

# LOADING AND BRACING\* ON COMMERCIAL FLATRACK ISO CONTAINERS OF AGM-130C-12 MISSILES PACKED IN CNU-578 CONTAINERS

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\* THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL, MOTOR, OR WATER CARRIERS.

## U.S. ARMY MATERIEL COMMAND DRAWING

<p>APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND</p> <p>RUS.ALLEN.J .1230354282</p> <p><small>Digitally signed by RUS.ALLEN.J.1230354282 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=RUS.ALLEN.J.1230354282 Date: 2013.12.12 15:53:49 -06'00'</small></p>		<p><b>CAUTION: VERIFY PRIOR TO USE AT <a href="https://mhp.redstone.army.mil">HTTPS://MHP.REDSTONE.ARMY.MIL</a> THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.</b></p>					
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<p>DESIGN ENGINEER</p>		<p>BASIC</p>	<p>CANH TRAN</p>				
		<p>REV.</p>					
<p>APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND</p> <p>SHIMP.UPTON .R.1231257183</p> <p><small>Digitally signed by SHIMP.UPTON.R.1231257183 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SHIMP.UPTON.R.1231257183 Date: 2014.01.09 10:00:21 -06'00'</small></p> <p>U.S. ARMY DEFENSE AMMUNITION CENTER</p>		<p>ENGINEERING DIVISION</p>	<p>FIEFFER.LAUR A.A.1230375727</p> <p><small>Digitally signed by FIEFFER.LAUR.A.1230375727 DN: cn=US, ou=U.S. Government, ou=PKI, ou=USA, cn=FIEFFER.LAUR.A.1230375727 Date: 2013.09.23 09:37:47 -05'00'</small></p>	<p>CLASS</p>	<p>DIVISION</p>	<p>DRAWING</p>	<p>FILE</p>
		<p>TEST ENGINEER</p>	<p>FELICIANO.AD IN.1259200373</p> <p><small>Digitally signed by FELICIANO.ADN.1259200373 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FELICIANO.ADN.1259200373 Date: 2013.09.24 12:34:07 -05'00'</small></p>	<p>19</p>	<p>48</p>	<p>8672</p>	<p>SP15J103</p>
		<p>TEST REPORT</p>	<p>N/A</p>				
		<p>EXPLOSIVE SAFETY DIRECTORATE</p>	<p>TRIVITT.TERRY .F.1230872011</p> <p><small>Digitally signed by TRIVITT.TERRY.F.1230872011 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=TRIVITT.TERRY.F.1230872011 Date: 2013.10.22 14:48:05 -05'00'</small></p>				

## 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 SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF AGM-130C-12 MISSILES PACKED IN CNU-578 SHIPPING AND STORAGE CONTAINERS. SEE PAGE 3 AND AIR FORCE DRAWING 9531330 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 86" 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 INCREASING THE LENGTH OF THE STRUTS.
- 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 END WALL GATES TO PROVIDE A UNIFORM LOAD BEARING SURFACE. NAIL THESE FILL PIECES TO THE END WALL 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.
- N. PORTIONS OF THE FLATRACK DEPICTED WITHIN THIS DRAWING, SUCH AS THE ENDWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

(CONTINUED AT RIGHT)

## O. 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.

## 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 TO ONE CONTAINER, IF DESIRED. SEE THE "LESS-THAN-FULL-LOAD PROCEDURES" ON PAGE 7.

