

BUREAU OF EXPLOSIVES

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# HAWK

## LOADING AND BRACING (TL & LTL) ON FLAT BED TRAILERS OF ROCKET MOTOR, M22E8 OR M112, PACKED IN WOODEN CRATE

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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 19-48-5721-GMIIA119, DATED 12 DECEMBER 1963, AND REVISION 1 THERETO, DATED 10 MARCH 1966.

DO NOT SCALE

REVISIONS		DRAFTSMAN	PROJ ENG	AMCPM-HAS
2	DEC 74	<i>Wesley E. Gilleland</i>	<i>MWD/rew</i>	
		<i>RSN/RAX</i>	LOG ENGRG OFFICE	AMPMI-SY
		<i>Wesley E. Gilleland</i>	<i>John Boyd</i>	<i>Wesley E. Gilleland</i>
		<i>A. E. Ehinger</i>	APPROVED BY ORDER OF COMMANDING GENERAL U. S. ARMY MATERIEL COMMAND	
			<i>A. E. Ehinger</i>	
			USAMC AMMO CENTER	
			U. S. ARMY MATERIEL COMMAND	
			DECEMBER 1974	
		CLASS	DIVISION	DRAWING
		19	48	5721
				FILE
				GM IIHA2

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. LOADS AS SHOWN HEREIN ARE BASED ON FLAT BED AND DROP FRAME TRAILERS 8'-0" WIDE BY 40'-0" LONG HAVING WOOD OR WOOD AND METAL FLOORS. TRAILERS HAVING ALL-METAL FLOORS WILL NOT BE USED FOR SHIPPING THESE ITEMS. SHORTER OR LONGER TRAILERS CAN BE USED. SEE GENERAL NOTES "R" AND "S" AT RIGHT.
- C. 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.
- D. FOR DETAILS OF THE CONTAINER FOR THE M22E8 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 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 ).

- E. THESE ITEMS ARE DOT CLASS "B" EXPLOSIVES. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE USED FOR SHIPMENT OF THE DEPICED CONTAINERS WHEN THEY ARE EMPTY OR LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEMS DESIGNATED WITHIN THE DRAWING TITLE. NOTE: 18" X 32" PLACARD BOARDS MUST BE PROVIDED AS REQUIRED BY LAW AND/OR REGULATION. CAUTION: PLACARD BOARDS AND BOARD MOUNTING BRACKETS MUST NOT BE NAILED TO THE LADING; THEY WILL BE NAILED TO THE CARRYING VEHICLE. LIKEWISE IF LOAD COVERING TARPULINS ARE USED, THEY MUST NOT BE NAILED TO THE LADING.
- F. SELECTION OF A VEHICLE USED TO TRANSPORT THE DESIGNATED ITEMS MUST COMPLY WITH AR 55-355, CHAPTER 213, FOR EXPLOSIVES AND OTHER DANGEROUS ARTICLES, IN FULL.

G. GROSS WEIGHT AND AXLE DISTRIBUTION OF WEIGHT FOR A LOAD WILL BE THE RESPONSIBILITY OF THE CARRIER. THE CARRIER WILL ADVISE THE SHIPPER OF APPLICABLE LOADING REQUIREMENTS, AND THE SHIPPER WILL LOAD ACCORDINGLY.

H. NOTICE: A SHIPMENT WILL BE POSITIONED ON A TRAILER CONSISTENT WITH STATE WEIGHT LAWS. THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS CONTAINED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING AND STAYING OF THE DESIGNATED ITEMS.

J. OTHER TYPES OF LADING ITEMS MAY BE LOADED ON A TRAILER WHICH IS PARTIALLY LOADED WITH THE DESIGNATED ITEMS, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN.

K. IF THE CAPACITY OF THE MATERIALS HANDLING EQUIPMENT ( MHE ) PERMITS, IT IS RECOMMENDED THAT CONTAINERS BE UNITIZED PRIOR TO PLACEMENT ABOARD THE TRAILER. 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 "UNITIZING AND HANDLING PROCEDURAL GUIDANCE" ON PAGE 3.

L. LADING WILL NOT BE SECURED BY CHAINS AND/OR LOAD BINDERS IN LIEU OF SPECIFIED DUNNAGE.

M. CAUTION: REGARDLESS OF THE TYPE OF TRAILER INVOLVED, ONLY THOSE TRAILERS HAVING TIE-DOWN STRAP ANCHORING FACILITIES WHICH PROVIDE HOLDING STRENGTH EQUAL TO OR GREATER THAN THE STRENGTH OF THE HOLD-DOWN STRAPS, AND WHICH ALIGN NEAR THE INDICATED LOCATIONS FOR THE SPECIFIED HOLD-DOWN STRAPS SHOULD BE USED. IF TRAILER STRAP ANCHOR DEVICES ARE NOT PROPERLY POSITIONED TO RECEIVE TWO INCH ( 2" ) STRAPPING AS SHOWN, OR IF THE STRAP ANCHOR DEVICES ARE NOT EQUAL TO OR GREATER THAN THE STRENGTH OF THE HOLD-DOWN STRAPS, THE STRAPS MAY BE APPLIED TO FORM A COMPLETE LOOP WHICH ENCOMPASSES BOTH THE LADING AND THE TRAILER FRAME AND/OR BED. CAUTION: AVOID TRAILER WHEELS, FIFTH WHEEL PLATE, CONTROLS AND OTHER APPURTENANCES. USE EDGE PROTECTORS ON ALL SHARP EDGES.

N. WHEN ANY STRAP IS SEALED AT AN END-OVER-END LAP JOINT, 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

( 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, FINIS- A OR B FOR 1-1/4" STRAPPING AND FINIS- A, ^, OR C FOR 2" STRAPPING, FED SPEC QQ-S-781.

