

APPROVED BY
BUREAU OF EXPLOSIVES

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DATE 5/13/94

LOADING AND BRACING WITH WOODEN DUNNAGE ON FLATRACK ISO CONTAINERS 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.

U.S. ARMY MATERIEL COMMAND DRAWING			
APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND <i>John E. Harkins</i>	DRAFTSMAN	TECHNICIAN	ENGINEER L. FIEFFER
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APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND <i>John L. Byrd Jr.</i>	DECEMBER 1993		
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL	CLASS	DIVISION	DRAWING
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			FILE SP15J34

DO NOT SCALE

GENERAL NOTES

(GENERAL NOTES CONTINUED)

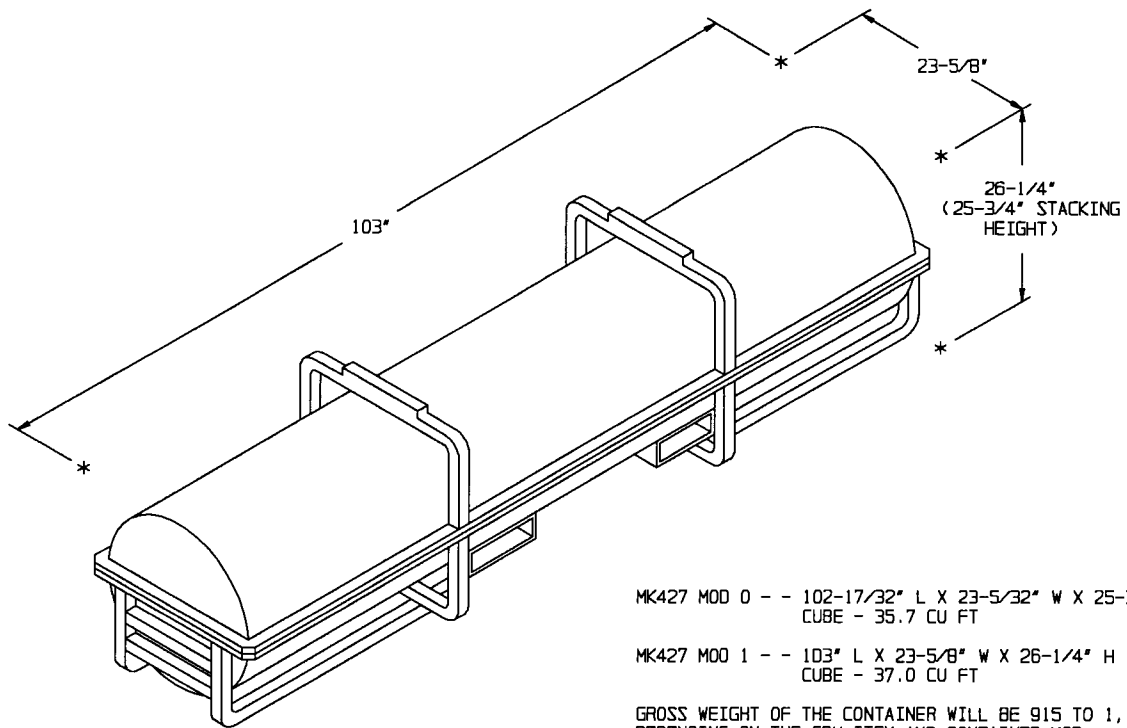
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. ALL LOADS SHIPPED BY THE PROCEDURES DEPICTED IN THIS DRAWING MUST BE IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN TITLE 49, THE UNITED STATES CODE OF FEDERAL REGULATIONS; AR 55-355/AFM 75-2; OOD 4500.32-R; DOD 5100.76-M; DOD 6055.9-STO; AS WELL AS ANY AND ALL OTHER APPLICABLE SERVICE REGULATIONS.
- C. THE SPECIFIED OUTLOADING PROCEDURES 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 (ROCKEY II)
 CBU-7B/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 CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE FLATRACK ISO CONTAINER MUST NOT BE EXCEEDED.
- D. THE LOAD AS SHOWN IS BASED ON A 20'-0" LONG BY 8'-0" WIDE FLATRACK ISO CONTAINER WITH FULL HEIGHT ENDWALLS, AND INSIDE DIMENSIONS OF 19'-4" LONG BY 7'-2" WIDE. THE LOAD AS SHOWN CAN BE SHIPPED BY ANY FORM OF SURFACE TRANSPORTATION. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN ALSO BE USED.
- E. WHEN LOADING THE MK427 CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD BETWEEN THE END BLOCKING ASSEMBLY AND THE LADING. ALTHOUGH A TOTAL OF ONE INCH OF UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD IS PERMITTED, LONGITUDINAL VOIDS WITHIN THE LOAD ARE TO BE HELD TO A MINIMUM, NOT EXCEEDING ONE-HALF INCH (1/2"). EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE HORIZONTAL PIECES ON THE CENTER GATE. NAIL EACH ADDITIONAL PIECE TO THE HORIZONTAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND QUANTITY OF THE VERTICAL PIECES IN THE CENTER GATE MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE LENGTH OF THE CONTAINER.
- 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. PORTIONS OF ONE OF THE FLATRACK ENDWALLS DEPICTED WITHIN THIS DRAWING HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.
- J. WHEN INSTALLING BLOCKING ASSEMBLIES, THE ASSEMBLIES MUST BE POSITIONED SO AS TO BE SUPPORTED AND IN LINE WITH THE STRONG POINTS OF THE FLATRACK ENDWALLS.
- K. WHEN STEEL STRAPPING IS SEALED IN AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER WITH TWO PAIR OF CRIMPS PER SEAL, WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 7 FOR GUIDANCE.
- L. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:
 - 1. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
 - 2. THE LOAD LIMIT OF A T/COFC RAILCAR 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.

