

REV NO. 2 APPROVED BY  
 BUREAU OF EXPLOSIVES  
*A. F. Braasnick*  
 SUPERVISOR, MILITARY & INTERMODAL SERVICES  
 DATE *12/12/74*

# HAWK

## LOADING AND BRACING (CL & LCL) ON FLAT CARS OF ROCKET MOTOR, M22E8 OR M112, PACKED IN WOODEN CRATE<sup>⊗</sup>

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**⊗ CAUTION:**

THE WOODEN CRATE CONTAINING THE M22E8 MOTOR DESIGNATED HEREIN MUST BE MODIFIED IN ACCORDANCE WITH DRAWING NUMBER 19-48-AMXAC-4103, REV 1, DATED SEPTEMBER 1971. THE CRATE CONTAINING THE M112 MOTOR DESIGNATED HEREIN MUST BE MODIFIED IN ACCORDANCE WITH DRAWING NUMBER 19-48-AMXAC-4321.

THIS DRAWING, INCLUDING REVISION 2, SUPERSEDES DRAWING 19-48-5451-GM5A138, DATED 12 DECEMBER 1963, AND REVISION 1 THERETO, DATED 7 MARCH 1966.

**DO NOT SCALE**

REVISIONS				DRAFTSMAN	PROJ. ENG.
				<i>GMH</i>	<i>A4</i>
2	NOV 74	<i>WGA</i>	<i>WGA</i>	<i>WGA</i>	<i>WGA</i>
				<i>WGA</i>	<i>WGA</i>
				<small>APPROVED BY ORDER OF COMMANDING GENERAL            U. S. ARMY MATERIEL COMMAND</small> <i>WGA</i>	
				<small>U. S. ARMY MISSILE COMMAND</small> <small>U. S. ARMY MATERIEL COMMAND</small> <small>USAMC AMMO CENTER</small>	
				<b>U. S. ARMY MATERIEL COMMAND</b> <b>NOVEMBER 1974</b>	
				CLASS	DIVISION
				19	48
				DRAWING	FILE
				5451	GM 5HA4

## 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 OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO THE ROCKET MOTOR, M22E8 OR M112, WHEN IT IS PACKED IN A WOODEN CRATE. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE WOODEN SHIPPING CRATE WITH CONTENTS.
- C. FOR DETAILS OF THE CONTAINER FOR THE M22E8 ROCKET MOTOR, SEE DRAWING NO. 9070094 AND DRAWING NO. 19-48-AMXAC-4103, REV. 1.
- CONTAINER DIMENSIONS -- 113-1/2" LONG X 20-3/4" WIDE X 23-1/2" HIGH.  
GROSS WEIGHT ----- 1,095 POUNDS (APPROX).
- FOR DETAILS OF THE CONTAINER FOR THE M112 ROCKET MOTOR, SEE DRAWING NO. 10242897 AND DRAWING NO. 19-48-AMXAC-4321.
- CONTAINER DIMENSIONS -- 118" LONG X 20-1/4" WIDE X 22-7/8" HIGH.  
GROSS WEIGHT ----- 1,128 POUNDS (APPROX).
- D. THESE ITEMS ARE DOT CLASS "B" EXPLOSIVES. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR SHIPMENT OF THE DEPICTED CONTAINERS WHEN THEY ARE EMPTY OR LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEMS DESIGNATED WITHIN THE DRAWING TITLE.
- E. THE LOAD AS SHOWN ON PAGE 4 IS BASED ON A 41'-6" LONG BY 8'-6" WIDE (PLATFORM) FLAT CAR WHICH HAS STAKE POCKETS SPACED 42" ON CENTER. LARGER CARS MAY BE USED; HOWEVER, CARS LONGER THAN 41'-6" SHOULD NOT BE ORDERED FOR SHIPMENT OF THE DEPICTED LOAD.
- F. THE LOAD AS SHOWN ON PAGE 6 IS BASED ON A 50'-6" LONG BY 10'-2" WIDE (PLATFORM) FLAT CAR WHICH HAS STAKE POCKETS SPACED 42" ON CENTER. LARGER CARS MAY BE USED.
- G. THE LOAD AS SHOWN ON PAGE 8 IS BASED ON A 48'-6" LONG (INSIDE LENGTH BETWEEN FIXED-END BULKHEADS) BY 10'-4" WIDE (PLATFORM) FLAT CAR EQUIPPED WITH 6'-6" (MINIMUM) HIGH FIXED-END BULKHEADS, AND WITH STAKE POCKETS SPACED 42" ON CENTER. LARGER CARS AND/OR CARS WITH HIGHER FIXED-END BULKHEADS MAY BE USED.
- H. NOTICE: A SHIPMENT WILL BE POSITIONED ON A RAILCAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR. THE APPROVED METHODS FOR THE LOADS SPECIFIED HEREIN MUST BE FOLLOWED. THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE CAR TO BE LOADED OR THE QUANTITY TO BE SHIPPED. FOR A LOAD QUANTITY OTHER THAN SPECIFIED, THE APPROVED METHODS FOR BLOCKING, BRACING AND STAYING MUST BE FOLLOWED AS CLOSELY AS POSSIBLE.
- J. OTHER TYPES OF LADING ITEMS MAY BE LOADED ON A CAR WHICH IS PARTIALLY LOADED WITH THE DESIGNATED ITEMS, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN.
- K. THE SELECTION OF RAILCARS FOR TRANSPORT OF THE DESIGNATED ITEMS WILL BE IN ACCORDANCE WITH HAZARDOUS MATERIALS REGULATIONS OF DOT AND AR 55-355, CHAPTER 213, FOR EXPLOSIVES AND OTHER DANGEROUS ARTICLES, IN FULL.
- L. PRIOR TO ACCEPTANCE OF A CAR FOR SHIPMENT OF THE DESIGNATED CONTAINERS, THE CAR WILL BE INSPECTED TO ASSURE THAT IT HAS A "SOUND" WOOD OR AVAILABLE METAL FLOOR. THE FLOOR MUST BE SMOOTH AND EVEN, FREE OF NAILS, WARPED OR SPLIT BOARDS, TORN METAL, OR ANY OTHER DEFECTS THAT WOULD PREVENT A FULL AND SOLID BEARING FOR ALL THE SKIDS OF THE FIRST LAYER CONTAINERS OF THE LOAD. ADDITIONALLY, THE CONDITION OF THE FLOOR MUST BE ADEQUATE TO RESULT IN STABLE AND ERECT STACKS OF UNITS WHEN THEY ARE LOADED.
- M. CARS WITH STEEL FLOOR ENDS AND/OR EXPOSED STEEL BOLSTERS WHICH INTERFERE WITH PROPER POSITIONING OR NAILING OF THE DUNNAGE WILL NOT BE USED. SEE THE "END BLOCKING FOR CARS WITH EXPOSED STEEL BOLSTERS" DETAIL ON PAGE 15 FOR SPECIAL BLOCKING REQUIREMENTS WHICH ARE APPLICABLE FOR THE LOADS SHOWN HEREIN. IF THE CAR TO BE USED FOR A FULL LOAD HAS EXPOSED STEEL BOLSTERS, IT MUST BE LONGER THAN THE ONE SPECIFIED FOR THAT LOAD.

(CONTINUED AT RIGHT)

## MATERIAL SPECIFICATIONS

- LUMBER ----- : SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.
- NAILS ----- : COMMON, CEMENT COATED OR CHEMICALLY ETCHED.  
FED SPEC FF-N-105.  
ALT: ANNULAR-RING TYPE NAIL OF SAME SIZE.
- STRAPPING, STEEL --- : TYPE I OR IV, FINISH A OR B FOR 1-1/4" STRAPPING AND FINISH A, B, OR C FOR 2" STRAPPING; REF FED SPEC QQ-5-781.
- STRAP SEAL,  
STRAP STAPLE, STAKE  
POCKET PROTECTOR,  
EDGE PROTECTOR --- : COMMERCIAL GRADE.
- ANTI-SKID PLATE --- : SIGNODE NO. 1 (OR EQUAL).

## (GENERAL NOTES CONTINUED)

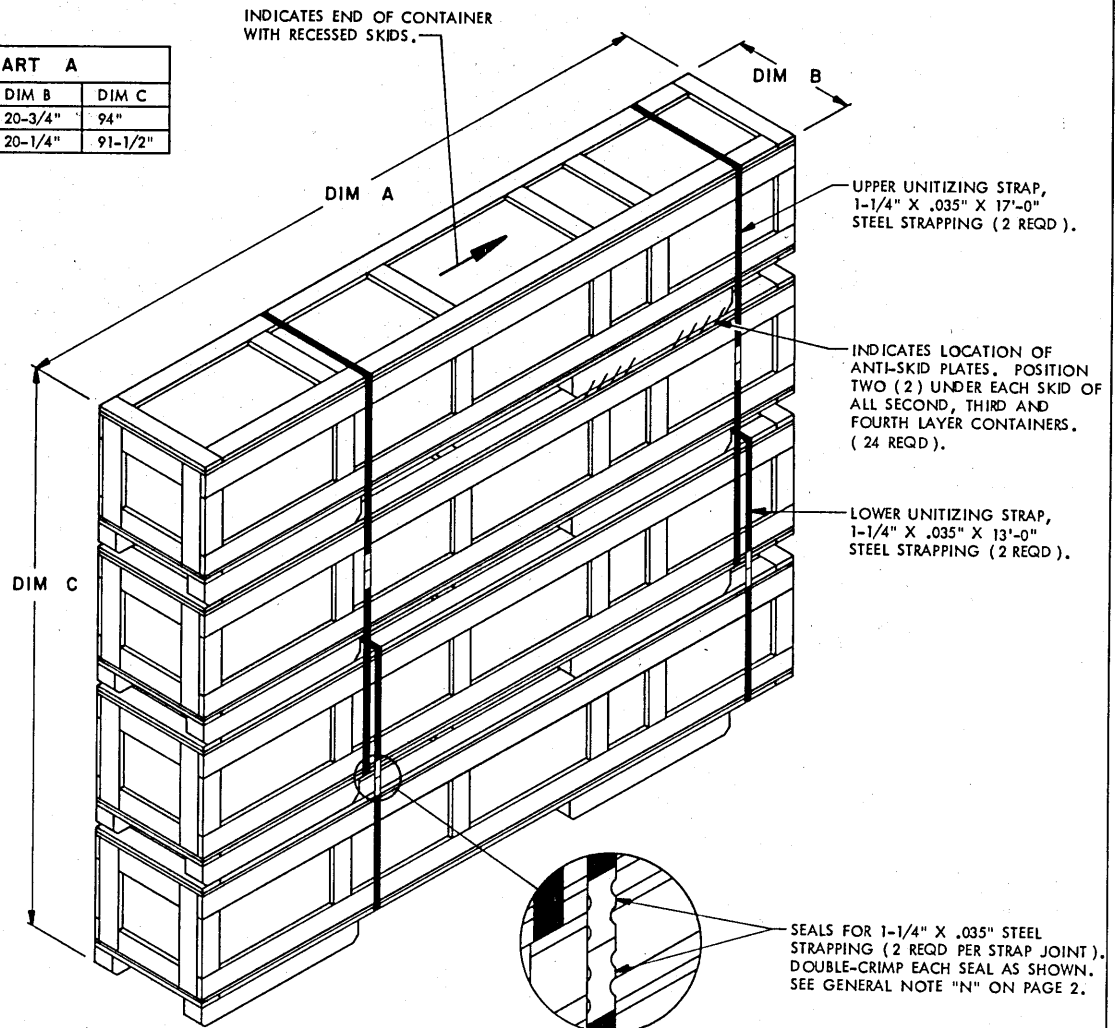
- N. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, OR AS SHOWN IN "DETAIL A" AND "DETAIL B" ON PAGE 16 A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL MUST BE USED TO SEAL THE JOINT. CAUTION: EXERCISE CARE DURING TENSIONING TO PREVENT DAMAGE TO THE CONTAINERS.
- O. CAUTION: STAKE POCKETS WILL BE USED FOR ANCHORING HOLD-DOWN STRAPPING WHENEVER POSSIBLE. DO NOT USE SWIVEL RING TYPE ANCHOR DEVICES. IF OTHER TYPES ARE USED, THEY MUST BE OF SUFFICIENT WIDTH TO RECEIVE 2" STRAPPING, AND ALSO BE OF A DESIGN WHICH WILL PROVIDE A BEARING SURFACE ACROSS THE FULL WIDTH OF THE STRAPPING, THAT WILL NOT DEFORM A STRAP, ESPECIALLY AT THE EDGES, WHEN IT IS TENSIONED.
- P. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS. 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.
- Q. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE OR 1-5/8" THICK BY 5-5/8" WIDE.
- R. IF THE CAPACITY OF THE AVAILABLE MATERIALS HANDLING EQUIPMENT (MHE) PERMITS, IT IS RECOMMENDED THAT CONTAINERS BE UNITIZED INTO STACKS PRIOR TO PLACEMENT ABOARD THE FLAT CAR. IN SOME INSTANCES, CONTAINERS WILL ALREADY BE UNITIZED INTO STACKS WHEN OFFERED FOR LOADING. THESE UNITIZED STACKS SHOULD BE INSPECTED, AND AS REQUIRED, LOOSE UNITIZING STEEL STRAPPING MUST BE REPLACED. SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3.
- S. IF THE CAR BEING USED IS NOT EQUIPPED WITH PLACARD BOARDS ON BOTH ENDS AND BOTH SIDES, 16" X 24" BOARDS MUST BE PROVIDED AS REQUIRED. CAUTION: BOARDS OR BOARD MOUNTING BRACKETS MUST NOT BE NAILED TO THE LADING.
- T. IF EDGE PROTECTORS FOR THE 2" STEEL STRAPPING ARE NOT COMMERCIALLY AVAILABLE, THEY MAY BE FORMED FROM 18 (MINIMUM) GAGE SHEET STEEL PIECES WHICH ARE 9" LONG BY 6" WIDE.
- U. THE WORDS "ANTI-SKID PLATE" WILL BE STENCILED IN ONE INCH (1") HIGH LETTERS ON BOTH SIDES OF A CONTAINER JUST ABOVE THE LOCATION OF THESE PLATES.
- V. FOR SPECIFIC GUIDANCE, ATTENTION IS DIRECTED TO THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO A DEPICTED OUTLOADING METHOD.

## REVISIONS

REVISION NO. 2, DATED NOVEMBER 1974, CONSISTS OF:

1. ADDING PROCEDURES FOR SHIPPING THE M112 MOTOR.
2. ADDING "UNITIZING AND HANDLING PROCEDURAL GUIDANCE".
3. CHANGES AS NECESSARY TO UPDATE DRAWING FORMAT.
4. CHANGING DRAWING FILE NO. FROM GM5A138 TO GM5HA4.
5. ADDING PROCEDURES FOR "FIXED-END" FLAT CARS.

