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DATE 2/19/91

LANCE

LOADING AND BRACING^① WITH WOODEN DUNNAGE ON COMMERCIAL FLATRACK CONTAINERS OF MAIN ASSEMBLAGE, M5, PACKED IN THE M599 CONTAINER

① LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLAT-CAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS. SEE GENERAL NOTE "L" ON PAGE 2.

		REVISIONS				DRAFTSMAN	TYPIST	CHECKER	TECHNICIAN	ENGINEER
		SY	TM	GRG	RSH	SY	TM	GRG	RSH	SY
1	DEC 91	RSH REVISED BY DATE	<i>Carl W. Horner</i>				<i>William F. Ernst</i>			
		RSH REVISED BY DATE	<i>William F. Ernst</i>				<i>Carl W. Horner</i>			
		REV					<i>William F. Ernst</i>			
		DES					<i>William F. Ernst</i>			
		CHK					<i>William F. Ernst</i>			
		APP					<i>William F. Ernst</i>			
		MTR					<i>William F. Ernst</i>			
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		DES					<i>William F. Ernst</i>			
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					APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC)					
					<i>William F. Ernst</i> U.S. ARMY DEFENSE ADMINISTRATION CENTER AND SCHOOL					
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		19	48	8180	GM 15LC3					

DO NOT SCALE

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. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO THE LANCE MAIN ASSEMBLAGE, M5, WHEN PACKED IN THE M599 CONTAINER. SEE PAGE 3 FOR DETAILS OF THE CONTAINER. **CAUTION:** REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE FLATRACK INCLUDING LADING AND DUNNAGE MUST NOT BE EXCEEDED.

C. FOR DETAIL OF THE M599 CONTAINER, SEE U.S. ARMY MISSILE COMMAND DRAWING NO. E-10-161905.

CONTAINER DIMENSIONS — 161" LONG BY 39" WIDE BY 43" HIGH
GROSS WEIGHT — 3,993 POUNDS (APPROX)
CUBIC FEET — 156.14 CU FT (APPROX)

D. THIS ITEM IS A DOT CLASS "B" EXPLOSIVE, WITH OR WITHOUT LIQUID PROPELLANTS, AND WILL BE SHIPPED UNDER DOT EXEMPTION 3600 AND A COAST GUARD CLASS "X-E" ITEM. THESE PROCEDURES CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE CONTAINERS WHEN THEY ARE LOADED WITH AN ITEM OTHER THAN THE SPECIFIED MAIN ASSEMBLAGE, OR WHEN THEY ARE EMPTY. **NOTICE:** WHEN M599 CONTAINERS ARE TO BE STOWED ABOARD SHIPS, STOWAGE IS RESTRICTED TO THE WEATHER DECK ONLY.

E. THE LOAD AS SHOWN IS BASED ON A 20'-0" LONG BY 8'-0" WIDE COMMERCIAL FLATRACK CONTAINER WITH FULL HEIGHT ENDWALLS, AND INSIDE DIMENSIONS OF 19'-5" LONG BY 7'-10" WIDE. THE LOAD AS SHOWN CAN BE SHIPPED BY ANY FORM OF SURFACE TRANSPORTATION. **NOTICE:** OTHER FLATRACK CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN ALSO BE USED.

F. DUNNAGE LUMBER SPECIFIED IS OF A NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 4" X 4" MATERIAL IS ACTUALLY 3-1/2" THICK BY 3-1/2" WIDE.

G. A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE, WHEN NAILS ARE DRIVEN INTO THE 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. WHEN LOADING THE M599 CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD BETWEEN THE END BLOCKING ASSEMBLY AND THE LADING. LONGITUDINAL VOIDS WITHIN THE LOAD ARE TO BE HELD TO A MINIMUM, NOT EXCEEDING ONE-HALF INCH (1/2"). THE LENGTH OF THE STRUTS IN THE END BLOCKING ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE A TIGHT FIT.