(CONTINUED AT RIGHT)

- M. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLAT BED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.
- N. THE 2" STRAPPING USED FOR LOAD SECUREMENT, I.E., HOLD-DOWN STRAPS, WILL ONLY BE FASTENED TO THE FLATRACK CONTAINER BY UTILIZING TIEDOWN PROVISIONS LOCATED ON THE TOP OR ALONG THE SIDE OF THE FLATRACK BOTTOM SIDE RAILS. CAUTION: THE LOAD SECUREMENT STRAPS WILL NOT BE POSITIONED AROUND THE UNDERSIDE OR THROUGH THE FORKLIFT POCKETS OF THE FLATRACK CONTAINER. ADDITIONALLY, THE FLATRACK TIEDOWN PROVISIONS MUST BE AT LEAST AS STRONG AS THE 2" LOAD SECUREMENT STRAPPING BEING USED; AND BE OF A SUFFICIENT WIDTH TO RECEIVE THE 2" STRAPPING AND BE OF A DESIGN WHICH WILL PROVIDE A BEARING SURFACE ACROSS THE FULL WIDTH OF THE 2" STRAPPING SO THAT THE STRAPPING WILL NOT BE DEFORMED, ESPECIALLY AT ITS EDGES, WHEN PROPERLY TENSIONED.
- O. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE DEPICTED CONTAINERS WHEN THEY ARE LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEMS DESIGNATED IN GENERAL NOTE "C" AT LEFT.
- P. REFER TO ASSOCIATION OF AMERICAN RAILROADS MANUAL "GENERAL RULES GOVERNING THE LOADING OF COMMODITIES ON OPEN TOP CARS" FOR APPLICABLE LOADING RULES AS FOLLOWS: PREFACE, 1A, 2, 5, 10, AND 15. NOTE THAT ALL STRAPPING USED FOR LOAD SECUREMENT, I.E., HOLD-DOWN STRAPS, MUST BE MARKED AS SPECIFIED IN LOADING RULE 15.
- Q. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN CONTAINERS AND BETWEEN CONTAINERS AND STEEL STRAPPING, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT.
- R. 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.
- S. THE CONTAINERS IN THE LOWER TWO LAYERS OF THE LOAD DEPICTED ON PAGE 4 MUST BE UNITIZED PRIOR TO LOADING. FOR UNITIZATION PROCEDURES, SEE NAVAL WEAPONS HANDLING LABORATORY DRAWINGS WR-54/140 OR WR-54/215 FOR MOD 0 CONTAINERS AND WR-54/266 OR WR-54/286 FOR MOD 1 CONTAINERS.

