

APPROVED BY
 BUREAU OF EXPLOSIVES
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 DATE 4/25/86

LOADING AND BRACING¹ IN VAN TYPE TRAILERS OF BOXED AMMUNITION & COMPONENTS, UNITIZED, FOR TRAILER-ON-FLAT-CAR (TOFC) SHIPMENT UTILIZING PALLA-GARD DEVICES

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¹ LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER-ON-FLAT-CAR (TOFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR CARRIERS. SEE GENERAL NOTE "V" ON PAGE 2.

REVISIONS				DESIGNER RS	DATE ds	PROJ. ENG. RSH/WRF	DATE
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U. S. ARMY AMC DRAWING							
JUNE 1986							
				CLASS	DIVISION	DRAWING	FILE
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DO NOT SCALE

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. THE UNLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO BOXED AMMUNITION AND COMPONENTS, UNITIZED, FOR TRAILER-ON-FLAT-CAR (TOFC) SHIPMENT UTILIZING PALLA-GARD DEVICES.
- C. REFER TO THE APPLICABLE AMC (DARCOM) 19-48 SERIES DRAWING FOR UNITIZATION PROCEDURES FOR BOXED AMMUNITION AND COMPONENTS ON 4-WAY ENTRY PALLETS OR SKID BASES.
- D. THE UNLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE DESIGNED FOR USE WITH TRAILER-ON-FLAT-CAR (TOFC) VAN TRAILERS. SEE GENERAL NOTE "Q" FOR ADDITIONAL SPECIFICATIONS.
- E. ALL LOADS SHOWN HEREIN ARE TYPICAL, HOWEVER, THE PROCEDURES ARE ADAPTABLE TO THE SIZE OF THE UNIT TO BE SHIPPED. THE NUMBER OF UNITS ACROSS THE TRAILER WILL BE AS SHOWN FOR A LOAD, ALTHOUGH THE SIZE MAY VARY. THE NUMBER OF UNITS IN THE LENGTH OF THE TRAILER WILL BE DEPENDENT UPON THE LENGTH OR WIDTH, AS APPLICABLE, OF THE UNIT, AND THE NUMBER OF TIERS WILL BE BASED UPON THE HEIGHT AND/OR WEIGHT OF THE UNIT BEING LOADED.
- F. 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. NOTICE: A LOAD WILL BE POSITIONED IN A TRAILER CONSISTENT WITH THE WEIGHT LAWS OF THE STATE OR STATES THROUGH WHICH THE TRAILER WILL BE TRANSPORTED BY HIGHWAY (MOTOR CARRIER).
- G. WHEN REFERRING TO THE PALLET UNIT LENGTH OR UNIT WIDTH, THE 40" OR 35" DIMENSION OF THE PALLET BASE CONSTITUTES THE LENGTH AND THE 48" OR 45-1/2" DIMENSION CONSTITUTES THE WIDTH. SEE THE "TYPICAL PALLET UNIT DETAILS" ON PAGE 5. WHEN REFERRING TO THE SKIDDED UNIT LENGTH OR WIDTH, THE LENGTH OF THE BOXES CONSTITUTES THE WIDTH OF THE UNIT. SEE THE "TYPICAL SKIDDED UNIT DETAILS" ON PAGE 4.
- H. EXCEPT FOR PLYWOOD, 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 AND 2" X 8" MATERIAL IS ACTUALLY 1-1/2" THICK BY 7-1/4" WIDE.
- J. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES 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.
- K. 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 SENCOR PRODUCTS INCORPORATED.
- L. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, ONE SEAL, CRIMPED WITH TWO PAIR OF NOTCHES, WILL BE USED TO SEAL THE JOINT.
- M. PORTIONS OF THE TRAILERS, SUCH AS SIDEWALLS, END WALLS, AND ROOFS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- N. TRAILERS HAVING WIDTH AND LENGTH DIMENSIONS DIFFERENT THAN THOSE SPECIFIED WITHIN THIS DOCUMENT MAY BE USED FOR SHIPMENT OF THE DEPICTED UNIT LOADS PROVIDED THAT THE TRAILERS CONFORM TO THE GUIDANCE CONTAINED IN GENERAL NOTE "O". WIDER OR NARROWER TRAILERS MAY BE USED BY ADJUSTING ANTI-SWAY BRACE/SIDE BLOCKING ASSEMBLIES APPROPRIATELY. WHEN USING TRAILERS OF A LENGTH DIFFERENT THAN THOSE DEPICTED IN THE LOAD VIEWS, CARE MUST BE TAKEN TO INSURE THAT THERE IS LEAST A 12" VOID FROM THE REAR OF THE PALLA-GARD UNITS TO THE METAL THRESHOLD OF THE TRAILER. THIS 12" VOID WILL PERMIT PROPER ENGAGEMENT OF THE PALLA-GARD DEVICES INTO THE WOOD FLOOR OF THE TOFC TRAILER WHEN THE LOAD INCURS FORCES INCIDENT TO NORMAL TRANSPORTATION.

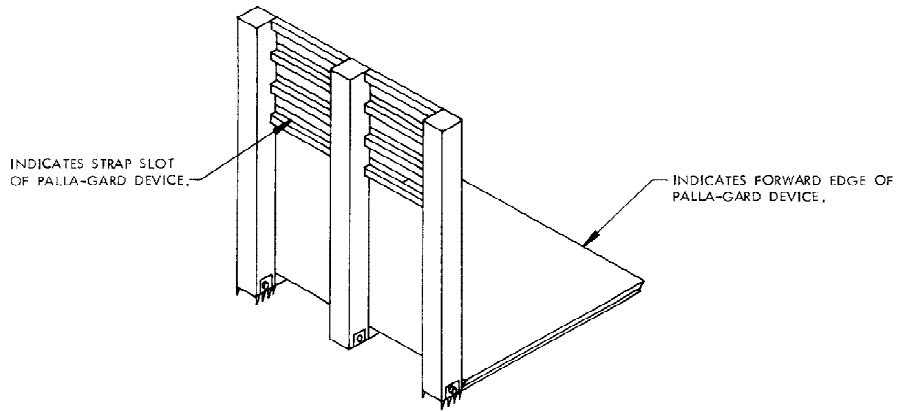
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MATERIAL SPECIFICATIONS

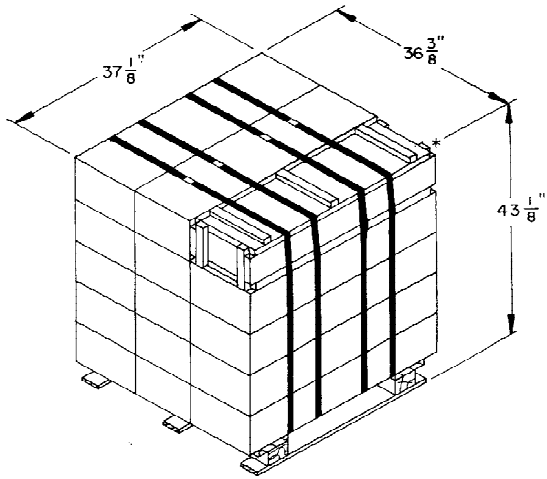
- LUMBER-----: SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.
- NAILS-----: COMMON, FED SPEC FF-N-105.
- PLYWOOD-----: GROUP B, CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, AN INTERIOR OR EXTERIOR GRADE MAY BE SUBSTITUTED; FED SPEC NN-P-530.
- STRAPPING, STEEL ---: CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B (GRADE 2) OR C; FED SPEC QQ-S-781.
- STRAP SEAL-----: TYPE D, STYLE I, II, OR IV, CLASS H, FINISH A, B, (GRADE 2), OR C; FED SPEC QQ-S-781.
- WIRE-----: ANNEALED, BLACK; FED SPEC QQ-W-461.

- O. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED UNLOADING METHODS.
- P. CONVERSION TO METRIC EQUIVALENTS: THE DIMENSIONS WITHIN THIS DRAWING ARE EXPRESSED IN INCHES, AND THE 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.
- Q. THE UNLOADING PROCEDURES ARE BASED UPON TRAILERS WHICH ARE 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION), UNLESS OTHERWISE SPECIFIED. THE TRAILERS, ADDITIONALLY, MUST BE OF THE TYPE SPECIFICALLY DESIGNED FOR TRAILER-ON-FLAT-CAR (TOFC) RAIL CARRIER SERVICE. I.E., THE TRAILER CONSTRUCTION MUST BE SUCH THAT THE FORWARD END WALL IS CAPABLE OF RESTRAINING A FULL LOAD DURING NORMAL TOFC TRANSPORTATION AND HANDLING. THE TRAILERS MUST ALSO HAVE WOOD OR WOOD AND METAL FLOORS WHICH WILL ALLOW FOR PROPER INSTALLATION AND PLACEMENT OF THE PALLA-GARD LOAD RESTRAINING DEVICES. FOR TOFC SHIPMENTS, ONLY RAIL-CARS WHICH ARE SPECIFIED BY BUREAU OF EXPLOSIVES PAMPHLET 6C WILL BE UTILIZED.
- R. SELECTION OF A VEHICLE TO BE USED FOR TRANSPORTING THE DESIGNATED ITEM MUST COMPLY WITH AR55-355, CHAPTER 213, FOR EXPLOSIVES AND OTHER DANGEROUS ARTICLES, IN FULL.
- S. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE TRAILER TO BE LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS SHOWN HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR THE BLOCKING AND BRACING OF THE DESIGNATED ITEM.
- T. OTHER TYPES OF LADING ITEMS MAY BE LOADED INTO TRAILERS WHICH ARE PARTIALLY LOADED WITH THE DEPICTED ITEM, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN.
- U. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE TRAILER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- V. REQUIREMENTS CITED WITHIN BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TOFC. SPECIAL TOFC NOTE FOLLOWS.