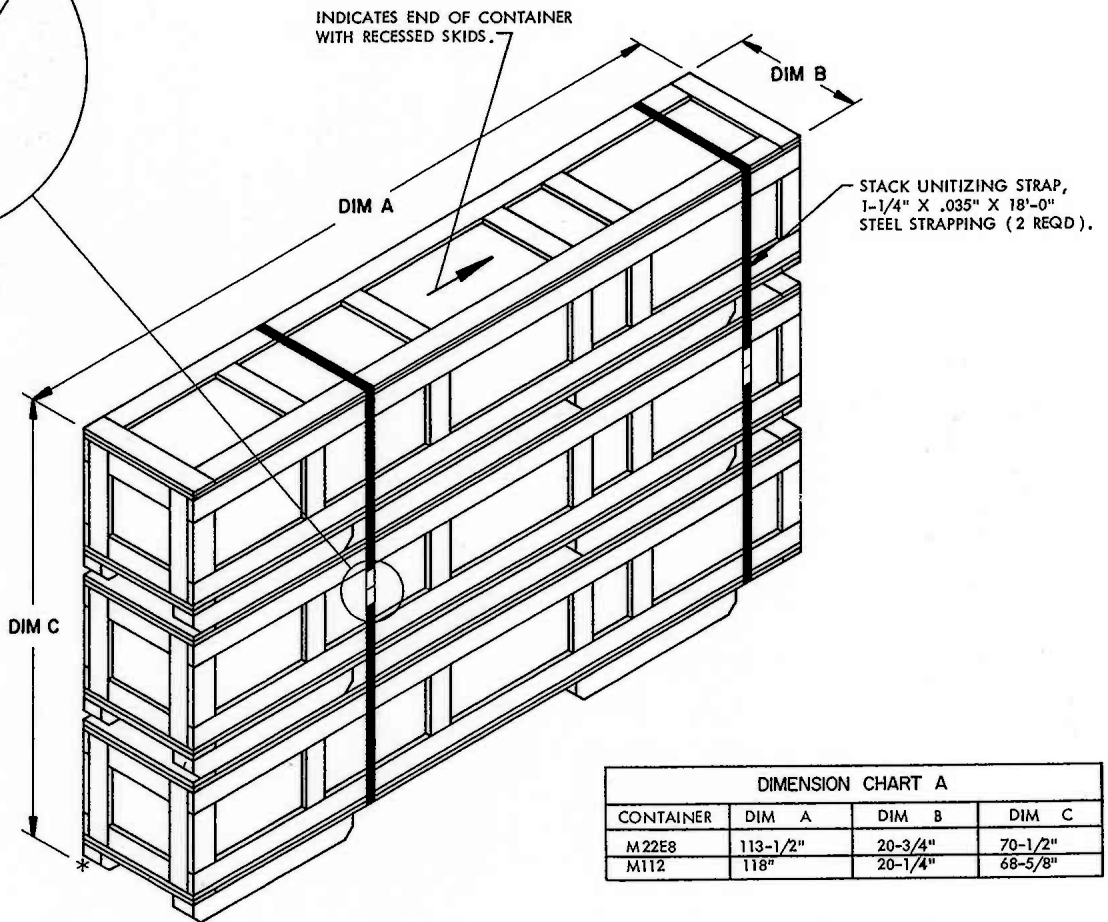
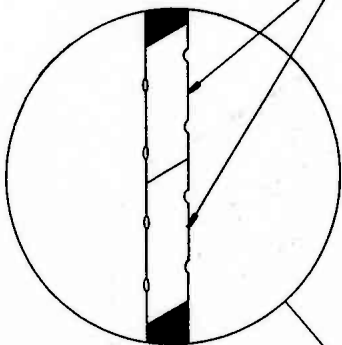
STRAP SEAL, STAKE  
POCKET PROTECTOR,  
EDGE PROTECTOR -----: COMMERCIAL GRADE.

- O. IF EDGE PROTECTORS FOR 2" STEEL STRAPPING ARE NOT COMMERCIALY AVAILABLE, THEY MUST BE FORMED FROM 18 ( MINIMUM ) GAGE STEEL PIECES WHICH ARE 9" LONG BY 6" WIDE.
- P. 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.
- Q. 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.
- R. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICED OUTLOADING METHODS.
- S. CAUTION: IF THE TRAILER FLOOR IS EQUIPPED WITH EXPOSED METAL DECKING ABOVE THE BOGIE ASSEMBLY, FIELD MEASUREMENTS SHOULD BE MADE TO ENSURE THAT THE METAL DECKING DOES NOT INTERFERE WITH THE PROPER POSITIONING AND NAILING OF THE DUNNAGE AS SPECIFIED BY THE PROCEDURES SHOWN HEREIN.

REVISIONS

- REVISION NO. 2, DATED DECEMBER 1974, CONSISTS OF:
1. ADDING PROVISIONS FOR SHIPPING THE M112 ROCKET MOTOR.
  2. ADDING "UNITIZATION AND HANDLING PROCEDURAL GUIDANCE".
  3. ADDING PROVISIONS FOR DROP FRAME TRAILERS.
  4. MAKING CHANGES AS NECESSARY TO UPDATE DRAWING FORMAT.
  5. CHANGING DWG FILE NO. FROM GM11A119 TO GM11A2.

SEAL FOR 1-1/4" X .035" STEEL STRAPPING  
(2 REQD PER STRAP JOINT). DOUBLE  
CRIMP EACH SEAL AS SHOWN. SEE GEN-  
ERAL NOTE "N" ON PAGE 2.



**TYPICAL STACK**

DIMENSION CHART A			
CONTAINER	DIM A	DIM B	DIM C
M22E8	113-1/2"	20-3/4"	70-1/2"
MIT2	118"	20-1/4"	68-5/8"

**UNITIZING AND HANDLING  
PROCEDURAL GUIDANCE**

**1. STACKING CONTAINERS FOR UNITIZING.**

- A. PLACE AN UPPER CONTAINER AS CLOSELY AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE NEXT LOWER CONTAINER.
- B. 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. SEE GENERAL NOTE "N" ON PAGE 2.**

- 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 ACROSS 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 SEALS ( BUTTED TOGETHER ) WITH TWO PAIR OF CRIMPS PER SEAL AS SHOWN. THE LAP JOINT WILL BE MADE ALONG THE SIDE OF THE STACK. EXCESS STRAPPING ( STRAP ENDS ) SHOULD BE CUT OFF OR BROKEN OFF NEAR THE JOINT SEALS.

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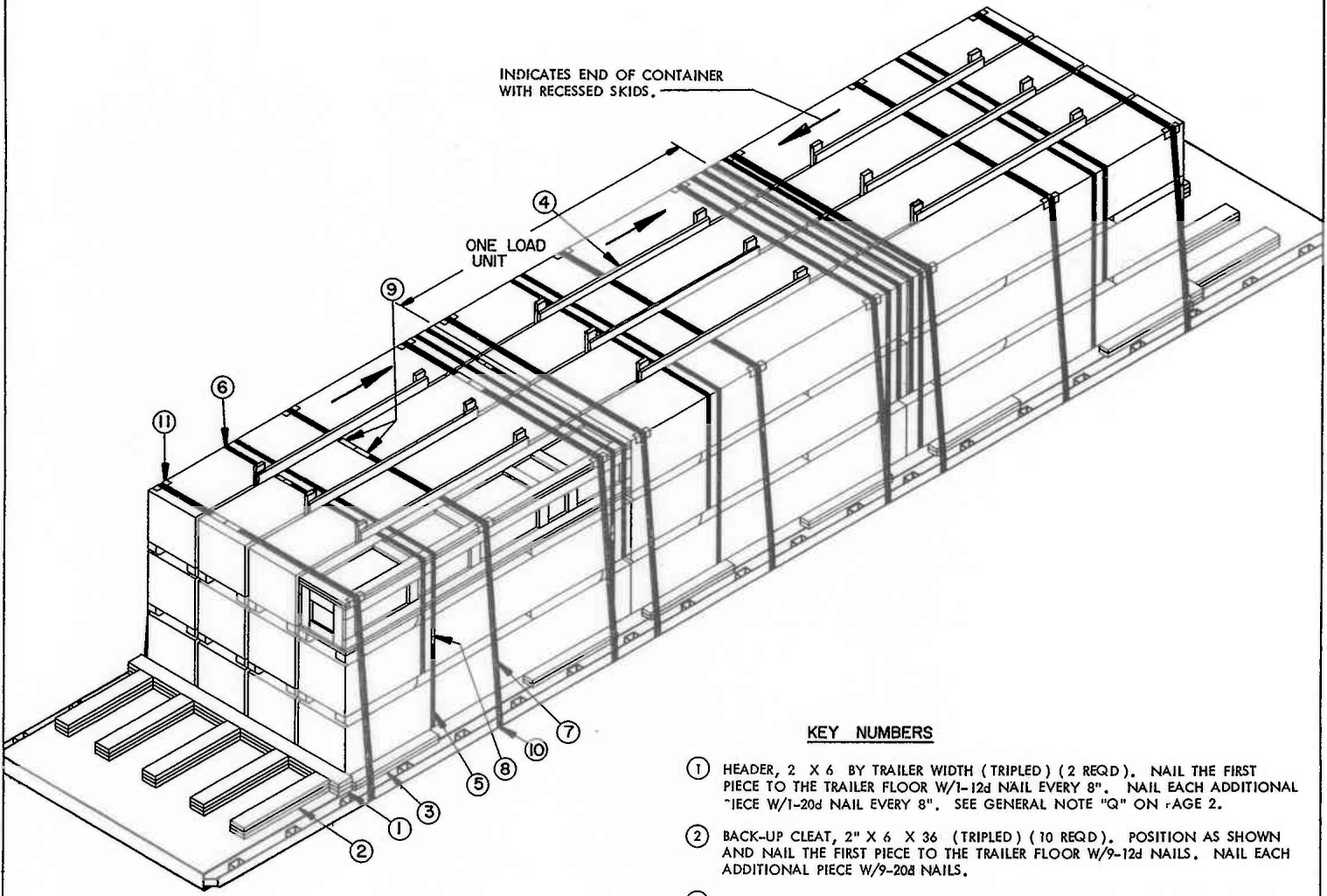
( UNITIZING AND HANDLING PROCEDURAL GUIDANCE CONTINUED )