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.
- STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
- ANTI-CHAFING MATERIAL - - - - - : MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.



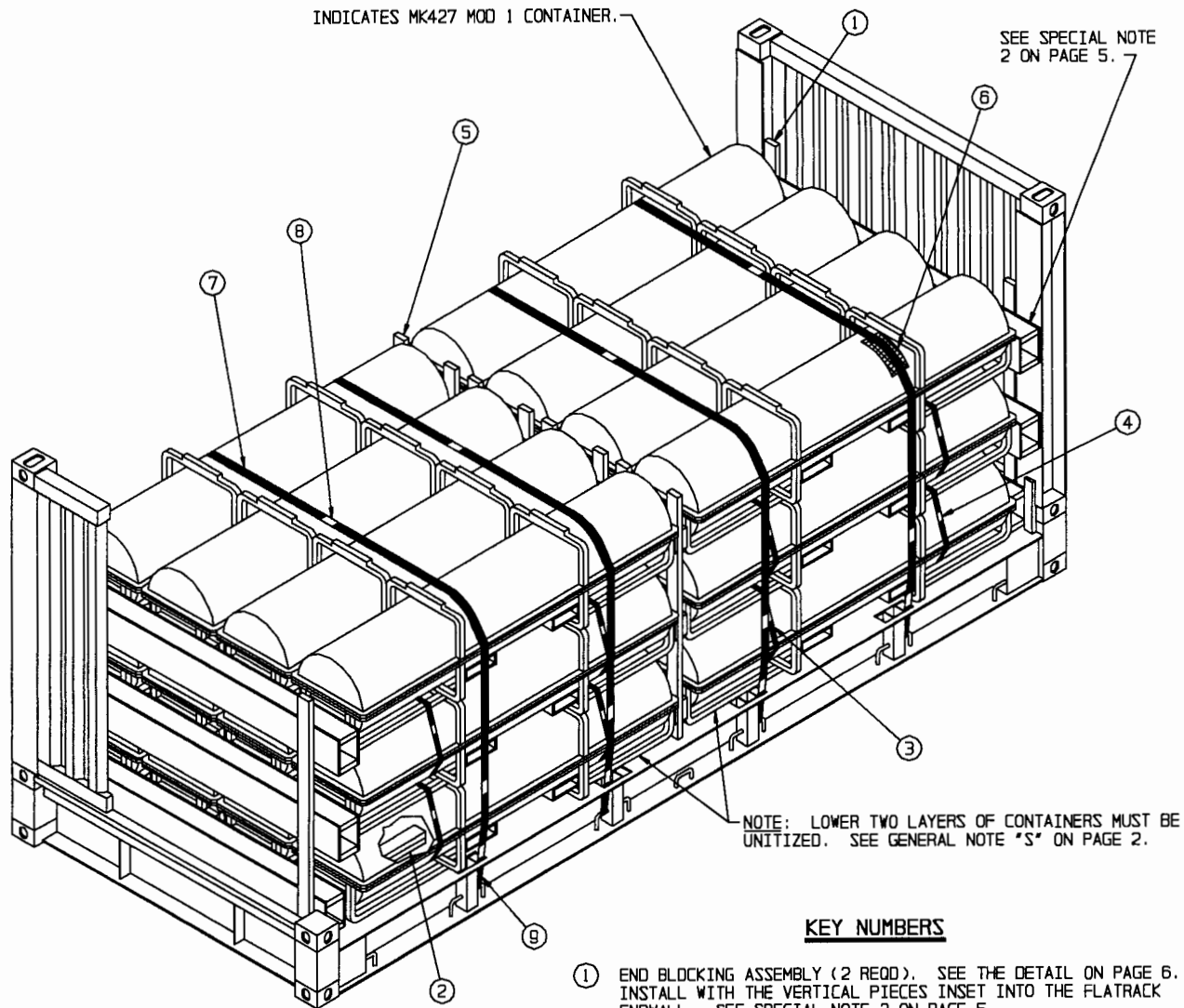
MK427 MOD 0 -- 102-17/32" L X 23-5/32" W X 25-31/32" H
 CUBE - 35.7 CU FT