## 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.

## MATERIAL SPECIFICATIONS

**LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.

**NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).

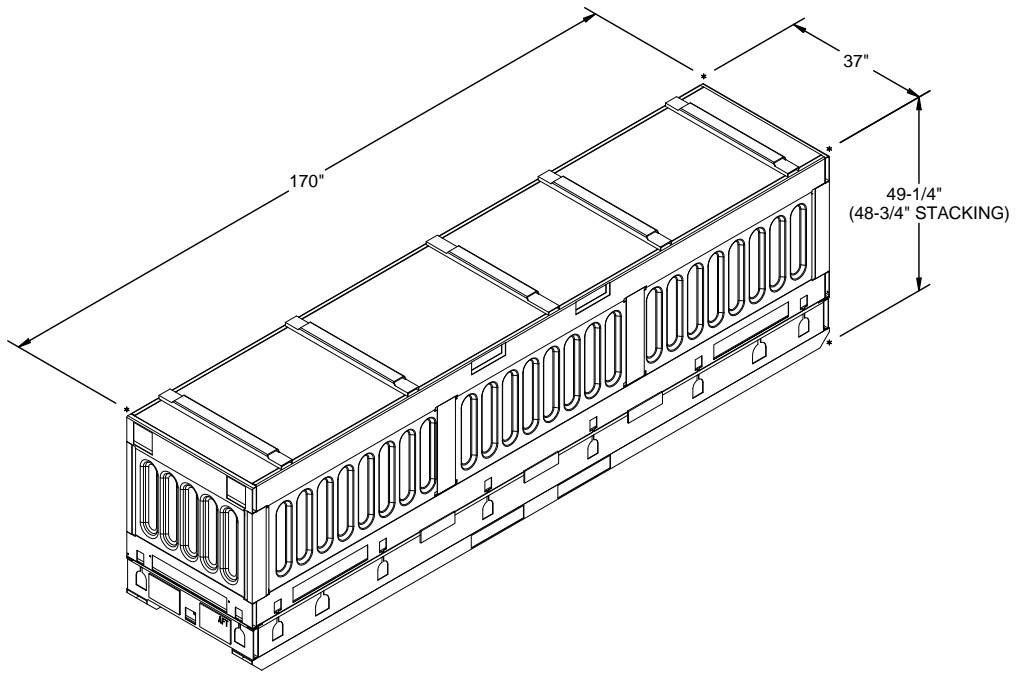