**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 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.

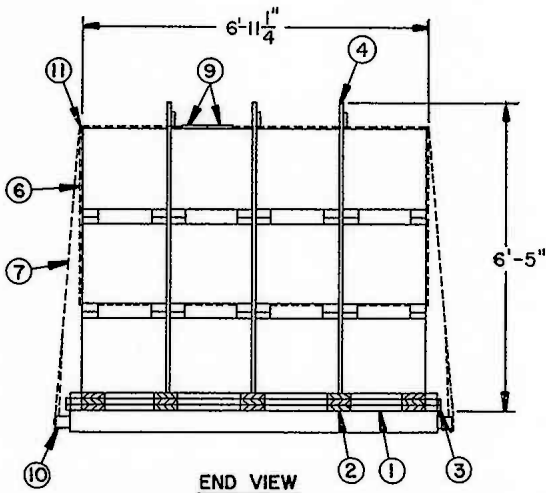


**ISOMETRIC VIEW**

(THE M112 MOTOR CONTAINER IS SHOWN)

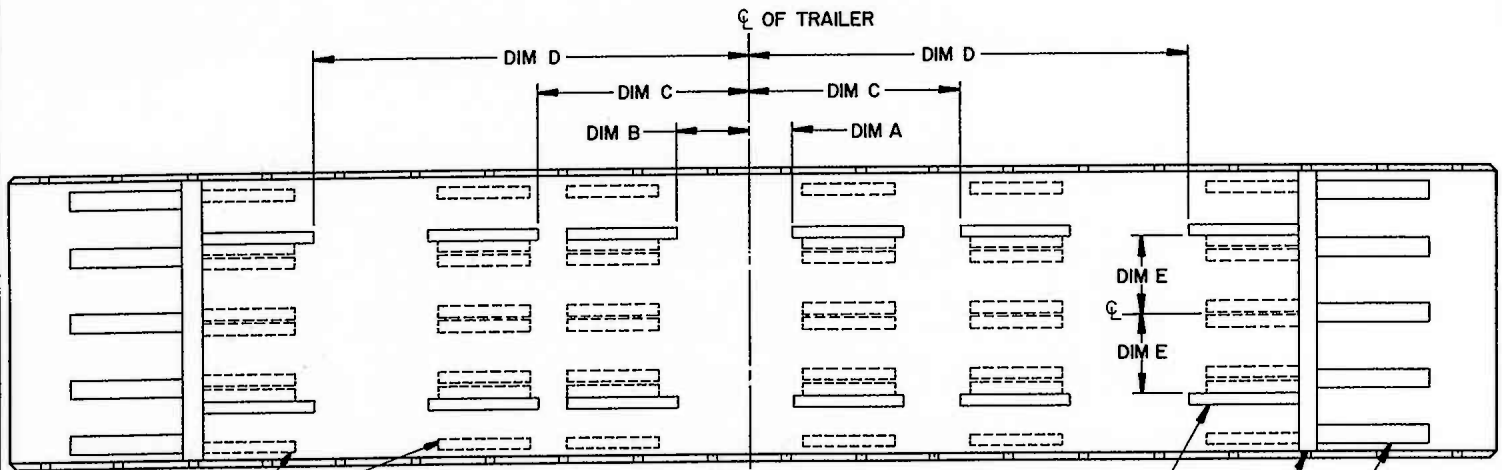
**KEY NUMBERS**

- ① HEADER, 2 X 6 BY TRAILER WIDTH (TRIPLED) (2 REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/1-12d NAIL EVERY 8". NAIL EACH ADDITIONAL PIECE W/1-20d NAIL EVERY 8". SEE GENERAL NOTE "Q" ON PAGE 2.
- ② BACK-UP CLEAT, 2" X 6 X 36 (TRIPLED) (10 REQD). POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/9-12d NAILS. NAIL EACH ADDITIONAL PIECE W/9-20d NAILS.
- ③ SIDE BLOCKING, 2" X 4 X 36" (DOUBLED) (12 REQD). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/9-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTES 1 AND 2 ON PAGE 5.
- ④ ANTI-CHAFING ASSEMBLY (9 REQD). SEE THE DETAIL ON PAGE 10.
- ⑤ STACK UNITIZING STRAP, 1-1/4" X .035" X 18'-0" STEEL STRAPPING (24 REQD). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "N" ON PAGE 2.
- ⑥ BUNDLING STRAP, 1-1/4" X .035" X 25'-0" STEEL STRAPPING (6 REQD). INSTALL TO ENCIRCLE SECOND AND THIRD LAYER CONTAINERS. SEE SPECIAL NOTE 5 ON PAGE 5.
- ⑦ HOLD-DOWN STRAP, 2" X .050" X 30'-0" STEEL STRAPPING (9 REQD). INSTALL EACH STRAP FROM TWO (2) 15'-0" LONG PIECES. SEE GENERAL NOTE "M" ON PAGE 2.
- ⑧ SEAL FOR 1-1/4" STRAPPING (60 REQD, 2 PER STRAP). DOUBLE-CRIMP EACH SEAL.
- ⑨ SEAL FOR 2" STRAPPING (54 REQD, 6 PER STRAP). DOUBLE-CRIMP EACH SEAL EXCEPT THOSE USED TO SECURE THE PADS.
- ⑩ PAD, 2" X .050" STEEL STRAPPING 18" LONG (18 REQD). POSITION UNDER ANCHORING FACILITY AND SEAL TO A HOLD-DOWN STRAP. SEE "DETAIL A" ON PAGE 10. ALT: STAKE POCKET PROTECTOR (36 REQD). USE TWO (2) UNDER EACH ANCHORING FACILITY WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 10.
- ⑪ EDGE PROTECTOR FOR 2" STRAPPING (18 REQD). POSITION UNDER A HOLD-DOWN STRAP AT THE TOP EDGE OF THE LOAD. SEE GENERAL NOTE "O" ON PAGE 2.



**END VIEW**

STACK UNITIZING STRAPS NOT SHOWN FOR CLARITY PURPOSES.



INDICATES LOCATION OF CONTAINER SKIDS.

