

APPROVED BY
BUREAU OF EXPLOSIVES

DATE 4-12-05

LOADING AND BRACING WITH WOODEN DUNNAGE ON FLATRACK ISO CONTAINERS OF STANDARD MISSILE, RIM-66, PACKED 1 PER MK372 SHIPPING AND STORAGE CONTAINER

INDEX

ITEM	PAGE(S)
GENERAL NOTES AND MATERIAL SPECIFICATIONS	2
CONTAINER DETAILS	3
TYPICAL LOADING PROCEDURES	4, 5
DETAILS	6, 7

- 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 FIELD SUPPORT COMMAND 	CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.						
	DO NOT SCALE		FEBRUARY 2005				
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND 	ENGINEER OR TECHNICIAN	BASIC REV.	MELVIN SIX				
	TRANSPORTATION ENGINEERING DIVISION						
	VALIDATION ENGINEERING DIVISION	TESTED	CLASS	DIVISION	DRAWING		
U.S. ARMY DEFENSE AMMUNITION CENTER	ENGINEERING DIRECTORATE			19	48	8802	SP15J149

PROJECT SP 501-03

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; DOD 4500.32-R; DOD 5100.76-M; DOD 6055.9-STD; AS WELL AS ANY AND ALL OTHER APPLICABLE SERVICE REGULATIONS.
- C. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO LOADS OF STANDARD MISSILES (RIM-66) PACKED IN MK372 CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH MISSILE. SEE NAVAL SEA SYSTEMS COMMAND DRAWING OR-68/21B AND PAGE 3 FOR DETAILS OF THE CONTAINER. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS 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 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 LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE BUFFER PIECES ON THE END BLOCKING ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12".
- 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 ON TO 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 END BLOCKING ASSEMBLIES, 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 SPACER PIECES TO BE INSTALLED ON THE END BLOCKING ASSEMBLY TO PROVIDE A UNIFORM LOAD BEARING SURFACE. NAIL THESE FILL PIECES TO THE END BLOCKING ASSEMBLY W/1 APPROPRIATELY SIZED NAIL EVERY SIX INCHES.

(CONTINUED AT RIGHT)

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 - - - - - : COMMERCIAL GRADE.
- ANTI-CHAFING MATERIAL - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.

- 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. 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. 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 ST THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.

- N. 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.

- O. 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.

- P. 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 ITEM DESIGNATED IN THE DRAWING TITLE.

- Q. 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.

- R. 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.