THE LOAD LIMIT OF A TOFC RAIL CAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF A CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.
- W. IF THE EXCESS SPACE ACROSS THE WIDTH OF A TRAILER, MEASURED BETWEEN THE LADING OF LATERALLY ADJACENT UNIT LOADS, EXCEEDS 6", ANTI-SWAY BRACING MUST BE INSTALLED BETWEEN THE UNIT LOADS TO PREVENT LATERAL DISPLACEMENT DURING TRANSPORT. FOR ADDITIONAL GUIDANCE SEE THE ANTI-SWAY BRACE DETAILS ON PAGE 9. LATERAL BRACING IS NOT REQUIRED IF THE EXCESS SPACE MEASURES 6" OR LESS.
- X. TO PRECLUDE DAMAGE TO THE UNIT LOADS POSITIONED IMMEDIATELY FORWARD OF THE PALLA-GARD DEVICES, THE UNIT LOADS POSITIONED ON THE DEVICES MUST BE FLUSH WITH OR OVERHANG THE FORWARD EDGES OF THE PALLA-GARD DEVICES. IF NECESSARY, A FILLER ASSEMBLY WILL BE PLACED BETWEEN THE BACK SIDE OF THE UNIT LOAD AND THE PALLA-GARD DEVICE SO THAT THE FORWARD SIDE OF THE UNIT IS FLUSH OR OVERHANGING THE DEVICE. FOR ADDITIONAL GUIDANCE, SEE THE "PALLA-GARD UNIT A DETAIL" ON PAGE 8.

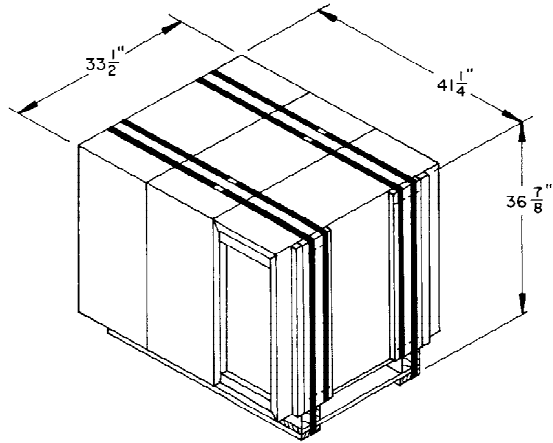


DETAIL OF PALLA-GARD DEVICE
GROSS WEIGHT ----- 310 LBS (APPROX).



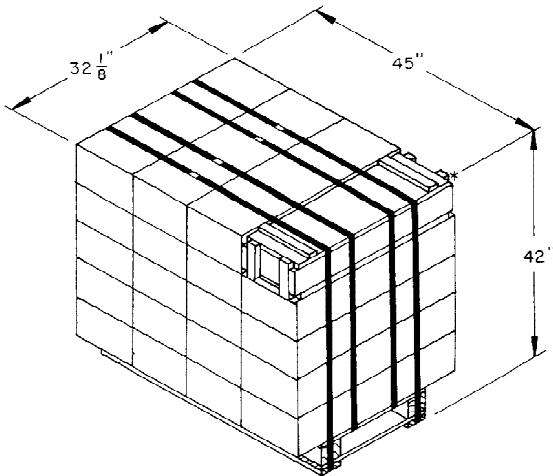
UNIT NO. 1

UNIT WEIGHT ----- 1,700 POUNDS (APPROX).
 CUBE ----- 33.7 CUBIC FEET.



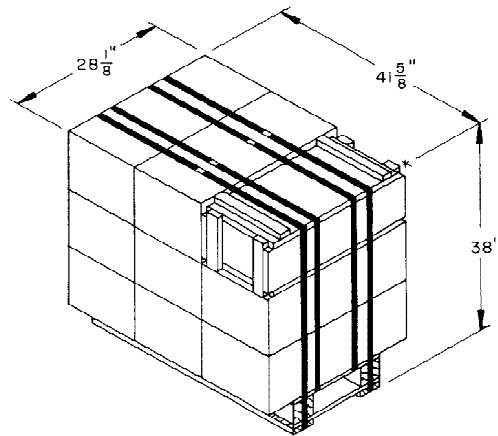
UNIT NO. 2

UNIT WEIGHT ----- 398 POUNDS (APPROX).
 CUBE ----- 29.5 CUBIC FEET.



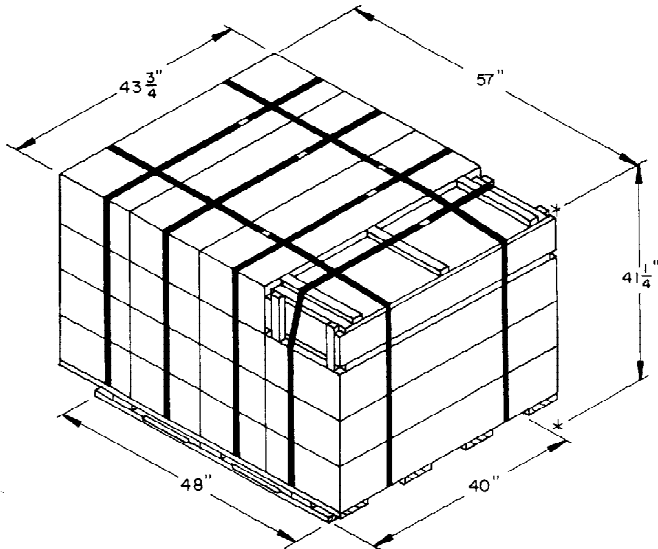
UNIT NO. 3

UNIT WEIGHT ----- 1,681 POUNDS (APPROX).
 CUBE ----- 35.1 CUBIC FEET.



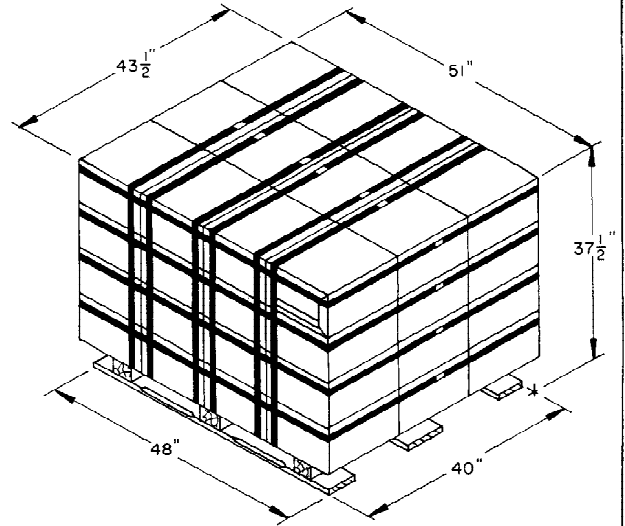
UNIT NO. 4

UNIT WEIGHT ----- 531 POUNDS (APPROX).
 CUBE ----- 25.7 CUBIC FEET.



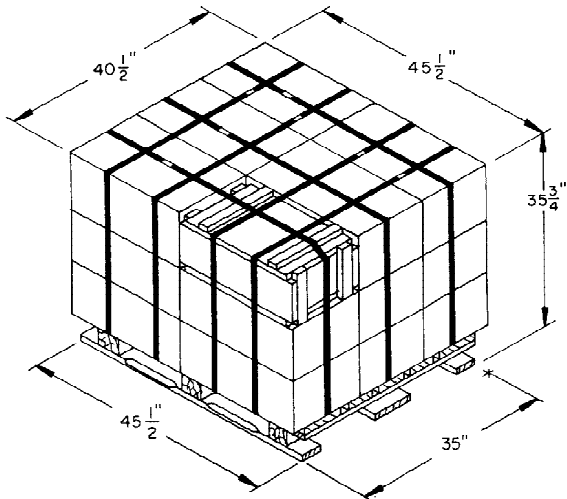
UNIT NO. 1

UNIT WEIGHT ----- 2,385 POUNDS (APPROX).
 CUBE ----- 59.5 CUBIC FEET.



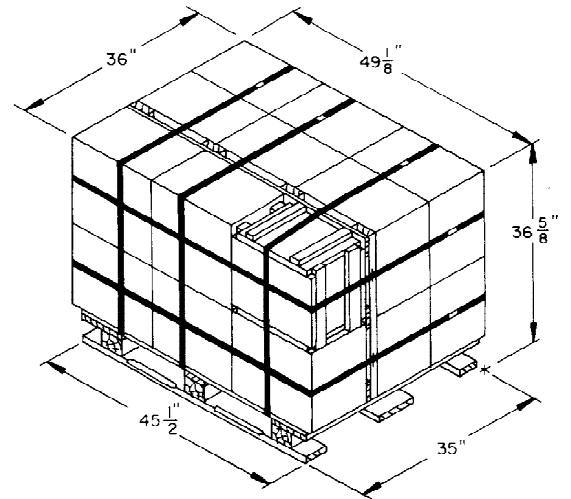
UNIT NO. 2

UNIT WEIGHT ----- 3,690 POUNDS (APPROX).
 CUBE ----- 48.1 CUBIC FEET.



