BUREAU OF EXPLOSIVES / A. J. Prasamuck (
DATE 12 9/68

LOADING AND BRACING (TL & LTL) ON FLAT BED TRAILERS OF BLU-27 AND BLU-32 FIRE BOMB SERIES PACKED IN OPEN WOODEN CRATES

INDEX

ITEM	PAGE(S)
GENERAL NOTES, AND MATERIAL SPECIFICATIONS	2
UNITIZATION AND HANDLING PROCEDURES	
36-UNIT LOAD ON A 40'-0" LONG TRAILER	- 4,5
TYPICAL LTL (2-UNIT LOAD)	6

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GENERAL NOTES

- BLU-32 FIRE BOMBS WHEN PACKAGED IN AN OPEN, WIREBOUND, WOODEN CRATE, SUBSEQUENT REFERENCE TO CRATE HEREIN MEANS THE CRATE WITH CONTENTS.
- THE LOAD AS SHOWN HEREIN IS BASED ON A 40'-0" LONG BY 8'-0" WIDE TRAILER HAYING A WOOD OR A WOOD AND METAL FLOOR, TRAILERS HAVING ALL METAL FLOORS WILL NOT BE USED FOR SHIPPING THESE ITEMS.

D. DETAILS OF CRATE:
CHATE DIMENSIONS ---- 116-1/4" LONG X 25-3/4" WIDE X 35-1/8" HIGH.

- E. THESE ITEMS ARE CLASSED AS A "FLAMMABLE LIQUID" AND WILL BE SHIPPED UNDER DOT SPECIAL PERMIT NO. 4580.
- PLACARD BOARDS MUST BE PROVIDED FOR BOTH SIDES AND BOTH ENDS OF A LOAD AS REQUIRED BY LAW AND/OR REGULATION. CAUTION: PLACARD BOARDS AND BOARD MOUNTING BRACKETS MUST NOT BE NAILED TO THE LADING. LIKEWISE, LOAD COVERING TARPAULINS ARE USED, THEY MUST NOT BE NAILED TO THE LADING.
- G. THE GROSS WEIGHT AND AXLE DISTRIBUTION OF WEIGHT FOR A LOAD ARE THE RE-SPONSIBILITY OF THE CARRIER. THE CARRIER WILL ADVISE THE SHIPPER OF THE APPLICABLE LOADING REQUIREMENTS, AND THE SHIPPER WILL LOAD ACCORDINGLY.
- THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE TRAILER TO BE LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS DEPICTED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE DESIGNATED ITEMS.
- OTHER TYPES OF LADING ITEMS MAY BE LOADED ON A TRAILER WHICH IS PARTIALLY COADED 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.
- One and one-quarter inch (1-1/4") steel strapping will be used to unitize crates as shown on page 3 and as specified in the outloading procedure on page 4. It is recommended that crates be unitized prior to placement ABOARD THE TRAILER.
- IN SOME INSTANCES, CRATES 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.
- WHEN STEEL STRAPPING 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.
- IF THE STAKE POCKETS AND/OR ANCHOR DEVICES ON A TRAILER ARE NOT PROPERLY LOCATED TO PERMIT THE SECURING OF THE TWO INCH (2") STEEL STRAPPING AS SHOWN, OR IF THE POCKETS AND/OR ANCHOR DEVICES ARE NOT EQUAL TO OR GREATER THAN THE STRENGTH OF THE TWO INCH (2") TIE-DOWN STRAPS, STRAPPING MAY BE APPLIED TO FORM A COMPLETE LOOP WHICH ENCOMPASSES BOTH THE LADING MAY BE APPLIED TO FORM A COMPLETE LOOP WHICH ENCOMPASSES BOTH THE LADING AND THE TRAILER FRAME AND/OR BED. CAUTION: WHEN INSTALLING A TIE-DOWN STAP WHICH ENCOMPASSES BOTH LADING AND TRAILER FRAME AND/OR BED, AVOID TRAILER WHEELS, FIFTH WHEEL PLATE, CONTROLS, AND OTHER APPURTENANCES. USE EDGE PROTECTORS OR PADS ON ALL SHARP EDGES AS CUSHIONING FOR THE STRAPPING. NOTE: PROVISIONS OF GENERAL NOTE "M" WILL ALSO APPLY.
- O. NOTICE: LADING WILL NOT BE SECURED BY CHAINS AND/OR LOAD BINDERS IN LIEU OF THE SPECIFIED DUNNAGE.
- DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 6" MATERIAL IS ACTUALLY 3/4" THICK BY 5-5/8" WIDE AND 2" X 4" MATERIAL IS ACTUALLY 1-5/8" THICK BY 3-5/8" WIDE.

