

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 MEDIUM CALIBER PROJECTILES AND PROJECTILE METAL PARTS, FROM 2.75 INCH THRU 165MM, WHEN PALLETIZED. SUBSEQUENT REFERENCE TO UNIT HEREIN MEANS THE PALLET UNIT WITH CONTENTS.
- C. FOR DETAILS OF THE BOXED-TYPE PALLET UNIT, SEE ORDNANCE CORPS DRAWING NO. F-7548604 AND THE PICTORIAL VIEW ON PAGE 3.
- D. FOR DETAILS OF THE "OPEN-TYPE" PALLET UNIT, SEE PICATINNY ARSENAL DRAWING NO. F-8837835 AND THE PICTORIAL VIEW ON PAGE 3.
- E. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN 40'-6" LONG CONVENTIONAL TYPE BOX CARS, FOR SHIPMENTS IN 50'-6" LONG CUSHIONED TYPE BOX CARS, AND FOR SHIPMENTS IN CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. FOR SPECIFIC GUIDANCE PERTAINING TO OUTLOADING IN 40'-6" LONG CONVENTIONAL TYPE BOX CARS AND IN 50'-6" LONG CUSHIONED TYPE BOX CARS, REFER TO THE GENERAL NOTES ON PAGE 5. REFER TO PAGE 41 FOR SPECIFIC GUIDANCE RELATIVE TO OUTLOADING IN LOAD DIVIDER CARS. SEE GENERAL NOTE "M" AT RIGHT.
- F. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF PALLETIZED MEDIUM CALIBER PROJECTILES IS THE RESPONSIBILITY OF THE ORIGINATING CARRIER AND THE SHIPPER. ONLY CARS WHICH HAVE "SOUND" FLOORS AND ARE IN OTHERWISE PROPER CONDITION, IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE REGULATORY DOCUMENTS, WILL BE SELECTED. BOX CARS MUST BE SELECTED AND LOADED IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH BY AAR (ASSOCIATION OF AMERICAN RAILROADS) CIRCULAR 42-F OF THE "GENERAL RULES COVERING LOADING OF CARLOAD SHIPMENTS OF COMMODITIES IN CLOSED CARS".
- G. BOX CARS EQUIPPED WITH VARIOUS WIDTH "THRU" CONVENTIONAL SLIDING DOORS HAVE BEEN SHOWN. HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CARS EQUIPPED WITH STAGGERED SLIDING DOORS AND FOR CARS EQUIPPED WITH "THRU" OR STAGGERED PLUG TYPE DOORS OF VARIOUS WIDTHS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF CAR SEALS, A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO, AND IN CONJUNCTION WITH, EACH CAR SEAL USED TO SEAL THE CAR. THE WIRE WILL BE THREADED THRU THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- H. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 6" MATERIAL IS ACTUALLY 3/4" THICK BY 5-1/2" OR 5-5/8" WIDE AND 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE OR 1-5/8" THICK BY 3-5/8" WIDE.
- J. NOTICE: 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 OR SIDEWALL 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 OR SIDEWALL 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.
- K. PORTIONS OF THE BOX CARS, SUCH AS SIDEWALLS, END WALLS, AND ROOFS, AND PORTIONS OF THE BLOCKING AND BRACING COMPONENTS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- L. WHEN ANY STRAP IS SEALED AT AN END-OVER-END LAP JOINT, TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL MUST BE USED TO SEAL THE JOINT. CAUTION: EXERCISE CARE DURING TENSIONING TO PREVENT DAMAGE TO THE PALLET UNITS.
- M. ALL THE LOADS SHOWN HEREIN ARE TYPICAL. BECAUSE OF THIS FACT IT IS MOST LIKELY THAT THE ACTUAL QUANTITY THAT IS TO BE SHIPPED WILL NOT BE DEPICTED IN ANY OF THE LOADING PROCEDURES HEREIN. HOWEVER, THE SPECIAL NOTES SECTION IN CONJUNCTION WITH THE CHART (S) IMMEDIATELY ADJACENT TO EACH OUTLOADING PROCEDURE SHOULD PROVIDE SUFFICIENT GUIDANCE THAT ANY DESIRED QUANTITY THAT IS TO BE SHIPPED CAN BE ATTAINED. THE INDEXES ON PAGE 4 MAKE REFERENCE TO PAGES FOR FULL LOADS OF AN ITEM. NOTE THAT THE FULL-LOAD PROCEDURES FOR SOME OF THE HEAVIER PALLET UNITS CAN BE APPLIED AS LCL PROCEDURES FOR PALLET UNITS WHICH ARE LIGHTER. THE SPECIAL NOTES SECTION FOR EACH OUTLOADING PROCEDURE PROVIDES FURTHER GUIDANCE.
- N. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOX CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAIL CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR. SEE GENERAL NOTE "K" ON PAGE 5 FOR GUIDANCE.
- O. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLET UNITS OF AMMUNITION ITEMS, 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.
- P. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "GENERAL NOTES" FOR EACH CAR TYPE AND TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

(CONTINUED AT RIGHT)

REVISIONS

REVISION NO. 1, DATED DECEMBER 1978, CONSISTS OF:

1. EXPANDING UPON THE PROCEDURES FOR 40'-6" LONG BOX CARS.
2. ADDING PROCEDURES FOR 50'-6" LONG CUSHIONED BOX CARS.
3. ADDING PROCEDURES FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
4. EXPANDING UPON THE PROCEDURES FOR LCL SHIPMENTS.
5. MAKING CHANGES AS NECESSARY TO UPDATE DRAWING FORMAT.

MATERIAL SPECIFICATIONS

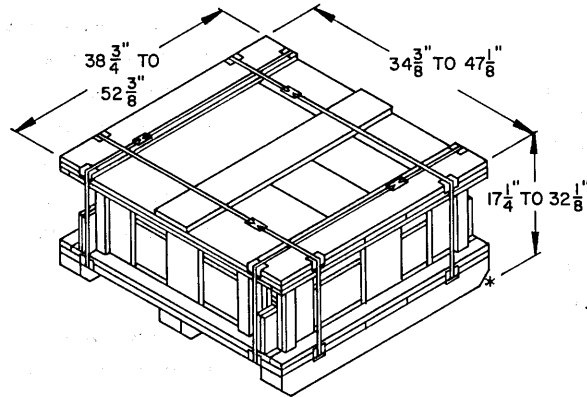
LUMBER ----- : SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.

NAILS ----- : COMMON, FED SPEC FF-N-105.

STRAPPING, STEEL --- : CLASS I, TYPE I OR II, HEAVY DUTY, FINISH A, B. (GRADE 2), OR C, FED SPEC QQ-5-781.

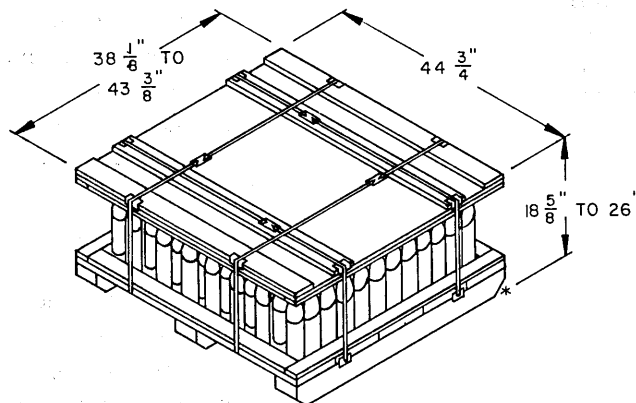
SEAL, STRAP ----- : TYPE D, STYLE I, II, OR III, CLASS H, FED SPEC QQ-5-781.

STRAP STAPLE ----- : COMMERCIAL GRADE.



TYPICAL BOXED-TYPE PALLET UNIT

THIS PALLET IS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604. THE PALLET IS DESIGNED FOR SHIPMENT OF THE DESIGNATED 2.75 INCH, 75MM, 76MM, 81MM, 90MM, 105MM, 106MM, AND 120MM AMMUNITION ITEMS. THE PALLET UNITS RANGE IN WEIGHT FROM 473 POUNDS TO 3,385 (EST) POUNDS. OUTLOADING PROCEDURES FOR BOXED-TYPE PALLET UNITS IN 40'-6" LONG CONVENTIONAL BOX CARS ARE SHOWN ON PAGES 6 THRU 13. OUTLOADING PROCEDURES FOR BOXED-TYPE PALLET UNITS IN 50'-6" LONG CUSHIONED TYPE BOX CARS ARE SHOWN ON PAGES 14 THRU 19. OUTLOADING PROCEDURES FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS ARE SHOWN ON PAGES 42 AND 43. REFER TO THE "BOXED-TYPE PALLET UNIT INDEX" ON PAGE 4 FOR SPECIFIC LOAD PAGE REFERENCES.



TYPICAL "OPEN-TYPE" PALLET UNIT

THIS PALLET IS DETAILED BY PICATINNY ARSENAL DRAWING NO. F-8837835. THE PALLET IS DESIGNED FOR SHIPMENT OF THE DESIGNATED 2.75 INCH, 75MM, 76MM, 90MM, 105MM, 106MM, 120MM, 152MM, 155MM, AND 165MM AMMUNITION ITEMS. THE PALLET UNITS RANGE IN WEIGHT FROM 912 POUNDS TO 3,424 (EST) POUNDS. OUTLOADING PROCEDURES FOR "OPEN-TYPE" PALLET UNITS IN CONVENTIONAL 40'-6" LONG BOX CARS ARE SHOWN ON PAGES 6 THRU 9. OUTLOADING PROCEDURES FOR "OPEN-TYPE" PALLET UNITS IN 50'-6" LONG CUSHIONED TYPE BOX CARS ARE SHOWN ON PAGES 14 THRU 17. OUTLOADING PROCEDURES FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS ARE SHOWN ON PAGES 42 AND 43. REFER TO THE "OPEN-TYPE" PALLET UNIT INDEX" ON PAGE 4 FOR SPECIFIC LOAD PAGE REFERENCES.

BOXED-TYPE PALLET UNIT INDEX

IDENTIFICATION			LOAD PAGE	
LINE NO.	CALIBER	DESIGNATION	CAR SIZE	
			40' CAR	50' CAR
1	75MM	AP-T M338A1	8	16
2	75MM	HEP-T150E 29 OR T165E29	8	16
3	75MM	HEP-T151E28	8	16
4	105MM	APERS-T M380	8, 10, 12	16, 18
4	105MM	APERS-T XM603E1	8, 10, 12	16, 18
5	76MM	HVAP-T M93A1	8, 10, 12	16, 18
6	76MM	AP-T M339E1 OR TP-T M340A1E1	8	16
7	76MM	CANNISTER M363	6, 10, 12	14, 18
8	90MM	CANNISTER M377	6	14
9	76MM	HVAP-T T66E3 OR T66E5	8, 10, 12	16, 18
10	76MM	HEAT-T M496	8	16
11	90MM	HVAP-TM332A 1E1 OR HVTP-M333A 1E1	8	16
12	90MM	TP-T M35321	6	14
13	90MM	AP-T M318A1C	6	14
14	90MM	HEAT M431E1	8	16
15	105MM	HEP-T M345 OR M345B1	8	16
16	105MM	HEAT M341	8	16
17	90MM	CANNISTER M336	6	14
18	105MM	HEAT M456A1 OR M456A1E1	8	16
19	106MM	HEP-T M346A1	8	16
20	105MM	APDS-T M392A3	8	16
21	120MM	AP-TM368E1 OR AP-T M359	6	14
22	120MM	HEAT M469	8, 10, 12	16, 18
23	90MM	HEAT M371E1	8	16
24	2.75 IN	WARHEAD HE XM229	6, 10, 12	14, 18
25	105MM	TP-T M459	8	16
26	81MM	WP M375E2	8	16

"OPEN-TYPE" PALLET UNIT INDEX

IDENTIFICATION			LOAD PAGE	
LINE NO.	CALIBER	DESIGNATION	CAR SIZE	
			40' CAR	50' CAR
1	75MM	HE M309 A1	6	14
2	75MM	HEAT-T, M310A1	6	14
3	75MM	WP 311A1	6	14
4	75MM	HE M48	6	14
5	75MM	SMOKE M64	6	14
6	75MM	HEAT M66	6	14
7	75MM	HE M334	8	16
8	2.75 IN	WARHEAD WTU-1/B	6	14
9	76MM	WP-M361	6	14
10	76MM	WP-M312	6	14
11	76MM	HE-M42A1	6	14
12	105MM	TACTICAL CS XM632	6	14
13	2.75 IN	WARHEAD HE M151, PRACTICE XM232	8	16
14	152MM	TP-T XM411E2	8	16
15	90MM	AP-M82	6	14
16	90MM	HE-M71	6	14
17	90MM	WP-M313	6	14
18	90MM	HE-T91	8	16
19	90MM	CHEM-T T92	8	16
20	105MM	WARHEAD, 105MM, XM547	8	16
21	105MM	HE M1	6	14
22	105MM	HEAT M67	6	14
23	105MM	HC, 8E, M64, M84B1	6	14
24	105MM	WP M60	6	14
25	105MM	HEP M393A2, WPXM416	8	16
26	105MM	HE M323	6	14
27	105MM	HEAT M324	6	14
28	105MM	WP M325	6	14
29	105MM	ILLUM, XM314A2E1	6	14
30	105MM	HE M442	6	14
31	106MM	HEAT M344A1	8	16
32	105MM	TP-T XM468	6	14
33	120MM	HE M73	6	14
34	120MM	HE M356	6	14
35	120MM	HE T15E3	6	14
36	120MM	CHEM T16E1	6	14
37	120MM	CHEM T16E3	6	14
38	105MM	HE M444, M444E1	8	16
39	165MM	HEP T237E4 (M123)	8	16
40	152MM	HE XM657E2	8	16
41	155MM	M549 MOTOR BODY ASSY	8	16

GENERAL NOTES

(GENERAL NOTES CONTINUED)

(FOR CONVENTIONAL TYPE AND CUSHIONED TYPE BOX CARS)

- A. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 6 THRU 13 ARE APPLICABLE FOR SHIPMENTS IN ALL-METAL OR WOOD LINED 40'-6" LONG CONVENTIONAL TYPE BOX CARS. THE PROCEDURES ARE APPLICABLE FOR CARS WHICH ARE 8'-6" THRU 9'-6" WIDE (EXCEPT AS NOTED WITHIN THE SPECIAL NOTES FOR A LOAD) AND ALSO FOR CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH. CAUTION: 50'-6" CONVENTIONAL (NON-CUSHIONED) BOX CARS MUST NOT BE USED.
- B. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 14 THRU 19 ARE APPLICABLE FOR SHIPMENTS IN ALL-METAL OR WOOD LINED 50'-6" LONG BY 9'-2" WIDE CUSHIONED TYPE BOX CARS. THE PROCEDURES ARE ALSO APPLICABLE FOR CARS WHICH ARE 8'-6" THRU 9'-6" WIDE (EXCEPT AS NOTED WITHIN THE SPECIAL NOTES FOR A LOAD) AND FOR CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH. CAUTION: 60'-8" AND 80' BOX CARS MUST NOT BE USED.
- C. REFER TO GENERAL NOTE "F" ON PAGE 2 FOR BASIC CAR SELECTION REQUIREMENTS. IN ADDITION, WHEN SELECTING RAIL CARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS. CARS WITH BOWED ENDS CAN BE USED; HOWEVER, IF AN END WALL IS BOWED OUTWARD MORE THAN TWO INCHES (2"), EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END-OF-CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A "SQUARED OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR. SEE THE "BULKHEAD A" AND "BULKHEAD B" DETAILS ON PAGE 29 FOR GUIDANCE.
- D. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. WHEN POSSIBLE TO DO SO, A FULL LOAD SHOULD BE BUILT USING AN OFFSET LOADING PATTERN. FOR INSTANCE, A LOAD CONSISTING OF AN EVEN NUMBER OF LOAD UNITS AND HAVING TWO MORE LOAD UNITS IN ONE END OF THE CAR THAN IN THE OPPOSITE END, OR A LOAD CONSISTING OF AN ODD NUMBER OF LOAD UNITS AND HAVING ONE MORE LOAD UNIT IN ONE END THAN IN THE OTHER IS CONSIDERED TO BE AN OFFSET LOAD. SEE GENERAL NOTE "K".
- E. TO LOAD THE PALLET UNITS THAT EXTEND INTO THE DOORWAY AREA OF THE CAR, IT WILL BE NECESSARY TO HANDLE THE UNITS FROM A SIDE POSITION WITH THE TINES OF A FORKLIFT TRUCK UNDER THE 4 BY 4 SKIDS OF THE PALLET. AFTER A PALLET HAS BEEN LOCATED IN ITS APPROXIMATE SHIPPING POSITION IT WILL BE LOWERED TO REST ON THE FLOOR OF THE CAR OR A FIRST LAYER UNIT ON THE FAR SIDE OF THE CAR AND ON A SHORT 4 BY 4 BLOCK ON THE NEAR SIDE. THE BLOCK WILL FACILITATE WITHDRAWAL OF THE FORKLIFT TINES. THE FORKLIFT TINES WILL THEN BE PLACED UNDER THE EDGE OF THE PALLET COVER ASSEMBLY AND USED TO RAISE THE PALLET UNIT JUST ENOUGH TO ALLOW FOR THE REMOVAL OF THE 4 BY 4 BLOCK. AFTER THE PALLET UNIT HAS BEEN LOWERED, IT WILL BE INCHED INTO ITS SHIPPING POSITION.
- F. WHEN POSITIONING PALLET UNITS IN A CAR THEY ARE TO BE PRESSED TIGHTLY TOGETHER LENGTHWISE SO AS TO ACHIEVE A TIGHT LOAD. TO AID IN ACHIEVING TIGHTNESS LENGTHWISE IN A FULL LOAD, A LOAD-COMPRESSING JACK MAY BE EMPLOYED IN THE AREA OF THE CENTER GATES TO MOVE THE PALLET UNITS INTO THEIR FINAL SHIPPING POSITION. A HYDRAULIC JACK IS RECOMMENDED FOR THIS OPERATION. CAUTION: WHEN USING A JACK TO COMPACT A LOAD, THE JACK MUST BE USED AGAINST STRONG POINTS OF THE PALLET UNITS, SUCH AS THE PALLET BASE OR COVER ASSEMBLY. PADDING, OF 2-INCH (2") THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.
- G. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT SLIGHTLY LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. ONE END OF THE STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE, THEN THE OTHER END WILL BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. THE TOP WILL BE TOENAILED TO THE ADJACENT CENTER GATE, AS SPECIFIED WITHIN THE KEY NUMBERS FOR A LOAD, IN SUCH A MANNER SO THAT AS NEARLY AS PRACTICAL, EQUAL LENGTHS OF A NAIL ARE EMBEDDED IN THE STRUT AND IN THE VERTICAL PIECE OF THE CENTER GATE. SEE THE "BEVEL CUT" DETAIL ON PAGE 38 FOR BEVELING INSTRUCTIONS, AND THE "STRUT INSTALLATION" DETAIL ON THAT PAGE FOR A PICTORIAL VIEW SHOWING THE PROPER POSITIONING OF A BEVELED STRUT FOR INSTALLATION. NOTE THAT THE UPPER CORNER NEEDS TO BE BEVELED ONLY IF THE STRUTS ARE VERY SHORT. IF ONLY ONE END IS BEVEL-CUT, THE BEVELED EDGE WILL BE PLACED IN THE DOWNWARD POSITION SO THAT IT WILL ALLOW THE STRUT END TO SLIDE MORE FREELY DOWN THE FACE OF THE VERTICAL PIECE ON THE ADJACENT CENTER GATE AS THE STRUT IS DRIVEN DOWN INTO ITS FINAL BLOCKING POSITION.
- H. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS TYPICALLY SHOWN BY PIECES MARKED ③ AND ④ ON PAGE 12 AND PIECES MARKED ⑤ AND ⑥ ON PAGE 16. THESE PIECES ARE NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48". THE LENGTH OF THE LOAD-BLOCKING STRUTS SHOULD BE KEPT AS SHORT AS POSSIBLE (APPROX 18" MINIMUM), BUT IN THE EVENT IT IS NECESSARY TO USE STRUTS WHICH ARE 8'-0" OR MORE IN LENGTH, IT WILL BE NECESSARY TO APPLY AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES AND THE CENTER GATES AND/OR BETWEEN ADJACENT STRUT BRACING PIECES. NOTE THAT LOADS SHOULD BE PLANNED SO THAT MORE THAN ONE SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES WILL NOT BE REQUIRED.
- J. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND A NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDEWALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED TO THE NAILING OF THE SIDE BLOCKING AND GATE RETAINER PIECES IN THE FULL LOADS AND TO THE LCL BRACES IN AN LCL LOAD. IF A NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE APPLICABLE KEY NUMBERS. SEE GENERAL NOTE "J" ON PAGE 2.

K. THE LOAD LIMIT OF A CAR MUST NOT BE EXCEEDED. LIKEWISE, THE LOAD IN ONE END OF A CAR MUST NOT EXCEED ONE-HALF OF THE LOAD LIMIT WHICH IS STENCILED ON THE OUTSIDE OF THE CAR. THE CENTER OF GRAVITY (CG) OF A LOAD HAVING AN EQUAL NUMBER OF UNITS IN EACH END OF THE CAR WILL BE AT THE LONGITUDINAL CENTER OF THE CAR AND THEREFORE THE TOTAL WEIGHT OF THE LADING AND DUNNAGE MAY EQUAL BUT MUST NOT EXCEED THE STENCILED LOAD LIMIT. HOWEVER, FOR A LOAD CONSTRUCTED IN AN OFFSET LOADING PATTERN, THE CG WILL BE LOCATED TOWARD THE LONG-LOAD END FROM THE LONGITUDINAL CENTER OF THE CAR SO NATURALLY THE LONG-LOAD END WILL BE THE HEAVIEST. THE TOTAL WEIGHT OF THE LADING AND DUNNAGE MUST THEN BE SOMETHING LESS THAN THE STENCILED LOAD LIMIT, TO DETERMINE THE PORTION OF THE WEIGHT OF THE OFFSET SECTION OF THE LOAD WHICH WILL BE TRANSMITTED TO EACH END OF A CAR, THE FOLLOWING GUIDANCE IS PRESENTED.

1. FOR A SHIPMENT CONSISTING OF AN EVEN NUMBER OF LOAD UNITS LONG LOADED IN AN OFFSET PATTERN, THE LONG PORTION OF A LOAD WILL BE TWO (2) LOAD UNITS LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE JOINT BETWEEN THOSE TWO UNITS. MEASURE THE DISTANCE FROM THE CENTER OF THE CAR LENGTH TO THE JOINT BETWEEN THOSE UNITS. REFER TO THE "WEIGHT DISTRIBUTION" CHART BELOW AND READ UNDER THE PROPER CAR SIZE HEADING AND OPPOSITE THE DIMENSION NEAREST TO THAT MEASURED, THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD (TWO LOAD UNITS IN THIS CASE) WHICH IS ON THE LONG-LOAD END OF THE CAR. MULTIPLY THIS PERCENTAGE FIGURE TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD AND ADD THE PRODUCT TO THE WEIGHT OF THE SHORT-LOAD END OF THE LOAD. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED FOR A SHIPMENT.
2. FOR A SHIPMENT CONSISTING OF AN UNEVEN NUMBER OF LOAD UNITS, THE LONG PORTION OF THE LOAD MAY BE ONE (1) LOAD UNIT LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE CENTER OF THAT LOAD UNIT. IN SOME CASES A SHIPMENT CONSISTING OF AN UNEVEN NUMBER OF LOAD UNITS MAY BE THREE (3) LOAD UNITS LONGER IN ONE END THAN THE OTHER. THE CG OF THE OFFSET PORTION WILL THEN BE AT THE CENTER OF THE SECOND OF THOSE THREE LOAD UNITS. MEASURE THE DISTANCE FROM THE CENTER OF THE CAR LENGTH TO THE CENTER OF THE ONE LOAD UNIT OR THE CENTER OF THE SECOND OF THE THREE, AS APPLICABLE. REFER TO THE "WEIGHT DISTRIBUTION" CHART BELOW AND READ UNDER THE PROPER CAR SIZE HEADING AND OPPOSITE THE DIMENSION NEAREST TO THAT MEASURED, THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD WHICH IS ON THE LONG-LOAD END OF THE CAR. MULTIPLY THIS PERCENTAGE FIGURE TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD AND ADD THE PRODUCT TO THE WEIGHT OF THE SHORT-LOAD END OF THE LOAD. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED FOR A SHIPMENT.

