

LOADING AND BRACING (TL & LTL) IN CLOSED OR OPEN TOP VAN TRAILER OF PALLETIZED BINARY CHEMICAL PROJECTILE, 155MM, GB2, M687

INDEX

<u>ITEM</u>	<u>PAGE (S)</u>
GENERAL NOTES, AND MATERIAL SPECIFICATIONS-----	2
PALLET UNIT DETAIL -----	3
TYPICAL FULL LOAD PROCEDURE-----	4, 5
TYPICAL LTL PROCEDURE-----	6, 7
PROCEDURES FOR SHIPMENT OF LEFTOVER PROJECTILES -----	8
DETAILS-----	3, 9-11
PROCEDURES FOR CONVENTIONAL VAN TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS-----	12, 13
PROCEDURES FOR CONVENTIONAL VAN TRAILERS EQUIPPED WITH LARGE-ANGLED FRONT CORNERS -----	14

CAUTION:

THE PROCEDURES SHOWN HEREIN ARE ONLY APPLICABLE FOR HIGHWAY MOVEMENTS, NOT FOR CONTAINER/TRAILER-ON-FLAT-CAR MOVEMENTS.

- PROJECTILE IS UNLOADED WITH THE M21 (OPA) CANISTER.

DO NOT SCALE

REVISIONS				DRAFTSMAN	pt	PROJ. ENG.	
				B.K.		RHA/WRF	
				CHECKER		LOG. ENGRG OFFICE	
				GRG		W. Ernst	
APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND							
<i>B. J. Graham</i>							
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC)							
<i>William F. Ernst</i>							
U.S. ARMY AMC DRAWING							
MAY 1987							
				CLASS	DIVISION	DRAWING	FILE
				19	48	4611	CB 11PE1

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 IN THIS DRAWING ARE APPLICABLE FOR THE 155MM, GB2, M687 BINARY CHEMICAL PROJECTILE WITH THE OPA CANISTER INSTALLED, PALLETIZED EIGHT PER PALLET. SEE THE PICTORIAL VIEW ON PAGE 3 FOR SIZE AND WEIGHT.
- C. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE VAN TRAILERS, AND APPLY TO TRAILERS HAVING WOOD, OR WOOD AND METAL, OR ALL METAL FLOORS. VAN TRAILERS WHICH ARE 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION) HAVE BEEN SHOWN, HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR TRAILERS WHICH ARE EIGHTY-NINE INCHES (89") THRU NINETY-NINE INCHES (99") IN WIDTH AND FOR TRAILERS OF OTHER LENGTHS FROM THE SHORTEST TO THE LONGEST AVAILABLE (REF: 24' TO 53'), AND FOR STRAIGHT TRUCK VANS. THE LOADING AND BRACING PROCEDURES SPECIFIED HEREIN ARE ALSO ADEQUATE (CONFIGURATION-WISE AND STRENGTH-WISE) FOR LOADS IN SHORTER OR LONGER VANS THAN SHOWN. THE SPECIFIED BRACING IS ADEQUATE FOR LOADS WEIGHING UP TO AND INCLUDING THE MAXIMUM WEIGHTS PERMITTED BY LAW.
- D. SELECTION OF A VEHICLE TO BE USED TO TRANSPORT THE DESIGNATED ITEM MUST COMPLY WITH AR 55-355, CHAPTER 213, FOR EXPLOSIVES AND OTHER DANGEROUS ARTICLES, IN FULL.
- E. THE GROSS WEIGHT AND AXLE DISTRIBUTION OF WEIGHT FOR A LOAD WILL BE THE RESPONSIBILITY OF THE CARRIER. THE CARRIER WILL ADVISE THE SHIPPER OF THE APPLICABLE LOADING REQUIREMENTS, AND THE SHIPPER WILL LOAD ACCORDINGLY. THE TOTAL WEIGHT OF THE LADING, OF THE DUNNAGE, OF THE TRACTOR, AND OF THE SEMI-TRAILER CARRYING THE LADING MUST NOT EXCEED THE MAXIMUM GROSS WEIGHT ALLOWED FOR THE STATE OR STATES THRU WHICH THE LOAD IS TO BE TRANSPORTED BY MOTOR CARRIER. LIKEWISE, THE GROSS WEIGHT ON A SINGLE OR TANDEM AXLE MUST NOT EXCEED THE MAXIMUM ALLOWABLE WEIGHT. IF THERE IS ANY DOUBT AS TO WHETHER THE TOTAL GROSS WEIGHT OR AXLE WEIGHT EXCEEDS THE MAXIMUM ALLOWED, WEIGHTS SHOULD BE VERIFIED BY ACTUALLY WEIGHING THE LOADED VEHICLE.
- F. **NOTICE:** A SHIPMENT WILL BE POSITIONED IN THE TRAILER CONSISTENT WITH STATE WEIGHT LAWS. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE TRAILER TO BE LOADED OR THE QUANTITY TO BE SHIPPED. COMBINATIONS OF THE OUTLOADING PROCEDURES SPECIFIED MAY BE USED; HOWEVER, THE APPROVED METHODS SHOWN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE DESIGNATED ITEMS.
- G. THE "LOAD AS SHOWN" FOR THE FULL LOAD DEPICTED HEREIN IS BASED ON AN APPROXIMATE LADING WEIGHT OF 42,000 POUNDS. THE SPECIFIED BLOCKING AND BRACING FOR THE FULL LOAD IS ADEQUATE FOR THE RETENTION OF HEAVIER LOADS, IF IT IS DESIRED TO INCREASE THE LADING WEIGHT.
- H. OTHER TYPES OF LADING ITEMS MAY BE LOADED INTO TRAILERS WHICH ARE PARTIALLY LOADED WITH PALLET UNITS OF BINARY PROJECTILES, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKING AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN.
- J. THE FULL LOAD IS SHOWN IN A TRAILER HAVING ROUNDED CORNERS AT THE FORWARD END. IF THE CONVENTIONAL VAN TRAILER BEING USED IS EQUIPPED WITH A SQUARE FRONT OR WITH AN INSTALLED BULKHEAD, OMIT THE FORWARD BLOCKING ASSEMBLY, PIECE MARKED (1), AND POSITION THE PALLET UNITS DIRECTLY AGAINST THE FORWARD PORTION OF THE TRAILER.

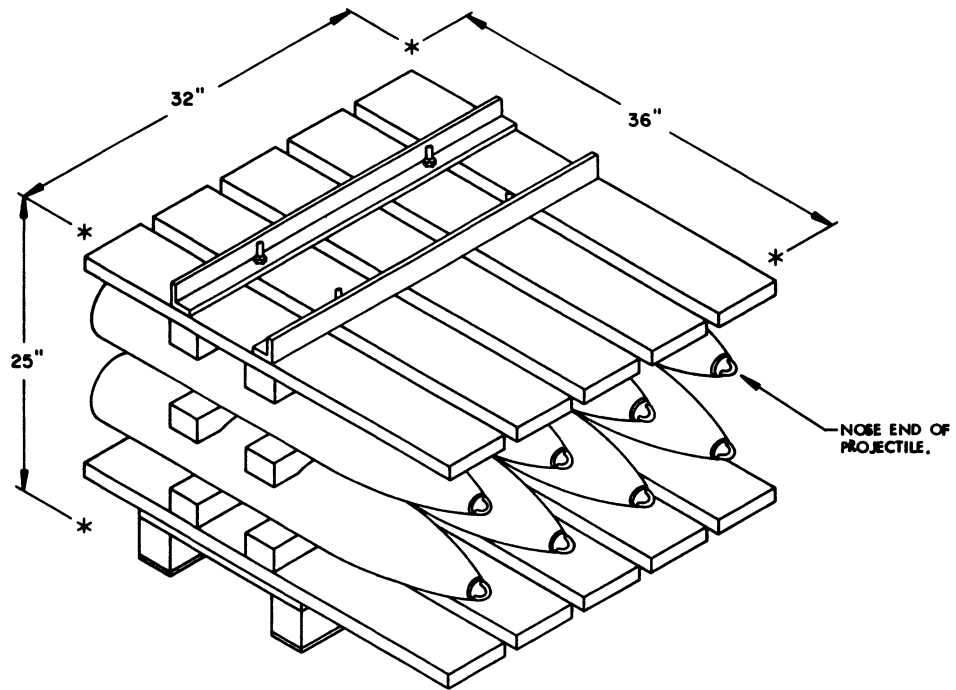
(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

LUMBER-----	: SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.
NAILS-----	: COMMON, FED SPEC FF-N-105.
STRAPPING, STEEL-----	: CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B (GRADE 2), OR C; FED SPEC QQ-5-781.
SEAL, STRAP-----	: TYPE D, STYLE I, II, OR IV, CLASS H, FINISH A, B (GRADE 2), OR C; FED SPEC QQ-5-781.
PLYWOOD-----	: GROUP B, CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D, FED SPEC NN-P-530. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
TYGARD-----	: POLYESTER YARN, 1100 POUNDS/INCH OF WIDTH STRENGTH.
ADHESIVE-----	: TYGARD ADHESIVE

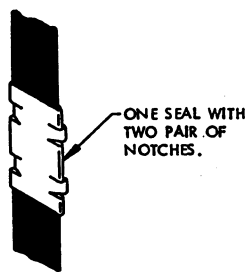
(GENERAL NOTES CONTINUED)

- K. PALLET UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF ITEMS CAN BE TRANSPORTED. SEE THE "PROCEDURES FOR SHIPMENT OF LEFTOVER PROJECTILES" DETAILS AND SPECIAL NOTES ON PAGE 8.
- L. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE (1) SEAL WITH TWO (2) PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 3 FOR GUIDANCE.
- M. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.
- N. **NOTICE:** A STAGGERED NAILING PATTERN WILL BE USED WHENEVER 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.
- O. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS. FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED TRAILER LOADS SHOWN THROUGHOUT THIS DRAWING. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2-1/2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH FEDERAL SPECIFICATION FF-N-105 AS NEARLY AS PRACTICABLE. STAPLES WHICH ARE LONGER THAN 2-1/2" WILL BE A COMMERCIAL GRADE, OF A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY SENCO PRODUCTS INCORPORATED. **NOTE:** STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD RESTRAINING FLOOR DUNNAGE APPLICATION.
- P. PORTIONS OF THE TRAILERS, SUCH AS SIDEWALLS, ENDWALLS, AND ROOFS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- Q. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- R. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454KG.



