

# LOADING AND BRACING<sup>⊕</sup> ON COMMERCIAL FLATRACK ISO CONTAINERS OF HARPOON MISSILES, RGM-84, PACKED IN MK632 MOD 0 CONTAINERS

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⊕ THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO  
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WATER CARRIERS.

## U.S. ARMY MATERIEL COMMAND DRAWING

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## 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. 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; DOD 4500.32-R; DOD 5100.76-M; DOD 6055.9-STD; AS WELL AS ANY AND ALL OTHER APPLICABLE SERVICE REGULATIONS.
- C. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF HARPOON MISSILES PACKED IN MK632 MOD 0 CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS CONTAINER WITH MISSILE INSTALLED. SEE PAGE 3 AND NAVAL SEA SYSTEMS COMMAND DRAWING DL5165989 FOR DETAILS OF THE CONTAINER. **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 5,700 POUND 20' LONG BY 8' WIDE FLATRACK ISO CONTAINER WITH FULL HEIGHT ENDWALLS, AND INSIDE DIMENSIONS OF 19'-4" LONG BY 7'-2" WIDE. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT, HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. **NOTICE:** OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.
- E. WHEN LOADING 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 1" 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 1/2". EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY ENSURING THAT THE STRUTS ARE MEASURED FOR A TIGHT (DRIVE) FIT.
- 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. WHEN INSTALLING END BLOCKING ASSEMBLIES AND ENDWALL GATES, THE ASSEMBLIES MUST BE POSITIONED SO AS TO BE SUPPORTED AND IN LINE WITH THE STRONG POINTS OF THE FLATRACK ENDWALLS. **NOTE:** SOME FLATRACK ENDWALLS WILL REQUIRE FILL PIECES TO BE INSTALLED ON THE ENDWALL GATES TO PROVIDE A UNIFORM LOAD BEARING SURFACE. NAIL THESE FILL PIECES TO THE ENDWALL GATES W/1 APPROPRIATELY SIZED NAIL EVERY SIX INCHES. THESE PIECES ARE NOT REQUIRED IF THE ENDWALL IS SMOOTH (IF THE HINGES DO NOT PROTRUDE).
- J. 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 8 FOR GUIDANCE.
- K. 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.
- L. 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, 1, 2, 3, 5, 7, 10, 12, 13, 14, AND 15. NOTE THAT ALL STRAPPING USED FOR LOAD SECUREMENT, I.E., HOLD-DOWN STRAPS, MUST BE MARKED AS SPECIFIED IN LOADING RULE 15.
- M. WHETHER A CONTAINER IS FULL OR IS 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 CONTAINER.

