

APPROVED BY
BUREAU OF EXPLOSIVES

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LOADING AND BRACING WITH WOODEN DUNNAGE ON FLATRACK ISO CONTAINERS OF CHARGE, DEMOLITION, LINEAR, HE M58, M58A1 & M58A2, AND INERT M68 & M68A1, IN METAL SHIPPING AND STORAGE CONTAINER

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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			
<small>APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND</small> <div style="text-align: center; font-size: 2em; font-family: cursive;"><i>Timothy R. Fore</i></div>	DRAFTSMAN	TECHNICIAN	ENGINEER
		G. GUAY	
<small>APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND</small> <div style="text-align: center; font-size: 1.5em; font-family: cursive;"><i>William F Ernst</i></div>	<small>VALIDATION ENGINEERING DIVISION</small> <div style="text-align: center; font-size: 1.2em; font-family: cursive;"><i>JAK</i></div>	<small>TRANSPORTATION ENGINEERING DIVISION</small> <div style="text-align: center; font-size: 1.2em; font-family: cursive;"><i>W. Zwick</i></div>	<small>LOGISTICS ENGINEERING OFFICE</small> <div style="text-align: center; font-size: 1.2em; font-family: cursive;"><i>W F Ernst</i></div>
JULY 1994			
<small>U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL</small>	CLASS	DIVISION	DRAWING
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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; 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 LINEAR DEMOLITION CHARGES, HE M58, MS8A1, AND MS8A2 AND INERT M58 AND M58A1 IN METAL SHIPPING AND STORAGE CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH CONTENTS. CAUTION: REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE FLATRACK ISO CONTAINER MUST NOT BE EXCEEDED.
- D. FOR DETAILS OF THE SHIPPING AND STORAGE CONTAINER, SEE THE DETAIL ON PAGE 3.

CONTAINER DIMENSIONS - - - 7'-10-3/4" LONG X 54" WIDE X 25" HIGH.

GROSS WEIGHT (APPROX)
WITH HE COMP C4, M58 CHARGE, DODIC M025 - - -3,000 LBS
WITH HE COMP C4, MS8A1 CHARGE, DODIC M025 - -3,000 LBS
WITH HE COMP C54, MS8A1 CHARGE, DODIC M913- -3,000 LBS
WITH HE COMP C4, MS8A2 CHARGE, DODIC M913 - -3,000 LBS
WITH INERT, M58 CHARGE, DODIC M051 - - - -3,000 LBS
WITH INERT, M58A1 CHARGE, DODIC M051 - - - -3,000 LBS

CUBE - - - - - 74.0 CUBIC FEET
- E. 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.
- F. 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 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 BUFFER PIECES ON THE END BLOCKING ASSEMBLY. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND QUANTITY OF THE BUFFER PIECES IN THE END BLOCKING ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE LENGTH OF THE CONTAINER.

(CONTINUED AT RIGHT)

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.
- WIRE, CARBON STEEL - - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.
- ANTI-CHAFING MATERIAL - - - - - : MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.