**PRE-POSITIONED DUNNAGE PLAN VIEW**

(SEE SPECIAL NOTES 1 AND 2 BELOW)

DIMENSION CHART B					
CONTAINER	DIM A	DIM B	DIM C	DIM D	DIM E
M112	14"	23"	68"	11'-8"	25"
M22E8	12"	21"	66"	11'-2"	25-1/2"

**SPECIAL NOTES:**

1. A 36-UNIT LOAD OF M112 MOTORS IS SHOWN ON A 40'-0" LONG BY 8'-0" WIDE FLAT BED TRAILER, HAVING AN AVAILABLE NAILING SURFACE OF THE TRAILER BED MEASURING AT LEAST 36'-5" LONG AND 7'-6" WIDE. IF THE NAILING SURFACE IS LESS THAN 7'-6" WIDE, SIDE BLOCKING PIECES MARKED ③ MUST BE PRE-POSITIONED AS DEPICTED IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ABOVE. A FIELD CHECK SHOULD BE MADE OF THE TRAILER BED PRIOR TO LOADING TO DETERMINE WHICH SIDE-BLOCKING METHOD SHOULD BE USED. LONGER OR SHORTER TRAILERS WITH REQUIRED LENGTH OF NAILING SURFACE CAN BE USED.
2. THE PROCEDURES DEPICTED ON PAGE 4 ARE ALSO APPLICABLE FOR SHIPPING A 36-UNIT LOAD OF M22E8 MOTORS, EXCEPT THAT THE SIDE BLOCKING MARKED ③ MUST BE PRE-POSITIONED AT THE LOCATIONS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ABOVE.
3. THE LOAD CONFIGURATION DEPICTED ON PAGE 4 MAY BE ADJUSTED TO SATISFY THE QUANTITY OF ITEMS TO BE SHIPPED BY OMITTING AN ENTIRE LOAD UNIT OF TWELVE (12) CONTAINERS; BY OMITTING FOUR (4), EIGHT (8) OR TWELVE (12) CONTAINERS FROM THE THIRD LAYER; OR BY OMITTING ONE (1), TWO (2) OR THREE (3) CONTAINERS FROM A CENTER ROW OF THE TOP LAYER AND USING "SPACER ASSEMBLIES", AS SHOWN ON PAGE 8, IN THE PLACE OF EACH OMITTED CONTAINER.
4. A TRAILER HAVING ROUNDED CORNERS AT THE FORWARD END MAY BE USED IF THE ROUNDED PORTION DOES NOT INTERFERE WITH LOCATING THE CONTAINERS, PLACEMENT AND NAILING OF DUNNAGE, OR POSITIONING OF THE HOLD-DOWN STRAPS.
5. CAUTION: BUNDLING STRAPS MARKED ⑥ MUST BE INSTALLED WITH CARE SO AS TO NOT HAVE AN EDGE-TO-EDGE CONTACT WITH THE STACK UNITIZING STRAPS MARKED ⑤

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	171	57
2" X 4"	72	48
2" X 6"	138	138
NAILS	NO. REQD	POUNDS
6d (2")	54	1/2
12d (3-1/4")	330	5-1/2
20d (4")	228	8-1/4
STEEL STRAPPING, 1-1/4" X .035"	582' REQD	83 LBS
STEEL STRAPPING, 2" X .050"	297' REQD	99 LBS
SEAL FOR 1-1/4" STRAPPING	60 REQD	3 LBS
SEAL FOR 2" STRAPPING	54 REQD	11 LBS
EDGE PROTECTOR	18 REQD	5 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
M112 MOTOR	36	40,608 LBS *
DUNNAGE		623 LBS

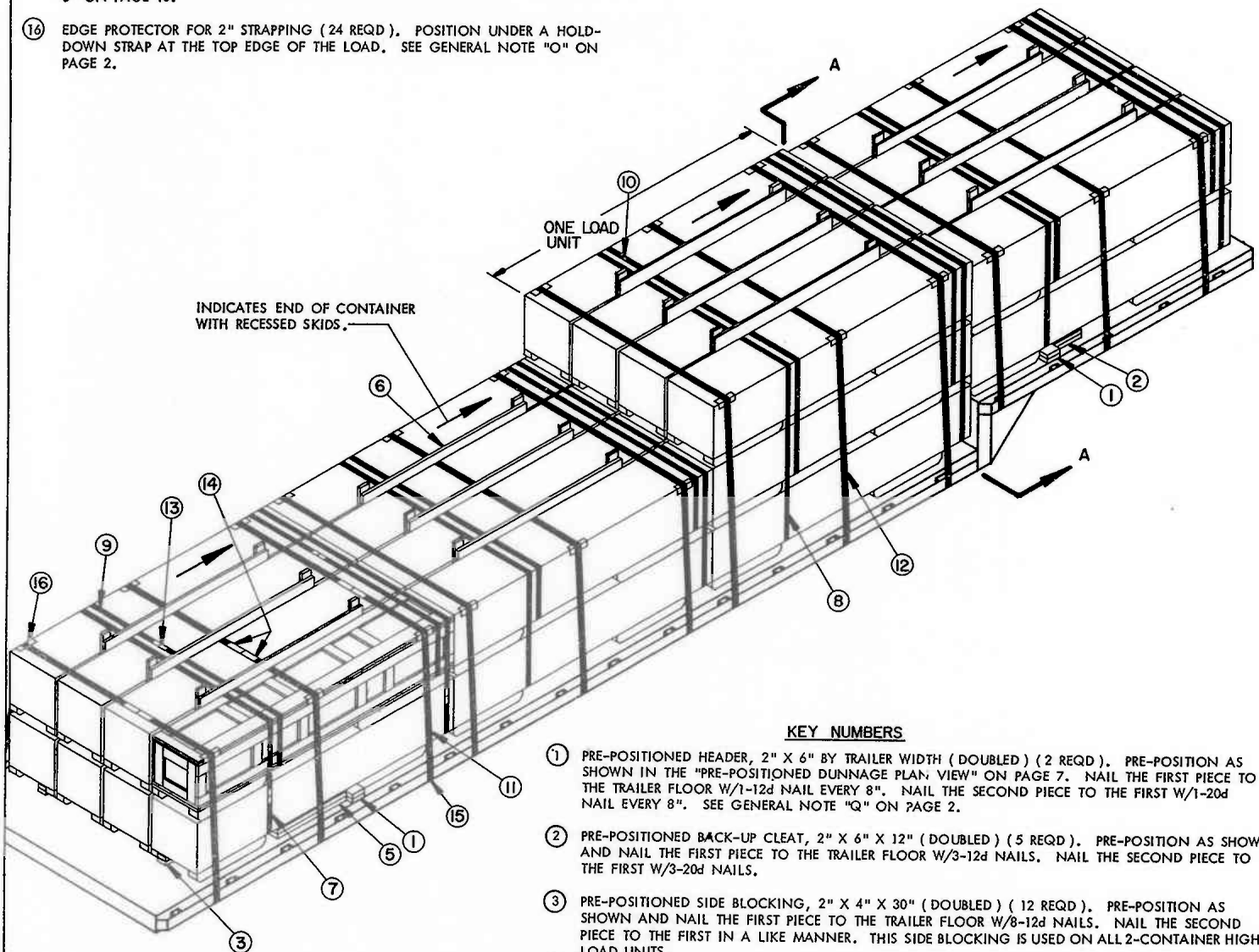
TOTAL WEIGHT ----- 41,431 LBS

\* LADING WEIGHT FOR THE M22E8 MOTOR WILL BE 39,420 POUNDS.