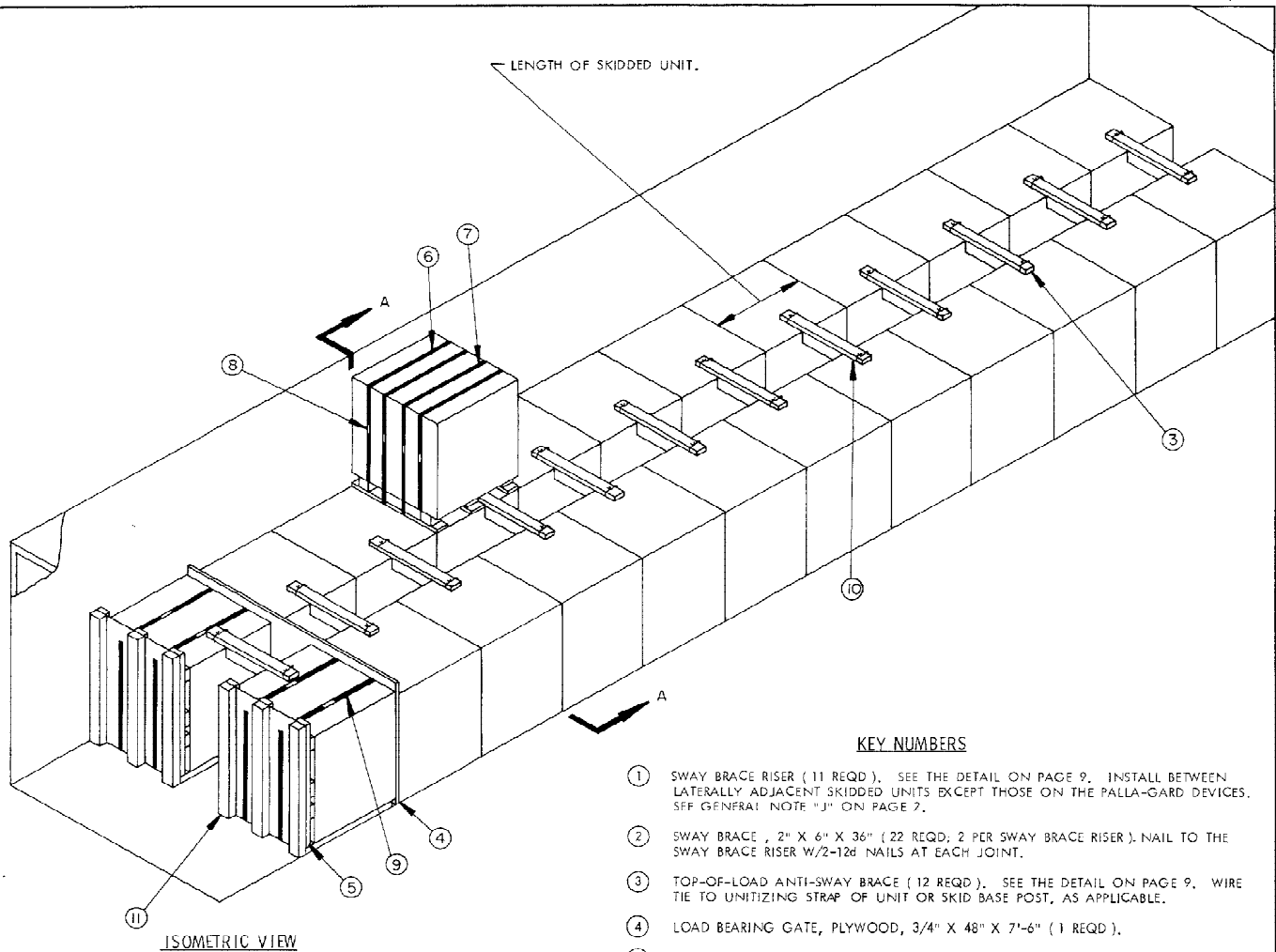
UNIT NO. 3

UNIT WEIGHT ----- 1,116 POUNDS (APPROX).
 CUBE ----- 38.1 CUBIC FEET.



UNIT NO. 4

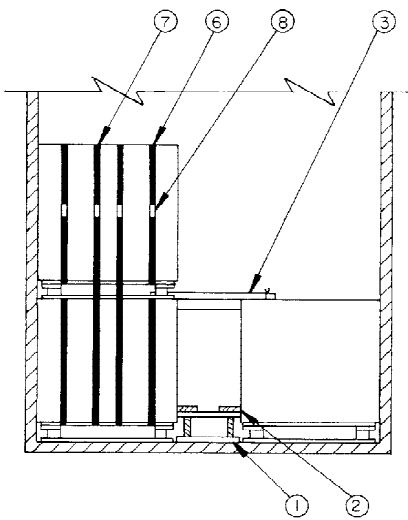
UNIT WEIGHT ----- 1,082 POUNDS (APPROX).
 CUBE ----- 37.5 CUBIC FEET.



ISOMETRIC VIEW

KEY NUMBERS

- ① SWAY BRACE RISER (11 REQD). SEE THE DETAIL ON PAGE 9. INSTALL BETWEEN LATERALLY ADJACENT SKIDDED UNITS EXCEPT THOSE ON THE PALLA-GARD DEVICES. SEE GENERAL NOTE "J" ON PAGE 7.
- ② SWAY BRACE , 2" X 6" X 36" (22 REQD ; 2 PER SWAY BRACE RISER). NAIL TO THE SWAY BRACE RISER W/2-12d NAILS AT EACH JOINT.
- ③ TOP-OF-LOAD ANTI-SWAY BRACE (12 REQD). SEE THE DETAIL ON PAGE 9. WIRE TIE TO UNITIZING STRAP OF UNIT OR SKID BASE POST, AS APPLICABLE.
- ④ LOAD BEARING GATE, PLYWOOD, 3/4" X 48" X 7'-6" (1 REQD).
- ⑤ FILLER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 8 AND GENERAL NOTE "X" ON PAGE 2.
- ⑥ FIGURE-8 UNITIZING STRAP, 1-1/4" X .035" OR .031" X 28'-0" LONG STEEL STRAPPING (2 REQD). SEE THE "STRAPPING DETAIL" ON PAGE 7.
- ⑦ VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 22'-0" LONG STEEL STRAPPING (2 REQD). SEE THE "STRAPPING DETAIL" ON PAGE 7.
- ⑧ SEAL FOR 1-1/4" STEEL STRAPPING (8 REQD , 1 PER STRAP). SEE GENERAL NOTE "L" ON PAGE 2.
- ⑨ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 14'-6" LONG STEEL STRAPPING (4 REQD , 2 PER PALLA-GARD DEVICE). SEE THE "PALLA-GARD UNIT A DETAIL" ON PAGE 8.
- ⑩ TIE WIRE, NO. 14 GAGE WIRE 18" LONG (24 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND SKIDDED UNIT UNITIZING STRAP OR SKID BASE POST, AS APPLICABLE. BRING ENDS TOGETHER AND TWIST TAUT.
- ⑪ PALLA-GARD DEVICE (2 REQD). SEE THE "PALLA-GARD UNIT A DETAIL" ON PAGE 8.

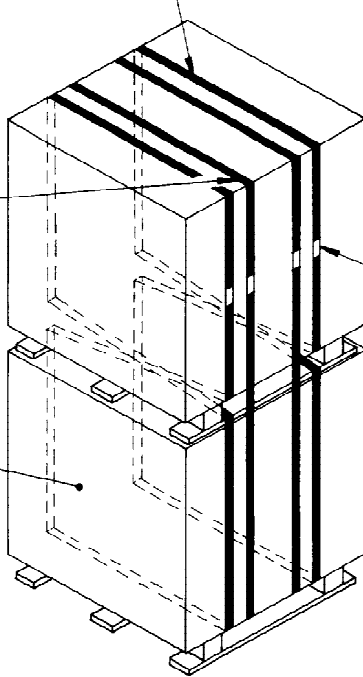


SECTION A-A

FIGURE-8 UNITIZING STRAP, 1-1/4" X .035" OR .031" X 28'-0" LONG STEEL STRAPPING (2 REQD). POSITION ADJACENT TO INNER SIDE OF POST. NOTE THAT THE STRAP PASSES UNDER THE SKID BASE TOP DECK BOARDS OF THE TOP UNIT, WHEN THE SKIDDED UNITS ARE POSITIONED AS SHOWN.

VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 22'-0" LONG STEEL STRAPPING (2 REQD). INSTALL ADJACENT TO FIGURE-8 UNITIZING STRAP SO AS TO ENIRCLE THE STACK OF SKIDDED UNITS.

INDICATES SKIDDED UNIT NO. 1.



SPECIAL NOTES:

1. A 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION) TOFC VAN TRAILER IS SHOWN. TRAILERS OF OTHER DIMENSIONS CAN BE USED. SEE GENERAL NOTES "D" AND "Q" ON PAGE 2.
2. THE SKIDDED UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD ON PAGE 6 HAS OVERALL DIMENSIONS OF 37-1/8" WIDE BY 36-3/8" LONG BY 43-1/8" HIGH WITH A WEIGHT OF 1,700 POUNDS PER SKIDDED UNIT. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. THE NUMBER OF UNITS MAY NEED TO BE ADJUSTED IF THE UNIT BEING LOADED HAS A DIFFERENT WEIGHT.

SEAL FOR 1-1/4" STRAPPING (4 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.

STRAPPING DETAIL

NOTE: THE STRAPPING AS DEPICTED ABOVE IS REQUIRED WHENEVER A STACK OF TWO SKIDDED UNITS IS PLACED IN A TRAILER LOAD.