J. PORTIONS OF THE FLATRACK ENDWALLS DEPICTED WITHIN THIS DRAWING HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

K. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE (1) SEAL WITH TWO (2) PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) 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 5 FOR GUIDANCE.

L. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLAT-CAR (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.

M. 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; 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.

MATERIAL SPECIFICATIONS

LUMBER — SEE TM 743-200-1, DUNNAGE LUMBER. FED SPEC MM-L-751.

NAILS — COMMON, FED SPEC FF-N-105.

STRAPPING, STEEL — CLASS 1, TYPE I OR IX, HEAVY DUTY, FINISH A, B (GRADE 2), OR C, FED SPEC QQ-S-781.

STRAP SEAL — TYPE D, STYLE I, II, OR III, CLASS H, FINISH A, B (GRADE 2), OR C, FED SPEC QQ-S-781.

ANTI-CHAFING MATERIAL — NEUTRAL BARRIER MATERIAL MIL-B-121 (OR EQUAL).

(GENERAL NOTES CONTINUED)

N. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS/MODIFIED FLATBED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.

O. 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 18. NOTE THAT ALL STRAPPING USED FOR LOAD SECUREMENT, I.E., HOLD-DOWN STRAPS, MUST BE MARKED AS SPECIFIED IN LOADING RULE 15.

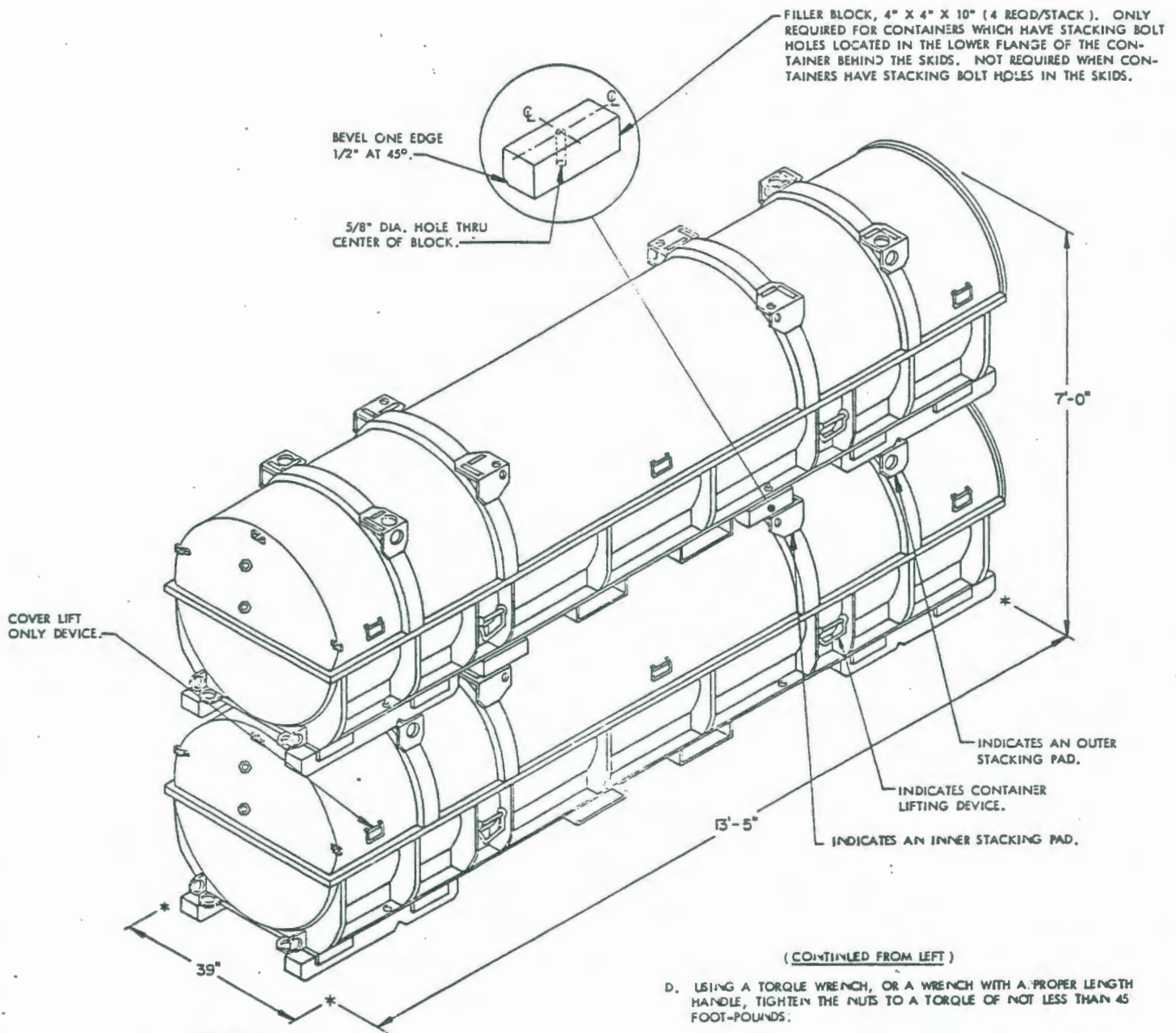
P. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454KG.