**36-UNIT LOAD ON A 40'-0" LONG TRAILER**

15 PAD, 2" X .050" STEEL STRAPPING 18" LONG (24 REQD). POSITION UNDER ANCHORING FACILITY AND SEAL TO A HOLD-DOWN STRAP. SEE "DETAIL A" ON PAGE 10. ALT: STAKE POCKET PROTECTOR (48 REQD). USE TWO (2) UNDER EACH ANCHORING FACILITY WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 10.

16 EDGE PROTECTOR FOR 2" STRAPPING (24 REQD). POSITION UNDER A HOLD-DOWN STRAP AT THE TOP EDGE OF THE LOAD. SEE GENERAL NOTE "O" ON PAGE 2.



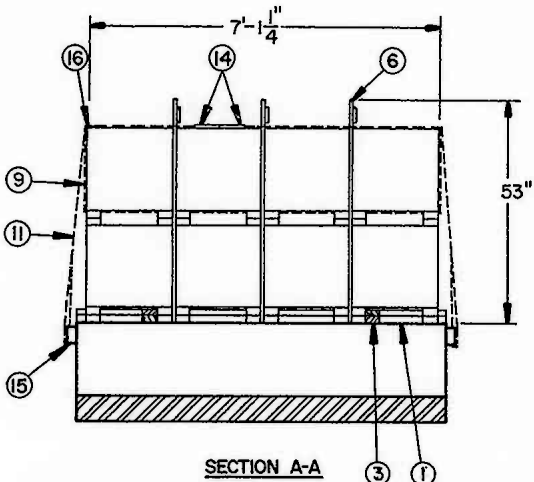
**ISOMETRIC VIEW**

(THE M22E8 MOTOR CONTAINER IS SHOWN)

**KEY NUMBERS**

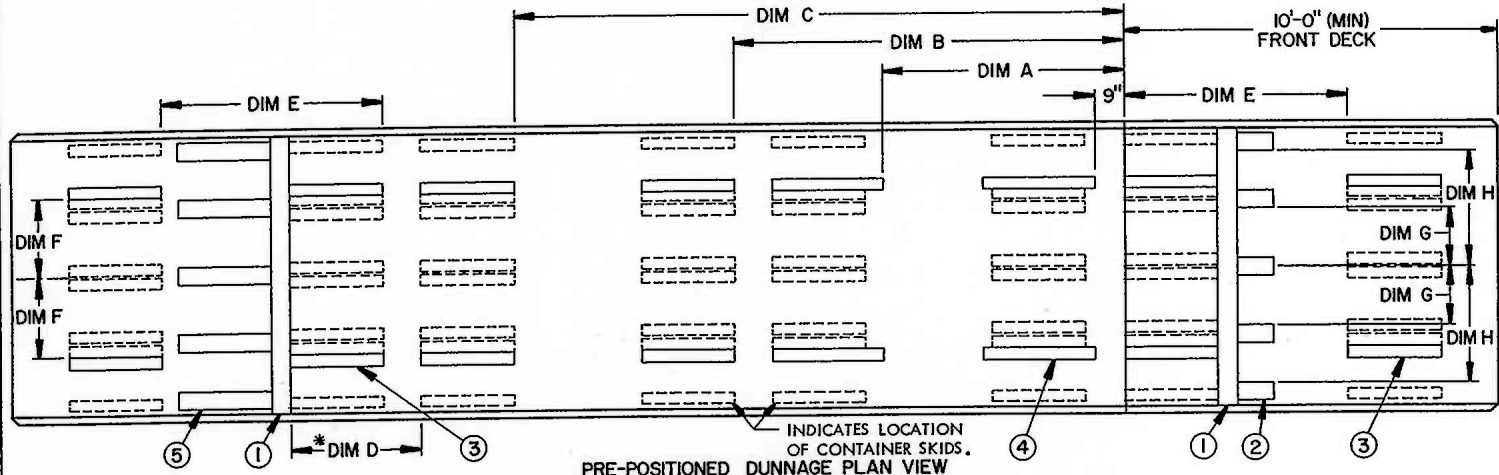
- 1 PRE-POSITIONED HEADER, 2" X 6" BY TRAILER WIDTH (DOUBLED) (2 REQD). PRE-POSITION AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 7. NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/1-12d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST W/1-20d NAIL EVERY 8". SEE GENERAL NOTE "Q" ON PAGE 2.
- 2 PRE-POSITIONED BACK-UP CLEAT, 2" X 6" X 12" (DOUBLED) (5 REQD). PRE-POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/3-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/3-20d NAILS.
- 3 PRE-POSITIONED SIDE BLOCKING, 2" X 4" X 30" (DOUBLED) (12 REQD). PRE-POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/8-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. THIS SIDE BLOCKING IS USED ON ALL 2-CONTAINER HIGH LOAD UNITS.
- 4 PRE-POSITIONED SIDE BLOCKING, 2" X 4" X 36" (DOUBLED) (4 REQD). PRE-POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/9-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. THIS SIDE BLOCKING IS USED ON THE 3-CONTAINER HIGH LOAD UNIT.
- 5 PRE-POSITIONED BACK-UP CLEAT, 2" X 6" X 30" (DOUBLED) (5 REQD). PRE-POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/8-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/8-20d NAILS.
- 6 ANTI-CHAFING ASSEMBLY (12 REQD). SEE THE DETAIL ON PAGE 10.
- 7 STACK UNITIZING STRAP, 1-1/4" X .035" X 14'-0" STEEL STRAPPING (24 REQD). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "N" ON PAGE 2.
- 8 STACK UNITIZING STRAP, 1-1/4" X .035" X 18'-0" STEEL STRAPPING (8 REQD).
- 9 BUNDLING STRAP, 1-1/4" X .035" X 20'-0" STEEL STRAPPING (6 REQD). INSTALL TO ENCIRCLE SECOND LAYER CONTAINERS. SEE SPECIAL NOTE 6 ON PAGE 7.
- 10 BUNDLING STRAP, 1-1/4" X .035" X 25'-0" STEEL STRAPPING (2 REQD). INSTALL TO ENCIRCLE SECOND AND THIRD LAYER CONTAINERS.
- 11 HOLD-DOWN STRAP, 2" X .050" X 26'-0" STEEL STRAPPING (9 REQD). INSTALL EACH STRAP FROM TWO (2) 13'-0" PIECES. SEE GENERAL NOTE "M" ON PAGE 2.
- 12 HOLD-DOWN STRAP, 2" X .050" X 30'-0" STEEL STRAPPING (3 REQD). INSTALL EACH STRAP FROM TWO (2) 15'-0" LONG PIECES.
- 13 SEAL FOR 1-1/4" STRAPPING (80 REQD, 2 PER STRAP). DOUBLE-CRIMP EACH SEAL.
- 14 SEAL FOR 2" STRAPPING (72 REQD, 6 PER STRAP). DOUBLE-CRIMP EACH SEAL EXCEPT THOSE USED TO SECURE THE PADS.

(CONTINUED AT LEFT ABOVE)



**SECTION A-A**

STACK UNITIZING STRAPS NOT SHOWN FOR CLARITY PURPOSES.



