

REV NO. 1 APPROVED BY U.S. COAST GUARD <i>M.D. M... H.</i>	REV NO. 1 APPROVED BY HAZARDOUS MATERIALS SYSTEMS (BOE) ASSOCIATION OF AMERICAN RAILROADS <i>J. H. ...</i>
DATE <i>8/1/88</i>	DATE <i>7/6/88</i>

# LOADING AND BRACING<sup>①</sup> IN MILVAN CONTAINERS<sup>⊕</sup> OF GAU-8/A 30MM AMMUNITION PACKAGED IN AUTOMATIC LOADING SYSTEM (ALS) CNU-309/E AND/OR CNU-332/E CONTAINERS<sup>●</sup>

- ① LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLAT-CAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS. SEE GENERAL NOTE "T" ON PAGE 2.
- ⊕ 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.

● THESE MILVAN LOADING PROCEDURES ARE ALSO APPLICABLE FOR SHIPMENTS OF A MIXED LOAD OF CNU-309A/E AND CNU-332A/E CONTAINERS.

REVISIONS			DRAFTSMAN <i>WRF</i>	AP <i>AP</i>	PROJ ENG <i>WRF</i>
1	FEB 88	<i>WRF</i>	<i>WRF</i>	<i>WRF</i>	<i>WRF</i>
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DO NOT SCALE

## 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 30MM AMMUNITION PACKED IN CNU-309/E AND/OR CNU-332/E METAL CONTAINERS. SUBSEQUENT REFERENCE TO TWIN-PACK UNIT MEANS TWO CNU-309/E OR TWO CNU-332/E CONTAINERS PINNED AND STRAPPED TOGETHER CONTAINING THE AMMUNITION ITEMS. **CAUTION:** REGARDLESS OF THE QUANTITY OF TWIN-PACK UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF 44,800 POUNDS MUST NOT BE EXCEEDED. SEE PAGE 3 FOR DETAILS OF THE METAL CONTAINERS.
- C. THE LOAD AS SHOWN IS 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 LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLAT-CAR (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 HEIGHT DIMENSIONS SPECIFIED WITHIN THIS DRAWING FOR THE INSTALLATION OF CROSS MEMBERS CONFORM WITH BUREAU OF EXPLOSIVES PAMPHLET 6C, WITH THE EXCEPTION THAT TWO (2) ADDITIONAL BELT RAILS HAVE BEEN SHOWN; ONE AT 72" AND ONE AT 83" ABOVE 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. SEE THE "FILL DETAIL" ON PAGE 5 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 THROUGH UNUSED DURING SOME SHIPMENTS. THE LOAD BLOCKING COMPONENT DESIGNATED AS "CROSS MEMBER" IS IDENTIFIED AS "BEAM ASSEMBLY" WITHIN TM 55-8115-200-24, DATED SEPTEMBER 1972. THE BEAM ASSEMBLY IS FURTHER IDENTIFIED AS NSN 8115-00-165-6623 (FORMERLY FSN 8115-165-6623).
- E. ALTHOUGH A TOTAL OF ONE AND ONE-HALF INCHES (1-1/2") OF UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS PERMITTED, LATERAL VOIDS WITHIN THE LOAD ARE TO BE HELD TO THE MINIMUM. EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BAY BY LAMINATING ADDITIONAL BEARING PIECES OF APPROPRIATE THICKNESS TO THE BEARING PIECES OF ONE OR MORE SIDE FILL GATES ON ONE OR BOTH SIDES OF THE CONTAINER. FIVE (5) NAILS OF APPROPRIATE SIZE WILL BE USED TO LAMINATE EACH ADDED BEARING PIECE.
- F. DUNNAGE LUMBER SPECIFIED IS OF A NOMINAL SIZE. FOR EXAMPLE, 1" X 6" MATERIAL IS ACTUALLY 3/4" THICK BY 5-1/2" WIDE AND 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.
- G. **CAUTION:** DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- H. A STAGGERED NAILING PATTERN WILL BE USED WHEREVER 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.
- J. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS ONE OF THE SIDE WALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- K. **CAUTION:** TWIN-PACK UNITS MUST BE LOADED IN A MILVAN WITH THE SAME END FORWARD TO INSURE PROPER OVERLAPPING OF THE STEEL ANGLES WELDED TO THE SIDES OF THE CNU-309/E OR CNU-332/E CONTAINER. ALSO, WHEN LOADING THE SECOND AND THIRD TWIN-PACK UNITS INTO A LOAD BAY, THE SECOND AND THIRD UNITS MUST BE SLID INTO PLACE SO THAT THE STEEL ANGLES WILL OVERLAP PROPERLY AND NOT IMPROPERLY INTERLOCK. BOTH CNU-309/E AND CNU-332/E CONTAINERS MAY BE SHIPPED IN THE SAME MILVAN CONTAINER LOAD BUT NOT IN THE SAME LOAD BAY UNLESS AN ADDITIONAL FILLER PIECE IS WIRE TIED TO THE CROSS MEMBER TO COMPENSATE FOR THE SHORTER LENGTH OF THE CNU-332/E CONTAINER. SEE THE "FILL DETAIL" ON PAGE 5 FOR ADDITIONAL GUIDANCE.