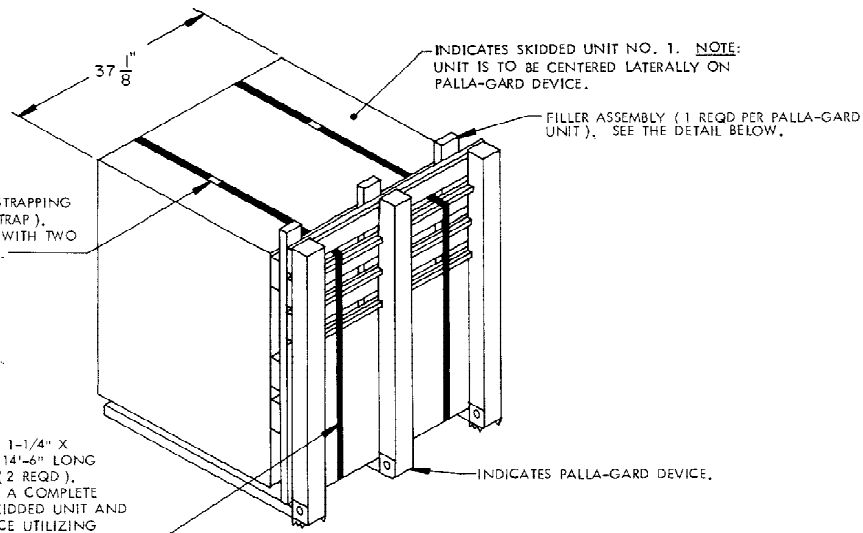
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	154	103
2" X 6"	150	150
4" X 4"	20	27
NAILS	NO. REQD	POUNDS
8d (2-1/2")	36	1/2
12d (3-1/4")	432	7
PLYWOOD, 3/4" THICK	30 SQ FT REQD	62 LBS
STEEL STRAPPING, 1-1/4"	158' REQD	22-3/4 LBS
SEAL FOR 1-1/4" STRAPPING	8 REQD	NIL
WIRE, NO. 14 GAGE	36' REQD	3/4 LB
PALLA-GARD DEVICE	2 REQD	620 LBS

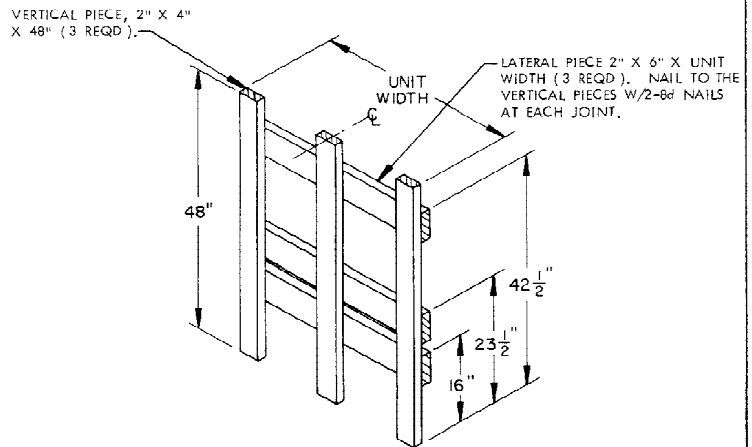
LOAD AS SHOWN

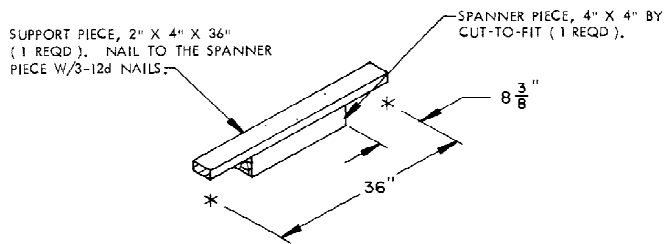
ITEM	QUANTITY	WEIGHT (APPROX)
SKIDDED UNIT	25	42,500 LBS
DUNNAGE		1,273 LBS
TOTAL WEIGHT		43,773 LBS

TYPICAL 25-SKIDDED UNIT LOAD IN A 40'-0" LONG X 7'-8" WIDE TRAILER

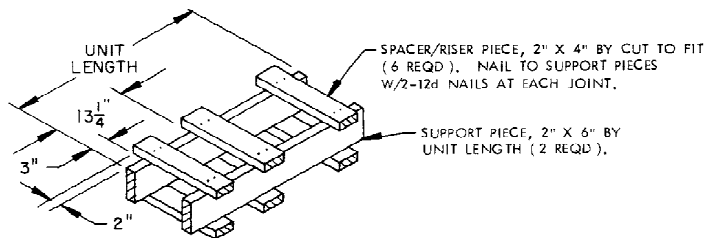


PALLA-GARD UNIT A DETAIL

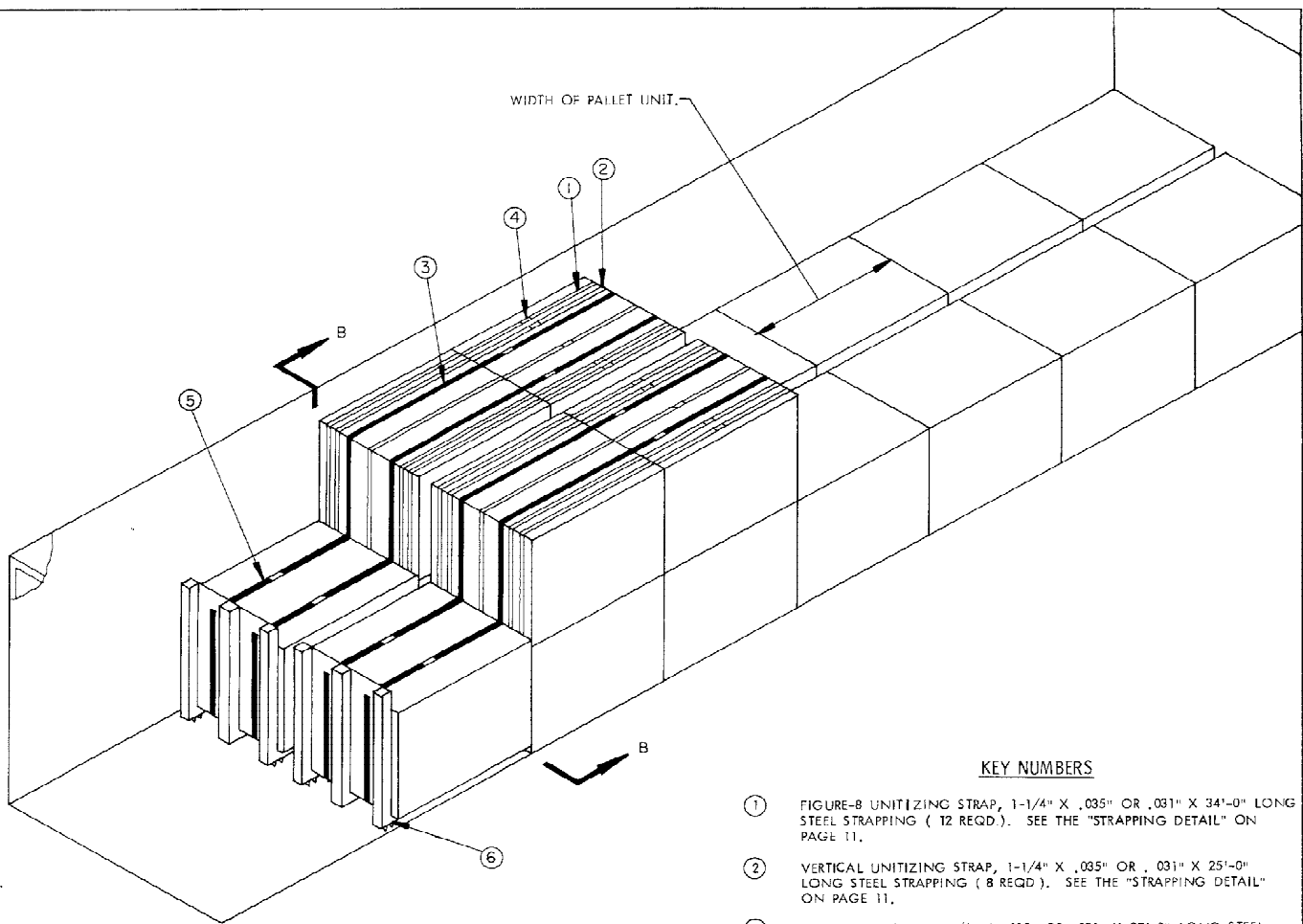




TOP-OF-LOAD SWAY BRACE



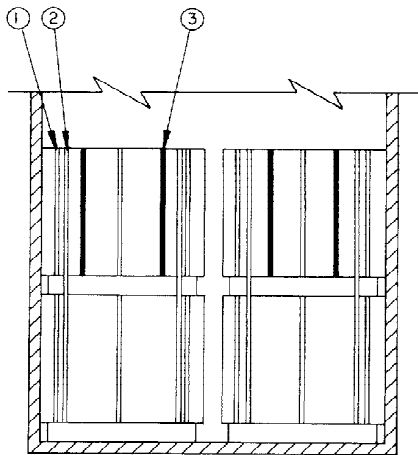
SWAY BRACE RISER



ISOMETRIC VIEW

KEY NUMBERS

- ① FIGURE-B UNITIZING STRAP, 1-1/4" X .035" OR .031" X 34'-0" LONG STEEL STRAPPING (12 REQD.). SEE THE "STRAPPING DETAIL" ON PAGE 11.
- ② VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 25'-0" LONG STEEL STRAPPING (8 REQD.). SEE THE "STRAPPING DETAIL" ON PAGE 11.
- ③ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 27'-0" LONG STEEL STRAPPING (4 REQD.). INSTALL SO AS TO ENCIRCLE THE TOP TWO LAYER PALLET UNITS.
- ④ SEAL FOR 1-1/4" STEEL STRAPPING (28 REQD, 1 PER STRAP). SEE GENERAL NOTE "L" ON PAGE 2.
- ⑤ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 18'-0" LONG STEEL STRAPPING (4 REQD, 2 PER PALLA-GARD DEVICE). SEE THE "PALLA-GARD UNIT B DETAIL" ON PAGE 11.
- ⑥ PALLA-GARD DEVICE (2 REQD.). SEE THE "PALLA-GARD UNIT B DETAIL" ON PAGE 11.