INDICATES LOCATION OF CONTAINER SKIDS.  
**PRE-POSITIONED DUNNAGE PLAN VIEW**

(SEE SPECIAL NOTES 1 AND 2 BELOW)

**DIMENSION CHART C**

CONTAINER	DIM A	DIM B	DIM C	*DIM D	DIM E	DIM F	DIM G	DIM H
M112	6'-10"	10'-10"	17'-2"	42"	6'-4"	25"	18-1/4"	36"
M22E8	6'-5-1/2"	10'-5-1/2"	16'-5"	42"	71-1/2"	25-1/2"	18-3/4"	37"

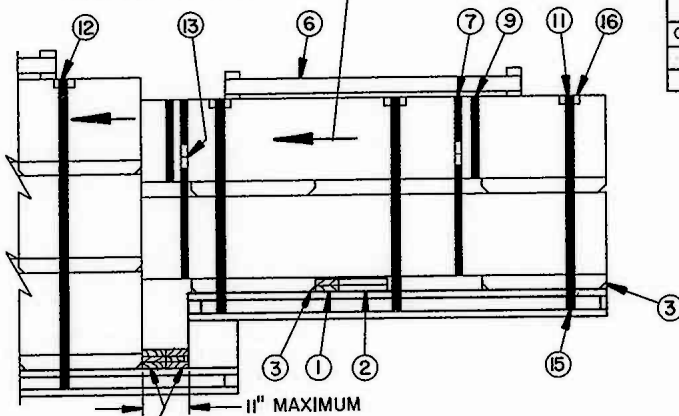
\* VERIFY AFTER LOADING FORWARD LOAD UNITS.

**SPECIAL NOTES**

- A 36-UNIT LOAD OF M22E8 MOTORS IS SHOWN ON A 40'-0" LONG BY 8'-0" WIDE DROP FRAME TRAILER WHICH HAS A 30'-0" LONG REAR DECK AND A 10'-0" LONG RAISED FRONT DECK. LONGER OR SHORTER TRAILERS MAY BE USED IF THE AVAILABLE LOADING SURFACE OF THE REAR DECK MEASURES AT LEAST 28'-6" LONG BY 7'-2" WIDE AND THE FRONT DECK MEASURES AT LEAST 9'-6" LONG BY 7'-2" WIDE. IF A LONGER TRAILER IS USED, THE PROCEDURES SPECIFIED IN NOTE 3 BELOW MAY APPLY. IF THE FRONT DECK IS LESS THAN 9'-6" BUT NOT LESS THAN 8'-6" LONG SEE NOTE 4 BELOW.
- THE PROCEDURES DEPICTED ON PAGE 6 ARE ALSO APPLICABLE FOR SHIPPING A 36-UNIT LOAD OF M112 MOTORS, EXCEPT THAT THE AVAILABLE LOADING SURFACE OF THE REAR DECK MUST MEASURE AT LEAST 29'-6" LONG BY 6'-11" WIDE AND THE FRONT DECK MUST MEASURE AT LEAST 9'-10" LONG BY 6'-11" WIDE. ALSO, IF THE NAILABLE SURFACE OF THE FRONT AND/OR REAR DECK OF THE TRAILER IS AT LEAST 7'-6" WIDE, IN LIEU OF PRE-POSITIONING SIDE BLOCKING PIECES MARKED ③ AND/OR ④, THE CONTAINERS MAY BE LOADED ON THE TRAILER, AND THE SIDE BLOCKING PIECES POSITIONED ON THE OUTSIDE OF THE CONTAINER SKIDS AS SHOWN IN THE ISOMETRIC LOAD VIEW ON PAGE 4 AND DESIGNATED AS PIECES MARKED ③. IF A LONGER TRAILER IS USED, THE PROCEDURES SPECIFIED IN NOTE 3 BELOW MAY ALSO APPLY. IF THE FRONT DECK IS LESS THAN 9'-10" BUT NOT LESS THAN 8'-11" LONG SEE NOTE 4 BELOW.
- IF A TRAILER LONGER THAN 40'-0" IS OFFERED FOR SHIPMENT OF A 36-UNIT LOAD, IT MAY BE POSSIBLE TO USE AN EXPOSED HEADER AND BACK-UP CLEATS OF TRIPLED MATERIAL AT THE REAR OF THE LOAD, AS SHOWN ON PAGE 4 BY PIECES MARKED ① AND ②, IN LIEU OF A PRE-POSITIONED HEADER AND BACK-UP CLEATS PIECES MARKED ① AND ⑤ ON PAGE 6. HOWEVER, TO PERMIT THE USE OF EXPOSED BLOCKING AT THE REAR OF THE LOAD, THE REAR DECK OF THE TRAILER MUST BE NOT LESS THAN 32'-0" LONG FOR A LOAD OF M22E8 MOTORS OR NOT LESS THAN 33'-0" LONG FOR A LOAD OF M112 MOTORS. THE FRONT DECK MUST BE OF THE LENGTH SPECIFIED IN NOTE 1 OR 2 ABOVE, AS APPLICABLE TO THE MOTORS BEING SHIPPED. SEE NOTE 4 BELOW.
- THE "PARTIAL ELEVATION VIEW OF PROCEDURES FOR TRAILERS WITH SHORTER FRONT DECKS" SHOWN AT LEFT, SPECIFIES THE METHOD OF BLOCKING TO BE USED WHEN SHIPPING M22E8 MOTORS ON A TRAILER HAVING AN 8'-6" (MIN) LONG FRONT DECK, OR WHEN SHIPPING M112 MOTORS ON A TRAILER HAVING AN 8'-11" (MIN) LONG FRONT DECK. NOTE: WHEN APPLYING THESE PROCEDURES, THE LOAD UNIT ON THE FRONT DECK AND THE ADJACENT LOAD UNIT ON THE REAR DECK MUST BE POSITIONED ON THE TRAILER SO THAT THE ENDS OF THE CONTAINERS WITH RECESSED SKIDS FACE THE REAR OF THE TRAILER AS INDICATED BY THE ARROWS ON THE "PARTIAL ELEVATION VIEW". THE REAR DECK, THEREFORE, MUST BE LONGER THAN THE MINIMUM LENGTH SPECIFIED IN NOTE 1 OR 2 ABOVE, AS APPLICABLE, TO COMPENSATE FOR THE PORTION OF THE FORWARD LOAD UNIT THAT OVERHANGS THE REAR DECK. ALSO, FOR PROPER BLOCKING OF THE LOAD UNITS ON THE REAR DECK, THE LONGITUDINAL LOCATION OF SIDE BLOCKING PIECES MARKED ③ AND ④ MUST BE ADJUSTED ACCORDINGLY FOR THOSE LOAD UNITS.
- THE LOAD CONFIGURATION DEPICTED ON PAGE 6 MAY BE ADJUSTED TO SATISFY THE QUANTITY OF CONTAINERS TO BE SHIPPED BY OMITTING AN ENTIRE LOAD UNIT OF EIGHT (8) OR TWELVE (12) CONTAINERS; BY OMITTING THE TOP LAYER OF FOUR (4) CONTAINERS FROM ONE OR MORE LOAD UNITS; OR BY OMITTING ONE (1) CONTAINER FROM THE TOP LAYER OF A CENTER ROW OF ONE OR MORE LOAD UNITS AND USING "SPACER ASSEMBLIES" IN THE PLACE OF EACH OMITTED CONTAINER, AS IS TYPICALLY SHOWN ON PAGE 8.

(CONTINUED AT LEFT)

INDICATES END OF CONTAINER WITH RECESSED SKIDS.



**PARTIAL ELEVATION VIEW OF PROCEDURES FOR TRAILERS WITH SHORTER FRONT DECKS**

(SEE SPECIAL NOTE 4 AT RIGHT.)