(CONTINUED AT RIGHT)

## MATERIAL SPECIFICATIONS

LUMBER	TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-4-751.
NAILS	FED SPEC FF-N-105; COMMON.
STAPLE, STRAP	COMMERCIAL GRADE.
WIRE	FED SPEC QQ-W-461.

## (GENERAL NOTES CONTINUED)

- L. THE ITEMIZED LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPACITY FACTORS. ALSO, THESE LISTED LOAD WEIGHTS IDENTIFY THE MAXIMUM COMBINED WEIGHTS OF AMMUNITION LADING UNITS AND DUNNAGE THAT CAN BE PLACED INTO ONE (1) 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 LOAD IS DELINEATED ON PAGES 4 AND 5, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOAD CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. ADDITIONAL INSTRUCTIONS ARE UNDER THE "REDUCED-LOAD PROVISIONS" SECTION ON PAGE 4.

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.

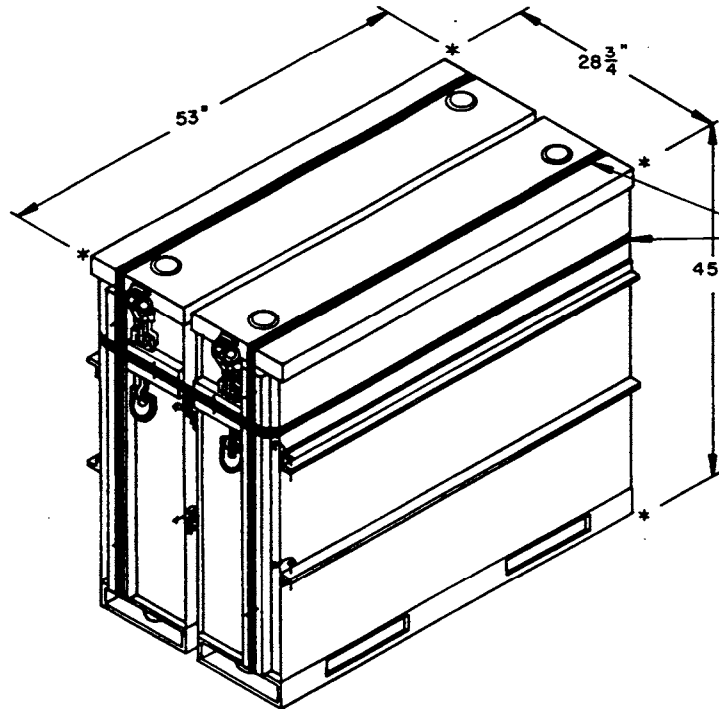
## M. SPECIAL T/COFC NOTES:

- A. **CAUTION:** LOADED CONTAINERS MUST BE ON CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE, REGARDLESS OF LOAD WEIGHT WITHIN THE CONTAINERS.
- B. 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.
- C. CHASSIS/CONTAINERS COUPLED INTO A 40-FT TRAILER CONFIGURATION MUST BE PLACED AT THE B-END OF A TOFC RAIL CAR. THE REAR END OF THE 40-FT UNIT WILL OVER-HANG 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. TO READY A TWIN-PACK UNIT FOR SHIPMENT, TWO CNU-309/E CONTAINERS MUST BE PINNED AND STRAPPED TOGETHER WITH THE WOODEN DUNNAGE PROPERLY PLACED BEHIND THE STRAPS AS DEPICTED IN THE "TWIN-PACK UNIT" DETAIL ON PAGE 3; TWO CNU-332/E CONTAINERS MUST ONLY BE PROPERLY PINNED TOGETHER AS DEPICTED ON PAGE 3.
- 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 0.454KG.
- P. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED LOADS SHOWN THROUGHOUT THIS DRAWING. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2-1/2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH FEDERAL SPECIFICATION FF-N-105 AS NEARLY AS PRACTICABLE. STAPLES WHICH ARE LONGER THAN 2-1/2" WILL BE A COMMERCIAL GRADE, OR A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY SENCO PRODUCTS INCORPORATED. **NOTE:** STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD RESTRAINING FLOOR DUNNAGE APPLICATION.

## REVISION

REVISION NO. 1, DATED FEBRUARY 1988, CONSISTS OF:

1. ADDING THE CNU-332/E TWIN-PACK UNIT TO THE DEPICTED PROCEDURES.
2. UPDATING GENERAL NOTES.

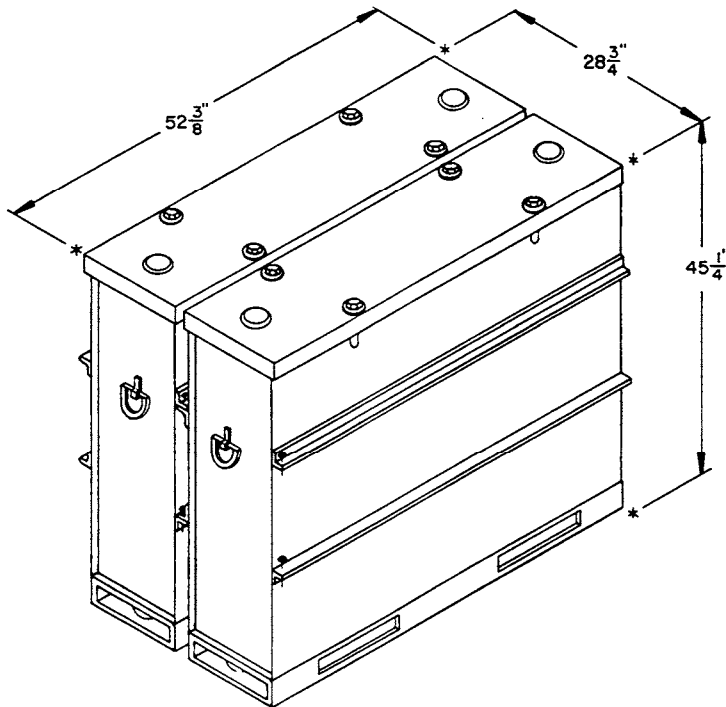


INDICATES UNITIZING STRAPS. SEE  
GENERAL NOTE "N" ON PAGE 2.