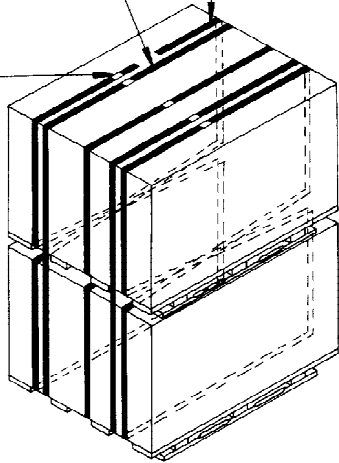


SECTION B-B

VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 25'-0" LONG STEEL STRAPPING (2 REQD). INSTALL ADJACENT TO OUTER FIGURE-8 UNITIZING STRAP SO AS TO ENCIRCLE THE STACK OF PALLET UNITS.

FIGURE-8 UNITIZING STRAP, 1-1/4" X .035" OR .031" X 34'-0" LONG STEEL STRAPPING (3 REQD). POSITION ADJACENT TO PALLET POSTS. NOTE THAT THE STRAP PASSES UNDER THE DECK AND STRINGER BOARDS OF THE TOP UNIT WHEN THE PALLET UNITS ARE STACKED AS SHOWN.

SEAL FOR 1-1/4" STRAPPING (5 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.



STRAPPING DETAIL

NOTE: THE STRAPPING AS DEPICTED ABOVE IS REQUIRED WHENEVER A STACK OF TWO PALLET UNITS IS PLACED IN A TRAILER LOAD.

SPECIAL NOTES:

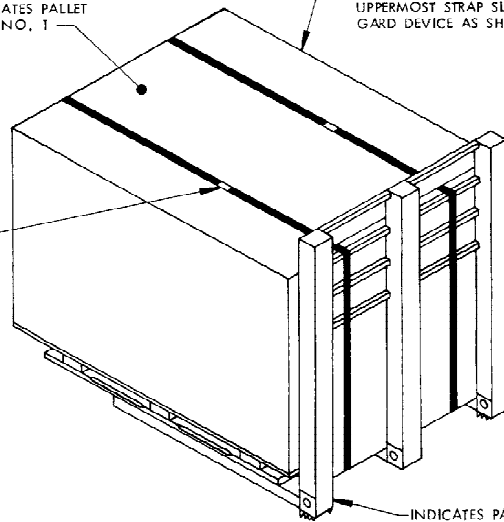
1. A 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION) TOPC VAN TRAILER IS SHOWN. TRAILERS OF OTHER DIMENSIONS CAN BE USED. SEE GENERAL NOTES "D" AND "Q" ON PAGE 2.
2. THE PALLET UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD ON PAGE 10 HAS OVERALL DIMENSIONS OF 57" WIDE BY 43-3/4" LONG BY 41-1/4" HIGH WITH A WEIGHT OF 2,385 POUNDS PER PALLET UNIT. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. THE NUMBER OF UNITS MAY NEED TO BE ADJUSTED IF THE UNIT BEING LOADED HAS A DIFFERENT WEIGHT.

INDICATES PALLET UNIT NO. 1.

BUNDLING STRAP, 1-1/4" X .035" OR .031" X 18'-0" LONG STEEL STRAPPING (2 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND PALLET UNIT AND PALLA-GARD DEVICE UTILIZING THE UPPERMOST STRAP SLOT IN THE PALLA-GARD DEVICE AS SHOWN.

INDICATES PALLET UNIT NO. 1

SEAL FOR 1-1/4" STRAPPING (2 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.



INDICATES PALLA-GARD DEVICE.

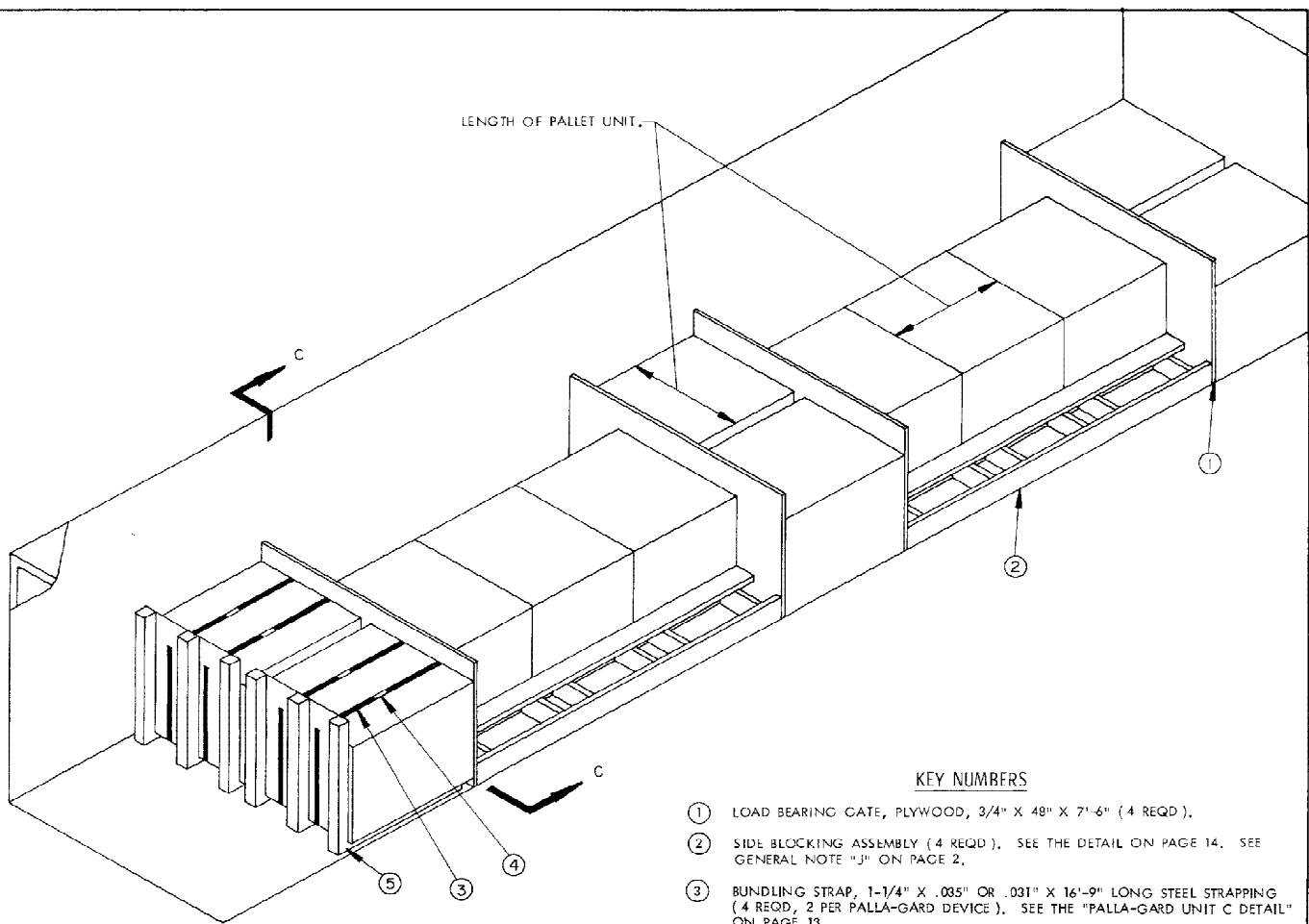
PALLA-GARD UNIT B DETAIL

BILL OF MATERIAL

STEEL STRAPPING, 1-1/4" -----	788' REQD -----	113 LBS
SEAL FOR 1-1/4" STRAPPING -----	28 REQD -----	1-1/2 LBS
PALLA-GARD DEVICE -----	2 REQD -----	620 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT -----	18 -----	42,930 LBS
DUNNAGE -----		735 LBS
TOTAL WEIGHT -----		43,665 LBS

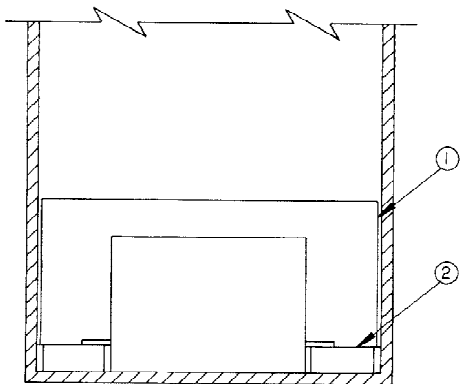


LENGTH OF PALLET UNIT.

ISOMETRIC VIEW

KEY NUMBERS

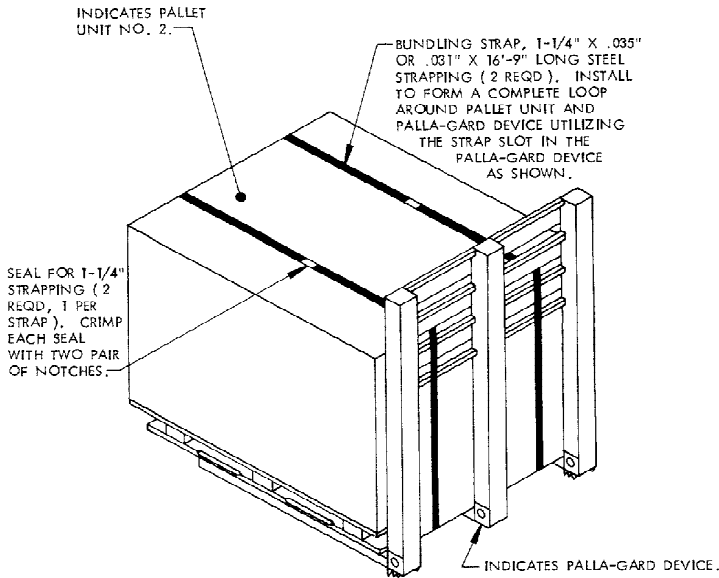
- ① LOAD BEARING GATE, PLYWOOD, 3/4" X 48" X 7'-6" (4 REQD).
- ② SIDE BLOCKING ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 14. SEE GENERAL NOTE "J" ON PAGE 2.
- ③ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 16'-9" LONG STEEL STRAPPING (4 REQD, 2 PER PALLA-GARD DEVICE). SEE THE "PALLA-GARD UNIT C DETAIL" ON PAGE 13.
- ④ SEAL FOR 1-1/4" STEEL STRAPPING (4 REQD, 1 PER STRAP). SEE GENERAL NOTE "L" ON PAGE 2.
- ⑤ PALLA-GARD DEVICE (2 REQD). SEE THE "PALLA-GARD UNIT C DETAIL" ON PAGE 13.



