS FROM INTERLOCKING OR CATCHING ON OTHER PROJECTIONS WHEN Laterally ADJACENT LADING UNITS ARE BEING LOADED. SLIP-SHEETS WILL BE USED AFTER TWO-THIRDS OF A STACK IS LOADED WITH ITS SIDES IN TIGHT CONTACT AT BOTH SIDES OF THE MILVAN. THE SLIP-SHEETS ARE TO BE PLACED AGAINST THE INNER SIDES OF THE PARTIAL STACK BEFORE THE LAST THIRD OF THE STACK IS LOADED. AFTER A STACK IS COMPLETED, THE SLIP-SHEETS ARE 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)



MK427 MOD 0 -- 102-17/32" L X 23-5/32" W X 25-31/32" H  
 CUBE - 35.7 CU FT

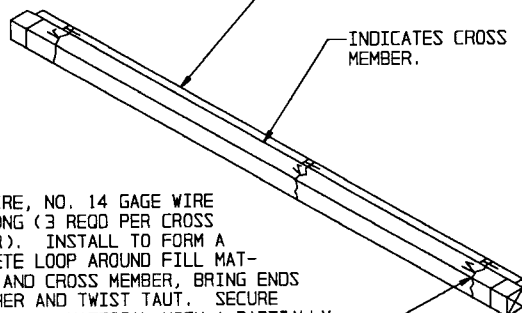
MK427 MOD 1 -- 103" L X 23-5/8" W X 26-1/4" H  
 CUBE - 37.0 CU FT

GROSS WEIGHT OF THE CONTAINER WILL BE 915 TO 1,179 LBS  
 DEPENDING ON THE CBU ITEM AND CONTAINER MOD.

**MK427 CONTAINER**

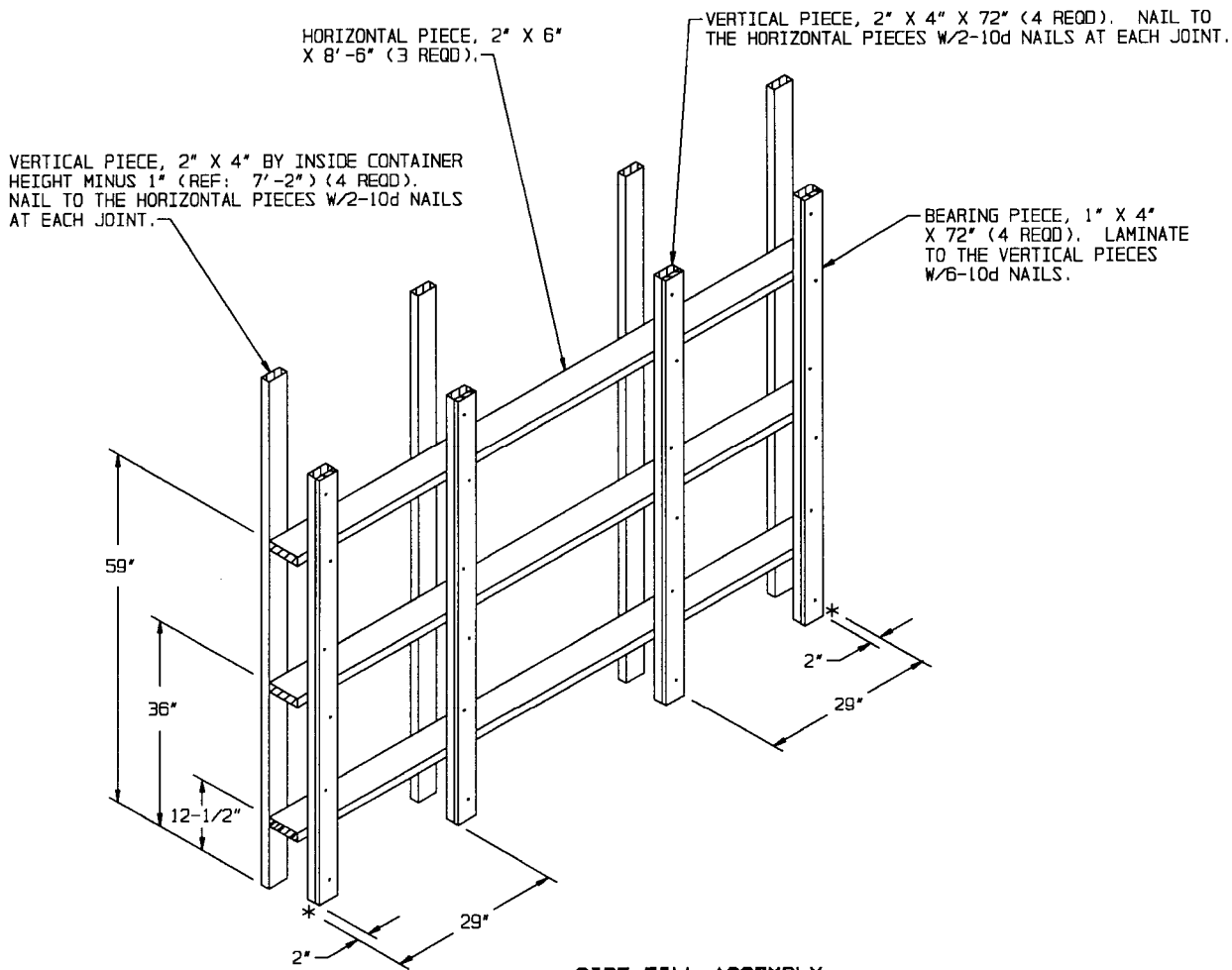
(MOD 1 SHOWN)