PALLET UNIT

PROJECTILE W/OPA CANISTER-----8 EACH @ 83 LBS (APPROX)
 CUBE-----16.7 CUBIC FEET (APPROX)
 GROSS WEIGHT-----784 LBS (APPROX)



STRAP JOINT A

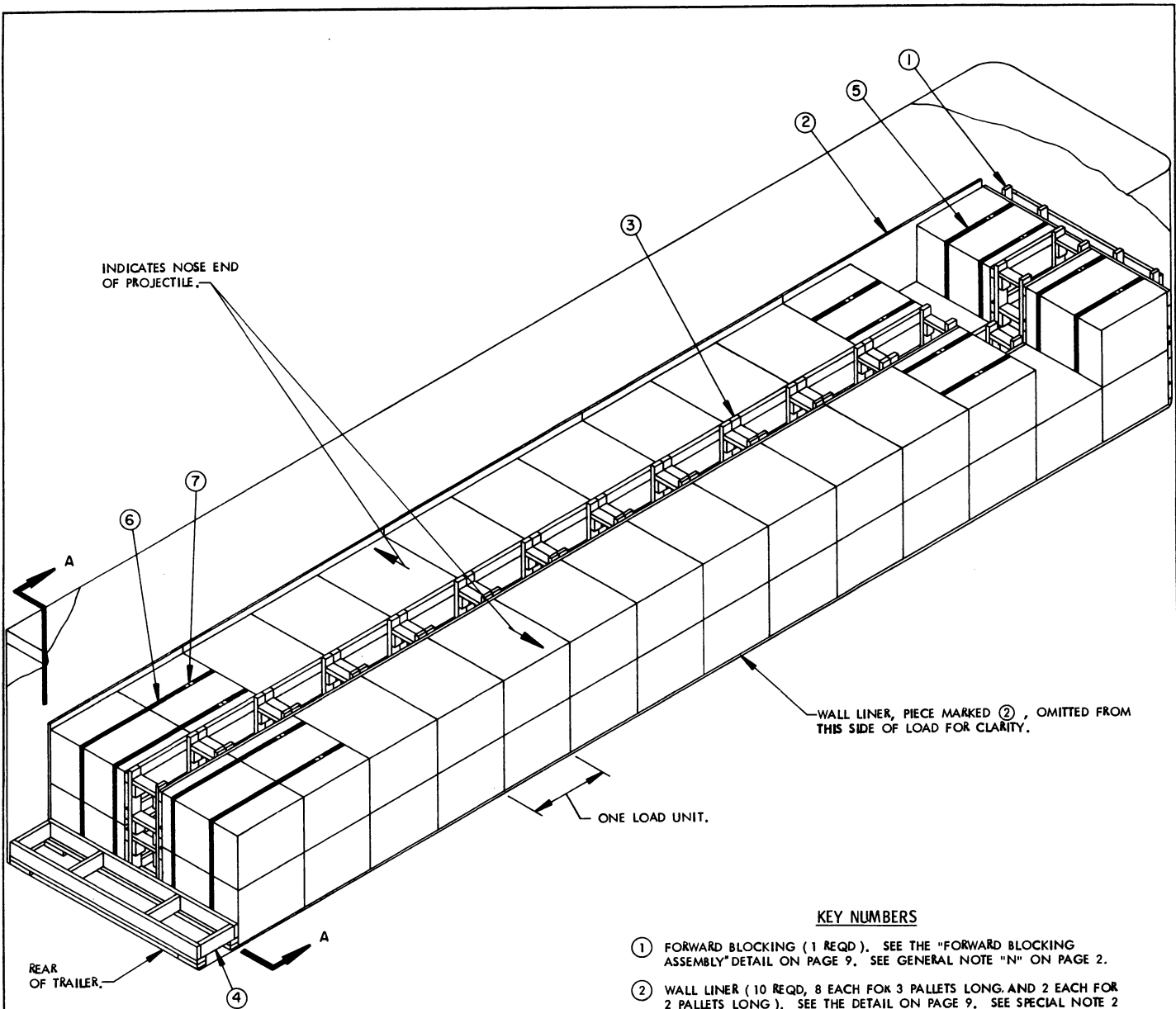
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.



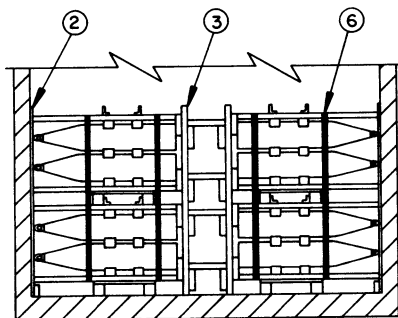
STRAP JOINT B

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

DETAILS



ISOMETRIC VIEW



SECTION A-A

KEY NUMBERS

- ① FORWARD BLOCKING (1 REQD). SEE THE "FORWARD BLOCKING ASSEMBLY" DETAIL ON PAGE 9. SEE GENERAL NOTE "N" ON PAGE 2.
- ② WALL LINER (10 REQD, 8 EACH FOR 3 PALLET LONG AND 2 EACH FOR 2 PALLET LONG). SEE THE DETAIL ON PAGE 9. SEE SPECIAL NOTE 2 ON PAGE 5.
- ③ CRIB FILL (14 REQD, 13 FOR 2 PALLET HIGH AND 1 FOR 1 PALLET HIGH). SEE THE "CRIB FILL" DETAIL ON PAGE 9.
- ④ REAR BLOCKING (1 REQD). SEE THE "REAR BLOCKING ASSEMBLY A" DETAIL ON PAGE 10. SEE SPECIAL NOTE 3 ON PAGE 5.
- ⑤ STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" X 14'-0" LONG STEEL STRAPPING (8 REQD). INSTALL SO AS TO ENCIRCLE A PALLET UNIT STACK AS SHOWN. SEE SPECIAL NOTE 4 ON PAGE 5.
- ⑥ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 20'-0" LONG STEEL STRAPPING (4 REQD). INSTALL SO AS TO ENCIRCLE TWO (2) PALLET UNIT STACKS AS SHOWN. SEE SPECIAL NOTE 5 ON PAGE 5.
- ⑦ SEAL FOR 1-1/4" STRAPPING (24 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.

SPECIAL NOTES:

1. A 54-UNIT LOAD IS SHOWN IN A 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION) CONVENTIONAL VAN TRAILER. TRAILERS OF OTHER DIMENSIONS MAY BE USED.
2. THE WALL LINER, PIECE MARKED ② , IS REQUIRED IN TRAILERS WHICH ARE METAL LINED AND IN TRAILERS WHICH HAVE EXPOSED VERTICAL POSTS BETWEEN PLYWOOD SIDE PANELS. IF THE TRAILER FURNISHED FOR LOADING HAS SIDEWALLS WHICH ARE COMPLETELY LINED ON THE INSIDE WITH PLYWOOD AND/OR FIBERGLASS/PLASTIC TO A HEIGHT OF AT LEAST 48", THE WALL LINER WILL NOT BE REQUIRED.
3. IF THE VOID AT THE REAR OF THE LOAD BETWEEN THE PALLET UNITS AND THE REAR DOORS MEASURES 1-1/2" OR LESS, REAR BLOCKING IS NOT REQUIRED. IF THE VOID AT THE REAR OF THE LOAD IS GREATER THAN 1-1/2" BUT LESS THAN 9", USE THE "REAR BLOCKING ASSEMBLY B" AS DETAILED ON PAGE 10. SEE SPECIAL NOTE 9.
4. A PALLET UNIT AT EACH END OF THE SECOND LAYER PORTION OF THE LOAD (EXCEPT IN THE VERY LAST STACK), OR NEXT TO A SINGLE LAYER PALLET, MUST BE UNITIZED TO A PALLET UNIT IN THE FIRST LAYER, UNLESS THE STACKED UNITS ARE AGAINST THE FRONT WALL OF A SQUARE-FRONT TRAILER OR AGAINST THE FORWARD BLOCKING ASSEMBLY WITH A PALLET STACK TO THE REAR OF THEM. THE UNITIZING STRAPS, PIECE MARKED ③ , MUST BE INSTALLED PRIOR TO FINAL POSITIONING OF THE STACK.
5. IF A STACK IN THE LOAD UNIT AT THE REAR OF THE LOAD IS MORE THAN ONE UNIT HIGH, AS SHOWN, BUNDLING STRAPS, SHOWN AS PIECE MARKED ④ , MUST BE INSTALLED SO AS TO ENCIRCLE THE REARMOST TWO (2) STACKS.
6. IF ONLY ONE PALLET UNIT IS TO BE LOADED IN THE SECOND LAYER OF EITHER ROW IT MUST NOT BE POSITIONED ON A REARMOST PALLET UNIT IN THE FIRST LAYER. PROVIDE LONGITUDINAL BRACING BY INSTALLING UNITIZING STRAPS, PIECE MARKED ⑤ . PROVIDE LATERAL BRACING BY INSTALLING A SPACER ASSEMBLY "B" ON TOP OF THE LATERALLY ADJACENT PALLET IN THE FIRST LAYER. SECURE THE SPACER ASSEMBLY TO THAT FIRST-LAYER PALLET UNIT WITH TWO (2) 1-1/4" X .035" OR .031" X 14'-0" LONG STEEL STRAPS. NOTE THAT THE STRAPS MUST BE PRE-POSITIONED PRIOR TO FINAL POSITIONING OF THE PALLET UNIT. ANY LOADS CONTAINING AN ODD NUMBER OF PALLET UNITS IN THE SECOND LAYER WILL ALSO HAVE THE ODD PALLET UNIT BRACED WITH A SPACER ASSEMBLY "B". SEE THE "SPACER ASSEMBLY B" DETAIL ON PAGE 11.
7. FOR SHIPMENTS OF LESS THAN FULL LOADS, REFER TO THE APPLICABLE GUIDANCE ON PAGES 6 AND 7.
8. PALLET UNITS HAVING LESS THAN THE FULL QUANTITY OF PROJECTILES CAN BE SHIPPED. REFER TO THE "PROCEDURES FOR SHIPMENT OF LEFTOVER PROJECTILES" ON PAGE 8 FOR GUIDANCE.
9. TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS MAY BE USED; HOWEVER, SPECIAL REAR BLOCKING MUST BE INSTALLED. SEE THE "PROCEDURES FOR CONVENTIONAL VAN TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS" ON PAGES 12 AND 13 FOR GUIDANCE. THE NAILED-HEADER METHOD IS SHOWN ON PAGE 12 AND THE TYGARD METHOD IS SHOWN ON PAGE 13. NOTE THAT THE SPECIAL REAR BLOCKING FOR TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS MAY ALSO BE USED IN TRAILERS EQUIPPED WITH HINGED DOORS.