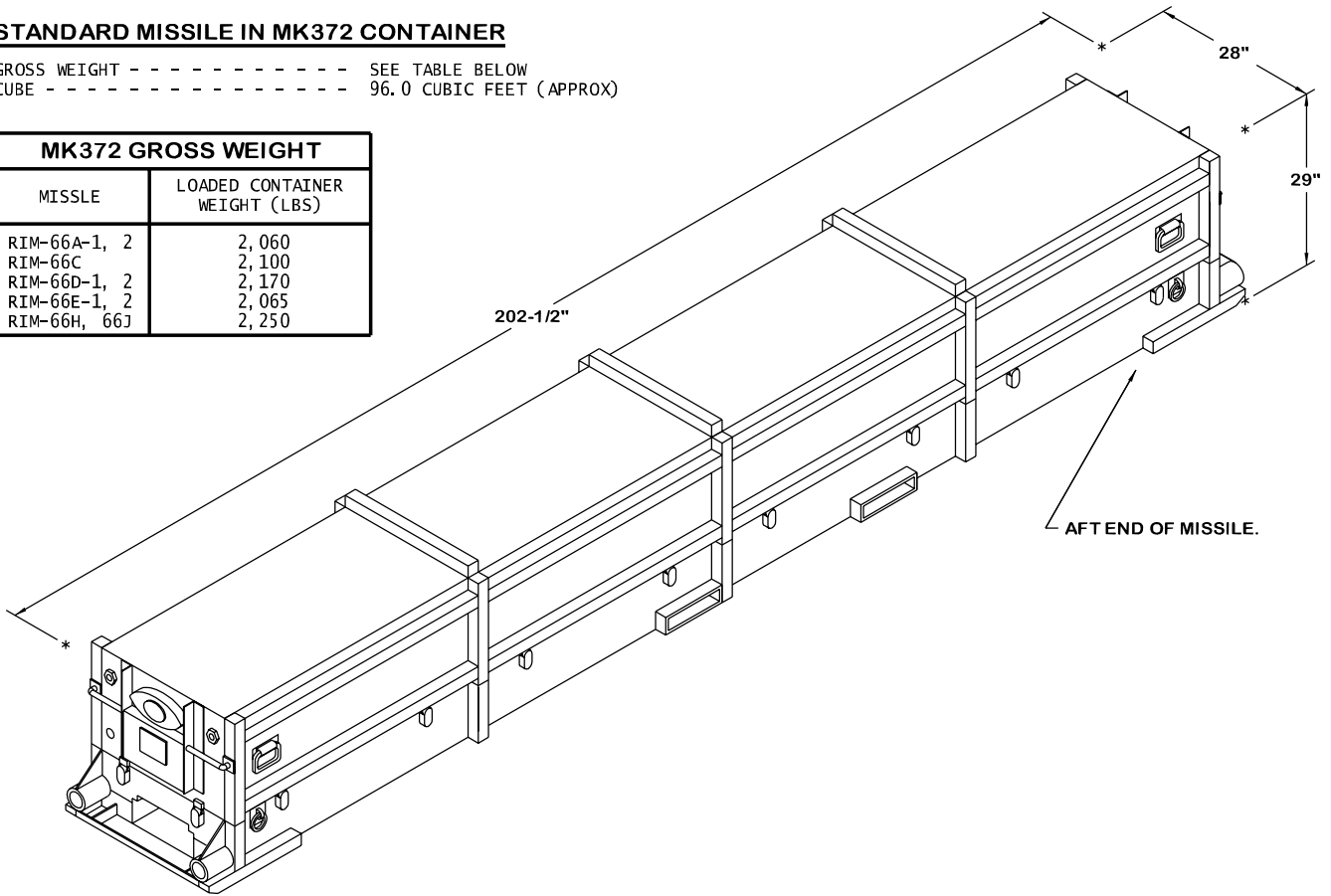
- S. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