DIMENSION CHART A			
CONTAINER	DIM A	DIM B	DIM C
M22E8	113-1/2"	20-3/4"	94"
M112	118"	20-1/4"	91-1/2"



TYPICAL STACK

**UNITIZING AND HANDLING  
PROCEDURAL GUIDANCE**

(PROCEDURAL GUIDANCE CONTINUED)

1. STACKING CONTAINERS FOR UNITIZING.
  - A. PLACE AN UPPER CONTAINER AS CLOSELY AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE NEXT LOWER CONTAINER.
  - B. INSTALL ANTI-SKID PLATES BETWEEN LAYERS AS SHOWN.
  - C. POSITION THE FORWARD END OF AN UPPER CONTAINER ABOVE THE FORWARD END OF THE NEXT LOWER CONTAINER.
2. INSTALLATION OF 1-1/4" X .035" UNITIZING STEEL STRAPPING.
  - A. POSITION EACH STRAP TO ENCIRCLE THE CONTAINERS NEAR THE AFT END OF THE SKIDS AND SO THAT THE STRAPPING LAYS FLAT AND STRAIGHT WITH THE BODY SURFACES OF THE CONTAINERS; I.E. VERTICAL ALONG THE SIDES AND STRAIGHT ALONG THE TOP AND BOTTOM OF THE STACK.
  - B. THE STRAPPING WILL BE FIRMLY TENSIONED SO THAT EACH STRAP CRUSHES SLIGHTLY INTO THE UPPER AND LOWER EDGES OF THE STACK. EACH END-OVER-END LAP JOINT WILL BE SEALED WITH TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL AS SHOWN. SEE GENERAL NOTE "N". THE LAP JOINT WILL BE ALONG THE SIDE OF THE STACK. EXCESS STRAPPING (STRAP ENDS) SHOULD BE CUT OFF OR BROKEN OFF NEAR THE JOINT SEALS.

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.

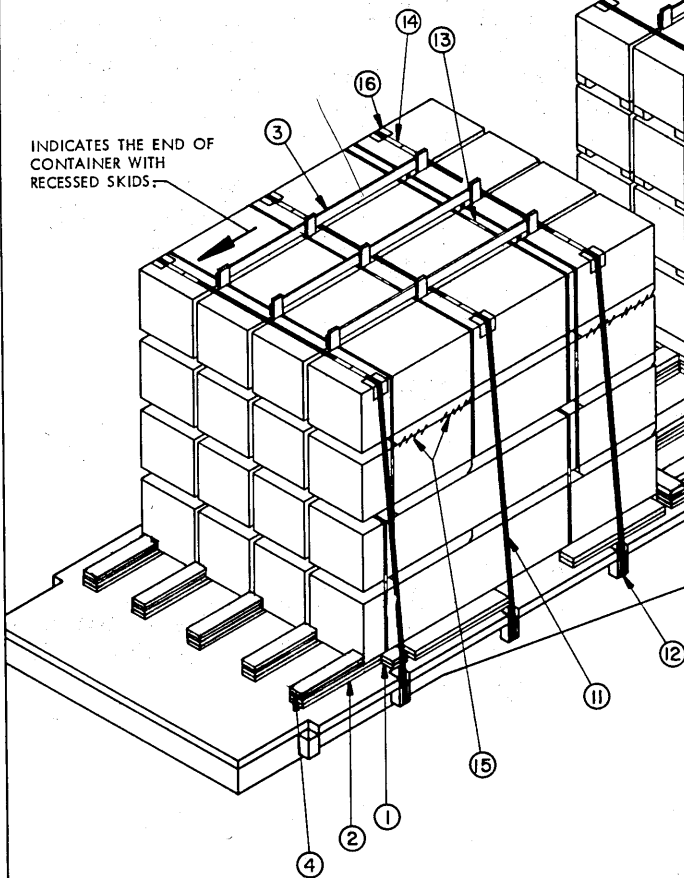
(2) PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.

  - 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 CAR LOADING, A CONTAINER STACK MAY BE HANDLED BY INSERTING THE FORKS OF THE FORKLIFT TRUCK UNDER THE BODY OF THE SECOND LAYER CONTAINER.
  - C. IF A CONTAINER OR STACK OF CONTAINERS IS HANDLED BY SLINGING, THE SLING MUST BE OF SUCH A DESIGN THAT LIFTING IS DONE ON THE BOTTOM OF THE LOWEST CONTAINER.

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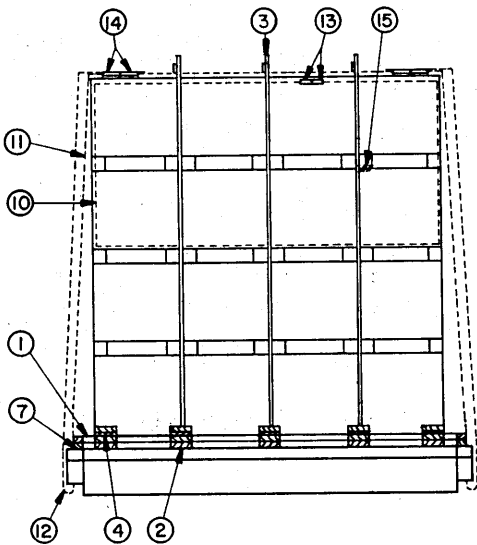
( KEY NUMBERS CONTINUED )

- ⑬ SEAL FOR 1-1/4" STRAPPING (.108 REQD, 2/STRAP). DOUBLE-CRIMP EACH SEAL. SEE GENERAL NOTE "N" ON PAGE 2.
- ⑭ SEAL FOR 2" STRAPPING ( 54 REQD, 6/STRAP ). EXCEPT FOR THE SEALS USED TO SECURE THE PADS, DOUBLE-CRIMP EACH SEAL.
- ⑮ ANTI-SKID PLATES ( 288-5" X 7" PLATES REQD OR 576-3-3/4" X 5" PLATES ). POSITION TWO ( 2 ) 5" X 7" PLATES OR FOUR ( 4 ) 3-3/4" X 5" PLATES UNDER EACH SKID OF EACH SECOND, THIRD AND FOURTH LAYER CONTAINER. SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "U" ON PAGE 2.
- ⑯ EDGE PROTECTOR FOR 2" STRAPPING ( 18 REQD ). POSITION TWO ( 2 ) UNDER EACH HOLD-DOWN STRAP AS SHOWN. SEE GENERAL NOTE "T" ON PAGE 2.



INDICATES THE END OF CONTAINER WITH RECESSED SKIDS.

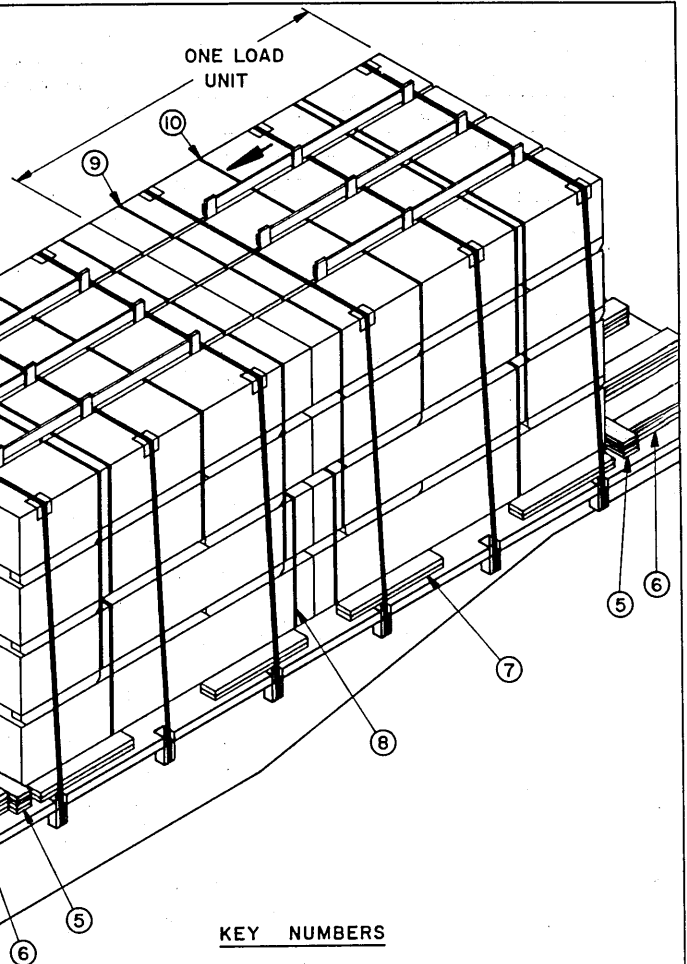
**ISOMETRIC VIEW**



**END VIEW**

UNITIZING STRAPS ARE NOT SHOWN FOR CLARITY PURPOSES.

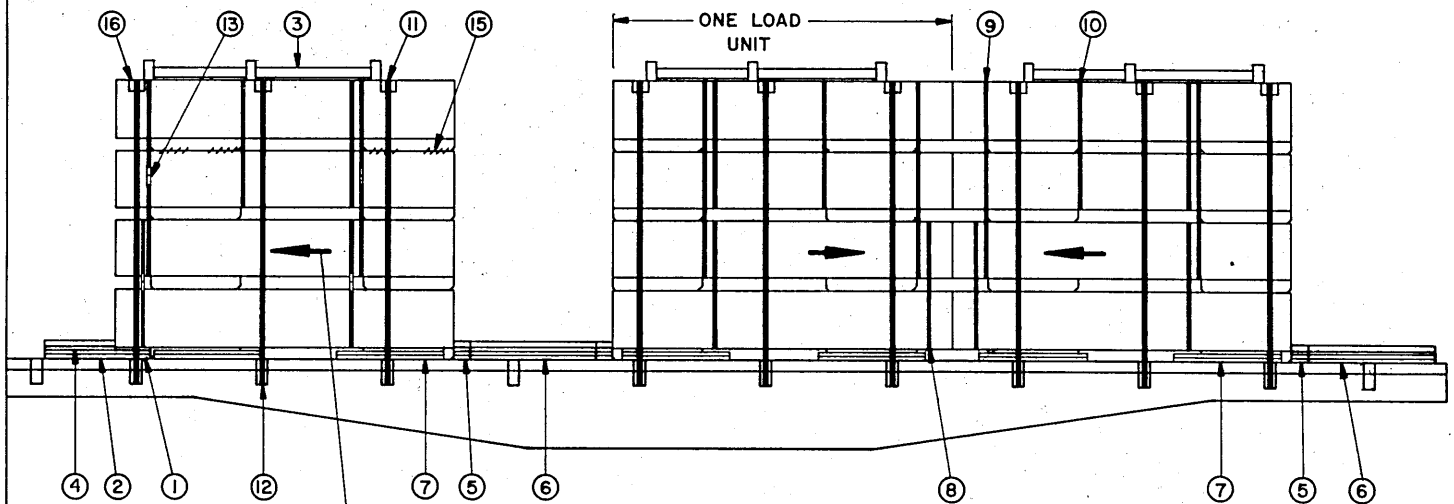
48-UNIT LOAD ON A 41'-6" LONG BY 8'-6" WIDE CAR



**KEY NUMBERS**

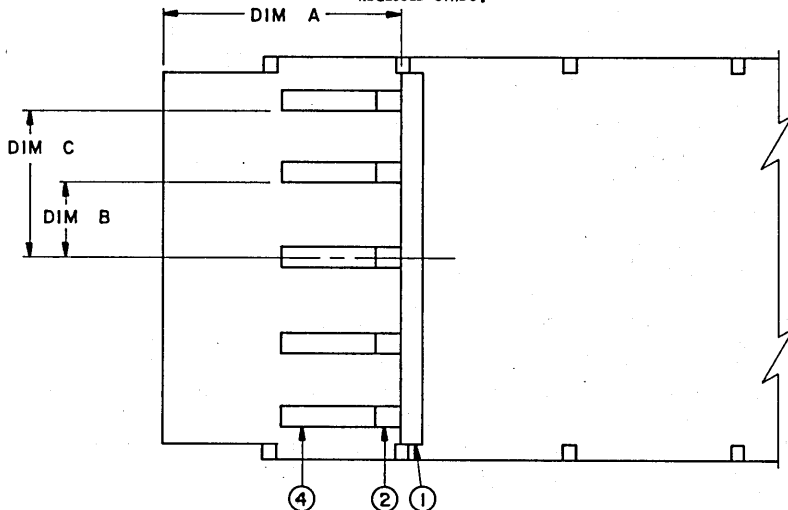
- ① PRE-POSITIONED HEADER, 2" X 6" X 8'-0" ( DOUBLED ) ( 1 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST W/1-60d NAIL EVERY 8". SEE THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 5 FOR LOCATION OF HEADER AND PIECES MARKED ②. SEE GENERAL NOTE "P" ON PAGE 2.
- ② PRE-POSITIONED BACK-UP CLEAT, 2" X 6" X 30" ( DOUBLED ) ( 5 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/5-60d NAILS.
- ③ ANTI-CHAFING ASSEMBLY ( 9 REQD ). SEE THE DETAIL ON PAGE 14.
- ④ CLEAT, 1" X 6" X 24" AND 2" X 6" X 24" ( 5 SETS REQD ). AFTER CONTAINERS HAVE BEEN PLACED ON THE CAR WITH THE RECESSED SKIDS BUTTED AGAINST HEADER MARKED ①, POSITION THE 1" X 6" PIECE UNDER THE 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO BACK-UP CLEAT MARKED ② W/4-60d NAILS.
- ⑤ HEADER, CONSISTING OF THREE 2" X 6" X 8'-0" AND ONE 1" X 6" X 8'-0" PIECES ( 3 SETS REQD ). NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/1-60d NAIL EVERY 8". POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/1-60d NAIL EVERY 8".
- ⑥ BACK-UP CLEAT, CONSISTING OF THREE 2" X 6" X 6" X 42" AND ONE 1" X 6" X 42" PIECES ( 10 SETS REQD ). ALIGN WITH CONTAINER SKIDS AS SHOWN AND NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/7-30d NAILS. NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/7-60d NAILS. POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/7-60d NAILS.
- ⑦ SIDE BLOCKING, 2" X 6" X 36" ( DOUBLED ) ( 12 REQD ). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑧ LOWER UNITIZING STRAP, 1-1/4" X .035" X 13'-0" LONG STEEL STRAPPING ( 24 REQD ). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "N" ON PAGE 2.
- ⑨ UPPER UNITIZING STRAP, 1-1/4" X .035" X 17'-0" LONG STEEL STRAPPING ( 24 REQD ).
- ⑩ LOAD BUNDLING STRAP, 1-1/4" X .035" X 25'-0" LONG STEEL STRAPPING ( 6 REQD ). INSTALL TO ENIRCLE THE TOP TWO ( 2 ) LAYERS OF CONTAINERS. SEE SPECIAL NOTE 6 ON PAGE 5.
- ⑪ HOLD-DOWN STRAP, 2" X .050" X 50'-0" LONG STEEL STRAPPING ( 9 REQD ). SEE THE "STRAPPING METHOD A" DETAIL ON PAGE 14 AND GENERAL NOTE "O" ON PAGE 2.
- ⑫ PAD, 2" X .050" STEEL STRAP 24" LONG ( 18 REQD ). POSITION UNDER A STAKE POCKET AND SEAL TO A PIECE MARKED ⑪. SEE "DETAIL C" ON PAGE 16. ALT: STAKE POCKET PROTECTOR ( 36 REQD ). USE TWO ( 2 ) UNDER EACH STAKE POCKET WITH A HOLD-DOWN STRAP. SEE "DETAIL D" ON PAGE 16.