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

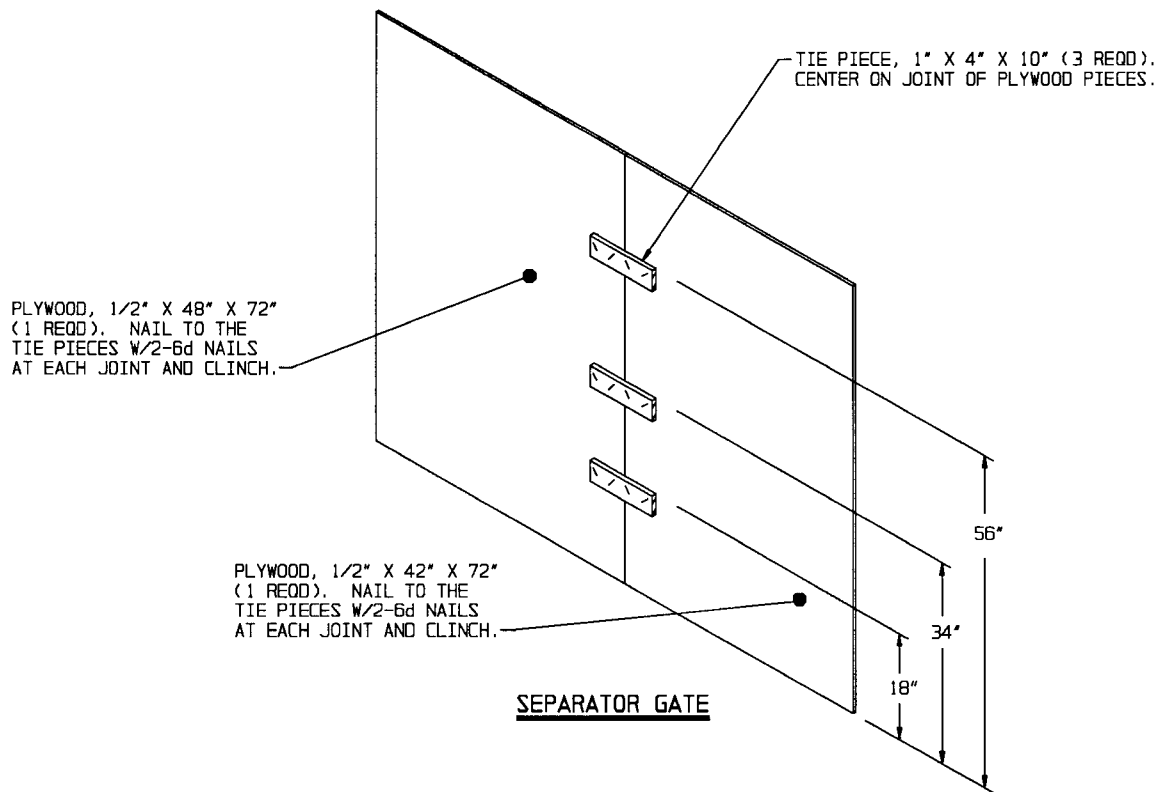


TIE WIRE, NO. 14 GAGE WIRE  
 18" LONG (3 REQD PER CROSS  
 MEMBER). INSTALL TO FORM A  
 COMPLETE LOOP AROUND FILL MAT-  
 ERIAL AND CROSS MEMBER, BRING ENDS  
 TOGETHER AND TWIST TAUT. SECURE  
 TO THE FILL MATERIAL WITH A PARTIALLY  
