

APPROVED BY
 BUREAU OF EXPLOSIVES
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 DATE 3/13/77

LOADING AND BRACING (LTL) IN CONVENTIONAL 30' MILITARY CLOSED TOP VAN TRAILERS OF CHEMICAL AGENTS PACKED IN DOT 3A STEEL SHIPPING BOTTLES, 20 PER SPECIAL 2-WAY PALLET, UNITIZED WITH STRAPPING

INDEX

<u>ITEM</u>	<u>PAGE (S)</u>
GENERAL NOTES, AND MATERIAL SPECIFICATIONS -----	2
PALLET UNIT -----	3
TYPICAL LTL (2-PALLET UNIT LOAD) -----	4,5
DETAILS -----	5
TYPICAL LTL (1-PALLET UNIT LOAD) -----	6,7
DETAILS -----	7,8

⊙ THE OUTLOADING PROCEDURES SPECIFIED WITHIN THIS DOCUMENT ARE ONLY TO BE USED WITH CONVENTIONAL TYPE TRAILERS. **CAUTION:** THE PROCEDURES SHOWN HEREIN FOR CONVENTIONAL TYPE TRAILERS, ARE ONLY APPLICABLE FOR HIGHWAY MOVEMENTS; **NOT** FOR CONTAINER/TRAILER-ON-FLAT-CAR MOVEMENTS.

REVISIONS				DRAFTSMAN	PROJ ENG
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U. S. ARMY DARCOM DRAWING					
MARCH 1979					
CLASS	DIVISION	DRAWING	FILE		
19	48	4613	CB II PMI		

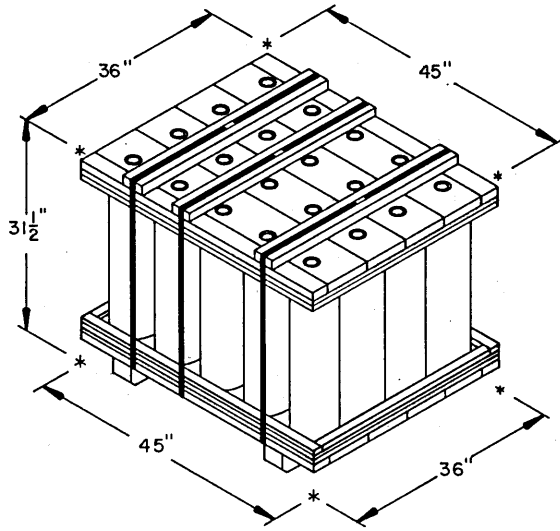
DO NOT SCALE

GENERAL NOTES

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED WITHIN THIS DOCUMENT ARE APPLICABLE TO THE DOT 3A STEEL SHIPPING BOTTLE FILLED WITH CHEMICAL AGENTS, UNITIZED 20 BOTTLES PER SPECIAL TWO-WAY ENTRY PALLET. SUBSEQUENT REFERENCE TO PALLET UNIT MEANS THE PALLET WITH CHEMICALLY FILLED BOTTLES.
- C. FOR DETAILS OF THE DOT 3A BOTTLE, SEE PICATINNY ARSENAL DRAWING HMCD-5K266.
- BOTTLE DIMENSIONS ----- 25" HIGH (APPROX) BY 7" DIAMETER (APPROX).
BOTTLE WEIGHT
(W/CHEMICAL AGENT) -- 64 LBS (APPROX).
- D. FOR DETAILS OF THE PALLET UNIT, SEE US ARMY DARCOM DRAWING NO. 19-48-4569-20PM1001 AND THE "PALLET UNIT" DETAIL ON PAGE 3.
- PALLET UNIT DIMENSIONS - 36" LONG X 45" WIDE X 31-1/2" HIGH.
GROSS WEIGHT ----- 1,492 POUNDS (APPROX).
- E. THESE PROCEDURES CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE DOT 3A BOTTLES WHEN THEY ARE FILLED WITH OTHER ITEMS, OR WHEN THEY ARE EMPTY.
- F. THE LOADS AS SHOWN HEREIN ARE BASED ON 30'-0" LONG CLOSED TOP VAN TRAILERS WHICH ARE 89" TO 93" WIDE (INSIDE DIMENSION) AND WHICH ARE LIMITED TO HIGHWAY MOVEMENTS ONLY. THE DEPICTED LOADS ARE BASED ON CONVENTIONAL TYPE TRAILERS HAVING WOOD, WOOD AND METAL, OR METAL FLOORS.
- G. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM. FOR CONVENTIONAL TRAILERS, REAR BLOCKING MUST CONTACT THE REAR DOORS OF THE TRAILER WHEN THEY ARE CLOSED.
- H. 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.
- J. 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.
- K. THE APPROVED BLOCKING, BRACING, AND STAYING METHODS FOR THE LOADS SPECIFIED MUST BE FOLLOWED. THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE VEHICLE TO BE LOADED OR THE QUANTITY TO BE SHIPPED. FOR A LOAD QUANTITY OTHER THAN SPECIFIED, THE APPROVED METHODS MUST BE FOLLOWED AS CLOSELY AS POSSIBLE.
- L. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF A NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- M. 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. 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.
- N. PORTIONS OF THE TRAILER BODIES DEPICTED WITHIN THIS PROCEDURAL DRAWING, SUCH AS ONE OF THE VAN TRAILER SIDE WALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- O. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- P. 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.