**TWIN-PACK UNIT ( CNU-309/E CONTAINER )**

**TWIN-PACK UNIT DATA:**

NUMBER OF CONTAINERS	-----	TWO ( 2 )
GROSS WEIGHT	-----	2,350 LBS ( APPROX )
CUBE	-----	39.9 CUBIC FEET

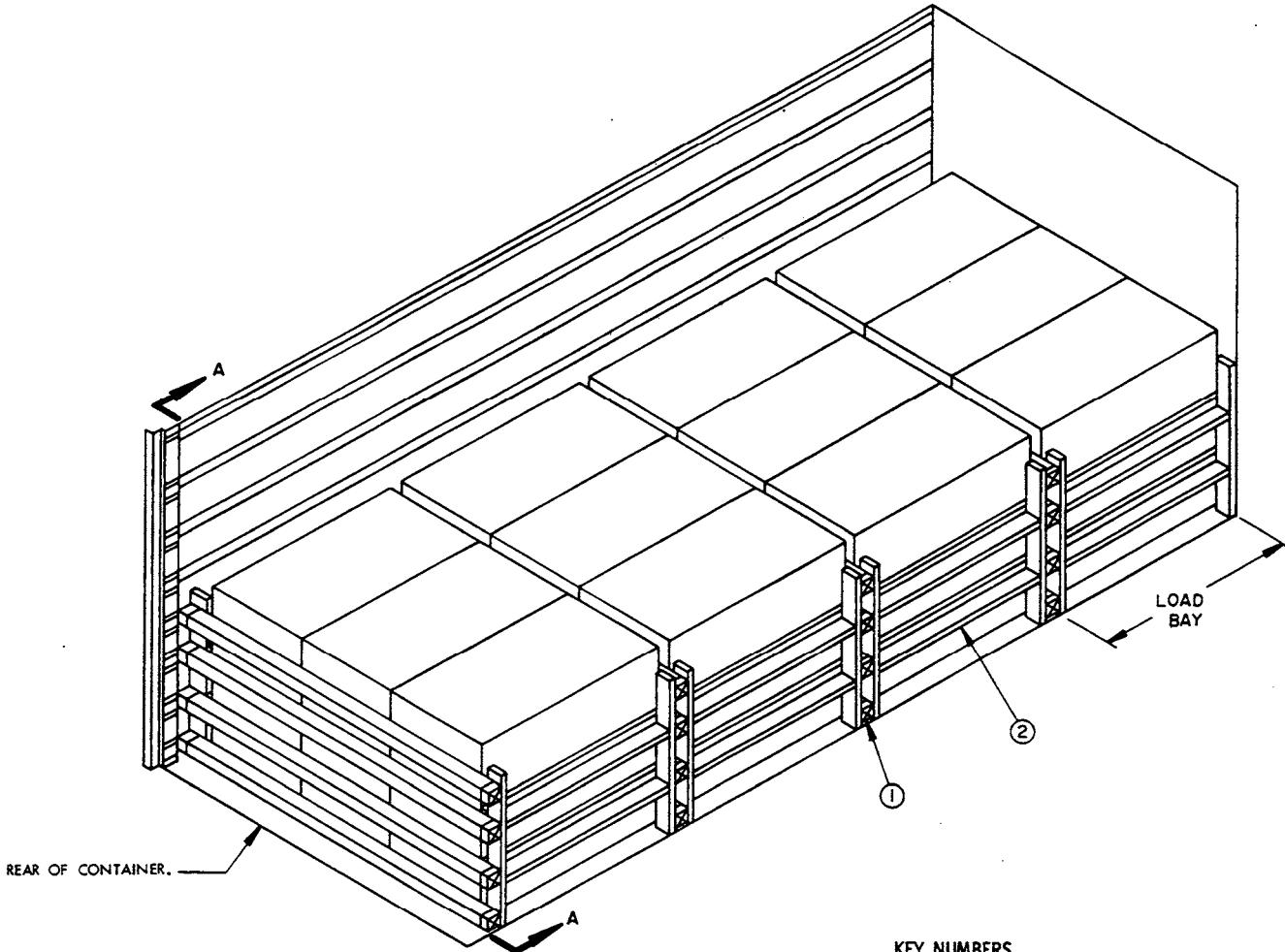


**TWIN-PACK UNIT ( CNU-332/E CONTAINER )**

**TWIN-PACK UNIT DATA:**

NUMBER OF CONTAINERS	-----	TWO ( 2 )
GROSS WEIGHT	-----	2,350 LBS ( APPROX )
CUBE	-----	39.4 CUBIC FEET

**TWIN-PACK UNIT DETAILS**



ISOMETRIC VIEW

**KEY NUMBERS**

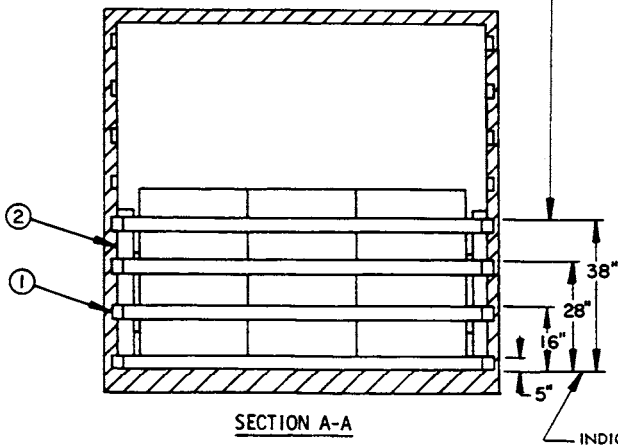
- ① CROSS MEMBER (16 REQD). POSITION AT THE HEIGHTS SPECIFIED IN THE "SECTION A-A" VIEW. SEE THE "FILL DETAIL" ON PAGE 5.
- ② SIDE FILL GATE ( 8 REQD ). SEE THE "SIDE FILL GATE" DETAIL ON PAGE 6. WIRE TIE TO A BELT RAIL W/2-24" LONG NO. 14 GAGE WIRES. INSTALL TWO TIE WIRES TO FORM A COMPLETE LOOP THRU HOLES IN BELT RAIL AND AROUND EACH SIDE FILL GATE, BRING ENDS TOGETHER AND TWIST TAUT.

INDICATES THE TOP SURFACE OF A CROSS MEMBER. PLUS OR MINUS 2" IS PERMITTED.