**PLYWOOD** - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.

**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.

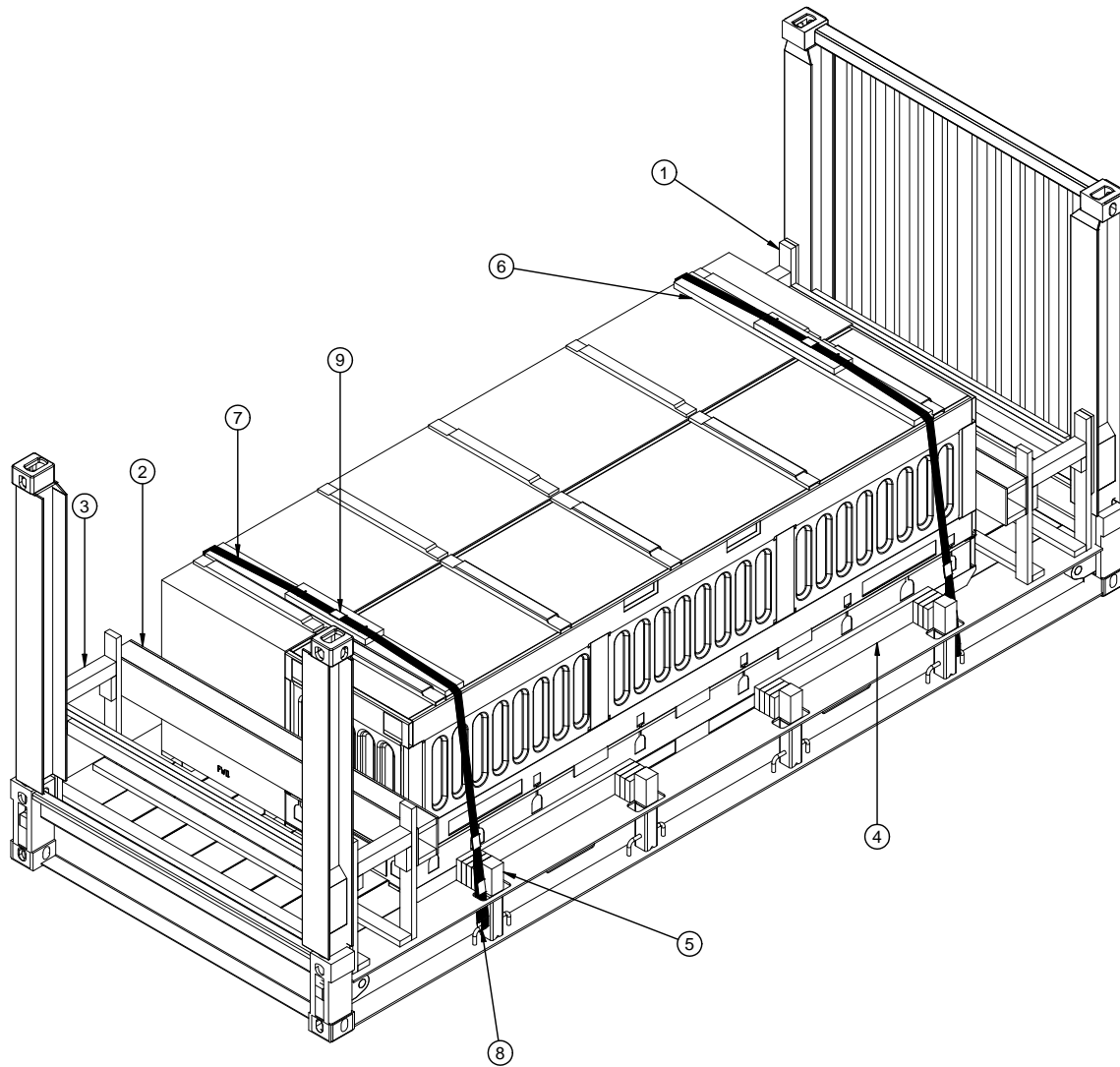
**STAPLE, STRAP** - - - - - : COMMERCIAL GRADE.