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)



INDICATES MK427 MOD 1 CONTAINER.

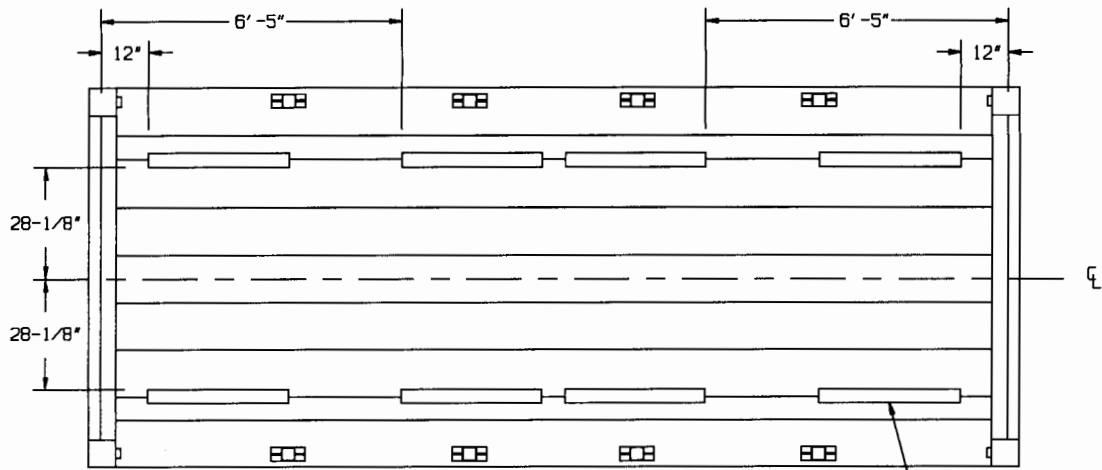
SEE SPECIAL NOTE 2 ON PAGE 5.

NOTE: LOWER TWO LAYERS OF CONTAINERS MUST BE UNITIZED. SEE GENERAL NOTE "S" ON PAGE 2.