MATERIAL SPECIFICATIONS

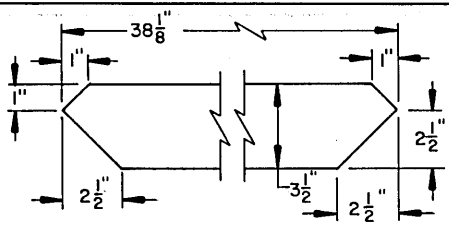
- LUMBER ----- : TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS ----- : FED SPEC FF-N-105; COMMON.
- STRAPPING, STEEL ---- : FED SPEC QQ-S-781; CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A OR B (GRADE 2) (1-1/4" X .035" OR .031").
- SEAL, STRAP ----- : FED SPEC QQ-S-781; TYPE D, STYLE I, II OR IV, CLASS H.
- STRAP ANCHOR PLATE - : NSN 5340-00-252-3014 (1-1/4" STRAP).
- STRAP ANCHOR PLATE NAIL ----- : NSN 5315-00-290-7140.



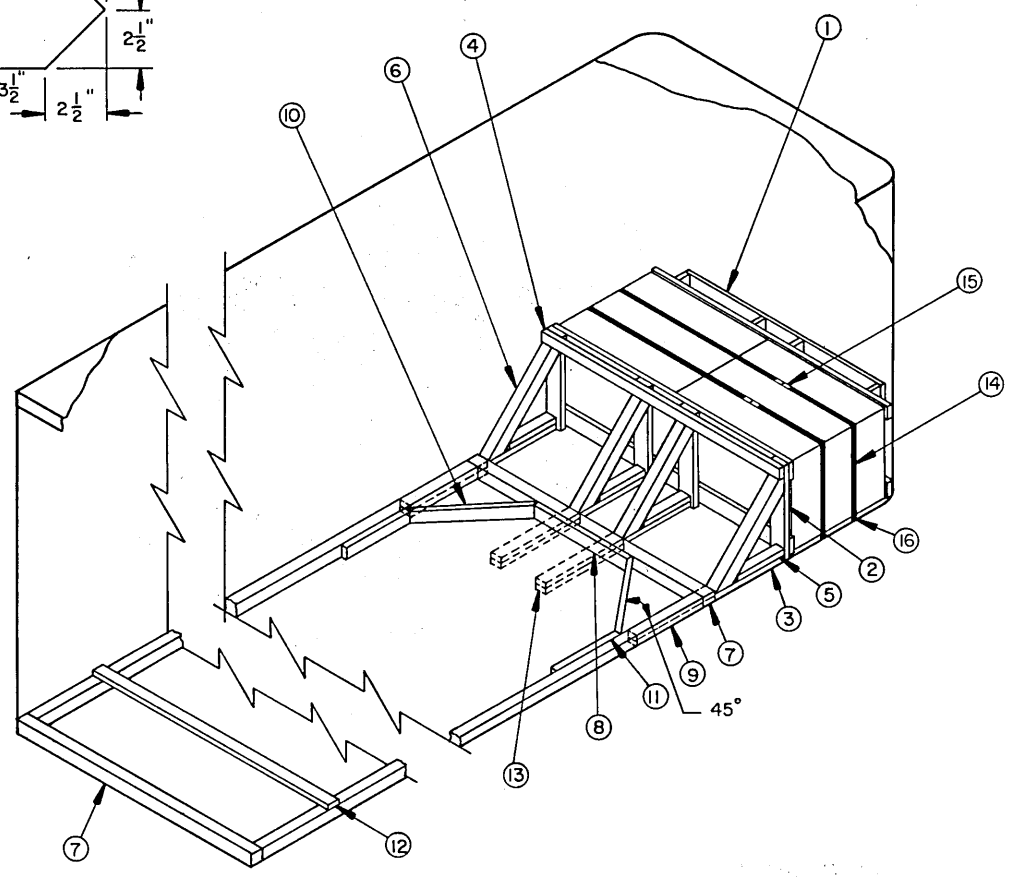
PALLET UNIT

PALLET UNIT DATA

NUMBER OF CONTAINERS -----	20
GROSS WEIGHT -----	1,492 POUNDS (APPROX)
CUBE -----	29.5 CUBIC FEET



KNEE BRACE



ISOMETRIC VIEW

KEY NUMBERS

- ① FORWARD BLOCKING ASSEMBLY (1 REQD). SEE THE "FORWARD BLOCKING ASSEMBLY" DETAIL ON PAGE 5, SPECIAL NOTE "I" AT LEFT, AND GENERAL NOTE "M" ON PAGE 2.
- ② GATE (1 REQD). SEE THE "REAR GATE A" DETAIL ON PAGE 5.
- ③ FLOOR CLEAT, 2" X 4" X 27" (4 REQD).
- ④ HOLD DOWN, 2" X 4" BY TRAILER WIDTH MINUS 1/2" (1 REQD). NAIL TO THE VERTICAL PIECES OF THE REAR GATE, PIECE MARKED ②, W/3-10d NAILS AT EACH JOINT.
- ⑤ POCKET CLEAT, 2" X 4" X 18" (4 REQD). NAIL TO THE FLOOR CLEAT, PIECE MARKED ③, W/5-10d NAILS. TOENAIL TO THE REAR GATE, PIECE MARKED ②, W/2-12d NAILS.
