

APPROVED BY
 BUREAU OF EXPLOSIVES
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 SUPERVISOR, MILITARY & INTERMODAL SERVICES
 DATE 6/24/88

LOADING AND BRACING[●] IN VAN TYPE TRAILERS OF PROPELLING CHARGES, UNITIZED, FOR TRAILER-ON-FLAT-CAR (TOFC) SHIPMENT UTILIZING PALLA-GARD DEVICES

● 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 "N" ON PAGE 2.

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U.S. ARMY AMC DRAWING AUGUST 1988					
CLASS	DIVISION	DRAWING	FILE		
19	48	4184	15PM 1004		

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 HEREIN ARE APPLICABLE TO PALLETIZED PROPELLING CHARGES PACKED IN CYLINDRICAL METAL CONTAINERS. SUBSEQUENT REFERENCE TO A PALLET UNIT MEANS THE UNIT WITH AMMUNITION ITEMS. SEE PAGES 4 AND 5 FOR TYPICAL PALLET UNIT DETAILS.
- C. THE LOADS AS SHOWN 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 RAILCARS WHICH ARE SPECIFIED BY BUREAU OF EXPLOSIVES PAMPHLET 6C WILL BE UTILIZED.
- D. FOR DETAILS OF THE PALLET UNITS DEPICTED WITHIN THIS PROCEDURAL DRAWING, REFER TO US ARMY AMC (DARCOM) DRAWING 19-48-4042A-20PM1001 AND APPENDICES THERETO.
- E. SELECTION OF A VEHICLE TO BE USED FOR TRANSPORTING THE DESIGNATED ITEM MUST COMPLY WITH AR 55-355, CHAPTER 213, FOR EXPLOSIVES AND OTHER DANGEROUS ARTICLES, IN FULL.
- 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. 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.
- H. 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 SPECIFICATIONS.
- J. DUNNAGE LUMBER SPECIFIED 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.
- K. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE TRAILER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- L. PORTIONS OF THE TRAILERS DEPICTED WITHIN THIS DRAWING, SUCH AS ONE OF THE SIDE WALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- M. 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.
- N. REQUIREMENTS CITED WITHIN THE 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 THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.
- O. 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.
- P. WHEN ANY STRAP IS SEALED AT AN END-OVER-END LAP JOINT, ONE SEAL, CRIMPED WITH TWO PAIR OF NOTCHES, WILL BE USED TO SEAL THE JOINT.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

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

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

- Q. IF THE EXCESS SPACE ACROSS THE WIDTH OF A TRAILER, MEASURED BETWEEN THE LADING OF LATERALLY ADJACENT PALLET UNITS, EXCEEDS 8", ANTI-SWAY BRACING AS DEPICTED ON PAGE 14 MUST BE INSTALLED BETWEEN PALLET UNITS TO PREVENT LATERAL DISPLACEMENT DURING TRANSPORT. FOR ADDITIONAL GUIDANCE SEE THE ANTI-SWAY BRACE DETAILS ON PAGES 6, 8, 10, 12 AND 14. IF THE EXCESS SPACE IS LESS THAN 7" BUT EXCEEDS 2", ANTI-SWAY ASSEMBLIES AS DEPICTED ON PAGE 16 MUST BE USED. LATERAL BRACING IS NOT REQUIRED IF THE EXCESS SPACE MEASURES 2" OR LESS.
- R. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- S. 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.
- T. TRAILERS HAVING WIDTH AND LENGTH DIMENSIONS DIFFERENT THAN THOSE SPECIFIED WITHIN THIS DOCUMENT MAY BE USED FOR SHIPMENT OF THE DEPICTED PALLET UNITS PROVIDED THAT THE TRAILERS CONFORM TO THE GUIDANCE CONTAINED IN GENERAL NOTE "C" AT LEFT. WIDER OR NARROWER TRAILERS MAY BE USED BY ADJUSTING ANTI-SWAY BRACE 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 AT 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.

(MATERIAL SPECIFICATIONS CONTINUED)

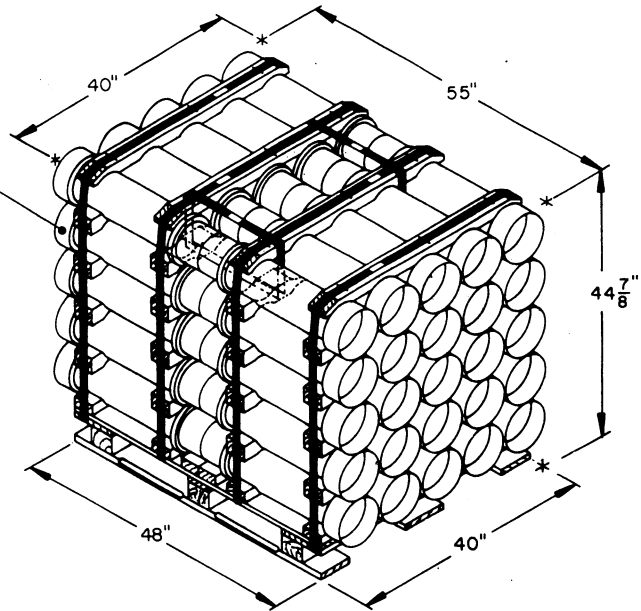
- DEVICE, PALLA-GARD ----: MILITARY PALLA-GARD UNIT, 100 SERIES, CARGO RESTRAINING DEVICE LOW PROFILE HD BANDABLE ASSEMBLY: CUSTOM DESIGN DRAWING NUMBER 100-0005, DATED 14 DEC 82.

PROPELLING CHARGE PALLET UNIT LOAD PLANNING CHART						
MAXIMUM TOFC PALLET UNIT QUANTITIES						
PROPELLING CHARGE CONTAINER SERIES	BASIC HEIGHT PALLET UNITS			INCREASED OR DECREASED HEIGHT PALLET UNITS		
	ALTERNATED CONTAINER METHOD	FLAT DUNNAGE METHOD	ROUTED DUNNAGE METHOD	ALTERNATED CONTAINER METHOD	FLAT DUNNAGE METHOD	ROUTED DUNNAGE METHOD
M10	25	25	25	19	19	19
M13	--	24	24	--	28	28
M14	31	28	28	26	32	32
M16	28	22	22	23	27	27
M18	--	23	23	--	25	25
M19	--	22	22	--	24	24
M460						
(W/O ASSY)	21	22	22	17	28	28
M460						
(W/ASSY)	--	20	--	--	27	--
PA37	28	22	22	22	27	28
PA66	28	23	23	24	28	28
PA68	31	28	28	25	24	24
PA75	32	28	28	28	28	28
PA91	--	20	--	--	24	--
PA92	--	21	--	--	26	--
PA93	--	19	--	--	24	--
PA94	--	28	--	--	32	--
PA95	--	22	--	--	26	--
PA96	--	23	--	--	27	--
PA97	--	21	--	--	31	--
PA99	--	24	--	--	28	--
PA100	--	28	--	--	32	--
PA103	--	19	--	--	23	--

SPECIAL NOTES:

1. THE COLUMN SPECIFIED AS "BASIC HEIGHT PALLET UNITS" IN THE ABOVE CHART IS BASED UPON THE PALLET UNITS THAT ARE DELINEATED IN THE APPENDICES TO AMC (DARCOM) DRAWING 19-48-4042A-20PM1001. THE COLUMN SPECIFIED AS "INCREASED OR DECREASED HEIGHT PALLET UNITS" IN THE ABOVE CHART IS BASED UPON THE DELINEATED PALLET UNITS BEING MODIFIED TO ADD OR OMIT A LAYER OF CONTAINERS AS SPECIFIED IN THE APPLICABLE "SPECIAL NOTES" SECTIONS OF THE AFOREMENTIONED DRAWINGS.
2. THE MAXIMUM PALLET UNIT QUANTITIES SPECIFIED IN THE ABOVE CHART ARE BASED UPON THE UNITS BEING LOADED INTO A TOFC VAN TRAILER HAVING INSIDE LENGTH AND WIDTH DIMENSIONS OF 39'-3" LONG BY 7'-8" WIDE AND A LADING WEIGHT CAPACITY OF APPROXIMATELY 42,000 POUNDS. ADDITIONALLY, THE SPECIFIED QUANTITIES ARE BASED UPON THE TWO REARMOST STACKS IN A TRAILER BEING ONE PALLET UNIT HIGH; I.E., EACH PALLA-GARD DEVICE WILL HAVE ONLY ONE PALLET UNIT PLACED UPON IT AND THE ADJACENT STACK DIRECTLY IN FRONT OF THE PALLA-GARD DEVICES WILL ONLY BE ONE PALLET UNIT HIGH.