SECTION C-C

SPECIAL NOTES:

1. A 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION) TOFC VAN TRAILER IS SHOWN. TRAILERS OF OTHER DIMENSIONS CAN BE USED. SEE GENERAL NOTES "D" AND "Q" ON PAGE 2.
2. THE PALLET UNIT SHOWN IN THE TYPICAL LOAD ON PAGE 12 HAS OVERALL DIMENSIONS OF 51" WIDE BY 43-1/2" LONG BY 37-1/2" HIGH WITH A WEIGHT OF 3,690 POUNDS PER PALLET UNIT. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. THE NUMBER OF UNITS MAY NEED TO BE ADJUSTED IF THE UNIT BEING LOADED HAS A DIFFERENT WEIGHT.
3. IF DESIRED, THREE "ALTERNATIVE SIDE BLOCKING ASSEMBLIES" AS DETAILED ON PAGE 14 MAY BE USED IN PLACE OF ONE "SIDE BLOCKING ASSEMBLY" SHOWN IN THE LOAD VIEW. WHEN USING THE ALTERNATIVE SIDE BLOCKING, THE LOAD SIDE OF THE ASSEMBLY WILL BEAR AGAINST THE POSTS OF THE PALLET.



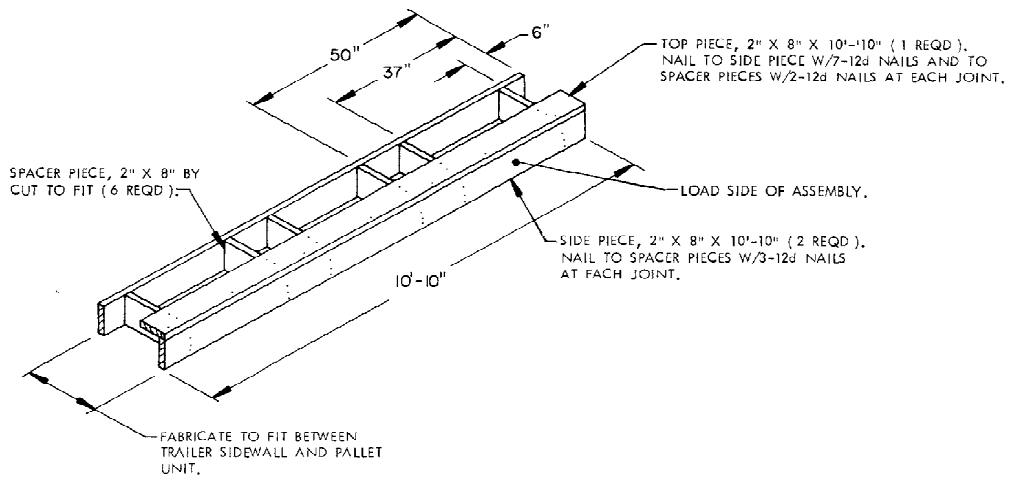
PALLA-GARD UNIT C DETAIL

BILL OF MATERIAL

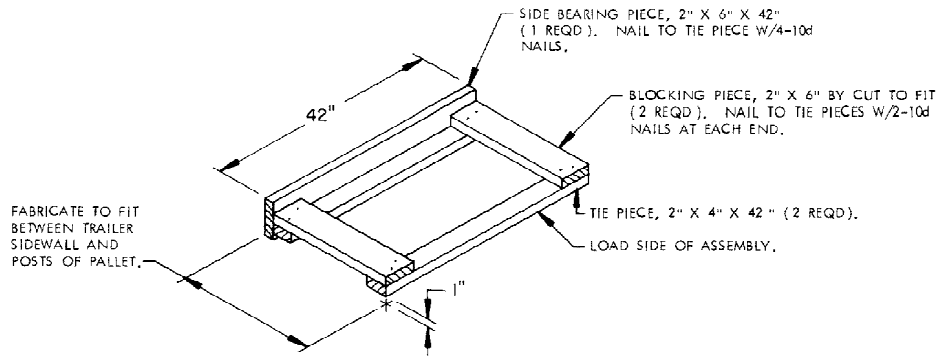
LUMBER	LINEAR FEET	BOARD FEET
2" X 8"	163	218
NAILS	NO. REQD	POUNDS
12d (3-1/4")	148	2-1/2
PLYWOOD, 3/4" THICK	120 SQ FT REQD	248 LBS
STEEL STRAPPING, 1-1/4" X .035"	67' REQD	9-1/2 LBS
SEAL FOR 1-1/4" STRAPPING	4 REQD	NIL
PALLA-GARD DEVICE	2 REQD	620 LBS

LOAD AS SHOWN

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLET UNIT	12	44,280 LBS
DUNNAGE		1,316 LBS
TOTAL WEIGHT --		45,596 LBS



SIDE BLOCKING ASSEMBLY



ALTERNATIVE SIDE BLOCKING ASSEMBLY

SPECIAL NOTES:

- THE FOLLOWING SPECIAL NOTES AND THE FOUR (4) CHARTS BELOW ARE PRESENTED AS GUIDANCE IN THE SELECTION OF A LOAD PATTERN, AND IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE LOADED IN A TOFC TYPE VAN TRAILER, BASED ON THE SIZE AND WEIGHT OF THE PALLET UNIT OR SKIDDED UNIT TO BE LOADED.
- CHART NO. 1 MAY BE USED IN SELECTING A LOAD PATTERN, SUCH AS 2-WIDE OR 3-WIDE, FOR THE WIDTH OF THE TRAILER WHICH IS TO BE LOADED. THE LOAD PATTERN WILL BE BASED EITHER ON THE UNIT LENGTH ACROSS THE TRAILER OR ON THE UNIT WIDTH ACROSS THE TRAILER DEPENDENT UPON THE LENGTH OR WIDTH DIMENSIONS OF THE UNIT TO BE LOADED. UNIT SIZE RANGES AND LOAD PATTERNS FOR SEVEN OF THE MOST POPULAR TRAILER WIDTHS ARE GIVEN. TRAILER OF OTHER WIDTHS MAY BE USED, OF COURSE, AND THE SIZE RANGE OF UNITS WHICH CAN BE LOADED IN THE TWO PATTERNS CAN BE CALCULATED. THE SMALLER FIGURE SHOWN FOR UNIT SIZE RANGE IS BASED ON THE MINIMUM UNIT LENGTH OR WIDTH, AS APPLICABLE, AND THE LARGER FIGURE IS CALCULATED ON THERE BEING AT LEAST ONE INCH (1") EXCESS LATERAL SPACE REMAINING IN THE TRAILER AFTER THE UNITS ARE POSITIONED.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

- CHART NO. 2 MAY BE USED IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE POSITIONED WITHIN ONE ROW IN THE LENGTH OF THE TRAILER. SEPARATE COLUMNS ARE SHOWN FOR FOUR OF THE MOST POPULAR TRAILER LENGTHS. TRAILERS OF OTHER LENGTHS MAY BE USED, OF COURSE, BUT THE UNIT SIZE RANGE FOR THE NUMBER OF UNITS LONG WILL HAVE TO BE CALCULATED. THE UNIT SIZE RANGE FOR EACH OF THE SPECIFIED TRAILER LENGTHS IS BASED ON THE INSIDE LENGTH OF A TRAILER BEING SIX INCHES (6") SHORTER THAN THE OUTSIDE LENGTH, AND IS ALSO BASED ON A TRAILER OF THE TYPE SPECIFICALLY DESIGNED FOR TOFC SERVICE WHICH NORMALLY HAS A "SQUARED" FRONT WALL.
- CHART NO. 3 MAY BE USED IN DETERMINING THE NUMBER OF TIERS WHICH CAN BE LOADED IN A TRAILER, BASED ONLY ON THE HEIGHT OF THE UNIT. FIVE DIFFERENT INSIDE HEIGHTS ARE GIVEN FOR GUIDANCE. THE HEIGHT RANGE OF UNITS SPECIFIED UNDER EACH HEIGHT TRAILER ALLOWS APPROXIMATELY ONE (1") CLEARANCE AT THE ROOF. NO ALLOWANCE HAS BEEN MADE FOR DOOR OPENING HEIGHT CLEARANCE. THE ACTUAL NUMBER OF TIERS WHICH CAN BE LOADED WILL BE BASED ON SEVERAL FACTORS, SUCH AS THE WEIGHT OF THE UNITS AND THE QUANTITY THAT IS TO BE SHIPPED.
- CHART NO. 4 MAY BE USED AS GUIDANCE IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE LOADED IN A TRAILER BASED ONLY UPON THE WEIGHT OF THE UNIT. THE "UNIT WEIGHT IN LBS" COLUMN SPECIFIES WEIGHTS RANGING FROM 250 POUNDS, THE APPROXIMATE MINIMUM, TO 2,250 POUNDS, THE APPROXIMATE MAXIMUM, BY ONE-HUNDRED-POUND INCREMENTS. COLUMNS ARE SHOWN FOR FOUR (4) DIFFERENT LOAD WEIGHTS. THE QUANTITY REQUIRED TO MAKE A SPECIFIED LOAD WEIGHT FOR A UNIT WHICH WEIGHS SOMEWHERE BETWEEN THE EVEN FIGURES GIVEN WILL HAVE TO BE INTERPOLATED. FOR EXAMPLE, 29 PALLETIZED UNITS WEIGHING 1,350 POUNDS EACH CAN BE LOADED IN A TRAILER FOR A 40,000 POUND LOAD. THE ACTUAL QUANTITY WHICH MAY BE LOADED CAN BE ONE OR MORE UNITS ABOVE THE SPECIFIED QUANTITY PROVIDING THE TOTAL WEIGHT OF THE LADING, DUNNAGE AND PALLA-GARD DEVICES DOES NOT EXCEED THE MAXIMUM WEIGHT ALLOWED.