WEIGHT DISTRIBUTION

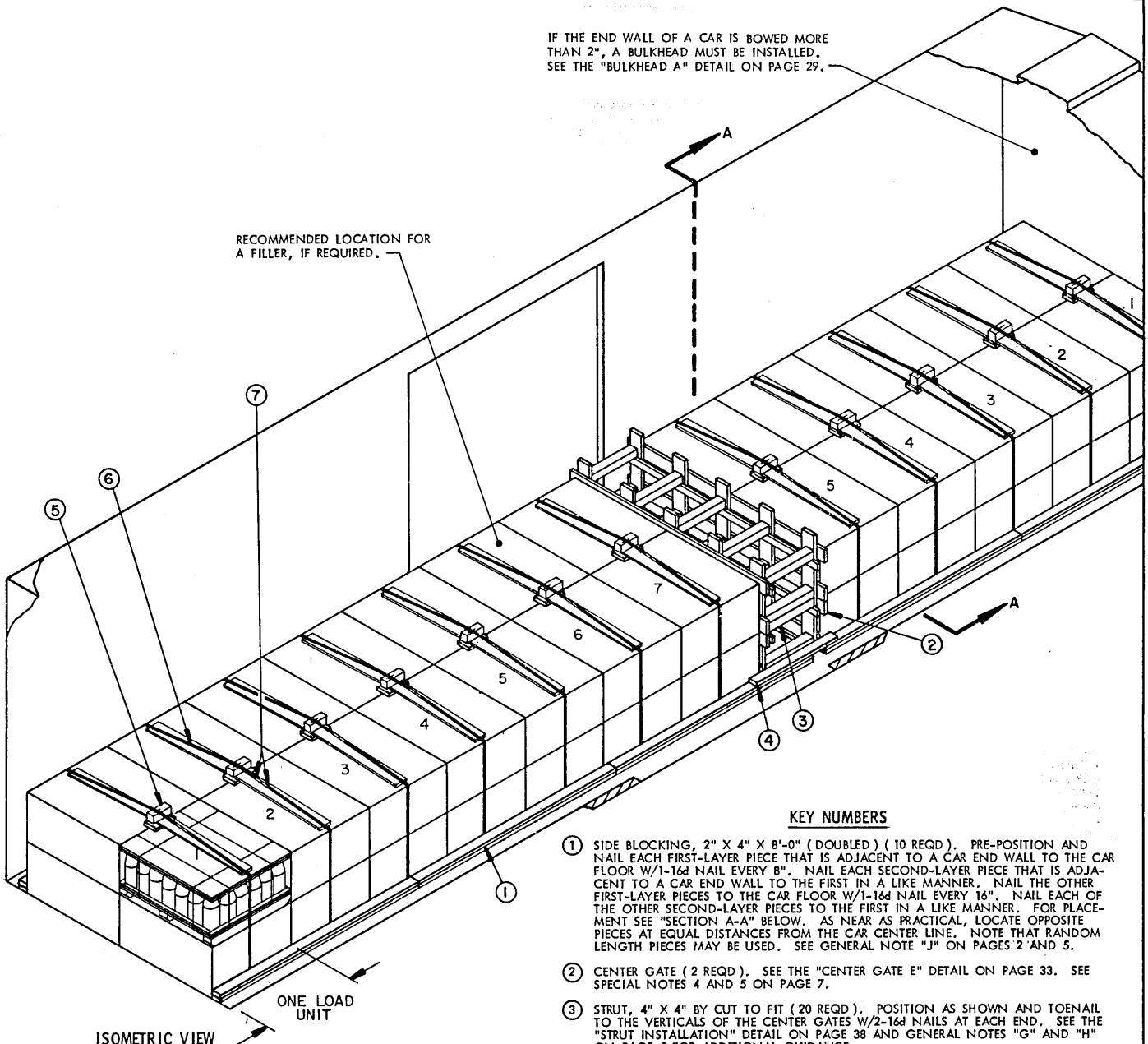
DISTANCE FROM CENTER OF CAR TO CG * OF OFFSET UNITS	PERCENT OF WEIGHT OF OFFSET UNITS ON HEAVY END OF CAR	
	40'-6" CAR	50'-6" CAR
6"	51.5	51.2
9"	52.9	51.9
12"	53.2	52.5
15"	54.1	53.1
18"	55.0	53.7
21"	55.8	54.4
24"	56.5	55.0
27"	57.3	55.6
30"	58.0	56.1
33"	58.9	56.8
36"	59.7	57.4
39"	60.5	58.2
42"	61.3	59.0
45"	62.2	59.4
48"	63.0	59.8
54"	64.5	61.0
60"	66.2	62.2

*CENTER OF GRAVITY.

(CONTINUED AT RIGHT)

IF THE END WALL OF A CAR IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 29.

RECOMMENDED LOCATION FOR A FILLER, IF REQUIRED.

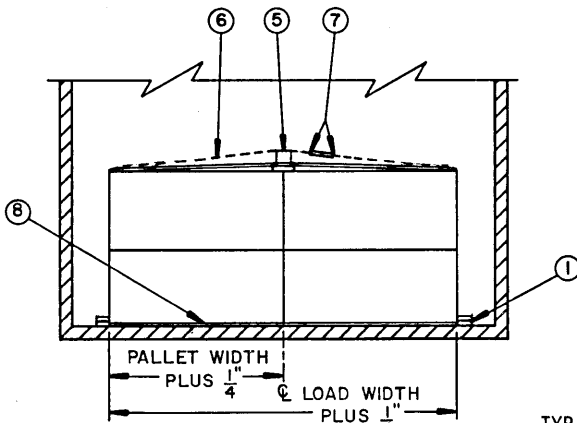


ISOMETRIC VIEW

ONE LOAD UNIT

KEY NUMBERS

- ① SIDE BLOCKING, 2" X 4" X 8'-0" (DOUBLED) (10 REQD). PRE-POSITION AND NAIL EACH FIRST-LAYER PIECE THAT IS ADJACENT TO A CAR END WALL TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL EACH SECOND-LAYER PIECE THAT IS ADJACENT TO A CAR END WALL TO THE FIRST IN A LIKE MANNER. NAIL THE OTHER FIRST-LAYER PIECES TO THE CAR FLOOR W/1-16d NAIL EVERY 16". NAIL EACH OF THE OTHER SECOND-LAYER PIECES TO THE FIRST IN A LIKE MANNER. FOR PLACEMENT SEE "SECTION A-A" BELOW. AS NEAR AS PRACTICAL, LOCATE OPPOSITE PIECES AT EQUAL DISTANCES FROM THE CAR CENTER LINE. NOTE THAT RANDOM LENGTH PIECES MAY BE USED. SEE GENERAL NOTE "J" ON PAGES 2 AND 5.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE E" DETAIL ON PAGE 33. SEE SPECIAL NOTES 4 AND 5 ON PAGE 7.
- ③ STRUT, 4" X 4" BY CUT TO FIT (20 REQD). POSITION AS SHOWN AND TOENAIL TO THE VERTICALS OF THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 38 AND GENERAL NOTES "G" AND "H" ON PAGE 5 FOR ADDITIONAL GUIDANCE.
- ④ GATE RETAINER, 2" X 4" BY LENGTH OF CENTER AREA VOID PLUS 12" (REF 48") (2 REQD). NAIL TO PIECES MARKED ① W/3-10d NAILS AT EACH END.
- ⑤ STRAP PURCHASE BLOCK (12 REQD). SEE THE DETAIL ON PAGE 38.
- ⑥ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (12 REQD). PRE-POSITION PRIOR TO LOADING A STACK SO THAT THE STRAP WILL ENIRCLE THE STACK AS SHOWN WHEN IT IS TENSIONED AND SEALED. SEAL EACH STRAP JOINT W/2-SEALS PER STRAP. STAPLE TO PIECE MARKED ⑤ W/1 STAPLE. SEE PIECE MARKED ⑥.
- ⑦ SEAL FOR 1-1/4" STEEL STRAPPING (24 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- ⑧ TEMPERED HARDBOARD STRIP, 1/8" THICK BY LOAD WIDTH IN LENGTH (4 REQD AT 12" WIDE, 10 REQD AT 24" WIDE). PRE-POSITION AS SHOWN BY THE "PREPARATION OF CAR FLOOR 1A" DETAIL ON PAGE 7. NAIL THE 12" WIDE STRIPS TO THE CAR FLOOR W/8-4d NAILS. NAIL THE 24" WIDE STRIPS TO THE CAR FLOOR W/12-4d NAILS. SEE SPECIAL NOTE 10 ON PAGE 7.



SECTION A-A

TYPICAL 48-UNIT FIXED LOAD (2-WIDE BY 2-HIGH) OF "OPEN-TYPE" OR BOXED-TYPE PALLET UNITS IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR.

LOAD CAPACITY CHART ("OPEN-TYPE")

LINE NO.	CALIBER	DESIGNATION	UNITS PER CAR	ESTIMATED LOAD WEIGHT FILLED	CENTER GATE	EMPTY LOAD WEIGHT
8	2.75 IN	WARHEAD WTU-1/B	48	109,056	E	90,240
1	75 MM	HE M309A1	48	107,280	E	92,688
2	75 MM	HEAT-T, M310A1	48	103,440	E	92,688
3	75 MM	WP311A1	48	102,192	E	98,688
4	75 MM	HE M48	48	108,720	E	94,128
5	75 MM	SMOKE M64	48	103,248	E	100,320
6	75 MM	HEAT M66	48	104,928	E	94,128
9	76 MM	WP-M361	48	92,880	E	89,184
10	76 MM	WP-M312	48	92,304	E	83,520
11	76 MM	HE M42A1	48	92,880	E	83,184
15	90 MM	AP M82	24	71,208	C	69,312
16	90 MM	HE M71	44	119,988	F	105,204
17	90 MM	WP M313	48	115,152	F	111,360
12	105 MM	TACTICAL CS XM632	24	78,336	F	77,400
21	105 MM	HE M1	44	126,764	F	106,700
22	105 MM	HEAT M67	48	125,232	F	111,600
23	105 MM	HC, BE, M64, M84B1	48	108,912	F	106,800
24	105 MM	WP M60	48	121,440	F	118,800
26	105 MM	HE M323	44	122,276	F	104,500
27	105 MM	HEAT M324	48	100,368	F	86,160
28	105 MM	WP M325	44	117,172	F	107,140
29	105 MM	ILLUM, XM314A2E1	24	82,176	C	77,400
30	105 MM	HE M442	48	101,904	F	90,960
32	105 MM	TP-T XM468	48	124,464	F	113,520
33	120 MM	HE M73	40	117,400	F	106,440
34	120 MM	HE M356	48	123,984	F	102,816
35	120 MM	HE T15E3	44	124,784	F	112,112
36	120 MM	CHEM T16E1	48	109,104	F	107,232
37	120 MM	CHEM T16E3	44	121,352	F	109,296

SPECIAL NOTES:

- A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH OR OF OTHER WIDTHS, AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN ALSO BE USED.
- THE TYPICAL FIXED LOAD SHOWN IS APPLICABLE FOR THE "OPEN-TYPE" PALLET UNITS AS DETAILED BY PICATINNY ARSENAL DRAWING NO. F-8837835, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART ("OPEN-TYPE")" AT LEFT. THE LOAD IS ALSO APPLICABLE FOR THE BOXED-TYPE PALLET UNITS AS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART (BOXED-TYPE)" AT LEFT. THE PROCEDURES ARE APPLICABLE FOR LOADS WHICH CONSIST OF EITHER ONE OR TWO LAYERS. SEE SPECIAL NOTE 5.
- A 48-UNIT LOAD OF "OPEN-TYPE" PALLET UNITS MEASURING 38-1/2" LONG BY 44-3/4" WIDE BY 22-1/2" HIGH AND WEIGHING 2,593 POUNDS IS SHOWN AS TYPICAL. THE ACTUAL QUANTITY THAT CAN BE SHIPPED WILL DEPEND UPON THE WEIGHT AND/OR SIZE OF THE ITEM BEING LOADED AND THE LOAD LIMIT OF THE CAR BEING USED. SEE THE "LOAD CAPACITY CHARTS" AT LEFT FOR GUIDANCE.
- THE "CENTER GATES E" AND TWENTY (20) STRUTS SHOWN IN THE LOAD ON PAGE 6 ARE NOT APPLICABLE FOR ALL LOADS. THE PROPER CENTER GATE FOR USE WITH AN ITEM IS SPECIFIED WITHIN THE CHARTS AT LEFT; THE QUANTITY OF STRUTS TO BE USED WITH THOSE GATES IS SPECIFIED UNDER THE GATE DETAIL.
- "OPEN-TYPE" LINE ITEMS NO. 12, 15, AND 29 ARE TOO HEAVY FOR A TWO-LAYER LOAD AND ARE THEREFORE LIMITED TO ONE HIGH. THE DEPICTED PROCEDURES ARE ADAPTABLE FOR USE WITH ONE-LAYER LOADS. THE STRAP PURCHASE BLOCK AND BUNDLING STRAP, PIECES MARKED (5) AND (6) RESPECTIVELY, WILL BE INSTALLED FOR EACH FIRST-LAYER LOAD UNIT. A "CENTER GATE C", AS DETAILED ON PAGE 32, WILL BE SUBSTITUTED FOR EACH "CENTER GATE E", AND TEN (10) STRUTS, PIECES MARKED (3), WILL BE OMITTED.
- "OPEN-TYPE" LINE ITEMS NO. 16, 21, 26, 28, 33, 35, AND 37 ARE ONLY LOADED 10 OR 11 (INSTEAD OF 12) LOAD UNITS LONG IN ORDER FOR THE LOAD WEIGHT TO FALL WITHIN THE NORMAL LOAD LIMIT RANGE FOR A CAR; OTHER ITEMS MAY ALSO HAVE TO BE SHIPPED LESS THAN TWELVE (12) LONG IF THE LOAD LIMIT OF THE CAR BEING LOADED IS NOT GREAT ENOUGH. STRUT BRACING MUST BE APPLIED WHEN SHIPPING THESE SHORTER-LENGTH LOADS. SEE GENERAL NOTE "H" ON PAGE 5.
- THESE LOADING PROCEDURES ON PAGES 6 AND 7 ARE RESTRICTED TO LOADS OF EITHER ONE (1) OR TWO (2) LAYERS; A LOAD WILL NOT BE INCREASED BY ADDING PALLET UNITS TO FORM A PARTIAL OR FULL THIRD LAYER.
- THE DEPICTED LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A TWO-LAYER LOAD CAN BE REDUCED BY A MULTIPLE OF FOUR (4) UNITS OR A ONE-LAYER LOAD CAN BE REDUCED BY A MULTIPLE OF TWO (2) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. TWO (2) UNITS CAN BE OMITTED FROM THE TOP LAYER BY UTILIZING THE STRUTTED-GATE METHOD SHOWN ON PAGE 25, OR ONE OR MORE UNITS CAN BE OMITTED BY INSTALLING A FILLER, AS DETAILED ON PAGE 40. IF THE DESIRED QUANTITY CANNOT BE ATTAINED BY OMITTING THE ENTIRE TOP LAYER (APPLICABLE ONLY FOR THE TWO-LAYER LOADS), UNITS CAN BE RETAINED IN BOTH ENDS OF THE CAR WITH KNEE BRACES AS SHOWN ON PAGES 26 AND 27, OR UNITS CAN BE RETAINED IN ONE OR BOTH ENDS OF THE CAR WITH K-BRACES AS SHOWN ON PAGE 20, PROVIDING THE CAR HAS NAILABLE SIDEWALLS.
- THE DEPICTED TWO-LAYER LOADING PROCEDURES AND/OR THE ONE-LAYER PROCEDURES AS PROVIDED FOR IN SPECIAL NOTE 5 CAN BE APPLIED FOR THE SHIPMENT OF A LCL LOAD FOR THOSE ITEMS LISTED ON PAGE 9, A FULL CAR LOAD OF WHICH WOULD CONSIST OF THREE OR MORE LAYERS.
- PALLET UNITS WILL SHIFT LONGITUDINALLY DURING NORMAL TRANSPORTATION OF A LOAD. IN ORDER TO HELP PREVENT THE BUNDLING STRAPS, PIECES MARKED (6) FROM BECOMING SNAGGED ON ROUGH PORTIONS OF A CAR FLOOR, THE PALLET UNITS MUST BE PLACED UPON PRE-POSITIONED TEMPERED HARDBOARD STRIPS. TWELVE INCH (12") WIDE STRIPS ARE REQUIRED AT THE CAR END WALLS AND ALSO ADJACENT TO EACH CENTER GATE; 24" WIDE STRIPS ARE TO BE LOCATED SO AS TO BE CENTERED UNDER JOINTS BETWEEN LOAD UNITS. SEE THE "PREPARATION OF CAR FLOOR "A" DETAIL BELOW FOR GUIDANCE. NOTE THAT THE NAILS FOR SECURING THE HARDBOARD STRIPS TO THE CAR FLOOR SHOULD BE LOCATED SO AS NOT TO BE UNDER THE PALLET SKIDS WHEN THE UNITS ARE POSITIONED IN THE CAR.

LOAD CAPACITY CHART (BOXED-TYPE)

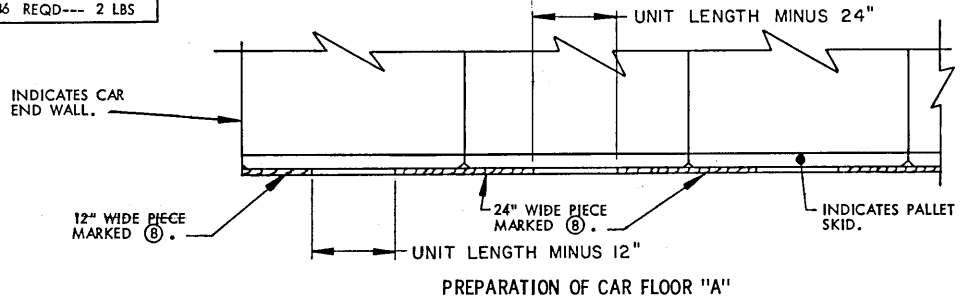
LINE NO.	CALIBER	DESIGNATION	UNITS PER CAR	ESTIMATED LOAD WEIGHT FILLED	CENTER GATE	EMPTY LOAD WEIGHT
24	2.75 IN	WARHEAD HE XM229	40	90,280	E	78,440
7	76 MM	CANNISTER M363	44	108,548	E	69,740
8	90 MM	CANNISTER M377	40	109,600	F	85,760
12	90 MM	TP-T M35321	40	92,880	E	86,920
13	90 MM	AP-T M318A1C	40	92,880	E	86,920
17	90 MM	CANNISTER M336	36	121,860	F	76,212
21	120 MM	AP-T M368E1 OR AP-T M359	36	110,412	E	101,556

BILL OF MATERIAL (TYPICAL)

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	90	45
2" X 2"	15	5
2" X 3"	37	19
2" X 4"	168	112
2" X 6"	112	112
4" X 4"	49	66

NAILS	NO. REQD	POUNDS
4d (1-1/2")	152	3/4
6d (2")	48	1/2
10d (3")	36	3/4
16d (3-1/2")	464	10-1/4

1/8" TEMPERED HARDBOARD	-----	192' SQ. FT.	84 LBS
STEEL STRAPPING, 1-1/4" X .035" OR .031"	---	288' REQD	41 LBS
STAPLE FOR 1-1/4" STRAPPING	-----	24 REQD	LB
SEAL FOR 1-1/4" STRAPPING	-----	36 REQD	2 LBS

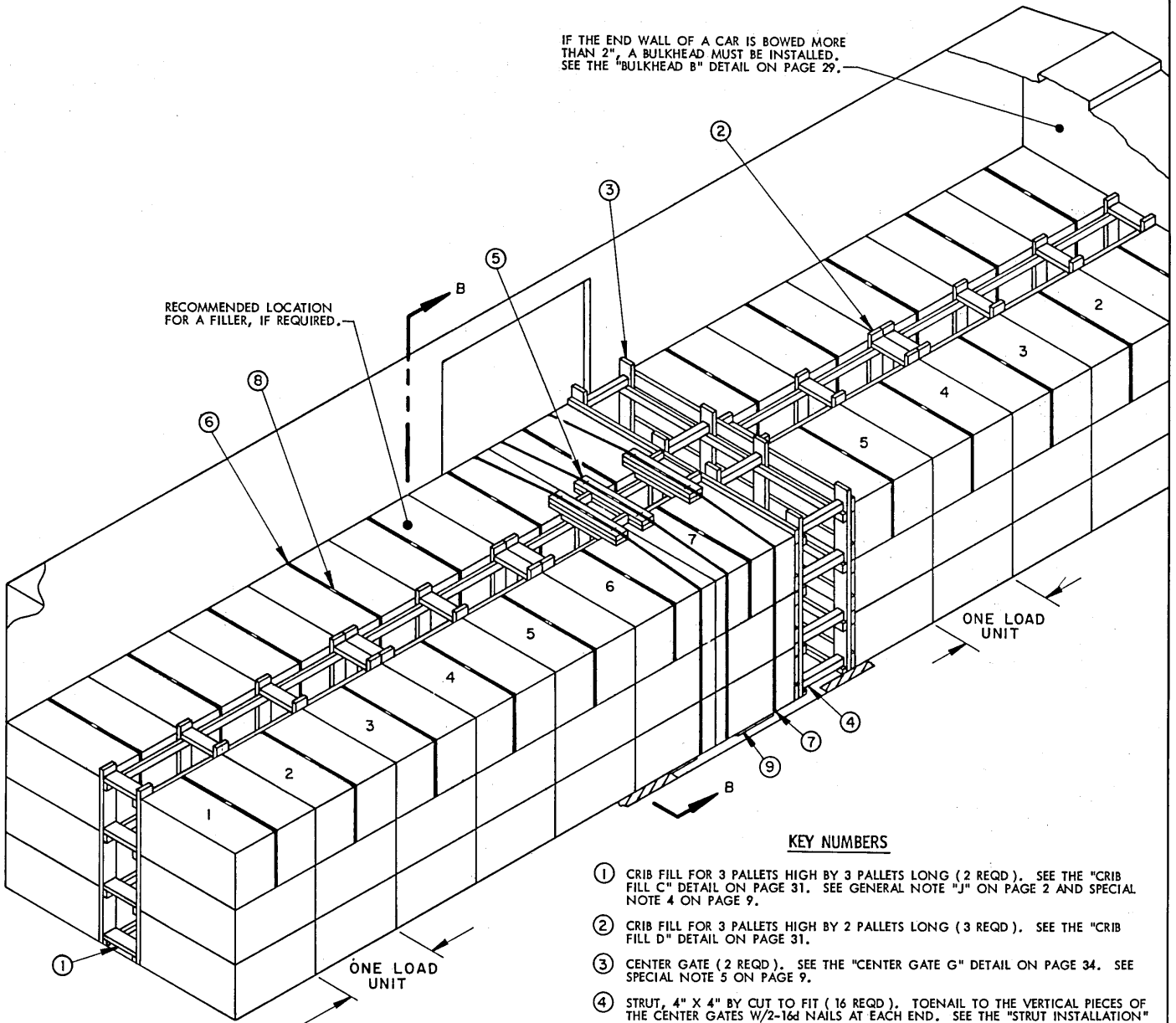


LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	48	124,464 LBS
DUNNAGE		856 LBS
TOTAL WEIGHT		125,320 LBS

TYPICAL 48-UNIT FIXED LOAD (2-WIDE BY 2-HIGH) OF "OPEN-TYPE" OR BOXED-TYPE PALLET UNITS IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR

IF THE END WALL OF A CAR IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD B" DETAIL ON PAGE 29.