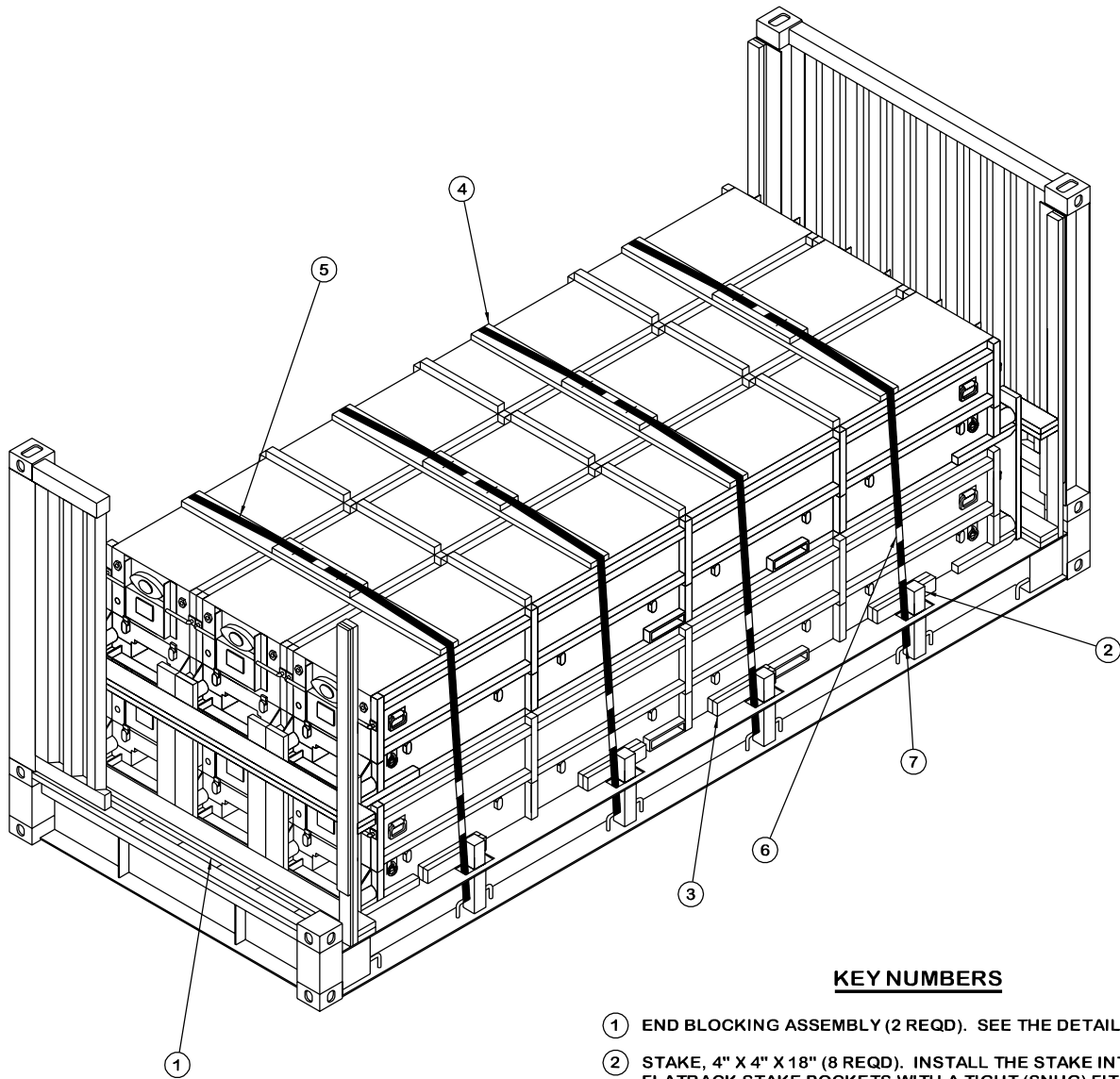
- T. THE LOAD AS SHOWN ON PAGE 4 MAY BE REDUCED BY ONE LAYER FOR A SHIPMENT OF THREE CONTAINERS, IF DESIRED.

STANDARD MISSILE IN MK372 CONTAINER

GROSS WEIGHT - - - - - SEE TABLE BELOW
 CUBE - - - - - 96.0 CUBIC FEET (APPROX)

MK372 GROSS WEIGHT	
MISSILE	LOADED CONTAINER WEIGHT (LBS)
RIM-66A-1, 2	2,060
RIM-66C	2,100
RIM-66D-1, 2	2,170
RIM-66E-1, 2	2,065
RIM-66H, 66J	2,250





KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.
- ② STAKE, 4" X 4" X 18" (8 REQD). INSTALL THE STAKE INTO THE FLATRACK STAKE POCKETS 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.
- ③ SIDE BLOCKING, 2" X 4" X 18" (DOUBLED) (8 REQD). LAMINATE THE FIRST PIECE TO THE SECOND PIECE W/3-10d NAILS. INSTALL AS DEPICTED, BETWEEN THE CONTAINERS AND THE STAKES. TOENAIL TO THE STAKE W/2-10d NAILS.
- ④ STRAPPING BOARD ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 6.
- ⑤ HOLD-DOWN STRAP, 2" X .050" OR .044" BY A LENGTH TO SUIT (REF: 24'-0") (4 REQD). INSTALL EACH STRAP FROM TWO 12'-0" LONG PIECES. STAPLE TO STRAPPING BOARD W/2 STAPLES EACH.
- ⑥ SEAL FOR 2" STRAPPING (20 REQD, 5 PER STRAP). FASTEN PIECE MARKED ⑤ WITH ONE SEAL AT EACH LOCATION CRIMPED WITH TWO PAIR OF NOTCHES. FASTEN PIECE MARKED ⑦ WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "TIEDOWN DETAIL" ON PAGE 7.
- ⑦ PAD, STRAPPING, 2" X .050" OR .044" X 18" (8 REQD). PREPOSITION THE PAD BETWEEN THE HOLD-DOWN STRAP, PIECE MARKED ⑤, AND THE FLATRACK TIEDOWN PROVISIONS. FASTEN WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "TIEDOWN DETAIL" ON PAGE 7.