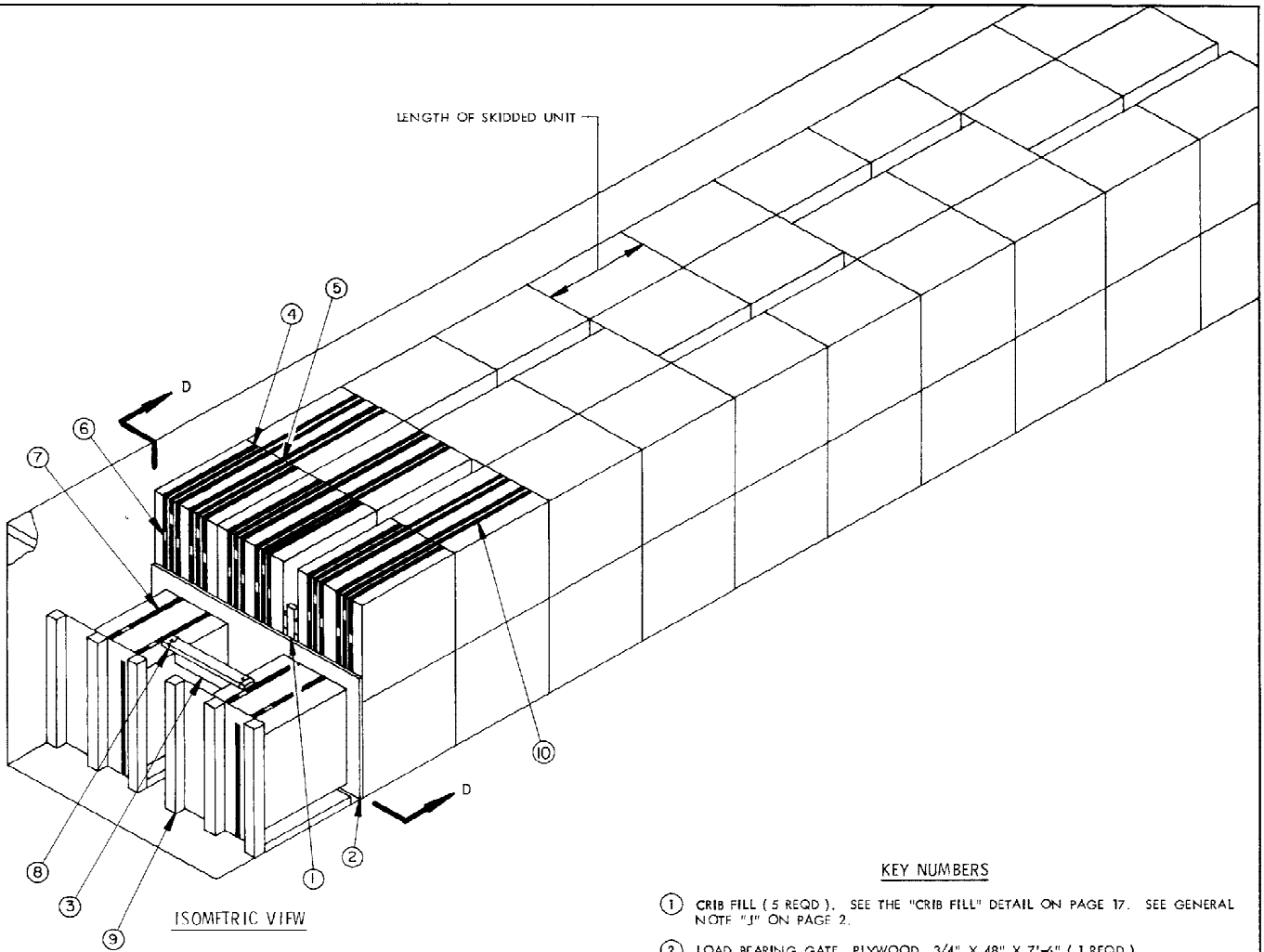
CHART NO. 1					
UNITS IN WIDTH OF TOFC TYPE VAN TRAILER					
VAN WIDTH!	LOAD PATTERN	UNIT SIZE RANGE			
		UNITS LENGTHWISE IN TRAILER		UNITS CROSSWISE IN TRAILER	
		UNIT LENGTH	LOAD PAGE	UNIT WIDTH	LOAD PAGE
90"	2-WIDE	25" TO 44-1/2"	6	27" TO 44-1/2"	10
	3-WIDE	25" TO 29-5/8"	16	27" TO 29-5/8"	16
90-1/2"	2-WIDE	25" TO 44-3/4"	6	27" TO 44-3/4"	10
	3-WIDE	25" TO 29-3/4"	16	27" TO 29-3/4"	16
91"	2-WIDE	25" TO 45"	6	27" TO 45"	10
	3-WIDE	25" TO 30"	16	27" TO 30"	16
91-1/2"	2-WIDE	25" TO 45-1/4"	6	27" TO 45-1/4"	10
	3-WIDE	25" TO 30-1/8"	16	27" TO 30-1/8"	16
92"	2-WIDE	25" TO 45-1/2"	6	27" TO 45-1/2"	10
	3-WIDE	25" TO 30-1/4"	16	27" TO 30-1/4"	16
92-1/2"	2-WIDE	25" TO 45-3/4"	6	27" TO 45-3/4"	10
	3-WIDE	25" TO 30-1/2"	16	27" TO 30-1/2"	16
93"	2-WIDE	25" TO 46"	6	27" TO 46"	10
	3-WIDE	25" TO 30-5/8"	16	27" TO 30-5/8"	16

CHART NO. 2				
UNITS IN LENGTH OF TOFC TYPE VAN TRAILER				
NO. OF UNITS LONG	UNIT SIZE RANGE			
	35' TRAILER	38' TRAILER	40' TRAILER	45' TRAILER
20	-----	-----	-----	25" TO 25-3/4"
19	-----	-----	-----	25-7/8" TO 27-1/8"
18	-----	-----	25" TO 25-1/4"	27-1/4" TO 28-5/8"
17	-----	25" TO 25-3/8"	25-1/8" TO 26-3/4"	28-3/4" TO 30-1/4"
16	-----	25-1/4" TO 27"	26-5/8" TO 28-1/2"	30-3/8" TO 32-1/4"
15	25" TO 26-3/8"	26-7/8" TO 28-3/4"	28-3/8" TO 30-3/8"	32-3/8" TO 34-3/8"
14	26-1/4" TO 28-1/4"	28-5/8" TO 30-3/4"	30-1/4" TO 32-1/2"	34-1/2" TO 36-3/4"
13	28-1/8" TO 30-3/8"	30-5/8" TO 33-1/4"	32-3/8" TO 35"	36-7/8" TO 39-5/8"
12	30-1/4" TO 33"	33-1/8" TO 36"	34-7/8" TO 38"	39-3/4" TO 43"
11	32-7/8" TO 36"	35-7/8" TO 39-1/4"	37-7/8" TO 41-3/8"	43-1/8" TO 46-7/8"
10	35-7/8" TO 39-5/8"	39-1/8" TO 43-1/8"	41-1/4" TO 45-5/8"	47" TO 51-5/8"
9	39-1/2" TO 44"	43" TO 48"	45-1/2" TO 50-5/8"	51-3/4" TO 57-1/4"
8	43-7/8" TO 49-1/2"	47-7/8" TO 54"	50-1/2" TO 57"	57-3/8" TO 64-1/2"
7	49-3/8" TO 56-1/2"	53-7/8" TO 61-5/8"	56-7/8" TO 65-1/8"	64-5/8" TO 73-5/8"
6	56-1/4" TO 66"	61-1/2" TO 72"	65" TO 76"	73-3/4" TO 86"
5	65-7/8" TO 79-1/8"	71-7/8" TO 86-3/8"	75-7/8" TO 91-1/8"	86-1/8" AND LONGER
4	79" AND LONGER	86-1/4" AND LONGER	91" AND LONGER	-----

CHART NO. 4				
MAXIMUM NO. OF UNITS PER TRAILER BY WEIGHT				
UNIT WEIGHT IN LBS	NO. OF UNITS			
	40,000 LBS	41,000 LBS	42,000 LBS	43,000 LBS
250	160	164	168	172
300	133	136	140	143
400	100	102	105	107
500	80	82	84	86
600	66	68	70	71
700	57	58	60	61
800	50	51	52	53
900	44	45	46	47
1,000	40	41	42	43
1,100	36	37	38	39
1,200	33	34	35	35
1,300	30	31	32	33
1,400	28	29	30	30
1,500	26	27	28	28
1,600	25	25	26	26
1,700	23	24	24	25
1,800	22	22	23	23
1,900	21	21	22	22
2,000	20	20	21	21
2,100	19	19	20	20
2,200	18	18	19	19
2,250	17	18	18	18