ISOMETRIC VIEW

KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 6. INSTALL WITH THE VERTICAL PIECES INSET INTO THE FLATRACK ENDWALL. SEE SPECIAL NOTE 2 ON PAGE 5.
- ② SIDE BLOCKING, 2" X 4" X 36" (DOUBLED) (8 REOD). PRE-POSITION AS SHOWN IN THE PLAN VIEW ON PAGE 5. NAIL THE FIRST PIECE TO THE FLATRACK FLOOR W/4-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST PIECE W/4-10d NAILS.
- ③ UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (REF: 21'-3") (8 REOD). INSTALL TO ENCIRCLE THE SKIDS OF AN UPPER LAYER OF CONTAINERS AND THE CONTAINERS IMMEDIATELY BELOW.
- ④ SEAL FOR 1-1/4" STRAPPING (8 REOD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ⑤ CENTER GATE (1 REOD). SEE THE DETAIL ON PAGE 6.
- ⑥ ANTI-CHAFING MATERIAL (AS REQD). POSITION UNDER STRAPS AT ALL POINTS OF CONTACT WITH THE CONTAINERS.
- ⑦ HOLD-DOWN STRAP, 2" X .044" OR .050" BY A LENGTH TO SUIT (REF: 24'-0") (4 REOD). INSTALL EACH STRAP FROM TWO 12'-0" LONG PIECES.
- ⑧ SEAL FOR 2" STRAPPING (20 REOD). FASTEN PIECE MARKED ⑧ WITH ONE SEAL AT EACH LOCATION CRIMPED WITH TWO PAIR OF NOTCHES. FASTEN PIECE MARKED ⑨ WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "TIEDOWN DETAIL" ON PAGE 7.
- ⑨ PAD, STRAPPING, 2" X .044" OR .050" X 18" (8 REOD). PRE-POSITION THE PAD BETWEEN THE HOLD-DOWN STRAP, PIECE MARKED ⑦, AND THE FLATRACK TIEDOWN PROVISIONS. FASTEN WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "TIEDOWN DETAIL" ON PAGE 7.



PRE-POSITIONED DUNNAGE PLAN VIEW

(THE KEY NUMBER REFERS TO THE KEY NUMBERS ON PAGE 4)

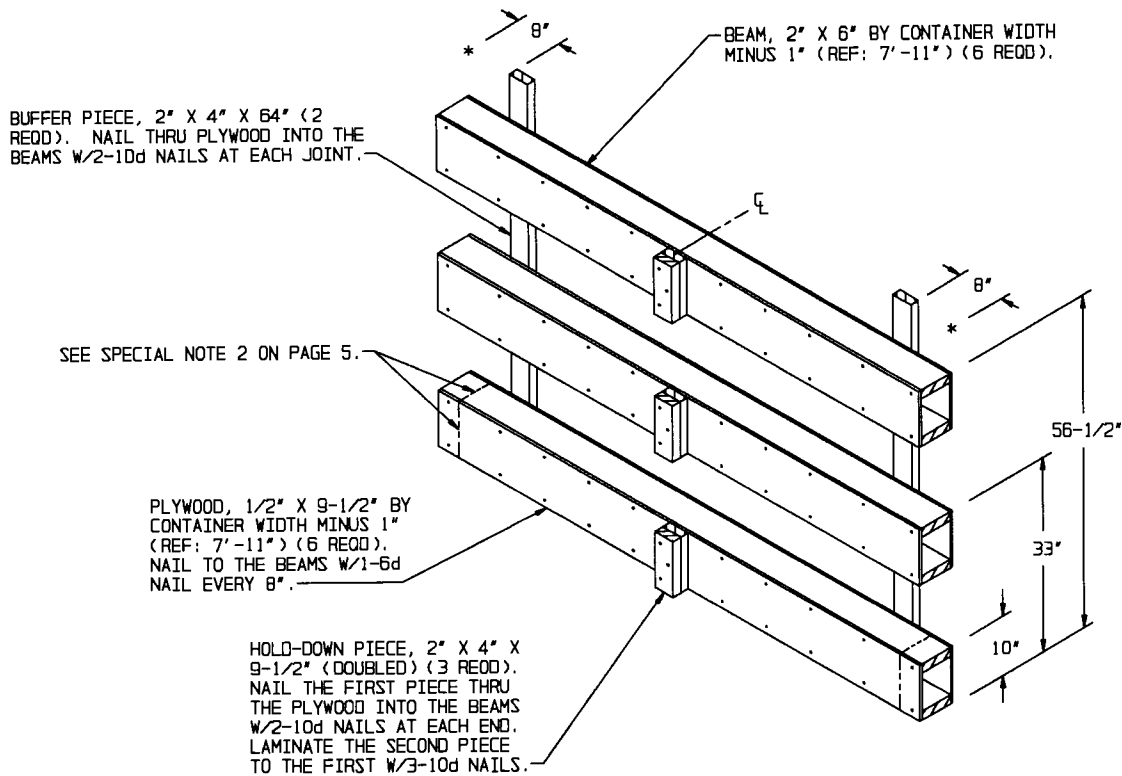
SPECIAL NOTES:

1. THE LOAD AS SHOWN ON PAGE 4 DEPICTS MK427 MOD 1 CONTAINERS. THE DEPICTED PROCEDURES MAY ALSO BE USED FOR LOADING MK427 MOD 0 CONTAINERS. WHEN LOADING MOD 0 CONTAINERS CHANGE THE TWO 28-1/8" DIMENSIONS SHOWN ABOVE TO 27-3/8".
2. THE LENGTH OF THE BOTTOM BOX BEAM ASSEMBLY IN THE END BLOCKING ASSEMBLY MUST BE DECREASED IN ORDER TO AVOID CONTACT WITH THE FLATRACK HINGE. THE BOX BEAM ASSEMBLIES, HOWEVER, MUST STILL BEAR AGAINST THE FLATRACK STRONG POINTS.
3. THE LOAD AS SHOWN MAY BE REDUCED BY ONE OR TWO LAYERS, IF DESIRED, FOR A SHIPMENT OF 16 OR 8 CONTAINERS.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	23	12
2" X 4"	123	82
2" X 6"	118	118
NAILS	NO. REQD	POUNDS
6d (2")	312	2
10d (3")	202	3-1/4
PLYWOOD, 1/2"	75.21 SQ FT	REQD - 103.42 LBS
STEEL STRAPPING, 1-1/4"	170'	REQD - 25 LBS
SEAL FOR 1-1/4" STRAPPING	8	REQD - NIL
STEEL STRAPPING, 2"	108'	REQD - 36 LBS
SEAL FOR 2" STRAPPING	20	REQD - 4 LBS

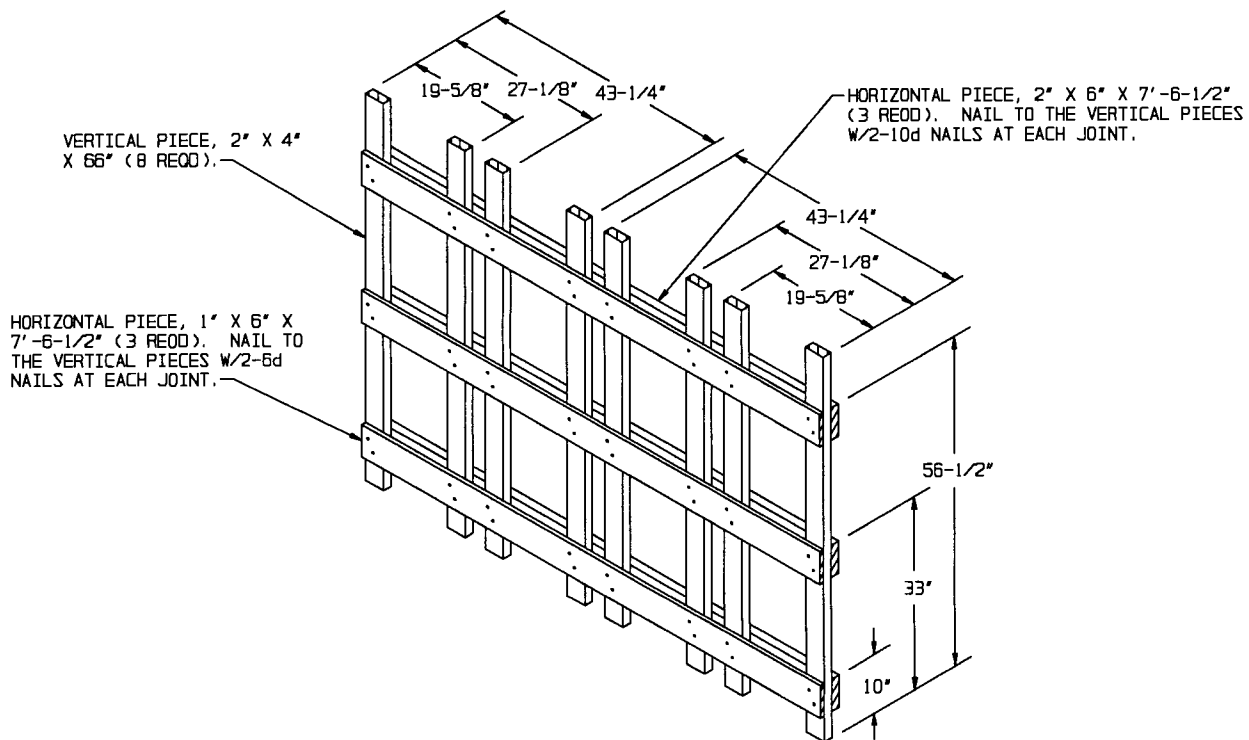
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MK427 CONTAINER	24	27,432 LBS
DUNNAGE		598 LBS
CONTAINER		5,700 LBS
TOTAL WEIGHT		33,802 LBS (APPROX)