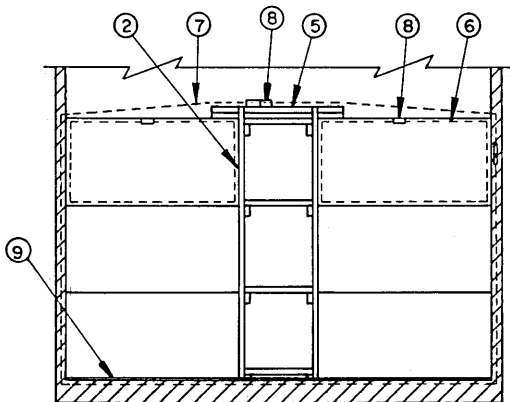


RECOMMENDED LOCATION FOR A FILLER, IF REQUIRED.

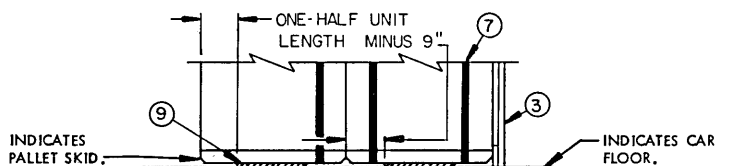
ISOMETRIC VIEW

KEY NUMBERS

- ① CRIB FILL FOR 3 PALLETS HIGH BY 3 PALLETS LONG (2 REQD). SEE THE "CRIB FILL C" DETAIL ON PAGE 31. SEE GENERAL NOTE "J" ON PAGE 2 AND SPECIAL NOTE 4 ON PAGE 9.
- ② CRIB FILL FOR 3 PALLETS HIGH BY 2 PALLETS LONG (3 REQD). SEE THE "CRIB FILL D" DETAIL ON PAGE 31.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE G" DETAIL ON PAGE 34. SEE SPECIAL NOTE 5 ON PAGE 9.
- ④ STRUT, 4" X 4" BY CUT TO FIT (16 REQD). TOENAIL TO THE VERTICAL PIECES OF THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 38 AND GENERAL NOTES "G" AND "H" ON PAGE 5 FOR ADDITIONAL GUIDANCE.
- ⑤ SPACER (3 REQD). SEE THE "SPACER B" DETAIL ON PAGE 40.
- ⑥ PALLET REINFORCING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (24 REQD). PRE-POSITION.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (3 REQD). INSTALL SO AS TO ENIRCLE THE LOAD UNITS IN THE DOORWAY AREA. SECURE TO PIECE MARKED ⑤ W/2 STAPLES. SEE SPECIAL NOTE 6 ON PAGE 9. SEE PIECE MARKED ⑧.
- ⑧ SEAL FOR 1-1/4" STRAPPING (30 REQD, 2 PER DOORWAY PROTECTION STRAP AND 1 PER PALLET REINFORCING STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- ⑨ TEMPERED HARDBOARD STRIP, 1/8" THICK BY 18" WIDE BY CAR WIDTH IN LENGTH (2 REQD). PRE-POSITION AS SHOWN BY THE "PREPARATION OF CAR FLOOR "B"" DETAIL BELOW. NAIL TO THE CAR FLOOR W/12-4d NAILS. SEE SPECIAL NOTE 11 ON PAGE 9.



SECTION B-B



PREPARATION OF CAR FLOOR "B"

LOAD CAPACITY CHART ("OPEN-TYPE")										
LINE NO.	CALIBER	DESIGNATION	FILLED PROJECTILES				EMPTY PROJECTILES			
			NO. OF LAYERS	NO. LONG	ESTIMATED LOAD WEIGHT	CENTER GATE	NO. OF LAYERS	NO. LONG	LOAD WEIGHT	CENTER GATE
13	2.75 IN	WARHEAD HE M151 PRACTICE XM232	3	12	111,096	H	4	12	115,680	K
7	75 MM	HE M334	3	11*	114,312	H	3	12	110,376	H
18	90 MM	HE-T 91	3	11*	113,520	H	3	12	109,872	H
19	90 MM	CHEM-T T92	3	11*	117,084	H	3	12	113,760	H
20	105 MM	WARHEAD, 105MM, XM547	3	12	114,336	H	3	12	97,920	H
25	105 MM	HEP M393A2, WP XM416	3	12	103,248	H	3	12	97,344	H
38	105 MM	HE XM400E3	3	12	106,776	H	4	11	110,440	J
38	105 MM	HE M444, M444E1	3	12	109,656	H	4	11	113,960	J
31	106 MM	HEAT M344A1	3	12	104,904	H	4	12	113,760	K
14	152 MM	TP-T XM411E2	3	10	112,500	H	3	10	110,820	H
40	152 MM	HE XM657E2	4	10	109,440	K	4	10	107,200	K
41	155 MM	M549 MOTOR BODY ASSY	3	12	111,456	H	4	12	107,520	K
39	165 MM	HEP T237E4 (M123)	3	12	112,608	H	4	12	87,552	J

*SEE SPECIAL NOTE 7 AT RIGHT.

LOAD CAPACITY CHART (BOXED-TYPE)										
LINE NO.	CALIBER	DESIGNATION	FILLED PROJECTILES				EMPTY PROJECTILES			
			NO. OF LAYERS	NO. LONG	ESTIMATED LOAD WEIGHT	CENTER GATE	NO. OF LAYERS	NO. LONG	LOAD WEIGHT	CENTER GATE
1	75 MM	AP-T M338A1	3	9	119,718	H	3	9	110,268	H
2	75 MM	HEP-T150E29 OR T165E29	5	9	110,160	L	5	9	76,680	L
3	75 MM	HEP-T151E28	5	9	107,460	L	5	9	73,980	L
5*	76 MM	HVAP-T M93A1	4	11	105,160	J	4	11	94,512	J
6	76 MM	AP-T M339E1 OR TP-T M340A1E1	3	11	109,230	H	3	11	101,244	H
9*	76 MM	HVAP-T T66E3 OR T66E5	5	11	106,810	L	5	11	93,500	L
10	76 MM	HEAT-T M496	5	11	116,050	L	5	11	99,000	L
26	81 MM	WP M375E2	5	11	120,230	L	5	11	96,800	L
11	90 MM	HVAP-TM332A1E1 OR HVTP-M333A1E1	4	10	108,080	K	4	10	96,160	K
14	90 MM	HEAT M431E1	4	9	104,832	J	4	9	95,040	J
23	90 MM	HEAT M371E1	5	11	70,730	L	5	11	52,030	L
4*	105 MM	APERS-T M380	3	8	90,192	H	4	8	110,080	K
4*	105 MM	APERS-T XM603E1	3	8	98,544	H	3	8	90,912	H
15	105 MM	HEP-T M345 OR M345B1	3	9	93,150	H	4	9	69,408	J
16	105 MM	HEAT M341	4	9	104,832	J	4	9	86,184	J
18	105 MM	HEAT M456A1 OR M456A1E1	4	10	110,400	K	4	10	96,720	K
20	105 MM	APDS-T M392A3	5	9	112,500	L	5	9	97,200	L
25	105 MM	TP-T M459	3	8	109,440	H	3	8	98,880	H
19	106 MM	HEP-T M346A1	3	9	91,152	H	4	9	69,408	J
22*	120 MM	HEAT M469	4	10	117,120	K	4	10	98,000	J

*SEE SPECIAL NOTE 10 BELOW.

(SPECIAL NOTES CONTINUED)

- BOXED-TYPE LINE ITEMS NO. 4, 5, 9, AND 22 MAY BE LOADED 3 AND 2-WIDE AS SHOWN ON PAGES 10 AND 11, OR MAY BE LOADED 3-WIDE AS SHOWN ON PAGES 12 AND 13, IF THOSE PROCEDURES ARE MORE ADVANTAGEOUS AS TO DUNNAGE REQUIREMENTS OR A READILY OBTAINABLE QUANTITY OF UNITS.
- PALLET UNITS WILL SHIFT LONGITUDINALLY DURING NORMAL TRANSPORTATION OF A LOAD. IN ORDER TO HELP PREVENT THE DOORWAY PROTECTION STRAPS, PIECES MARKED (2), FROM BECOMING SNAGGED ON ROUGH PORTIONS OF A CAR FLOOR, THE PALLET UNITS IN THE DOORWAY OF A CAR EQUIPPED WITH PLUG DOORS MUST BE PLACED UPON PRE-POSITIONED TEMPERED HARDBOARD STRIPS. SEE THE "PREPA-

(CONTINUED BELOW)

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	95	32
2" X 3"	327	114
2" X 6"	482	482
4" X 4"	30	40
NAILS	NO. REQD	POUNDS
4d (1-1/2")	28	NIL
10d (3")	356	5-1/2
12d (3-1/4")	272	4-3/4
16d (3-1/2")	384	8-1/2
TEMPERED HARDBOARD	28 SQ FT	13 LBS
STEEL STRAPPING, 1-1/4" X .035" OR .031"	401 REQD	58 LBS
SEAL FOR 1-1/4" STRAPPING	30 REQD	1-1/2 LBS
STAPLES FOR 1-1/4" STRAPPING	6 REQD	NIL

(SPECIAL NOTES CONTINUED)

RATION OF CAR FLOOR "B" DETAIL ON PAGE 8 FOR GUIDANCE. NOTE THAT THE NAILS FOR SECURING THE HARDBOARD STRIPS TO THE CAR FLOOR SHOULD BE LOCATED SO AS NOT TO BE UNDER THE PALLET SKIDS WHEN THE UNITS ARE POSITIONED IN THE CAR.

SPECIAL NOTES:

- A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH OR OF OTHER WIDTHS, AND CARS HAVING WIDER DOOR OPENINGS CAN ALSO BE USED.
- THE TYPICAL FIXED LOAD SHOWN IS APPLICABLE FOR THE "OPEN-TYPE" PALLET UNITS AS DETAILED BY PICATINNY ARSENAL DRAWING NO. F-8837835, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART ("OPEN-TYPE")" AT LEFT. THE LOAD IS ALSO APPLICABLE FOR THE BOXED-TYPE PALLET UNITS AS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART (BOXED-TYPE)" AT LEFT. THE PROCEDURES ARE APPLICABLE FOR LOADS WHICH CONSIST OF MORE THAN TWO LAYERS.
- A 72-UNIT LOAD OF "OPEN-TYPE" PALLET UNITS MEASURING 38-1/8" LONG BY 44-3/4" WIDE BY 23" HIGH AND WEIGHING 1,434 POUNDS IS SHOWN AS TYPICAL. THE ACTUAL QUANTITY THAT CAN BE SHIPPED WILL DEPEND UPON THE WEIGHT AND/OR SIZE OF THE ITEM BEING LOADED AND THE LOAD LIMIT OF THE CAR BEING USED. SEE THE LOAD CAPACITY CHARTS AT LEFT FOR GUIDANCE.
- IF THE BASES OF THE PALLET UNITS BEING SHIPPED ARE OF THE TYPE WHICH ARE PROVIDED WITH FORK LIFT OPENINGS FOR 4-WAY PICKUP, ANTI-SWAY BRACES MAY BE USED FOR LATERAL BRACING IN LIEU OF THE DEPICTED CRIB FILL ASSEMBLIES. SEE THE DETAIL ON PAGE 40. NOTE THAT ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLET UNITS IN EACH LAYER, AND MUST BE INSTALLED IN-PLACE AS LOADING PROGRESSES.
- THE "CENTER GATES G" AND SIXTEEN (16) STRUTS SHOWN IN THE LOAD ON PAGE 8 ARE NOT APPLICABLE FOR ALL MULTI-LAYER LOADS. THE PROPER CENTER GATE FOR USE WITH AN ITEM, FOR THE NUMBER OF LAYERS (MAX) STATED, IS SPECIFIED WITHIN THE CHARTS AT LEFT. IF A LESSER NUMBER OF LAYERS IS TO BE SHIPPED, A DIFFERENT CENTER GATE WILL BE REQUIRED. SEE THE "CENTER GATE CHART" ON PAGE 38 FOR SELECTION GUIDANCE. THE QUANTITY OF STRUTS TO BE USED WITH THE APPLICABLE CENTER GATES IS SPECIFIED UNDER THE DETAIL FOR THAT GATE.
- DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH. DOORWAY PROTECTION IN THE DEPICTED LOAD IS PROVIDED BY THE SPACERS, PIECES MARKED (5), AND THE DOORWAY PROTECTION STRAPS, PIECES MARKED (7). TWO (2) STRAPS AND SPACERS ARE REQUIRED AROUND A LOAD UNIT WHICH IS NOT RETAINED BY AT LEAST SIX INCHES (6") OF THE CAR SIDEWALL ON BOTH SIDES OF THE LOAD, AND ONE (1) STRAP AND SPACER ARE REQUIRED AROUND A LOAD UNIT WHICH IS RETAINED BY AT LEAST SIX INCHES (6") BUT LESS THAN HALF OF THE UNIT LENGTH. NOTE THAT PIECES MARKED (5) AND (7) IN THE DEPICTED LOAD ARE ONLY APPLICABLE FOR USE IN CARS EQUIPPED WITH PLUG TYPE DOORS. THESE PIECES WILL NOT BE USED IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS; THE WOODEN GATE TYPE MUST BE USED INSTEAD. REFER TO THE "DOORWAY PROTECTION A" AND "DOORWAY PROTECTION B" DETAILS ON PAGE 39 FOR CONSTRUCTION GUIDANCE.
- THE "NO. LONG" SPECIFIED FOR FILLED PROJECTILES, "OPEN-TYPE" LINE ITEMS NO. 7, 18, AND 19, IS LESS THAN THE MAXIMUM WHICH CAN BE LOADED IN A CAR. IF THE LOAD LIMIT OF THE CAR BEING LOADED PERMITS, ONE (1) ADDITIONAL LOAD UNIT MAY BE SHIPPED. NOTE THAT STRUT BRACING MUST BE APPLIED WHEN SHIPPING THESE SHORTER-LENGTH LOADS. SEE GENERAL NOTE "H" ON PAGE 5.
- IF DESIRED, THE DEPICTED PROCEDURES CAN BE APPLIED FOR THE SHIPMENT OF 2-LAYER LOADS FOR ANY OF THE ITEMS SPECIFIED WITHIN THE CHARTS ABOVE, OR THEY CAN BE USED IN LIEU OF THE PROCEDURES SHOWN ON PAGE 6.
- A LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD CAN BE INCREASED BY ADDING PALLET UNITS IN ONE OR BOTH ENDS OF THE CAR, RETAINED WITH K-BRACES AS SHOWN ON PAGE 20, PROVIDING THE CAR HAS NAILABLE SIDEWALLS. A LOAD CAN BE REDUCED BY A MULTIPLE OF THE NUMBER OF PALLET UNITS IN A LOAD UNIT BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. TWO UNITS CAN BE OMITTED FROM THE TOP LAYER BY UTILIZING THE STRUTTED-GATE METHOD SHOWN ON PAGE 25, OR ONE OR MORE UNITS CAN BE OMITTED BY INSTALLING A FILLER, AS DETAILED ON PAGE 40. IF THE DESIRED QUANTITY CANNOT BE ATTAINED BY OMITTING THE ENTIRE TOP LAYER, UNITS CAN BE RETAINED IN BOTH ENDS OF THE CAR WITH KNEE BRACES AS SHOWN ON PAGES 26 AND 27, OR UNITS CAN BE RETAINED IN ONE OR BOTH ENDS OF THE CAR WITH K-BRACES AS SHOWN ON PAGE 20, PROVIDING THE CAR HAS NAILABLE SIDEWALLS.

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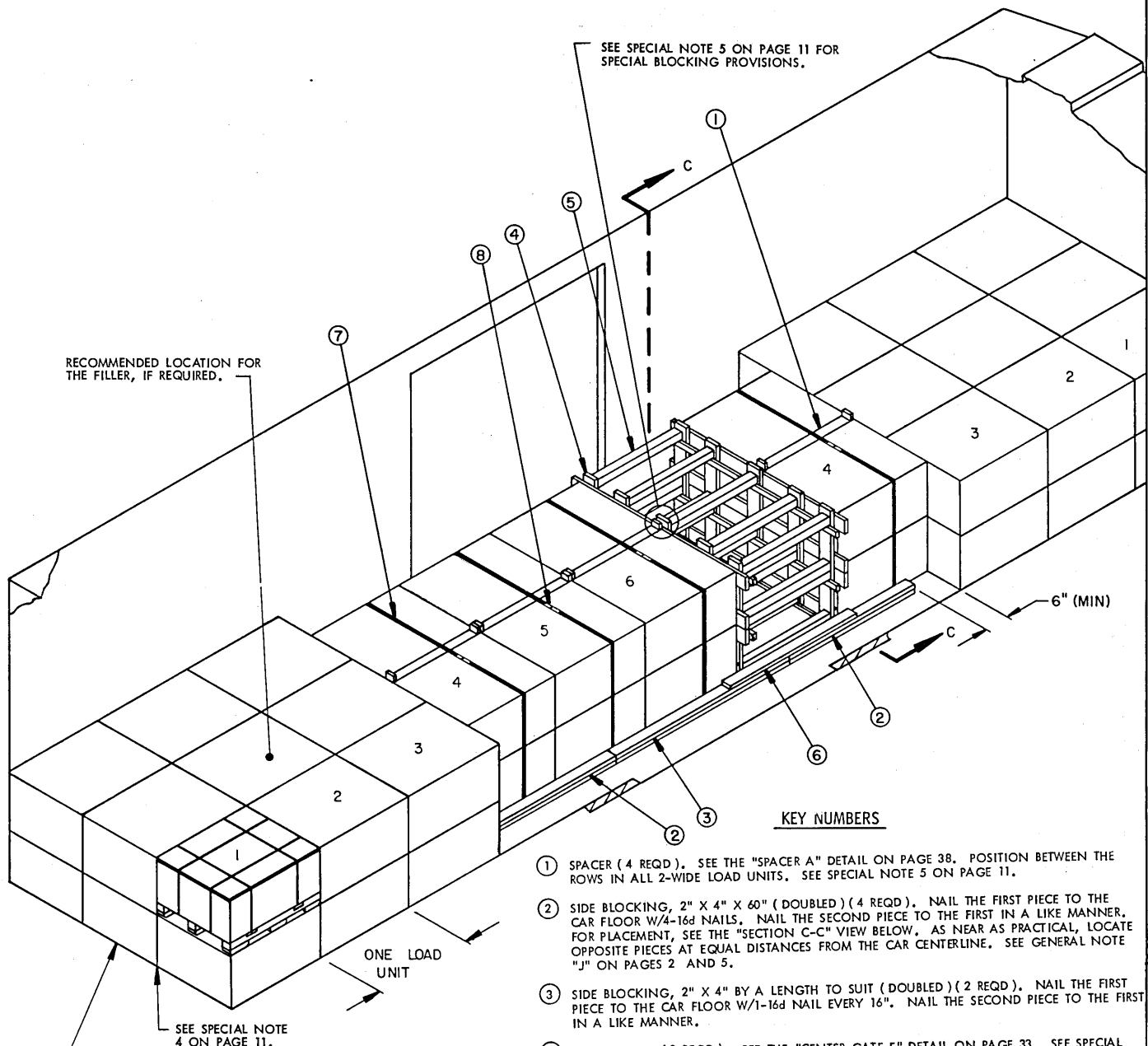
LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	72	103,248 LBS
DUNNAGE		1,428 LBS
TOTAL WEIGHT		104,676 LBS

TYPICAL 72-UNIT FIXED LOAD (2-WIDE X 3-HIGH) OF "OPEN-TYPE" OR BOXED-TYPE PALLET UNITS IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR

SEE SPECIAL NOTE 5 ON PAGE 11 FOR SPECIAL BLOCKING PROVISIONS.

RECOMMENDED LOCATION FOR THE FILLER, IF REQUIRED.

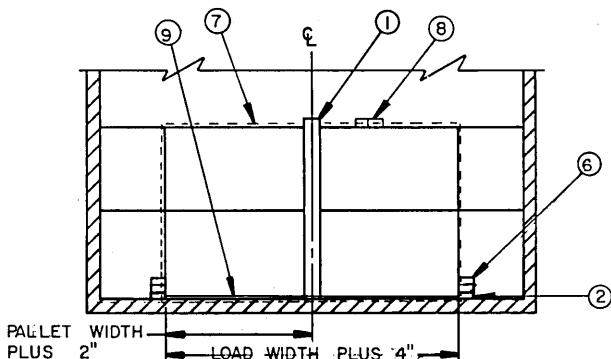


KEY NUMBERS

- ① SPACER (4 REQD). SEE THE "SPACER A" DETAIL ON PAGE 38. POSITION BETWEEN THE ROWS IN ALL 2-WIDE LOAD UNITS. SEE SPECIAL NOTE 5 ON PAGE 11.
- ② SIDE BLOCKING, 2" X 4" X 60" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. FOR PLACEMENT, SEE THE "SECTION C-C" VIEW BELOW. AS NEAR AS PRACTICAL, LOCATE OPPOSITE PIECES AT EQUAL DISTANCES FROM THE CAR CENTERLINE. SEE GENERAL NOTE "J" ON PAGES 2 AND 5.
- ③ SIDE BLOCKING, 2" X 4" BY A LENGTH TO SUIT (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 16". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE E" DETAIL ON PAGE 33. SEE SPECIAL NOTE 6 ON PAGE 11.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (20 REQD). POSITION AS SHOWN AND TOENAIL TO VERTICAL PIECES OF THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 38 AND GENERAL NOTES "G" AND "H" ON PAGE 5 FOR ADDITIONAL GUIDANCE.
- ⑥ GATE RETAINER, 2" X 4" BY LENGTH OF CENTER VOID PLUS 12" (2 REQD). NAIL TO PIECES MARKED ② AND ③ W/3-10d NAILS NEAR EACH END.
- ⑦ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (4 REQD). ALTHOUGH IT IS NOT MANDATORY, IT IS SUGGESTED THAT A STRAP BE PRE-POSITIONED PRIOR TO LOADING A STACK SO THAT THE STRAP WILL ENCIRCLE THE STACK AS SHOWN, WHEN IT IS TENSIONED AND SEALED. SEAL EACH STRAP JOINT W/2 SEALS PER STRAP. SEE PIECE MARKED ⑧.
- ⑧ SEAL FOR 1-1/4" STEEL STRAPPING (8 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- ⑨ TEMPERED HARDBOARD STRIP, 1/8" THICK BY LOAD WIDTH IN LENGTH (TWO PALLET WIDTHS PLUS WIDTH OF SPACER) (2 REQD AT 12" WIDE, 4 REQD AT 24" WIDE). PRE-POSITION AS TYPICALLY SHOWN BY THE "PREPARATION OF CAR FLOOR "A"" DETAIL ON PAGE 7. NAIL THE 12" WIDE STRIPS TO THE CAR FLOOR W/8-4d NAILS. NAIL THE 24" WIDE STRIPS TO THE CAR FLOOR W/12-4d NAILS. SEE SPECIAL NOTE 11 ON PAGE 11.

ISOMETRIC VIEW

IF THE END WALL OF A CAR IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD B" DETAIL ON PAGE 29.



SECTION C-C

LOAD CAPACITY CHART								
LINE NO.	CALIBER	DESIGNATION	MIN CAR WIDTH	NO. LONG	MAX UNITS	ESTIMATED LOAD WEIGHT FILLED	CENTER GATE	EMPTY LOAD WEIGHT
24	2.75 IN	WARHEAD HE XM229	9'-2"	10	52*	117,364	E	101,972
5	76 MM	HVAP-T M93A1	9'-4"	11	62	74,090	F	66,588
7	76 MM	CANNISTER M363	9'-4"	11	48*	118,415	F	76,080
9	76 MM	HVAP-T T66E3 OR T66E5	9'-6"	11	62	60,202	D	52,700
4	105 MM	APERS-T M1380	9'-2"	8	44	82,676	E	75,680
4	105 MM	APERS-T XM603E1	9'-2"	8	44	90,332	E	83,336
22	120 MM	HEAT M469	9'-6"	9	50	73,200	D	61,250

*SEE SPECIAL NOTE 7 AT RIGHT.