BILL OF MATERIAL

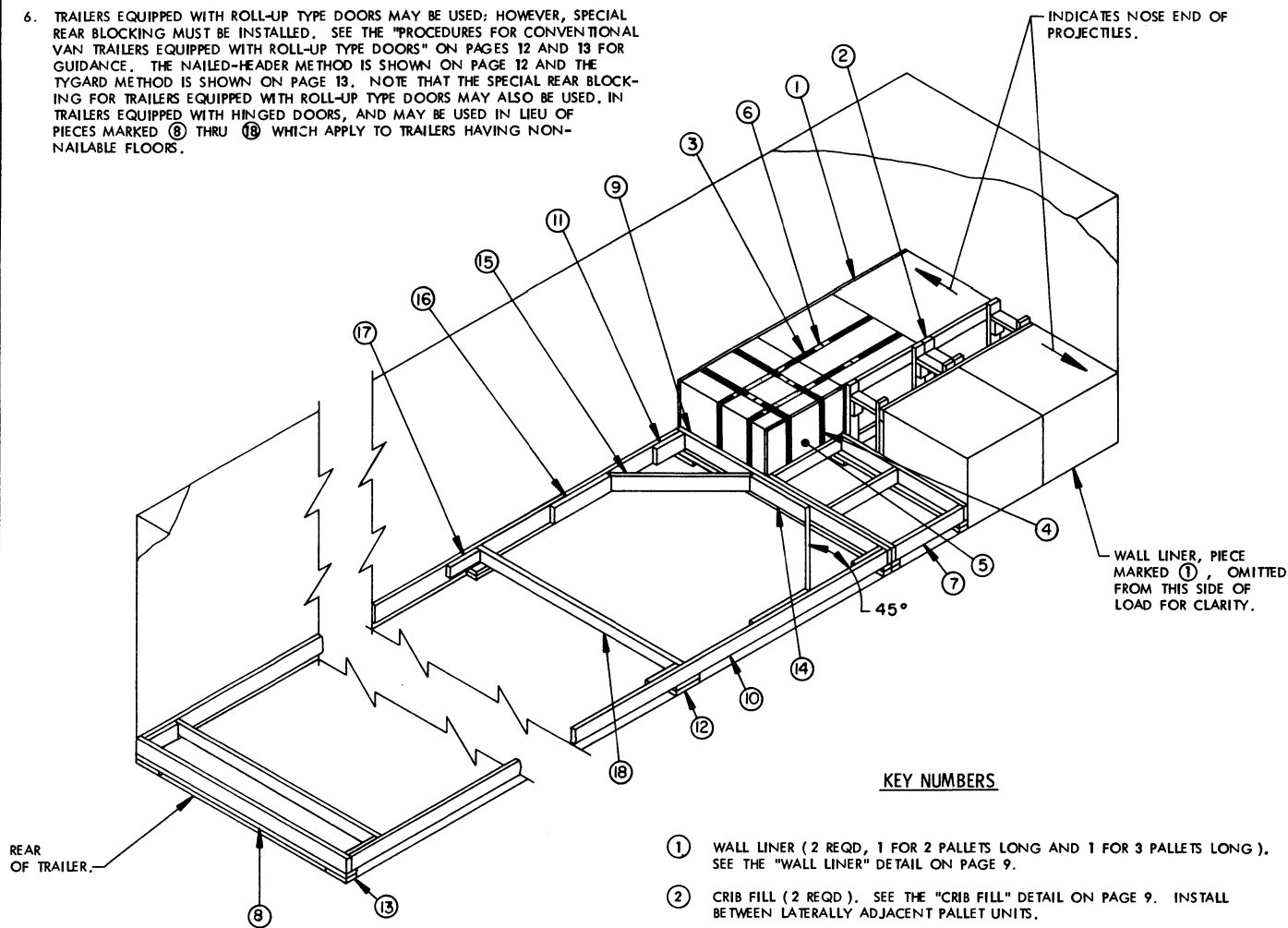
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	765	510
2" X 6"	77	77
NAILS	NO. REQD	POUNDS
4d	80	NIL
10d	1630	25-1/4
PLYWOOD, 1/4" X 48" X 8'-0"-----8 REQD-----176 LBS PLYWOOD, 1/4" X 48" X 64"-----2 REQD-----30 LBS STEEL STRAPPING, 1-1/4" X .035" OR .031"---192' REQD---28 LBS SEAL FOR 1-1/4" STRAPPING-----24 REQD---1 LB		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT -----	54-----	42,336 LBS
DUNNAGE -----		1,435 LBS
TOTAL WEIGHT-----		43,771 LBS (APPROX)

(SPECIAL NOTES CONTINUED.)

6. TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS MAY BE USED; HOWEVER, SPECIAL REAR BLOCKING MUST BE INSTALLED. SEE THE "PROCEDURES FOR CONVENTIONAL VAN TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS" ON PAGES 12 AND 13 FOR GUIDANCE. THE NAILED-HEADER METHOD IS SHOWN ON PAGE 12 AND THE TYGARD METHOD IS SHOWN ON PAGE 13. NOTE THAT THE SPECIAL REAR BLOCKING FOR TRAILERS EQUIPPED WITH ROLL-UP TYPE DOORS MAY ALSO BE USED. IN TRAILERS EQUIPPED WITH HINGED DOORS, AND MAY BE USED IN LIEU OF PIECES MARKED ⑧ THRU ⑱ WHICH APPLY TO TRAILERS HAVING NON-AVAILABLE FLOORS.



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 5-UNIT LOAD IS SHOWN IN A 7'-8" WIDE (INSIDE DIMENSION) CONVENTIONAL VAN TRAILER. TRAILERS OF OTHER WIDTHS CAN BE USED.
2. THE TRAILER IS SHOWN HAVING A SQUARE FRONT; HOWEVER, IF THE TRAILER BEING LOADED HAS ROUNDED CORNERS, A FORWARD BLOCKING ASSEMBLY, AS DETAILED ON PAGE 9, MUST BE USED.
3. THE "K-BRACE BLOCKING" SHOWN AS PIECES MARKED ⑧ THRU ⑱, IS ADEQUATE FOR RETAINING A MAXIMUM LTL LOAD OF 20,000 POUNDS.
4. THE FOLLOWING SEQUENCE WILL APPLY FOR THE LOADING OF AN ODD QUANTITY OF PALLET UNITS AND THE INSTALLATION OF THE BLOCKING AND BRACING FOR THE ODD UNIT:
 - A. PRE-POSITION THE BUNDLING STRAPS, PIECE MARKED ③.
 - B. LOAD THE SECOND PALLET UNIT IN THE ROW.
 - C. PRE-POSITION THE UNITIZING STRAPS, PIECE MARKED ④.
 - D. LOAD THE THIRD PALLET UNIT IN THE ROW.
 - E. POSITION RETAINER PANEL, PIECE MARKED ⑤.
 - F. TENSION AND SEAL BUNDLING STRAPS, PIECE MARKED ③.
 - G. TENSION AND SEAL UNITIZING STRAPS, PIECE MARKED ④.
5. THE SIDE STRUTS, PIECE MARKED ⑩, MAY NEED TO BE SPLICED. SPLICING CAN BE ACCOMPLISHED BY CENTERING A 2" X 6" X 24" PIECE ON THE JOINT OF THE SIDE STRUTS AND NAILING W/4-10d NAILS AT EACH END. CAUTION: A FILLER PIECE, PIECE MARKED ⑫, MUST BE POSITIONED UNDER EACH SPLICE JOINT. IF DESIRED, THE STRUT BRACING, PIECE MARKED ⑬, MAY BE NAILED TO THE SPLICE PIECE IN LIEU OF USING ADDITIONAL STRUT BRACE RETAINING CLEATS, PIECE MARKED ⑭.

(CONTINUED ABOVE)