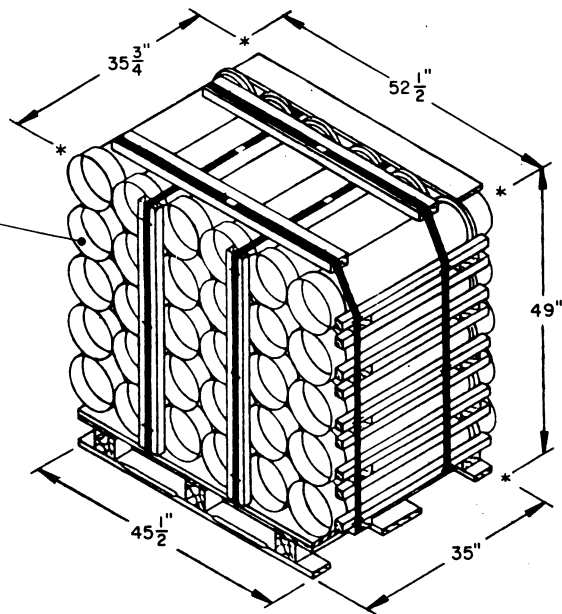
INDICATES M13
PROPELLING
CHARGE CONTAINER.



PALLET UNIT NO. 1

(BASIC HEIGHT ---ROUTED DUNNAGE METHOD)
UNIT WEIGHT-----1,766 LBS (APPROX)
UNIT CUBE-----57.1 CU FT (APPROX)

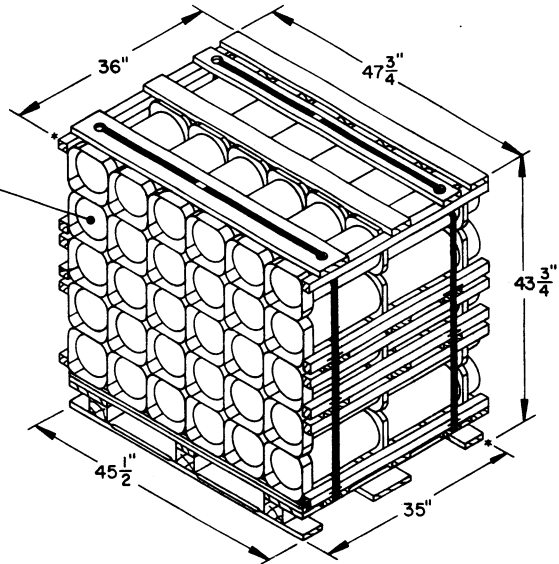
INDICATES PA37
PROPELLING CHARGE
CONTAINER.



PALLET UNIT NO. 2

(BASIC HEIGHT ---FLAT DUNNAGE METHOD)
UNIT WEIGHT-----1,847 LBS (APPROX)
UNIT CUBE -----53.2 CU FT (APPROX)

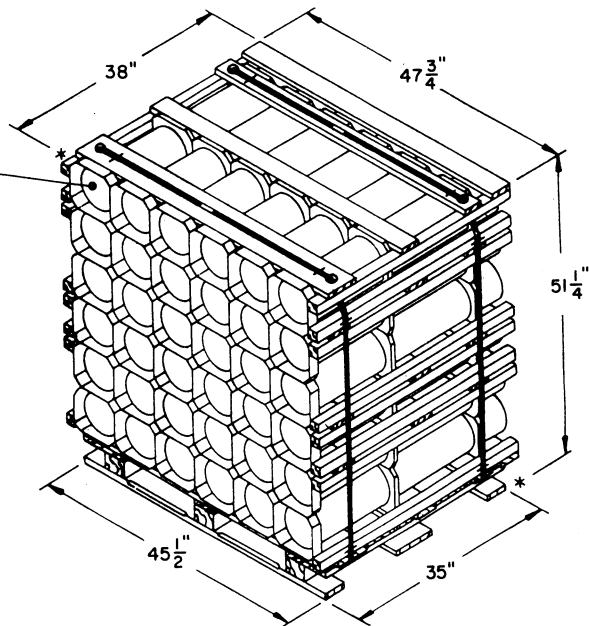
INDICATES PA91
PROPELLING CHARGE
CONTAINER.



PALLET UNIT NO. 3

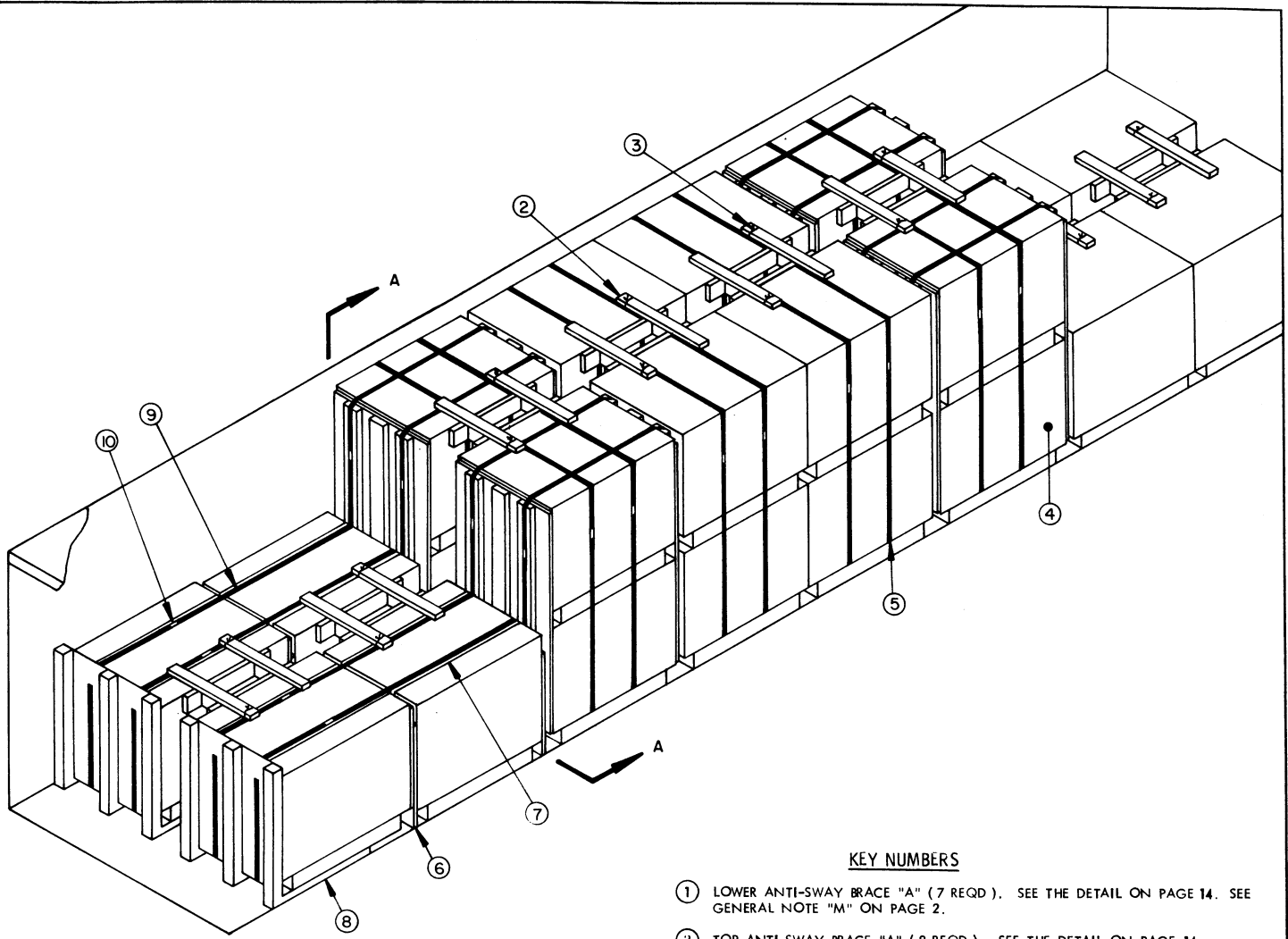
(DECREASED HEIGHT-FLAT DUNNAGE METHOD)
UNIT WEIGHT -----1,697 LBS (APPROX)
UNIT CUBE -----43.5 CU FT (APPROX)

INDICATES PA103
PROPELLING CHARGE
CONTAINER.