(GENERAL NOTES CONTINUED)

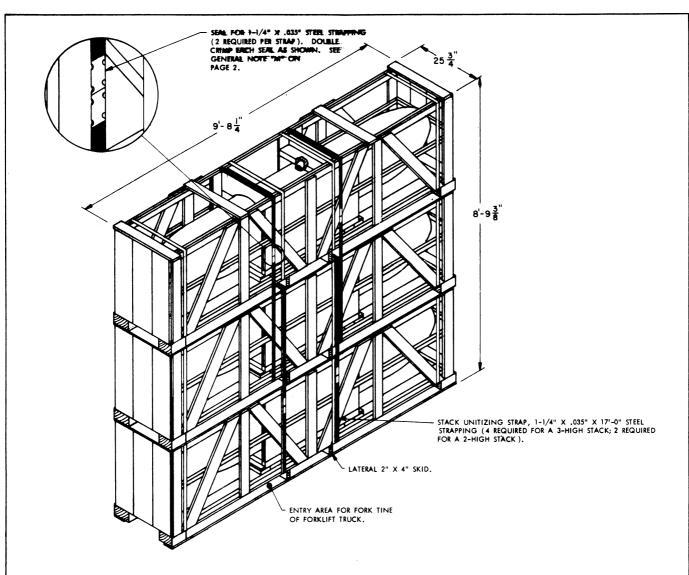
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AMCR 740-13,
 AND AUGMENTS TM 743-200-1 (CHAPTER 5).

 B. THE DUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO THE BLU-27 AND

 MALED TO THE FLOOR OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
 - R. FOR ADDITIONAL 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

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 NAILS OF THE SAME SIZE. STRAPPING, STEEL-----: TYPE I OR IV, CLASS A OR B FOR 1-1/4 INCH, CLASS A .OR B FOR STRAP STAPLE; EDGE PROTECTOR: STAKE
POCKET PROTECTOR -----: COMMERCIAL GRADE.



TYPICAL STACK

UNITIZING AND HANDLING PROCEDURAL GUIDANCE

- 1. STACKING CRATES FOR UNITIZING.
 - A. PLACE AN UPPER CRATE AS CLOSE AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE NEXT LOWER CRATE.
- 2. INSTALLATION OF 1-1/4" X .035" UNITIZING STEEL STRAPPING. SEE GENERAL NOTE "L" ON PAGE 2.
 - A. POSITION EACH OF THE TWO SETS OF UNITIZING STRAPS AROUND THE CRATES AS SHOWN. PLACE STRAPPING AS NEAR AS PRACTICAL TO THE LATERAL 2" X 4" SKIDS. THE STRAPPING SHOULD LAY FLAT AND STRAIGHT WITH THE BODY SURFACES OF THE CRATES; I.E., VERTICAL ALONG THE SIDES AND STRAIGHT ACROSS THE TOP AND BOTTOM OF THE STACK.
 - B. THE STRAPPING WILL BE FIRMLY TENSIONED, AND EACH END-OVER-END LAP JOINT WILL BE SEALED WITH TWO SEALS (BUTTED TOGETHER) WITH TWO PAIR OF CRIMPS PER SEAL AS SHOWN. SEE GENERAL NOTE "M" ON PAGE 2. THE LAP JOINT WILL BE MADE ALONG THE SIDE OF THE STACK. DURING STRAP TENSIONING, CARE SHOULD BE EXCENCISED TO ENSURE THAT THE CRATES ARE NOT DAMAGED. EXCESS STRAPPING (STRAP ENDS) SHOULD BE CUT OFF OR BROKEN OFF NEAR THE JOINT SEALS.
- 3. CRATE OR CRATE STACK HANDLING.