SOLID FILL, 2" THICK MATERIAL BY TRAILER WIDTH IN LENGTH AND BY THE WIDTH (S) REQUIRED TO FILL THE VOID (TRIPLED) (AS REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/1-12d NAIL EVERY 8". NAIL EACH ADDITIONAL PIECE W/1-20d NAIL EVERY 8".

(SPECIAL NOTES CONTINUED)

- CAUTION:** BUNDLING STRAPS 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 ⑦ AND ⑧ RESPECTIVELY.

**BILL OF MATERIAL**

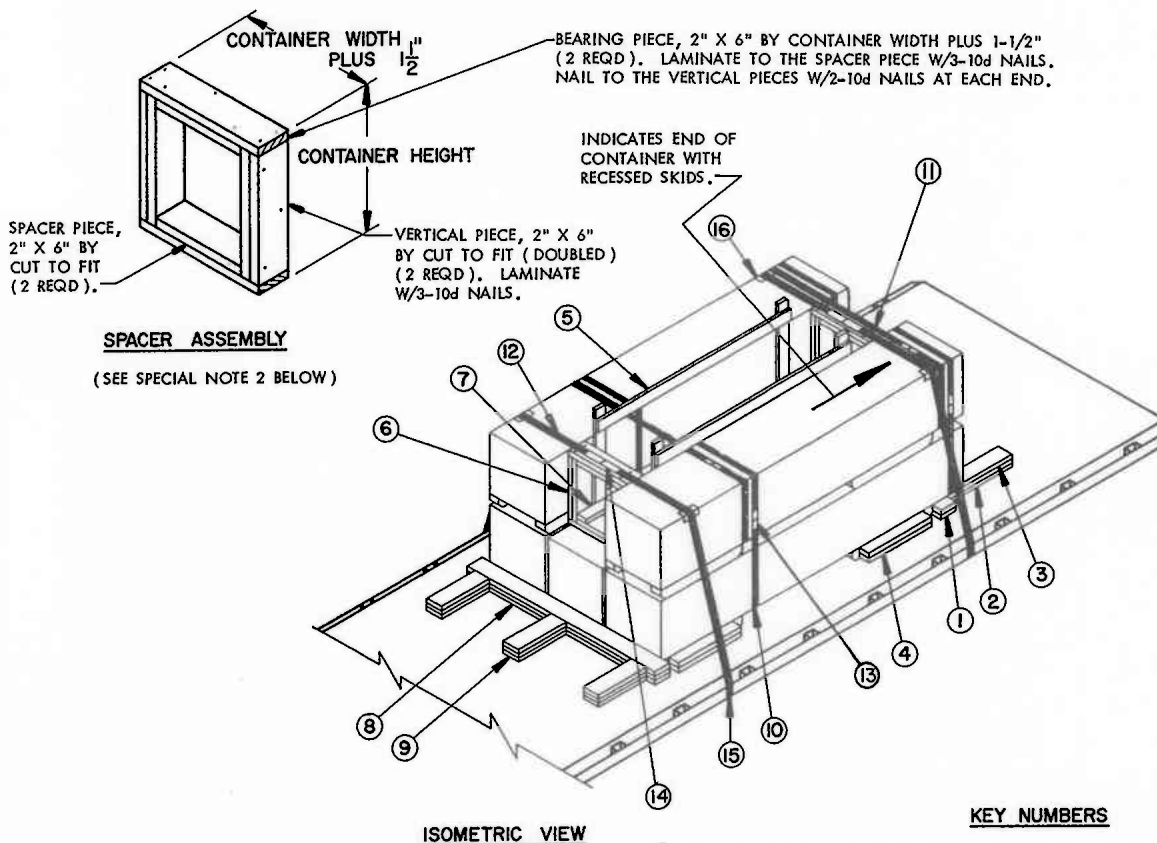
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	192	64
2" X 4"	84	56
2" X 6"	67	67
NAILS	NO. REQD	POUNDS
6d (2")	72	1/2
12d (3-1/4")	343	5-3/4
20d (4")	79	3
STEEL STRAPPING, 1-1/4" X .035"	650' REQD	93 LBS
STEEL STRAPPING, 2" X .050"	360' REQD	120 LBS
SEAL FOR 1-1/4" STRAPPING	80 REQD	4 LBS
SEAL FOR 2" STRAPPING	72 REQD	15 LBS
EDGE PROTECTOR	24 REQD	6 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
M22E8 MOTOR	36	39,420 LBS **
DUNNAGE		716 LBS
<b>TOTAL WEIGHT</b>		<b>40,136 LBS</b>

\*\* LADING WEIGHT FOR THE M112 MOTOR WILL BE 40,608 POUNDS..