PALLET UNIT NO. 4

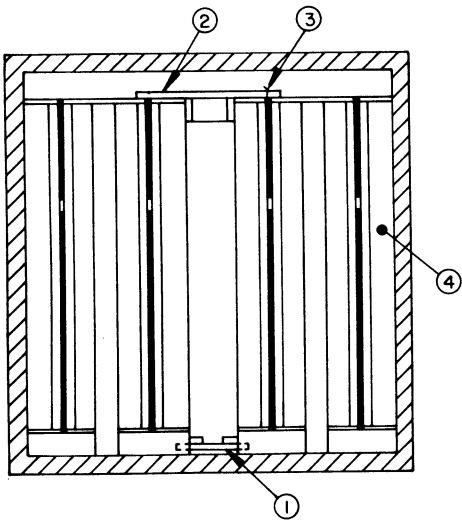
(BASIC HEIGHT-FLAT DUNNAGE METHOD)
UNIT WEIGHT -----2,100 LBS (APPROX)
UNIT CUBE -----53.8 CU FT (APPROX)



ISOMETRIC VIEW

KEY NUMBERS

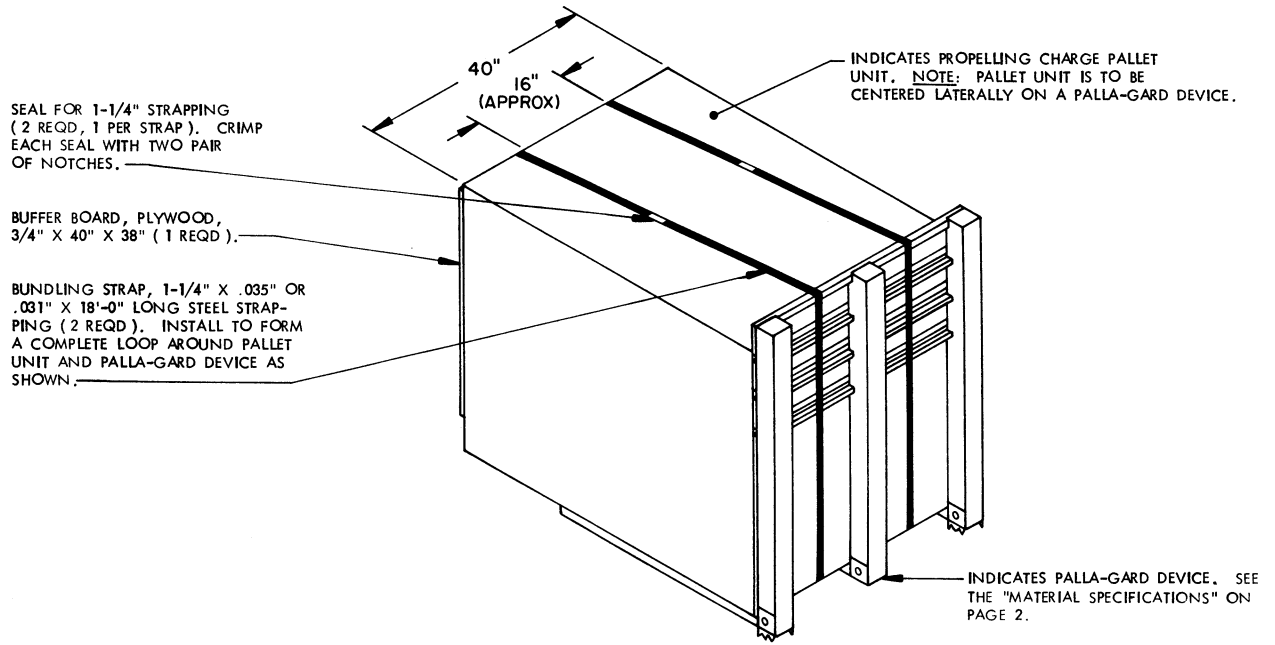
- ① LOWER ANTI-SWAY BRACE "A" (7 REQD). SEE THE DETAIL ON PAGE 14. SEE GENERAL NOTE "M" ON PAGE 2.
- ② TOP ANTI-SWAY BRACE "A" (8 REQD). SEE THE DETAIL ON PAGE 14.
- ③ TIE WIRE, NO. 14 GAGE WIRE 18" LONG (16 REQD). INSTALL SO AS TO ATTACH DIAGONALLY OPPOSITE CORNERS OF A TOP ANTI-SWAY BRACE TO THE TOP OF A PALLET UNIT.
- ④ SPECIAL BUNDLED STACK "A" (4 REQD). SEE THE DETAIL ON PAGE 14 AND SPECIAL NOTE 4 ON PAGE 7.
- ⑤ VERTICAL BUNDLING STRAP, 1-1/4" X .035" OR .031" X 23'-0" LONG STEEL STRAPPING (16 REQD, 2 PER STACK). INSTALL SO AS TO BE DIRECTLY ON TOP OF THE TWO INNER PALLET UNIT UNITIZING STRAPS.
- ⑥ BUFFER BOARD, PLYWOOD, 3/4" X 38" X 40" (4 REQD).
- ⑦ BUFFER BOARD STRAP, 1-1/4" X .035" OR .031" X 17'-0" LONG STEEL STRAPPING (4 REQD, 2 PER UNIT). INSTALL SO AS TO ATTACH THE BUFFER BOARDS TO THE ENDS OF A PALLET UNIT.
- ⑧ PALLA-GARD DEVICE (2 REQD). SEE THE "PALLA-GARD UNIT A" DETAIL ON PAGE 7.
- ⑨ HORIZONTAL BUNDLING STRAP, 1-1/4" X .035" OR .031" X 28'-0" LONG STEEL STRAPPING (4 REQD, 2 PER PALLA-GARD DEVICE). INSTALL SO AS TO ENCIRCLE A PALLA-GARD UNIT AND ADJACENT FORWARD PALLET UNIT.
- ⑩ SEAL FOR 1-1/4" STRAPPING (26 REQD, ONE PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "P" ON PAGE 2.



SECTION A-A

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; HOWEVER, A LONGITUDINAL VOID OF AT LEAST 12" MUST REMAIN TO THE REAR OF THE LOAD SUBSEQUENT TO THE PALLA-GARD UNIT PLACEMENT. THIS 12" VOID ALLOWS FOR PROPER ENGAGEMENT OF THE PALLA-GARD RESTRAINT DEVICES WITH THE TRAILER FLOOR WHEN THE LOAD UNDERGOES IMPACT DURING SHIPMENT.
2. THE PALLETIZED UNITS SHOWN IN THE TYPICAL LOAD ON PAGE 6 ARE BASED ON PALLET UNIT NO. 1 SHOWN ON PAGE 4. THE DEPICTED LOADING PROCEDURES ARE ALSO APPLICABLE FOR PALLETIZED UNITS OF OTHER DIMENSIONS. REFER TO THE "LOAD PLANNING GUIDANCE" ON PAGE 3 FOR ADDITIONAL GUIDANCE.
3. THE LOWER ANTI-SWAY BRACES, SPECIFIED AS PIECES MARKED ① ON PAGE 6, ARE DESIGNED FOR USE WITHIN LOADS THAT HAVE THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE TRAILER SIDEWALLS.
4. EACH TWO-HIGH STACK OF PALLET UNITS THAT IS TO BE POSITIONED ADJACENT TO A ONE-HIGH PALLET UNIT MUST BE BUNDLED AS SHOWN IN THE "SPECIAL STACK BUNDLING" DETAIL ON PAGE 14 PRIOR TO LOADING INTO A TRAILER.