 DRIVEN 10d NAIL BENT OVER THE WIRE,  
 OR WITH A STRAP STAPLE.

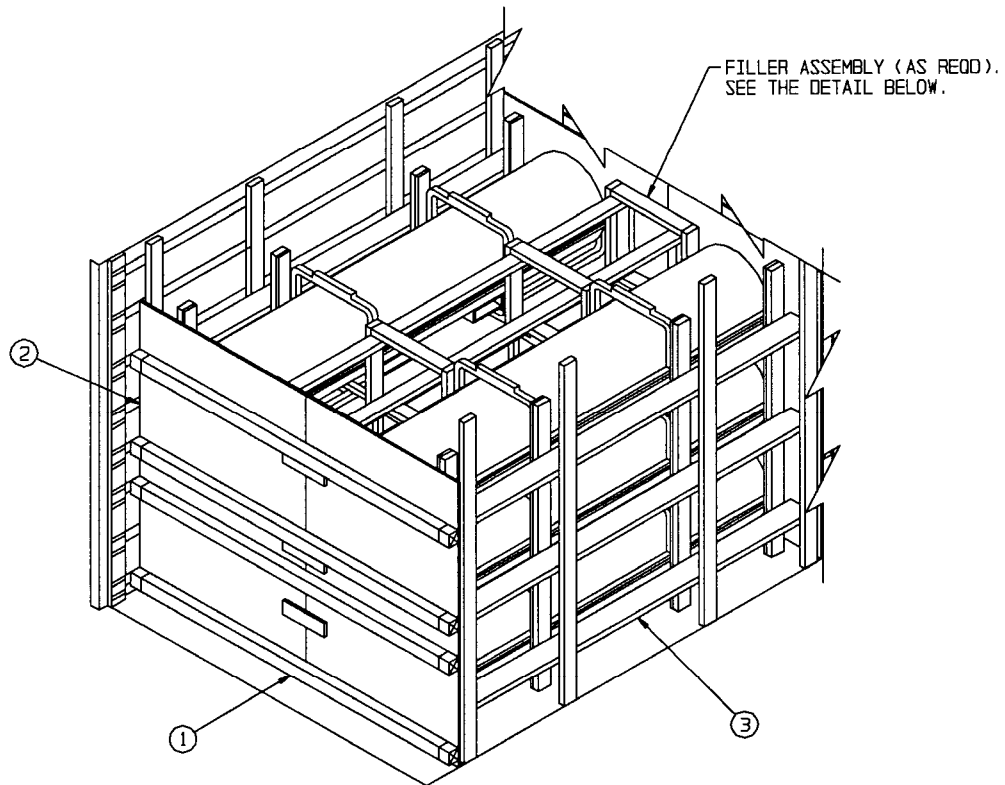
**FILL DETAIL**



**SIDE FILL ASSEMBLY**



**SEPARATOR GATE**



**LESS-THAN-FULL-LOAD PROCEDURE**

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (LESS THAN 18 UNITS). KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2.