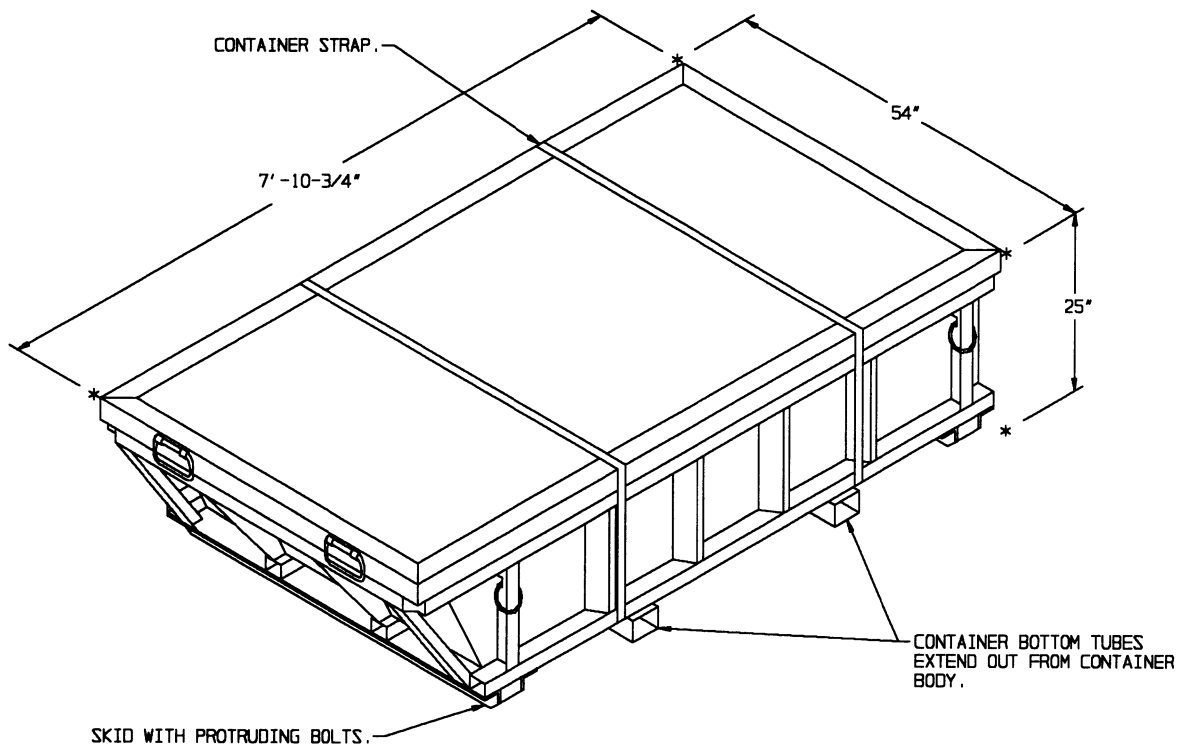
- G. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- H. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES 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.
- J. PORTIONS OF ONE OF THE FLATRACK ENDWALLS DEPICTED WITHIN THIS DRAWING HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.
- K. 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 FILL 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.
- L. 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.
- M. 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.
- N. 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.
- O. 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.
- P. 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.
- Q. 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.

(CONTINUED ON PAGE 3)