**36-UNIT LOAD ON A 40'-0" LONG DROP FRAME TRAILER**



ISOMETRIC VIEW

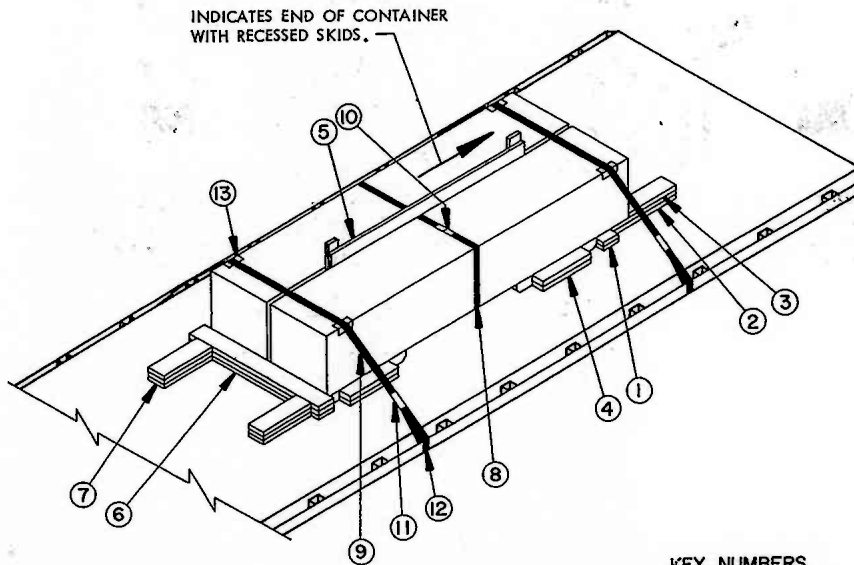
KEY NUMBERS

- ① HEADER, 2" X 6" X 72" (DOUBLED) (1 REQD). PRE-POSITION AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/1-12d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST W/1-20d NAIL EVERY 8". SEE GENERAL NOTE "Q" ON PAGE 2.
- ② BACK-UP CLEAT, 2" X 6" X 24" (DOUBLED) (3 REQD). PRE-POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/6-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/6-20d NAILS.
- ③ BEARING CLEAT, 2" X 6" X 18" (3 REQD). POSITION AGAINST THE CONTAINER AND NAIL TO PIECE MARKED ② W/5-20d NAILS.
- ④ SIDE BLOCKING, 2" X 4" X 24" (DOUBLED) (4 REQD). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/6-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑤ ANTI-CHAFING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 10.
- ⑥ SPACER ASSEMBLY (2 REQD). SEE THE DETAIL ABOVE AND SPECIAL NOTE 2 AT LEFT.
- ⑦ SEPARATOR PIECE, 2" X 4" BY LENGTH TO SUIT (2 REQD). NAIL TO THE SPACER ASSEMBLIES W/3-10d NAILS AT EACH JOINT.
- ⑧ HEADER, 2" X 6" X 72" (TRIPLED) (1 REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/1-12d NAIL EVERY 8". NAIL EACH ADDITIONAL PIECE W/1-20d NAIL EVERY 8".
- ⑨ BACK-UP CLEAT, 2" X 6" X 18" (TRIPLED) (3 REQD). POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/5-12d NAILS. NAIL EACH ADDITIONAL PIECE W/5-20d NAILS.
- ⑩ STACK UNITIZING STRAP, 1-1/4" X .035" X 14'-0" STEEL STRAPPING (4 REQD). SEE THE "UNITIZATION AND HANDLING PROCEDURES" ON PAGE 3 AND GENERAL NOTE "N" ON PAGE 2.
- ⑪ BUNDLING STRAP, 1-1/4" X .035" X 16'-0" STEEL STRAPPING (2 REQD). SEE SPECIAL NOTE 4 AT LEFT.
- ⑫ HOLD-DOWN STRAP, 2" X .050" X 26'-0" STEEL STRAPPING (2 REQD). INSTALL EACH STRAP FROM TWO (2) 13'-0" LONG PIECES. STAPLE TO "SPACER ASSEMBLY" W/2 STAPLES. SEE GENERAL NOTE "M" ON PAGE 2.
- ⑬ SEAL FOR 1-1/4" STRAPPING (12 REQD, 2 PER STRAP). DOUBLE-CRIMP EACH SEAL.
- ⑭ SEAL FOR 2" STRAPPING (12 REQD, 6 PER STRAP). DOUBLE-CRIMP EACH SEAL EXCEPT THOSE USED TO SECURE THE PADS.
- ⑮ PAD, 2" X .050" STEEL STRAPPING 18" LONG (4 REQD). POSITION UNDER ANCHORING FACILITY AND SEAL TO A HOLD-DOWN STRAP. SEE "DETAIL A" ON PAGE 10. ALT. STAKE POCKET PROTECTOR (8 REQD). USE TWO (2) UNDER EACH ANCHORING FACILITY WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 10.
- ⑯ EDGE PROTECTOR FOR 2" STRAPPING (4 REQD). POSITION UNDER A HOLD-DOWN STRAP AT THE TOP EDGE OF THE LOAD. SEE GENERAL NOTE "O" ON PAGE 2.

SPECIAL NOTES:

1. ONE LOAD UNIT OF FIVE (5) M22E8 MOTORS IS SHOWN ON AN 8'-0" WIDE FLAT BED TRAILER. THESE PROCEDURES ARE ALSO APPLICABLE FOR SHIPPING THE SAME QUANTITY OF M112 MOTORS.
2. THE USE OF "SPACER ASSEMBLIES" IS SPECIFIED FOR THE DEPICTED LOAD ONLY TO SHOW A TYPICAL APPLICATION. ONE (1) SPACER ASSEMBLY IS REQUIRED UNDER EACH 2" HOLD-DOWN STRAP MARKED ⑫. TWO (2) SPACER ASSEMBLIES MUST NOT BE POSITIONED SIDE-BY-SIDE LATERALLY, THEREFOR, ONLY ONE (1) CONTAINER MAY BE OMITTED FROM THE TOP LAYER OF A LOAD UNIT.
3. THREE (3) BACK-UP CLEATS, PIECES MARKED ② AND ③ OR PIECES MARKED ⑨ ARE ADEQUATE FOR RETAINING A MAXIMUM LTL LOAD OF 15,000 POUNDS.
4. CAUTION: BUNDLING STRAPS MARKED ① MUST BE INSTALLED WITH CARE SO AS TO NOT HAVE AN EDGE-TO-EDGE CONTACT WITH THE STACK UNITIZING STRAPS MARKED ⑩.





ISOMETRIC VIEW

KEY NUMBERS

- ① HEADER, 2" X 6" X 48" (DOUBLED) (1 REQD). PRE-POSITION AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/6-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/6-20d NAILS. SEE GENERAL NOTE "Q" ON PAGE 2.
- ② BACK-UP CLEAT, 2" X 6" X 24" (DOUBLED) (2 REQD). PRE-POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/6-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/6-20d NAILS.
- ③ BEARING CLEAT, 2" X 6" X 18" (2 REQD). POSITION AGAINST THE CONTAINER AND NAIL TO PIECE MARKED ② W/5-20d NAILS.
- ④ SIDE BLOCKING, 2" X 4" X 18" (DOUBLED) (4 REQD). POSITION AGAINST A CONTAINER SKID AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/5-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑤ ANTI-CHAFING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 10.
- ⑥ HEADER, 2" X 6" X 48" (TRIPLED) (1 REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/6-12d NAILS. NAIL EACH ADDITIONAL PIECE W/6-20d NAILS.
- ⑦ BACK-UP CLEAT, 2" X 6" X 18" (TRIPLED) (2 REQD). POSITION AS SHOWN AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/5-12d NAILS. NAIL EACH ADDITIONAL PIECE W/5-20d NAILS.
- ⑧ BUNDLING STRAP, 1-1/4" X .035" X 13'-0" STEEL STRAPPING (1 REQD). SEE GENERAL NOTE "N" ON PAGE 2.
- ⑨ HOLD-DOWN STRAP, 2" X .050" X 18'-0" STEEL STRAPPING (2 REQD). INSTALL EACH STRAP FROM ONE (1) PIECE OF STRAPPING; ANCHOR IT TO THE ANCHORING FACILITY ON ONE SIDE OF THE TRAILER, RUN IT OVER THE LOAD, PASS IT THROUGH THE ANCHORING FACILITY ON THE OPPOSITE SIDE OF THE TRAILER, AND BRING IT BACK UP ABOVE THE TRAILER FLOOR WHERE IT CAN BE TENSIONED AND SEALED. SEE GENERAL NOTE "M" ON PAGE 2.
- ⑩ SEAL FOR 1-1/4" STRAPPING (2 REQD). DOUBLE-CRIMP EACH SEAL.
- ⑪ SEAL FOR 2" STRAPPING (8 REQD, 4 PER STRAP). DOUBLE-CRIMP EACH SEAL EXCEPT THOSE USED TO SECURE THE PADS.
- ⑫ PAD, 2" X .050" STEEL STRAPPING 18" LONG (4 REQD). POSITION UNDER ANCHORING FACILITY AND SEAL TO A HOLD-DOWN STRAP. SEE "DETAIL A" ON PAGE 10. ALT: STAKE POCKET PROTECTOR (8 REQD). USE TWO (2) UNDER EACH ANCHORING FACILITY WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 10.
- ⑬ EDGE PROTECTOR FOR 2" STRAPPING (4 REQD). POSITION UNDER A HOLD-DOWN STRAP AT THE TOP EDGE OF THE CONTAINER. SEE GENERAL NOTE "O" ON PAGE 2.

SPECIAL NOTES:

1. A 2-UNIT LOAD OF M22E8 MOTORS IS SHOWN ON AN 8'-0" WIDE FLAT BED TRAILER. THESE PROCEDURES ARE ALSO APPLICABLE FOR SHIPPING THE SAME QUANTITY OF M1T2 MOTORS.
2. TWO (2) BACK-UP CLEATS, PIECES MARKED ② AND ③ OR PIECES MARKED ⑦, ARE ADEQUATE FOR RETAINING A MAXIMUM LTL LOAD OF 10,000 POUNDS.