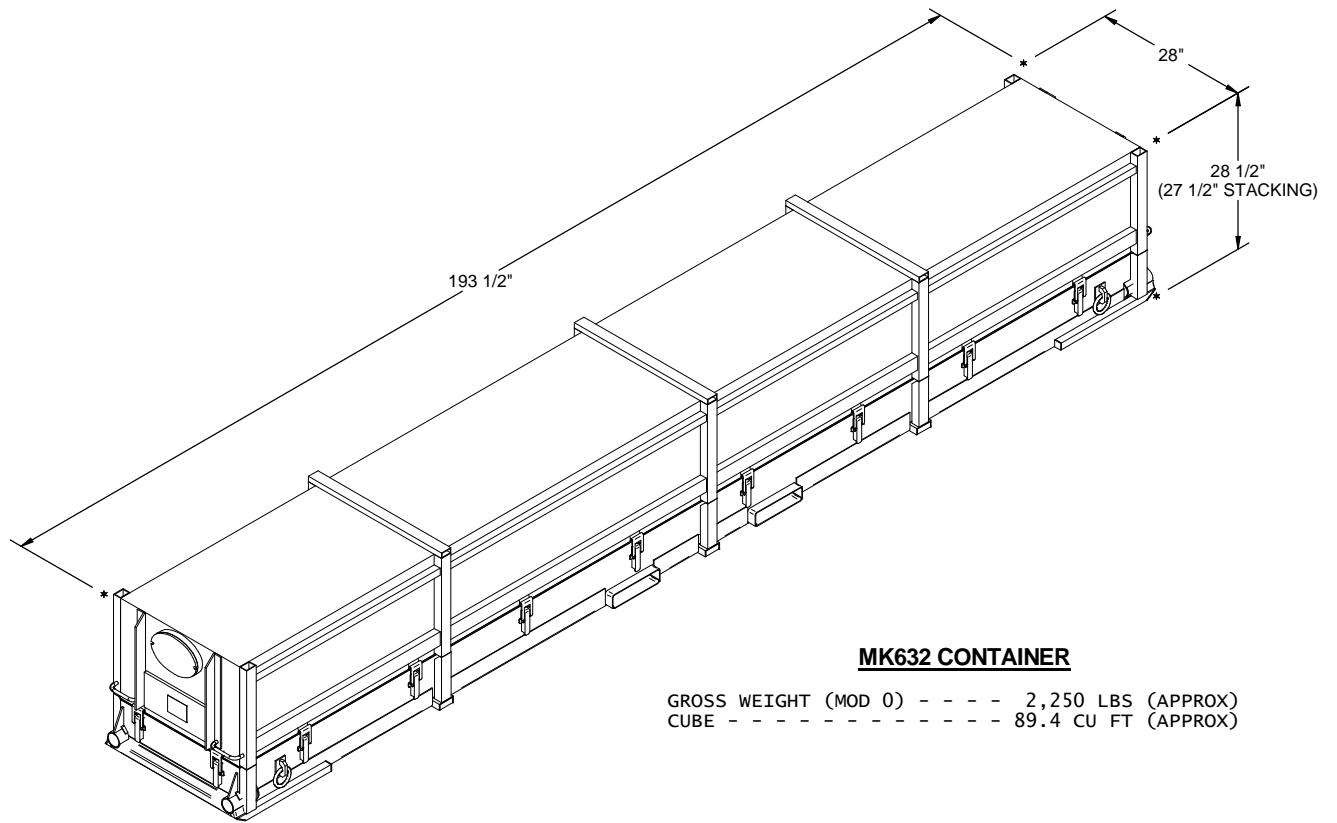
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## (GENERAL NOTES CONTINUED)

- N. PORTIONS OF THE FLATRACK DEPICTED WITHIN THIS DRAWING, SUCH AS THE ENDWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- O. **MAXIMUM LOAD WEIGHT CRITERIA:**  
THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOAD IS DELINEATED IN THE LOAD VIEW, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOAD 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.
- P. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE 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.
- Q. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.
- R. THE LOAD AS SHOWN ON PAGE 4 MAY BE REDUCED BY ONE LAYER FOR A SHIPMENT OF THREE CONTAINERS, IF DESIRED.
- S. 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 AND MARKINGS.
- T. 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.
- U. RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD ON PAGE 4:  
1. PREFABRICATE TWO ENDWALL GATES, TWO END BLOCKING ASSEMBLIES, AND TWO STRAPPING BOARD ASSEMBLIES. ONE ENDWALL GATE WILL HAVE ADDITIONAL HORIZONTAL PIECES (KEY NUMBER 5).  
2. INSTALL THE TWO ENDWALL GATES, STRAPPED TO ENDWALLS, AND INSTALL ONE END BLOCKING ASSEMBLY TO THE ENDWALL GATE WITH THE ADDED HORIZONTAL PIECE W/2-12d NAILS AT EACH JOINT.  
3. INSTALL THREE UNITIZED STACKS OF CONTAINERS.  
4. INSTALL SECOND END BLOCKING ASSEMBLY.  
5. INSTALL CUT-TO-FIT STRUTS.  
6. INSTALL EIGHT STAKES AND TWO SIDE BLOCKING PIECES.  
7. INSTALL FOUR STRAPPING BOARD ASSEMBLIES AND FOUR HOLD-DOWN STRAPS AND PADS.