REVISION

REVISION NO. 1 DATED

CONSISTS OF:

1. CHANGING FILE NUMBER FROM GM 15LC2 TO GM 15LC3.
2. INCREASING THICKNESS OF ANTI-CHAFING ASSEMBLY.
3. REDUCING WIDTH OF SIDE BLOCKING ASSEMBLY.



STACK DETAIL

UNITIZING AND HANDLING PROCEDURAL GUIDANCE

1. STACKING CONTAINERS FOR UNITIZING.

- A. THE UPPER CONTAINER SHOULD BE PLACED AS CLOSELY AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE LOWER CONTAINER.
- B. POSITION THE FORWARD END OF THE UPPER CONTAINER ABOVE THE FORWARD END OF THE LOWER CONTAINER.
- C. THE CONTAINER INDEXING NOTCHES WITHIN THE SKID OF THE UPPER CONTAINER SHOULD BE FULLY SEATED OVER THE LOCATORS ON THE STACKING PADS OF THE LOWER CONTAINER.

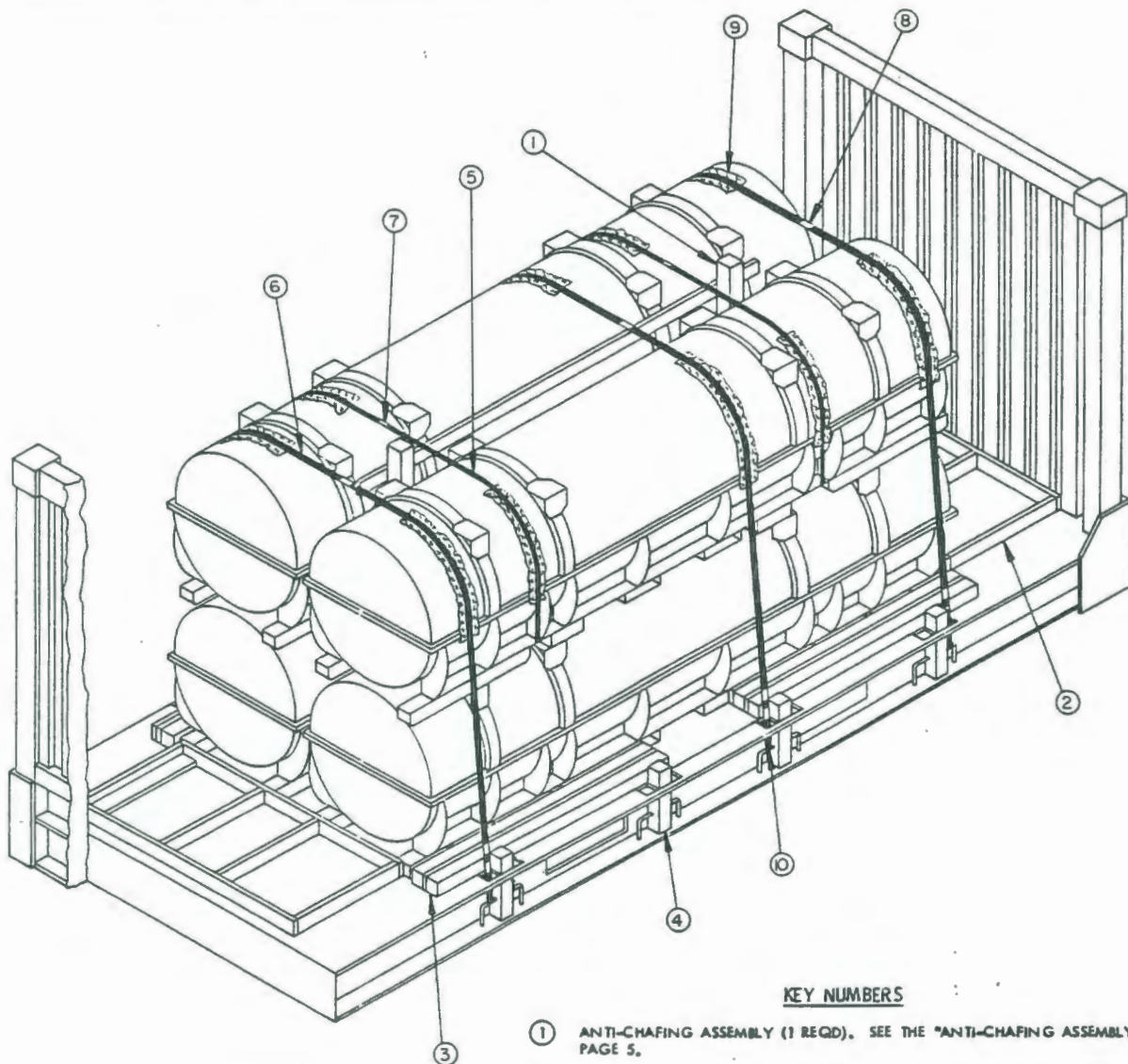
2. APPLICATION OF CONTAINER STACKING BOLTS.

- A. STACKING BOLTS ARE STORED ON THE SIDE OF EACH CONTAINER.
- B. SOME CONTAINERS ARE PROVIDED WITH A BOLT HOLE IN EACH SKID FOR SECURING AN UPPER CONTAINER OF A STACK TO THE FOUR (4) OUTER STACKING PADS OF A LOWER CONTAINER. HOWEVER, IF