- ⑥ KNEE BRACE, 4" X 4" X 38-1/8" (4 REQD). SEE THE "KNEE BRACE" DETAIL ABOVE FOR BEVEL CUTS REQUIRED. TOENAIL TO THE REAR GATE, PIECE MARKED ②, AND THE FLOOR CLEAT, PIECE MARKED ③, W/2-12d NAILS AT EACH END.
- ⑦ HEADER, 4" X 4" BY TRAILER WIDTH MINUS 1/2" (2 REQD). TOENAIL FORWARD HEADER TO KNEE BRACES, PIECES MARKED ⑥, W/2-12d NAILS AT EACH JOINT.
- ⑧ CENTER CLEAT, 2" X 4" X 35" (1 REQD). NAIL TO THE FORWARD HEADER, PIECE MARKED ⑦, W/7-10d NAILS.
- ⑨ SIDE STRUT, 4" X 4" BY CUT TO FIT BETWEEN FORWARD AND REAR HEADERS, PIECES MARKED ⑦. TOENAIL TO THE HEADERS W/2-16d NAILS AT EACH END.
- ⑩ DIAGONAL BRACE, 2" X 4" BY CUT TO FIT (2 REQD). DOUBLE BEVEL EACH END WITH 45° CUTS. INSTALL AT A 45° ANGLE AS SHOWN AND TOENAIL TO THE FORWARD HEADER, PIECE MARKED ⑦, AND SIDE STRUT, PIECE MARKED ⑨, W/2-12d NAILS AT EACH END.
- ⑪ SIDE CLEAT, 2" X 4" X 24" (2 REQD). NAIL TO THE SIDE STRUT, PIECE MARKED ⑨, W/8-10d NAILS.
- ⑫ STRUT BRACING, 2" X 4" BY TRAILER WIDTH MINUS 1/2" (MINIMUM OF 1 REQD). INSTALL ONE STRUT BRACE NEAR THE REAR END OF THE SIDE STRUTS, PIECES MARKED ⑨, AS SHOWN. ONE ADDITIONAL STRUT BRACE IS REQUIRED FOR EVERY 7'-0" OF STRUT LENGTH. NAIL TO THE SIDE STRUTS, PIECES MARKED ⑨, W/3-10d NAILS AT EACH END.
- ⑬ BACK-UP CLEAT, 2" X 4" X 30" (DOUBLED) (4 REQD). ALIGN CLEAT WITH A KNEE BRACE, PIECE MARKED ⑥, AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/7-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE "3" AT LEFT.