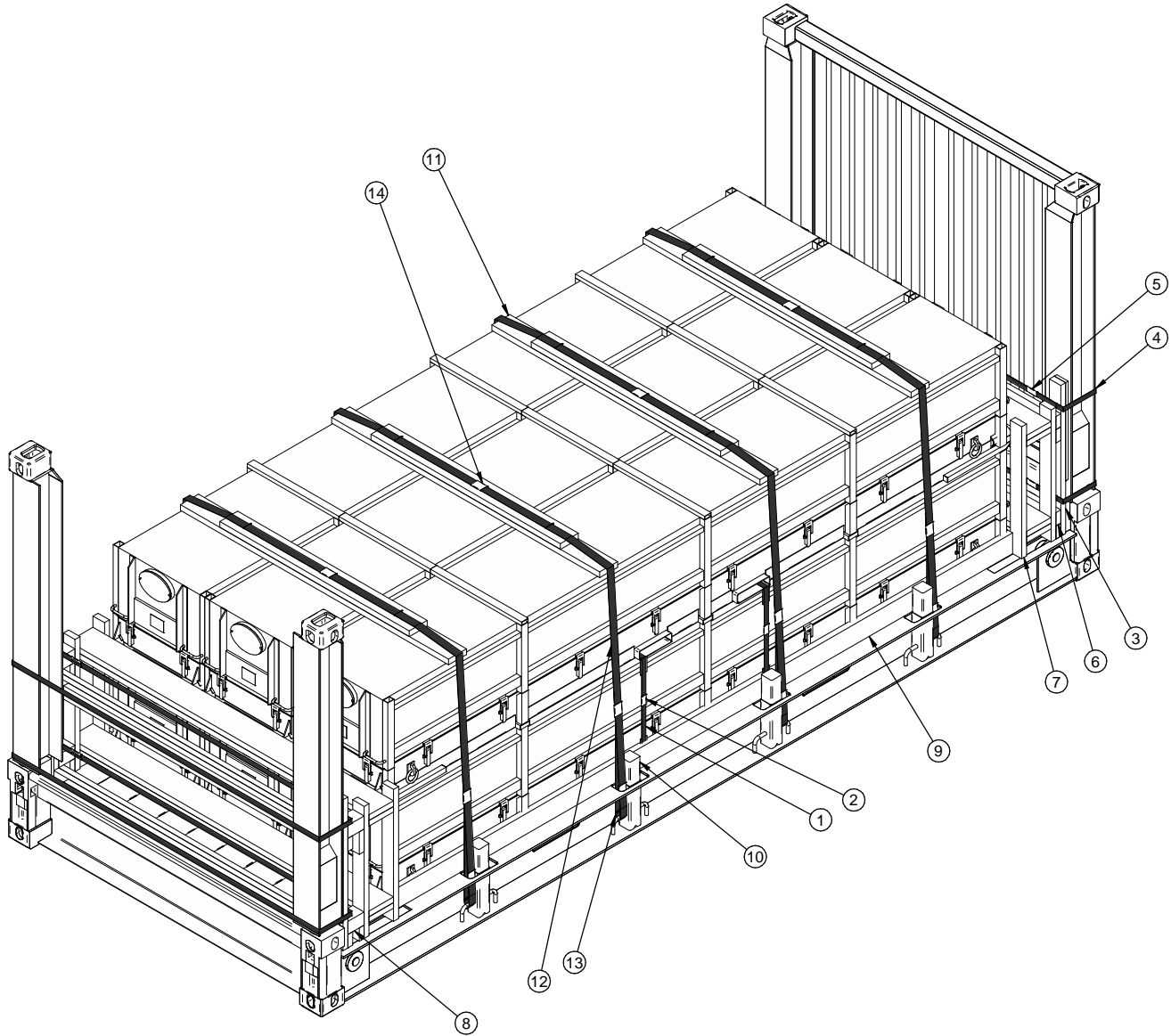
## MATERIAL SPECIFICATIONS

- LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMS).
- 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.
- STAPLE, STRAP** - - - : COMMERCIAL GRADE.
- ANTI-CHAFING MATERIAL** - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.



**MK632 CONTAINER**

GROSS WEIGHT (MOD 0) - - - - 2,250 LBS (APPROX)  
 CUBE - - - - - 89.4 CU FT (APPROX)