CONTAINERS HAVE BOLT HOLES LOCATED IN THE LOWER FLANGE OF THE CONTAINER BEHIND THE SKIDS, A NOMINAL 4" X 4" X 10" LONG "FILLER BLOCK" MUST BE USED IN CONJUNCTION WITH EACH STACKING BOLT AND THE UPPER CONTAINER SECURED TO THE FOUR (4) INNER STACKING PADS OF A LOWER CONTAINER.
- C. AFTER CONTAINERS ARE STACKED AND STACKING BOLTS, WITH "FILLER BLOCKS" IF APPLICABLE, ARE IN PLACE, INSTALL THE NUTS AND TIGHTEN WITH A RATCHET WRENCH AND AN APPROPRIATELY SIZED SOCKET UNTIL "SNUG."

(UNITIZING AND HANDLING PROCEDURAL GUIDANCE CONTINUED)

- (CONTINUED FROM LEFT)
- D. USING A TORQUE WRENCH, OR A WRENCH WITH A PROPER LENGTH HANDLE, TIGHTEN THE NUTS TO A TORQUE OF NOT LESS THAN 45 FOOT-POUNDS.
- 3. CONTAINER OR CONTAINER STACK HANDLING.**
- NOTES:** (1) APPROVED MATERIALS HANDLING EQUIPMENT (MHE) IS SPECIFIED IN OTHER DOCUMENTS. MHE IS INTENDED TO MEAN EQUIPMENT SUCH AS FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, AND SPREADER BARS.
- (2) PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.