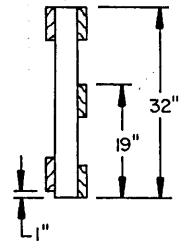
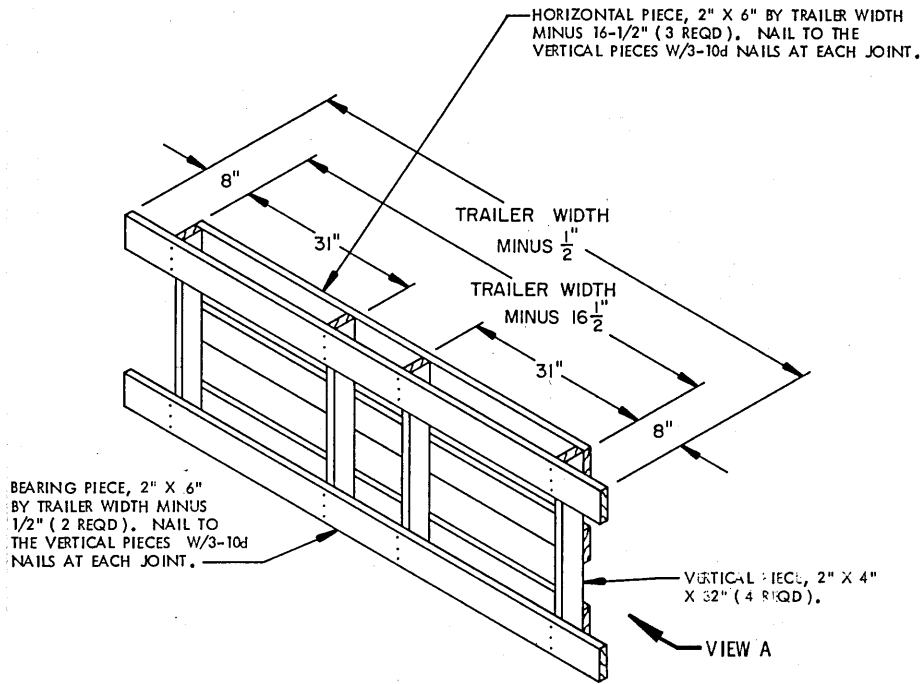
SPECIAL NOTES:

- 1. THESE LTL OUTLOADING PROCEDURES ARE SHOWN DEPICTING THE USE OF "KNEE BRACE" BLOCKING IN A 7'-7" WIDE TRAILER. WIDER TRAILERS CAN BE USED. IF A SQUARE FRONT TRAILER IS USED, THE "FORWARD BLOCKING ASSEMBLY", PIECE MARKED ①, WILL NOT BE REQUIRED.
- 2. THE "K-BRACE" BLOCKING, SHOWN AS PIECES MARKED ⑦ THRU ⑫, IS ADEQUATE FOR RETAINING A MAXIMUM LOAD OF 24,000 POUNDS.
- 3. PIECES MARKED ⑬ ARE FOR USE IN A TRAILER WHICH HAS A NAILABLE FLOOR AND SHOULD BE USED, IF POSSIBLE, IN LIEU OF PIECES MARKED ⑦ THRU ⑫ WHICH APPLY TO TRAILERS HAVING NON-NAILABLE FLOORS. WHEN USING NAILED FLOOR LINE DUNNAGE, NAIL THE FLOOR CLEAT, PIECE MARKED ③, TO THE TRAILER FLOOR W/1-12d NAIL EVERY 6". THE FOUR BACK-UP CLEATS, PIECES MARKED ⑬, ARE ADEQUATE FOR RETAINING A MAXIMUM LOAD OF NOT MORE THAN TEN (10) PALLET UNITS.

(KEY NUMBERS CONTINUED)

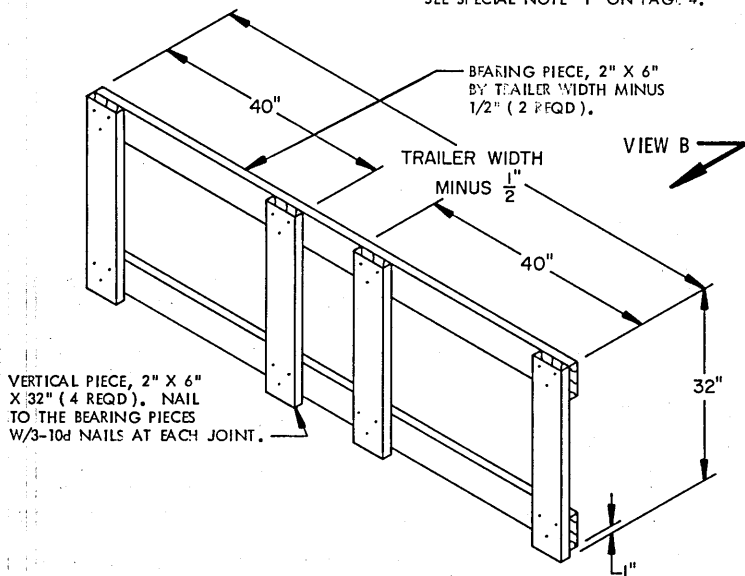
- ⑭ HOLD-DOWN STRAP, 1-1/4" X .035" OR .031" X 17'-0" LONG STEEL STRAPPING (2 REQD). INSTALL EACH STRAP FROM TWO 8'-6" LONG PIECES. SEE THE "APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE" DETAIL ON PAGE 8.
- ⑮ SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ⑯ STRAP ANCHOR PLATE FOR 1-1/4" STRAPPING (4 REQD). NAIL TO TRAILER FLOOR W/8 STRAP ANCHOR PLATE NAILS.