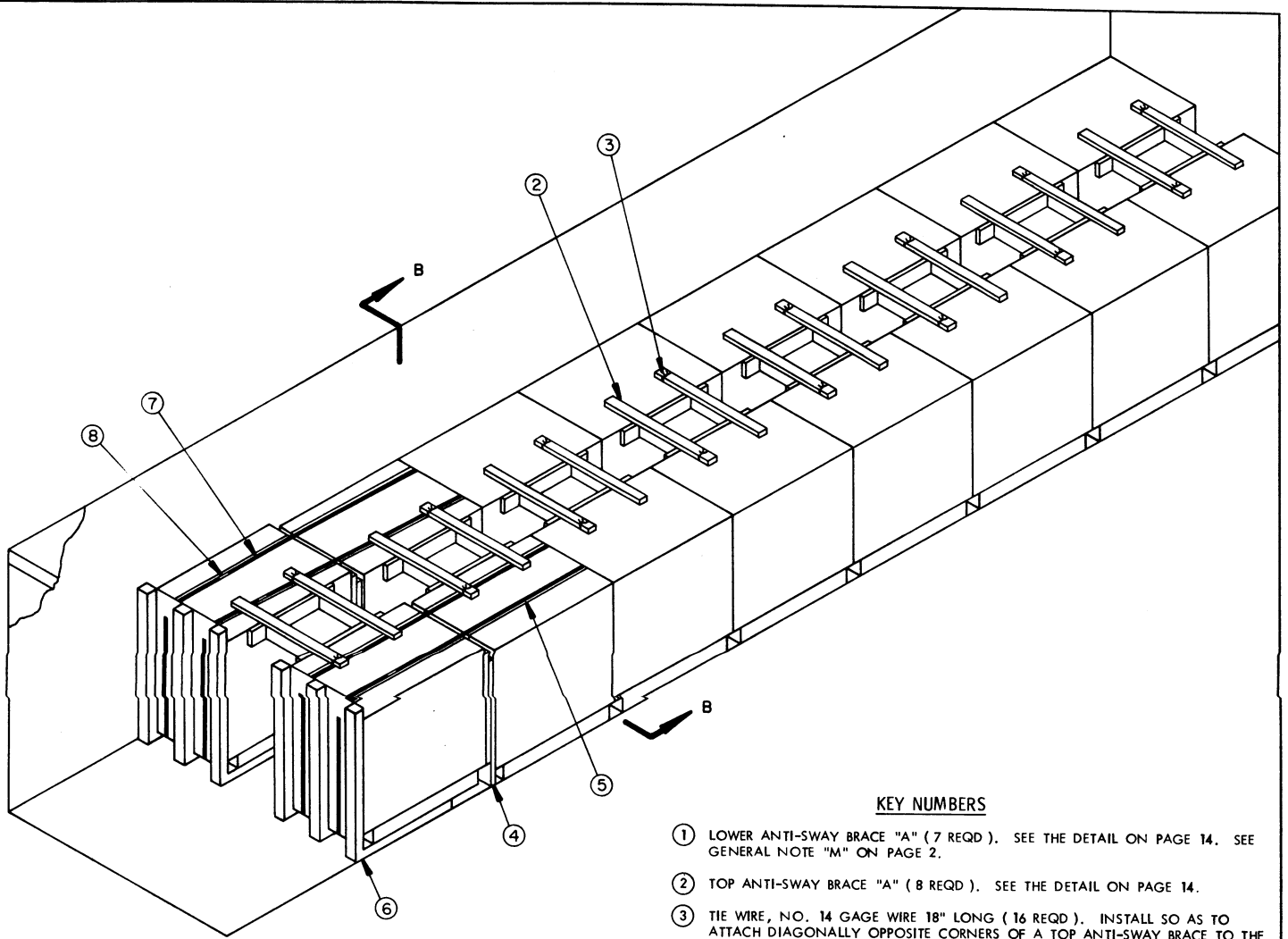
PALLA-GARD UNIT A

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	118	79
2" X 6"	70	70
NAILS	NO. REQD	POUNDS
10d (3")	168	2-3/4
16d (3-1/2")	112	2-1/2
PLYWOOD, 3/4" THICK -----	268 SQ FT REQD -----	554 LBS
STEEL STRAPPING, 1-1/4" -----	548' REQD -----	79 LBS
SEAL FOR 1-1/4" STRAPPING -----	36 REQD -----	1-3/4 LB
WIRE, NO. 14 GAGE -----	24' REQD -----	1/2 LB
PALLA-GARD DEVICE -----	2 REQD -----	620 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT NO. 1 --24-----		42,384 LBS
DUNNAGE -----		1,559 LBS
TOTAL WEIGHT -----		43,943 LBS

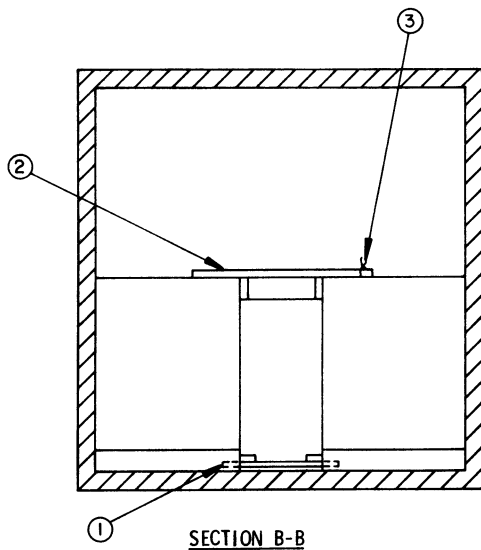
TYPICAL 24-UNIT LOAD IN A 40'-0" LONG TOFC TYPE VAN TRAILER (PALLET UNIT NO. 1)



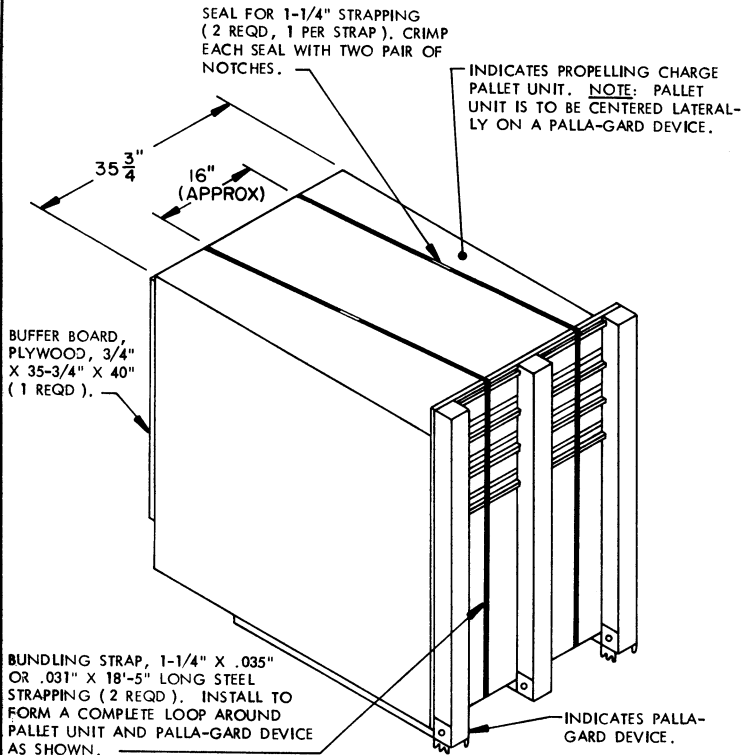
ISOMETRIC VIEW

KEY NUMBERS

- ① LOWER ANTI-SWAY BRACE "A" (7 REQD). SEE THE DETAIL ON PAGE 14. SEE GENERAL NOTE "M" ON PAGE 2.
- ② TOP ANTI-SWAY BRACE "A" (8 REQD). SEE THE DETAIL ON PAGE 14.
- ③ TIE WIRE, NO. 14 GAGE WIRE 18" LONG (16 REQD). INSTALL SO AS TO ATTACH DIAGONALLY OPPOSITE CORNERS OF A TOP ANTI-SWAY BRACE TO THE TOP OF A PALLET UNIT.
- ④ BUFFER BOARD, PLYWOOD, 3/4" X 35" X 46" (2 REQD).
- ⑤ BUFFER BOARD STRAP, 1-1/4" X .035" OR .031" X 17'-6" LONG STEEL STRAPPING (4 REQD, 2 PER UNIT). INSTALL SO AS TO ATTACH THE BUFFER BOARDS TO THE ENDS OF A PALLET UNIT.
- ⑥ PALLA-GARD DEVICE (2 REQD). SEE THE "PALLA-GARD UNIT B" DETAIL ON PAGE 9.
- ⑦ HORIZONTAL BUNDLING STRAP, 1-1/4" X .035" OR .031" X 28'-0" LONG STEEL STRAPPING (4 REQD, 2 PER PALLA-GARD DEVICE). INSTALL SO AS TO ENIRCLE A PALLA-GARD UNIT AND ADJACENT FORWARD PALLET UNIT.
- ⑧ SEAL FOR 1-1/4" STRAPPING (8 REQD, ONE PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "P" ON PAGE 2.