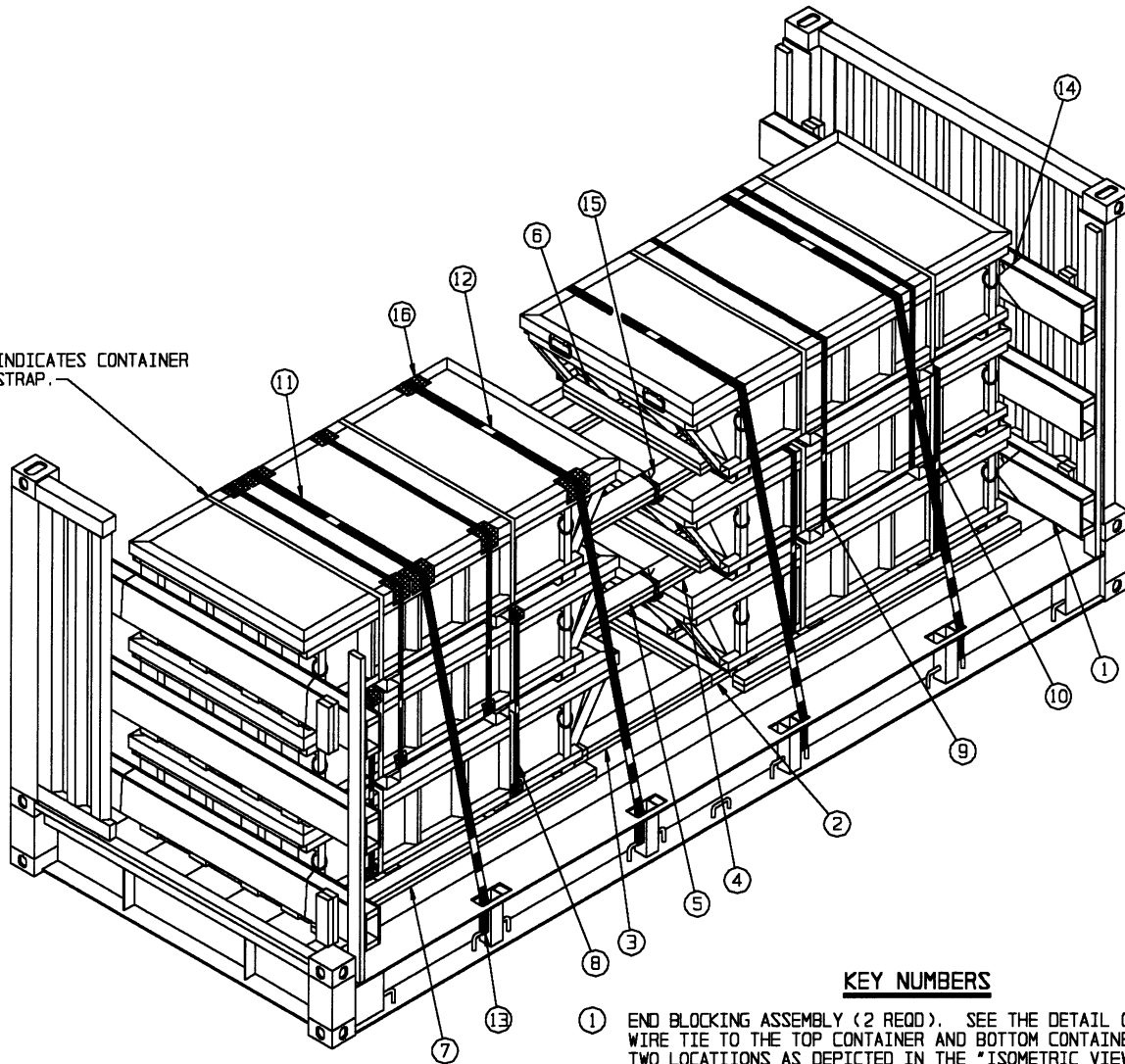


SHIPPING AND STORAGE CONTAINER

(GENERAL NOTES CONTINUED FROM PAGE 2)

- R. 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.
- 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 25.4 MM AND ONE POUND EQUALS 0.454 KG.

INDICATES CONTAINER STRAP.



ISOMETRIC VIEW

(KEY NUMBERS CONTINUED)

- ⑩ SEAL FOR 1-1/4" STRAPPING (8 REQ., 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ⑪ HOLD-DOWN STRAP, 2" X .044" OR .050" BY A LENGTH TO SUIT (REF: 21'-8") (4 REQ.). INSTALL EACH STRAP FROM TWO 10'-10" LONG PIECES.
- ⑫ SEAL FOR 2" STRAPPING (20 REQ.). FASTEN PIECE MARKED ⑪ WITH ONE SEAL CRIMPED WITH TWO PAIR OF NOTCHES. FASTEN PIECE MARKED ⑬ WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "TIEDOWN DETAIL" ON PAGE 7.
- ⑬ PAD, STRAPPING, 2" X .044" OR .050" X 18" (8 REQ.). PRE-POSITION THE PAD BETWEEN THE HOLD-DOWN STRAP, PIECE MARKED ⑪ AND THE FLATRACK TIEDOWN PROVISIONS. FASTEN WITH ONE SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "TIEDOWN DETAIL" ON PAGE 7.
- ⑭ TIE WIRE, NO. 14 GAGE, 36" LONG (8 REQ.). INSTALL TO FORM A COMPLETE LOOP AROUND BEAM ASSEMBLY AND CONTAINER RING. BRING ENDS TOGETHER AND TWIST TAUT. SEE KEY NUMBER ① FOR INSTALLATION REQUIREMENTS.
- ⑮ TIE WIRE, NO. 14 GAGE, 36" LONG (4 REQ.). INSTALL TO FORM A COMPLETE LOOP AROUND PIECES MARKED ④ AND ⑤ AND THRU CONTAINER HANDLES. BRING ENDS TOGETHER AND TWIST TAUT.
- ⑯ ANTI-CHAFING MATERIAL (AS REQ.). POSITION UNDER STRAPS AT ALL POINTS OF CONTACT WITH THE CONTAINERS.