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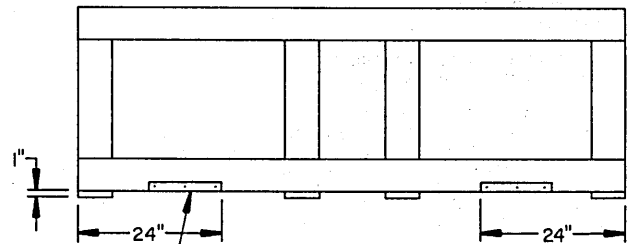


FORWARD BLOCKING ASSEMBLY

SEE SPECIAL NOTE "1" ON PAGE 4.



REAR GATE A



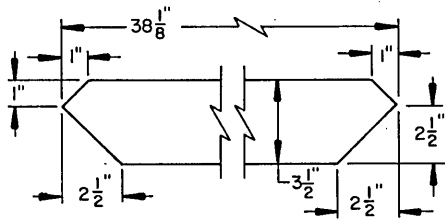
HOLD-DOWN PIECE, 2" X 2" X 12" (2 REQD). NAIL TO THE BEARING PIECE W/3-10d NAILS.

BILL OF MATERIAL

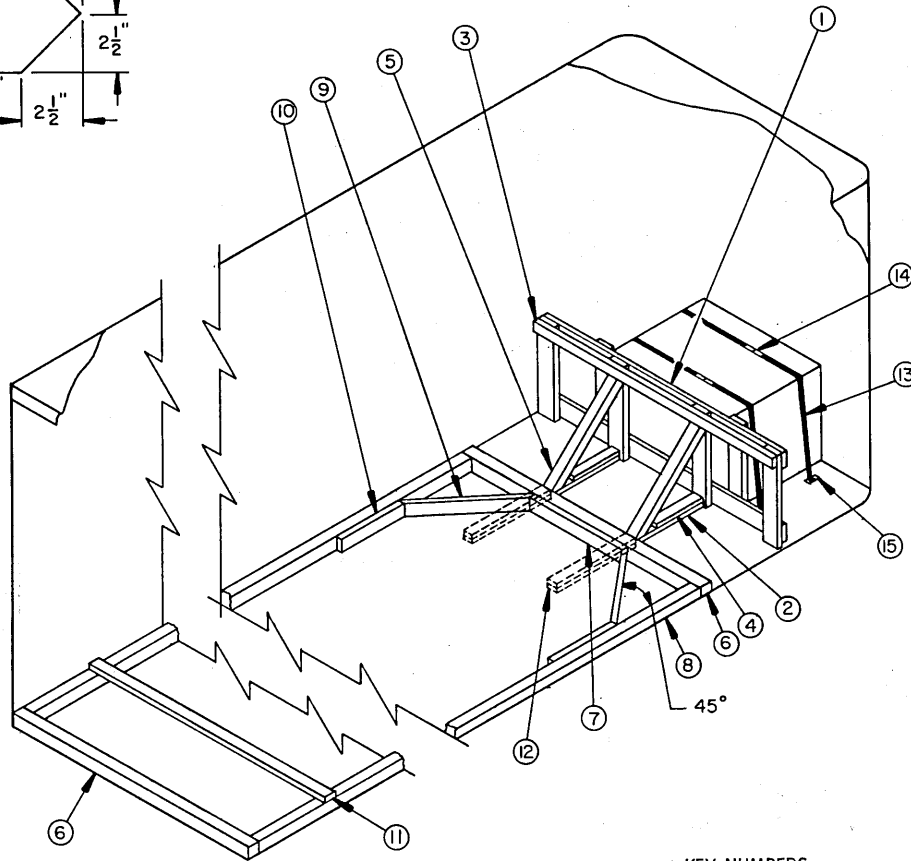
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	2	2/3
2" X 4"	70	47
2" X 6"	60	60
4" X 4"	74	99
NAILS	NO. REQD	POUNDS
10d (3")	163	2-1/2
12d (3-1/4")	24	1/2
16d (3-1/2")	24	1/2
STEEL STRAPPING, 1-1/4"	34' REQD	5 LBS
SEAL FOR 1-1/4" STRAPPING	4 REQD	NIL
STRAP ANCHOR PLATE FOR 1-1/4" STRAPPING	4 REQD	1 LB
STRAP ANCHOR PLATE NAIL	32 REQD	3/4 LB