( CONTINUED AT LEFT ABOVE )



INDICATES THE END OF CONTAINER WITH RECESSED SKIDS.

ELEVATION VIEW



PRE-POSITIONED DUNNAGE PLAN VIEW

DIMENSION CHART B			
CONTAINER	DIM A	DIM B	DIM C
M22E8	60"	18-3/4"	37-1/8"
M112	48"	18-1/4"	36-1/8"

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	285	95
1" X 6"	69	35
2" X 6"	300	300
NAILS		POUNDS
6d (2")	81	1/2
30d (4-1/2")	287	14-1/2
60d (6")	269	27
STEEL STRAPPING, 1-1/4" X .035"	870' REQD	125 LBS
STEEL STRAPPING, 2" X .050"	486' REQD	162 LBS
SEALS FOR 1-1/4" STRAPPING	108 REQD	6 LBS
SEALS FOR 2" STRAPPING	54 REQD	11 LBS
ANTI-SKID PLATES, 5" X 7"	288 REQD	72 LBS
EDGE PROTECTORS	18 REQD	5 LBS

SPECIAL NOTES:

1. A 48-UNIT LOAD OF M22E8 MOTORS IS SHOWN ON A 41'-6" LONG BY 8'-6" WIDE ( PLATFORM ) FLAT CAR. LARGER CARS MAY BE USED; HOWEVER, A LONGER CAR SHOULD NOT BE ORDERED FOR THE SHIPMENT OF A 48-UNIT LOAD.
2. THE CAR SHOWN IS EQUIPPED WITH 12 STAKE POCKETS ON EACH SIDE SPACED 42" ON CENTER. TO PROVIDE FOR APPLICATION OF THE HOLD-DOWN STRAPS IN THE APPROXIMATE LOCATION SHOWN, THE LOAD UNITS MUST BE POSITIONED ON THE CAR AS SHOWN IN THE LOAD VIEWS DEPICTED. ALSO, THE END OF THE CONTAINER WITH THE RECESSED SKIDS MUST FACE THE DIRECTION INDICATED BY THE ARROWS.
3. IF CARS ARE AVAILABLE WITH STAKE POCKETS SPACED OTHER THAN 42" APART, OR IF ADEQUATE TIE DOWN DEVICES ARE PROVIDED BETWEEN STAKE POCKETS, THE CONTAINERS SHOULD BE POSITIONED ON THE CAR TO MOST EFFICIENTLY UTILIZE HOLD-DOWN STRAP ATTACHMENT POINTS. THE LENGTH OF THE BACK-UP CLEATS, PIECES MARKED (6), MAY BE ADJUSTED, BUT MUST NOT BE LESS THAN 42". CAUTION: A STRAP MUST NOT BE POSITIONED CLOSER THAN 6" TO THE END OF A CONTAINER.
4. THE DEPICTED LOAD CONFIGURATION MAY BE ADJUSTED TO SATISFY THE QUANTITY OF ITEMS TO BE SHIPPED BY OMITTING AN ENTIRE LOAD UNIT OF SIXTEEN (16) CONTAINERS, BY OMITTING FOUR (4), EIGHT (8) OR TWELVE (12) FROM THE TOP LAYER, OR BY OMITTING ONE (1), TWO (2) OR THREE (3) CONTAINERS FROM THE TOP LAYER AND USING "SPACER ASSEMBLIES", AS DETAILED ON PAGE 15 AND AS SHOWN IN THE LOAD VIEW ON PAGE 11, IN THE PLACE OF EACH OMITTED CONTAINER. TWO (2) SPACER ASSEMBLIES MUST NOT BE USED SIDE-BY-SIDE; THEREFORE, ONLY ONE (1) CONTAINER MAY BE OMITTED FROM THE TOP LAYER OF EACH LOAD UNIT.
5. THE PROCEDURES DEPICTED ON PAGE 4 ARE ALSO APPLICABLE FOR SHIPPING THE SAME QUANTITY OF M112 MOTORS, PROVIDING THE PROVISIONS OF SPECIAL NOTE 3 CAN BE MAINTAINED. SEE THE "PRE-POSITIONED DUNNAGE PLAN VIEW" AT LEFT FOR PROPER POSITIONING OF PRE-POSITIONED HEADER AND BACK-UP CLEATS.
6. CAUTION: LOAD BUNDLING STRAPS, PIECES MARKED (10), MUST BE INSTALLED WITH CARE SO AS TO NOT HAVE AN EDGE-TO-EDGE CONTACT WITH THE STACK UNITIZING STRAPS MARKED (9).

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
M22E8 MOTOR	48	52,560 LBS *
DUNNAGE		1,498 LBS

TOTAL WEIGHT ----- 54,058 LBS

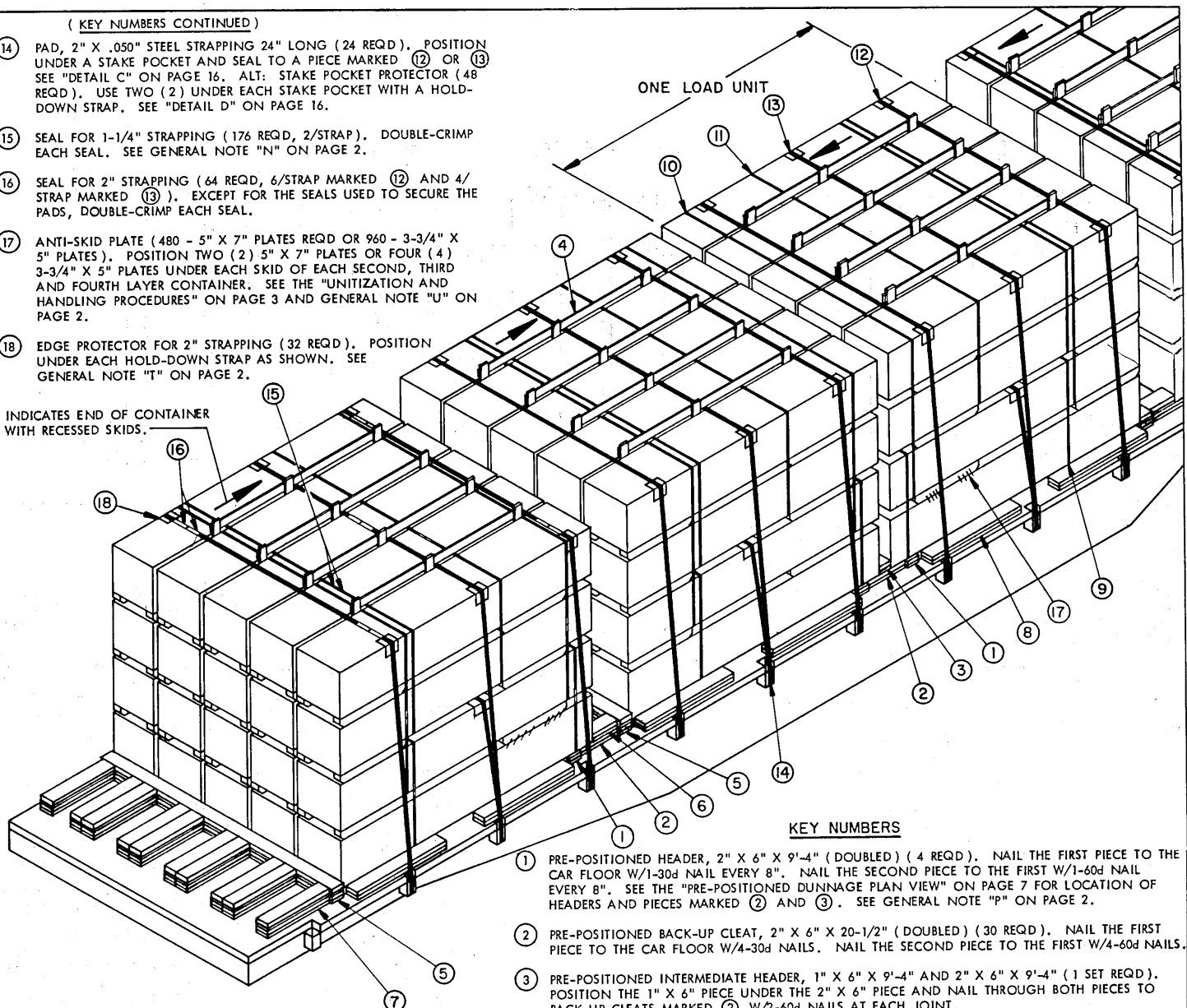
\* LADING WEIGHT FOR THE M112 ROCKET MOTOR WILL BE 54,144 LBS.

48-UNIT LOAD ON A 41'-6" LONG BY 8'-6" WIDE CAR

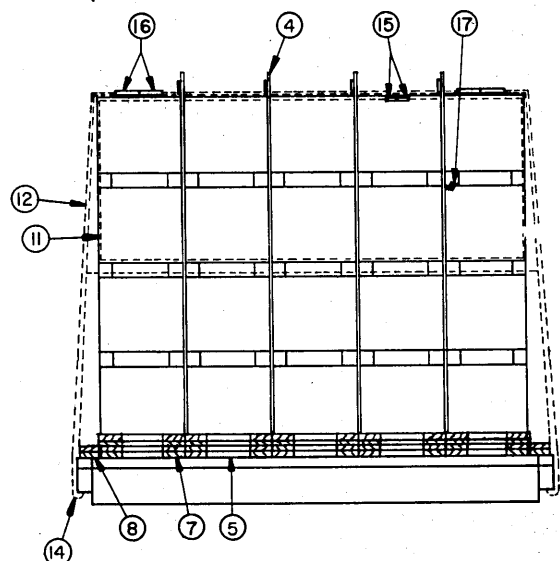
( KEY NUMBERS CONTINUED )

- 14 PAD, 2" X .050" STEEL STRAPPING 24" LONG (24 REQD). POSITION UNDER A STAKE POCKET AND SEAL TO A PIECE MARKED 12 OR 13 SEE "DETAIL C" ON PAGE 16. ALT: STAKE POCKET PROTECTOR (48 REQD). USE TWO (2) UNDER EACH STAKE POCKET WITH A HOLD-DOWN STRAP. SEE "DETAIL D" ON PAGE 16.
- 15 SEAL FOR 1-1/4" STRAPPING (176 REQD, 2/STRAP). DOUBLE-CRIMP EACH SEAL. SEE GENERAL NOTE "N" ON PAGE 2.
- 16 SEAL FOR 2" STRAPPING (64 REQD, 6/STRAP MARKED 12 AND 4/STRAP MARKED 13). EXCEPT FOR THE SEALS USED TO SECURE THE PADS, DOUBLE-CRIMP EACH SEAL.
- 17 ANTI-SKID PLATE (480 - 5" X 7" PLATES REQD OR 960 - 3-3/4" X 5" PLATES). POSITION TWO (2) 5" X 7" PLATES OR FOUR (4) 3-3/4" X 5" PLATES UNDER EACH SKID OF EACH SECOND, THIRD AND FOURTH LAYER CONTAINER. SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "U" ON PAGE 2.
- 18 EDGE PROTECTOR FOR 2" STRAPPING (32 REQD). POSITION UNDER EACH HOLD-DOWN STRAP AS SHOWN. SEE GENERAL NOTE "T" ON PAGE 2.

INDICATES END OF CONTAINER WITH RECESSED SKIDS.