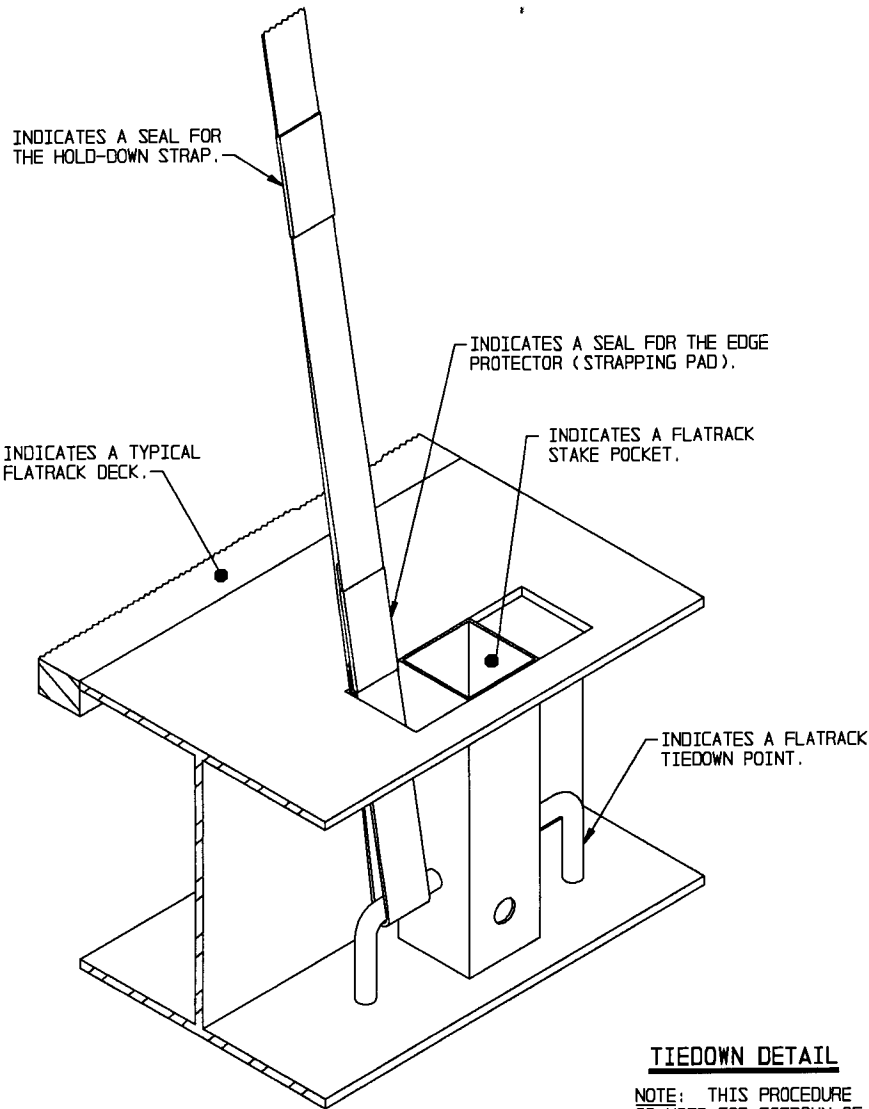
END BLOCKING ASSEMBLY

NOTE: FOR TWO HIGH LOAD, ELIMINATE THE TOP BOX BEAM ASSEMBLY, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO BOX BEAM ASSEMBLIES. SHORTEN BUFFER PIECES APPROPRIATELY.

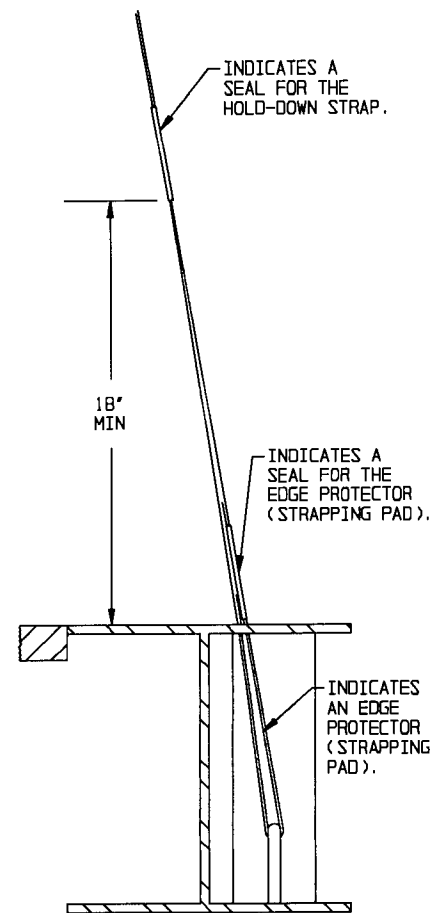


CENTER GATE

NOTE: FOR TWO HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP FOUR HORIZONTAL PIECES. SHORTEN VERTICAL PIECES APPROPRIATELY.