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	2	2,984 LBS
DUNNAGE		424 LBS
TOTAL WEIGHT		3,408 LBS



KNEE BRACE



ISOMETRIC VIEW

KEY NUMBERS

- ① GATE (1 REQD). SEE THE "REAR GATE B" DETAIL ON PAGE 7.
- ② FLOOR CLEAT, 2" X 4" X 27" (2 REQD).
- ③ HOLD DOWN, 2" X 4" BY TRAILER WIDTH MINUS 1/2" (1 REQD). NAIL TO THE VERTICAL PIECES OF THE REAR GATE, PIECE MARKED ①, W/3-10d NAILS AT EACH JOINT.
- ④ POCKET CLEAT, 2" X 4" X 15" (2 REQD). NAIL TO FLOOR CLEAT, PIECE MARKED ②, W/5-10d NAILS. TOENAIL TO REAR GATE, PIECE MARKED ①, W/2-12d NAILS.
- ⑤ KNEE BRACE, 4" X 4" X 38-1/8" (2 REQD). SEE THE "KNEE BRACE" DETAIL ABOVE FOR THE BEVEL CUTS REQUIRED. TOENAIL TO THE REAR GATE, PIECE MARKED ①, AND THE FLOOR CLEAT, PIECE MARKED ②, W/2-16d NAILS AT EACH END.
- ⑥ HEADER, 4" X 4" BY TRAILER WIDTH MINUS 1/2" (2 REQD). TOENAIL FORWARD HEADER TO KNEE BRACES, PIECES MARKED ⑤, W/2-12d NAILS AT EACH JOINT.
- ⑦ CENTER CLEAT, 2" X 4" X 36" (1 REQD). NAIL TO THE FORWARD HEADER, PIECE MARKED ⑥, W/7-10d NAILS.
- ⑧ SIDE STRUT, 4" X 4" BY CUT TO FIT BETWEEN FORWARD AND REAR HEADERS, PIECES MARKED ⑥. TOENAIL TO THE HEADERS W/2-16d NAILS AT EACH END.
- ⑨ DIAGONAL BRACE, 2" X 4" BY CUT TO FIT (2 REQD). DOUBLE BEVEL EACH END WITH 45° CUTS. INSTALL AT A 45° ANGLE AS SHOWN AND TOENAIL TO THE FORWARD HEADER, PIECE MARKED ⑥, AND SIDE STRUT, PIECE MARKED ⑧, W/2-12d NAILS AT EACH END.
- ⑩ SIDE CLEAT, 2" X 4" X 24" (2 REQD). NAIL TO THE SIDE STRUT, PIECE MARKED ⑧, W/8-10d NAILS.
- ⑪ STRUT BRACING, 2" X 4" BY TRAILER WIDTH MINUS 1/2" (MINIMUM OF 1 REQD). INSTALL ONE STRUT BRACE NEAR THE REAR END OF THE SIDE STRUTS, PIECES MARKED ⑧, AS SHOWN. ONE ADDITIONAL STRUT BRACE IS REQUIRED FOR EVERY 7'-0" OF STRUT LENGTH. NAIL TO THE SIDE STRUTS, PIECES MARKED ⑧, W/3-10d NAILS AT EACH END.
- ⑫ BACK-UP CLEAT, 2" X 4" X 30" (DOUBLED) (2 REQD). ALIGN WITH A KNEE BRACE, PIECE MARKED ⑤, AND NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/7-12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE "3" AT LEFT.
- ⑬ HOLD-DOWN STRAP, 1-1/4" X .035" OR .031" X 14'-0" LONG STEEL STRAPPING (2 REQD). INSTALL EACH STRAP FROM TWO 7'-0" LONG PIECES. SEE THE "APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE" DETAIL ON PAGE 8.
- ⑭ SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.
- ⑮ STRAP ANCHOR PLATE FOR 1-1/4" STRAPPING (4 REQD). NAIL TO TRAILER FLOOR W/8 STRAP ANCHOR PLATE NAILS.