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



**CNU-578 CONTAINER**

GROSS WEIGHT - - - - - 4,960 LBS (APPROX)  
CUBE - - - - - 179.3 CU FT (APPROX)



**ISOMETRIC VIEW**

**(KEY NUMBERS CONTINUED)**

- ⑥ STRAPPING BOARD ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 5.
- ⑦ HOLD-DOWN STRAP, 2" X .050" OR .044" X 21'-0" LONG STEEL STRAPPING (2 REQD). INSTALL EACH STRAP FROM TWO PIECES, EACH 10'-6" 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.
- ⑧ PAD, STRAPPING 2" X .050" OR .044" X 18" (4 REQD). PRE-POSITION THE PAD BETWEEN THE HOLD-DOWN STRAP AND THE FLATRACK TIEDOWN PROVISIONS. SEE THE "TIEDOWN DETAIL" ON PAGE 8.
- ⑨ SEAL FOR 2" STRAPPING (10 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.

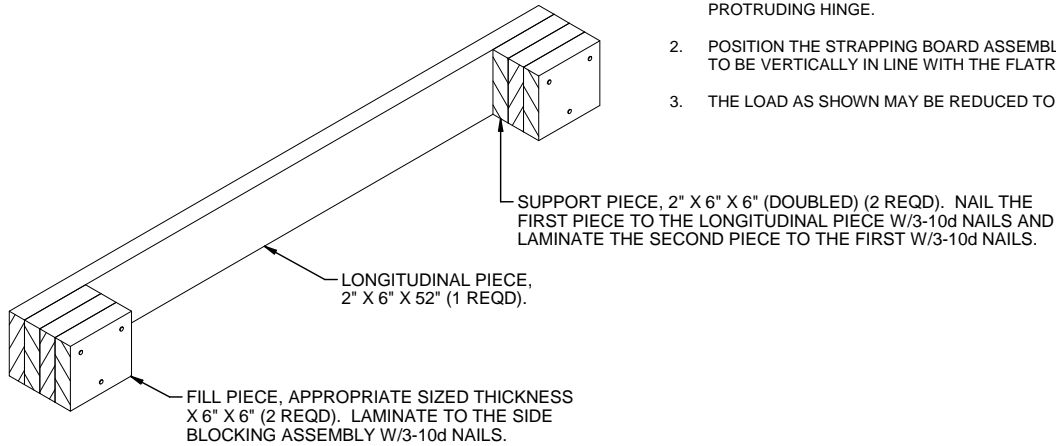
**KEY NUMBERS**

- ① ENDWALL GATE (2 REQD). NAIL THE RETAINER PIECE TO THE DECK W/6-10d NAILS. SEE DETAIL ON PAGE 6.
- ② END BLOCKING ASSEMBLY (2 REQD). NAIL THE RETAINER PIECE TO THE DECK W/6-10d NAILS. SEE DETAIL ON PAGE 6.
- ③ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 16") (4 REQD). TOENAIL TO THE BUFFER PIECES OF THE END BLOCKING ASSEMBLY AND THE VERTICAL PIECES OF THE ENDWALL GATE W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 8.
- ④ SIDE BLOCKING ASSEMBLY (4 REQD). SEE DETAIL ON PAGE 5.
- ⑤ 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. TOENAIL TO THE FILL PIECE AND/OR TO THE SUPPORT PIECE W/2-20d NAILS.

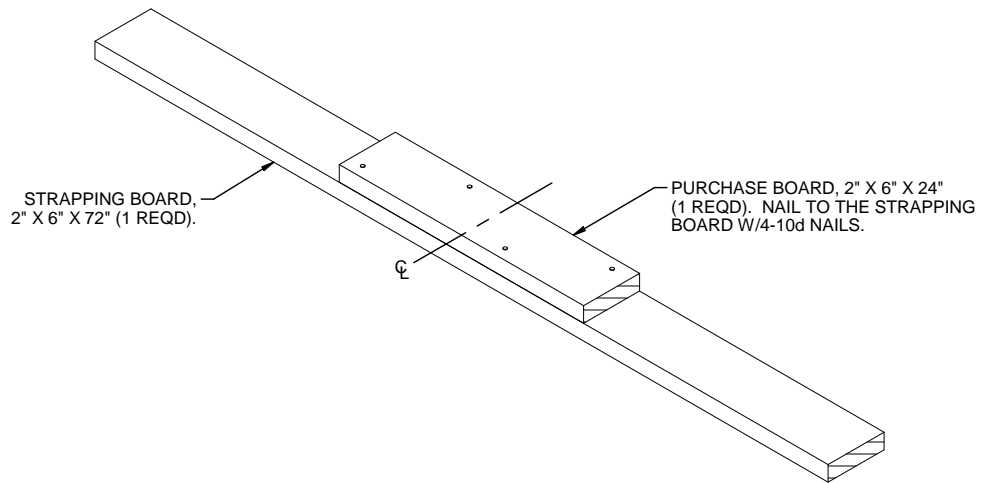
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**SPECIAL NOTES:**

1. IF THE CORNER POSTS OF THE FLATRACK ARE SMOOTH, I.E., THE ENDWALL HINGE DOES NOT PROTRUDE FROM THE CORNER POST, THE FILL PIECES MAY BE ELIMINATED FROM THE ENDWALL GATES. ALSO, THE LENGTH OF THE FILL PIECE MUST BE ADJUSTED AS REQUIRED DEPENDING ON THE LENGTH OF THE PROTRUDING HINGE.
2. POSITION THE STRAPPING BOARD ASSEMBLY AND THE HOLD-DOWN STRAPS TO BE VERTICALLY IN LINE WITH THE FLATRACK TIEDOWN POINTS.
3. THE LOAD AS SHOWN MAY BE REDUCED TO ONE CONTAINER IF DESIRED.