KEY NUMBERS

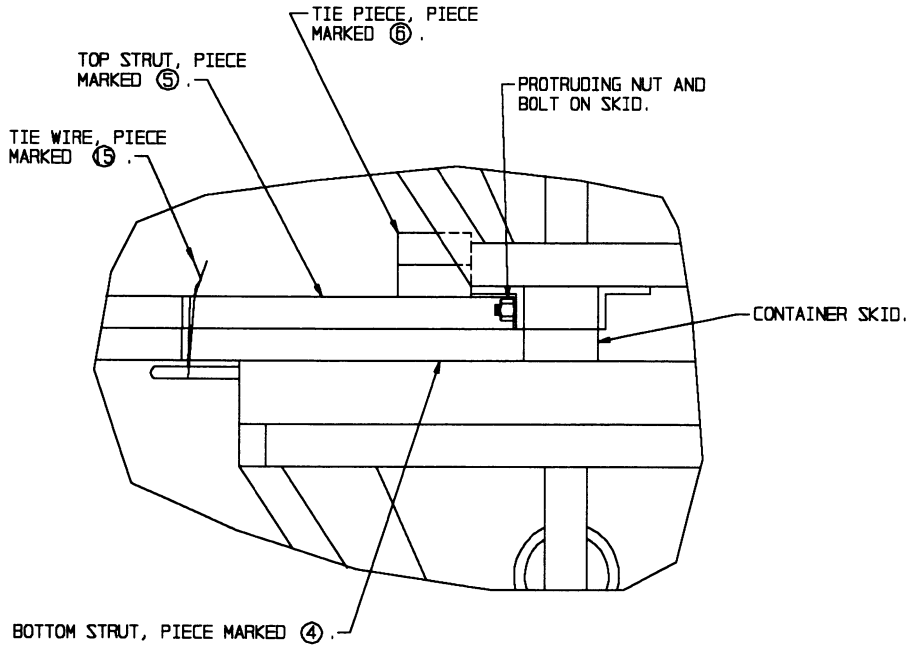
- ① END BLOCKING ASSEMBLY (2 REQ.). SEE THE DETAIL ON PAGE 6. WIRE TIE TO THE TOP CONTAINER AND BOTTOM CONTAINER RINGS AT TWO LOCATIONS AS DEPICTED IN THE "ISOMETRIC VIEW" ABOVE. SEE KEY NUMBER ⑭ AT LEFT.
- ② HEADER, 2" X 6" X 48" (DOUBLED) (2 REQ.). POSITION AS SHOWN AGAINST THE CONTAINER SKIDS. NAIL THE FIRST PIECE TO THE FLOOR W/5-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/5-20d NAILS.
- ③ CENTER CLEAT, 2" X 6" BY CUT-TO-FIT (REF: 36-1/2") (DOUBLED) (2 REQ.). POSITION AS SHOWN. NAIL THE FIRST PIECE TO THE FLOOR W/4-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/4-20d NAILS.
- ④ BOTTOM STRUT, 2" X 6" BY CUT-TO-FIT BETWEEN CONTAINER SKIDS (REF: 48-1/2") (4 REQ.). CENTER OVER CONTAINER HANDLES AS SHOWN. SEE THE SPECIAL NOTE ON PAGE 5.
- ⑤ TOP STRUT, 2" X 6" BY CUT-TO-FIT BETWEEN CONTAINER SKIDS (REF: 48") (4 REQ.). NAIL TO THE BOTTOM STRUT, PIECE MARKED ④, W/4-10d NAILS. SEE THE SPECIAL NOTE ON PAGE 5.
- ⑥ TIE PIECE, 2" X 4" BY CUT-TO-FIT BETWEEN OUTSIDE CONTAINER ANGLE BRACES (REF: 41-1/2") (DOUBLED) (4 REQ.). POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TOP STRUT, PIECE MARKED ⑤, W/2-10d NAILS AT EACH JOINT. LAMINATE THE SECOND PIECE TO THE FIRST W/4-10d NAILS.
- ⑦ SIDE BLOCKING, 2" X 4" X 6'-10" (DOUBLED) (4 REQ.). POSITION AS SHOWN. NAIL THE FIRST PIECE TO THE FLOOR W/10-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/10-10d NAILS.
- ⑧ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY LENGTH-TO-SUIT (REF: 17'-9") (4 REQ.). INSTALL TO ENIRCLE THE BOTTOM TWO CONTAINERS OF EACH STACK.
- ⑨ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY LENGTH-TO-SUIT (REF: 17'-9") (4 REQ.). INSTALL TO ENIRCLE THE TOP TWO CONTAINERS OF EACH STACK.