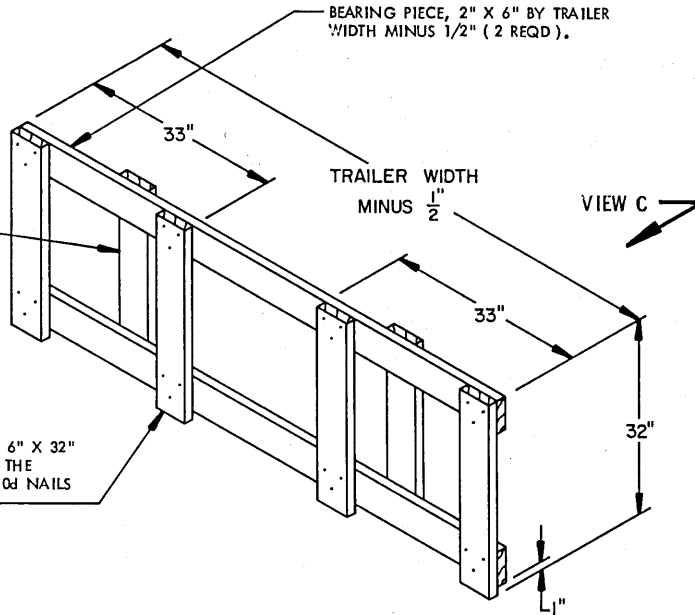
SPECIAL NOTES:

1. THESE LTL OUTLOADING PROCEDURES ARE SHOWN DEPICTING THE USE OF "KNEE BRACE" BLOCKING IN A 7'-6" WIDE TRAILER. WIDER OR NARROWER TRAILERS CAN BE USED.
2. THE "K-BRACE" BLOCKING, SHOWN AS PIECES MARKED ⑥ THRU ⑪, IS ADEQUATE FOR RETAINING A MAXIMUM LOAD OF 24,000 POUNDS.
3. PIECES MARKED ⑫ ARE FOR USE IN A TRAILER WHICH HAS A NAILABLE FLOOR AND SHOULD BE USED, IF POSSIBLE, IN LIEU OF PIECES MARKED ⑥ THRU ⑪ WHICH APPLY TO TRAILERS HAVING NON-NAILABLE FLOORS. WHEN USING NAILABLE FLOOR LINE DUNNAGE, NAIL THE FLOOR CLEAT, PIECE MARKED ②, TO THE TRAILER FLOOR W/1-12d NAIL EVERY 6". THE TWO BACK-UP CLEATS, PIECES MARKED ⑫, ARE ADEQUATE FOR RETAINING A MAXIMUM LOAD OF NOT MORE THAN FIVE (5) PALLET UNITS.
4. WHEN TWO OR MORE PALLET UNITS ARE TO BE LOADED IN A 7'-6" WIDE OR NARROWER TRAILER, THE LOAD CONFIGURATION DEPICTED ABOVE CAN BE USED BY DELETING THE TWO SIDE BLOCKING PIECES FROM "REAR GATE B" AND ADDING AN APPROPRIATE NUMBER OF SIDE BLOCKING ASSEMBLIES (TWO SIDE BLOCKING ASSEMBLIES ARE REQUIRED PER PALLET UNIT). SEE THE "SIDE BLOCKING ASSEMBLY" DETAIL ON PAGE 8.

SIDE BLOCKING, 2" X 6" X 32" (2 REQD), NAIL TO THE BEARING PIECES W/3-10d NAILS AT EACH END.

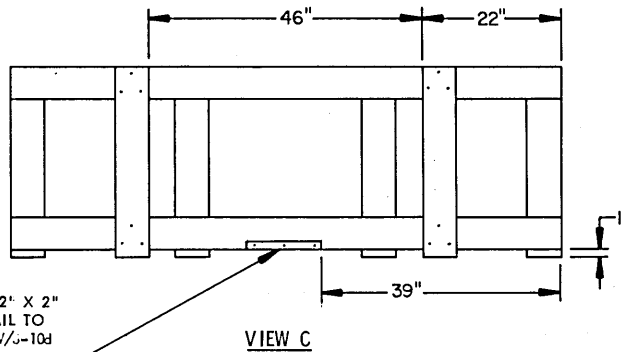
VERTICAL PIECE, 2" X 6" X 32" (4 REQD). NAIL TO THE BEARING PIECES W/3-10d NAILS AT EACH END.

BEARING PIECE, 2" X 6" BY TRAILER WIDTH MINUS 1/2" (2 REQD).



REAR GATE B

HOLD-DOWN PIECE, 2" X 2" X 12" (1 REQD). NAIL TO THE BEARING PIECE W/3-10d NAILS.