CHART NO. 3					
TIERS IN HEIGHT OF TOFC TYPE VAN TRAILER					
NO. OF TIERS	UNIT HEIGHT RANGE				
	91" HIGH	94" HIGH	97" HIGH	104" HIGH	107" HIGH
3	22-3/4" THRU 30-1/4"	23-3/8" THRU 31"	24-1/8" THRU 32"	25-7/8" THRU 34-1/4"	26-5/8" THRU 35-1/4"
2	30-1/4" THRU 45-1/2"	31" THRU 46"	32" THRU 48"	34-1/4" THRU 51-1/2"	35-1/4" THRU 53"
1	OVER 45-1/2"	OVER 46"	OVER 48"	OVER 51-1/2"	OVER 53"

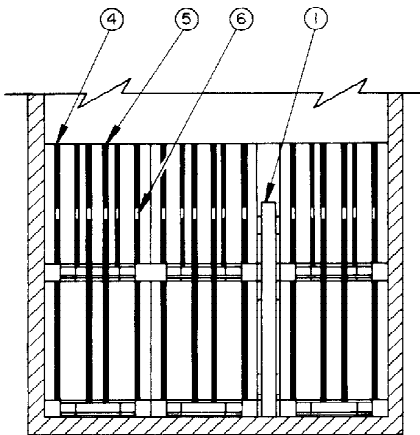
LENGTH OF SKIDDED UNIT



ISOMETRIC VIEW

KEY NUMBERS

- ① CRIB FILL (5 REQD). SEE THE "CRIB FILL" DETAIL ON PAGE 17. SEE GENERAL NOTE "J" ON PAGE 2.
- ② LOAD BEARING GATE, PLYWOOD, 3/4" X 48" X 7'-6" (1 REQD).
- ③ TOP-OF-LOAD ANTI-SWAY BRACE (1 REQD). SEE DETAIL ON PAGE 9. WIRE TIE TO UNITIZING STRAP OF UNIT.
- ④ FIGURE 8 UNITIZING STRAP, 1-1/4" X .035" OR .031" X 29'-0" LONG STEEL STRAPPING (6 REQD). SEE THE "STRAPPING DETAIL" ON PAGE 17.
- ⑤ VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 21'-6" LONG STEEL STRAPPING (12 REQD). SEE THE "STRAPPING DETAIL" ON PAGE 17.
- ⑥ SEAL FOR 1-1/4" STEEL STRAPPING (28 REQD, 1 PER STRAP). SEE GENERAL NOTE "L" ON PAGE 2.
- ⑦ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 13'-0" LONG STEEL STRAPPING (4 REQD, 2 PER PALLA-GARD DEVICE). SEE THE "PALLA-GARD UNIT D DETAIL" ON PAGE 17.
- ⑧ TIE WIRE, NO. 14 GAGE WIRE 18" LONG (2 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND THE SKIDDED UNIT UNITIZING STRAP. BRING ENDS TOGETHER AND TWIST TAUT.
- ⑨ PALLA-GARD DEVICE (2 REQD). SEE THE "PALLA-GARD UNIT D DETAIL" ON PAGE 17.
- ⑩ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 28'-0" LONG STEEL STRAPPING (6 REQD). INSTALL SO AS TO ENCIRCLE THE TOP TWO LAYER SKIDDED UNITS.



SECTION D-D

SEAL FOR 1-1/4" STRAPPING
(4 REQD, 1 PER STRAP).
CRIMP EACH SEAL WITH TWO
PAIR OF NOTCHES.

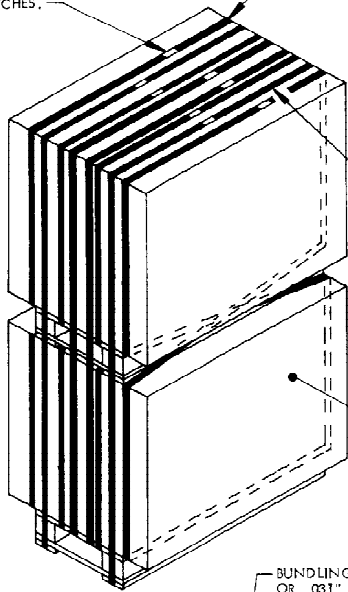


FIGURE-8 UNITIZING STRAP,
1-1/4" X .035" OR .031" X
29'-0" LONG STEEL STRAPPING
(2 REQD). POSITION ADJA-
CENT TO POSTS OF SKID BASE.
NOTE THAT THE STRAP PASSES
UNDER THE DECK AND STRINGER
BOARDS OF THE TOP UNIT WHEN
THE SKIDDED UNITS ARE STACKED
AS SHOWN.

VERTICAL UNITIZING STRAP,
1-1/4" X .035" OR .031" X
21'-6" LONG STEEL STRAP-
PING (2 REQD). INSTALL
ADJACENT TO OUTER FIGU-
RE-8 UNITIZING STRAP SO
AS TO ENCIRCLE THE STACK
OF SKIDDED UNITS.

INDICATES SKIDDED
UNIT NO. 4.

STRAPPING DETAIL

NOTE: THE STRAPPING AS DEPICTED
ABOVE IS REQUIRED WHENEVER A
STACK OF TWO SKIDDED UNITS IS
PLACED ADJACENT TO A PALLA-
GARD UNIT OR A ONE-HIGH SKID-
DED UNIT IN A TRAILER LOAD.

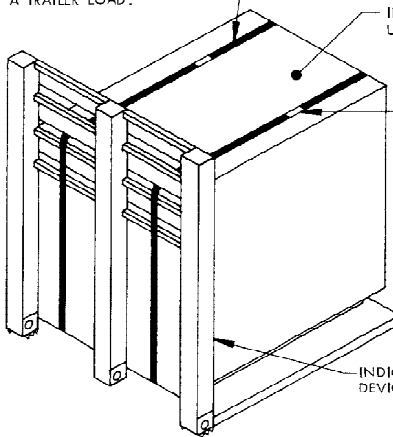
BUNDLING STRAP, 1-1/4" X .035"
OR .031" X 13'-0" LONG STEEL
STRAPPING (2 REQD). INSTALL
TO FORM A COMPLETE LOOP AROUND
SKIDDED UNIT AND PALLA-GARD
DEVICE UTILIZING THE STRAP SLOT IN
THE PALLA-GARD DEVICE AS SHOWN.

INDICATES SKIDDED
UNIT NO. 4.

SEAL FOR
1-1/4" STRAPPING
(2 REQD, 1 PER
STRAP). CRIMP
EACH SEAL WITH
TWO PAIR OF
NOTCHES.

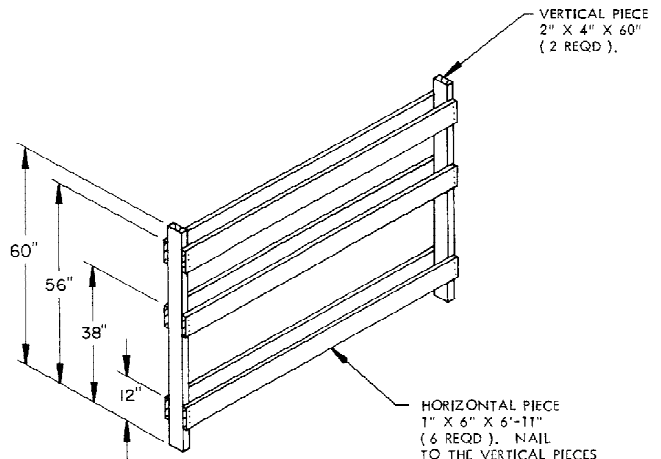
INDICATES PALLA-GARD
DEVICE.

PALLA-GARD UNIT D DETAIL



SPECIAL NOTES:

1. A 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION) TOPC VAN TRAILER IS SHOWN. TRAILERS OF OTHER DIMENSIONS CAN BE USED. SEE GENERAL NOTES "D" AND "Q" ON PAGE 2.
2. THE SKIDDED UNIT SHOWN IN THE TYPICAL LOAD ON PAGE 16 HAS OVER ALL DIMENSIONS OF 28-1/8" WIDE BY 41-5/8" LONG BY 38" HIGH WITH A WEIGHT OF 531 POUNDS PER SKIDDED UNIT. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. THE NUMBER OF UNITS MAY NEED TO BE ADJUSTED IF THE UNIT BEING LOADED HAS A DIFFERENT SIZE OR WEIGHT.
3. IF NECESSARY, THE CRIB FILL, SHOWN AS PIECE MARKED ①, MAY BE ADJUSTED IN LENGTH AND HEIGHT TO SUIT DEPENDING ON THE NUMBER OF UNITS LONG OR NUMBER OF TIERS OF UNITS TO BE SHIPPED.



CRIB FILL

HORIZONTAL PIECE
1" X 6" X 6'-11"
(6 REQD). NAIL
TO THE VERTICAL PIECES
W/3-6d NAILS AT EACH END.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	208	104
2" X 4"	53	36
4" X 4"	2	3
NAILS	NO. REQD	POUNDS
6d (2")	180	1-1/4
12d (3-1/4")	3	NIL
PLYWOOD, 3/4" THICK	30 SQ FT REQD	62 LBS
STEEL STRAPPING, 1-1/4"	652' REQD	93-1/4 LBS
SEAL FOR 1-1/4" STRAPPING	28 REQD	1-1/2 LB
WIRE, NO. 14 GAGE	3' REQD	NIL
PALLA-GARD DEVICE	2 REQD	620 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
SKIDDED UNIT	62	32,922 LBS
DUNNAGE		1,064 LBS

TOTAL WEIGHT ----- 33,986 LBS

TYPICAL 62-SKIDDED UNIT LOAD IN A 40'-0" LONG X 7'-8" WIDE TRAILER