- A. ONLY APPROVED AND APPROPRIATELY SIZED MATERIALS HANDLING EQUIPMENT WILL BE USED FOR HANDLING THE DEPICTED CONTAINERS.
- B. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, THE CONTAINERS SHOULD BE HANDLED FROM A SIDE POSITION AS MUCH AS POSSIBLE. CARE MUST BE EXERCISED WHEN INSERTING FORKS UNDER A CONTAINER, TO PREVENT DAMAGE TO THE CONTAINER BY THE FORK TINES OR THE FORKLIFT PACKAGE GUARD. FOR VERY SHORT "INCHING" SPEED MOVEMENTS, SUCH AS WILL BE EXPERIENCED DURING TRAILER LOADING, A TWO-HIGH CONTAINER STACK MAY BE HANDLED BY INSERTING THE FORKS OF A FORKLIFT TRUCK INTO THE FORK RECEPTACLES OF THE UPPER CONTAINER.
- C. IF ONE CONTAINER IS HANDLED BY SLINGING, THE SLING MAY BE ATTACHED TO THE LIFTING DEVICES ON THE CONTAINER, HOWEVER, IF A TWO-HIGH STACK IS HANDLED BY SLINGING, DO NOT ATTACH THE SLING TO THE LIFTING DEVICES ON THE CONTAINER. THE SLING USED MUST BE OF SUCH A DESIGN THAT LIFTING IS DONE ON THE BOTTOM OF THE LOWER CONTAINER.