**ISOMETRIC VIEW**

**(KEY NUMBERS CONTINUED)**

- ⑩ STAKE, 4" X 4" X 18" (8 REQD). INSTALL THE STAKE INTO THE FLATRACK STAKE POCKET WITH A TIGHT (SNUG) FIT. NOTE: REFERENCE DIMENSIONS FOR A TIGHT FITTING STAKE ARE 3-1/4" (ACTUAL) X 3-1/4" (ACTUAL). NAIL 1-20d NAIL THROUGH THE HOLE PROVIDED IN THE FACE OF THE FLATRACK STAKE POCKET AND INTO THE STAKE. BEND THE PROTRUDING HEAD OF THE NAIL OVER AND AGAINST THE STAKE POCKET.
- ⑪ STRAPPING BOARD ASSEMBLY (4 REQD). SEE DETAIL ON PAGE 7.
- ⑫ HOLD-DOWN STRAP, 2" X .050" OR .044" X 22'-0" LONG STEEL STRAPPING (4 REQD). INSTALL EACH STRAP FROM TWO PIECES, EACH 11'-0" LONG. FASTEN TO TIEDOWN PROVISION ON THE SIDE OF THE FLATRACK AND BRING UP TO THE TOP OF THE LOAD WHERE THEY CAN BE TENSIONED AND SEALED. STAPLE TO STRAPPING BOARD W/2 STAPLES EACH.
- ⑬ PAD, STRAPPING 2" X .050" OR .044" X 18" (8 REQD). PRE-POSITION THE PAD BETWEEN THE HOLD-DOWN STRAP AND THE FLATRACK TIEDOWN PROVISIONS. SEE THE "TIEDOWN DETAIL" ON PAGE 8.
- ⑭ SEAL FOR 2" STRAPPING (20 REQD, 5 PER STRAP). FASTEN 2" HOLD DOWN STRAP WITH ONE SEAL AT EACH LOCATION CRIMPED WITH TWO PAIR OF NOTCHES. FASTEN PAD WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "TIEDOWN DETAIL" ON PAGE 8.

**KEY NUMBERS**

- ① UNITIZING STRAP, 1-1/4" X .031" OR .035" X 9'-4" (6 REQD). INSTALL STRAPPING THROUGH THE FORK POCKETS OF THE TOP AND BOTTOM CONTAINERS AS FAR APART AS POSSIBLE.
- ② SEAL FOR 1-1/4" STRAPPING (6 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ③ ENDWALL GATE (2 REQD). SEE DETAIL ON PAGE 7.
- ④ GATE STRAP, 1-1/4" X .031" OR .035" BY A LENGTH TO SUIT (REF: 20'-0") (4 REQD). INSTALL STRAPPING AROUND ENDWALL AND ENDWALL GATE AS SHOWN.
- ⑤ SEAL FOR 1-1/4" STRAPPING (4 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ⑥ HORIZONTAL PIECE, 2" X 4" X 7'-8" (2 REQD). POSITION ABOVE THE STRUT LEDGERS OF THE ENDWALL GATE AND NAIL TO THE VERTICAL PIECES OF THE ENDWALL GATE W/2-10d NAILS AT EACH END.
- ⑦ END BLOCKING ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 6. NAIL TO THE HORIZONTAL PIECES INSTALLED ON THE ENDWALL GATE W/2-12d NAILS AT EACH JOINT.
- ⑧ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 5") (4 REQD). TOENAIL TO THE VERTICAL PIECES OF THE END BLOCKING ASSEMBLY AND THE ENDWALL GATE W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 6.
- ⑨ SIDE BLOCKING, 2" X 6" X 15'-0" (2 REQD). POSITION AGAINST THE CONTAINER AS SHOWN. TOENAIL TO THE STAKES W/2-12d NAILS AT EACH JOINT. SIDE BLOCKING MAY BE INSTALLED FROM TWO 7'-6" LONG PIECES IF DESIRED.