SECTION B-B



PALLA-GARD UNIT B

SPECIAL NOTES:

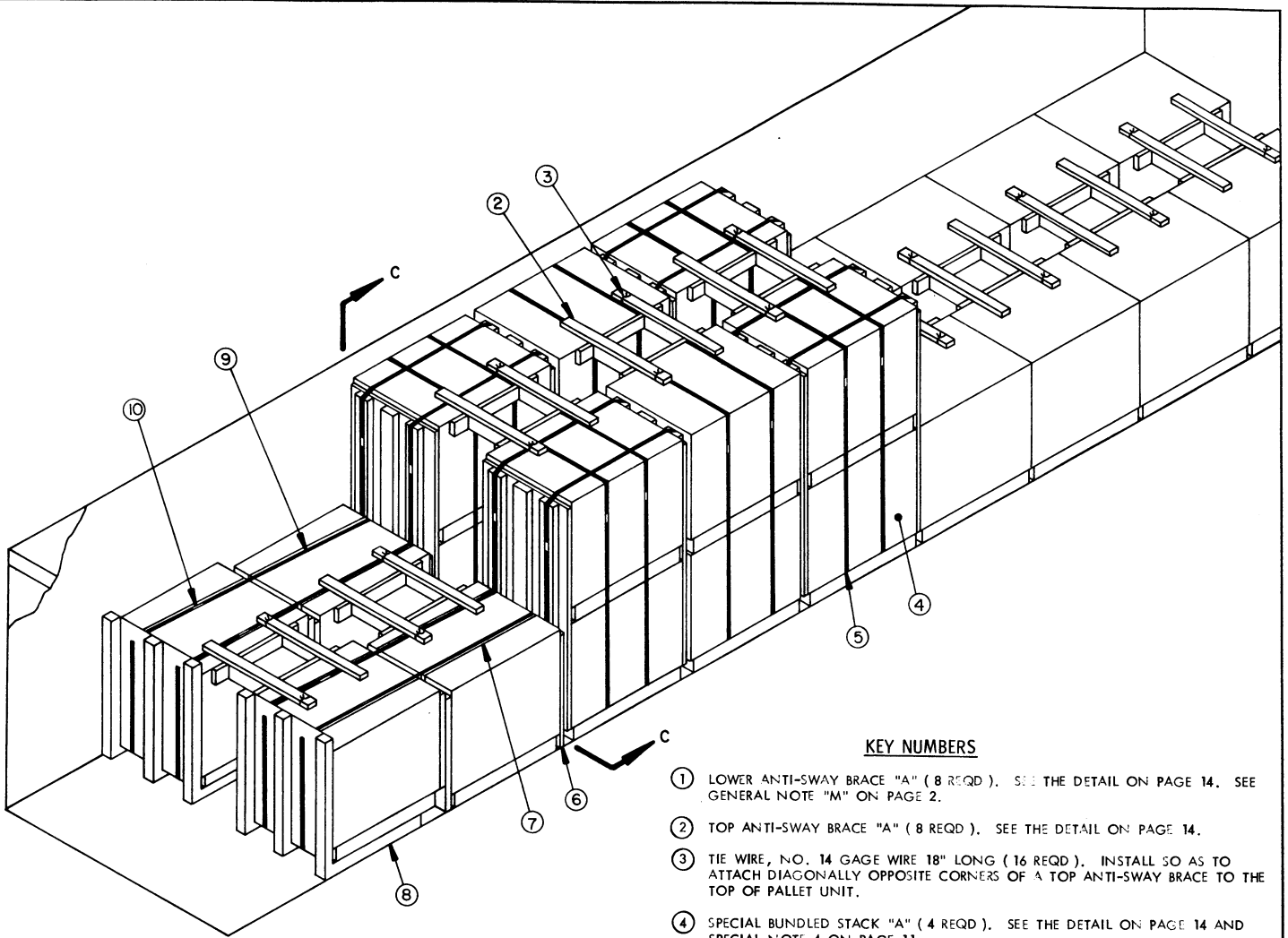
1. A 40'-0" LONG BY 7'-8" WIDE (INSIDE DIMENSION) TOFC VAN TRAILER IS SHOWN. TRAILERS OF OTHER DIMENSIONS CAN BE USED; HOWEVER, A LONGITUDINAL VOID OF AT LEAST 12" MUST REMAIN TO THE REAR OF THE LOAD SUBSEQUENT TO THE PALLA-GARD UNIT PLACEMENT. THIS 12" VOID ALLOWS FOR PROPER ENGAGEMENT OF THE PALLA-GARD RESTRAINT DEVICES WITH THE TRAILER FLOOR WHEN THE LOAD UNDERGOES IMPACT DURING SHIPMENT.
2. THE PALLETIZED UNITS SHOWN IN THE TYPICAL LOAD ON PAGE 8 ARE BASED ON PALLET UNIT NO. 2 SHOWN ON PAGE 4. THE DEPICTED LOADING PROCEDURES ARE ALSO APPLICABLE FOR PALLETIZED UNITS OF OTHER DIMENSIONS. REFER TO THE "LOAD PLANNING GUIDANCE" ON PAGE 3 FOR ADDITIONAL GUIDANCE.
3. THE LOWER ANTI-SWAY BRACES, SPECIFIED AS PIECES MARKED ① ON PAGE 8, ARE DESIGNED FOR USE WITHIN LOADS THAT HAVE THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE TRAILER SIDEWALLS.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	116	77
2" X 6"	77	77
NAILS	NO. REQD	POUNDS
10d (3")	84	1-1/2
16d (3-1/2")	208	1-3/4
PLYWOOD, 3/4" THICK	46 SQ FT REQD	96 LBS
STEEL STRAPPING, 1-1/4"	182' REQD	26 LBS
SEAL FOR 1-1/4" STRAPPING	8 REQD	1/2 LB
WIRE, NO. 14 GAGE	24' REQD	1/2 LB
PALLA-GARD DEVICE	2 REQD	620 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT NO. 2	16	29,552 LBS
DUNNAGE		1,055 LBS
TOTAL WEIGHT		30,607 LBS

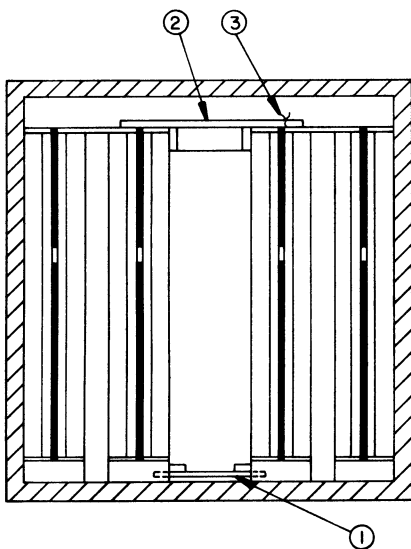
TYPICAL 16-UNIT LOAD IN A 40'-0" LONG TOFC TYPE VAN TRAILER (PALLET UNIT NO. 2)



ISOMETRIC VIEW

KEY NUMBERS

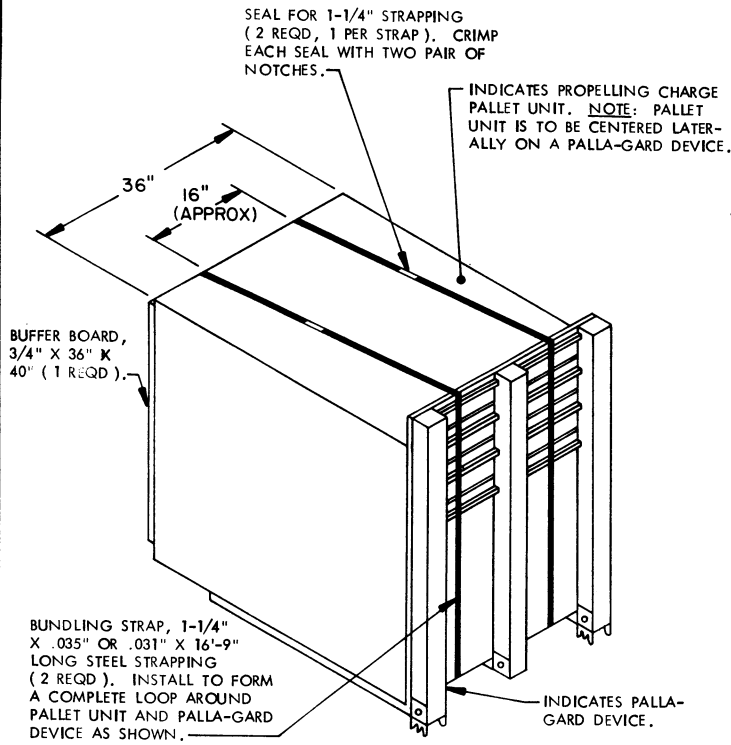
- ① LOWER ANTI-SWAY BRACE "A" (8 REQD). SEE THE DETAIL ON PAGE 14. SEE GENERAL NOTE "M" ON PAGE 2.
- ② TOP ANTI-SWAY BRACE "A" (8 REQD). SEE THE DETAIL ON PAGE 14.
- ③ TIE WIRE, NO. 14 GAGE WIRE 18" LONG (16 REQD). INSTALL SO AS TO ATTACH DIAGONALLY OPPOSITE CORNERS OF A TOP ANTI-SWAY BRACE TO THE TOP OF PALLET UNIT.
- ④ SPECIAL BUNDLED STACK "A" (4 REQD). SEE THE DETAIL ON PAGE 14 AND SPECIAL NOTE 4 ON PAGE 11.
- ⑤ VERTICAL BUNDLING STRAP, 1-1/4" X .035" OR .031" X 23'-6" LONG STEEL STRAPPING (12 REQD, 2 PER STACK). INSTALL SO AS TO BE DIRECTLY ON TOP OF THE TWO INNER PALLET UNIT UNITIZING STRAPS.
- ⑥ BUFFER BOARD, PLYWOOD, 3/4" X 36" X 39" (4 REQD).
- ⑦ BUFFER BOARD STRAP, 1-1/4" X .035" OR .031" X 17'-0" LONG STEEL STRAPPING (4 REQD, 2 PER UNIT). INSTALL SO AS TO ATTACH THE BUFFER BOARDS TO THE ENDS OF A PALLET UNIT.
- ⑧ PALLA-GARD DEVICE (2 REQD). SEE THE "PALLA-GARD UNIT C" DETAIL ON PAGE 11.
- ⑨ HORIZONTAL BUNDLING STRAP, 1-1/4" X .035" OR .031" X 24'-6" LONG STEEL STRAPPING (4 REQD, 2 PER PALLA-GARD DEVICE). INSTALL SO AS TO ENIRCLE A PALLA-GARD UNIT AND ADJACENT FORWARD PALLET UNIT.
- ⑩ SEAL FOR 1-1/4" STRAPPING (24 REQD, ONE PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "P" ON PAGE 2.