SPECIAL NOTES:

1. A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH, WIDER CARS, AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN ALSO BE USED. NOTE THAT SOME ITEMS WILL REQUIRE CARS WIDER THAN 9'-2". SEE THE "LOAD CAPACITY CHART" AT LEFT FOR GUIDANCE.
2. THE TYPICAL FIXED LOAD SHOWN IS APPLICABLE FOR BOXED-TYPE PALLET UNITS AS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART" AT LEFT. THE PROCEDURES ARE APPLICABLE ONLY FOR THOSE PALLET UNITS WHICH ARE NARROW ENOUGH TO BE LOADED THREE (3) WIDE IN A BOX CAR, BUT EITHER BECAUSE OF THE ITEM WEIGHT OR THE QUANTITY TO BE SHIPPED CANNOT BE LOADED 3-WIDE THRU THE ENTIRE LENGTH OF THE CAR.
3. A 52-UNIT LOAD OF BOXED-TYPE PALLET UNITS MEASURING 44-5/8" LONG BY 36-1/4" WIDE BY 21" HIGH AND WEIGHING 2,257 POUNDS IS SHOWN AS TYPICAL. THE ACTUAL QUANTITY THAT CAN BE SHIPPED WILL DEPEND UPON THE WEIGHT AND/OR SIZE OF THE ITEM BEING LOADED AND THE LOAD LIMIT OF THE CAR BEING USED. SEE THE "LOAD CAPACITY CHART" AT LEFT FOR GUIDANCE.
4. PALLET STACKS IN THE 3-WIDE PORTION OF THE LOAD MUST BE POSITIONED SNUGLY AGAINST A CAR SIDEWALL AND/OR AGAINST AN ALREADY-POSITIONED PALLET STACK. IF THE REMAINING VOID AFTER THE PALLET UNITS ARE POSITIONED IS MORE THAN TWO AND ONE-HALF INCHES (2-1/2"), THE VOID MUST BE FILLED IN ORDER TO PREVENT LATERAL DISPLACEMENT OF TWO ROWS OF PALLET UNITS WITHIN A STACK. THE FILL MUST BE POSITIONED BETWEEN TWO ROWS OF PALLET UNITS. SEE THE "CRIB FILL A" AND/OR "CRIB FILL B" DETAIL ON PAGE 30 FOR GUIDANCE IN THE CONSTRUCTION OF ASSEMBLIES TO BE USED IN A SMALL VOID. THE ASSEMBLIES SHOWN BY THE "CRIB FILL C" AND/OR "CRIB FILL D" DETAILS ON PAGE 31 MAY BE USED FOR WIDER VOIDS OF 8" OR MORE.
5. AFTER LOADING THE CAR, IF THERE IS A VOID BETWEEN THE END OF THE LOAD BAY AND THE SPACER, PIECE MARKED (1), NOMINAL 4" WIDE BY LOAD HEIGHT PLUS 2-1/2" LONG MATERIAL OF SUITABLE THICKNESS MUST BE USED AS REQUIRED TO FILL THE VOID. DO NOT "OVER FILL"; ALLOW SPACE FOR TIGHTENING OF THE LOAD WITH LOAD JACKS OR DRIVEN STRUTS (REFERENCE GENERAL NOTES "F" AND "G" ON PAGE 5). LAMINATE THE FILL MATERIAL TO THE SPACER W/2 APPLICABLY SIZED NAILS.
6. THE "CENTER GATES E" AND TWENTY (20) STRUTS SHOWN IN THE LOAD ON PAGE 10 ARE NOT APPLICABLE FOR ALL 3 AND 2-WIDE BY 2-HIGH LOADS. THE PROPER CENTER GATE FOR USE WITH AN ITEM IS SPECIFIED WITHIN THE CHART AT LEFT; THE QUANTITY OF STRUTS TO BE USED WITH THOSE GATES IS SPECIFIED UNDER THE GATE DETAIL.
7. THE "MAX UNITS" SPECIFIED FOR LINE ITEMS NO. 24 AND 7 ARE BASED ON A LOAD WEIGHT OF APPROXIMATELY 120,000 POUNDS. IF THE LOAD LIMIT OF THE CAR PERMITS, ADDITIONAL PALLET UNITS MAY BE SHIPPED.
CAUTION: IF ONE-HALF OR MORE OF A 3-WIDE LOAD UNIT EXTENDS INTO THE DOORWAY, DOORWAY PROTECTION MUST BE PROVIDED. SEE PIECE MARKED (5) ON PAGE 12.
8. THESE LOADING PROCEDURES ON PAGES 10 AND 11 ARE RESTRICTED TO LOADS OF EITHER ONE (1) OR TWO (2) LAYERS. FOR SHIPMENT OF A ONE-LAYER LOAD, OMIT THE BUNDLING STRAPS, PIECES MARKED (7), AND SUBSTITUTE CENTER GATES A, B, OR C, AS APPLICABLE FOR THE SPECIFIED CENTER GATES. SEE THE "CENTER GATE CHART" ON PAGE 38 FOR GUIDANCE.
9. THE DEPICTED PROCEDURES CAN BE APPLIED FOR THE SHIPMENT OF A LCL LOAD FOR THOSE ITEMS LISTED ON PAGE 13, A FULL LOAD OF WHICH WOULD CONSIST OF A FULL TWO OR MORE LAYERS.
10. A 2-HIGH LOAD CAN BE ADJUSTED BY TWO PALLET UNITS BY INCREASING OR DECREASING THE NUMBER OF 3-WIDE LOAD UNITS AND AT THE SAME TIME DECREASING OR INCREASING THE NUMBER OF 2-WIDE LOAD UNITS. TO OBTAIN AN UNEVEN LOAD QUANTITY, INSTALL A FILLER WITHIN THE TOP LAYER. SEE THE "FILLER" DETAIL ON PAGE 40.
11. PALLET UNITS WILL SHIFT LONGITUDINALLY DURING NORMAL TRANSPORTATION OF A LOAD. IN ORDER TO HELP PREVENT THE BUNDLING STRAPS, PIECES MARKED (7), FROM BECOMING SNAGGED ON ROUGH PORTIONS OF A CAR FLOOR, THE PALLET UNITS WHICH ARE BUNDLED (PLUS THE ADJACENT END OF A 3-WIDE LOAD UNIT) MUST BE PLACED UPON PRE-POSITIONED TEMPERED HARDBOARD STRIPS. TWELVE INCH (12") WIDE STRIPS ARE REQUIRED ADJACENT TO EACH CENTER GATE. 24" WIDE STRIPS ARE TO BE LOCATED SO AS TO BE CENTERED UNDER JOINTS BETWEEN THE BUNDLED LOAD UNITS, AS WELL AS UNDER THE UNITS BETWEEN THE 3-WIDE AND 2-WIDE PORTIONS OF THE LOAD. SEE THE "PREPARATION OF CAR FLOOR A" DETAIL ON PAGE 7 FOR GUIDANCE. NOTE THAT THE NAILS FOR SECURING THE HARDBOARD STRIPS TO THE CAR FLOOR SHOULD BE LOCATED SO AS NOT TO BE UNDER THE PALLET SKIDS WHEN THE UNITS ARE POSITIONED IN THE CAR.

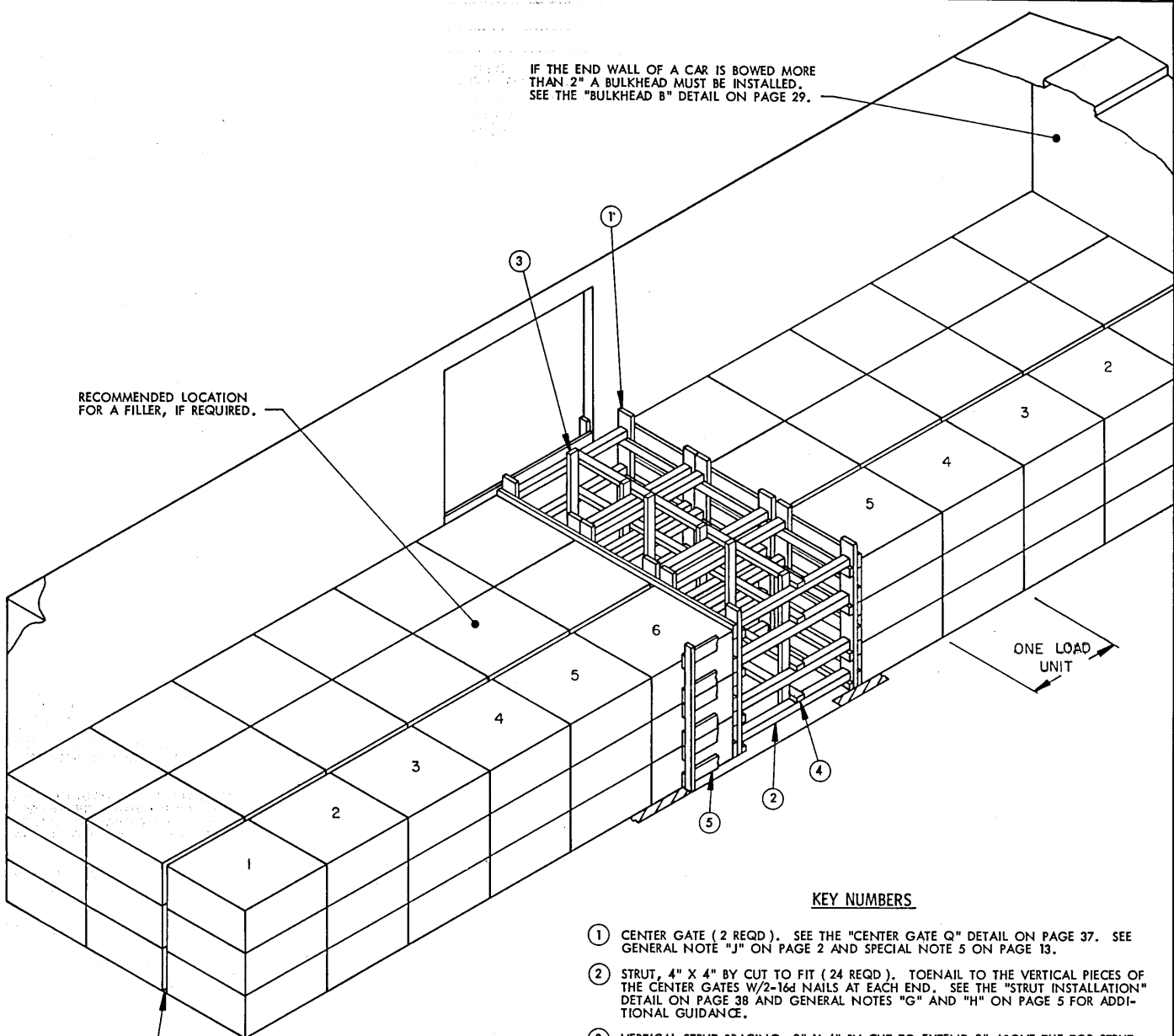
BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	13	5
2" X 3"	32	16
2" X 4"	170	74
2" X 6"	95	95
4" X 4"	128	171
NAILS	NO. REQD	POUNDS
4d (1-1/2")	56	1/4
10d (3")	12	1/4
16d (3-1/2")	394	8-3/4
1/8" TEMPERED HARDBOARD ----- 67 SQ FT -- 30 LBS		
STEEL STRAPPING, 1-1/4" X .035" X .031" --- 89' REQD --- 13 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 8 REQD --- 1/2 LB		

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	52	117,364 LBS
DUNNAGE		775 LBS
TOTAL WEIGHT		118,139 LBS

IF THE END WALL OF A CAR IS BOWED MORE THAN 2" A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD B" DETAIL ON PAGE 29.

RECOMMENDED LOCATION FOR A FILLER, IF REQUIRED.



SEE SPECIAL NOTE 4 ON PAGE 13.

ISOMETRIC VIEW

KEY NUMBERS

- ① CENTER GATE (2 REQD). SEE THE "CENTER GATE Q" DETAIL ON PAGE 37. SEE GENERAL NOTE "J" ON PAGE 2 AND SPECIAL NOTE 5 ON PAGE 13.
- ② STRUT, 4" X 4" BY CUT TO FIT (24 REQD). TOENAIL TO THE VERTICAL PIECES OF THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 38 AND GENERAL NOTES "G" AND "H" ON PAGE 5 FOR ADDITIONAL GUIDANCE.
- ③ VERTICAL STRUT BRACING, 2" X 4" BY CUT TO EXTEND 2" ABOVE THE TOP STRUT (6 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 6 ON PAGE 13.
- ④ HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 1/2" (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑤ DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 39. SEE SPECIAL NOTE 7 ON PAGE 13.

40' CAR LOAD CAPACITY CHART

LINE NO.	CALIBER	DESIGNATION	MIN CAR WIDTH	FILLED PROJECTILES				EMPTY PROJECTILES			
				NO. OF LAYERS	NO. LONG	ESTIMATED LOAD WEIGHT	CENTER GATE	NO. OF LAYERS	NO. LONG	LOAD WEIGHT	CENTER GATE
24	2.75 IN	WARHEAD HE XM229	9'-2"	2	9	121,878	O	3	9	105,894	P
5	76 MM	HVAP-T M93A1	9'-4"	3	11	118,305	Q	4	11	94,512	R
7	76 MM	CANNISTER M363	9'-6"	1	11	81,411	M	2	11	104,610	O
9	76 MM	HVAP-T T66E3 OR T66E5	9'-6"	3	11	96,129	P	4	11	74,800	R
4	105 MM	APERS-T XM603E1	9'-2"	2	8	98,544	O	3	8	90,912	P
4	105 MM	APERS-T M380	9'-2"	2	8	90,192	O	4	8	110,080	R
22	120 MM	HEAT M469	9'-6"	3	9	118,584	Q	4	9	88,200	R

SPECIAL NOTES:

1. A 40'-6" LONG BY 9'-4" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH, WIDER OR NARROWER CARS, AND CARS HAVING WIDER DOOR OPENINGS CAN ALSO BE USED; SOME ITEMS WILL REQUIRE CARS WIDER THAN 9'-4".
2. THE TYPICAL FIXED LOAD SHOWN IS APPLICABLE FOR BOXED-TYPE PALLET UNITS AS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604 AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART" ABOVE. THE PROCEDURES ARE APPLICABLE ONLY FOR THOSE PALLET UNITS WHICH ARE NARROW ENOUGH TO BE LOADED THREE (3) WIDE IN A BOX CAR, AND WHICH ARE LIGHT ENOUGH TO BE LOADED 3-WIDE THRU THE ENTIRE LENGTH OF THE CAR. THE LOAD MAY CONSIST OF ONE THRU FOUR LAYERS.
3. A 99-UNIT LOAD OF BOXED-TYPE PALLET UNITS MEASURING 38-3/4" LONG BY 36-5/8" WIDE BY 17-5/8" HIGH AND WEIGHING 1,195 POUNDS IS SHOWN AS TYPICAL. THE ACTUAL QUANTITY THAT CAN BE SHIPPED WILL DEPEND UPON THE WEIGHT AND/OR SIZE OF THE ITEM BEING LOADED AND THE LOAD LIMIT OF THE CAR BEING USED. SEE THE "LOAD CAPACITY CHART" ABOVE FOR GUIDANCE.
4. PALLET STACKS MUST BE POSITIONED SNUGLY AGAINST A CAR SIDEWALL AND/OR AGAINST AN ALREADY-POSITIONED PALLET STACK. IF THE REMAINING VOID AFTER THE PALLET UNITS ARE POSITIONED IS MORE THAN TWO AND ONE-HALF IN. (2-1/2"), THE VOID MUST BE FILLED IN ORDER TO PREVENT LATERAL DISPLACEMENT OF THE PALLET UNITS WITHIN A STACK. THE FILL MUST BE POSITIONED BETWEEN TWO ROWS OF PALLET UNITS IN ONE END OF THE CAR AND BETWEEN THE DIRECTLY OPPOSITE ROWS IN THE OTHER END OF THE CAR. SEE THE "CRIB FILL A" AND "CRIB FILL B" DETAILS ON PAGE 30 FOR GUIDANCE IN THE CONSTRUCTION OF ASSEMBLIES TO BE USED IN A SMALL VOID. THE ASSEMBLIES SHOWN BY THE "CRIB FILL C" AND/OR "CRIB FILL D" DETAILS ON PAGE 31 MAY BE USED FOR THE WIDER VOIDS OF 8" OR MORE.
5. THE "CENTER GATES Q" AND TWENTY-FOUR (24) STRUTS SHOWN IN THE LOAD ON PAGE 12 ARE NOT APPLICABLE TO ALL 3-WIDE LOADS. THE PROPER CENTER GATE FOR USE WITH AN ITEM, FOR THE NUMBER OF LAYERS (MAX) STATED, IS SPECIFIED WITHIN THE CHART ABOVE. IF A LESSER NUMBER OF LAYERS IS TO BE SHIPPED, A DIFFERENT CENTER GATE WILL BE REQUIRED. SEE THE "CENTER GATE CHART" ON PAGE 38 FOR SELECTION GUIDANCE. THE QUANTITY OF STRUTS TO BE USED WITH THE APPLICABLE CENTER GATES IS SPECIFIED UNDER THE DETAIL FOR THAT GATE.
6. STRUT BRACING, SHOWN IN THE DEPICTED LOAD AS PIECES MARKED (3) AND (4), IS REQUIRED FOR THE STIFFENING OF STRUTS WHICH ARE 48" OR MORE IN LENGTH. IF THE LENGTH OF THE STRUTS FOR THE ITEM BEING SHIPPED IS LESS THAN 48" THE STRUT BRACING IS NOT REQUIRED. SEE GENERAL NOTE "H" ON PAGE 5.
7. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OF MORE OF THE UNIT LENGTH. THE DOORWAY PROTECTION, PIECE MARKED (5) IN THE DEPICTED LOAD, IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS, INSTALL DOORWAY PROTECTION STRAPS IN LIEU OF THE WOODEN GATES. SEE PIECE MARKED (7) ON PAGE 8 FOR INSTALLATION GUIDANCE. NOTE THAT THE SPACERS, PIECES MARKED (5) ON PAGE 8 WILL NOT BE REQUIRED FOR A 3-WIDE LOAD IF CRIB FILL IS NOT USED.
8. A LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD CAN BE INCREASED BY ADDING PALLET UNITS IN ONE OR BOTH ENDS OF THE CAR, RETAINED WITH K-BRACES AS SHOWN ON PAGE 20, PROVIDING THE CAR HAS NAILABLE SIDEWALLS. A LOAD CAN BE REDUCED BY A MULTIPLE OF THE NUMBER OF PALLETS IN A LOAD UNIT BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. THREE UNITS CAN BE OMITTED FROM THE TOP LAYER BY UTILIZING THE STRUTTED-GATE METHOD SHOWN ON PAGE 25 (SOME ADJUSTMENTS NECESSARY), OR ONE OR MORE UNITS CAN BE OMITTED BY INSTALLING A FILLER, AS DETAILED ON PAGE 40. IF THE DESIRED QUANTITY CANNOT BE ATTAINED BY OMITTING THE ENTIRE TOP LAYER OR BY UTILIZING THE 3 AND 2-WIDE LOADING PROCEDURES ON PAGES 10 AND 11, UNITS CAN BE RETAINED IN ONE OR BOTH ENDS OF THE CAR WITH K-BRACES AS SHOWN ON PAGE 20, PROVIDING THE CAR HAS NAILABLE SIDEWALLS.

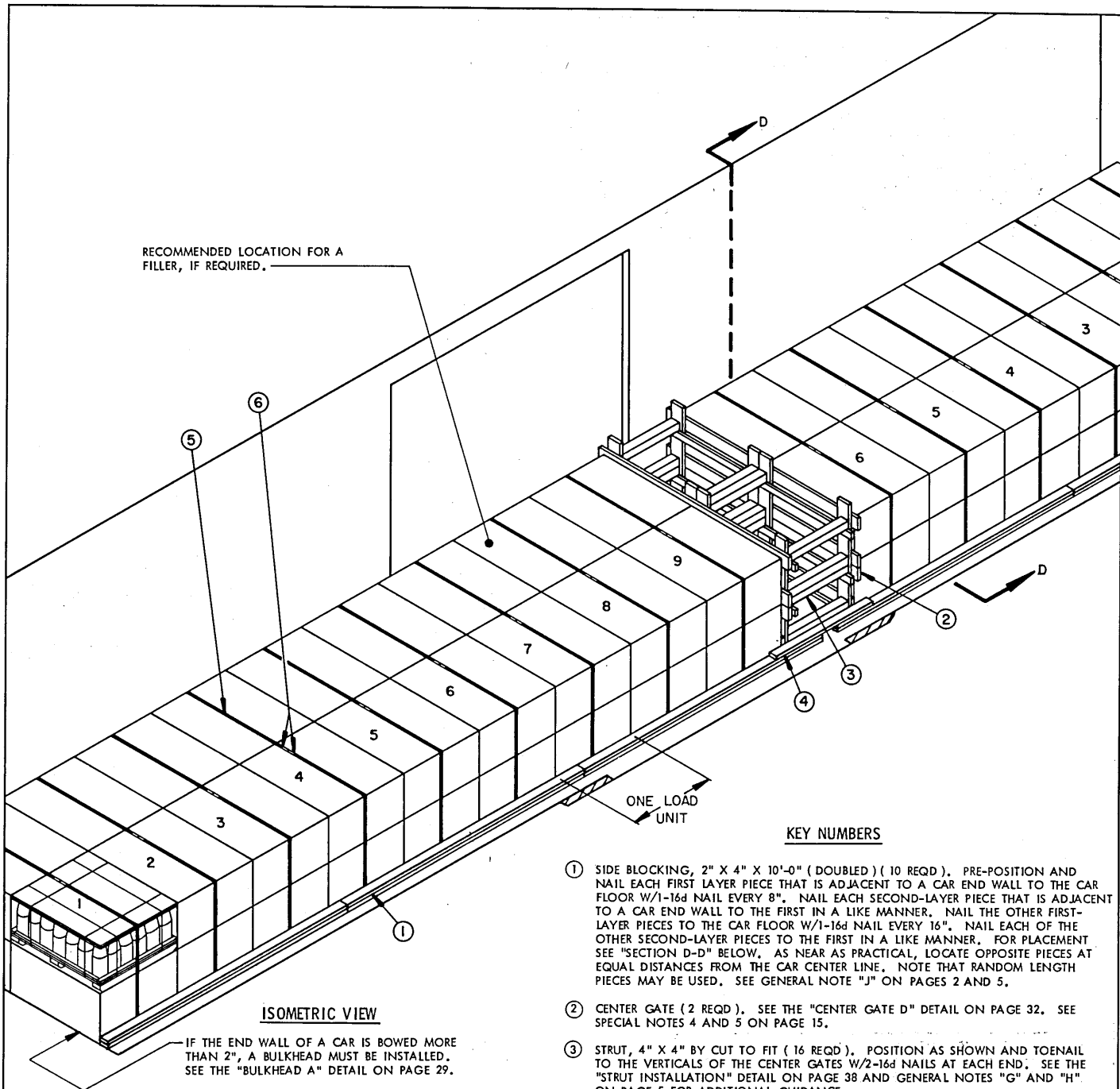
BILL OF MATERIAL (TYPICAL)

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	72	36
2" X 2"	19	7
2" X 3"	78	39
2" X 4"	64	43
2" X 6"	169	169
4" X 4"	108	144
NAILS	NO. REQD	POUNDS
6d (2")	72	1/2
10d (3")	144	2-1/4
12d (3-1/4")	20	1/2
16d (3-1/2")	416	9-1/4

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	99	118,305 LBS
DUNNAGE		889 LBS
TOTAL WEIGHT		119,194 LBS

TYPICAL 99-UNIT FIXED LOAD (3-WIDE BY 3-HIGH) OF BOXED-TYPE PALLET UNITS IN A 40'-6" LONG BY 9'-4" WIDE CONVENTIONAL BOX CAR



RECOMMENDED LOCATION FOR A FILLER, IF REQUIRED.