SPECIAL NOTES:

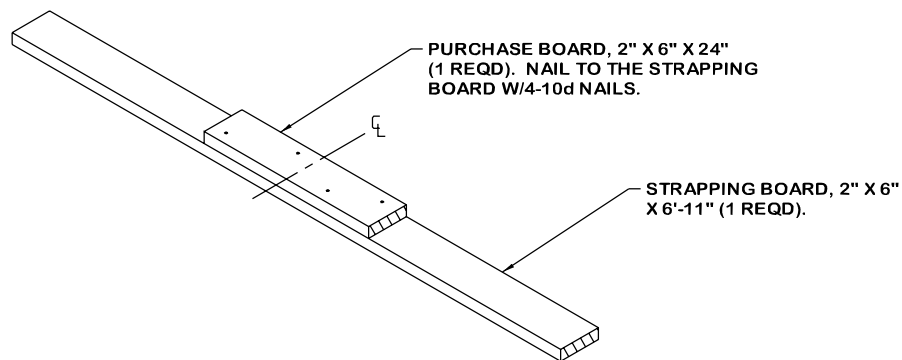
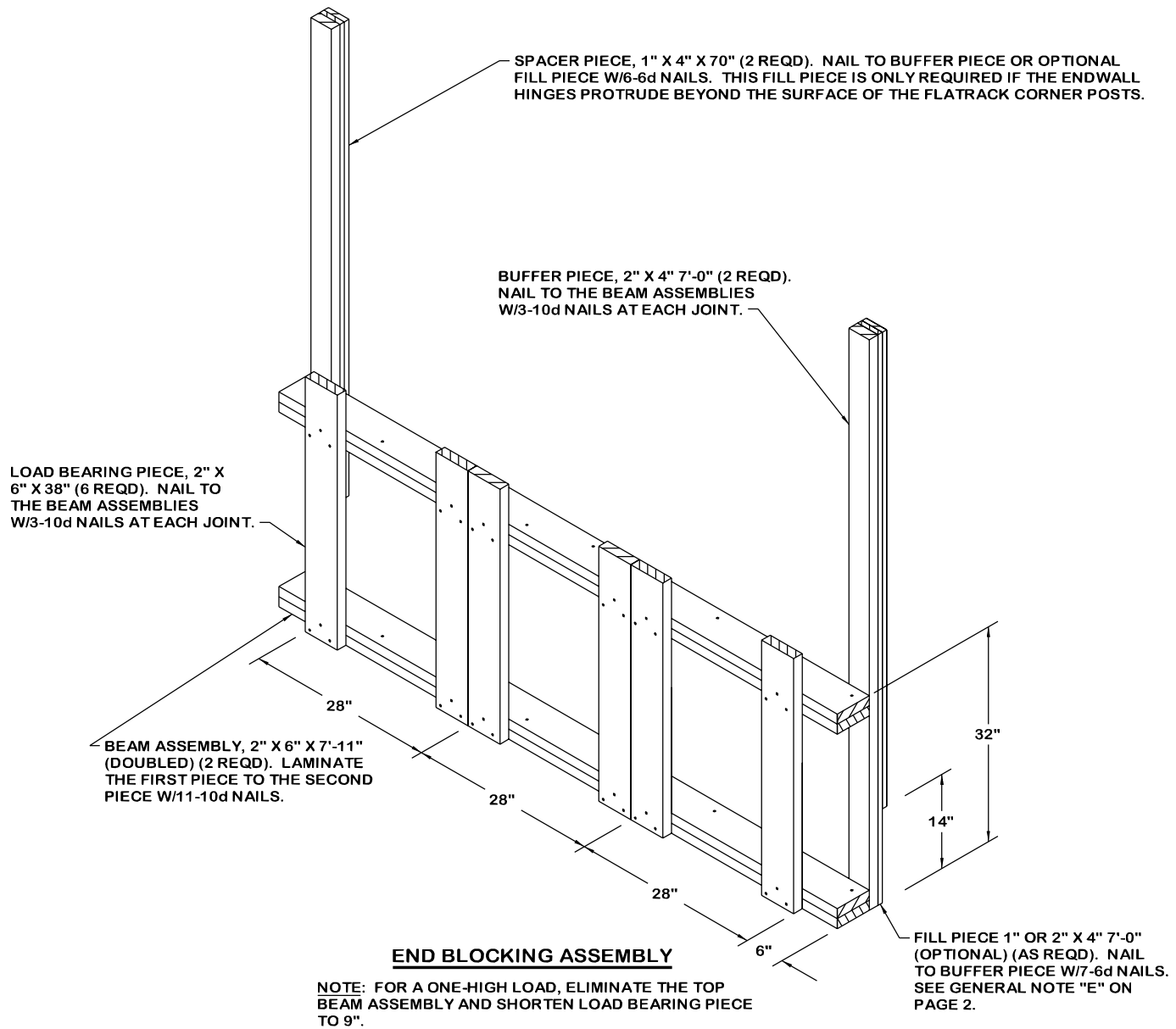
1. IF THE CORNER POSTS OF THE FLATRACK ARE SMOOTH, I.E., THE ENDWALL HINGE DOES NOT PROTRUDE FROM THE CORNER POST, THE SPACER PIECES MAY BE ELIMINATED FROM THE END BLOCKING ASSEMBLIES. ALSO THE LENGTH OF THE SPACER PIECES MUST BE ADJUSTED AS REQUIRED DEPENDING ON THE LENGTH OF THE PROTRUDING HINGE.
2. POSITION THE STRAPPING BOARD ASSEMBLIES AND THE HOLD-DOWN STRAPS TO BE VERTICALLY IN LINE WITH THE FLATRACK TIEDOWN POINTS.
3. THE LOAD MAY BE REDUCED BY ONE LAYER FOR THE SHIPMENT OF THREE CONTAINERS.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	38	13
2" X 4"	52	35
2" X 6"	138	138
4" X 4"	12	16
NAILS	NO. REQD	POUNDS
6d (2")	38	1/4
10d (3")	196	3
20d (4")	8	1/3
STEEL STRAPPING, 2" - - - - -	92' REQD - - - - -	31 LBS
SEAL FOR 2" STRAPPING - - - - -	20 REQD - - - - -	4 LBS
STAPLE FOR 2" STRAPPING - - - - -	8 REQD - - - - -	NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER - - - - -	6 - - - - -	13,500 LBS
DUNNAGE - - - - -	- - - - -	438 LBS
FLATRACK - - - - -	- - - - -	5,700 LBS
TOTAL WEIGHT - - - - -		19,638 LBS (APPROX)