(CONTINUED AT LEFT)

SPECIAL NOTE:

DUE TO THE LOCATION OF THE PROTRUDING BOLT AND NUT ON THE CONTAINER SKID, THE FOLLOWING PROCEDURES MUST BE FOLLOWED FOR THE INSTALLATION OF THE BOTTOM AND TOP STRUTS, PIECES MARKED ④ AND ⑤ ON PAGE 4.

1. AFTER ALL SIX CONTAINERS ARE LOADED ON THE FLATRACK, SLIDE THE TOP STRUT, PIECE MARKED ⑤ BETWEEN THE CONTAINER SKIDS. SLIDE THE BOTTOM STRUT, PIECE MARKED ④ BETWEEN CONTAINER SKIDS AND POSITION UNDER PIECE MARKED ⑤. ALIGN BOTH PIECES ABOVE THE LOWER CONTAINER HANDLES AND NAIL AS SPECIFIED IN KEY NUMBER 5. SEE "DETAIL A" BELOW.



DETAIL A

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	220	147
2" X 6"	61	61
NAILS	NO. REQD	POUNDS
6d (2")	288	1-3/4
10d (3")	194	3
20d (4")	58	2
STEEL STRAPPING, 1-1/4"	142' REQD	21 LBS
SEAL FOR 1-1/4" STRAPPING	8 REQD	1/2 LB
STEEL STRAPPING, 2"	99' REQD	33 LBS
SEAL FOR 2" STRAPPING	20 REQD	4 LBS
WIRE, NO. 14 GAGE	36' REQD	3/4 LB
PLYWOOD, 1/2"	74.42 SQ FT REQD	102.33 LBS
ANTI-CHAFING MATERIAL	AS REQD	NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	6	18,000 LBS
DUNNAGE		585 LBS
FLATRACK		5,700 LBS