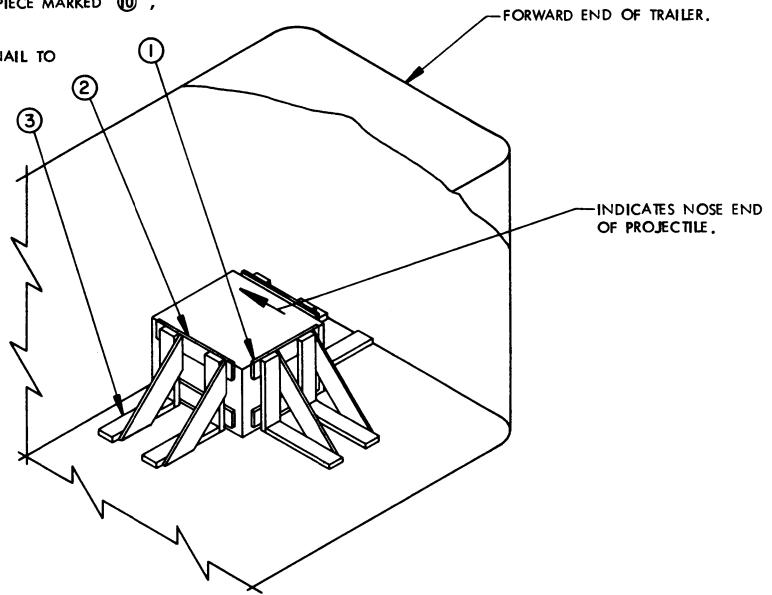
KEY NUMBERS

- ① WALL LINER (2 REQD, 1 FOR 2 PALLET LONG AND 1 FOR 3 PALLET LONG). SEE THE "WALL LINER" DETAIL ON PAGE 9.
- ② CRIB FILL (2 REQD). SEE THE "CRIB FILL" DETAIL ON PAGE 9. INSTALL BETWEEN LATERALLY ADJACENT PALLET UNITS.
- ③ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 15'-6" LONG STEEL STRAPPING (2 REQD). PRE-POSITION PRIOR TO PLACING THE SECOND PALLET UNIT IN THE ROW BUT DO NOT TENSION YET. SEE SPECIAL NOTE 4 AT LEFT.
- ④ UNITIZING STRAP, 1-1/4" X .035" OR .031" X 11'-0" LONG STEEL STRAPPING (2 REQD). PRE-POSITION SO AS TO BE UNDER THE THIRD PALLET UNIT IN THE ROW BUT DO NOT TENSION YET.
- ⑤ RETAINER PANEL (1 REQD). SEE THE "RETAINER PANEL" DETAIL ON PAGE 11. SEE SPECIAL NOTE 4 AT LEFT.
- ⑥ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- ⑦ SPACER ASSEMBLY (1 REQD). SEE THE "SPACER ASSEMBLY A" DETAIL ON PAGE 10. NAIL TO A HEADER, PIECE MARKED ⑨, W/2-10d NAILS AT EACH END.
- ⑧ RISER, 2" X 4" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (2 REQD). NAIL TO BOTTOM EDGE OF HEADER, PIECE MARKED ⑨, W/1-10d NAIL EVERY 12".
- ⑨ HEADER, 2" X 6" BY TRAILER WIDTH MINUS 1/2" IN LENGTH (2 REQD). SEE SPECIAL NOTE 3 AT LEFT.
- ⑩ SIDE STRUT, 2" X 6" BY CUT-TO-FIT BETWEEN FORWARD AND REAR HEADERS, PIECES MARKED ⑩ (2 REQD). SEE SPECIAL NOTE 5 AT LEFT.
- ⑪ POCKET CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO A SIDE STRUT, PIECE MARKED ⑩, W/3-10d NAILS. TOENAIL TO THE ADJACENT HEADER, PIECE MARKED ⑨, W/3-12d NAILS.
- ⑫ FILLER PIECE, 2" X 4" X 9" (DOUBLED) (AS REQD). POSITION SO AS TO BE CENTERED UNDER THE JOINT OF THE STRUT BRACE AND THE STRUT BRACE RETAINING CLEAT, PIECES MARKED ⑭ AND ⑬. NAIL TO A SIDE STRUT, PIECE MARKED ⑩, W/2-10d NAILS. LAMINATE SECOND PIECE IN A LIKE MANNER.
- ⑬ RISER PIECE, 2" X 4" X 9" (4 REQD). NAIL TO THE BOTTOM EDGE OF THE RISER, PIECE MARKED ⑧, W/2-10d NAILS.
- ⑭ CENTER CLEAT, 2" X 6" X 24" (1 REQD). NAIL TO THE HEADER, PIECE MARKED ⑨, W/6-10d NAILS.
- ⑮ DIAGONAL BRACE, 2" X 6" BY CUT-TO-FIT (2 REQD). DOUBLE BEVEL EACH END WITH 45° CUTS. INSTALL AT A 45° ANGLE AS SHOWN AND TOENAIL TO THE ADJACENT HEADER AND SIDE STRUT, PIECES MARKED ⑨ AND ⑩, W/2-16d NAILS AT EACH END.

(CONTINUED ON PAGE 7)

(KEY NUMBERS CONTINUED FROM PAGE 6)

- ⑩ SIDE CLEAT, 2" X 6" X 24" (2 REQD). NAIL TO SIDE STRUT, PIECE MARKED ⑩, W/8-10d NAILS.
- ⑪ STRUT BRACE RETAINING CLEAT, 2" X 4" X 12" (AS REQD). NAIL TO A SIDE STRUT, PIECE MARKED ⑩, W/3-10d NAILS.
- ⑫ STRUT BRACE, 2" X 4" BY TRAILER WIDTH MINUS 3" IN LENGTH (MINIMUM OF ONE REQD). INSTALL ONE (1) NEAR THE REAR OF THE TRAILER AS SHOWN. ONE (1) ADDITIONAL PIECE REQUIRED FOR EVERY 7'-0" OF STRUT LENGTH. NAIL TO THE POCKET CLEATS, PIECES MARKED ⑪, AND/OR TO THE STRUT BRACE RETAINING CLEATS, PIECES MARKED ⑪, W/2-12d NAILS AT EACH END.



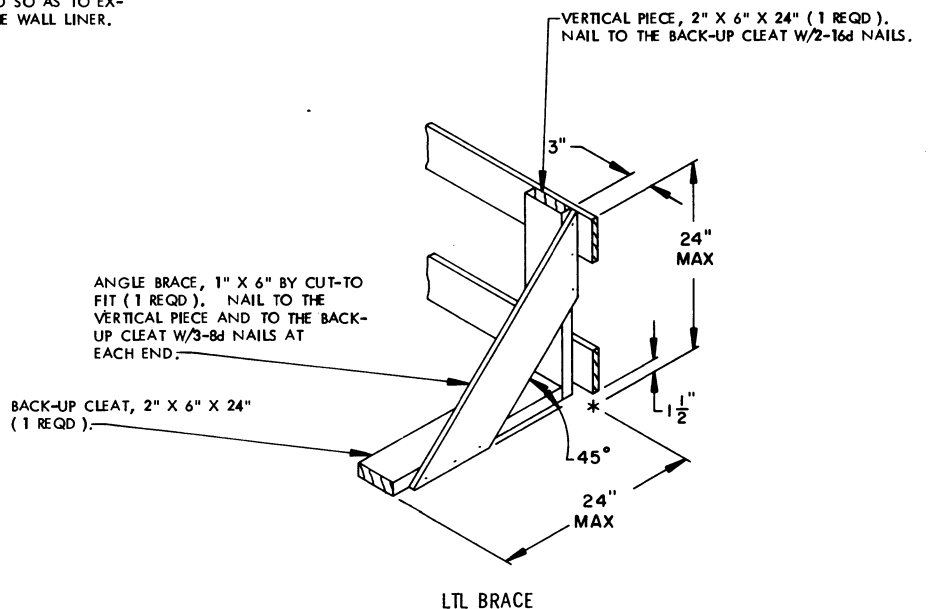
ISOMETRIC VIEW

KEY NUMBERS

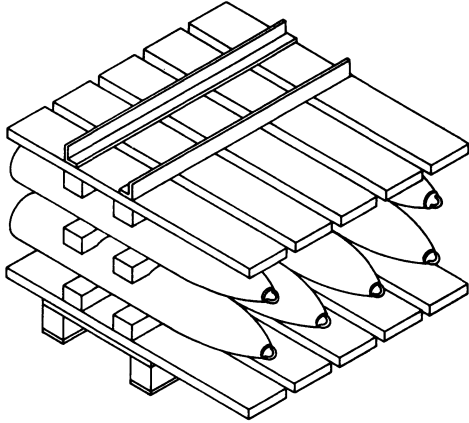
SPECIAL NOTES:

1. A 7'-8" WIDE (INSIDE DIMENSION) TRAILER WHICH HAS A NAILABLE FLOOR IS SHOWN. TRAILERS OF OTHER WIDTHS CAN BE USED.
2. THE POSITIONING OF A SINGLE PALLET UNIT IS OPTIONAL. IF THE TRAILER HAS A SQUARE FRONT, THE TWO (2) FORWARD LTL BRACES MAY BE OMITTED AND THE UNIT POSITIONED AGAINST THE END WALL.
3. MORE THAN ONE PALLET UNIT CAN BE SHIPPED PROVIDING THE CAPACITY OF THE LTL BRACES IS NOT EXCEEDED. THE LOAD SHOULD BE FORMED IN ROWS, WITH THE UNITS POSITIONED AGAINST OPPOSITE SIDEWALLS. THE CRIB FILL ASSEMBLY, DETAILED ON PAGE 9, MUST BE INSTALLED BETWEEN LATERALLY ADJACENT UNITS.
4. EACH LTL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL SUPPORT 2,000 POUNDS OF LADING, HOWEVER, NOT LESS THAN TWO (2) BRACES WILL BE USED AGAINST EACH PALLET UNIT ACROSS THE WIDTH OF THE TRAILER. ADDITIONAL BRACES MAY BE INSTALLED FOR THE RETENTION OF A HEAVIER LOAD.
5. IF THE TRAILER BEING LOADED HAS A METAL LINING OR HAS EXPOSED VERTICAL POSTS BETWEEN THE PLYWOOD SIDE PANELS, A WALL LINER MUST BE USED. A 24" X 32" PIECE OF 1/4" PLYWOOD WITH STOP PIECES APPLIED SIMILAR TO THE STOP PIECES ON THE "WALL LINER" DETAIL ON PAGE 9, WILL BE POSITIONED BETWEEN THE PALLET UNIT AND THE TRAILER SIDEWALL. ADDITIONALLY, PIECE MARKED ② MUST BE LENGTHENED SO AS TO EXTEND TO THE TRAILER SIDEWALL IN ORDER TO RETAIN THE WALL LINER.

- ① LOAD BEARING PIECE, 1" X 6" X 26" (2 REQD). LOCATE AT THE HEIGHTS AS SPECIFIED IN THE "LTL BRACE" DETAIL BELOW. NAIL TO THE LTL BRACES W/4-6d NAILS AT EACH JOINT. SEE GENERAL NOTE "N" ON PAGE 2.
- ② LOAD BEARING PIECE, 1" X 6" X 30" (4 REQD). LOCATE AT THE HEIGHTS AS SPECIFIED IN THE "LTL BRACE" DETAIL BELOW. NAIL TO THE LTL BRACES W/4-6d NAILS AT EACH JOINT. SEE SPECIAL NOTE 5 AT LEFT.
- ③ LTL BRACE (6 REQD). SEE THE "LTL BRACE" DETAIL BELOW. NAIL TO THE TRAILER FLOOR W/7-10d NAILS.