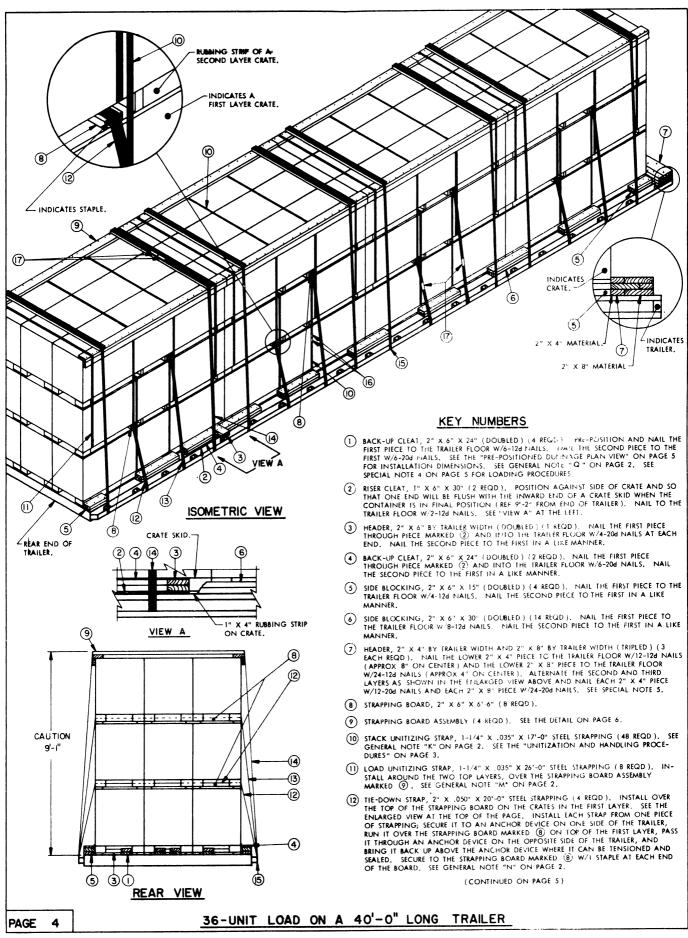
NOTES: (1) APPROVED MATERIALS HANDLING EQUIPMENT (FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, SPREADER BARS, ETC.) IS SPECIFIED ELSEWHERE THAN HEREIN.

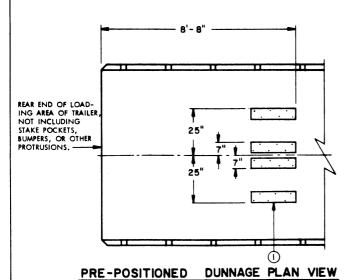
(UNITIZING AND HANDLING PROCEDURAL GUIDANCE CONTINUED)

- (2) PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE USED FOR HANDLING THE DEPICTED CRATES.
- A. ONLY APPROVED AND APPROPRIATELY-SIZED MATERIALS HANDLING EQUIPMENT WILL BE USED FOR HANDLING THE DEPICTED CRATES.
- B. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, THE CRATES SHOULD BE HANDLED FROM A SIDE POSITION. <u>CAUTION</u>: THE USUALLY APPLIED END-HANDLING IS NOT PERMITTED. CARE MUST BE EXERCISED WHEN INSERTING FORKS UNDER A CRATE, TO PREVENT DAMAGE TO A CRATE 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 OR THREE-CRATE STACK MAY BE HANDLED BY INSERTING THE FORKS OF THE FORKLIFT UNDER THE BODY OF AN UPPER CRATE.
- C. IF THE CRATES ARE HANDLED BY SLINGING, THE SLING MUST BE OF SUCH A DESIGN THAT LIFTING IS DONE FROM THE BOTTOM OF THE BODY OF THE LOWEST CRATE. DO NOT PASS SLING UNDER THE RUBBING STRIP OF THE LOWEST CRATE.

UNITIZATION AND HANDLING PROCEDURES

PAGE 3





(KEY NUMBERS CONTINUED FROM PAGE 4)

- (3) TIE-DOWN STRAP, 2" X .050" X 26'-0" STEEL STRAPPING (4 REQD). INSTALL OVER THE TOP OF THE STRAPPING BOARD ON THE CRATES IN THE SECOND LAYER. INSTALL EACH STRAP FROM ONE PIECE OF STRAPPING. SECURE TO THE STRAPPING BOARD MARKED (8) W/1 STAPLE AT EACH END OF THE BOARD.
- (4) TIE-DOWN STRAP, 2" X .050" X 34'-0" STEEL STRAPPING (8 REQD.). INSTALL EACH STRAP FROM TWO (2) 17'-0" LONG PIECES. SECURE TO STRAPPING BOARD ASSEMBLY MARKED ③ W/4 STAPLES. SEE GENERAL NOTE "M" ON PAGE 2.
- (5) PAD, 2" X .050" STEEL STRAPPING 18" LONG (32 REQD). POSITION UNDER AND SEAL TO PIECES MARKED (2), (3) AND (4). SEE "DETAIL A" ON PAGE 6. ALTERNATIVE: STAKE POCKET PROTECTOR (64 REQD). USE TWO (2) UNDER EACH ANCHOR POINT WITH PIECES MARKED (2), (3) AND (4). SEE "DETAIL B" ON PAGE 6.
- (6) SEAL FOR 1-1/4" STRAPPING (112 REQD). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "M" ON PAGE 2.
- (7) SEAL FOR 2" STRAPPING (80 REQD). DOUBLE CRIMP EACH SEAL, EXCEPT THOSE USED TO SECURE PIECES MARKED (3).