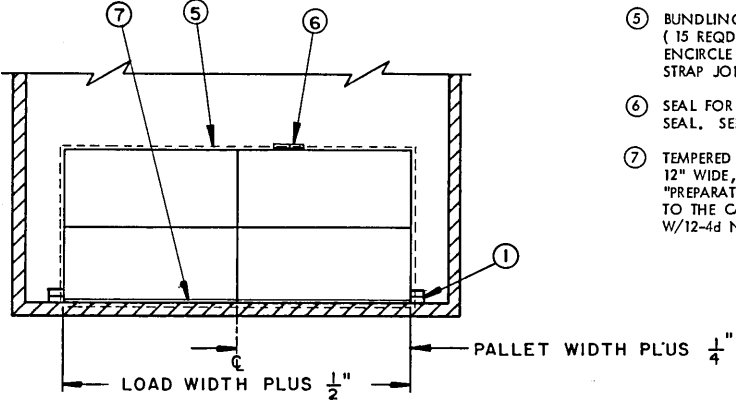
ISOMETRIC VIEW

IF THE END WALL OF A CAR IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 29.

ONE LOAD UNIT

KEY NUMBERS

- ① SIDE BLOCKING, 2" X 4" X 10'-0" (DOUBLED) (10 REQD). PRE-POSITION AND NAIL EACH FIRST LAYER PIECE THAT IS ADJACENT TO A CAR END WALL TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL EACH SECOND-LAYER PIECE THAT IS ADJACENT TO A CAR END WALL TO THE FIRST IN A LIKE MANNER. NAIL THE OTHER FIRST-LAYER PIECES TO THE CAR FLOOR W/1-16d NAIL EVERY 16". NAIL EACH OF THE OTHER SECOND-LAYER PIECES TO THE FIRST IN A LIKE MANNER. FOR PLACEMENT SEE "SECTION D-D" BELOW. AS NEAR AS PRACTICAL, LOCATE OPPOSITE PIECES AT EQUAL DISTANCES FROM THE CAR CENTER LINE. NOTE THAT RANDOM LENGTH PIECES MAY BE USED. SEE GENERAL NOTE "J" ON PAGES 2 AND 5.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 32. SEE SPECIAL NOTES 4 AND 5 ON PAGE 15.
- ③ STRUT, 4" X 4" BY CUT TO FIT (16 REQD). POSITION AS SHOWN AND TOENAIL TO THE VERTICALS OF THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 38 AND GENERAL NOTES "G" AND "H" ON PAGE 5 FOR ADDITIONAL GUIDANCE.
- ④ GATE RETAINER, 2" X 4" BY LENGTH OF CENTER AREA VOID PLUS 12" (REF: 48") (2 REQD). NAIL TO PIECES MARKED ① W/3-10d NAILS AT EACH END.
- ⑤ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (15 REQD). PRE-POSITION PRIOR TO LOADING A STACK SO THAT THE STRAP WILL ENCIRCLE THE STACK AS SHOWN WHEN IT IS TENSIONED AND SEALED. SEAL EACH STRAP JOINT W/2-SEALS PER STRAP. SEE PIECE MARKED ⑥.
- ⑥ SEAL FOR 1-1/4" STEEL STRAPPING (30 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- ⑦ TEMPERED HARDBOARD STRIP, 1/8" THICK BY LOAD WIDTH IN LENGTH (4 REQD AT 12" WIDE, 13 REQD AT 24" WIDE). PRE-POSITION AS TYPICALLY SHOWN BY THE "PREPARATION OF CAR FLOOR "A"" DETAIL ON PAGE 7. NAIL THE 12" WIDE STRIPS TO THE CAR FLOOR W/8-4d NAILS. NAIL THE 24" WIDE STRIPS TO THE CAR FLOOR W/12-4d NAILS. SEE SPECIAL NOTE 10 ON PAGE 15.



SECTION D-D

LOAD CAPACITY CHART ("OPEN-TYPE")

LINE NO.	CALIBER	DESIGNATION	UNITS PER CAR	ESTIMATED LOAD WEIGHT FILLED	CENTER GATE	EMPTY LOAD WEIGHT
8	2.75 IN	WARHEAD WTU-1/8	60	136,320	D	112,800
1	75 MM	HE M309A1	60	134,100	D	115,860
2	75 MM	HEAT-T, M310A1	60	129,300	D	115,860
3	75 MM	WP 311A1	60	127,740	D	123,360
4	75 MM	HE M48	60	135,900	D	117,660
5	75 MM	SMOKE M64	60	129,060	D	125,400
6	75 MM	HEAT M66	60	131,160	D	117,660
9	76 MM	WP-M361	60	116,100	D	111,480
10	76 MM	WP-M312	60	115,380	D	104,400
11	76 MM	HE M42A1	60	116,100	D	103,980
15	90 MM	AP M82	30	89,010	A	86,640
16	90 MM	HE M71	56*	152,712	D	133,896
17	90 MM	WP M313	60	143,940	D	139,200
12	105 MM	TACTICAL CS XM632	30*	97,920	B	96,750
21	105 MM	HE M1	52*	149,812	D	126,100
22	105 MM	HEAT M67	56*	146,104	D	130,200
23	105 MM	SIC, BE, M64, M84B1	60	136,140	D	148,500
24	105 MM	WP M60	60	151,800	D	133,500
26	105 MM	HE M323	52*	144,508	D	149,500
27	105 MM	HEAT M324	60	125,460	D	123,500
28	105 MM	WP M325	56*	149,128	D	107,700
29	105 MM	ILLUM, XM314A2E1	30	102,720	B	96,750
30	105 MM	HE M442	60	127,380	D	113,700
32	105 MM	TP-T XM468	56*	145,208	D	132,440
33	120 MM	HE M73	30	88,050	A	79,830
34	120 MM	HE M356	56*	144,648	D	119,952
35	120 MM	HE T15E3	30	85,080	A	76,440
36	120 MM	CHEM T16E1	60	136,380	D	134,040
37	120 MM	CHEM T16E3	56*	143,416	D	139,104

* SEE SPECIAL NOTE 6 AT RIGHT.

LOAD CAPACITY CHART (BOXED-TYPE)

LINE NO.	CALIBER	DESIGNATION	UNITS PER CAR	ESTIMATED LOAD WEIGHT FILLED	CENTER GATE	EMPTY LOAD WEIGHT
24	2.75 IN	WARHEAD HE XM229	52	94,794	D	101,972
7	76 MM	CANNISTER M363	56	138,152	D	88,760
8	90 MM	CANNISTER M377	52	115,080	D	111,488
12	90 MM	TP-T M353E1	52	120,744	D	112,996
13	90 MM	AP-T M318A1C	52	120,744	D	112,996
17	90 MM	CANNISTER M336	52	142,170	D	110,084
21	120 MM	AP-T M358E1 OR AP-T M359	48	147,216	D	135,408

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH OR OF OTHER WIDTHS, AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN ALSO BE USED.
2. THE TYPICAL FIXED LOAD SHOWN IS APPLICABLE FOR "OPEN-TYPE" PALLET UNITS AS DETAILED BY PICATINNY ARSENAL DRAWING NO. F-9837835, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART ("OPEN-TYPE")" AT LEFT. THE LOAD IS ALSO APPLICABLE FOR THE BOXED-TYPE PALLET UNITS AS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART (BOXED-TYPE)" AT LEFT. THE PROCEDURES ARE APPLICABLE FOR LOADS WHICH CONSIST OF EITHER ONE OR TWO LAYERS. SEE SPECIAL NOTE 5.
3. A 60-UNIT LOAD OF "OPEN-TYPE" PALLET UNITS MEASURING 38-1/8" LONG BY 44-3/4" WIDE BY 22-9/16" HIGH AND WEIGHING 1,935 POUNDS IS SHOWN AS TYPICAL. THE ACTUAL QUANTITY THAT CAN BE SHIPPED WILL DEPEND UPON THE WEIGHT AND/OR SIZE OF THE ITEM BEING LOADED AND THE LOAD LIMIT OF THE CAR BEING USED. SEE THE LOAD CAPACITY CHARTS AT LEFT FOR GUIDANCE.
4. THE "CENTER GATES D" AND SIXTEEN (16) STRUTS SHOWN IN THE LOAD ON PAGE 14 ARE APPLICABLE FOR ALL 2-LAYER LOADS. IF ONLY ONE LAYER OF THOSE ITEMS IS TO BE SHIPPED, "CENTER GATE A" AND EIGHT (8) STRUTS WILL BE USED. OMIT THE BUNDLING STRAPS, PIECES MARKED (5).
5. "OPEN-TYPE" LINE ITEMS NO. 12, 15, 29, 33, AND 35 ARE TOO HEAVY FOR A 2-LAYER LOAD AND ARE THEREFORE LIMITED TO ONE HIGH. THE DEPICTED PROCEDURES ARE ADAPTABLE FOR USE WITH 1-LAYER LOADS. THE BUNDLING STRAPS, PIECES MARKED (5), WILL NOT BE REQUIRED. "CENTER GATE A" (OR B") AS DETAILED ON PAGE 32, WILL BE SUBSTITUTED FOR EACH "CENTER GATE D", AND EIGHT (8) OR SIX (6) STRUTS, PIECES MARKED (3), WILL BE OMITTED.
6. "OPEN-TYPE" LINE ITEMS NO. 16, 21, 22, 26, 28, 32, 34, AND 37 ARE ONLY LOADED 13 OR 14 (INSTEAD OF 15) LOAD UNITS LONG IN ORDER FOR THE LOAD WEIGHT TO FALL WITHIN THE NORMAL LOAD LIMIT RANGE FOR A HIGH CAPACITY CAR; OTHER ITEMS MAY ALSO HAVE TO BE SHIPPED LESS THAN FIFTEEN (15) LONG IF THE LOAD LIMIT OF THE CAR BEING LOADED IS NOT GREAT ENOUGH. STRUT BRACING MUST BE APPLIED WHEN SHIPPING THESE SHORTER-LENGTH LOADS. SEE GENERAL NOTE "H" ON PAGE 5.
7. THESE LOADING PROCEDURES ON PAGES 14 AND 15 ARE RESTRICTED TO LOADS OF EITHER ONE (1) OR TWO (2) LAYERS; A LOAD WILL NOT BE INCREASED BY ADDING PALLET UNITS TO FORM A PARTIAL OR FULL THIRD LAYER.
8. THE DEPICTED LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A 2-LAYER LOAD CAN BE REDUCED BY A MULTIPLE OF FOUR (4) UNITS OR A 1-LAYER LOAD CAN BE REDUCED BY A MULTIPLE OF TWO (2) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. TWO UNITS CAN BE OMITTED FROM THE TOP LAYER BY UTILIZING THE STRUTTED-GATE METHOD SHOWN ON PAGE 25, OR ONE OR MORE UNITS CAN BE OMITTED BY INSTALLING A FILLER, AS DETAILED ON PAGE 40. IF THE DESIRED QUANTITY CANNOT BE ATTAINED BY OMITTING THE ENTIRE TOP LAYER, UNITS CAN BE RETAINED IN BOTH ENDS OF THE CAR WITH KNEE BRACES AS SHOWN ON PAGES 26 AND 27, OR UNITS CAN BE RETAINED IN ONE OR BOTH ENDS OF THE CAR WITH K-BRACES AS SHOWN ON PAGE 20, PROVIDING THE CAR HAS NAILABLE SIDEWALLS.
9. THE DEPICTED 2-LAYER LOADING PROCEDURES AND/OR THE 1-LAYER PROCEDURES AS PROVIDED FOR IN SPECIAL NOTE 5 CAN BE APPLIED FOR THE SHIPMENT OF A LCL LOAD FOR THOSE ITEMS LISTED ON PAGE 17, FULL LOADS OF WHICH WOULD CONSIST OF THREE OR MORE LAYERS.
10. PALLET UNITS WILL SHIFT LONGITUDINALLY DURING NORMAL TRANSPORTATION OF A LOAD. IN ORDER TO HELP PREVENT THE BUNDLING STRAPS, PIECES MARKED (5), FROM BECOMING SNAGGED ON ROUGH PORTIONS OF A CAR FLOOR, THE PALLET UNITS MUST BE PLACED UPON THE PRE-POSITIONED TEMPERED HARDBOARD STRIPS. TWELVE INCH (12") WIDE STRIPS ARE REQUIRED AT THE CAR END WALLS AND ALSO ADJACENT TO EACH CENTER GATE; 24" WIDE STRIPS ARE TO BE LOCATED SO AS TO BE CENTERED UNDER JOINTS BETWEEN LOAD UNITS. SEE THE "PREPARATION OF CAR FLOOR A" DETAIL ON PAGE 7 FOR GUIDANCE. NOTE THAT THE NAILS FOR SECURING THE HARDBOARD STRIPS TO THE CAR FLOOR SHOULD BE LOCATED SO AS NOT TO BE UNDER THE PALLET SKIDS WHEN THE UNITS ARE POSITIONED IN THE CAR.

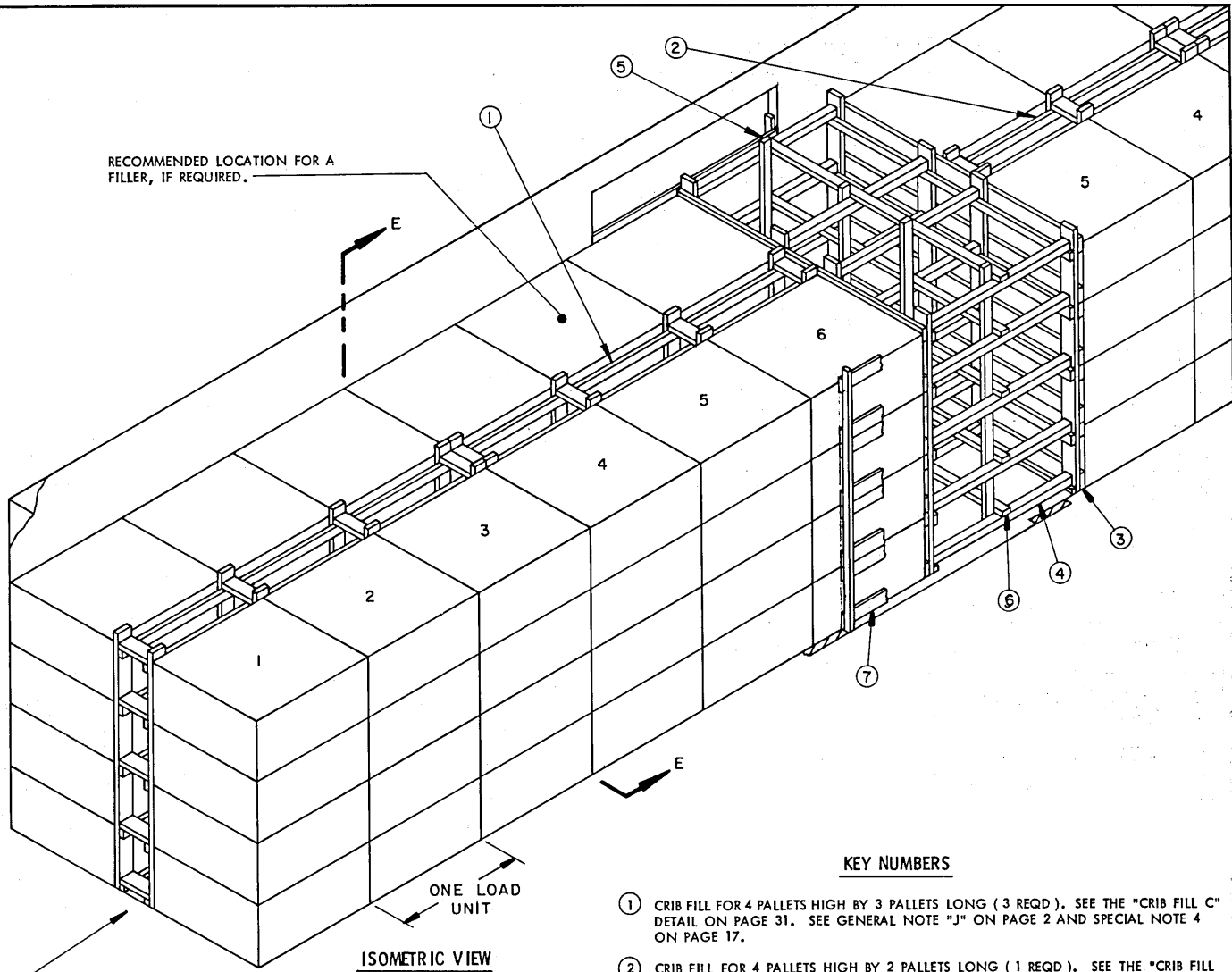
BILL OF MATERIAL (TYPICAL)

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	15	5
2" X 3"	37	16
2" X 4"	208	139
2" X 6"	95	95
4" X 4"	42	56
NAILS	NO. REQD	POUNDS
4d (1-1/2")	188	3/4
10d (3")	12	1/4
16d (3-1/2")	456	10
1/8" TEMPERED HARDBOARD	-----	272 SQ FT -- 119 LBS
STEEL STRAPPING, 1-1/4" X .035" OR .031"	-----	360' REQD --- 52 LBS
SEAL FOR 1-1/4" STRAPPING	-----	30 REQD -- 1-1/2 LBS

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	----- 60	116,100 LBS
DUNNAGE	-----	805 LBS
TOTAL WEIGHT	-----	116,905 LBS

TYPICAL 60-UNIT FIXED LOAD (2-WIDE BY 2-HIGH) OF "OPEN-TYPE" OR BOXED-TYPE PALLET UNITS IN A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR



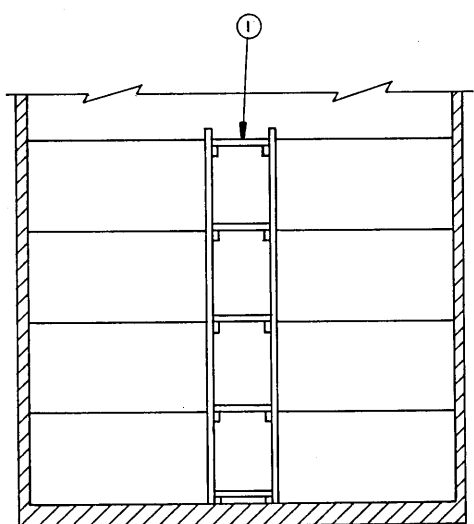
RECOMMENDED LOCATION FOR A FILLER, IF REQUIRED.

ISOMETRIC VIEW

IF THE END WALL OF A CAR IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD B" DETAIL ON PAGE 29.

KEY NUMBERS

- ① CRIB FILL FOR 4 PALLETS HIGH BY 3 PALLETS LONG (3 REQD). SEE THE "CRIB FILL C" DETAIL ON PAGE 31. SEE GENERAL NOTE "J" ON PAGE 2 AND SPECIAL NOTE 4 ON PAGE 17.
- ② CRIB FILL FOR 4 PALLETS HIGH BY 2 PALLETS LONG (1 REQD). SEE THE "CRIB FILL D" DETAIL ON PAGE 31.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE J" DETAIL ON PAGE 34. SEE SPECIAL NOTE 5 ON PAGE 17.
- ④ STRUT, 4" X 4" BY CUT TO FIT (20 REQD). TOENAIL TO THE VERTICAL PIECES OF THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 38 AND GENERAL NOTES "G" AND "H" ON PAGE 5 FOR ADDITIONAL GUIDANCE.
- ⑤ VERTICAL STRUT BRACING, 2" X 4" BY CUT TO EXTEND 2" ABOVE THE TOP STRUT (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 6 ON PAGE 17.
- ⑥ HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 1/2" (5 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑦ DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 39. SEE SPECIAL NOTE 7 ON PAGE 17.



SECTION E-E

TYPICAL 88-UNIT FIXED LOAD (2-WIDE BY 4-HIGH) OF "OPEN-TYPE" OR BOXED-TYPE PALLET UNITS IN A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR

LOAD CAPACITY CHART ("OPEN-TYPE")

LINE NO.	CALIBER	DESIGNATION	FILLED PROJECTILES				EMPTY PROJECTILES			
			NO. OF LAYERS	NO. LONG	ESTIMATED LOAD WEIGHT	CENTER GATE	NO. OF LAYERS	NO. LONG	LOAD WEIGHT	CENTER GATE
13	2.75 IN	WARHEAD HE M151, PRACTICE XM232	3	15	138,870	G	4	15	144,600	J
7	75 MM	HE M334	3	14*	145,488	G	3	15	137,970	G
18	90 MM	HE-T 91	3	14*	144,480	G	3	15	137,340	G
19	90 MM	CHEM-T T92	3	14*	149,016	G	3	15	142,200	G
20	105 MM	WARHEAD, 105MM XM547	3	15	142,920	G	3	15	122,400	G
25	105 MM	HEP M393A2, WP XM416	3	15	129,060	G	3	15	121,680	G
38	105 MM	HE XM400E3, M444, M444E1	3	15	133,470	G	3	15	112,950	G
38	105 MM	HE M444, M444E1	3	15	137,070	G	3	15	116,550	G
31	106 MM	HEAT M344A1	3	15	131,130	G	3	15	106,650	G
14	152 MM	TP-T XM411E2	3	13	146,250	G	3	13	144,056	G
40	152 MM	HE XM657E2	4	13	142,272	J	4	13	137,360	J
41	155 MM	M549 MOTOR BODY ASSY	3	15	139,320	G	4	15	134,400	J
39	165 MM	HEP T237E4 (M123)	3	15	140,760	G	4	15	109,440	J

*SEE SPECIAL NOTE 8 AT RIGHT.

LOAD CAPACITY CHART (BOXED-TYPE)

LINE NO.	CALIBER	DESIGNATION	FILLED PROJECTILES				EMPTY PROJECTILES		
			NO. OF LAYERS	NO. LONG	ESTIMATED LOAD WEIGHT	CENTER GATE	NO. OF LAYERS	NO. LONG	LOAD WEIGHT
1	75 MM	AP-T M338A1	3	11*	146,322	G	3	11	134,772
2	75 MM	HEP-T150E29 OR T165E29	5	11	134,640	L	5	11	93,720
3	75 MM	HEP-T151E28	5	11	131,340	L	5	11	90,420
5*	76 MM	HVAP-T M93A1	4	14	133,840	J	4	14	120,288
6	76 MM	AP-T M339E1 OR TP-T M340A1E1	3	14	139,020	G	3	14	128,856
9*	76 MM	HVAP-T T66E3 OR T66E5	5	14	135,940	L	5	14	119,000
10	76 MM	HEAT-T M496	5	14	147,700	L	5	14	126,000
26	81 MM	WP M375E2	5	14	153,020	L	5	14	123,200
11	90 MM	HVAP-TM332A1E1 OR HVTP-M333A1E1	4	13	140,504	J	4	13	125,008
14	90 MM	HEAT M431E1	4	12	144,864	J	4	12	126,720
23	90 MM	HEAT M371E1	5	13	83,590	G	5	13	61,490
4*	105 MM	APERS-T M380	3	11	124,014	J	3	11	113,520
4*	105 MM	APERS-T XM603E1	3	11	135,498	G	3	11	125,004
15	105 MM	HEP-T M345 OR M345B1	4	11	151,800	J	4	11	84,832
16	105 MM	HEAT M341	4	11	128,128	J	4	11	105,336
18	105 MM	HEAT M456A1 OR M456A1E1	4	13*	143,520	J	4	14	128,736
20	105 MM	APDS-T M392A3	5	12	150,000	L	5	12	129,600
25	105 MM	TP-T M459	3	11	150,480	G	3	11	135,960
19	106 MM	HEP-T M346A1	4	11	148,544	J	4	11	84,832
22*	120 MM	HEAT M469	4	12	140,544	J	4	12	117,600

*SEE SPECIAL NOTE 8 AT RIGHT.