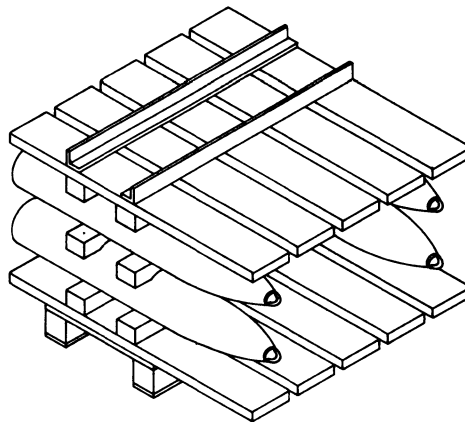
TYPICAL LTL (1-UNIT LOAD) IN A CONVENTIONAL VAN TRAILER



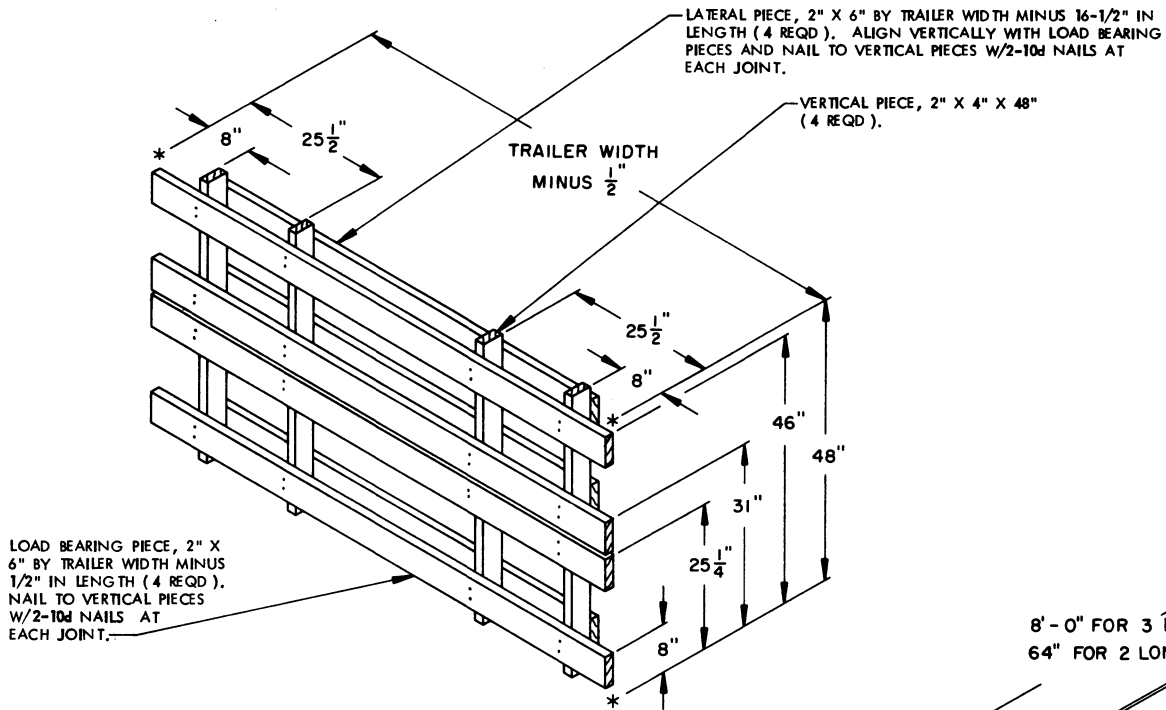
POSITIONING OF SIX PROJECTILES

SPECIAL NOTES:

1. SHIPMENTS OF BINARY PROJECTILES SHOULD CONSIST OF FULL 8-PROJECTILE PALLET UNITS TO THE MAXIMUM EXTENT POSSIBLE, HOWEVER, CERTAIN LESS-THAN-FULL PALLETS ARE PERMITTED. A FULL HEIGHT UNIT MUST BE MAINTAINED AND EQUAL WEIGHT DISTRIBUTION IS REQUIRED. THE ONLY PROJECTILE QUANTITIES WHICH MEET THESE REQUIREMENTS ARE A 6-PROJECTILE UNIT AS SHOWN ABOVE AND A 4-PROJECTILE UNIT AS SHOWN AT RIGHT. ANY QUANTITY OF PROJECTILES OTHER THAN FOUR OR SIX IN A PARTIAL PALLET ARE NOT PERMITTED.
2. SHIPMENT OF 6-PROJECTILE AND 4-PROJECTILE PALLET UNITS IS APPLICABLE FOR CONUS OR OCONUS MOTOR CARRIER SHIPMENTS FROM DEPOT TO DEPOT OR FROM DEPOT TO POSTS, CAMPS, AND STATIONS, OR UPON APPROVAL FROM HIGHER HEADQUARTERS, FOR SHIPMENTS FROM LOAD, ASSEMBLY, AND PACK PLANTS TO DEPOTS. SHIPMENT BY WATER CARRIER IS PERMITTED.
3. THE PROCEDURES ON THIS PAGE ARE APPLICABLE FOR SHIPMENT OF 6-PROJECTILE AND 4-PROJECTILE PALLET UNITS IN ANY OF THE LOADS SHOWN HEREIN.
4. IT IS RECOMMENDED THAT 6-PROJECTILE AND 4-PROJECTILE PALLET UNITS BE PLACED IN THE TOP LAYER OF A LOAD FOR BOTH MOTOR CARRIER AND WATER CARRIER SHIPMENTS.

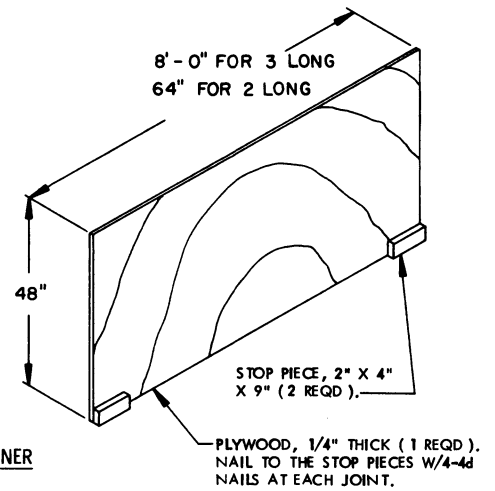


POSITIONING OF FOUR PROJECTILES

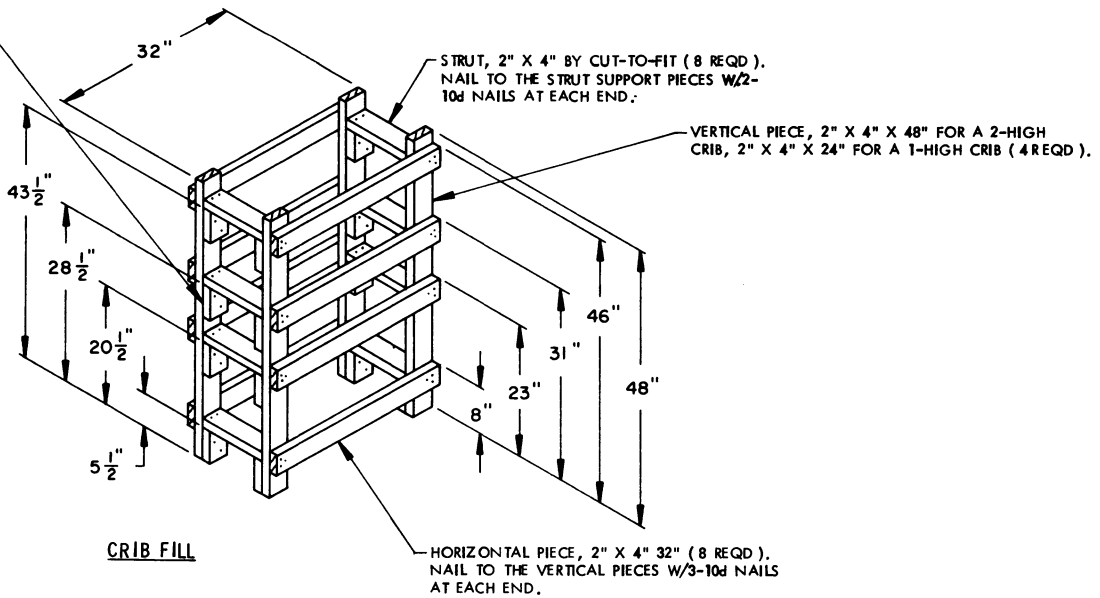


FORWARD BLOCKING ASSEMBLY

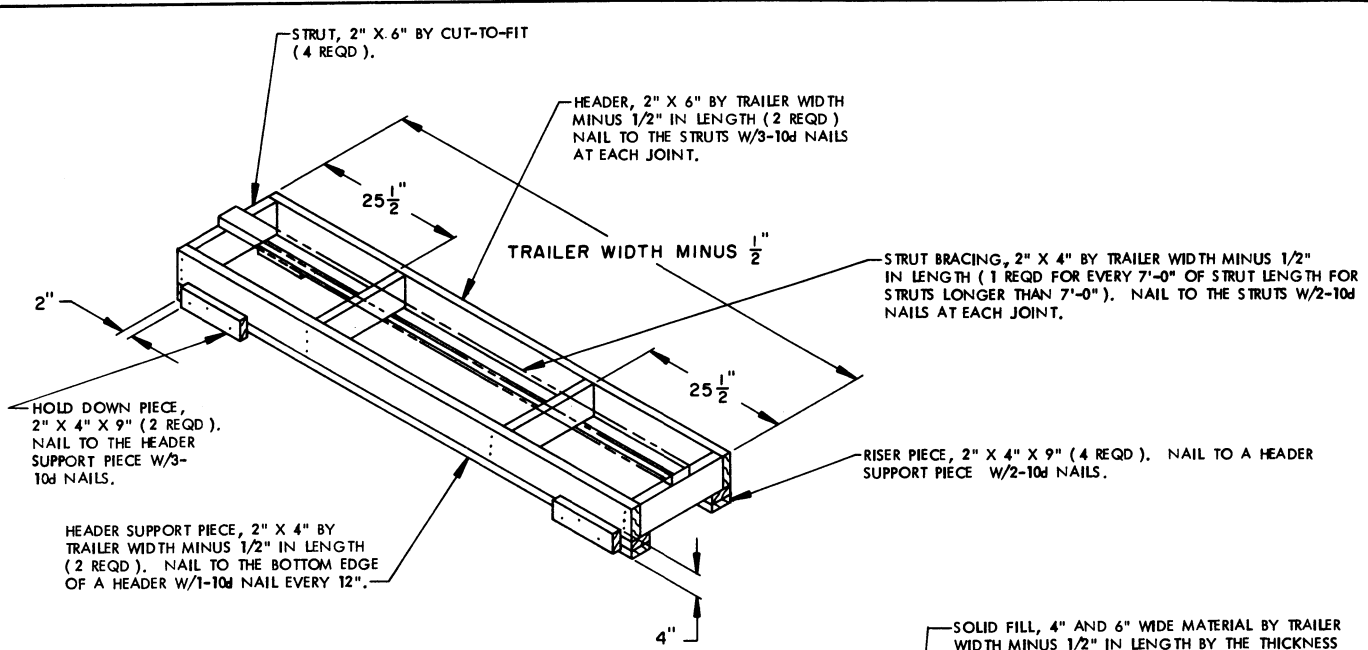
THIS ASSEMBLY IS DESIGNED FOR USE AT THE FRONT END OF A TRAILER HAVING ROUNDED CORNERS, AND IS APPLICABLE FOR A CORNER RADIUS OF NOT MORE THAN 6-1/2". IF THE RADIUS IS FROM 6-1/2" TO 8", 2" X 6" VERTICAL PIECES WILL BE USED IN LIEU OF THE 2" X 4" PIECES. IF THE TRAILER TO BE LOADED HAS LARGE-ANGLED CORNERS AT THE FORWARD END, REFER TO PAGE 14 FOR GUIDANCE.