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**SPECIAL NOTES:**

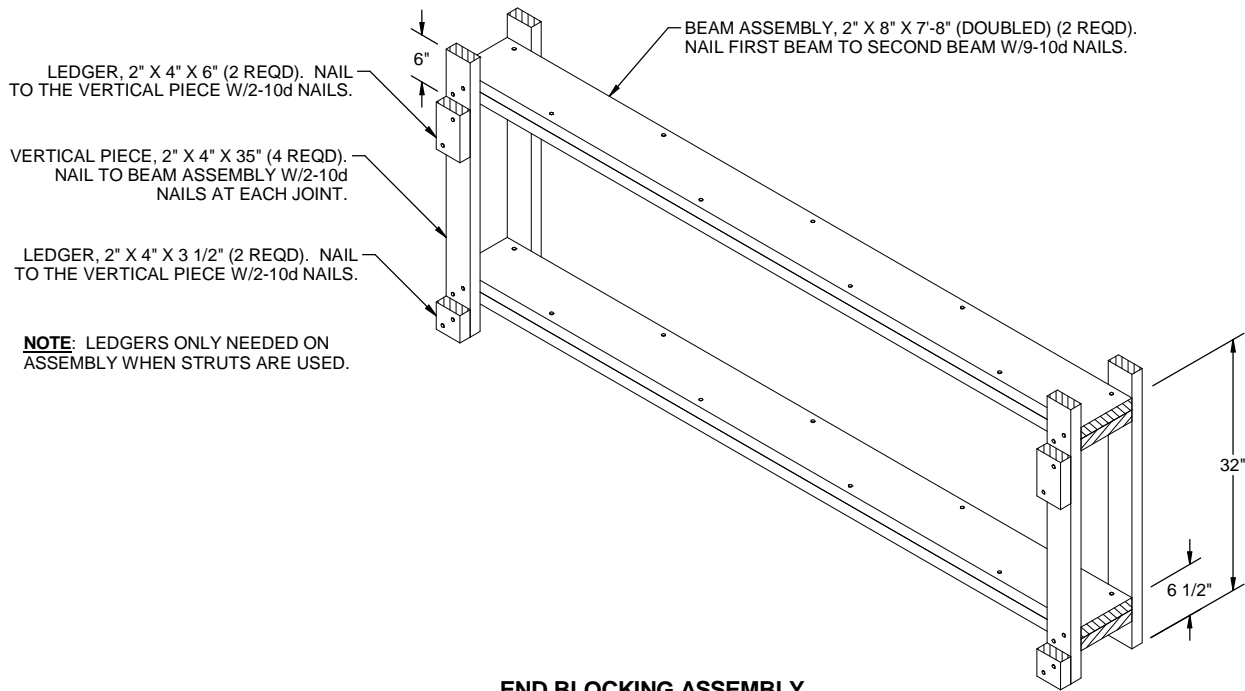
1. POSITION THE STRAPPING ASSEMBLY AND THE HOLD-DOWN STRAPS SO AS TO BE VERTICALLY IN LINE WITH THE FLATRACK TIEDOWN POINTS.
2. THE LOAD AS SHOWN MAY BE REDUCED BY ONE LAYER, IF DESIRED, FOR A SHIPMENT OF THREE MK632 CONTAINERS.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
1" x 4"	9	3
2" x 4"	138	92
2" x 6"	77	77
2" x 8"	61	82
4" x 4"	2	2
NAILS	NO. REQD	POUNDS
6d (2")	12	NIL
10d (3")	172	2-1/2
12d (3-1/4")	40	1
STEEL STRAPPING, 1-1/4" - 136' REQD - 19.43 LBS		
SEAL FOR 1-1/4" STRAPPING - 10 REQD - 0.45 LBS		
STEEL STRAPPING, 2" - - - 88' REQD - 29.33 LBS		
SEAL FOR 2" STRAPPING - - - 20 REQD - 4.00 LBS		
STAPLE, 2" - - - - - 8 REQD - - - - NIL		
ANTI-CHAFING MATERIAL - - - AS REQD - - - - NIL		

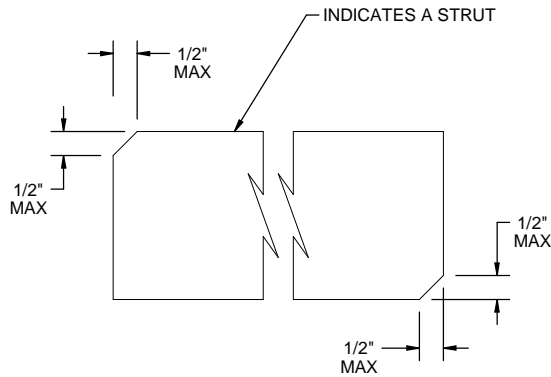
**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
MK632 CONTAINER - - -	6 - - - - -	13,500 LBS
DUNNAGE - - - - -	- - - - -	568 LBS
FLATRACK - - - - -	- - - - -	5,700 LBS
<b>TOTAL WEIGHT - - - - -</b>		<b>19,768 LBS (APPROX)</b>