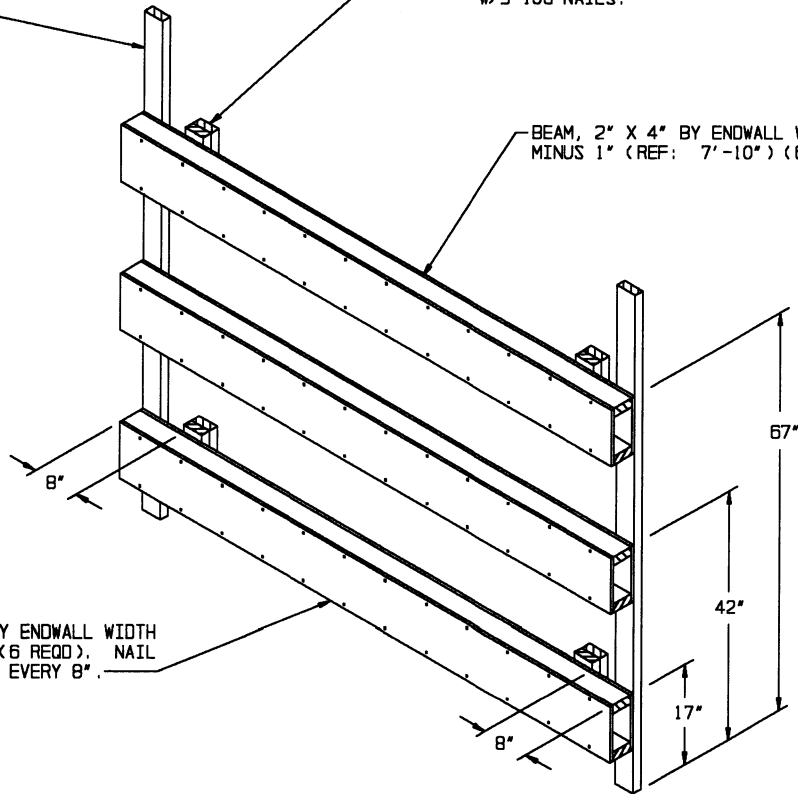
TOTAL WEIGHT - - - - - 24,285 LBS (APPROX)

BUFFER PIECE, 2" X 4" X 7'-0"
(2 REQD). NAIL THRU PLYWOOD
INTO THE BEAMS W/2-10d NAILS
AT EACH JOINT.

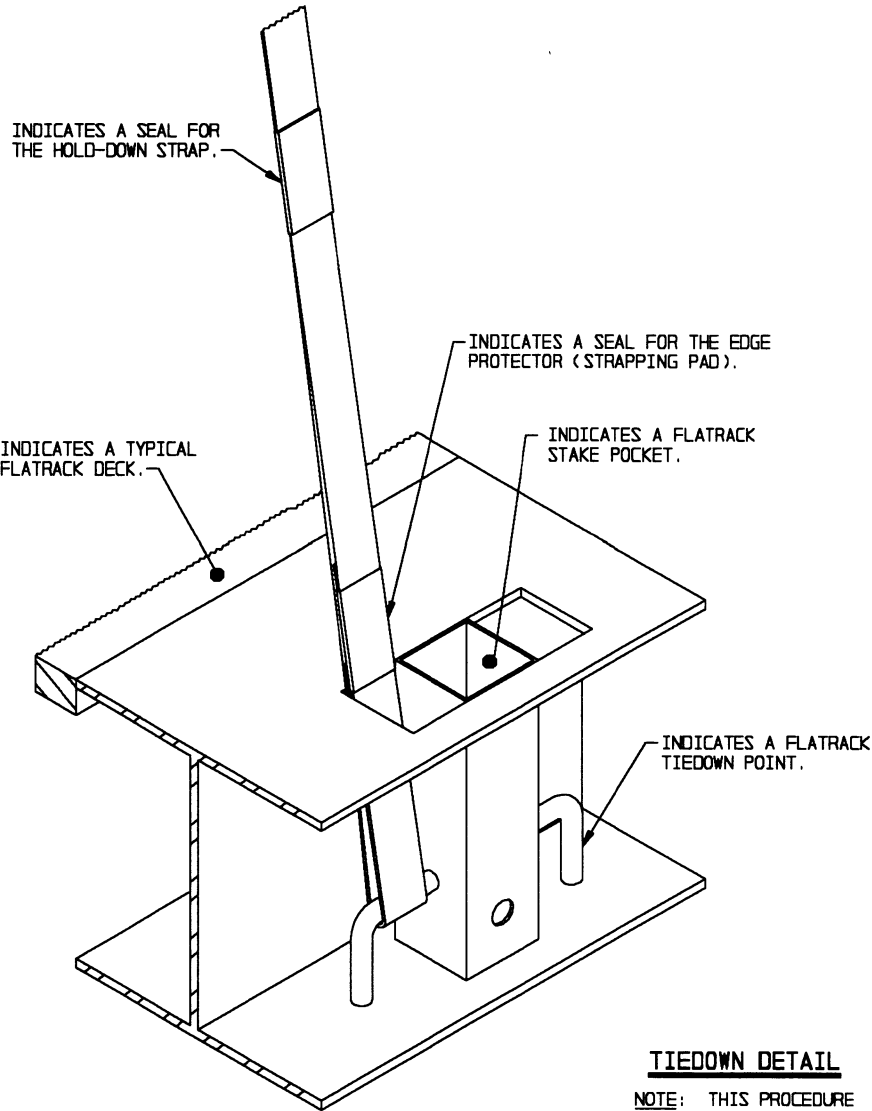
STOP PIECE, 2" X 4" X 12" (DOUBLED)
(4 REQD). CENTER ON BEAM ASSEMBLY
AND NAIL THE FIRST PIECE TO THE
BEAMS W/2-10d NAILS AT EACH JOINT.
NAIL THE SECOND PIECE TO THE FIRST
W/3-10d NAILS.