STRUT SUPPORT PIECE, 2" X 4" X 5-1/2" (16 REQD). NAIL TO A VERTICAL PIECE W/2-10d NAILS.



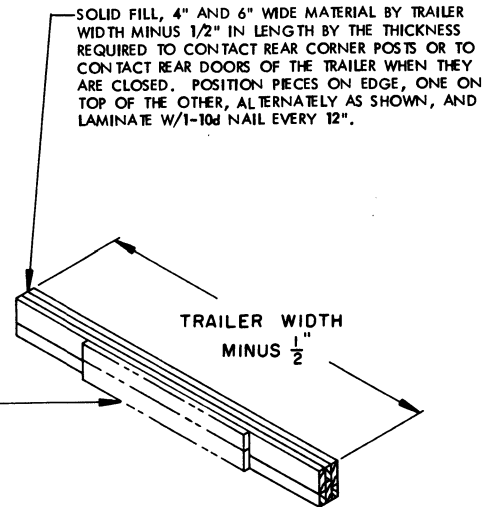
DETAILS



REAR BLOCKING ASSEMBLY A

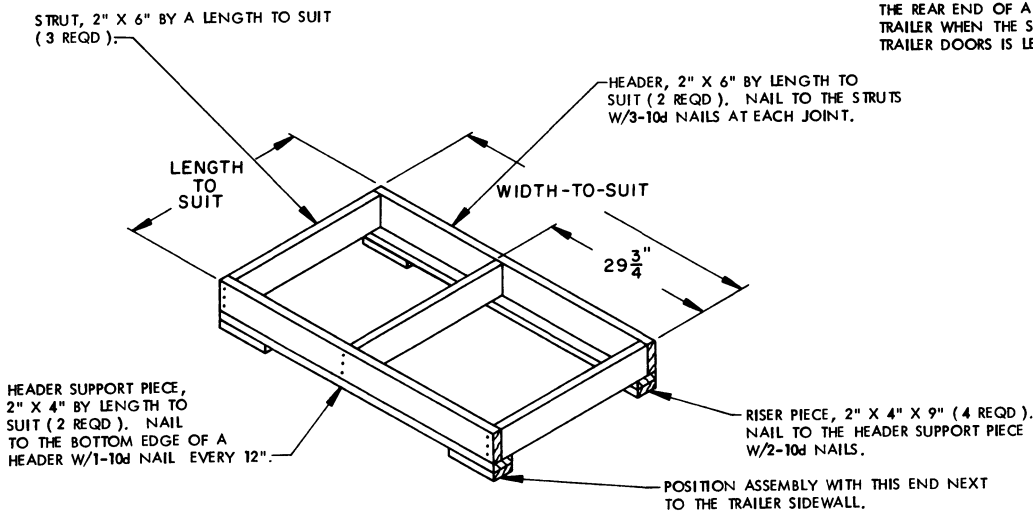
THIS ASSEMBLY IS FOR USE AT THE REAR OF THE LOAD IN A CONVENTIONAL VAN TRAILER WHEN THE EXCESS SPACE BETWEEN THE LADING AND THE TRAILER DOORS IS MORE THAN 9". NOTE THAT THE ABOVE VIEW IS ROTATED 180° FROM THE POSITION IN WHICH IT WILL BE INSTALLED.

IF THE TRAILER IS EQUIPPED WITH REAR CORNER POSTS, INSTALL SOLID FILL, 4" AND 6" WIDE BY 48" LONG BY THE THICKNESS REQUIRED TO CONTACT REAR CORNER POSTS OR TO CONTACT REAR DOORS OF THE TRAILER WHEN THEY ARE CLOSED. POSITION PIECES ON EDGE, ONE ON TOP OF THE OTHER AS SHOWN, AND NAIL TO THE REAR BLOCKING W/4 APPLICABLY SIZED NAILS.



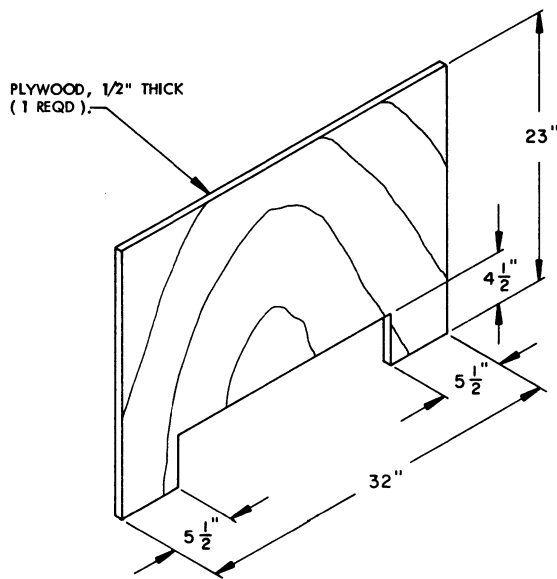
REAR BLOCKING ASSEMBLY B

THIS REAR BLOCKING ASSEMBLY IS DESIGNED FOR USE AT THE REAR END OF A LOAD IN A CONVENTIONAL VAN TRAILER WHEN THE SPACE BETWEEN THE LADING AND THE TRAILER DOORS IS LESS THAN 9" BUT AT LEAST 1-1/2".



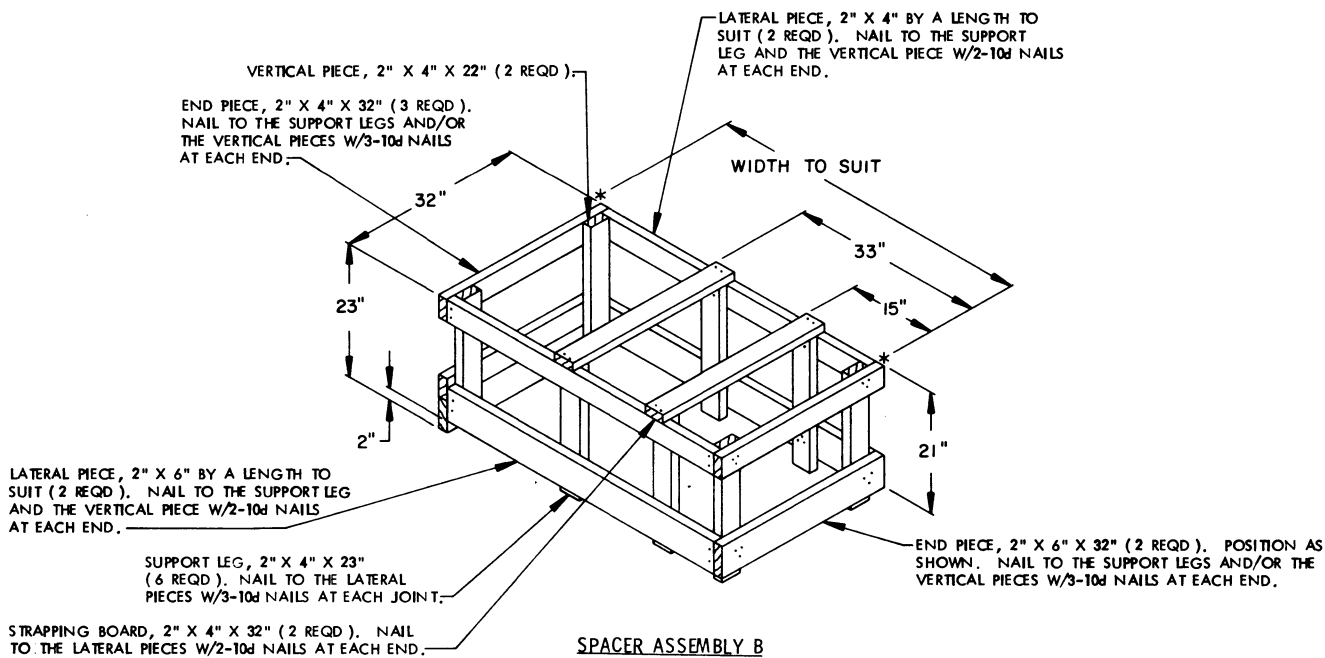
SPACER ASSEMBLY A

THIS ASSEMBLY IS TO BE USED IN THE PLACE OF AN OMITTED PALLET UNIT IN THE FIRST LAYER. SEE PIECE MARKED ⑦ ON PAGE 6.