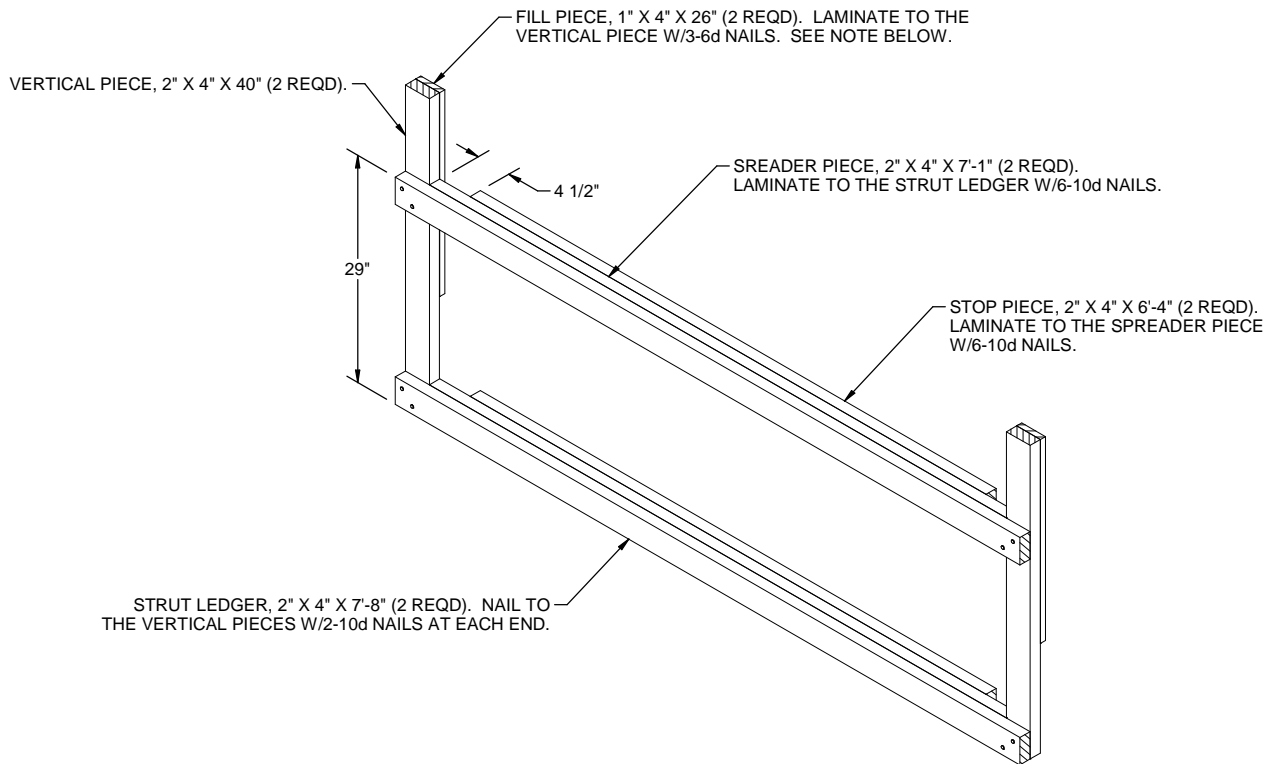
**END BLOCKING ASSEMBLY**

**NOTE:** FOR A ONE HIGH LOAD, OMIT THE TOP BEAM ASSEMBLY AND SHORTEN THE VERTICAL PIECES TO 10".



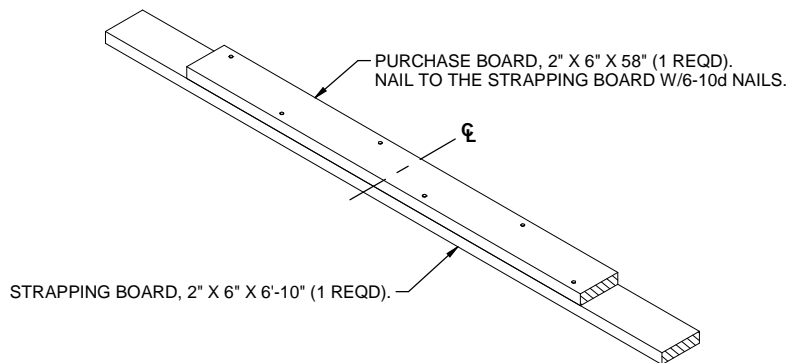
**BEVEL CUT**

IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE INSTALLING THE STRUTS WITH A "DRIVE" FIT.