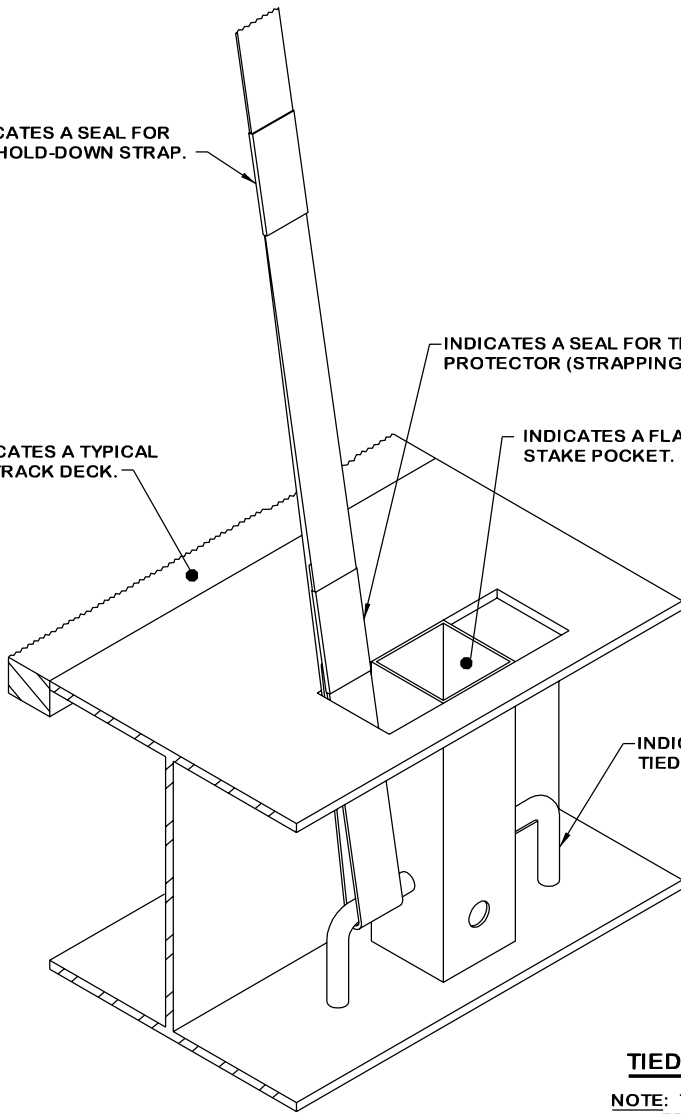
INDICATES A SEAL FOR THE HOLD-DOWN STRAP.