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; HOWEVER, A LONGITUDINAL VOID OF AT LEAST 12" MUST REMAIN TO THE REAR OF THE LOAD SUBSEQUENT TO THE PALLA-GARD UNIT PLACEMENT. THIS 12" VOID ALLOWS FOR PROPER ENGAGEMENT OF THE PALLA-GARD RESTRAINT DEVICES WITH THE TRAILER FLOOR WHEN THE LOAD UNDERGOES IMPACT DURING SHIPMENT.
2. THE PALLETIZED UNITS SHOWN IN THE TYPICAL LOAD ON PAGE 10 ARE BASED ON PALLET UNIT NO. 3 SHOWN ON PAGE 5. THE DEPICTED LOADING PROCEDURES ARE ALSO APPLICABLE FOR PALLETIZED UNITS OF OTHER DIMENSIONS. REFER TO THE "LOAD PLANNING GUIDANCE" ON PAGE 3 FOR ADDITIONAL GUIDANCE.
3. THE LOWER ANTI-SWAY BRACES, SPECIFIED AS PIECES MARKED ① ON PAGE 10, ARE DESIGNED FOR USE WITHIN LOADS THAT HAVE THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE TRAILER SIDEWALLS.
4. EACH TWO-HIGH STACK OF PALLET UNITS THAT IS TO BE POSITIONED ADJACENT TO A ONE-HIGH PALLET UNIT MUST BE BUNDLED AS SHOWN IN THE "SPECIAL STACK BUNDLING" DETAIL ON PAGE 14 PRIOR TO LOADING INTO A TRAILER.

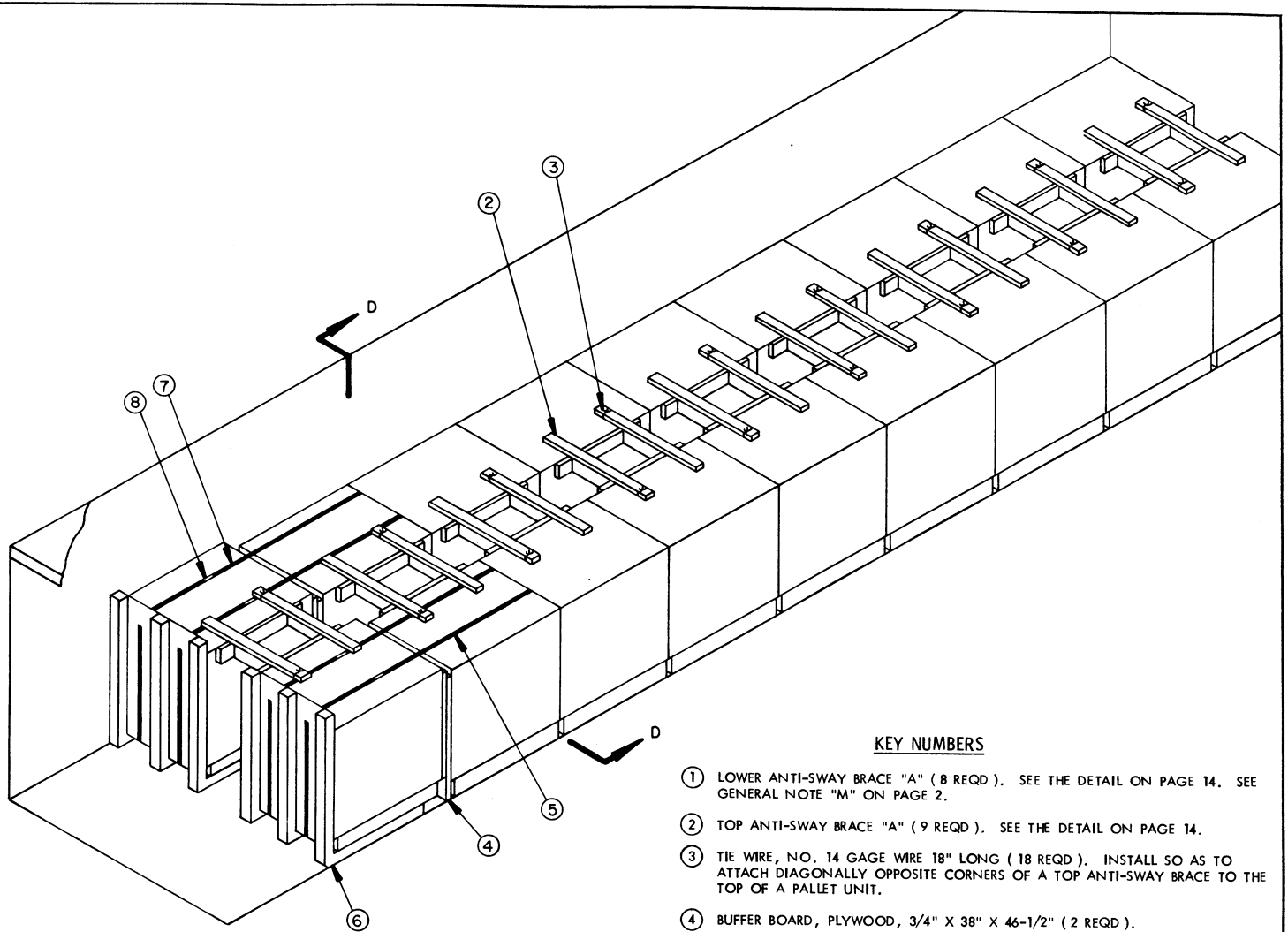


PALLA-GARD UNIT C

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	126	84
2" X 6"	92	92
NAILS	NO. REQD	POUNDS
10d (3")	180	3
16d (3-1/2")	208	4-3/4
PLYWOOD, 3/4" THICK---	221 SQ FT REQD	457 LBS
STEEL STRAPPING, 1-1/4" -----	544' REQD	78 LBS
SEAL FOR 1-1/4" STRAPPING -----	24 REQD	1-1/4 LBS
WIRE, NO. 14 GAGE -----	24' REQD	1/2 LB
PALLA-GARD DEVICE -----	2 REQD	620 LBS

LOAD AS SHOWN

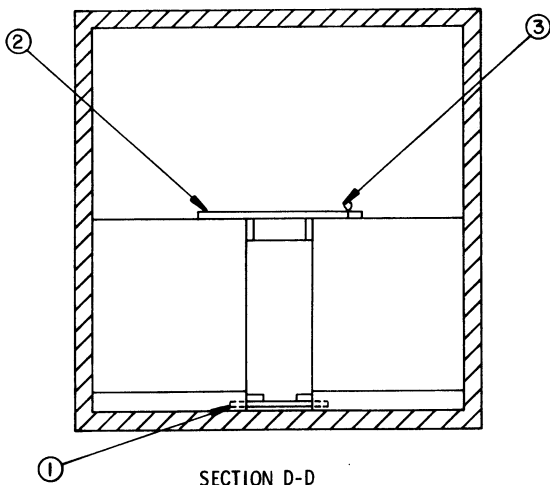
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT NO. 3	24	40,728 LBS
DUNNAGE		1,517 LBS
TOTAL WEIGHT		42,245 LBS