*SEE SPECIAL NOTE 11 AT RIGHT.

SPECIAL NOTES:

- A 50'-4" LONG BY 9'-2" WIDE CUSHIONED TYPE BOX CAR EQUIPPED WITH 7'-0" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH OR OF OTHER WIDTHS, AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN ALSO BE USED.
- THE TYPICAL FIXED LOAD SHOWN IS APPLICABLE FOR "OPEN-TYPE" PALLET UNITS AS DETAILED BY PICA-TINNY ARSENAL DRAWING NO. F-8837835, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART ("OPEN-TYPE")" AT LEFT. THE LOAD IS ALSO APPLICABLE FOR BOXED-TYPE PALLET UNITS AS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART ("BOXED-TYPE")" AT LEFT. THE PROCEDURES ARE APPLICABLE FOR LOADS WHICH CONSIST OF MORE THAN TWO LAYERS.
- AN 88-UNIT LOAD OF BOXED-TYPE PALLET UNITS MEASURING 49-3/8" LONG BY 46-1/2" WIDE BY 24" HIGH AND WEIGHING 1,456 POUNDS IS SHOWN AS TYPICAL. THE ACTUAL QUANTITY THAT CAN BE SHIPPED WILL DEPEND UPON THE WEIGHT AND/OR SIZE OF THE ITEM BEING LOADED AND THE LOAD LIMIT OF THE CAR BEING USED. SEE THE LOAD CAPACITY CHARTS AT LEFT FOR GUIDANCE.
- IF THE BASES OF THE PALLET UNITS BEING SHIPPED ARE OF THE TYPE WHICH ARE PROVIDED WITH FORK LIFT OPENINGS FOR 4-WAY PICKUP, ANTI-SWAY BRACES MAY BE USED FOR LATERAL BRACING IN LIEU OF THE DEPICTED CRIB FILL ASSEMBLIES. SEE THE DETAIL ON PAGE 40. NOTE THAT ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLET UNITS IN EACH LAYER, AND MUST BE INSTALLED IN-PLACE AS LOADING PROGRESSES.
- THE "CENTER GATES J" AND TWENTY (20) STRUTS SHOWN IN THE LOAD ON PAGE 16 ARE NOT APPLICABLE FOR ALL MULTI-LAYER LOADS. THE PROPER CENTER GATE FOR USE WITH AN ITEM, FOR THE NUMBER OF LAYERS (MAX) STATED, IS SPECIFIED WITHIN THE CHARTS AT LEFT. IF A LESSER NUMBER OF LAYERS IS TO BE SHIPPED, A DIFFERENT CENTER GATE WILL BE REQUIRED. SEE THE "CENTER GATE CHART ON PAGE 38 FOR SELECTION GUIDANCE. THE QUANTITY OF STRUTS TO BE USED WITH THE APPLICABLE CENTER GATES IS SPECIFIED UNDER THE DETAIL FOR THAT GATE.
- STRUT BRACING, SHOWN IN THE DEPICTED LOAD AS PIECES MARKED (5) AND (6), IS REQUIRED FOR THE STIFFENING OF STRUTS WHICH ARE 48" OR MORE IN LENGTH. IF THE LENGTH OF THE STRUTS FOR THE ITEM BEING SHIPPED IS LESS THAN 48" THE STRUT BRACING IS NOT REQUIRED. SEE GENERAL NOTE "H" ON PAGE 5.
- DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH. THE DOORWAY PROTECTION, PIECE MARKED (7) IN THE DEPICTED LOAD, IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS, INSTALL SPACERS AND DOORWAY PROTECTION STRAPS IN LIEU OF THE WOODEN GATES. SEE PIECES MARKED (5) AND (7) ON PAGE 8 FOR INSTALLATION GUIDANCE.
- THE "NO. LONG" SPECIFIED FOR FILLED PROJECTILES, "OPEN-TYPE" LINE ITEMS NO. 7, 18, AND 19, AND BOXED-TYPE LINE ITEMS NO. 1 AND 18, IS LESS THAN THE MAXIMUM WHICH CAN BE LOADED IN A CAR. IF THE LOAD LIMIT OF THE CAR BEING LOADED PERMITS, ONE (1) ADDITIONAL LOAD UNIT MAY BE SHIPPED. NOTE THAT STRUT BRACING MUST BE APPLIED WHEN SHIPPING THESE SHORTER-LENGTH LOADS. SEE GENERAL NOTE "H" ON PAGE 5.
- IF DESIRED, THE DEPICTED PROCEDURES CAN BE APPLIED FOR THE SHIPMENT OF A 2-LAYER LOAD FOR ANY OF THE ITEMS SPECIFIED WITHIN THE CHARTS ABOVE, OR THEY CAN BE USED IN LIEU OF THE PROCEDURES SHOWN ON PAGE 14.
- A LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD CAN BE INCREASED BY ADDING PALLET UNITS IN ONE OR BOTH ENDS OF THE CAR, RETAINED WITH K-BRACES AS SHOWN ON PAGE 20, PROVIDING THE CAR HAS NAILABLE SIDEWALLS. A LOAD CAN BE REDUCED BY A MULTIPLE OF THE NUMBER OF PALLETS IN A LOAD UNIT BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. TWO UNITS CAN BE OMITTED FROM THE TOP LAYER BY UTILIZING THE STRUTTED-GATE METHOD SHOWN ON PAGE 25, OR ONE OR MORE UNITS CAN BE OMITTED BY INSTALLING A FILLER, AS DETAILED ON PAGE 40. IF THE DESIRED QUANTITY CANNOT BE ATTAINED BY OMITTING THE ENTIRE TOP LAYER, UNITS CAN BE RETAINED IN BOTH ENDS OF THE CAR WITH KNEE BRACES AS SHOWN ON PAGES 26 AND 27, OR UNITS CAN BE RETAINED IN ONE OR BOTH ENDS OF THE CAR WITH K-BRACES AS SHOWN ON PAGE 20, PROVIDING THE CAR HAS NAILABLE SIDEWALLS.
- BOXED-TYPE LINE ITEMS NO. 4, 5, 9, AND 22 MAY BE LOADED 3-WIDE, AND/OR 3 AND 2-WIDE, AS SHOWN OR PROVIDED FOR ON PAGES 18 AND 19, IF THOSE PROCEDURES ARE MORE ADVANTAGEOUS AS TO DUNNAGE REQUIREMENTS OR A READILY OBTAINABLE QUANTITY OF UNITS.

BILL OF MATERIAL (TYPICAL)

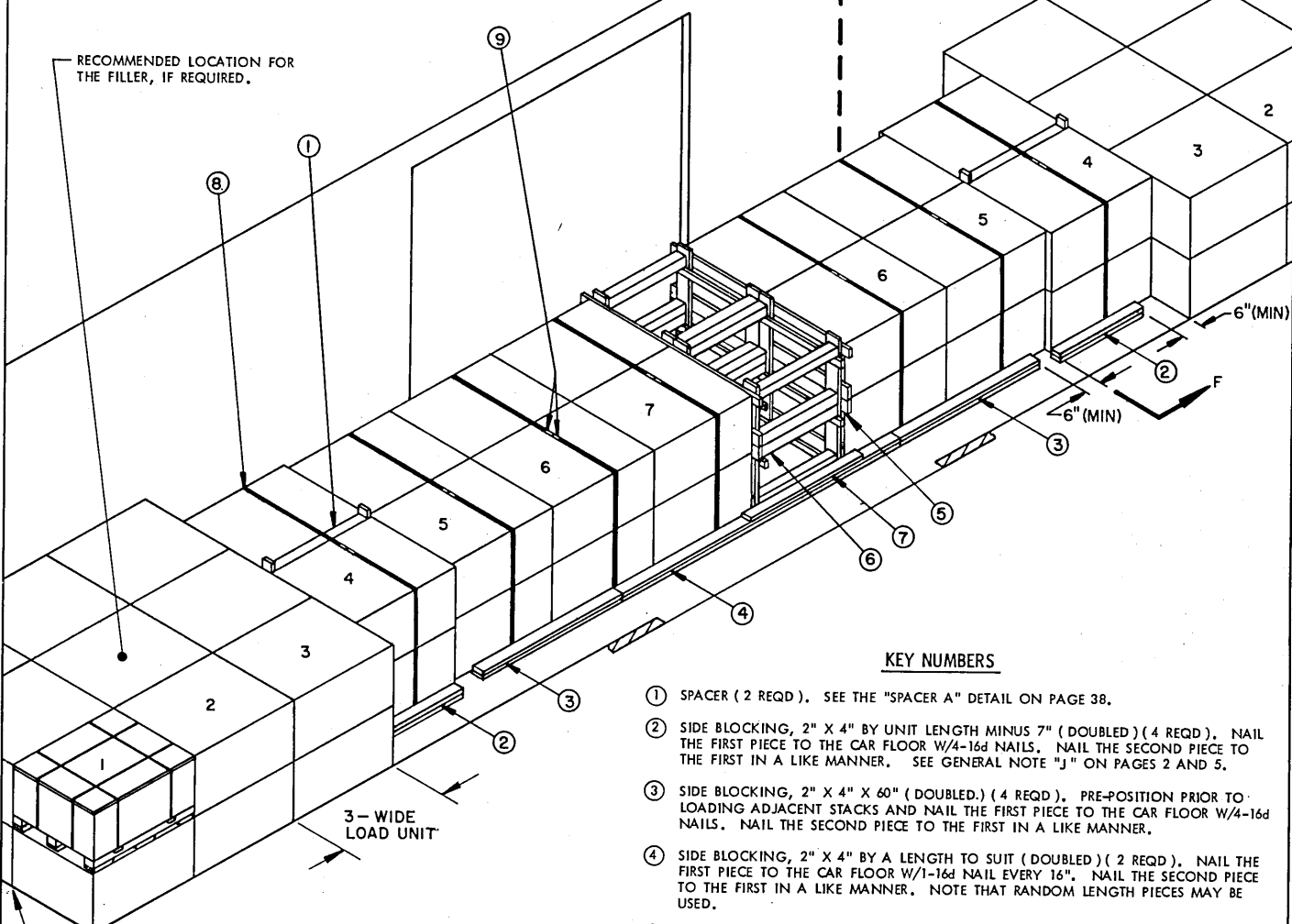
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	112	56
2" X 2"	110	37
2" X 3"	384	192
2" X 4"	79	53
2" X 6"	532	532
4" X 4"	95	127
NAILS	NO. REQD	POUNDS
6d (2")	96	3/4
10d (3")	446	7
12d (3-1/4")	240	4
16d (3-1/2")	368	8

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	88	128,128 LBS
DUNNAGE		2,014 LBS
TOTAL WEIGHT		130,142 LBS

TYPICAL 88-UNIT FIXED LOAD (2-WIDE X 4-HIGH) OF "OPEN-TYPE" OR BOXED-TYPE PALLET UNITS IN A 50'-6" L X 9'-2" W CUSHIONED BOXCAR.

IF THE END WALL OF A CAR IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD B" DETAIL ON PAGE 29.



RECOMMENDED LOCATION FOR THE FILLER, IF REQUIRED.

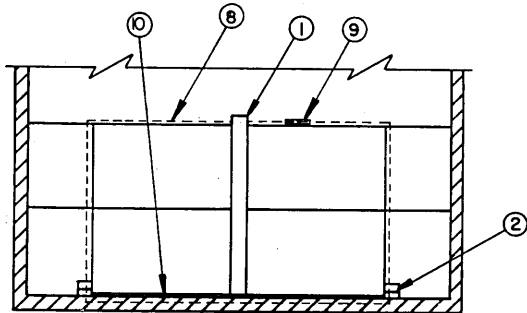
3-WIDE LOAD UNIT

SEE SPECIAL NOTE 4 ON PAGE 19.

ISOMETRIC VIEW

KEY NUMBERS

- ① SPACER (2 REQD). SEE THE "SPACER A" DETAIL ON PAGE 38.
- ② SIDE BLOCKING, 2" X 4" BY UNIT LENGTH MINUS 7" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "J" ON PAGES 2 AND 5.
- ③ SIDE BLOCKING, 2" X 4" X 60" (DOUBLED) (4 REQD). PRE-POSITION PRIOR TO LOADING ADJACENT STACKS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ④ SIDE BLOCKING, 2" X 4" BY A LENGTH TO SUIT (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 16". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. NOTE THAT RANDOM LENGTH PIECES MAY BE USED.
- ⑤ CENTER GATE (2 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 32.
- ⑥ STRUT, 4" X 4" BY CUT TO FIT (16 REQD). POSITION AS SHOWN AND TOENAIL TO THE VERTICALS OF THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 38 AND GENERAL NOTES "G" AND "H" ON PAGE 5 FOR ADDITIONAL GUIDANCE.
- ⑦ GATE RETAINER, 2" X 4" BY LENGTH OF CENTER VOID PLUS 12" (REF: 48") (2 REQD). NAIL TO PIECE MARKED ④ W/6-10d NAILS.
- ⑧ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (7 REQD). ALTHOUGH IT IS NOT MANDATORY, IT IS SUGGESTED THAT A STRAP BE PRE-POSITIONED PRIOR TO LOADING A STACK SO THAT THE STRAP WILL ENIRCLE THE STACK AS SHOWN, WHEN IT IS TENSIONED AND SEALED. SEAL EACH STRAP JOINT W/2-SEALS PER STRAP. SEE PIECE MARKED ⑩.
- ⑨ SEAL FOR 1-1/4" STEEL STRAPPING (14 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- ⑩ TEMPERED HARDBOARD STRIP, 1/8" THICK BY A WIDTH AND LENGTH TO SUIT (2 REQD AT 12" WIDE BY TWO PALLET WIDTHS IN LENGTH, 5 REQD AT 24" WIDE BY TWO PALLET WIDTHS IN LENGTH, AND 2 REQD AT A LENGTH OF TWO PALLET WIDTHS PLUS WIDTH OF SPACER). PRE-POSITION AS TYPICALLY SHOWN BY THE "PREPARATION OF CAR FLOOR "A"" DETAIL ON PAGE 7. NAIL THE 12" WIDE STRIPS TO THE CAR FLOOR W/8-4d NAILS. NAIL THE 24" WIDE STRIPS TO THE CAR FLOOR W/12-4d NAILS. SEE SPECIAL NOTE 10 ON PAGE 19.



SECTION F-F

TYPICAL 64-UNIT FIXED LOAD (3 AND 2-WIDE BY 2-HIGH) OF BOXED-TYPE PALLET UNITS IN A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR

3 AND 2-WIDE LOAD CAPACITY CHART

LINE NO.	CALIBER	DESIGNATION	MIN CAR WIDTH	NO. LONG	MAX UNITS	ESTIMATED LOAD WEIGHT FILLED	CENTER GATE	EMPTY LOAD WEIGHT
24	2.75 IN	WARHEAD HE XM229	9'-2"	13	66*	148,962	D	129,426
5	76 MM	HVAP-T M93A1	9'-4"	15	86	102,770	D	92,364
7	76 MM	CANNISTER M363	9'-6"	14	60*	148,020	D	95,100
9	76 MM	HVAP-T T66E3 OR T66E5	9'-6"	14	80	77,680	D	68,000
4	105 MM	APERS-T M380	9'-2"	11	62	116,498	D	106,640
4	105 MM	APERS-T XM603E1	9'-2"	11	62	127,286	D	117,428
22	120 MM	HEAT M469	9'-6"	12	68	99,552	D	83,300

*SEE SPECIAL NOTE 5 AT RIGHT.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH, WIDER CARS, AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN ALSO BE USED. NOTE THAT SOME ITEMS WILL REQUIRE CARS WIDER THAN 9'-2". SEE THE "3 AND 2-WIDE LOAD CAPACITY CHART" ABOVE.
2. THE TYPICAL FIXED LOAD SHOWN IS APPLICABLE FOR BOXED-TYPE PALLET UNITS AS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604, AND FOR THE ITEMS AS SPECIFIED IN THE "LOAD CAPACITY CHART" ABOVE. THE PROCEDURES ARE APPLICABLE ONLY FOR THOSE PALLET UNITS WHICH ARE NARROW ENOUGH TO BE LOADED THREE (3) WIDE IN A BOX CAR, BUT EITHER BECAUSE OF THE ITEM WEIGHT OR THE QUANTITY TO BE SHIPPED CANNOT BE LOADED 3-WIDE THRU THE ENTIRE LENGTH OF THE CAR.
3. A 64-UNIT LOAD OF BOXED-TYPE PALLET UNITS MEASURING 44-5/8" LONG BY 36-1/2" WIDE BY 28-7/8" HIGH AND WEIGHING 2,257 POUNDS IS SHOWN AS TYPICAL. THE ACTUAL QUANTITY THAT CAN BE SHIPPED WILL DEPEND UPON THE LENGTH AND WEIGHT OF THE ITEM BEING LOADED AND THE LOAD LIMIT OF THE CAR BEING USED. SEE THE "LOAD CAPACITY CHART" ABOVE FOR GUIDANCE.
4. PALLET STACKS IN THE 3-WIDE PORTION OF THE LOAD MUST BE POSITIONED SNUGLY AGAINST A CAR SIDEWALL AND/OR AGAINST AN ALREADY-POSITIONED PALLET STACK. IF THE REMAINING VOID AFTER THE PALLET UNITS ARE POSITIONED IS MORE THAN TWO AND ONE-HALF INCHES (2-1/2"), THE VOID MUST BE FILLED IN ORDER TO PREVENT LATERAL DISPLACEMENT OF THE PALLET UNITS WITHIN A STACK. THE FILL MUST BE POSITIONED BETWEEN TWO ROWS OF PALLET UNITS. SEE THE "CRIB FILL A" AND/OR "CRIB FILL B" DETAILS ON PAGE 30 FOR GUIDANCE IN THE CONSTRUCTION OF ASSEMBLIES TO BE USED IN A SMALL VOID. THE ASSEMBLIES SHOWN BY THE "CRIB FILL C" AND/OR "CRIB FILL D" DETAILS ON PAGE 31 MAY BE USED FOR WIDER VOIDS OF 8" OR MORE.
5. THE "MAX UNITS" SPECIFIED FOR LINE ITEMS NO. 7 AND 24 IN THE "3 AND 2-WIDE LOAD CAPACITY CHART" AT LEFT IS BASED ON A LOAD WEIGHT OF NOT MORE THAN 150,000 POUNDS. IF THE LOAD LIMIT OF THE CAR BEING LOADED PERMITS, ADDITIONAL PALLET UNITS MAY BE SHIPPED BY INCREASING THE NUMBER OF 3-WIDE LOAD UNITS AND DECREASING THE NUMBER OF 2-WIDE LOAD UNITS. CAUTION: IF ONE-HALF OR MORE OF A 3-WIDE LOAD UNIT EXTENDS INTO THE DOORWAY, DOORWAY PROTECTION MUST BE PROVIDED. SEE PIECE MARKED (5) ON PAGE 12.
6. ALTHOUGH A CARLOAD IS NOT SHOWN, THE BOXED-TYPE PALLET UNITS IN THE 3 AND 2-WIDE PROCEDURES ON PAGE 18 CAN ALSO BE LOADED 3-WIDE THROUGHOUT THE FULL LENGTH OF THE CAR. SEE THE "FULL 3-WIDE LOAD CAPACITY CHART" AT LEFT FOR GUIDANCE AS TO THE NUMBER OF LAYERS, NUMBER LONG, AND LOAD WEIGHTS. THE PROPER CENTER GATES FOR USE ARE ALSO SPECIFIED WITHIN THE CHART, AND ARE TYPICALLY SHOWN IN THE LOAD ON PAGE 12. DOORWAY PROTECTION MUST BE INSTALLED, AND IS ALSO SHOWN IN THE PAGE 12 LOAD AS IS STRUT BRACING, IF REQUIRED. SEE GENERAL NOTE "H" ON PAGE 5. MINIMUM CAR WIDTHS FOR AN ITEM ARE THE SAME AS FOR THE 3 AND 2-WIDE LOAD AND ARE SPECIFIED BY THE CHART FOR THAT LOAD.
7. THESE LOADING PROCEDURES ON PAGES 18 AND 19 ARE RESTRICTED TO LOADS OF EITHER ONE (1) OR TWO (2) LAYERS. FOR SHIPMENT OF A ONE-LAYER LOAD, OMIT THE BUNDLING STRAPS, PIECES MARKED (8), AND SUBSTITUTE "CENTER GATE A" FOR THE SPECIFIED "CENTER GATE D".
8. THE DEPICTED PROCEDURES CAN BE APPLIED FOR THE SHIPMENT OF A LCL LOAD FOR THOSE ITEMS LISTED IN THE "FULL 3-WIDE LOAD CAPACITY CHART" AT LEFT, A FULL LOAD OF WHICH WOULD CONSIST OF A FULL TWO OR THREE LAYERS.
9. A 2-HIGH LOAD CAN BE ADJUSTED BY TWO PALLET UNITS BY INCREASING OR DECREASING THE NUMBER OF 3-WIDE LOAD UNITS AND AT THE SAME TIME DECREASING OR INCREASING THE NUMBER OF 2-WIDE LOAD UNITS. TO OBTAIN AN UNEVEN LOAD QUANTITY, INSTALL A FILLER WITHIN THE TOP LAYER. SEE THE "FILLER" DETAIL ON PAGE 40.
10. PALLET UNITS WILL SHIFT LONGITUDINALLY DURING NORMAL TRANSPORTATION OF A LOAD. IN ORDER TO HELP PREVENT THE BUNDLING STRAPS, PIECES MARKED (8), FROM BECOMING SNAGGED ON ROUGH PORTIONS OF A CAR FLOOR, THE PALLET UNITS WHICH ARE BUNDLED (PLUS THE ADJACENT END OF A 3-WIDE LOAD UNIT) MUST BE PLACED UPON PRE-POSITIONED TEMPERED HARDBOARD STRIPS. TWELVE INCH (12") WIDE STRIPS ARE REQUIRED ADJACENT TO EACH CENTER GATE; 24" WIDE STRIPS ARE TO BE LOCATED SO AS TO BE CENTERED UNDER JOINTS BETWEEN THE BUNDLED LOAD UNITS, AS WELL AS UNDER THE JOINTS BETWEEN THE 3-WIDE AND 2-WIDE PORTIONS OF THE LOAD. SEE THE "PREPARATION OF A CAR FLOOR 'A'" DETAIL ON PAGE 7 FOR GUIDANCE. NOTE THAT THE NAILS FOR SECURING THE HARDBOARD STRIPS TO THE CAR FLOOR SHOULD BE LOCATED SO AS NOT TO BE UNDER THE PALLET SKIDS WHEN THE UNITS ARE POSITIONED IN THE CAR.