INDICATES A TYPICAL FLATRACK DECK.

INDICATES A SEAL FOR THE EDGE PROTECTOR (STRAPPING PAD).

INDICATES A FLATRACK STAKE POCKET.

INDICATES A FLATRACK TIEDOWN POINT.



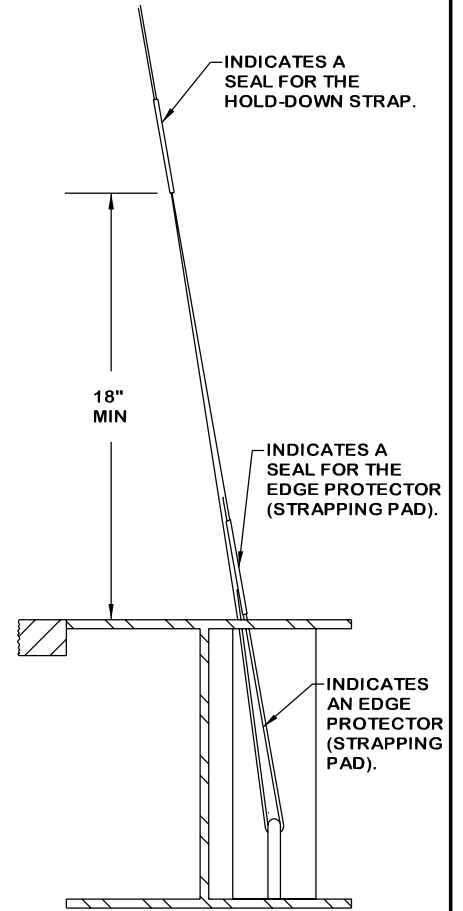
PARTIAL ISOMETRIC SECTION VIEW

INDICATES A SEAL FOR THE HOLD-DOWN STRAP.

18" MIN

INDICATES A SEAL FOR THE EDGE PROTECTOR (STRAPPING PAD).

INDICATES AN EDGE PROTECTOR (STRAPPING PAD).



PARTIAL SIDE VIEW

TIEDOWN DETAIL

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



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.

END-OVER-END LAP JOINT DETAILS