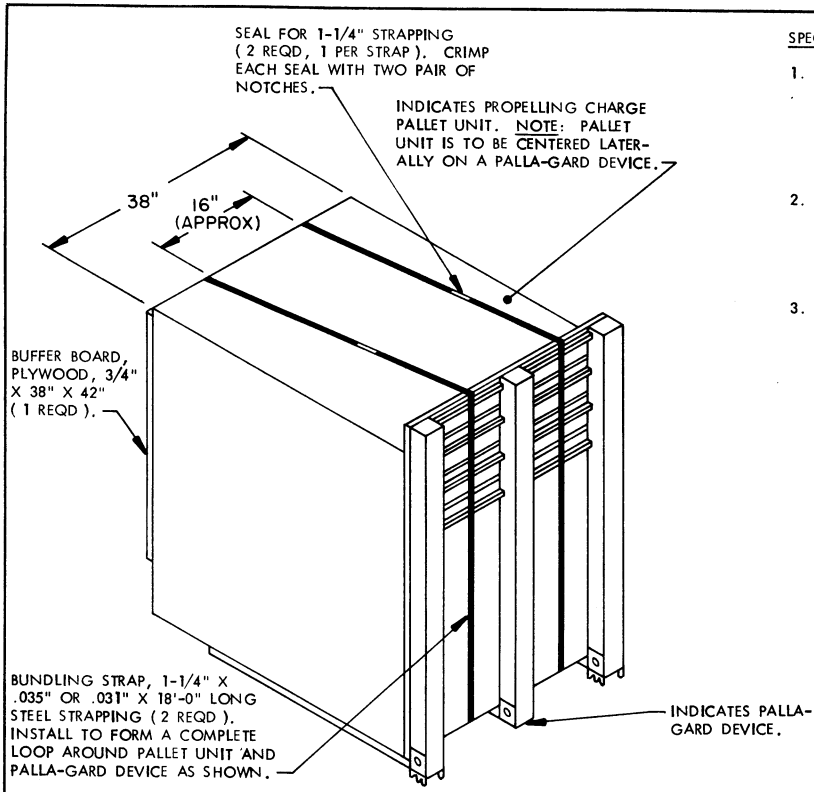
ISOMETRIC VIEW

KEY NUMBERS

- ① LOWER ANTI-SWAY BRACE "A" (8 REQD). SEE THE DETAIL ON PAGE 14. SEE GENERAL NOTE "M" ON PAGE 2.
- ② TOP ANTI-SWAY BRACE "A" (9 REQD). SEE THE DETAIL ON PAGE 14.
- ③ TIE WIRE, NO. 14 GAGE WIRE 18" LONG (18 REQD). INSTALL SO AS TO ATTACH DIAGONALLY OPPOSITE CORNERS OF A TOP ANTI-SWAY BRACE TO THE TOP OF A PALLET UNIT.
- ④ BUFFER BOARD, PLYWOOD, 3/4" X 38" X 46-1/2" (2 REQD).
- ⑤ BUFFER BOARD STRAP, 1-1/4" X .035" OR .031" X 17'-0" LONG STEEL STRAPPING (4 REQD, 2 PER UNIT). INSTALL SO AS TO ATTACH THE BUFFER BOARDS TO THE ENDS OF A PALLET UNIT.
- ⑥ PALLA-GARD DEVICE (2 REQD). SEE THE "PALLA-GARD UNIT D" DETAIL ON PAGE 13.
- ⑦ HORIZONTAL BUNDLING STRAP, 1-1/4" X .035" OR .031" X 22'-0" LONG STEEL STRAPPING (4 REQD, 2 PER PALLA-GARD DEVICE). INSTALL SO AS TO ENCIRCLE A PALLA-GARD UNIT AND ADJACENT FORWARD PALLET UNIT.
- ⑧ SEAL FOR 1-1/4" STRAPPING (8 REQD, ONE PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "P" ON PAGE 2.



SECTION D-D



PALLA-GARD UNIT D

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; HOWEVER, A LONGITUDINAL VOID OF AT LEAST 12" MUST REMAIN TO THE REAR OF THE LOAD SUBSEQUENT TO THE PALLA-GARD UNIT PLACEMENT. THIS 12" VOID ALLOWS FOR PROPER ENGAGEMENT OF THE PALLA-GARD RESTRAINT DEVICES WITH THE TRAILER FLOOR WHEN THE LOAD UNDERGOES IMPACT DURING SHIPMENT.
2. THE PALLETIZED UNITS SHOWN IN THE TYPICAL LOAD ON PAGE 12 ARE BASED ON PALLET UNIT NO. 4 SHOWN ON PAGE 5. THE DEPICTED LOADING PROCEDURES ARE ALSO APPLICABLE FOR PALLETIZED UNITS OF OTHER DIMENSIONS. REFER TO THE "LOAD PLANNING GUIDANCE" ON PAGE 3 FOR ADDITIONAL GUIDANCE.
3. THE LOWER ANTI-SWAY BRACES, SPECIFIED AS PIECES MARKED ① ON PAGE 12, ARE DESIGNED FOR USE WITHIN LOADS THAT HAVE THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE TRAILER SIDEWALLS.

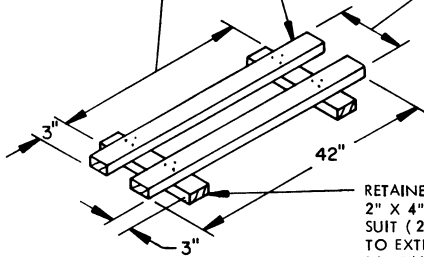
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	124	83
2" X 6"	78	78
NAILS	NO. REQD	POUNDS
10d (3")	96	1/2
16d (3-1/2")	234	5-1/4
PLYWOOD, 3/4" THICK---50 SQ FT REQD-----		104 LBS
STEEL STRAPPING, 1-1/4"-----88' REQD-----		13 LBS
SEAL FOR 1-1/4" STRAPPING --- 8 REQD-----		1/2 LB
WIRE, NO. 14 GAGE-----27' REQD-----		1/2 LB
PALLA-GARD DEVICE-----2 REQD-----		620 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT NO. 4	18	37,800 LBS
DUNNAGE		1,066 LBS
TOTAL WEIGHT		38,866 LBS

BUFFER PIECE, 2" X 4" BY THE DISTANCE BETWEEN OUTSIDE PALLET POSTS PLUS 6" (2 REQD). NAIL TO THE RETAINER PIECES W/3-10d NAILS AT EACH JOINT.

FABRICATE TO FIT AGAINST THE PALLET POSTS (REF: 30" ON 35" X 45-1/2" PALLET AND 33" ON 40" X 48" PALLET).

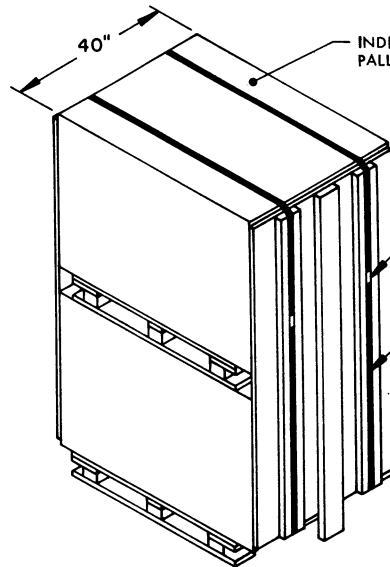


DISTANCE BETWEEN LATERALLY ADJACENT PALLET UNITS.

RETAINER PIECE, 2" X 4" X LENGTH TO SUIT (2 REQD). POSITION TO EXTEND UNDER THE LATERALLY ADJACENT PALLETS AND AGAINST THE PALLET POSTS.

LOWER ANTI-SWAY BRACE A

THIS ASSEMBLY MUST BE FABRICATED IN PLACE BETWEEN THE PALLET UNITS.



INDICATES PROPELLING CHARGE PALLET UNIT (2 REQD).

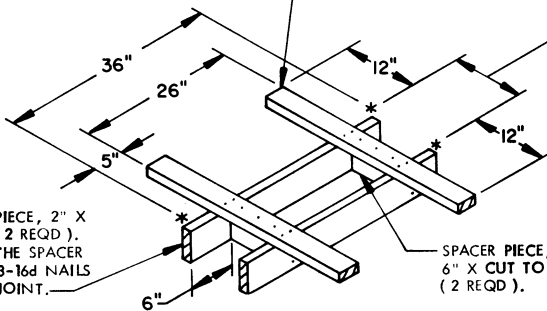
STACK BUNDLING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 15.

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

BUNDLING STRAP, 1-1/4" X .035" OR .031" X 26'-0" LONG STEEL STRAPPING (2 REQD).