ISOMETRIC VIEW



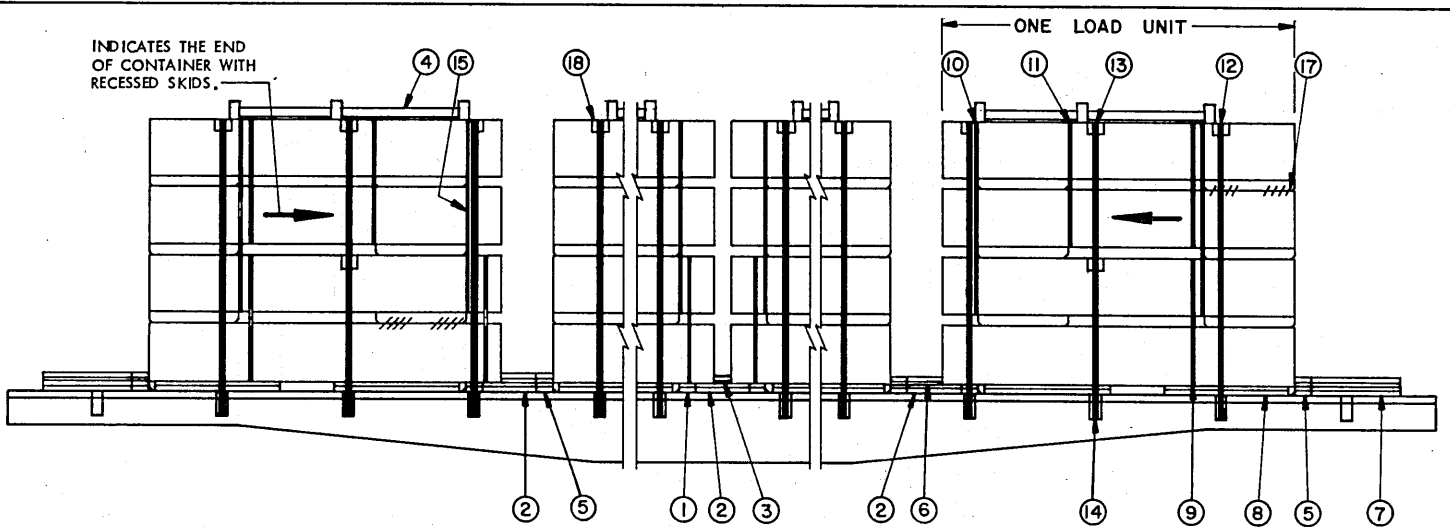
END VIEW

KEY NUMBERS

- 1 PRE-POSITIONED HEADER, 2" X 6" X 9'-4" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST W/1-60d NAIL EVERY 8". SEE THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 7 FOR LOCATION OF HEADERS AND PIECES MARKED 2 AND 3. SEE GENERAL NOTE "P" ON PAGE 2.
- 2 PRE-POSITIONED BACK-UP CLEAT, 2" X 6" X 20-1/2" (DOUBLED) (30 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/4-60d NAILS.
- 3 PRE-POSITIONED INTERMEDIATE HEADER, 1" X 6" X 9'-4" AND 2" X 6" X 9'-4" (1 SET REQD). POSITION THE 1" X 6" PIECE UNDER THE 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO BACK-UP CLEATS MARKED 2 W/2-60d NAILS AT EACH JOINT.
- 4 ANTI-CHAFING ASSEMBLY (16 REQD). SEE THE DETAIL ON PAGE 14.
- 5 HEADER, CONSISTING OF THREE 2" X 6" X 9'-4" AND ONE 1" X 6" X 9'-4" PIECES (4 SETS REQD). NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/1-60d NAIL EVERY 8". POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/1-60d NAIL EVERY 8".
- 6 CLEAT, 1" X 6" AND 2" X 6" BY CUT-TO-FIT (20 SETS REQD). POSITION THE 1" X 6" PIECE UNDER THE 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO A PRE-POSITIONED BACK-UP CLEAT MARKED 2 W/3-60d NAILS.
- 7 BACK-UP CLEAT, CONSISTING OF THREE 2" X 6" X 30" AND ONE 1" X 6" X 30" PIECES (20 SETS REQD). ALIGN WITH CONTAINER SKIDS AS SHOWN AND NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/5-60d NAILS. POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/5-60d NAILS.
- 8 SIDE BLOCKING, 2" X 6" X 42" (DOUBLED) (16 REQD). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/7-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- 9 LOWER UNITIZING STRAP, 1-1/4" X .035" X 13'-0" LONG STEEL STRAPPING (40 REQD). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "N" ON PAGE 2.
- 10 UPPER UNITIZING STRAP, 1-1/4" X .035" X 17'-0" LONG STEEL STRAPPING (40 REQD).
- 11 LOAD BUNDLING STRAP, 1-1/4" X .035" X 29'-0" LONG STEEL STRAPPING (8 REQD). INSTALL TO ENCIRCLE THE TOP TWO (2) LAYERS OF CONTAINERS. SEE SPECIAL NOTE 6 ON PAGE 7.
- 12 HOLD-DOWN STRAP, 2" X .050" X 54'-0" LONG STEEL STRAPPING (8 REQD). SEE THE "STRAPPING METHOD A" DETAIL ON PAGE 14 AND GENERAL NOTE "O" ON PAGE 2.
- 13 HOLD-DOWN STRAP, 2" X .050" X 52'-0" LONG STEEL STRAPPING (4 REQD). SEE THE "STRAPPING METHOD B" DETAIL ON PAGE 14.

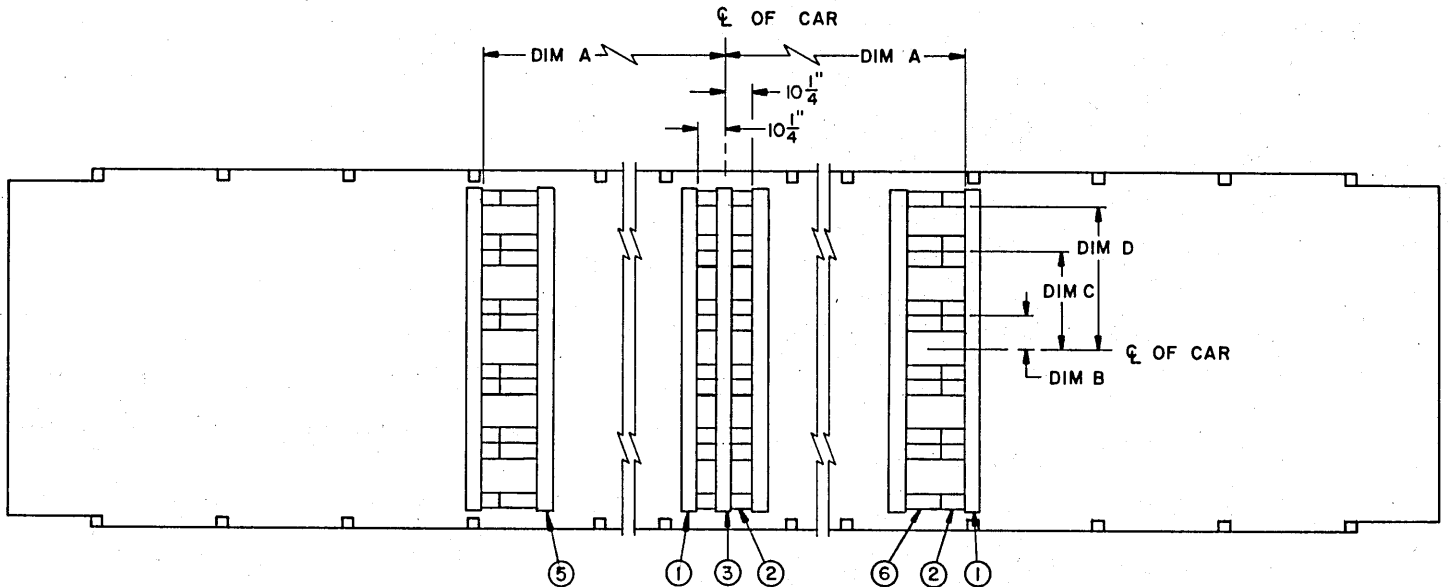
( CONTINUED AT LEFT ABOVE )

INDICATES THE END OF CONTAINER WITH RECESSED SKIDS.



ELEVATION VIEW

DIMENSION CHART C				
CONTAINER	DIM A	DIM B	DIM C	DIM D
M22E8	11'-10-1/4"	10-3/4"	32-1/4"	48"
M112	12'-2-3/4"	10-1/2"	31-1/2"	46-5/8"



PRE-POSITIONED DUNNAGE PLAN VIEW

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	507	169
1" X 6"	119	60
2" X 6"	585	585
NAILS	NO. REQD	POUNDS
6d (2")	144	1
30d (4-1/2")	556	28
60d (6")	568	57
STEEL STRAPPING, 1-1/4" X .035"	1,432' REQD	205 LBS
STEEL STRAPPING, 2" X .050"	688' REQD	230 LBS
SEALS FOR 1-1/4" STRAPPING	176 REQD	9 LBS
SEALS FOR 2" STRAPPING	64 REQD	13 LBS
ANTI-SKID PLATES, 5" X 7"	480 REQD	120 LBS
EDGE PROTECTORS	32 REQD	8 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
M112 MOTOR	80	90,240 LBS *
DUNNAGE		2,706 LBS
<b>TOTAL WEIGHT</b>		<b>92,946 LBS</b>

\* LADING WEIGHT FOR THE M22E8 MOTOR WILL BE 87,600 POUNDS.

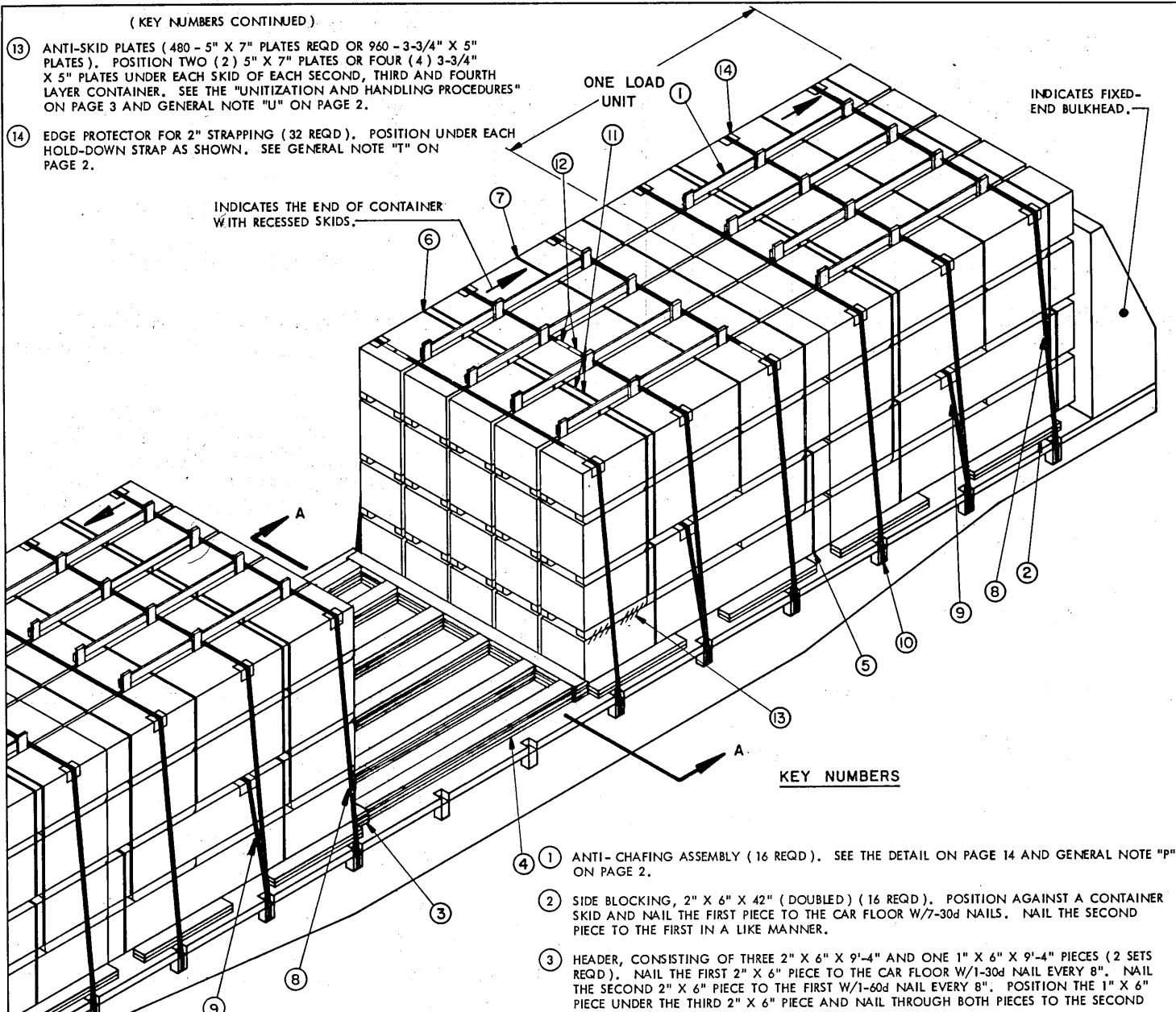
SPECIAL NOTES:

- AN 80-UNIT LOAD OF M112 MOTORS IS SHOWN ON A 50'-6" LONG BY 10'-2" WIDE (PLATFORM) FLAT CAR. LONGER CARS MAY BE USED; HOWEVER, A LONGER CAR SHOULD NOT BE ORDERED FOR SHIPMENT OF AN 80-UNIT LOAD.
- THE CAR SHOWN IS EQUIPPED WITH 14 STAKE POCKETS ON EACH SIDE SPACED 42" ON CENTER. TO PROVIDE FOR APPLICATION OF THE HOLD-DOWN STRAPS IN THE APPROXIMATE LOCATION SHOWN, THE LOAD UNITS MUST BE POSITIONED ON THE CAR AS SHOWN IN THE LOAD VIEWS DEPICTED. ALSO, THE END OF THE CONTAINER WITH THE RECESSED SKIDS MUST FACE THE DIRECTION INDICATED BY THE ARROWS.
- IF CARS ARE AVAILABLE WITH STAKE POCKETS SPACED OTHER THAN 42" APART, OR IF ADEQUATE TIE-DOWN DEVICES ARE PROVIDED BETWEEN STAKE POCKETS, THE CONTAINERS SHOULD BE POSITIONED ON THE CAR TO MOST EFFICIENTLY UTILIZE HOLD-DOWN STRAP ATTACHMENT POINTS. THE LENGTH OF THE PRE-POSITIONED BACK-UP CLEATS, MARKED (2), MAY BE ADJUSTED, BUT NOT LESS THAN 18". CAUTION: A STRAP MUST NOT BE POSITIONED CLOSER THAN 6" TO THE END OF A CONTAINER.
- THE DEPICTED LOAD CONFIGURATION MAY BE ADJUSTED TO SATISFY THE NUMBER OF ITEMS TO BE SHIPPED BY OMITTING AN ENTIRE LOAD UNIT OF TWENTY (20) CONTAINERS, BY OMITTING FIVE (5), TEN (10), FIFTEEN (15) OR TWENTY (20) CONTAINERS FROM THE TOP LAYER, OR BY OMITTING ONE (1) OR TWO (2) CONTAINERS FROM THE TOP LAYER OF ANY LOAD UNITS AND USING "SPACER ASSEMBLIES", AS DETAILED ON PAGE 15 AND AS SHOWN IN THE LOAD VIEW ON PAGE 11, IN THE PLACE OF EACH OMITTED CONTAINER. TWO (2) SPACER ASSEMBLIES MUST NOT BE POSITIONED SIDE-BY-SIDE; THEREFORE, ONLY TWO (2) CONTAINERS MAY BE OMITTED FROM THE TOP LAYER OF EACH LOAD UNIT.
- THE PROCEDURES DEPICTED ON PAGE 6 ARE ALSO APPLICABLE FOR SHIPPING THE SAME QUANTITY OF M22E8 MOTORS, PROVIDING THE PROVISIONS OF SPECIAL NOTE 3 CAN BE MAINTAINED. SEE THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ABOVE FOR PROPER POSITIONING OF PRE-POSITIONED HEADERS AND BACK-UP CLEATS.
- CAUTION: LOAD BUNDLING STRAPS, PIECES MARKED (11), MUST BE INSTALLED WITH CARE SO AS TO NOT HAVE AN EDGE-TO-EDGE CONTACT WITH THE STACK UNITIZING STRAPS MARKED (10).