**SIDE BLOCKING ASSEMBLY**

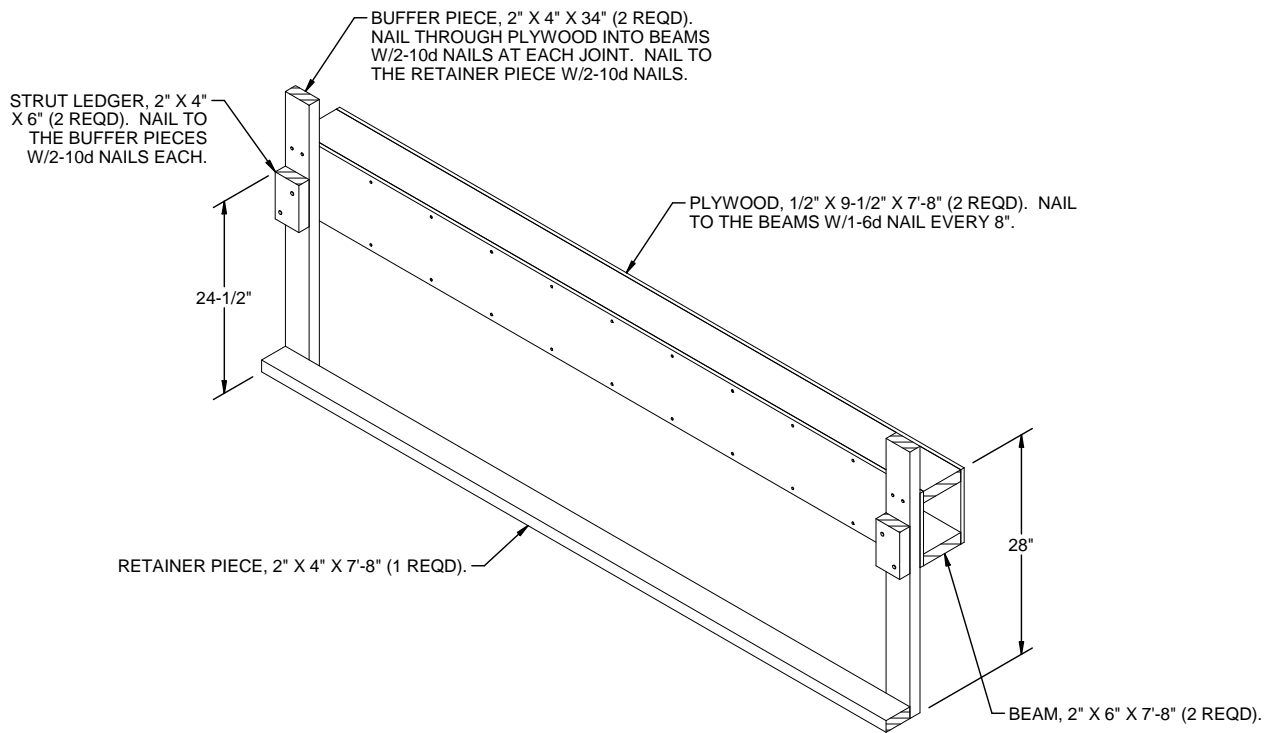


**STRAPPING BOARD ASSEMBLY**

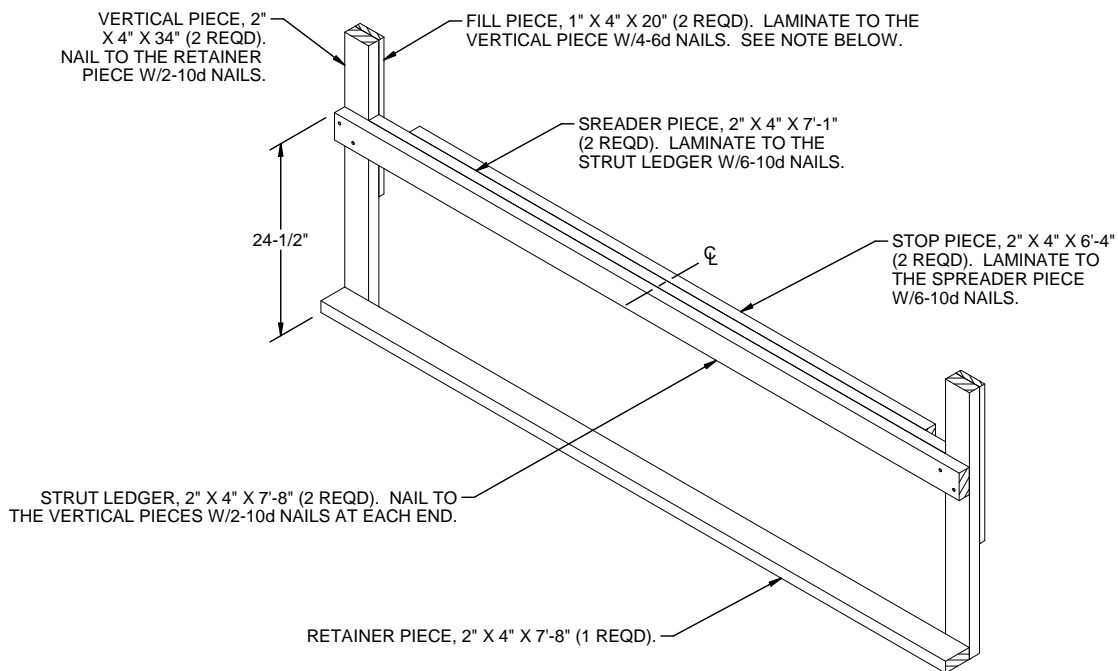
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	7	2
2" X 4"	98	65
2" X 6"	61	61
4" X 4"	5	7
NAI LS	NO. REQD	POUNDS
6d (2")	104	3/4
10d (3")	176	2-3/4
12d (3-1/4")	16	1/2
20d (4")	24	1
STEEL STRAPPING, 2" - - -	39.08' REQD	- 13.03 LBS
SEAL FOR 2" STRAPPING - - -	10 REQD	- - 2 LBS
STAPLE FOR 2" STRAPPING - - -	4 REQD	- - - NIL
PLYWOOD, 1/2" - - -	24.28 SQFT REQD	- 33.38 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-578 - - - - -	2 - - - - -	9,920 LBS
DUNNAGE - - - - -	- - - - -	323 LBS
CONTAINER - - - - -	- - - - -	5,700 LBS
TOTAL WEIGHT - - - - -		15,943 LBS (APPROX)