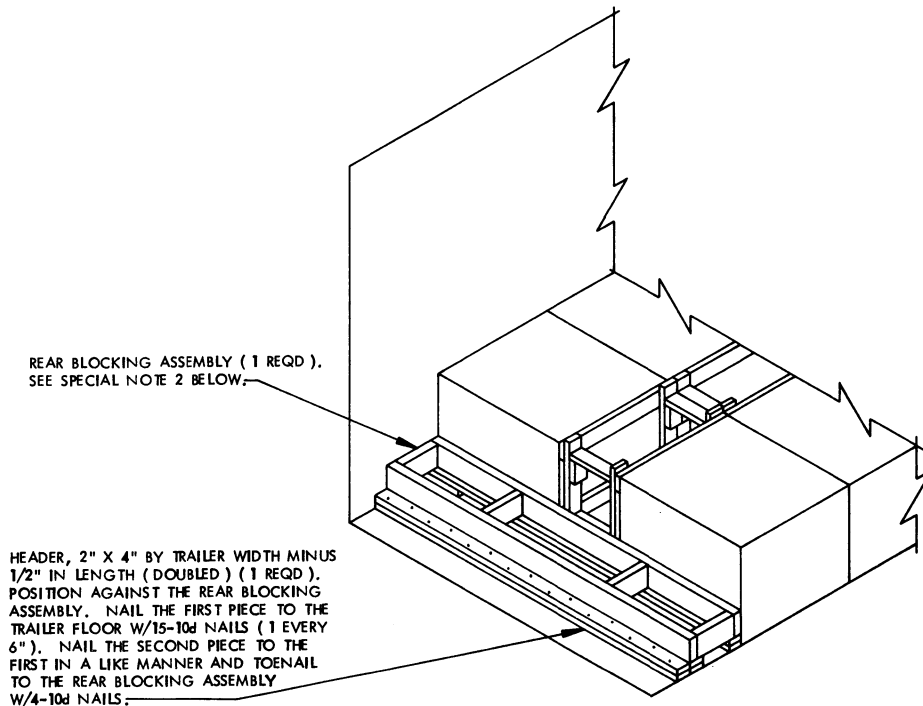
RETAINER PANEL

THIS PANEL IS TO BE STRAPPED TO ONE OR BOTH SIDES OF A PALLET UNIT, AS APPLICABLE, WHEN THE PALLET UNIT IS NOT AGAINST EITHER THE TRAILER SIDEWALL OR AGAINST A CRIB FILL ASSEMBLY.



SPACER ASSEMBLY B

DETAILS



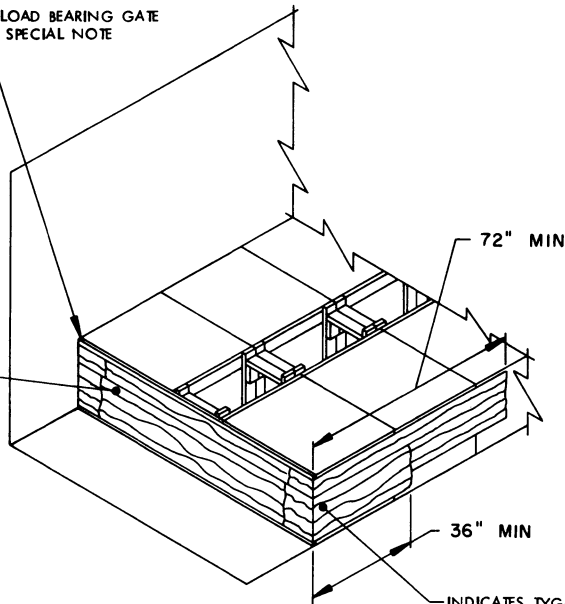
NAILED-HEADER METHOD

SPECIAL NOTES:

1. THE NAILED-HEADER METHOD OF REAR BLOCKING DEPICTED ABOVE CAN ONLY BE USED IN TRAILERS HAVING A NAILABLE FLOOR AREA BETWEEN THE LADING AND THE METAL THRESHOLD, OR A THRESHOLD PLATE IF THE TRAILER IS SO EQUIPPED, OF AT LEAST FOURTEEN INCHES (14")
2. REAR BLOCKING ASSEMBLY "A" IS SHOWN. SEE THE DETAIL ON PAGE 10. CONSTRUCT THE ASSEMBLY USING 6" (MINIMUM) LONG STRUTS.
3. THE NAILED-HEADER METHOD OF REAR BLOCKING IS ADEQUATE FOR THE RETENTION OF THE MAXIMUM WEIGHT LOAD.
4. THE NAILED-HEADER METHOD, ALTHOUGH DESIGNED ESPECIALLY FOR TRAILERS HAVING ROLL-UP TYPE DOORS, MAY ALSO BE USED IN TRAILERS EQUIPPED WITH HINGED DOORS.

1/2" PLYWOOD LOAD BEARING GATE (1 REQ'D). SEE SPECIAL NOTE 2 AT RIGHT.

TYGARD PATCH PIECE.



TYGARD METHOD A

INDICATES TYGARD MATERIAL, STAPLE TO THE LOAD BEARING GATE TO PREVENT SAGGING. AS AN ALTERNATIVE, A 1" X 4" BY LOAD HEIGHT PIECE MAY BE NAILED THRU THE TYGARD MATERIAL INTO THE LOAD BEARING GATE. CAUTION: PLACE 1" X 4" SO AS TO BE ALIGNED WITH THE VOID BETWEEN THE ROWS OF PALLET UNITS.

RECOMMENDED EQUIPMENT/INSTALLATION PROCEDURES

EQUIPMENT REQUIRED

- PAINT ROLLER, LATEX
- PAINT ROLLER PAN
- TENSIONING ROD/TOOL
- PRESSURE ROLLER
- RATCHET WRENCH (12" TO 15" HANDLE)
- OPEN END OR BOX WRENCH (12" TO 15" HANDLE)
- SCISSORS OR KNIFE
- TYGARD (15" WIDE ROLL)
- TYGARD ADHESIVE

BASIC INSTALLATION GUIDANCE

1. CUT TO LENGTH FOUR (4) TYGARD PIECES FOR ATTACHMENT TO THE TRAILER SIDEWALL. PIECES WILL BE OF A LENGTH AS REQUIRED TO PROVIDE PROPER BONDING TO THE TRAILER SIDEWALL (ONE PIECE ON EACH SIDE TO EXTEND AT LEAST 72" FORWARD FROM THE REAR OF THE TWO-WIDE PORTION OF THE LOAD AND ONE PIECE ON EACH SIDE TO EXTEND AT LEAST 36" FORWARD) AND TO EXTEND 60" ACROSS THE REAR OF THE LOAD. ALSO, CUT 72" LONG "PATCH" PIECES OF TYGARD MATERIAL, ONE FOR EACH SET OF TWO PIECES PREVIOUSLY CUT.
2. PRIOR TO POSITIONING OF THE PALLETS IN THE REARMOST TWO (OR THREE) LOAD UNITS, APPLY TYGARD ADHESIVE TO THE PROPER PORTIONS OF THE TRAILER SIDEWALLS. ONE PORTION IS AN AREA APPROXIMATELY 16" WIDE (FROM 8" ABOVE THE FLOOR TO 24" ABOVE THE FLOOR) EXTENDING FORWARD FROM A POINT WHICH IS AT LEAST 72" AHEAD OF THE REAR OF THE LOAD TO A POINT AT LEAST 72" AHEAD OF THE REAR OF THE LOAD ON EACH SIDE OF THE TRAILER. THE OTHER PORTION IS AN AREA APPROXIMATELY 16" WIDE (FROM 2" ABOVE THE FLOOR TO 18" ABOVE THE FLOOR) EXTENDING FORWARD FROM THE REAR OF THE LOAD TO AT LEAST 36". THESE DIMENSIONS ARE FROM THE REAR OF THE 2-WIDE PORTION OF A LOAD. ALSO APPLY ADHESIVE TO THE CORD SIDE OF A CORRESPONDING LENGTH OF EACH OF THE TYGARD PIECES THAT ARE TO BE ATTACHED TO THE SIDEWALLS OF THE TRAILER. ALLOW TIME FOR THE ADHESIVE TO "CURE" BEFORE PLACING A STRIP OF TYGARD ON TO A SIDEWALL (ADHESIVE WILL FEEL ALMOST DRY WHEN TOUCHED). **NOTE:** APPLICATION OF TYGARD IS SIMILAR TO THE APPLICATION OF "FORMICA".
3. FIRST, APPLY THE TYGARD PIECES TO THE 36" LONG ADHESIVE NEAREST THE REAR OF THE LOAD. NEXT, APPLY THE TYGARD PIECES TO THE 36" LONG ADHESIVE PORTION WHICH IS AT LEAST 72" AHEAD OF THE REAR OF THE LOAD. APPLY TYGARD SO THAT THE PIECES ARE PARALLEL OR NEARLY PARALLEL TO THE FLOOR. ROLL THE TYGARD WITH THE PRESSURE ROLLER TO ENSURE PROPER BONDING IS ACHIEVED. TEMPORARILY SECURE THE LOOSE ENDS TO THE TRAILER SIDEWALL OR TO AN OPEN HINGED TYPE DOOR OR TO THE OUTSIDE WALL, AS APPLICABLE.
4. POSITION THE REMAINING PALLET UNITS INTO THE TRAILER AND INSTALL THE SPECIFIED CRIB FILL.