**REDUCED LOAD PROVISIONS**

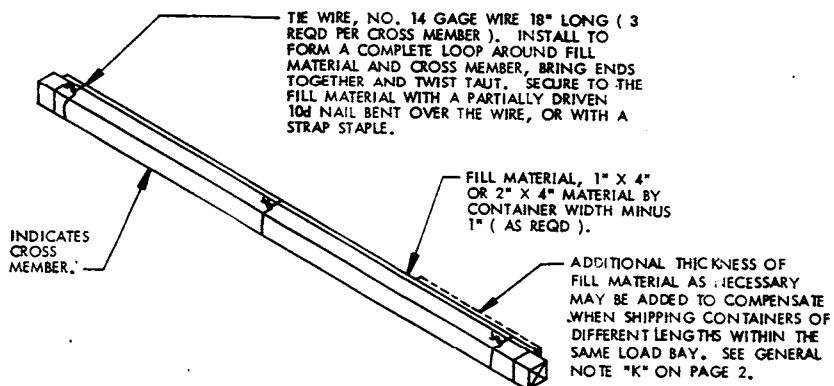
WHEN A CONTAINER IS TO BE LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF A LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MIDPOINT IN A MILVAN, AND THE FOLLOWING CRITERIA WILL APPLY.

- A. IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT, LADING UNITS NORMALLY MAY BE ELIMINATED FROM THE REAR OF THE LOAD.
- B. IF A LOAD IS REDUCED BY A LARGE AMOUNT, LADING UNITS SHOULD BE ELIMINATED FROM LOCATIONS WITHIN THE LOAD OR LADING UNITS SHOULD BE ELIMINATED AS REQUIRED AND THE TOTAL LOAD SHIFTED AS NECESSARY FORE OR AFT, 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.



SECTION A-A

INDICATES CONTAINER FLOOR.



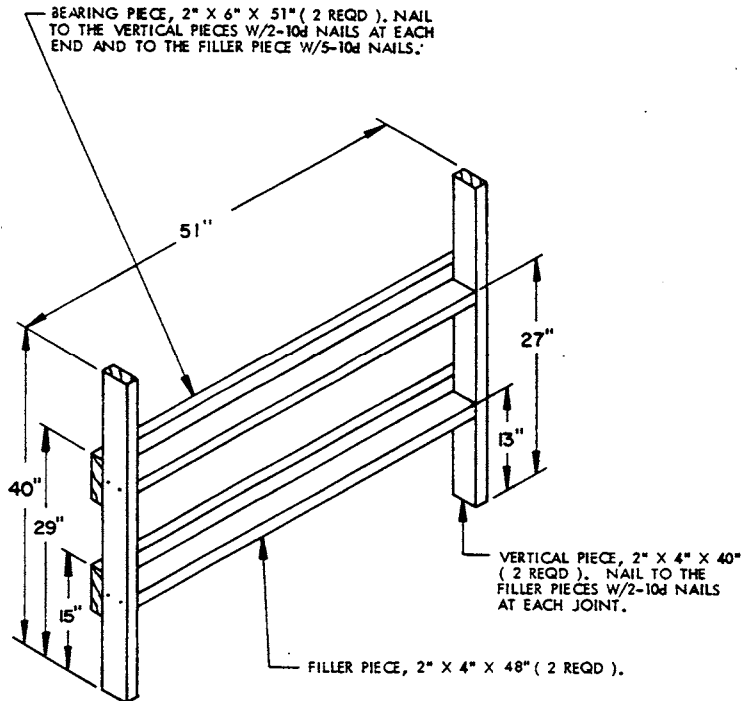
**FILL DETAIL**

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

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	117	78
2" X 6"	68	68
NAILS	NO. REQD	POUNDS
10d ( 3" )	208	3-1/4
WIRE, NO. 14 GAGE	32' REQD	1 2 LB
CROSS MEMBERS		16 REQD