80-UNIT LOAD ON A 50'-6" LONG BY 10'-2" WIDE CAR

(KEY NUMBERS CONTINUED)

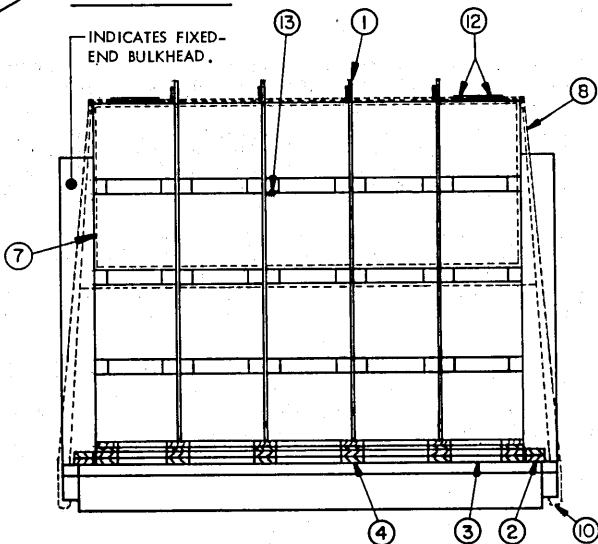
- 13 ANTI-SKID PLATES (480 - 5" X 7" PLATES REQD OR 960 - 3-3/4" X 5" PLATES). POSITION TWO (2) 5" X 7" PLATES OR FOUR (4) 3-3/4" X 5" PLATES UNDER EACH SKID OF EACH SECOND, THIRD AND FOURTH LAYER CONTAINER. SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "U" ON PAGE 2.
- 14 EDGE PROTECTOR FOR 2" STRAPPING (32 REQD). POSITION UNDER EACH HOLD-DOWN STRAP AS SHOWN. SEE GENERAL NOTE "I" ON PAGE 2.



**KEY NUMBERS**

- 1 ANTI-CHAFING ASSEMBLY (16 REQD). SEE THE DETAIL ON PAGE 14 AND GENERAL NOTE "N" ON PAGE 2.
- 2 SIDE BLOCKING, 2" X 6" X 42" (DOUBLED) (16 REQD). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/7-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- 3 HEADER, CONSISTING OF THREE 2" X 6" X 9'-4" AND ONE 1" X 6" X 9'-4" PIECES (2 SETS REQD). NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/1-60d NAIL EVERY 8". POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/1-60d NAIL EVERY 8".
- 4 STRUT, CONSISTING OF THREE 2" X 6" AND ONE 1" X 6" PIECES, ALL CUT-TO-FIT BETWEEN HEADERS MARKED 3 (6 SETS REQD). ALIGN WITH CONTAINER SKIDS AS SHOWN AND NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 6". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/1-60d NAIL EVERY 6". POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/1-60d NAIL EVERY 6".
- 5 LOWER UNITIZING STRAP, 1-1/4" X .035" X 13'-0" LONG STEEL STRAPPING (40 REQD). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "N" ON PAGE 2.
- 6 UPPER UNITIZING STRAP, 1-1/4" X .035" X 17'-0" LONG STEEL STRAPPING (40 REQD).
- 7 LOAD BUNDLING STRAP, 1-1/4" X .035" X 29'-0" LONG STEEL STRAPPING (8 REQD). INSTALL TO ENCIRCLE THE TOP TWO (2) LAYERS OF CONTAINERS. SEE SPECIAL NOTE 5 ON PAGE 9.
- 8 HOLD-DOWN STRAP, 2" X .050" X 54'-0" LONG STEEL STRAPPING (8 REQD). SEE THE "STRAPPING METHOD A" DETAIL ON PAGE 14 AND GENERAL NOTE "O" ON PAGE 2.
- 9 HOLD-DOWN STRAP, 2" X .050" X 52'-0" LONG STEEL STRAPPING (4 REQD). SEE THE "STRAPPING METHOD B" DETAIL ON PAGE 14.
- 10 PAD, 2" X .050" STEEL STRAPPING 24" LONG (24 REQD). POSITION UNDER A STAKE POCKET AND SEAL TO A PIECE MARKED 8 OR 9. SEE "DETAIL C" ON PAGE 16. ALT: STAKE POCKET PROTECTOR (48 REQD). USE TWO (2) UNDER EACH STAKE POCKET WITH A HOLD-DOWN STRAP. SEE "DETAIL D" ON PAGE 16.
- 11 SEAL FOR 1-1/4" STRAPPING (176 REQD, 2/STRAP). DOUBLE-CRIMP EACH SEAL. SEE GENERAL NOTE "N" ON PAGE 2.
- 12 SEAL FOR 2" STRAPPING (64 REQD, 6/STRAP MARKED 8 AND 4/STRAP MARKED 9). EXCEPT FOR THE SEALS USED TO SECURE THE PADS, DOUBLE-CRIMP EACH SEAL.

**ISOMETRIC VIEW**

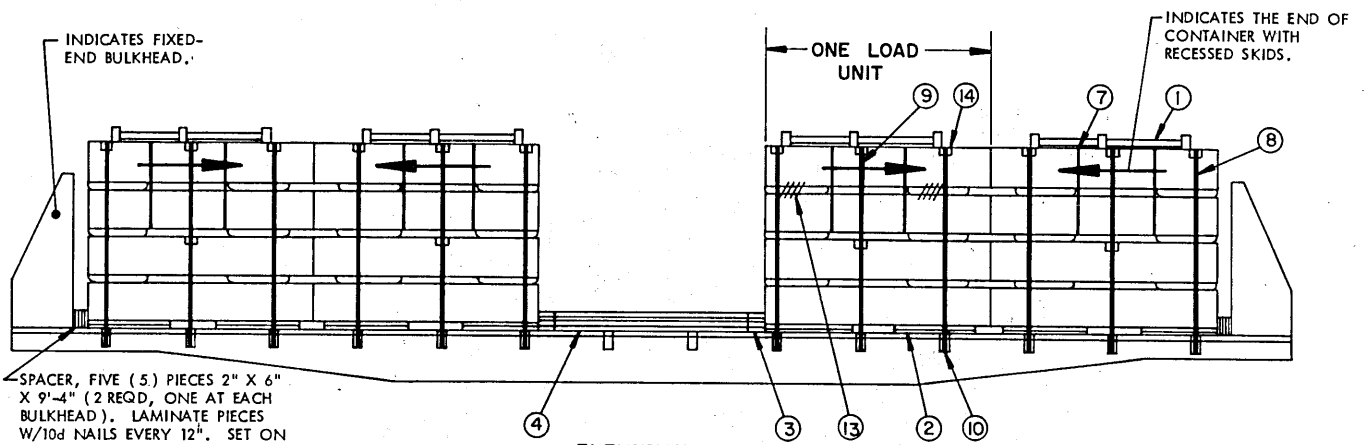


**SECTION A-A**

UNITIZING STRAPS ARE NOT SHOWN FOR CLARITY PURPOSES.

80-UNIT LOAD ON A 53'-6" LONG BY 10'-4" WIDE FIXED-END FLAT CAR





**ELEVATION VIEW**

THIS VIEW DEPICTS AN 80-UNIT LOAD OF M22E8 MOTORS. STACK UNITIZING STRAPS AND SEALS ARE OMITTED FROM THE VIEW FOR CLARITY. SEE SPECIAL NOTES 1 AND 2 BELOW.

**SPECIAL NOTES:**

1. AN 80-UNIT LOAD IS SHOWN ON A 48'-6" LONG (INSIDE LENGTH BETWEEN FIXED-END BULKHEADS) BY 10'-4" WIDE (PLATFORM) FLAT CAR EQUIPPED WITH 6'-6" (MINIMUM) HIGH FIXED-END BULKHEADS, AND HAVING 14 STAKE POCKETS ON EACH SIDE SPACED 42" ON CENTER. TO PROVIDE FOR APPLICATION OF THE HOLD-DOWN STRAPS IN THE APPROXIMATE LOCATIONS SHOWN, THE LOAD UNITS MUST BE POSITIONED ON THE CAR AS SHOWN IN THE ISOMETRIC VIEW ON PAGE 8 WHEN SHIPPING THE M112 MOTOR AND AS SHOWN IN THE ELEVATION VIEW ABOVE WHEN SHIPPING THE M22E8 MOTOR. ALSO, THE END OF THE CONTAINER WITH THE RECESSED SKIDS MUST FACE THE DIRECTION INDICATED BY THE ARROWS. LARGER CARS MAY BE USED; HOWEVER, LONGER CARS SHOULD NOT BE ORDERED FOR THE SHIPMENT OF AN 80-UNIT LOAD. NARROWER CARS MAY ALSO BE USED BUT MUST BE NOT LESS THAN 9'-10" WIDE FOR THE DEPICTED LOAD. AN 80-UNIT LOAD CAN ALSO BE SHIPPED ON A SHORTER CAR, PROVIDING THE CLEARANCE BETWEEN FIXED-END BULKHEADS IS AT LEAST 37'-10" FOR A SHIPMENT OF M22E8 MOTORS OR AT LEAST 39'-4" FOR A SHIPMENT OF M112 MOTORS, AND PROVIDING SUFFICIENT STAKE POCKETS OR TIE DOWN DEVICES ARE AVAILABLE AND SUITABLY LOCATED FOR APPLICATION OF THE SPECIFIED HOLD-DOWN STRAPS. SEE NOTE 2 BELOW.
2. IF CARS ARE AVAILABLE WITH STAKE POCKETS OTHER THAN 42" APART, OR IF ADEQUATE TIE-DOWN DEVICES ARE PROVIDED BETWEEN STAKE POCKETS, THE CONTAINERS SHOULD BE POSITIONED ON THE CAR TO MOST EFFICIENTLY UTILIZE HOLD-DOWN STRAP ATTACHMENT POINTS. CAUTION: THREE (3) HOLD-DOWN STRAPS, PIECES MARKED (8) AND (9), MUST BE APPLIED TO EACH LOAD UNIT, AND A STRAP MUST NOT BE POSITIONED CLOSER THAN 6" TO THE END OF A CONTAINER.
3. THE DEPICTED LOAD CONFIGURATION MAY BE ADJUSTED TO SATISFY THE QUANTITY OF ITEMS TO BE SHIPPED BY OMITTING AN ENTIRE LOAD UNIT OF TWENTY (20) CONTAINERS, BY OMITTING FIVE (5), TEN (10), FIFTEEN (15) OR TWENTY (20) CONTAINERS FROM THE TOP LAYER, OR BY OMITTING ONE (1), TWO (2), THREE (3) OR FOUR (4) CONTAINERS FROM THE TOP LAYER AND USING "SPACER ASSEMBLIES", AS DETAILED ON PAGE 15 AND AS SHOWN IN THE LOAD VIEW ON PAGE 11, IN THE PLACE OF EACH OMITTED CONTAINER. TWO (2) SPACER ASSEMBLIES MUST NOT BE POSITIONED SIDE-BY-SIDE; THEREFORE, ONLY TWO (2) CONTAINERS MAY BE OMITTED FROM THE TOP LAYER OF A LOAD UNIT.
4. IT IS PERMISSIBLE TO SHIP A 100-UNIT LOAD (5 LOAD UNITS) OF M22E8 MOTORS ON A CAR HAVING 47'-4" OR MORE BETWEEN FIXED-END BULKHEADS OR A 100-UNIT LOAD OF M112 MOTORS ON A CAR HAVING 49'-2" OR MORE BETWEEN BULKHEADS; HOWEVER, THE QUANTITY AND LOCATION OF STAKE POCKETS AND/OR OTHER SUITABLE TIE DOWN DEVICES MUST PERMIT COMPLIANCE WITH REQUIREMENTS SET FORTH IN NOTE 2 ABOVE.
5. CAUTION: LOAD BUNDLING STRAPS, PIECES MARKED (7), MUST BE INSTALLED WITH CARE SO AS TO NOT HAVE AN EDGE-TO-EDGE CONTACT WITH THE UNITIZING STRAPS MARKED (5) AND (6).

**BILL OF MATERIAL**

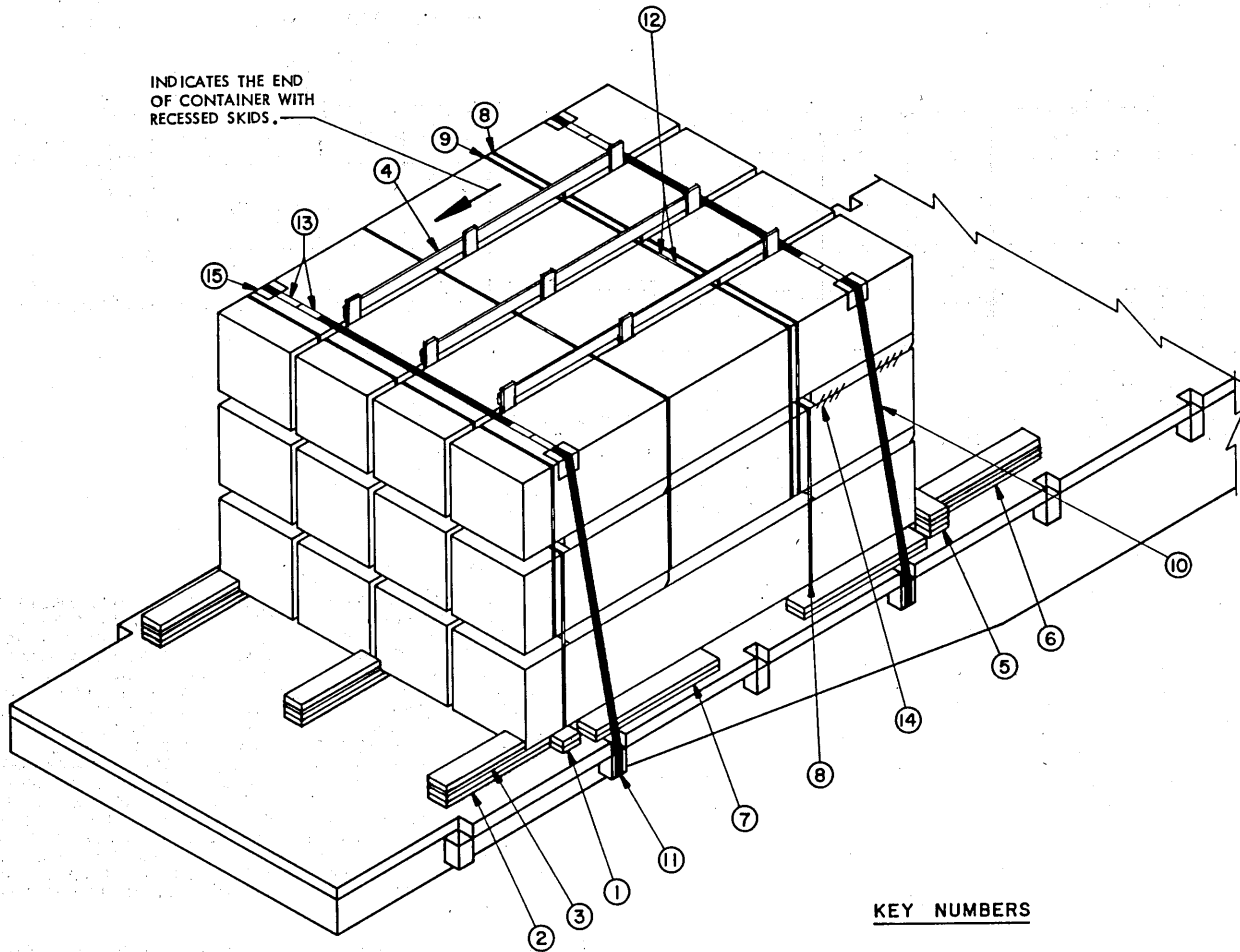
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	507	169
1" X 6"	69	35
2" X 6"	317	317
NAILS	NO. REQD	POUNDS
6d (2")	144	1
30d (4-1/2")	354	17-3/4
60d (6")	260	26
STEEL STRAPPING, 1-1/4" X .035"	1,432' REQD	205 LBS
STEEL STRAPPING, 2" X .050"	688 REQD	230 LBS
SEALS FOR 1-1/4" STRAPPING	176 REQD	9 LBS
SEALS FOR 2" STRAPPING	64 REQD	13 LBS
ANTI-SKID PLATES, 5" X 7"	480 REQD	120 LBS
EDGE PROTECTORS	32 REQD	8 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
M112 MOTOR	80	90,240 LBS*
DUNNAGE		1,932 LBS
<b>TOTAL WEIGHT</b>		<b>92,172 LBS</b>

\* LADING WEIGHT FOR THE M22E8 ROCKET MOTOR WILL BE 87,600 POUNDS.