(CONTINUED AT RIGHT)

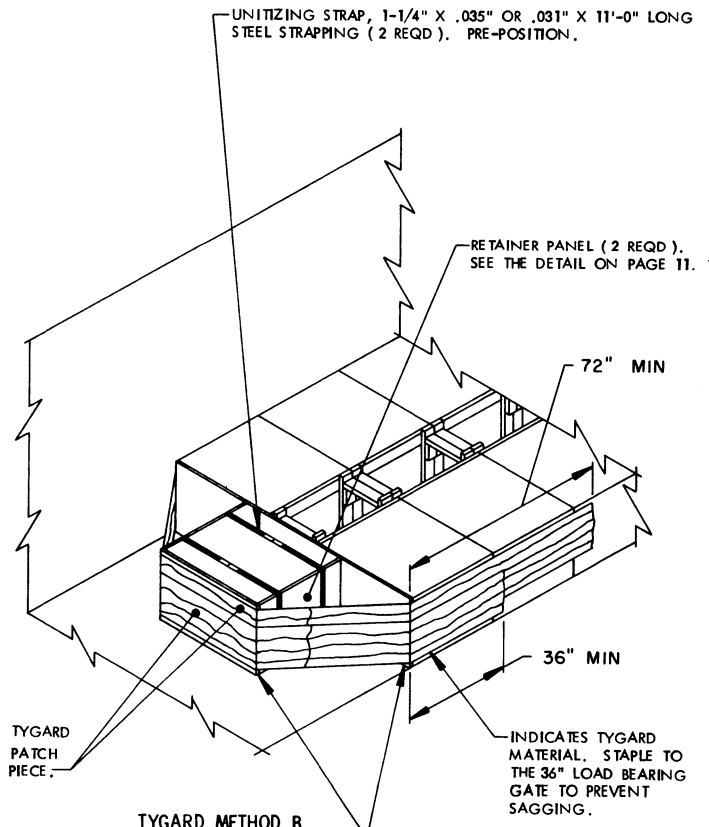
SPECIAL NOTES:

1. THE TYGARD METHOD OF REAR BLOCKING DEPICTED, CAN ONLY BE USED IN TRAILERS WHICH HAVE REASONABLY SMOOTH AND ADEQUATELY SECURED SIDEWALL PANELS IN THE AREA WHERE THE TYGARD MATERIAL IS TO BE APPLIED. NOTE THAT TYGARD MATERIAL MUST BE INSTALLED AT TWO LEVELS ON THE REAR LOAD UNIT.
2. A 24" HIGH PLYWOOD GATE MUST BE INSTALLED AT THE REAR OF THE LOAD TO PROVIDE A SMOOTH SURFACE FOR THE TYGARD MATERIAL TO EXTEND AROUND. IF THE REAR LOAD UNIT IS 2-WIDE, INSTALL A GATE WHICH IS TRAILER WIDTH MINUS 1/2" IN LENGTH AS SHOWN BY THE "TYGARD METHOD A" DETAIL AT LEFT. IF THE REAR LOAD UNIT IS 1-WIDE, INSTALL ONE (1) PALLET WIDTH GATE, AND ONE (1) TRAILER WIDTH MINUS 1/2" IN LENGTH GATE, AS SHOWN BY THE "TYGARD METHOD B" DETAIL BELOW.
3. THE TYGARD MATERIAL AND THE ADHESIVE FOR ATTACHING IT ARE COMMERCIAL PRODUCTS. FOR A SOURCE OF SUPPLY, CONTACT WALNUT INDUSTRIES, INC., 1344 ADAMS ROAD, P.O. BOX "E", BENSALEM, PA 10920-0860, PHONE 1-800-523-6536. APPLICATION INSTRUCTIONS AND GUIDANCE CAN ALSO BE OBTAINED FROM THAT OFFICE.
4. THE TYGARD METHOD, ALTHOUGH ESPECIALLY FOR TRAILERS HAVING ROLL-UP TYPE DOORS, MAY ALSO BE USED IN TRAILERS EQUIPPED WITH HINGED DOORS.
5. **NOTICE:** IF THE AREA OF A SIDEWALL WHERE THE TYGARD SHOULD BE ATTACHED IS ROUGH AND/OR BROKEN, THE APPLICABLE PIECE(S) OF TYGARD CAN BE LENGTHENED A SUITABLE AMOUNT AND ATTACHED TO THE SIDEWALL AHEAD OF THE INDICATED PREFERRED LOCATION.

(BASIC INSTALLATION GUIDANCE CONTINUED)

5. UNDO THE PREVIOUSLY SECURED LOOSE ENDS AND BRING A SET OF TWO PIECES TOGETHER ACROSS THE REAR OF THE LOAD. POSITION THE TENSIONING ROD SO THAT THE LOOSE ENDS OF THE TYGARD MATERIAL EXTEND THRU THE SLOT IN ROD. USING THE TWO WRENCHES, ROLL UP THE TYGARD TO TENSION IT ACROSS REAR OF THE LOAD. POSITION A WRENCH SO AS TO MAINTAIN THE TENSION IN THE TYGARD PIECES. CUT OFF AND DISCARD EXCESS MATERIAL FROM ONE PIECE OF THE TYGARD.
6. APPLY TYGARD ADHESIVE TO THE TENSIONED TYGARD PIECES AND ALSO TO THE CORD SIDE OF THE PREVIOUSLY CUT "PATCH" PIECE. APPLY THE "PATCH" AND ROLL WITH THE PRESSURE ROLLER TO ENSURE PROPER BONDING.

UNITIZING STRAP, 1-1/4" X .035" OR .031" X 11'-0" LONG STEEL STRAPPING (2 REQ'D). PRE-POSITION.

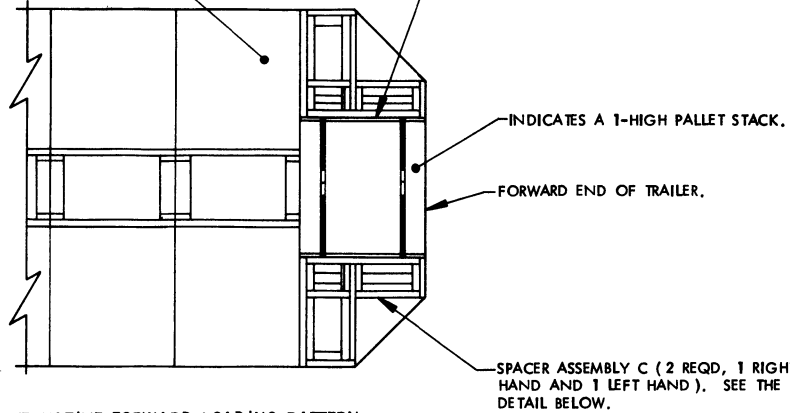


TYGARD METHOD B

1/2" PLYWOOD LOAD BEARING GATES (1 EACH REQ'D). SEE SPECIAL NOTE 2 ABOVE.

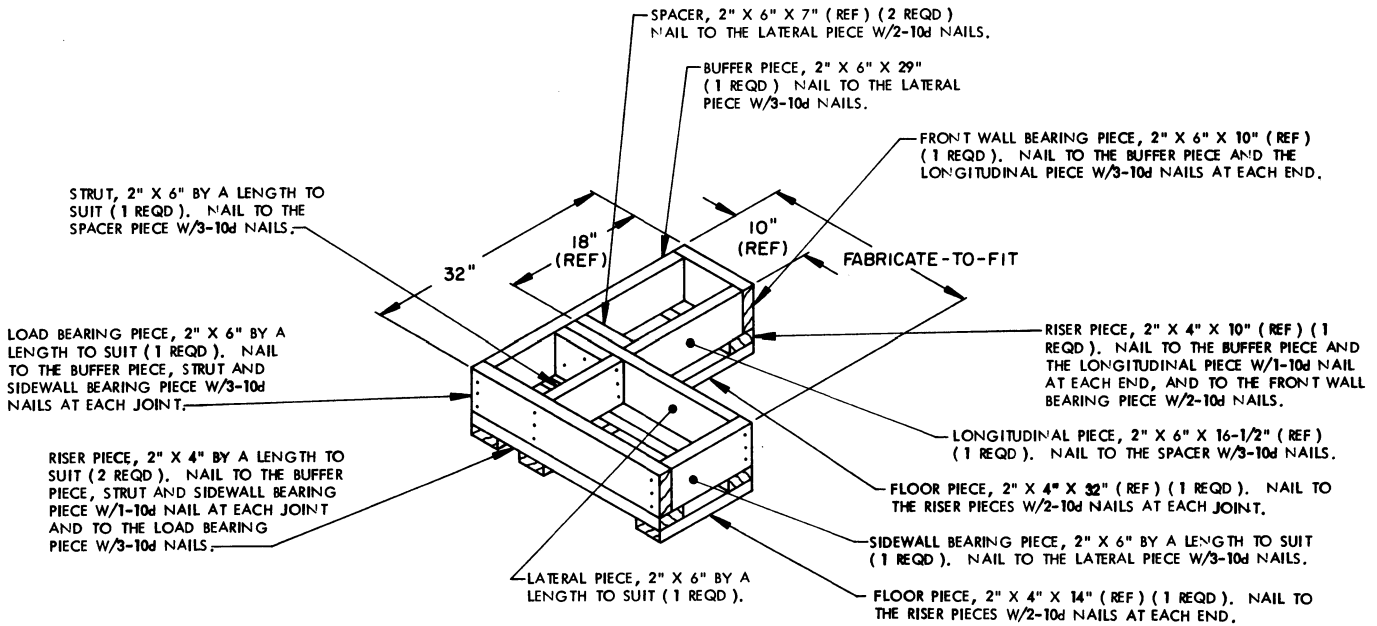
THE PALLET IN THIS LOAD UNIT MAY BE STACKED IF TWO (2) STACK UNITIZING STRAPS ARE APPLIED FOR EACH STACK.

TWO (2) RETAINER PANELS, ONE ON EACH SIDE OF THE PALLET UNIT, MUST BE SECURED TO THE PALLET UNIT WITH 11'-0" LONG UNITIZING STRAPS AS SHOWN. SEE THE "RETAINER PANEL" DETAIL ON PAGE 11.



ALTERNATIVE FORWARD LOADING PATTERN

THIS PROCEDURE IS APPLICABLE TO THE LOADING OF ONE (1) PALLET UNIT IN THE FORWARD END OF A CONVENTIONAL VAN TRAILER HAVING LARGE ANGLED FRONT CORNERS (REF: 18"). THE PROCEDURE MAY ALSO BE USED IN TRAILERS HAVING SQUARE CORNERS, OR ROUNDED FRONT CORNERS, OR ANGLED CORNERS OF ANOTHER SIZE. THE PROCEDURE MAY ALSO BE USED AS A MEANS OF OBTAINING AN UNEVEN LOAD QUANTITY.



SPACER ASSEMBLY C

THIS ASSEMBLY IS DESIGNED FOR LATERAL BRACING OF A SINGLE PALLET UNIT POSITIONED IN THE FRONT OF AN ANGLED-CORNER CONVENTIONAL VAN TRAILER AS SHOWN IN THE "ALTERNATIVE FORWARD LOADING PATTERN" VIEW ABOVE. RIGHT HAND AND LEFT HAND SPACER ASSEMBLIES ARE REQUIRED.