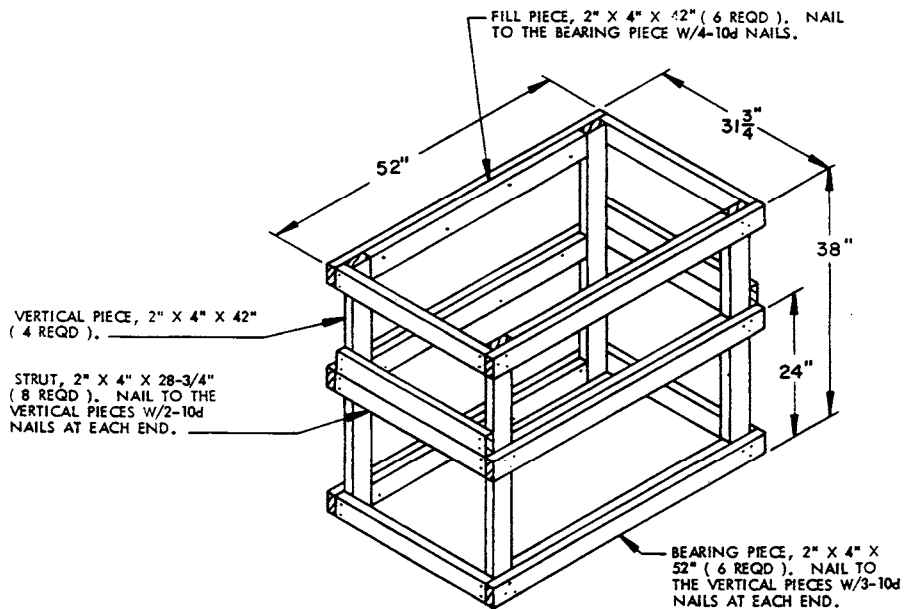
**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT ( APPROX )
TWIN-PACK UNIT	12	28,200 LBS
DUNNAGE		296 LBS
CONTAINER		5,700 LBS
TOTAL GROSS WEIGHT		34,196 LBS



**SIDE FILL GATE**

THE ASSEMBLY AS DEPICTED ABOVE MAY BE MODIFIED, WHEN EITHER THE INSIDE WIDTH DIMENSION OF THE MILVAN BEING USED IS LESS THAN THE WIDTH AS SPECIFIED IN GENERAL NOTE "C" ON PAGE 2 OR THE TWIN-PACK UNIT WIDTH IS GREATER THAN THAT SPECIFIED BY USING 1" X 6" MATERIAL FOR THE BEARING PIECES ON ONE OR BOTH SIDES OF THE MILVAN IN LIEU OF THE 2" X 6" MATERIAL, AS SPECIFIED. IN ADDITION, 6d NAILS WILL BE USED FOR NAILING THE 1" X 6" BEARING PIECES TO THE VERTICAL AND FILLER PIECES RATHER THAN THE 10d NAILS SPECIFIED ABOVE.



**OMITTED-UNIT ASSEMBLY**

THE ASSEMBLY AS SPECIFIED ABOVE IS FOR USE IN PLACE OF AN OMITTED TWIN-PACK UNIT, AND WILL BE REQUIRED FOR SOME LOADS TO PROVIDE A 3-WIDE LOADING PATTERN THROUGHOUT THE LENGTH OF THE LOAD. IT WILL NEVER BE REQUIRED TO USE MORE THAN TWO ( 2 ) ASSEMBLIES IN ANY ONE LOAD. CAUTION: AN ASSEMBLY OR ASSEMBLIES MUST ONLY BE PLACED WITHIN THE MIDDLE ROW OF A LOAD.