**80-UNIT LOAD ON A 53'-6" LONG BY 10'-4" WIDE FIXED-END FLAT CAR**



**ISOMETRIC VIEW**

( KEY NUMBERS CONTINUED )

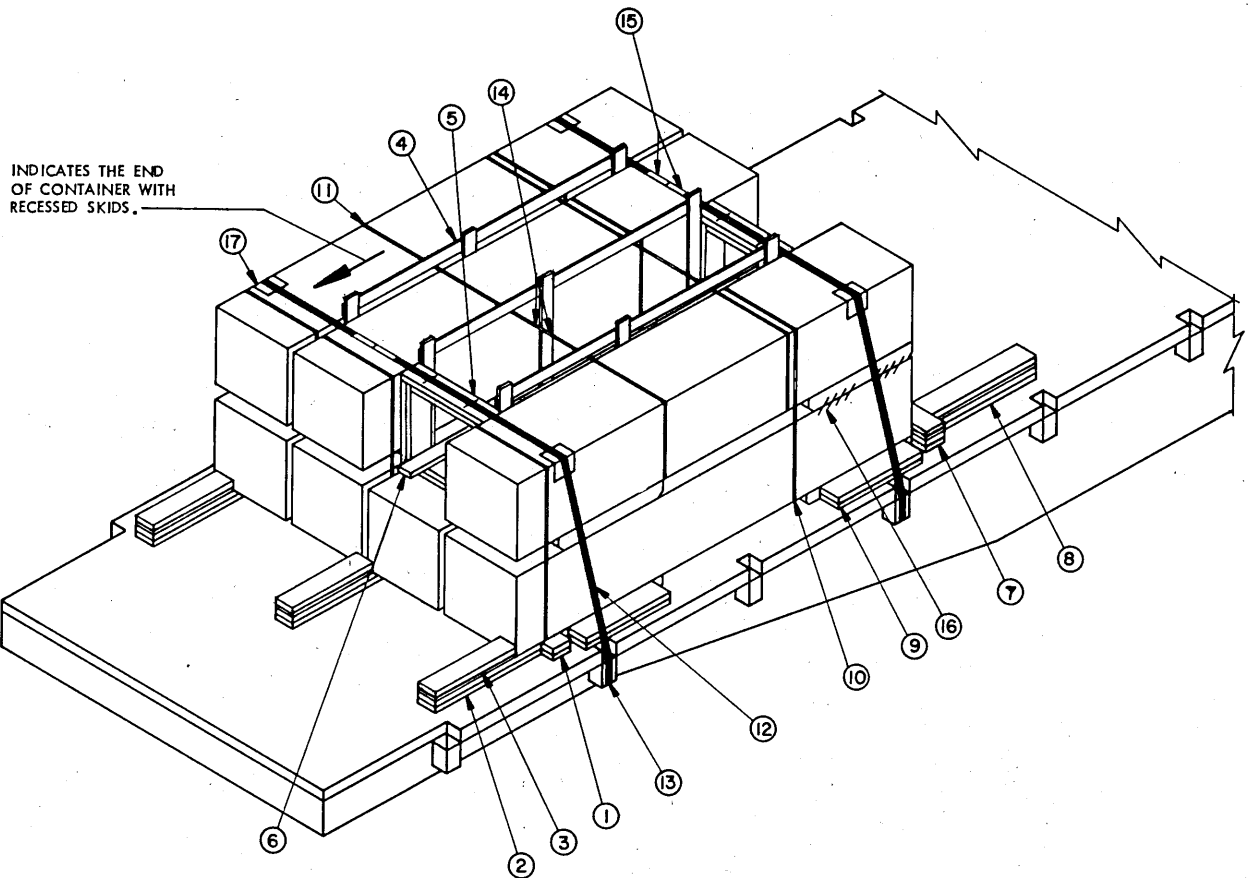
- ⑫ SEAL FOR 1-1/4" STRAPPING ( 36 REQD, 2/STRAP ). DOUBLE-CRIMP EACH SEAL. SEE GENERAL NOTE "N" ON PAGE 2.
- ⑬ SEAL FOR 2" STRAPPING ( 12 REQD, 6/STRAP ). EXCEPT FOR THE SEALS USED TO SECURE THE PADS, DOUBLE-CRIMP EACH SEAL.
- ⑭ ANTI-SKID PLATES ( 64 - 5" X 7" PLATES REQD OR 128 - 3-3/4" X 5" PLATES ). POSITION TWO ( 2 ) 5" X 7" PLATES OR FOUR ( 4 ) 3-3/4" X 5" PLATES UNDER EACH SKID OF EACH SECOND AND THIRD LAYER CONTAINER. SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "U" ON PAGE 2.
- ⑮ EDGE PROTECTOR FOR 2" STRAPPING ( 4 REQD ). POSITION UNDER EACH HOLD-DOWN STRAP AS SHOWN. SEE GENERAL NOTE "T" ON PAGE 2.

**SPECIAL NOTES:**

- 1. A 12-UNIT LOAD OF M22E8 MOTORS IS SHOWN ON AN 8'-6" WIDE ( PLATFORM ) FLAT CAR. WIDER CARS MAY BE USED. THESE PROCEDURES ARE ALSO APPLICABLE FOR SHIPPING THE SAME QUANTITY OF M112 MOTORS.
- 2. THREE ( 3 ) BACK-UP CLEATS, SHOWN AS PIECES MARKED ② AND ③ OR PIECE MARKED ⑥, ARE ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 15,000 POUNDS.
- 3. CAUTION: LOAD BUNDLING STRAPS, PIECES MARKED ⑨, MUST BE INSTALLED WITH CARE SO AS TO NOT HAVE AN EDGE-TO-EDGE CONTACT WITH THE STACK UNITIZING STRAPS MARKED ⑧.

**KEY NUMBERS**

- ① PRE-POSITIONED HEADER, 2" X 6" X 8'-0" ( DOUBLED ) ( 1 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST W/1-60d NAIL EVERY 8". SEE GENERAL NOTE "P" ON PAGE 2.
- ② PRE-POSITIONED BACK-UP CLEAT, 2" X 6" X 30" ( DOUBLED ) ( 3 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/5-60d NAILS.
- ③ CLEAT, 1" X 6" X 24" AND 2" X 6" X 24" ( 3 SETS REQD ). AFTER CONTAINERS HAVE BEEN PLACED ON THE CAR WITH THE RECESSED SKIDS BUTTED AGAINST HEADER MARKED ①, POSITION THE 1" X 6" PIECE UNDER THE 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO BACK-UP CLEAT MARKED ② W/4-60d NAILS.
- ④ ANTI-CHAFING ASSEMBLY ( 3 REQD ). SEE THE DETAIL ON PAGE 14.
- ⑤ HEADER, CONSISTING OF THREE 2" X 6" X 8'-0" AND ONE 1" X 6" X 8'-0" PIECES ( 1 SET REQD ). NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/1-60d NAIL EVERY 8". POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/1-60d NAIL EVERY 8".
- ⑥ BACK-UP CLEAT, CONSISTING OF THREE 2" X 6" X 30" AND ONE 1" X 6" X 30" PIECES ( 3 SETS REQD ). ALIGN WITH CONTAINER SKIDS AS SHOWN AND NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/5-60d NAILS. POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/5-60d NAILS.
- ⑦ SIDE BLOCKING, 2" X 6" X 36" ( DOUBLED ) ( 4 REQD ). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑧ UNITIZING STRAP, 1-1/4" X .035" X 13'-0" LONG STEEL STRAPPING ( 16 REQD ). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3.
- ⑨ LOAD BUNDLING STRAP, 1-1/4" X .035" X 25'-0" LONG STEEL STRAPPING ( 2 REQD ). INSTALL TO ENCIRCLE THE TOP TWO ( 2 ) LAYERS OF CONTAINERS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑩ HOLD-DOWN STRAP, 2" X .050" X 42'-0" LONG STEEL STRAPPING ( 2 REQD ). SEE THE "STRAPPING METHOD A" DETAIL ON PAGE 14 AND GENERAL NOTE "O" ON PAGE 2.
- ⑪ PAD, 2" X .050" STEEL STRAPPING 24" LONG ( 4 REQD ). POSITION UNDER A STAKE POCKET AND SEAL TO A PIECE MARKED ⑩. SEE "DETAIL C" ON PAGE 16. ALT: STAKE POCKET PROTECTOR ( 8 REQD ). USE TWO ( 2 ) UNDER EACH STAKE POCKET WITH A HOLD-DOWN STRAP. SEE "DETAIL D" ON PAGE 16.



**ISOMETRIC VIEW**

( KEY NUMBERS CONTINUED )

**KEY NUMBERS**

- ⑫ HOLD-DOWN STRAP, 2" X .050" X 28'-0" LONG STEEL STRAPPING ( 2 REQD ). INSTALL EACH STRAP FROM TWO ( 2 ) 14'-0" LONG PIECES. SEE GENERAL NOTE "O" ON PAGE 2. STAPLE TO THE "SPACER ASSEMBLY" MARKED ⑤ W/2 STAPLES.
- ⑬ PAD, 2" X .050" STEEL STRAPPING 24" LONG ( 4 REQD ). POSITION UNDER A STAKE POCKET AND SEAL TO A PIECE MARKED ⑫. SEE "DETAIL A" ON PAGE 16. ALT: STAKE POCKET PROTECTOR ( 8 REQD ). USE TWO ( 2 ) UNDER A STAKE POCKET WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 16.
- ⑭ SEAL FOR 1-1/4" STRAPPING ( 16 REQD, 2/STRAP ). DOUBLE-CRIMP EACH SEAL. SEE GENERAL NOTE "N" ON PAGE 2.
- ⑮ SEAL FOR 2" STRAPPING ( 16 REQD, 8/STRAP ). EXCEPT FOR THE SEALS USED TO SECURE THE PADS, DOUBLE-CRIMP EACH SEAL.
- ⑯ ANTI-SKID PLATES ( 24 - 5" X 7" PLATES REQD OR 48 - 3-3/4" X 5" PLATES ). POSITION TWO ( 2 ) 5" X 7" PLATES OR FOUR ( 4 ) 3-3/4" X 5" PLATES UNDER EACH SKID OF EACH SECOND LAYER CONTAINER. SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "U" ON PAGE 2.
- ⑰ EDGE PROTECTOR FOR 2" STRAPPING ( 4 REQD ). POSITION UNDER A HOLD-DOWN STRAP AS SHOWN. SEE GENERAL NOTE "T" ON PAGE 2.

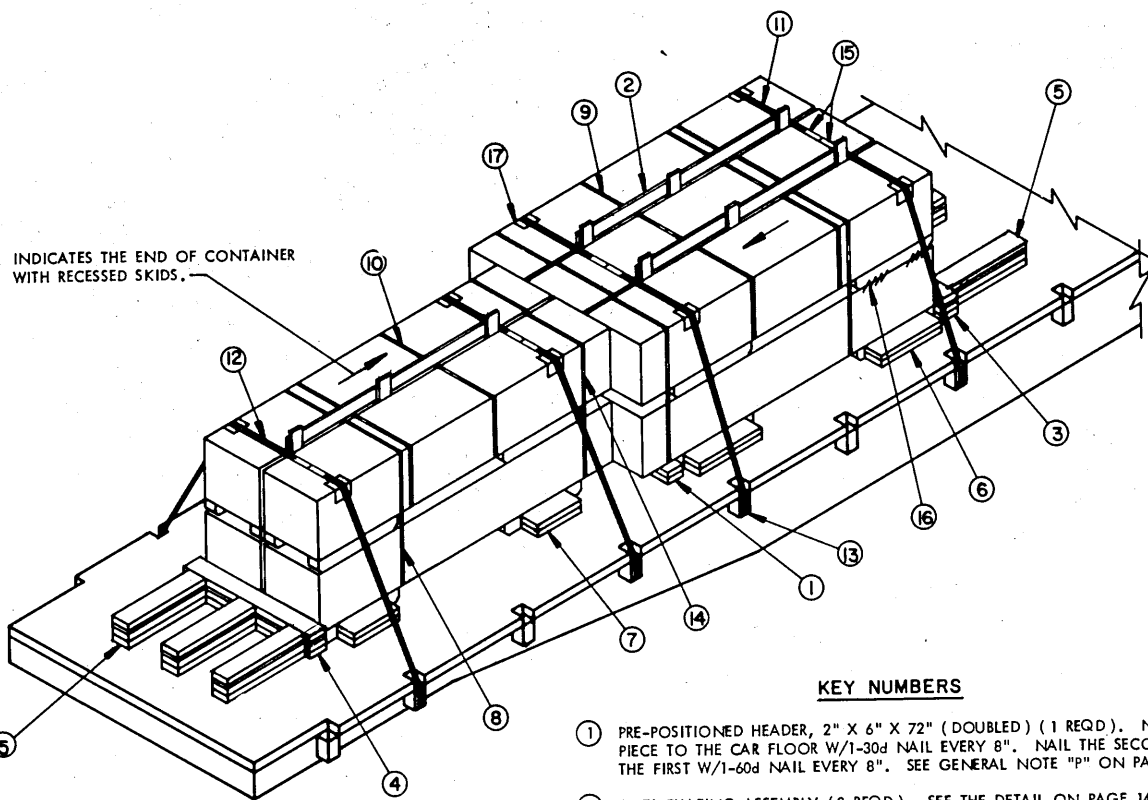
- ① PRE-POSITIONED HEADER, 2" X 6" X 8'-0" ( DOUBLED ) ( 1 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST W/1-60d NAIL EVERY 8". SEE GENERAL NOTE "P" ON PAGE 2.
- ② PRE-POSITIONED BACK-UP CLEAT, 2" X 6" X 30" ( DOUBLED ) ( 3 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/5-60d NAILS.
- ③ CLEAT, 1" X 6" X 24" AND 2" X 6" X 24" ( 3 SETS REQD ). AFTER CONTAINERS HAVE BEEN PLACED ON THE CAR WITH THE RECESSED SKIDS BUTTED AGAINST HEADER MARKED ①, POSITION THE 1" X 6" PIECE UNDER THE 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO BACK-UP CLEAT MARKED ② W/4-60d NAILS.
- ④ ANTI-CHAFING ASSEMBLY ( 3 REQD ). SEE THE DETAIL ON PAGE 14.
- ⑤ SPACER ASSEMBLY ( 1 REQD UNDER EACH HOLD-DOWN STRAP ). SEE THE DETAIL ON PAGE 15 AND SPECIAL NOTE 3 AT LEFT.
- ⑥ TIE PIECE, 2" X 4" X 8'-0" ( 2 REQD ). NAIL TO THE SPACER ASSEMBLIES MARKED ⑤ W/3-10d NAILS AT EACH JOINT.
- ⑦ HEADER, CONSISTING OF THREE 2" X 6" X 8'-0" AND ONE 1" X 6" X 8'-0" PIECES ( 1 SET REQD ). NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/1-60d NAIL EVERY 8". POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/1-60d NAIL EVERY 8".
- ⑧ BACK-UP CLEAT, CONSISTING OF THREE 2" X 6" X 30" AND ONE 1" X 6" X 30" PIECES ( 3 SETS REQD ). ALIGN WITH CONTAINER SKIDS AS SHOWN AND NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/5-60d NAILS. POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/5-60d NAILS.
- ⑨ SIDE BLOCKING, 2" X 6" X 24" ( DOUBLED ) ( 4 REQD ). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑩ UNITIZING STRAP, 1-1/4" X .035" X 13'-0" LONG STEEL STRAPPING ( 6 REQD ). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3.
- ⑪ LOAD BUNDLING STRAP, 1-1/4" X .035" X 21'-0" LONG STEEL STRAPPING ( 2 REQD ). INSTALL TO ENCIRCLE THE TOP LAYER OF CONTAINERS. SEE SPECIAL NOTE 4 AT LEFT.