BEAM, 2" X 4" BY ENDWALL WIDTH
MINUS 1" (REF: 7'-10") (6 REQD).

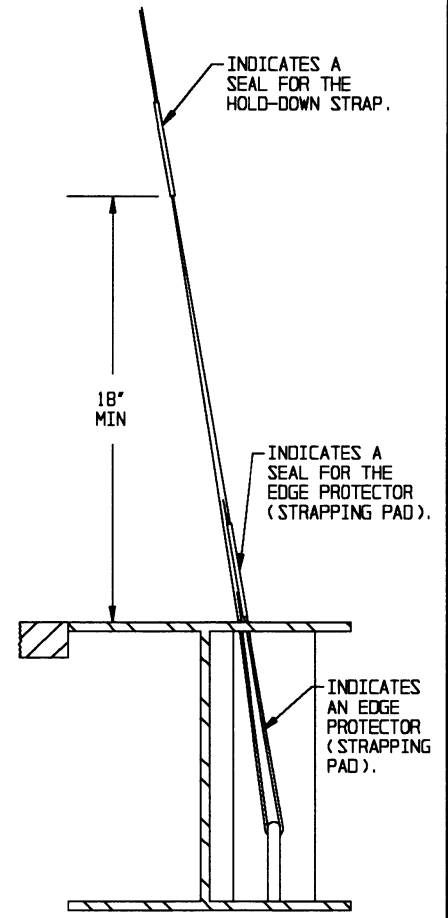
PLYWOOD, 1/2" X 9-1/2" BY ENDWALL WIDTH
MINUS 1" (REF: 7'-10") (6 REQD). NAIL
TO THE BEAMS W/1-6d NAIL EVERY 8".



END BLOCKING ASSEMBLY



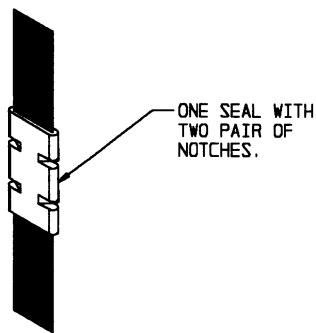
PARTIAL ISOMETRIC SECTION VIEW



PARTIAL SIDE VIEW

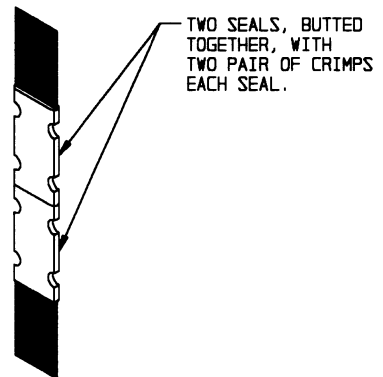
TIEDOWN DETAIL

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