SECIAL NOTE

- 1. A 36-UNIT LOAD IS SHOWN ON A 40'-0" LONG BY 8'-0" WIDE FLAT BED TRAILER, A SHORTER TRAILER CAN NOT BE USED FOR THE SHIPMENT OF THE DEPICTED LOAD
- TWENTY-SEVEN (27) CRATES MAY BE LOADED ON A FLAT BED TRAILER WHICH IS 30"-0" OR LONGER BY APPLYING THE PROCEDUMES USED FOR THE DEPICTED 36-UNIT LOAD. ADJUST DUNNAGE QUANTITIES AS NECESSARY.
- 3. IF THE TRAILER TO BE USED FOR A SHIPMENT OF TWENTY-SEVEN (27) CRATES IS 32'-0" OR LONGER, A TRIPLED 2" X 6" BY TRAILER WIDTH HEADER AND 6-2" X 6" X 18" TRIPLED BACK-UP CLEATS, POSITIONED IN LINE WITH THE CRATE SKIDS, MAY BE USED AT THE REAR OF THE LOAD IN LIEU OF PIECES MARKED (1) THU (4) AS SPECIFIED ON PAGE 4. THIS ALTERNATIVE BLOCKING MAY BE USED AT BOTH ENDS OF THE LOAD IF THE TRAILER IS 33"-0" OR LONGER.
- 4. THE LOADING OF THE TRAILER MUST PROGRESS FROM THE REAR TO THE FRONT.
 THE FOLLOWING STEP-BY-STEP PROCEDURES APPLY TO THE LOADING AND BRACING OF THE REARMOST LOAD UNIT OF NINE (9) CRATES:
 - A. INSTALL PIECES MARKED ① ON THE TRAILER AS DIMENSIONED WITHIN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" AT THE LEFT. CAUTION. THE 8'-8" DIMENSION SHOWN WILL LOCATE THE CRATES SO THAT THE END FACING THE REAR WILL BE FLUSH WITH OR EXTEND SLIGHTLY BEYOND THE REARMOST LOADING SURFACE OF THE TRAILER BED. THIS IS NECESSARY IN ORDER TO PROVIDE A NAILING AREA FOR THE HEADER PIECES MARKED ② AT THE FRONT OF THE LOAD.
 - B. POSITION THE CENTER STACK TO STRADDLE THE TWO BACK-UP CLEATS NEAREST THE CENTER LINE OF THE TRAILER. POSITION EACH OUTSIDE STACK NEXT TO THE CENTER STACK. NOTE: EACH STACK MUST BE POSITIONED SO THERE IS AT LEAST 6" DISTANCE FROM THE FORWARD END OF A BACK-UP CLEAT MARKED ① TO THE REARWARD SURFACE OF THE CRATE SKID TO FACILITATE THE PLACEMENT OF THE HEADER PIECES MARKED ②.
 - C. INSTALL THE RISER PIECES MARKED ②.
 - D. INSERT ONE HEADER PIECE MARKED ③ UNDER THE CRATES SO AS TO BE CENTERED ON THE WIDTH OF THE TRAILER AND ALSO IN CONTACT WITH THE PRE-POSITIONED BACK-UP CLEATS MARKED ①. NAIL EACH END. INSERT THE SECOND HEADER PIECE AND NAIL EACH END.
 - E. MOVE EACH CONTAINER STACK REARWARD UNTIL THE CRATE SKID IS IN CONTACT WITH THE HEADER PIECE MARKED ③.
 - F. POSITION AND NAIL THE BACK-UP CLEATS MARKED 4.
- 5. IF THE TRAILER BEING LOADED HAS ROUNDED CORNERS AT THE FORWARD END,
 THE ENDS OF THE HEADER PIECES MARKED ② WILL BE CUT OFF AS NECESSARY
 TO CONFORM WITH THE ROUNDED CORNERS.