**SPECIAL NOTES:**

- 1. A 7-UNIT LOAD OF M22E8 MOTORS IS SHOWN ON AN 8'-6" WIDE ( PLATFORM ) FLAT CAR. A WIDER CAR MAY BE USED. THESE PROCEDURES ARE ALSO APPLICABLE FOR SHIPPING THE SAME QUANTITY OF M112 MOTORS.
- 2. THREE ( 3 ) BACK-UP CLEATS, SHOWN AS PIECES MARKED ② AND ③ OR PIECE MARKED ⑧, ARE ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 15,000 POUNDS.
- 3. THE USE OF THE "SPACER ASSEMBLIES" IS SPECIFIED FOR THE DEPICTED LOAD ONLY TO SHOW A TYPICAL APPLICATION. ONE ( 1 ) SPACER ASSEMBLY IS REQUIRED UNDER EACH HOLD-DOWN STRAP MARKED ⑫. TWO ( 2 ) SPACER ASSEMBLIES MUST NOT BE POSITIONED SIDE-BY-SIDE; THEREFORE, ONLY ONE CONTAINER MAY BE OMITTED FROM THE TOP LAYER OF A LOAD UNIT.
- 4. **CAUTION:** LOAD BUNDLING STRAPS, PIECES MARKED ⑪, MUST BE INSTALLED WITH CARE SO AS TO NOT HAVE AN EDGE-TO-EDGE CONTACT WITH THE STACK UNITIZING STRAPS MARKED ⑩.

TYPICAL LCL ( 7-UNIT LOAD )

( CONTINUED AT LEFT )



INDICATES THE END OF CONTAINER WITH RECESSED SKIDS.

### ISOMETRIC VIEW

(KEY NUMBERS CONTINUED)

- ⑭ SEAL FOR 1-1/4" STRAPPING (28 REQ'D, 2/STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "N" ON PAGE 2.
- ⑮ SEAL FOR 2" STRAPPING (32 REQ'D, 8/STRAP). EXCEPT FOR THE SEALS USED TO SECURE THE PADS, DOUBLE CRIMP EACH SEAL.
- ⑯ ANTI-SKID PLATES (40 - 5" X 7" PLATES REQ'D OR 80 - 3-3/4" X 5" PLATES). POSITION TWO (2) 5" X 7" PLATES OR FOUR (4) 3-3/4" X 5" PLATES UNDER EACH SKID OF EACH SECOND LAYER CONTAINER. SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "U" ON PAGE 2.
- ⑰ EDGE PROTECTOR FOR 2" STRAPPING (8 REQ'D). POSITION UNDER EACH HOLD-DOWN STRAP AS SHOWN. SEE GENERAL NOTE "T" ON PAGE 2.

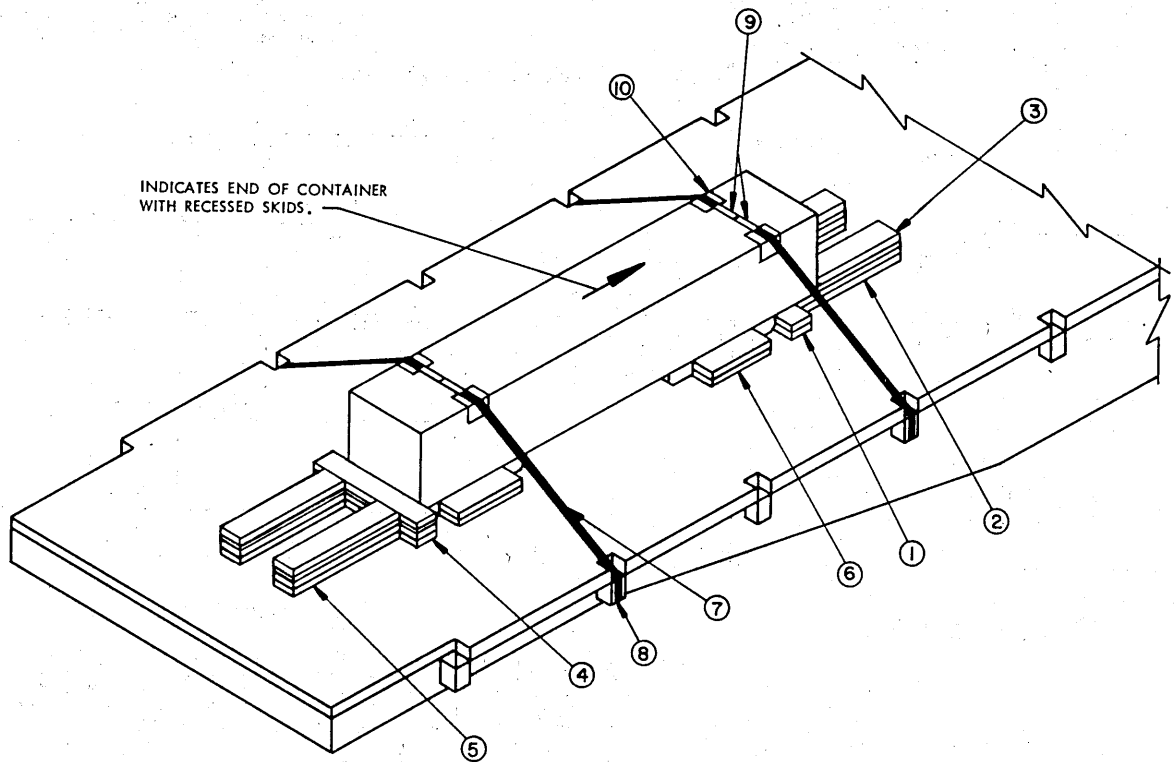
#### SPECIAL NOTES:

- 1. A 10-UNIT LOAD IS SHOWN AND IS APPLICABLE TO A SHIPMENT OF M22E8 AND/OR M112 MOTORS.
- 2. THREE (3) BACK-UP CLEATS, SHOWN AS PIECES MARKED ⑤, ARE ADEQUATE FOR RETAINING A MAXIMUM OF 15,000 POUNDS OF LADING.
- 3. **CAUTION:** LOAD BUNDLING STRAPS, PIECES MARKED ⑨ AND ⑩, MUST BE INSTALLED WITH CARE SO AS TO NOT HAVE AN EDGE-TO-EDGE CONTACT WITH THE STACK UNITIZING STRAPS MARKED ⑧.

### KEY NUMBERS

- ① PRE-POSITIONED HEADER, 2" X 6" X 72" (DOUBLED) (1 REQ'D). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST W/1-60d NAIL EVERY 8". SEE GENERAL NOTE "P" ON PAGE 2.
- ② ANTI-CHAFING ASSEMBLY (3 REQ'D). SEE THE DETAIL ON PAGE 14.
- ③ HEADER, CONSISTING OF THREE 2" X 6" X 72" AND ONE 1" X 6" X 72" PIECES (1 SET REQ'D). NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/1-60d NAIL EVERY 8". POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/1-60d NAIL EVERY 8".
- ④ HEADER, CONSISTING OF THREE 2" X 6" X 48" AND ONE 1" X 6" X 48" PIECES (1 SET REQ'D). NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/1-30d NAIL EVERY 8". NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/1-60d NAIL EVERY 8". POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/1-60d NAIL EVERY 8".
- ⑤ BACK-UP CLEAT, CONSISTING OF THREE 2" X 6" X 30" AND ONE 1" X 6" X 30" PIECES (6 SETS REQ'D). ALIGN WITH CONTAINER SKIDS AS SHOWN AND NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/5-60d NAILS. POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/5-60d NAILS.
- ⑥ SIDE BLOCKING, 2" X 6" X 24" (DOUBLED) (4 REQ'D). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑦ SIDE BLOCKING, 2" X 6" X 18" (DOUBLED) (4 REQ'D). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/3-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑧ UNITIZING STRAP, 1-1/4" X .035" X 13'-0" LONG STEEL STRAPPING (10 REQ'D). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3.
- ⑨ LOAD BUNDLING STRAP, 1-1/4" X .035" X 16'-0" LONG STEEL STRAPPING (2 REQ'D). INSTALL TO ENCIRCLE THE TOP LAYER OF CONTAINERS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑩ LOAD BUNDLING STRAP, 1-1/4" X .035" X 13'-0" LONG STEEL STRAPPING (2 REQ'D). INSTALL TO ENCIRCLE THE TOP LAYER OF CONTAINERS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑪ HOLD-DOWN STRAP, 2" X .050" X 30'-0" LONG STEEL STRAPPING (2 REQ'D). INSTALL EACH STRAP FROM TWO (2) 15'-0" LONG PIECES. SEE GENERAL NOTE "O" ON PAGE 2.
- ⑫ HOLD-DOWN STRAP, 2" X .050" X 25'-0" LONG STEEL STRAPPING (2 REQ'D). INSTALL EACH STRAP FROM TWO (2) 12'-6" LONG PIECES.
- ⑬ PAD, 2" X .050" STEEL STRAPPING 24" LONG (8 REQ'D). POSITION UNDER A STAKE POCKET AND SEAL TO PIECES MARKED ⑪ OR ⑫. SEE "DETAIL A" ON PAGE 16. ALT: STAKE POCKET PROTECTOR (16 REQ'D). USE TWO (2) UNDER A STAKE POCKET WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 16.

(CONTINUED AT LEFT)



**ISOMETRIC VIEW**

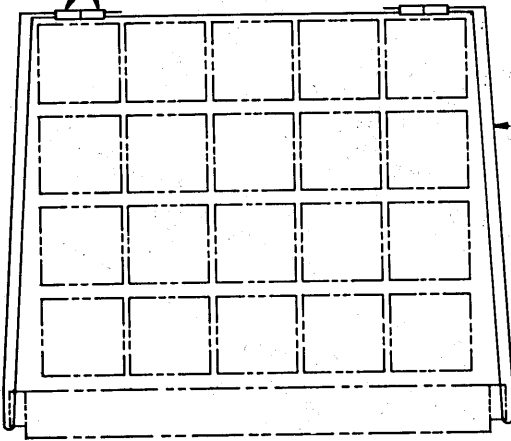
**KEY NUMBERS**

**SPECIAL NOTES:**

1. A 1-UNIT LOAD IS SHOWN AND IS APPLICABLE TO THE SHIPMENT OF THE M22E8 OR M112 MOTOR.
2. CONTAINERS MUST NOT BE STACKED WHEN SHIPPING A ONE-CONTAINER-WIDE LOAD.
3. FOR THE SHIPMENT OF A TWO OR THREE-UNIT LOAD, POSITION CONTAINERS SIDE-BY-SIDE, USING ANTI-CHAFING ASSEMBLIES, AS DETAILED ON PAGE 14, BETWEEN CONTAINERS. ALSO, TWO (2) 1-1/4" X .035" LOAD BUNDLING STRAPS MUST BE PROVIDED TO ENCIRCLE THE CONTAINERS. FOR APPLICATION, REFER TO OTHER LOADS DEPICTED IN THIS DRAWING. ADJUST LENGTH AND NAILING OF HEADERS MARKED ① AND ④ AS REQUIRED.
4. TWO (2) BACK-UP CLEATS, SHOWN AS PIECES MARKED ② AND ③ OR PIECE MARKED ⑤, ARE ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 10,000 POUNDS.

- ① PRE-POSITIONED HEADER, 2" X 6" X 30" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/5-60d NAILS. SEE GENERAL NOTE "P" ON PAGE 2.
- ② PRE-POSITIONED BACK-UP CLEAT, 2" X 6" X 30" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/5-60d NAILS.
- ③ CLEAT, 1" X 6" X 24" AND 2" X 6" X 24" (2 SETS REQD). AFTER CONTAINER HAS BEEN PLACED ON THE CAR WITH THE RECESSED SKIDS BUTTED AGAINST HEADER MARKED ①, POSITION THE 1" X 6" PIECE UNDER THE 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO BACK-UP CLEAT MARKED ② W/4-60d NAILS.
- ④ HEADER, CONSISTING OF THREE 2" X 6" X 30" AND ONE 1" X 6" X 30" PIECES (1 SET REQD). NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/5-60d NAILS. POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/5-60d NAILS.
- ⑤ BACK-UP CLEAT, CONSISTING OF THREE 2" X 6" X 30" AND ONE 1" X 6" X 30" PIECES (2 SETS REQD). ALIGN WITH CONTAINER SKIDS AS SHOWN AND NAIL THE FIRST 2" X 6" PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL THE SECOND 2" X 6" PIECE TO THE FIRST W/5-60d NAILS. POSITION THE 1" X 6" PIECE UNDER THE THIRD 2" X 6" PIECE AND NAIL THROUGH BOTH PIECES TO THE SECOND 2" X 6" PIECE W/5-60d NAILS.
- ⑥ SIDE BLOCKING, 2" X 6" X 18" (DOUBLED) (4 REQD). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/3-30d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑦ HOLD-DOWN STRAP, 2" X .050" X 24'-0" LONG STEEL STRAPPING (2 REQD). INSTALL EACH STRAP FROM TWO (2) 12'-0" LONG PIECES. SEE GENERAL NOTE "O" ON PAGE 2.
- ⑧ PAD, 2" X .050" STEEL STRAPPING 24" LONG (4 REQD). POSITION UNDER A STAKE POCKET AND SEAL TO A PIECE MARKED ⑦. SEE "DETAIL A" ON PAGE 16. ALT: STAKE POCKET PROTECTOR (8 REQD). USE TWO (2) UNDER A STAKE POCKET WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 16.
- ⑨ SEAL FOR 2" STRAPPING (16 REQD, 8/STRAP). EXCEPT FOR THE SEALS USED TO SECURE THE PADS, DOUBLE CRIMP EACH SEAL.
- ⑩ EDGE PROTECTOR FOR 2" STRAPPING (4 REQD). POSITION UNDER A HOLD-DOWN STRAP AS SHOWN. SEE GENERAL NOTE "T" ON PAGE 2.