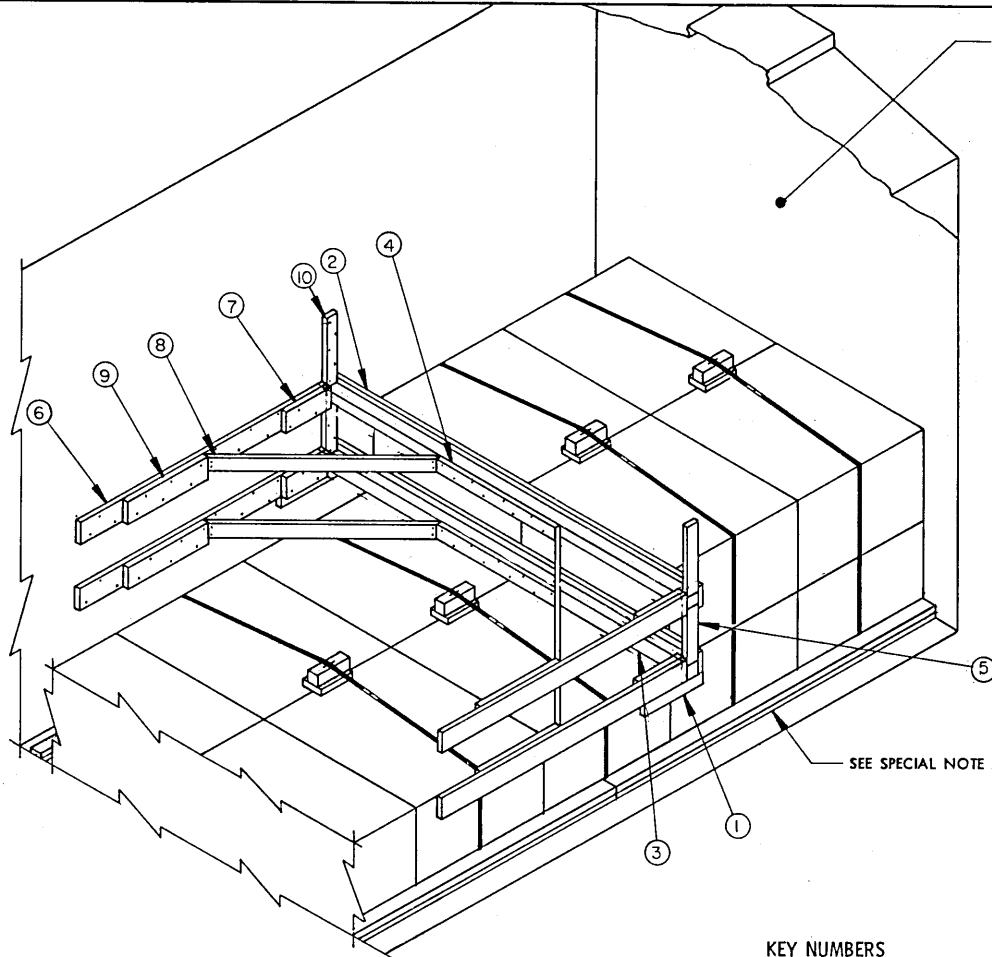
BILL OF MATERIAL (TYPICAL)

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	12	4
2" X 3"	28	14
2" X 4"	129	86
2" X 6"	80	80
4" X 4"	74	99
NAILS	NO. REQD	POUNDS
4d (1-1/2")	100	1/2
10d (3")	12	1/4
16d (3-1/2")	350	7-3/4
1/8" TEMPERED HARDBOARD -----		98 SQ FT --43 LBS
STEEL STRAPPING, 1-1/4" X .035" OR .031" -----		154' REQD ---22 LBS
SEAL FOR 1-1/4" STRAPPING -----		14 REQD --3/4 LB

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT -----	64 -----	144,448 LBS
DUNNAGE -----		641 LBS
TOTAL WEIGHT -----		145,089 LBS

TYPICAL 64-UNIT FIXED LOAD (3 AND 2-WIDE BY 2-HIGH) OF BOXED-TYPE PALLET UNITS IN A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL, WOOD-LINED BOX CAR IS SHOWN. WOOD-LINED CARS OF OTHER WIDTHS CAN BE USED.
2. THE LCL LOAD SHOWN AND THE BLOCKING AND BRACING SHOWN ARE TYPICAL. K-BRACES MAY BE USED FOR THE BRACING OF A PARTIAL LAYER IN ANY OF THE LOADS SHOWN ON PAGES 6 THRU 18.
3. THE K-BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING MAY BE USED IN WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL UPPER LAYER. THE TYPE "A" BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL LAYER OF NOT MORE THAN 8,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 21, 22, AND 23 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE.
4. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL LAYER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑦, AND ⑩ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A SIDEWALL. IT IS ALRIGHT FOR THE END OF A DIAGONAL BRACE MARKED ⑧

(CONTINUED AT RIGHT)

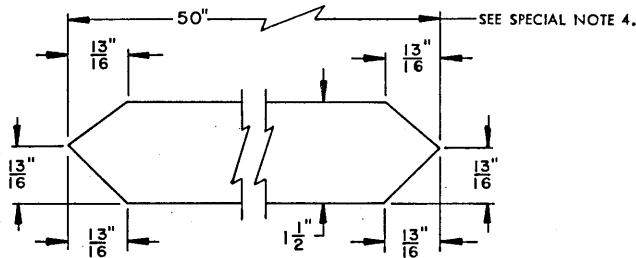
KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 3" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "J" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 5 BELOW.
- ⑤ SPACER CLEAT, 2" X 4" BY PALLET UNIT HEIGHT MINUS 8-1/2" (2 REQD). NAIL TO THE CAR SIDEWALL W/1-12d NAIL EVERY 4".
- ⑥ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD); NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑦ POCKET CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/4-16d NAILS.
- ⑧ DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/2-16d NAILS AT EACH END. SEE SPECIAL NOTE 4.
- ⑨ BACK-UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/8-16d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

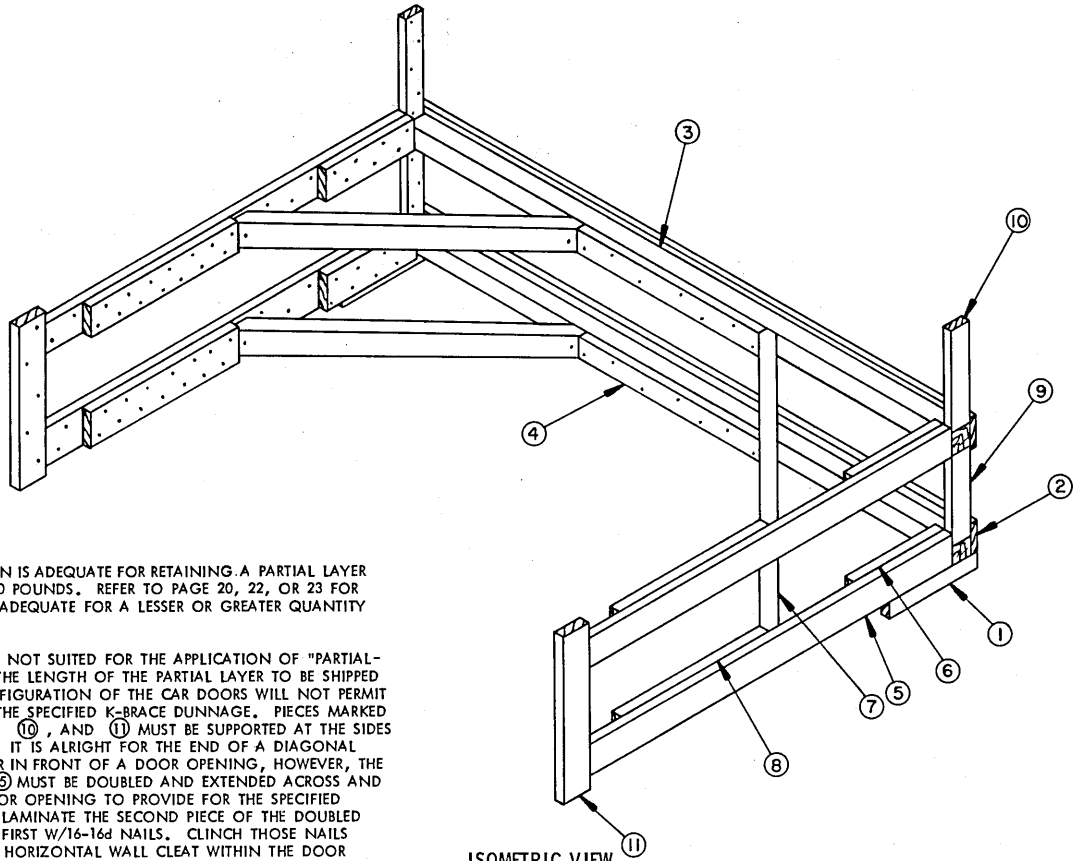
(SPECIAL NOTES CONTINUED)

TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ④ MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE. LAMINATE THE SECOND PIECE OF THE DOUBLED PIECE MARKED ④ TO THE FIRST W/16-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ④ IS DOUBLED.

5. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑤, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2" WIDE CAR, 38" LONG FOR A 9'-4" WIDE CAR, AND 40" LONG FOR A 9'-6" WIDE CAR. ADJUST THE LENGTH PROPORTIONALLY FOR CARS OF OTHER WIDTHS.
6. A FILLER WILL BE USED IN OBTAINING A QUANTITY OTHER THAN A FULL QUANTITY BEHIND THE K-BRACE. SEE THE "FILLER" DETAIL ON PAGE 40.



DIAGONAL BRACE



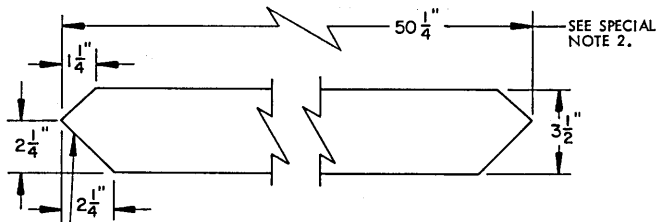
ISOMETRIC VIEW

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 3" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③ , W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "J" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③ , W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤ , W/7-16d NAILS.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③ , AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤ , W/1-60d NAIL AT EACH END. SEE SPECIAL NOTE 2 AT LEFT.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤ , W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" BY PALLET UNIT HEIGHT MINUS 8-1/2" (2 REQD). NAIL TO THE CAR SIDEWALL W/1-12d NAIL EVERY 4".
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ VERTICAL BACK-UP CLEAT, 2" X 6" BY UNIT HEIGHT (2 REQD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.

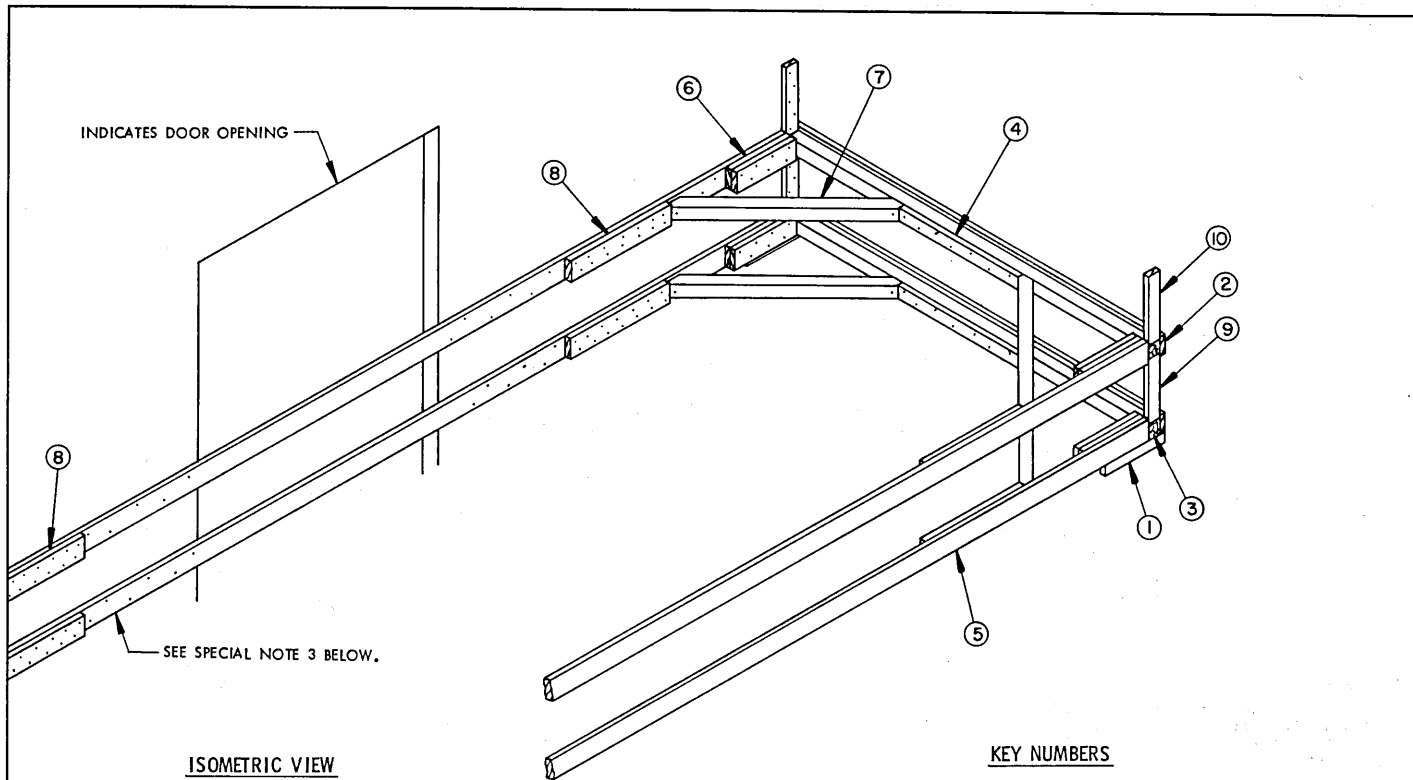
SPECIAL NOTES:

- 1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL LAYER OF NOT MORE THAN 14,000 POUNDS. REFER TO PAGE 20, 22, OR 23 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A LESSER OR GREATER QUANTITY OF PALLET UNITS.
- 2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL LAYER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ① , ② , ③ , ④ , ⑤ , ⑥ , ⑦ , ⑧ , ⑨ , ⑩ , AND ⑪ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A SIDEWALL. IT IS ALRIGHT FOR THE END OF A DIAGONAL BRACE MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ③ MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE. LAMINATE THE SECOND PIECE OF THE DOUBLED PIECE MARKED ③ TO THE FIRST W/16-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ③ IS DOUBLED.
- 3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ④ , WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2" WIDE CAR, 38" LONG FOR A 9'-4" WIDE CAR, AND 40" FOR A 9'-6" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
- 4. REFER TO PAGE 20 FOR A TYPICAL INSTALLATION OF A K-BRACE.



DIAGONAL BRACE

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A CROSS CAR BRACE, PIECE MARKED ③ , OR A HORIZONTAL WALL CLEAT, PIECE MARKED ⑤ .



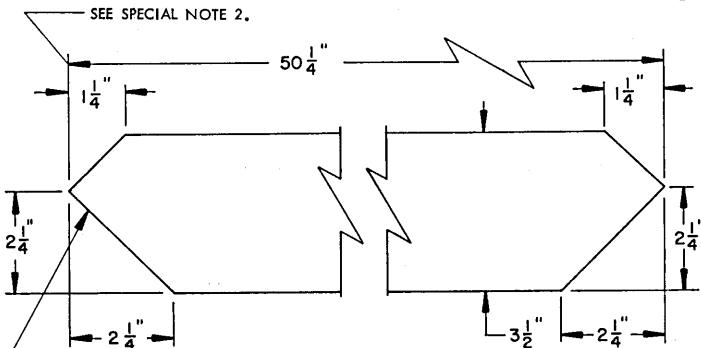
ISOMETRIC VIEW

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 3" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③; W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "J" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 3 ON PAGE 21.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO CONTACT PIECE MARKED ③ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/1-60d NAIL AT EACH END. SEE SPECIAL NOTE 2 AT LEFT.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" BY UNIT HEIGHT MINUS 8-1/2" (2 REQD). NAIL TO THE CAR SIDE WALL W/4-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

SPECIAL NOTES:

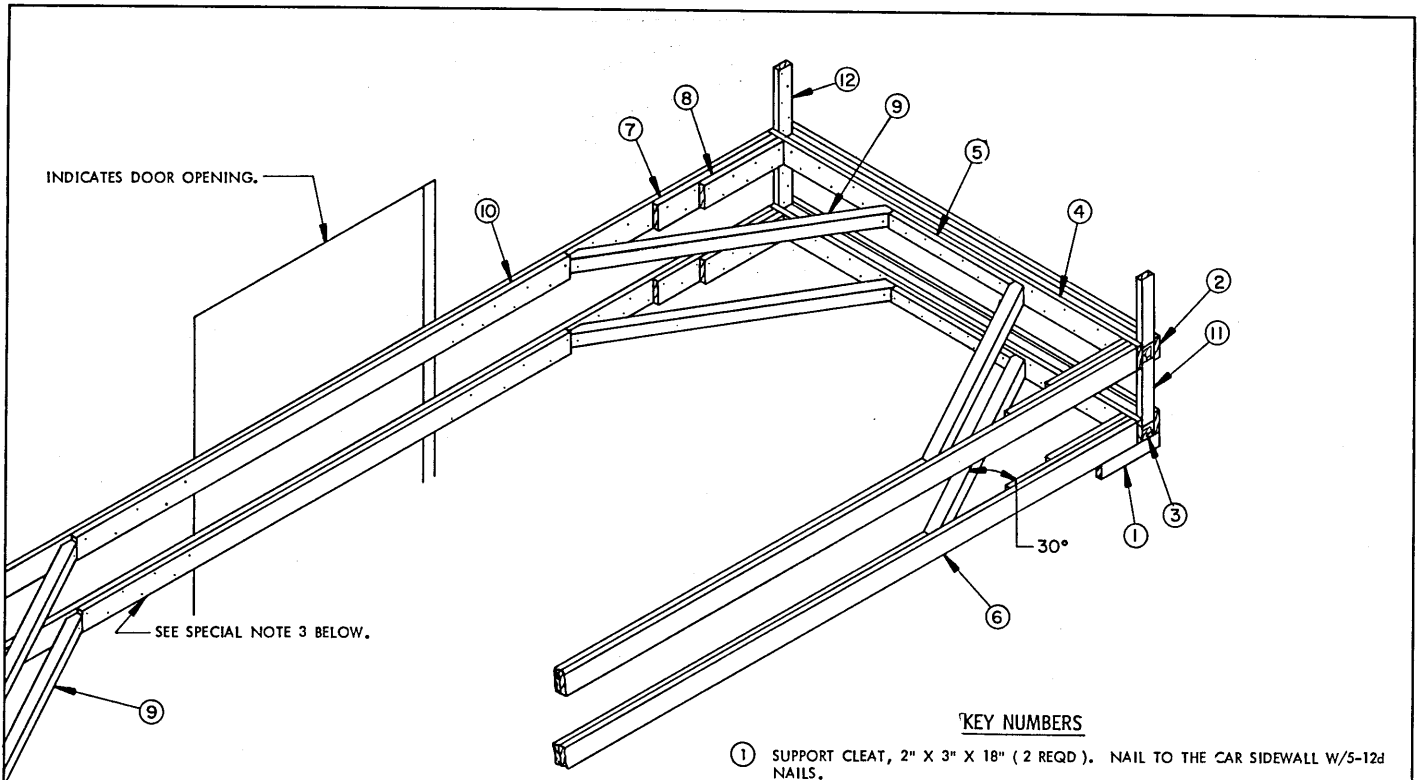
- 1. THE TYPE "C" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL LAYER OF NOT MORE THAN 20,000 POUNDS IN EACH END OF THE CAR. REFER TO PAGE 20, 21, OR 23 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A LESSER OR GREATER QUANTITY OF PALLET UNITS.
- 2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑨ AND ⑩ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALLRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED.
- 3. **CAUTION:** A TYPE "C" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR; THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑤, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.
- 4. REFER TO PAGE 20 FOR A TYPICAL INSTALLATION OF A K-BRACE.



DIAGONAL BRACE

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A CROSS CAR BRACE, PIECE MARKED ③, OR A HORIZONTAL WALL CLEAT, PIECE MARKED ⑤.

TYPE "C" K-BRACE



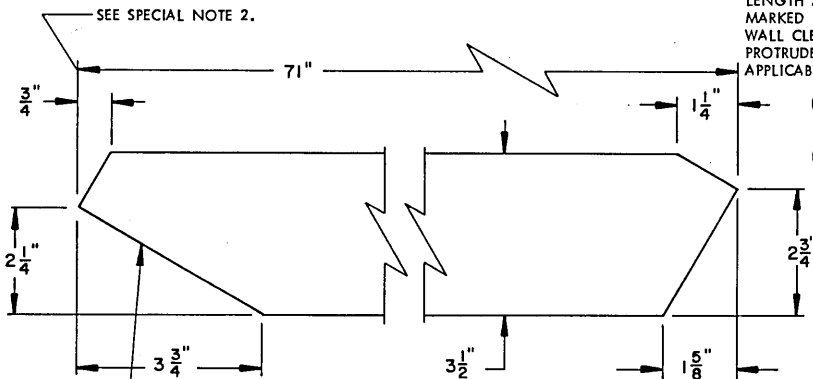
ISOMETRIC VIEW

SPECIAL NOTES:

1. THE TYPE "D" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL LAYER OF NOT MORE THAN 25,000 POUNDS IN EACH END OF THE CAR. REFER TO PAGE 20, 21, OR 22 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A LESSER QUANTITY OF PALLET UNITS.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑦, ⑧, ⑪, AND ⑫ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑨ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑥ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 70-1/4" LONG IN LIEU OF 71" LONG WHEN PIECE MARKED ⑥ IS DOUBLED.
3. **CAUTION:** A TYPE "D" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR; THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑥ AND ⑩, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.
4. REFER TO PAGE 20 FOR A TYPICAL INSTALLATION OF A K-BRACE.

KEY NUMBERS

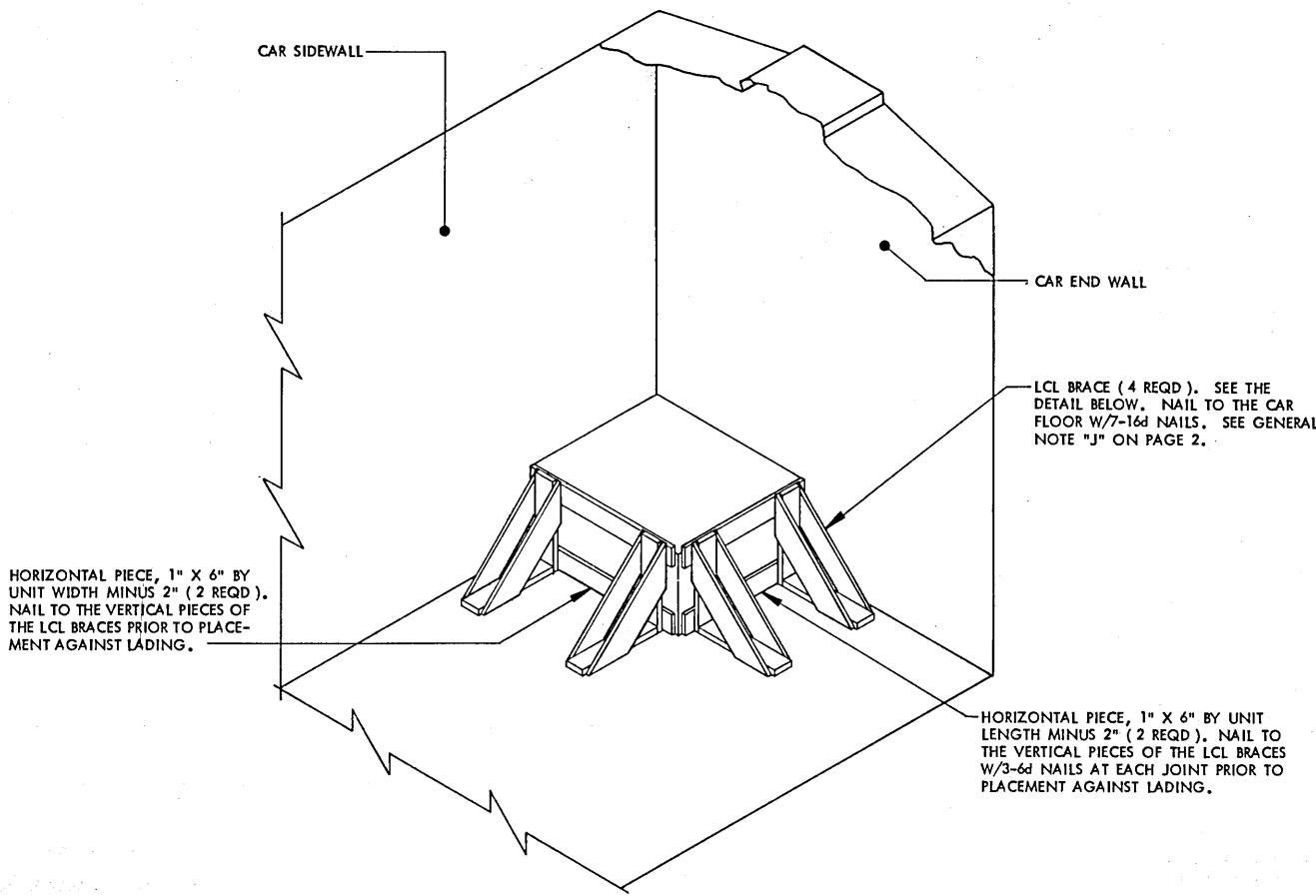
- ① SUPPORT CLEAT, 2" X 3" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "J" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6".
- ⑤ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE HORIZONTAL PIECE, PIECE MARKED ④, W/7-16d NAILS. SEE SPECIAL NOTE 5 ON PAGE 20.
- ⑥ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO CONTACT PIECE MARKED ④ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑦ POCKET CLEAT, 2" X 6" X 36" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/10-16d NAILS.
- ⑧ POCKET CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE POCKET CLEAT, PIECE MARKED ⑦, W/7-16d NAILS.
- ⑨ DIAGONAL BRACE, 4" X 4" X 71" (4 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE HORIZONTAL PIECE, PIECE MARKED ④, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/1-60d NAIL AT EACH END. SEE SPECIAL NOTE 2 AT LEFT.
- ⑩ BACK-UP CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND TO CONTACT THE DIAGONAL BRACE PIECE MARKED ⑨, IN THE OPPOSITE END OF THE CAR. NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/18-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING, IF APPLICABLE.
- ⑪ SPACER CLEAT, 2" X 4" BY UNIT HEIGHT MINUS 8-1/2" (2 REQD). NAIL TO THE CAR SIDEWALL W/1-12d NAIL EVERY 4".
- ⑫ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.