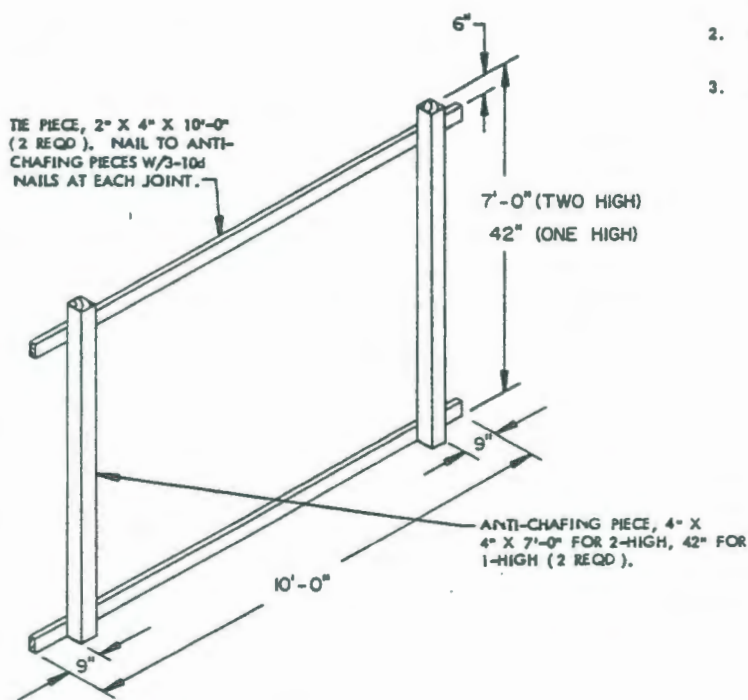
ISOMETRIC VIEW

KEY NUMBERS

- ① ANTI-CHAFING ASSEMBLY (1 REQD). SEE THE "ANTI-CHAFING ASSEMBLY" DETAIL ON PAGE 5.
- ② END BLOCKING ASSEMBLY (2 REQD). SEE THE "END BLOCKING ASSEMBLY" DETAIL ON PAGE 6. NAIL THRU EACH HOLD-DOWN CLEAT INTO THE CONTAINER FLOOR W/6-10d NAILS.
- ③ SIDE BLOCKING ASSEMBLY (4 REQD). SEE THE "SIDE BLOCKING ASSEMBLY" DETAIL ON PAGE 6.
- ④ STAKE, 4" X 4" X 15" (8 REQD). INSTALL THE STAKES IN THE FLATRACK STAKE POCKETS WITH A TIGHT (SNUG) FIT. NAIL 1-12d NAIL INTO THE STAKE THROUGH THE HOLD PROVIDED IN THE FRONT FACE OF THE STAKE POCKET. TO NAIL TO THE SIDE BLOCKING ASSEMBLY, PIECE MARKED ③, W/2-12d NAILS.
- ⑤ BUNDLING STRAP, 1 1/4" X .035" OR .031" BY A LENGTH-TO-SUIT (REF: 214-979-1-1-1). (2 REQD). INSTALL TO ENCIRCLE THE CONTAINERS IN THE UPPER LAYER.
- ⑥ HOLD-DOWN STRAP, 2" X .050" BY A LENGTH-TO-SUIT (REF: 261-07) (3 REQD). INSTALL EACH STRAP FROM TWO (2) 13'-0" LONG PIECES. SEE GENERAL NOTE "O" ON PAGE 2.
- ⑦ SEAL, 1 1/4" (2 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.
- ⑧ SEAL, 2" (15 REQD, 5 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES EXCEPT FOR SEALS USED TO SECURE STRAPPING PADS. SEE GENERAL NOTE "K" ON PAGE 2.
- ⑨ ANTI-CHAFING, NEUTRAL BARRIER MATERIAL (AS REQD). PLACE UNDER THE STRAPPING AT ALL POINTS OF CONTACT WITH THE M599 CONTAINERS.
- ⑩ PAD, STRAPPING, 2" X .050" X 18" (6 REQD). PRE-POSITION THE PAD BETWEEN THE HOLD-DOWN STRAP, PIECE MARKED ⑥, AND THE FLATRACK TIEDOWN PROVISION AND SECURE WITH SEAL CRIMPED WITH ONE PAIR OF NOTCHES. SEE THE "TIEDOWN DETAIL" ON PAGE 6.

SPECIAL NOTES:

1. A 4-UNIT LOAD OF M599 CONTAINERS IS DEPICTED ON A COMMERCIAL FLATRACK CONTAINER.
2. IT IS RECOMMENDED THAT HOLD-DOWN STRAP, PIECES MARKED ⑥, BE TENSIONED AND SEALED PRIOR TO THE BUNDLING STRAP, PIECE MARKED ⑤.
3. THE BUNDLING STRAPS, PIECES MARKED ⑤, ARE NOT REQUIRED IF THE HORIZONTAL TIE BARS ARE USED BETWEEN THE M599 CONTAINERS.



ANTI-CHAFING ASSEMBLY

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 3"	6	3
2" X 4"	118	79
4" X 4"	54	72
NAILS	NO. REQD	POUNDS
10d (3")	162	2-1/2
12d (3-1/4")	24	1/2
16d (3-1/2")	10	1/4
STEEL STRAPPING, 1-1/4" X .035" OR .031" — 42' REQD — 6 LBS		
SEAL FOR 1-1/4" STRAPPING — 2 REQD — NIL		
STEEL STRAPPING, 2" X .050" — 87' REQD — 30 LBS		
SEAL FOR 2" STRAPPING — 15 REQD — 3 LBS		
ANTI-CHAFING — AS REQD — NIL		