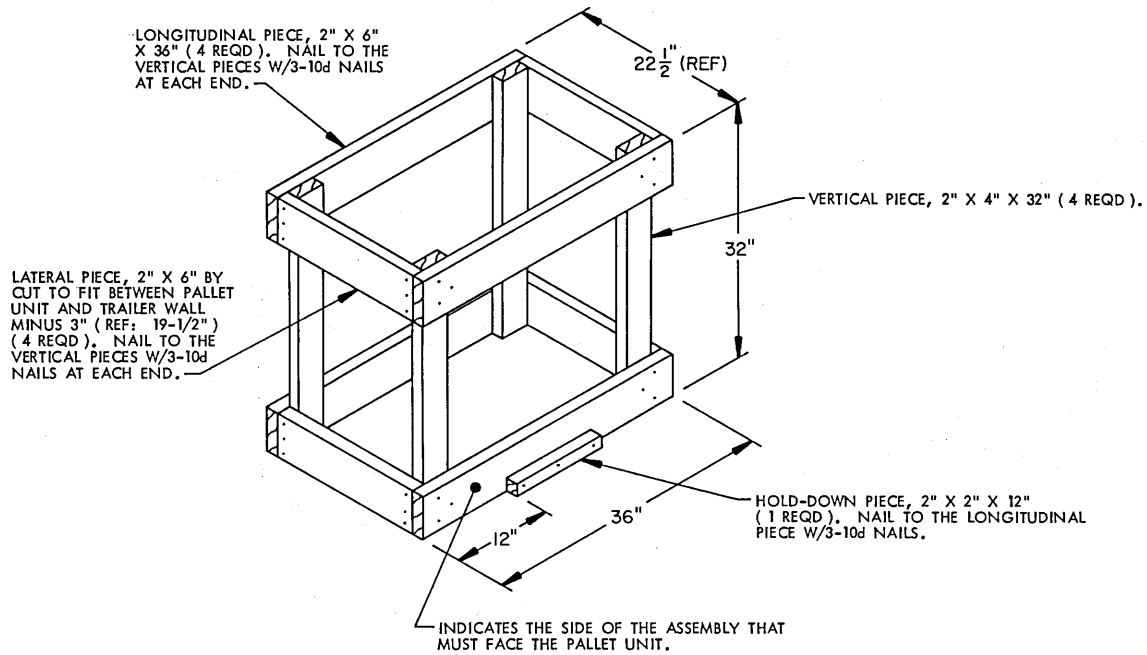
VIEW C

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	1	1/3
2" X 4"	51	34
2" X 6"	31	31
4" X 4"	69	92
NAILS	NO. REQD	POUNDS
10d (3")	102	1-1/2
12d (3-1/4")	16	1/4
16d (3-1/2")	24	1/2
STEEL STRAPPING, 1-1/4" -----	28' REQD -----	4 LBS
SEAL FOR 1-1/4" STRAPPING -----	4 REQD -----	NIL
STRAP ANCHOR PLATE FOR 1-1/4" STRAPPING -----	4 REQD -----	1 LB
STRAP ANCHOR PLATE NAIL -----	32 REQD -----	3/4 LB

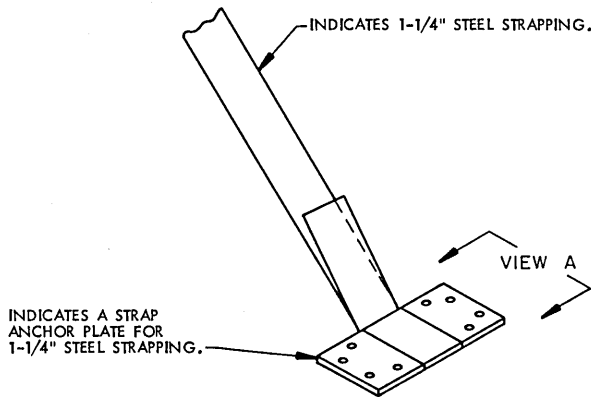
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT -----	1 -----	1,492 LBS
DUNNAGE -----	-----	323 LBS
TOTAL WEIGHT -----	-----	1,815 LBS

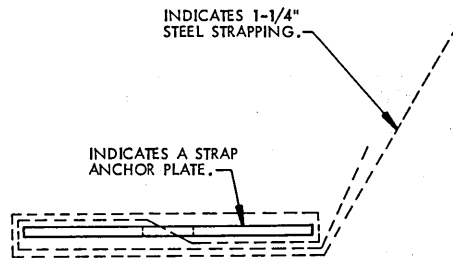


SIDE BLOCKING ASSEMBLY

SEE SPECIAL NOTE "4" ON PAGE 6.



ISOMETRIC VIEW



VIEW A

APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE

THESE VIEWS ARE APPLICABLE FOR THE 1-1/4" HOLD-DOWN STRAPS IN THE LOADS SHOWN ON PAGES 4 AND 6.