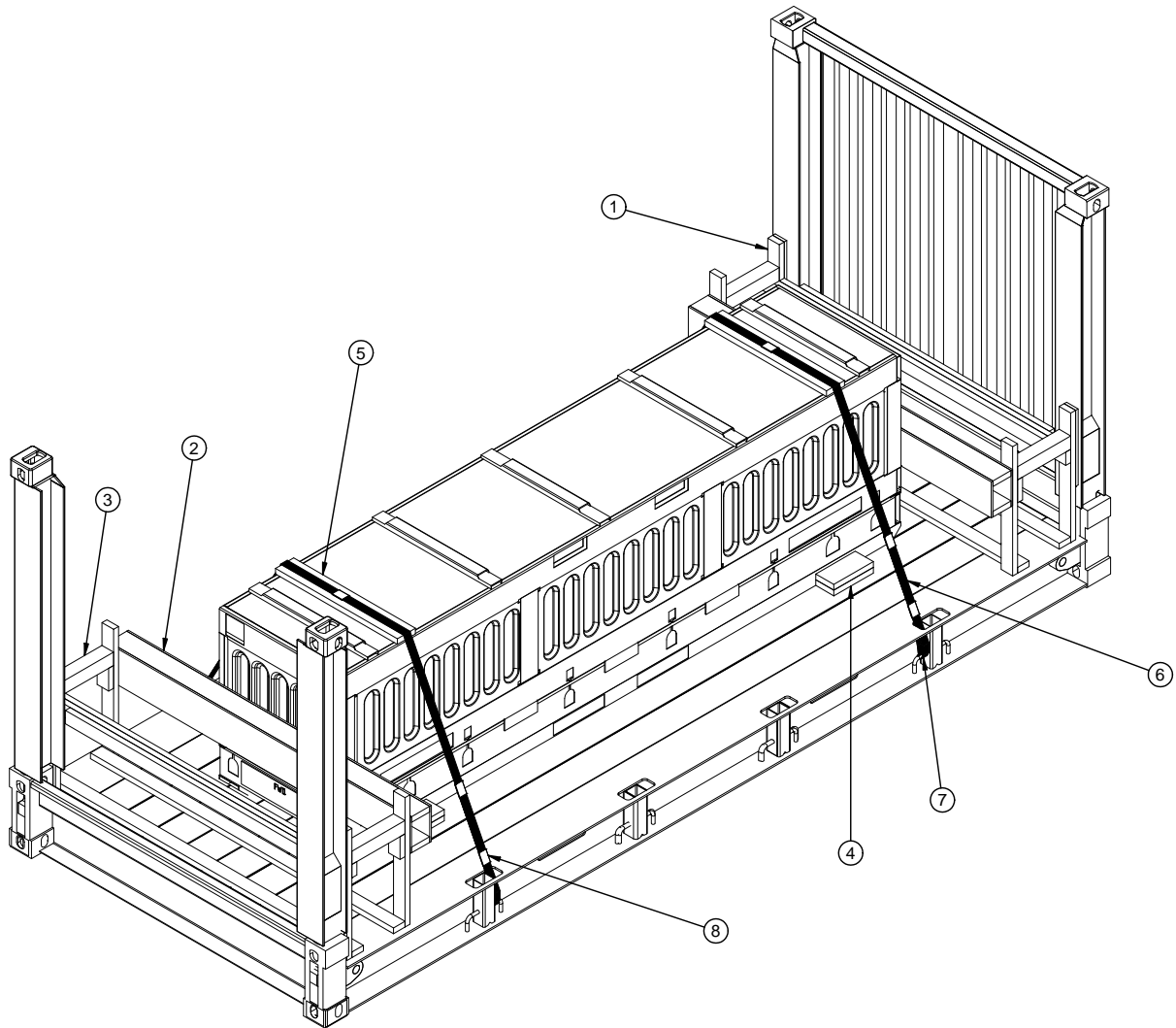


**END BLOCKING ASSEMBLY**



**ENDWALL GATE**

**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.



**LESS-THAN-FULL-LOAD PROCEDURES**

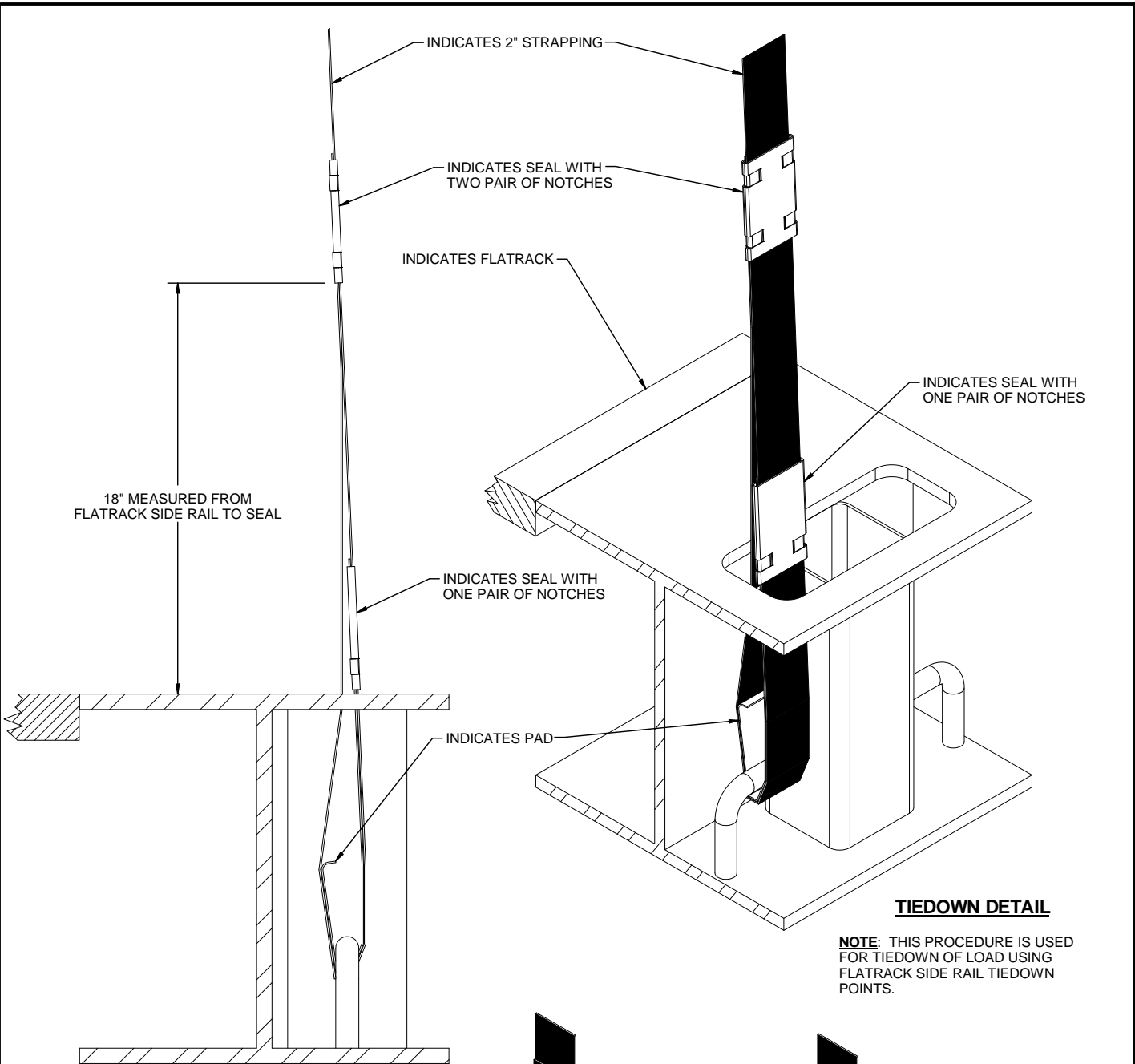
**(KEY NUMBERS CONTINUED)**

- ⑥ HOLD-DOWN STRAP, 2" X .050" OR .044" X 18"-10" LONG STEEL STRAPPING (2 REQD). INSTALL EACH STRAP FROM TWO PIECES, EACH 9'-5" 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.
- ⑦ PAD, STRAPPING 2" X .050" OR .044" X 18" (4 REQD). PRE-POSITION THE PAD BETWEEN THE HOLD-DOWN STRAP AND THE FLATRACK TIEDOWN PROVISIONS. SEE THE "TIEDOWN DETAIL" ON PAGE 8.
- ⑧ SEAL FOR 2" STRAPPING (10 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 ENDWALL GATE (2 REQD). NAIL THE RETAINER PIECE TO THE DECK W/6-10d NAILS. SEE DETAIL ON PAGE 6.
- ② END BLOCKING ASSEMBLY (2 REQD). NAIL THE RETAINER PIECE TO THE DECK W/6-10d NAILS. SEE DETAIL ON PAGE 6.
- ③ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 16") (4 REQD). TOENAIL TO THE BUFFER PIECES OF THE END BLOCKING ASSEMBLY AND THE VERTICAL PIECES OF THE ENDWALL GATE W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 8.
- ④ SIDE BLOCKING, 2" X 6" X 12" (DOUBLED) (4 REQD). POSITION THE FIRST PIECE AGAINST THE CONTAINER AS SHOWN AND NAIL TO THE FLOOR W/4-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST W/4-10d NAILS.
- ⑤ STRAPPING BOARD, 2" X 6" X 37" (2 REQD).

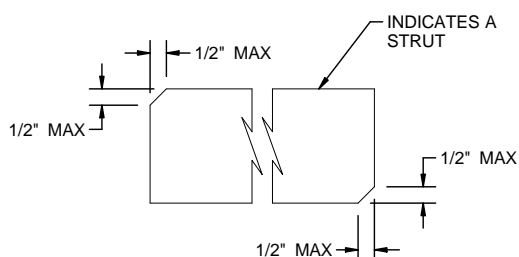
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**TIEDOWN DETAIL**

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

**PARTIAL SIDE VIEW**



**BEVEL CUT**

IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT END OF LOAD FIT.



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**