BILL OF MATERIAL						
LUMBER	LINEAR FEET	BOARD FEET				
1" X 6"	5	3				
2" X 4"	156	104				
2" X 6"	192	192				
2" X 8"	24	32				
NAILS	NO. REQD	POUNDS				
12d (3-1/4")	520	8-3/4				
20d (4")	136	5				
STEEL STRAPPING, 1-1/4" X .035" 1,024 FT REQD 147 LBS STEEL STRAPPING, 2" X .050" 504 FT REQD 168 LBS SEAL FOR 1-1/4" STRAPPING						

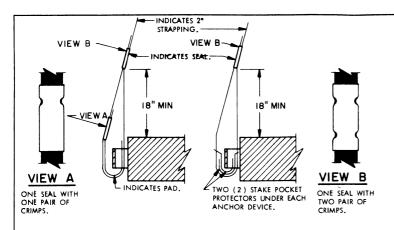
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CRATE WITH SERIES FIRE B	BLU-27 36 OMB	36,720 LBS *
DUNNAGE		1,180 LBS
	TOTAL WEIGHT	37,900 LBS

LOAD WEIGHT WITH BLU-32 SERIES FIRE BOMB
IS 27, 576 POUNDS

36-UNIT LOAD ON A 40'-O" LONG TRAILER

PAGE 5



SPECIAL NOTES

- 1. A 2-UNIT LOAD IS SHOWN AS A TYPICAL LTL LOAD ON AN 8'-0" WIDE TRAILER.
- THREE (3) BACK-UP CLEATS, SHOWN AS PIECES MARKED ②, ARE ADEQUATE FOR RETAINING A MAXIMUM LOAD WEIGHT OF 15,000 POUNDS.

DETAIL A

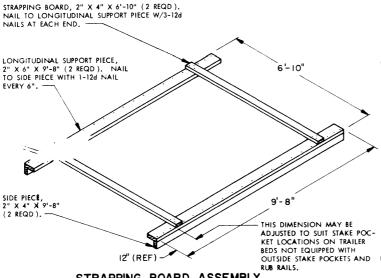
METHOD FOR INSTALLING 2" STRAPPING AND PAD.

DETAIL B

METHOD FOR INSTALLING 2" STRAPPING AND STAKE POC-KET PROTECTORS (ALT PAD). 4 (3) 2

ISOMETRIC VIEW

KEY NUMBERS



STRAPPING BOARD ASSEMBLY

THE ASSEMBLY AS SHOWN IS DESIGNED FOR USE ON THE ASSEMBLY AS SHOWN IS DESIGNED FOR USE ON A 3-WIDE LOAD UNIT. ADJUST THE WIDTH AS NECES-SARY FOR USE ON A 2-WIDE LOAD UNIT. FOR A SINGLE CONTAINER, A 2" X 6" X 26" STRAPPING BOARD MAY BE POSITIONED UNDER THE STRAP, IN LIEU OF USING THE ASSEMBLY.

- HEADER, 2" X 4" X 58" (TRIPLED) (2 REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/7-12d NAILS. NAIL EACH ADDITIONAL PIECE W/7-20d NAILS. SEE GENERAL NOTE "Q"ON PAGE 2.
- (2) BACK-UP CLEAT, 2" X 6" X 18" (TRIPLED) (6 REQD). ALIGN WITH A CONTAINER SKID OR WITH THE JOINT BETWEEN CONTAINERS, AS APPLICABLE, AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/5-124 NAILS. NAIL EACH ADDITIONAL PIECE W/5-20d NAILS. SEE SPECIAL NOTE 2 ABOVE.
- SIDE BLOCKING, 2" X 6" X 15" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/4-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- STRAPPING BOARD ASSEMBLY (1 REQD). SEE THE DETAIL AT
 - TIE-DOWN STRAP, 2" X ,050" X 19'-0" STEEL STRAPPING
 (2 REQD). INSTALL EACH STRAP FROM ONE PIECE OF STRAPPING; SECURE TO AN ANCHOR DEVICE ON ONE SIDE OF THE
 TRAILER, RUN IT OVER THE LOAD, PASS IT THROUGH AN ANCHOR
 DEVICE ON THE OPPOSITE SIDE OF THE TRAILER, AND BRING IT
 BACK UP ABOVE THE ANCHOR DEVICE WHERE IT CAN BE TENSIONED AND SEALED. SECURE TO STRAPPING BOARD ASSEMBLY
 MADDED. W/2 STABLES. SEC GENERAL NOTE "MI ON MARKED 4 W/3 STAPLES, SEE GENERAL NOTE "M" ON PAGE 2.
- PAD, 2" X .050" STEEL STRAPPING 18" LONG (4 REQD). POSITION UNDER AND SEAL TO A PIECE MARKED (5). SEE "DETAIL A" ABOVE. ALTERNATIVE: STAKE POCKET PROTECTOR (8 REQD) USE TWO (2) UNDER EACH ANCHOR POINT WITH PIECES (6) MARKED (5). SEE "DETAIL B" ABOVE.
- (7) SEAL FOR 2" STRAPPING (8 REQD). DOUBLE CRIMP EACH SEAL, EXCEPT FOR THOSE USED TO SECURE PIECES MARKED .

TYPICAL LTL (2-UNIT LOAD)

PAGE 6