STRAP JOINT A

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

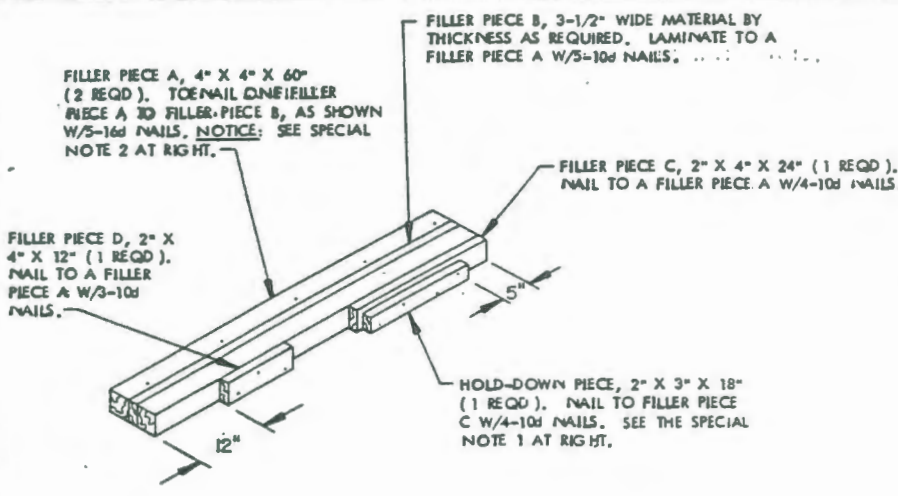


STRAP JOINT B

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

LOAD AS SHOWN

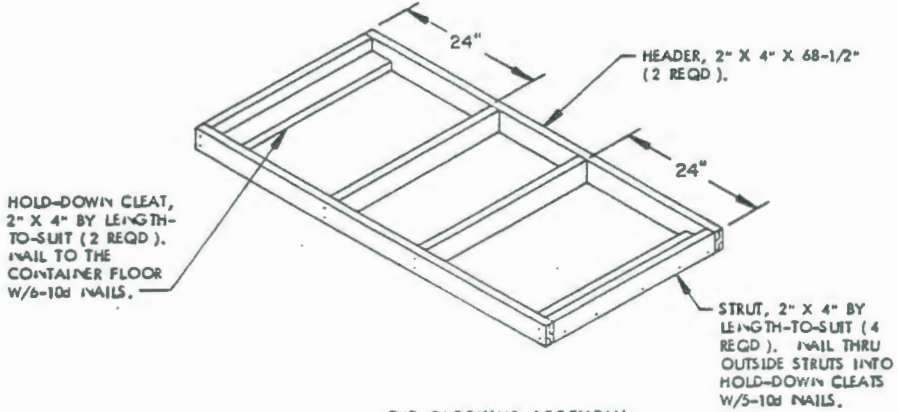
ITEM	QUANTITY	WEIGHT (APPROX)
M599 CONTAINER	4	15,972 LBS
DUNNAGE		351 LBS
FLAT RACK		5,732 LBS
TOTAL WEIGHT		22,055 LBS