SPECIAL BUNDLED STACK A

SUPPORT PIECE, 2" X 4" X LENGTH TO SUIT (2 REQD). NAIL TO THE BEARING PIECES W/2-16d NAILS AT EACH JOINT AND TO THE SPACER PIECE W/3-16d NAILS.

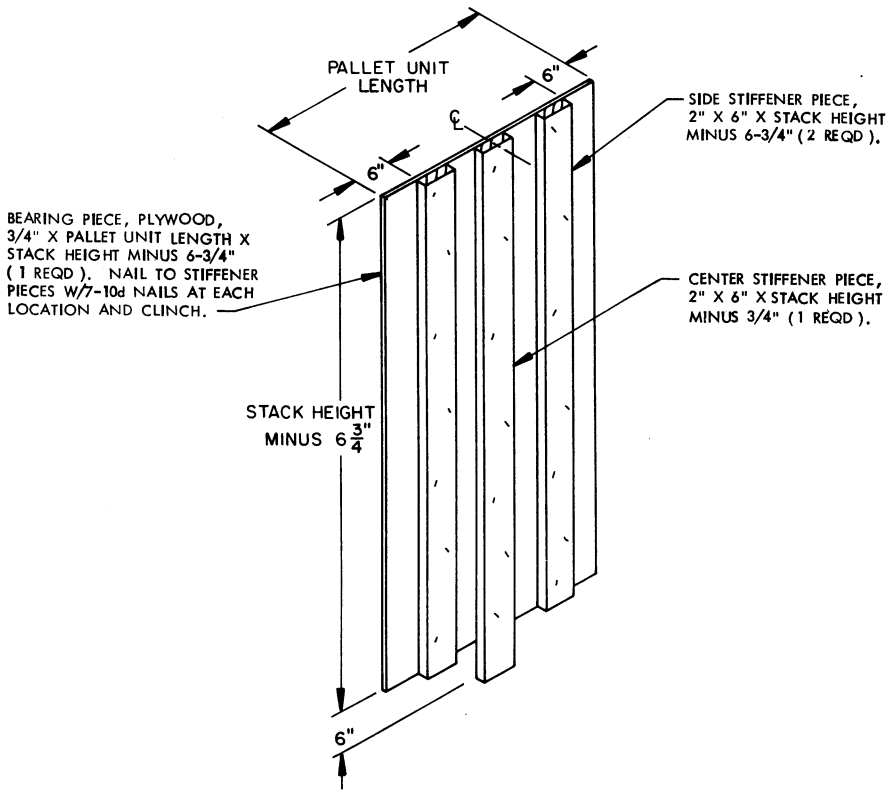


DISTANCE BETWEEN LATERALLY ADJACENT PALLET UNITS.

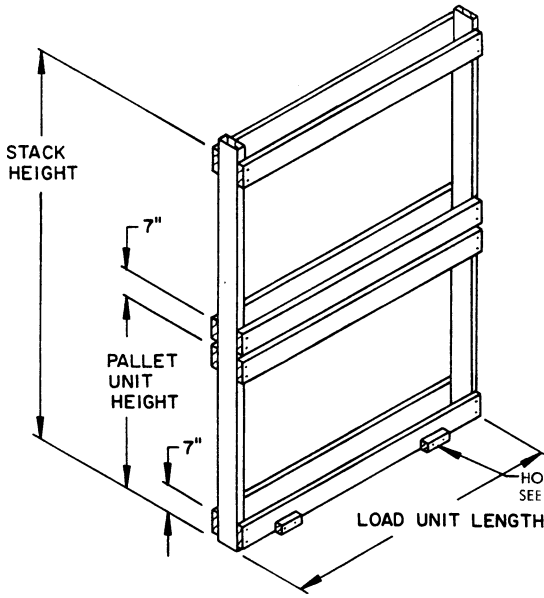
BEARING PIECE, 2" X 6" X 36" (2 REQD). NAIL TO THE SPACER PIECES W/3-16d NAILS AT EACH JOINT.

SPACER PIECE, 2" X 6" X CUT TO FIT (2 REQD).

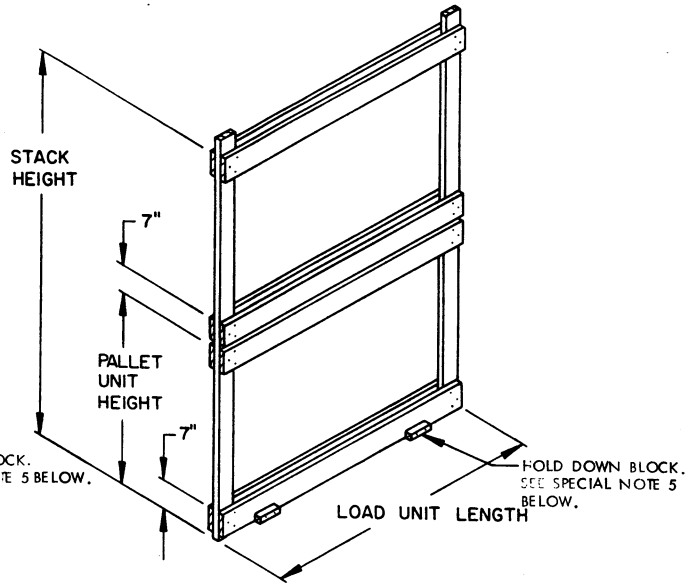
TOP ANTI-SWAY BRACE A



STACK BUNDLING ASSEMBLY



TYPE A ANTI-SWAY ASSEMBLY



TYPE B ANTI-SWAY ASSEMBLY

SPECIAL NOTES:

1. THE ANTI-SWAY ASSEMBLIES SHOWN ON THIS PAGE ARE FOR USE WHEN THE VOID BETWEEN LATERALLY ADJACENT PALLET UNITS IS LESS THAN EIGHT INCHES (8"). FOR A WIDER VOID SPACE, THE ANTI-SWAY BRACES DEPICTED ON PAGE 14 WILL BE USED. FOR VOID SPACES TWO INCHES (2") OR LESS, NO ANTI-SWAY ASSEMBLY IS REQUIRED.
2. THE SIZES AND PLACEMENT OF THE HORIZONTAL AND VERTICAL PIECES SHOWN IN THE ABOVE VIEWS AND THE CHART AT THE LEFT ARE TYPICAL. THE HORIZONTAL AND VERTICAL PIECES MAY BE ADJUSTED AS NECESSARY TO BEAR AGAINST THE STRONG POINTS OF THE PALLET UNIT BEING SHIPPED.
3. NAIL SIZES USED FOR FABRICATION OF THE ABOVE ASSEMBLIES WILL BE 10d NAILS FOR 2" THICK LUMBER AND 6d NAILS FOR 1" THICK LUMBER. TWO NAILS AT EACH JOINT WILL BE USED IN FABRICATION OF A TYPE A ANTI-SWAY ASSEMBLY AND THREE NAILS AT EACH JOINT WILL BE USED FOR A TYPE B ANTI-SWAY ASSEMBLY.
4. THE ANTI-SWAY BRACES SHOWN ON THIS PAGE ARE BASED ON A 2-LAYER LOAD. IF USING THE ANTI-SWAY BRACES IN A 1-LAYER LOAD, THE HEIGHT OF THE ASSEMBLY WILL BE APPROPRIATELY REDUCED.
5. HOLD-DOWN BLOCKS, 2" X 2" BY LENGTH TO SUIT (2 REQD PER ASSEMBLY) SHOULD BE NAILED TO LOWER LOAD BEARING PIECE OF AN ANTI-SWAY ASSEMBLY. THEY SHALL BE POSITIONED SO AS TO FIT INTO THE FORKLIFT OPENING OF A PALLET. IN ADDITION, THE ANTI-SWAY ASSEMBLY MUST BE POSITIONED AGAINST A LOAD UNIT, WITH THE HOLD-DOWN BLOCKS IN THE FORKLIFT OPENINGS AND WIRE TIED TO THE LOAD UNIT PRIOR TO FINAL POSITIONING OF THE LOAD UNIT IN THE TRAILER.

CHART A

VOID WIDTH	ANTI-SWAY TYPE	SIZE OF VERTICAL PIECES	SIZE OF HORIZONTAL PIECES
7"	A	2" X 6"	2" X 6"
6"	A	2" X 4"	1-1" X 6" & 1-2" X 6"
5-1/2"	A	2" X 4"	1" X 6"
5"	B	2" X 4"	2" X 6"
4"	B	2" X 4"	1-1" X 6" & 1-2" X 6"
3"	B	1" X 4"	1" X 6"
2" OR LESS	NO ANTI-SWAY ASSEMBLY REQUIRED		