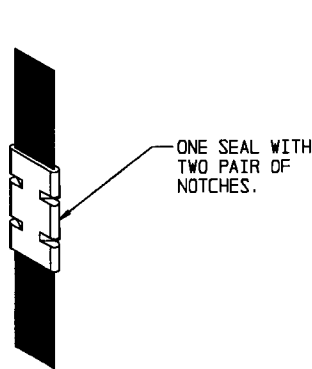
PARTIAL ISOMETRIC SECTION VIEW



PARTIAL SIDE VIEW

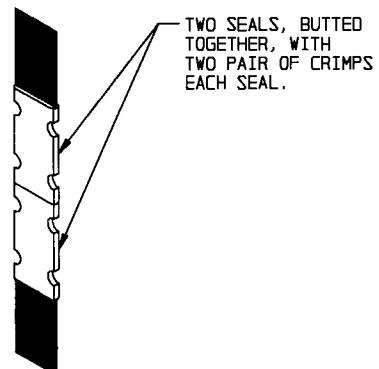
TIEDOWN DETAIL

NOTE: THIS PROCEDURE IS USED FOR TIEDOWN OF THE LOAD USING FLATRACK SIDE RAIL TIEDOWN POINTS. SEE GENERAL NOTE "N" ON PAGE 2.



STRAP JOINT A

METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.



STRAP JOINT B

METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

STRAP/SEAL DETAIL

DETAILS