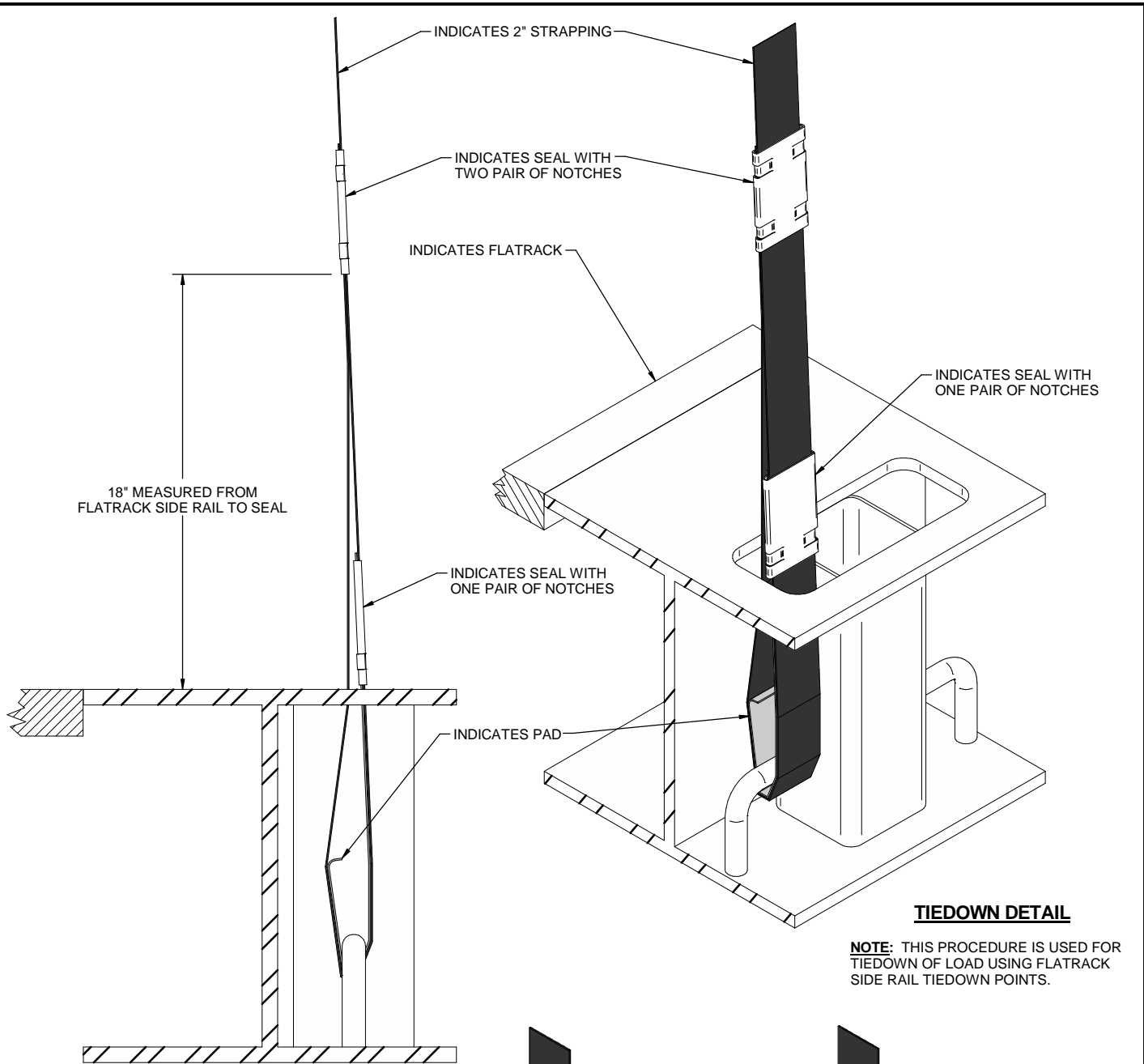


### **ENDWALL GATE**

FOR A ONE HIGH LOAD, ELIMINATE THE TOP STRUT LEDGER, SPREADER PIECE, AND STOP PIECE. SHORTEN THE VERTICAL AND FILL PIECES APPROPRIATELY. **NOTE:** THE FILL PIECES ARE ONLY REQUIRED IF THE ENDWALL HINGES PROTRUDE BEYOND THE EDGES OF THE FLATRACK CORNER POSTS, ELIMINATE IF THE CONTACT SURFACE IS FLAT.



### **STRAPPING BOARD ASSEMBLY**



**TIEDOWN DETAIL**

**NOTE:** THIS PROCEDURE IS USED FOR TIEDOWN OF LOAD USING FLATRACK SIDE RAIL TIEDOWN POINTS.

**PARTIAL SIDE VIEW**



ONE SEAL WITH TWO PAIR OF NOTCHES.

**STRAP JOINT A**

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



TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS EACH SEAL.

**STRAP JOINT B**

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