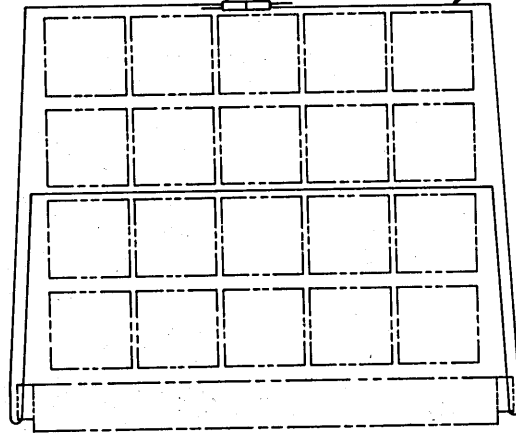
INDICATES SEALS FOR 2" STRAPPING. LOCATE AND DOUBLE-CRIMP ONE SEAL; CRIMP OTHER THREE (3) SEALS AFTER TENSIONING. ALT: USE TWO (2) TENSIONING TOOLS AT THE SAME TIME, ONE (1) AT EACH SIDE OF THE LOAD.



**STRAPPING METHOD A**

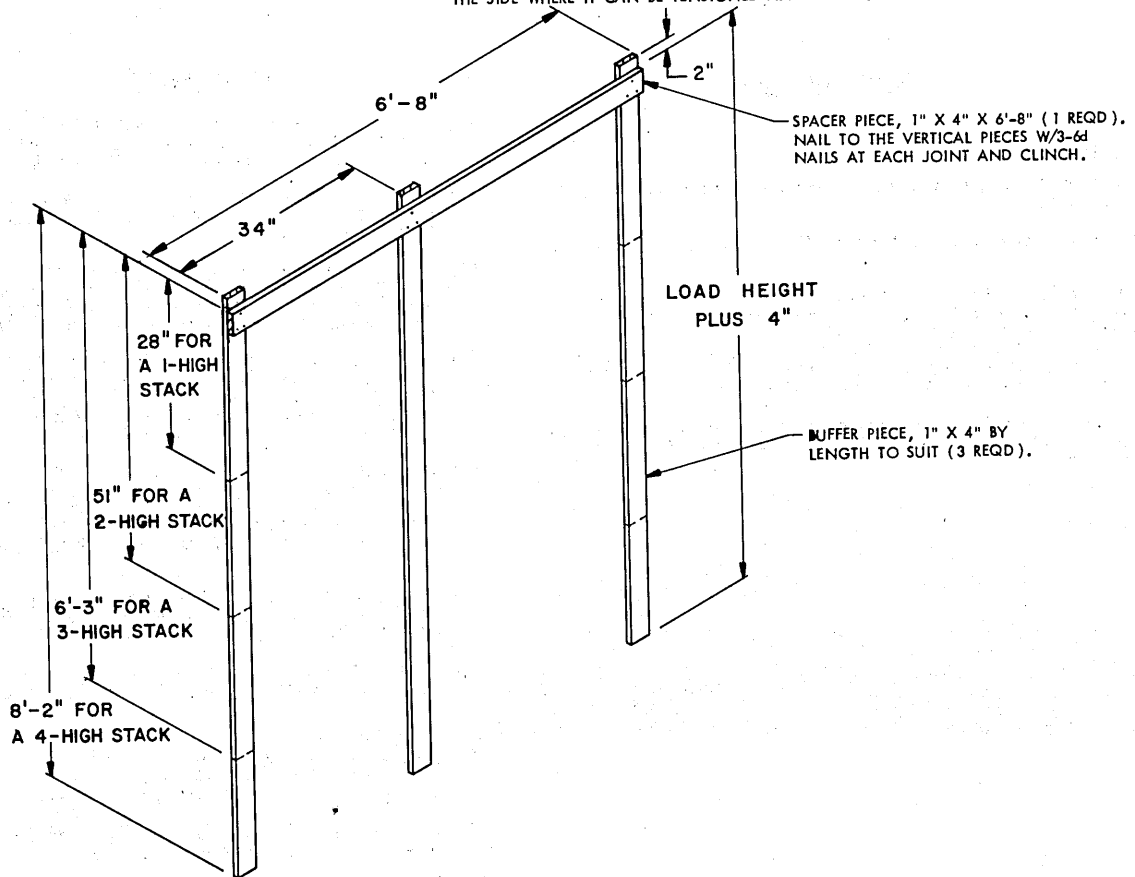
INDICATES A 2" HOLD-DOWN STRAP. THREAD THE STRAP DOWN TO AND UP THRU THE STAKE POCKET ON ONE SIDE OF THE CAR, UP AND OVER THE SECOND LAYER OF CONTAINERS, DOWN THRU THE STAKE POCKET ON THE OPPOSITE SIDE OF THE CAR, AND BACK UP ON TOP OF LOAD WHERE IT CAN BE TENSIONED AND SEALED.

INDICATES SEALS FOR 2" STRAPPING.



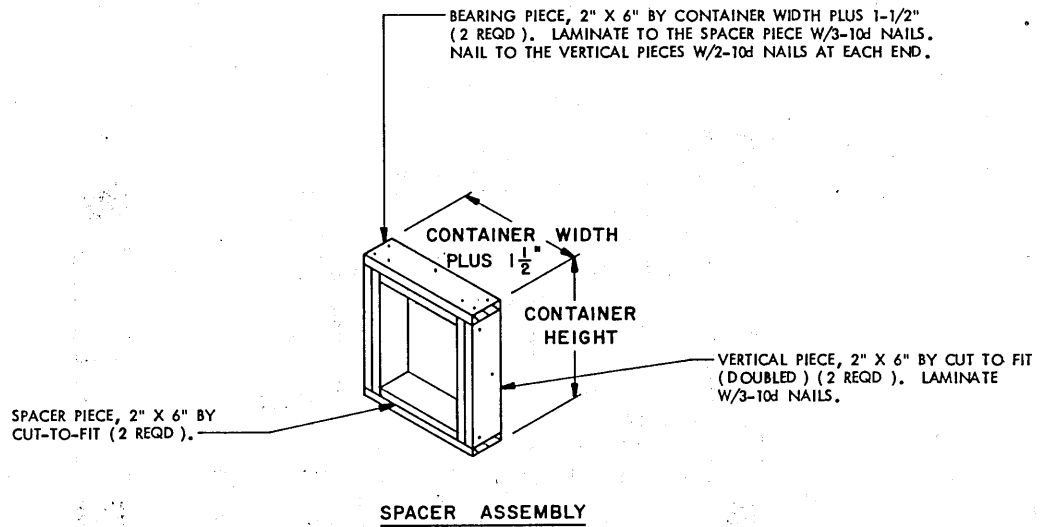
**STRAPPING METHOD B**

IF DESIRABLE, THIS STRAPPING METHOD CAN BE ACCOMPLISHED BY THREADING THE STRAP FROM THE SIDE OF THE LOAD DOWN TO AND UP THRU THE STAKE POCKET ON ONE SIDE OF THE CAR, UP AND OVER THE SECOND LAYER OF CONTAINERS, DOWN THRU THE STAKE POCKET ON THE OPPOSITE SIDE OF THE CAR, UP AND ACROSS THE TOP OF THE LOAD AND DOWN THE SIDE WHERE IT CAN BE TENSIONED AND SEALED.



**ANTI-CHAFING ASSEMBLY**

**DETAILS**

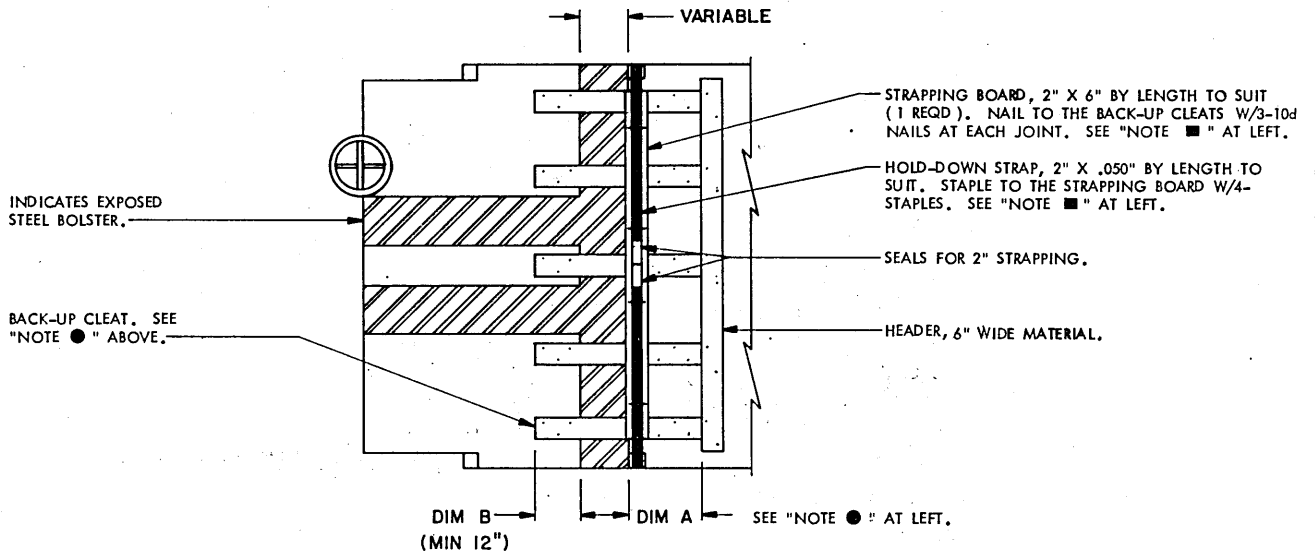


**NOTE ● :**

WHEN LOADING CARS HAVING EXPOSED STEEL BOLSTERS, DIMENSION "B" MUST BE AT LEAST 12", AND THE TOTAL OF DIMENSIONS "A" AND "B" MUST BE EQUAL TO OR GREATER THAN THE LENGTH OF A BACK-UP CLEAT TO PROVIDE FOR PROPER NAILING TO THE CAR FLOOR.

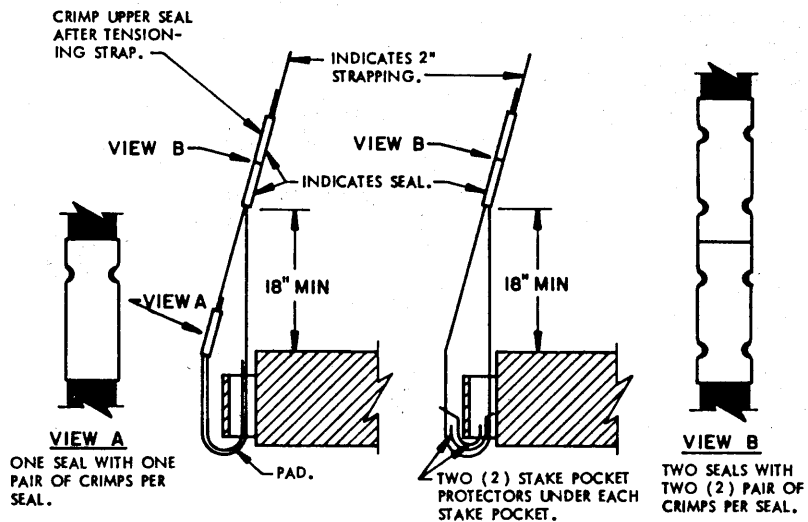
**NOTE ■ :**

THE OPTIONAL STRAP HOLD-DOWN FOR END BLOCKING IS FOR CARS WITH OR WITHOUT EXPOSED STEEL BOLSTERS.



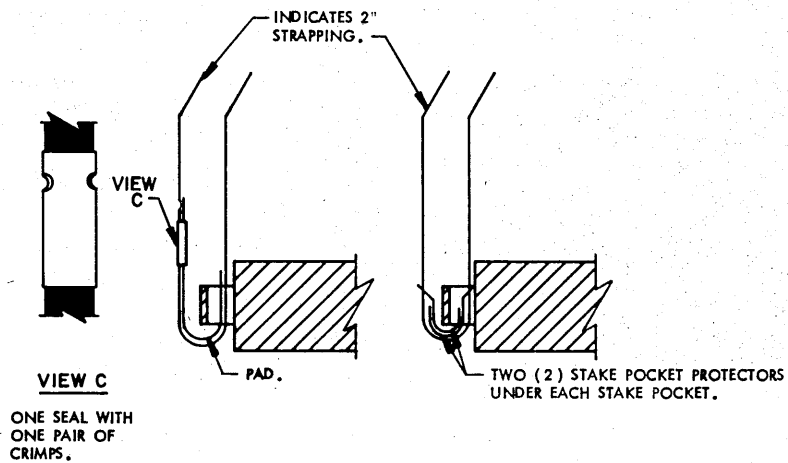
**TYPICAL END BLOCKING FOR CARS WITH EXPOSED STEEL BOLSTERS**

(SEE GENERAL NOTE "M" ON PAGE 2).



**DETAIL A**  
METHOD OF INSTALLING 2" STRAPPING AND PAD AT STAKE POCKET.

**DETAIL B**  
METHOD OF INSTALLING 2" STRAPPING AND STAKE POCKET PROTECTORS (ALT PAD).



**DETAIL C**  
METHOD OF INSTALLING 2" STRAPPING AND PAD AT STAKE POCKET.

**DETAIL D**  
METHOD OF INSTALLING 2" STRAPPING AND STAKE POCKET PROTECTORS (ALT PAD).