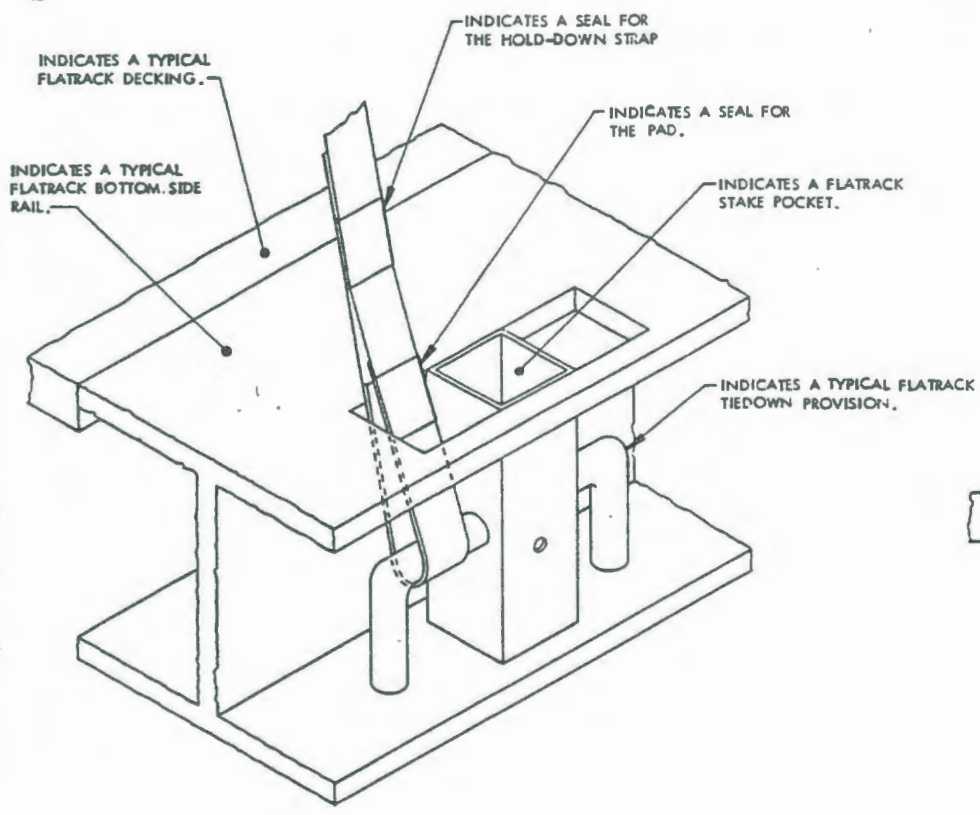
SIDE BLOCKING ASSEMBLY

SPECIAL NOTES:

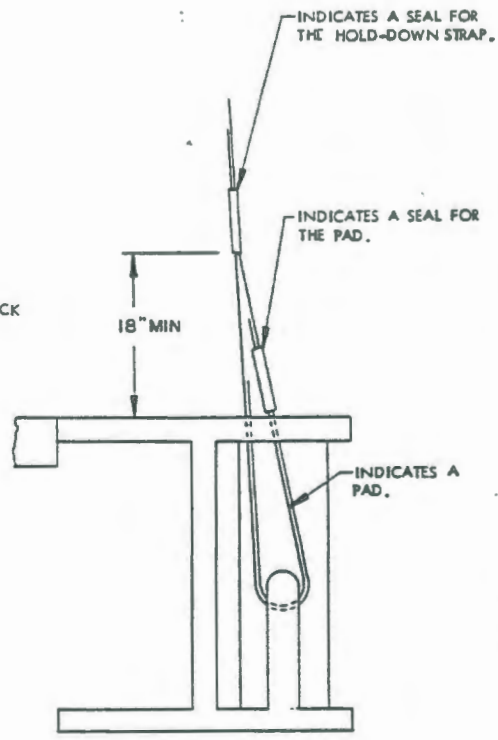
1. THE "SIDE BLOCKING ASSEMBLY" DEPICTED AT LEFT IS DESIGNED SO THAT THE "HOLD-DOWN PIECE" WILL BE LOCATED UNDER THE M599 CONTAINER BODY BETWEEN THE SKID AND THE FORKLIFT TUNNEL. TWO ASSEMBLIES AS DEPICTED MUST BE CONSTRUCTED AND TWO ASSEMBLIES HAVING THE "HOLD-DOWN PIECES" AND "FILLER PIECES C AND D" LOCATED OPPOSITE FROM THAT DEPICTED MUST BE CONSTRUCTED TO ENSURE PROPER SIDE BLOCKING ASSEMBLY FIT AND FUNCTION.
2. NOTICE: USE A 2" X 4" X 60" IN LIEU OF A 4" X 4" X 60" FOR THE TWO SIDE BLOCKING ASSEMBLIES ON ONE SIDE OF THE LOAD. LAMINATE THE 2" X 4" FILLER PIECE A TO THE FILLER PIECE B W/5-10d NAILS. THE REMAINING TWO SIDE BLOCKING ASSEMBLIES WILL BE CONSTRUCTED AS SHOWN.



END BLOCKING ASSEMBLY



TIEDOWN DETAIL



SIDE VIEW