DIAGONAL BRACE

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A HORIZONTAL WALL CLEAT, PIECE MARKED ⑥.

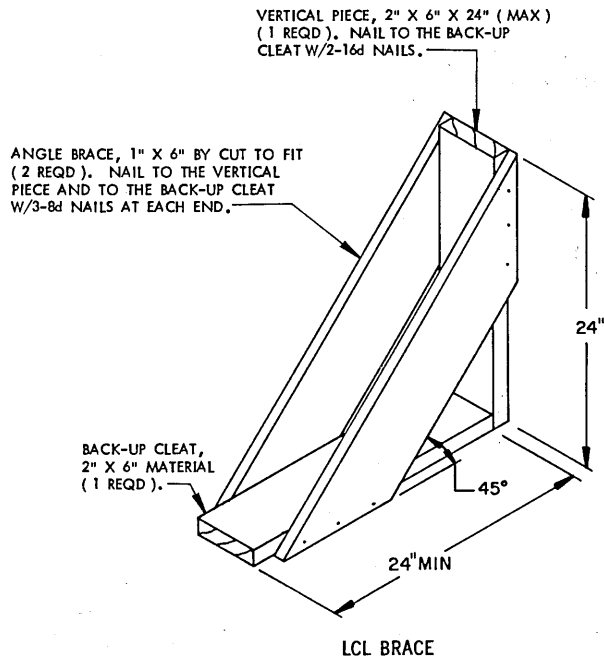
TYPE "D" K-BRACE



ISOMETRIC VIEW

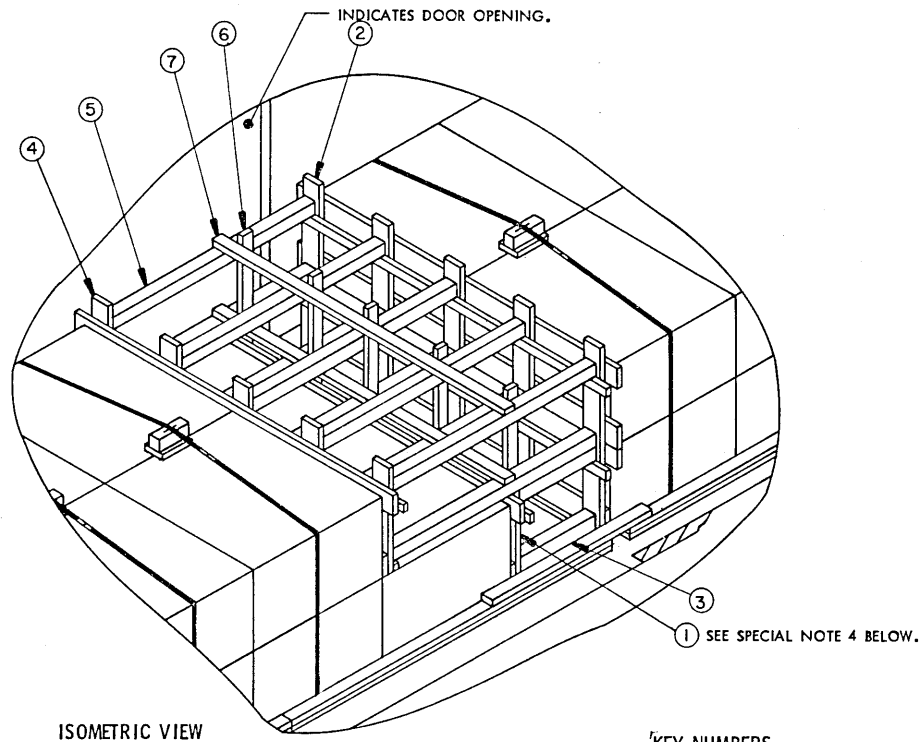
SPECIAL NOTES:

1. AN 8'-6" WIDE CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "J" ON PAGES 2 AND 5.
2. THE PALLET UNIT SHOWN IN THE TYPICAL LCL LOAD HAS OVERALL DIMENSIONS OF 38-1/2" LONG BY 44-3/4" WIDE BY 22" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. **CAUTION:** PALLETS MORE THAN 24" HIGH MUST NOT BE BRACED WITH LCL BRACES.
3. THE LOAD SHOWN DEPICTING THE LCL BRACE METHOD OF ONE-LAYER BRACING IS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER QUANTITIES AS LONG AS THE CAPACITY OF THE BRACES IS NOT EXCEEDED. SEE SPECIAL NOTE 4.
4. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. A MINIMUM OF TWO (2) BRACES MUST BE USED FOR LONGITUDINAL BRACING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 8,000 POUNDS OF LADING.



LCL BRACE

TYPICAL LCL LOAD USING LCL BRACE METHOD OF PARTIAL-LAYER BRACING

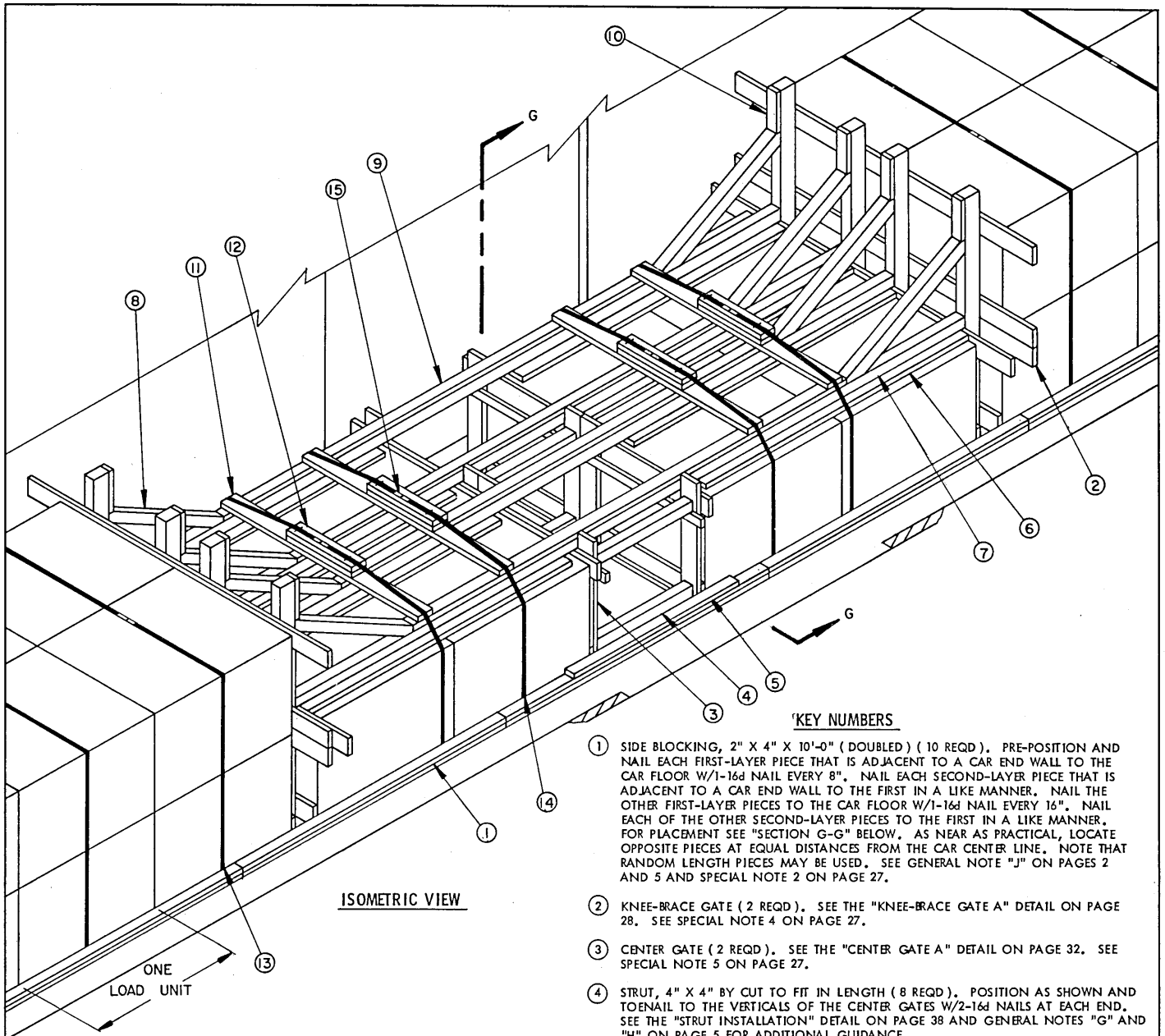


SPECIAL NOTES:

1. THE PROCEDURE FOR ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF THE TOP LAYER FROM A 2-WIDE BY 2-HIGH LOAD UNIT IS SHOWN AS TYPICAL. THE PRINCIPLES MAY ALSO BE APPLIED TO 3-WIDE LOADS AND TO LOADS OF 3, 4, OR 5 LAYERS.
2. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO PERMIT THE OMISSION OF THE UNITS FROM THE TOP LAYER ARE SPECIFIED BY THE KEY NUMBERS AT RIGHT. THE OTHER DUNNAGE SHOWN BUT NOT KEY NUMBERED IS APPLICABLE FOR ONLY ONE OF THE OUTLOADING PROCEDURES DEPICTED HEREIN. THE ACTUAL DUNNAGE MAY VARY, DEPENDING UPON WHICH LOAD THE STRUTTED-GATE METHOD OF REDUCING A LOAD IS BEING APPLIED TO.
3. CENTER GATES "B" AND "E" ARE USED IN THE DEPICTED LCL LOAD. THE ACTUAL GATES REQUIRED WILL DEPEND UPON THE CONFIGURATION OF THE LOAD AND THE WEIGHT OF THE ITEM BEING SHIPPED.
4. THE "CENTER GATE B" USED IN THE DEPICTED LOAD AND/OR THE APPLICABLE CENTER GATE BEING USED IF A LOAD CONFIGURATION OTHER THAN SHOWN IS BEING SHIPPED, MUST BE CONSTRUCTED WITH THE TOP OF THE VERTICAL PIECES FLUSH WITH THE TOP EDGE OF THE UPPER HORIZONTAL PIECE IN ORDER TO PROVIDE CLEARANCE FOR THE 4" X 4" STRUTS DIRECTLY ABOVE.
5. THE LENGTH OF THE LOWER LEVEL (5) OF STRUTS AND/OR THE LENGTH OF THE OMITTED UNITS MAY REQUIRE THAT MORE THAN ONE SET OF VERTICAL AND HORIZONTAL STRUT BRACING BE INSTALLED. TO PROTECT THE LADING FROM BEING PUNCTURED WHEN A SET OF VERTICAL STRUT BRACING IS INSTALLED ABOVE A LOWER LAYER OF THE LOAD, A SUITABLE LENGTH OF 2" X 4" OR 2" X 6" MATERIAL MUST BE POSITIONED UNDER AND SECURED TO EACH APPLICABLE VERTICAL STRUT BRACING PIECE.

KEY NUMBERS

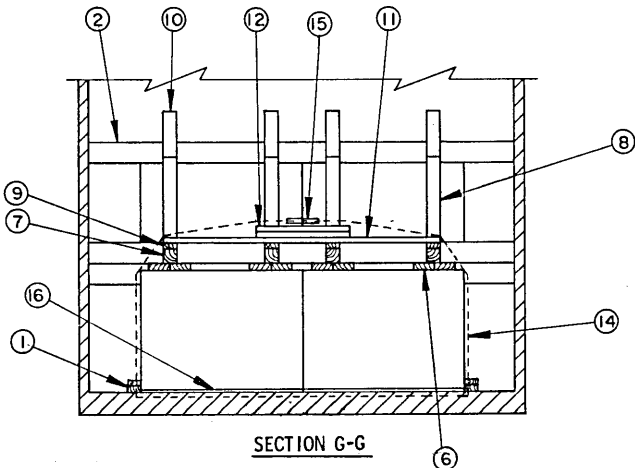
- ① CENTER GATE FOR BOTTOM LAYER (1 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 32. SEE SPECIAL NOTES 3 AND 4 AT LEFT.
- ② CENTER GATE FOR FULL LOAD HEIGHT (1 REQD). SEE THE "CENTER GATE E" DETAIL ON PAGE 33.
- ③ STRUT, 4" X 4" BY CUT TO FIT (10 REQD). TOENAIL TO THE VERTICAL PIECES OF PIECES MARKED ① AND ② W/2-16d NAILS AT EACH END.
- ④ CENTER GATE FOR TOP LAYER (1 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 32.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (10 REQD). TOENAIL TO THE VERTICAL PIECES OF PIECES MARKED ② AND ④ W/2-16d NAILS AT EACH END.
- ⑥ VERTICAL STRUT BRACING, 2" X 4" BY CUT TO EXTEND 2" ABOVE THE TOP STRUT (5 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 5 AT LEFT.
- ⑦ HORIZONTAL STRUT BRACING, 2" X 4" BY LOAD WIDTH IN LENGTH (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.



ISOMETRIC VIEW

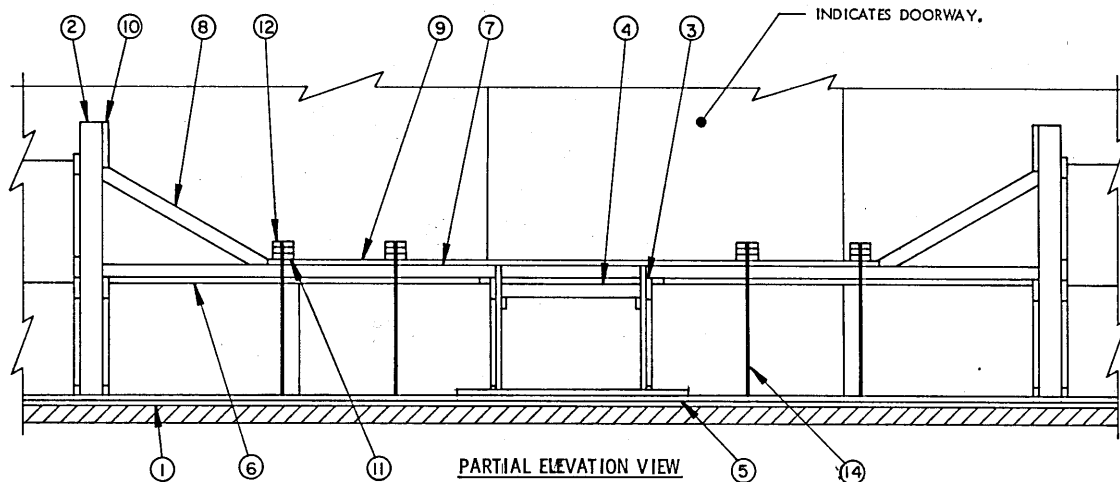
KEY NUMBERS

- ① SIDE BLOCKING, 2" X 4" X 10'-0" (DOUBLED) (10 REQD). PRE-POSITION AND NAIL EACH FIRST-LAYER PIECE THAT IS ADJACENT TO A CAR END WALL TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL EACH SECOND-LAYER PIECE THAT IS ADJACENT TO A CAR END WALL TO THE FIRST IN A LIKE MANNER. NAIL THE OTHER FIRST-LAYER PIECES TO THE CAR FLOOR W/1-16d NAIL EVERY 16". NAIL EACH OF THE OTHER SECOND-LAYER PIECES TO THE FIRST IN A LIKE MANNER. FOR PLACEMENT SEE "SECTION G-G" BELOW. AS NEAR AS PRACTICAL, LOCATE OPPOSITE PIECES AT EQUAL DISTANCES FROM THE CAR CENTER LINE. NOTE THAT RANDOM LENGTH PIECES MAY BE USED. SEE GENERAL NOTE "J" ON PAGES 2 AND 5 AND SPECIAL NOTE 2 ON PAGE 27.
- ② KNEE-BRACE GATE (2 REQD). SEE THE "KNEE-BRACE GATE A" DETAIL ON PAGE 28. SEE SPECIAL NOTE 4 ON PAGE 27.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 32. SEE SPECIAL NOTE 5 ON PAGE 27.
- ④ STRUT, 4" X 4" BY CUT TO FIT IN LENGTH (8 REQD). POSITION AS SHOWN AND TOENAIL TO THE VERTICALS OF THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 38 AND GENERAL NOTES "G" AND "H" ON PAGE 5 FOR ADDITIONAL GUIDANCE.
- ⑤ GATE RETAINER, 2" X 4" BY LENGTH OF CENTER VOID PLUS 12" (REF: 60") (2 REQD). NAIL TO PIECES MARKED ① W/3-10d NAILS AT EACH END.
- ⑥ BEARING PIECE, 2" X 6" BY CUT TO FIT BETWEEN PIECES MARKED ② AND ③ MINUS 3" (16 REQD). POSITION TWO (2) EACH SIDE BY SIDE WITH THE ENDS AGAINST THE HORIZONTAL PIECE OF THE KNEE-BRACE GATE AND CENTERED WITH A VERTICAL PIECE OF THE GATE. TOENAIL TO THE HORIZONTAL PIECE W/1-12d NAIL.
- ⑦ STRUT, 4" X 4" BY CUT TO FIT BETWEEN THE VERTICAL PIECES OF THE KNEE-BRACE GATES (4 REQD). TOENAIL TO THE VERTICAL PIECES W/3-16d NAILS AT EACH END. TOENAIL EACH SIDE TO THE BEARING PIECES, PIECES MARKED ⑥, W/1-10d NAIL EVERY 18".
- ⑧ KNEE-BRACE, 4" X 4" BY CUT TO FIT (8 REQD). SEE THE "KNEE-BRACE" DETAIL ON PAGE 28 FOR DIMENSIONS OF BEVEL CUTS AND LENGTH. TOENAIL TO PIECES MARKED ② AND ⑦ W/2-16d NAILS AT EACH END.
- ⑨ BACK-UP CLEAT, 2" X 4" BY CUT TO FIT BETWEEN PIECES MARKED ⑧ (4 REQD). NAIL TO PIECE MARKED ⑦ W/1-16d NAIL EVERY 6".
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 12" (8 REQD). PRE-DRILL AND NAIL TO PIECE MARKED ② W/5-16d NAILS.
- ⑪ CROSS BRACE, 2" X 6" BY CUT TO EXTEND ACROSS PIECES MARKED ⑨ (4 REQD). NAIL TO PIECES MARKED ⑨ W/3-16d NAILS AT EACH JOINT. SEE SPECIAL NOTE 6 ON PAGE 27.
- ⑫ STRAPPING BOARD, 2" X 6" BY CUT TO EXTEND ACROSS THE CENTRALLY LOCATED PIECES MARKED ⑨ (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO PIECE MARKED ⑪ W/1-10d NAIL EVERY 12" (2 MIN). NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.



SECTION G-G

(KEY NUMBERS CONTINUED ON PAGE 27)



(KEY NUMBERS CONTINUED FROM PAGE 26)

- 13 BUNDLING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (7 REQD). PRE-POSITION PRIOR TO LOADING A STACK SO THAT THE STRAP WILL ENCIRCLE THE STACK AS SHOWN WHEN IT IS TENSIONED AND SEALED. SEAL EACH STRAP JOINT W/2-SEALS PER STRAP. SEE PIECE MARKED 16.
- 14 HOLD-DOWN STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (4 REQD). PRE-POSITION AND INSTALL SO AS TO ENCIRCLE THE PALLET UNITS, CROSS BRACE, AND STRAPPING BOARD. STAPLE TO A STRAPPING BOARD W/2-STAPLES AND TO A CROSS BRACE W/1 STAPLE AT EACH END. SEE PIECE MARKED 16.
- 15 SEAL FOR 1-1/4" STEEL STRAPPING (22 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- 16 TEMPERED HARDBOARD STRIP, 1/8" THICK BY LOAD WIDTH IN LENGTH (8 REQD AT 12" WIDE, 7 REQD AT 24"). POSITION AS SHOWN BY THE "PREPARATION OF CAR FLOOR "A"" DETAIL ON PAGE 7. NAIL THE 12" WIDE STRIPS TO THE CAR FLOOR W/8-4d NAILS. NAIL THE 24" WIDE STRIPS TO THE CAR FLOOR W/12-4d NAILS. SEE SPECIAL NOTE B AT RIGHT.

(SPECIAL NOTES CONTINUED)

ARE TO BE LOCATED SO AS TO BE CENTERED UNDER JOINTS BETWEEN LOAD UNITS IN THE 2-HIGH PORTION OF THE LOAD AND ALSO UNDER THE GATE SIDE OF THE 1-HIGH LOAD UNITS ADJACENT TO THE KNEE-BRACE GATES. SEE THE "PREPARATION OF CAR FLOOR "A"" DETAIL ON PAGE 7 FOR GUIDANCE (TYPICAL ONLY). NOTE THAT THE NAILS FOR SECURING THE HARDBOARD STRIPS TO THE CAR FLOOR SHOULD BE LOCATED SO AS NOT TO BE UNDER THE PALLET SKIDS WHEN THE UNITS ARE POSITIONED IN THE CAR.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED TYPE BOX CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH, NARROWER OR WIDER CARS, AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN ALSO BE USED.
2. THE KNEE-BRACE METHOD OF PARTIAL-LAYER BRACING MAY BE USED IN ALL-METAL CARS OR IN WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL TOP LAYER OF NOT MORE THAN 22,000 POUNDS IN EACH END OF A CAR. THE TOP LAYER CAN BE A SECOND, THIRD, OR OTHER, AS LONG AS ALL THE LOWER LAYERS ARE FULL LAYERS BLOCKED AND BRACED USING CENTER GATES AND STRUTS. KNEE BRACING IS LIMITED TO LOADS HAVING TWO (2) ROWS OF PALLET UNITS, EITHER THRU THE CENTER OF THE CAR AS SHOWN, OR ONE ROW ALONG EACH CAR SIDEWALL. NOTE THAT THE BLOCKING AND BRACING, AS SHOWN, IS ONLY APPLICABLE FOR 2-LAYER LOADS THRU THE CENTER OF THE CAR; THE BLOCKING AND BRACING WILL VARY FOR LOADS AGAINST THE CAR SIDEWALLS, OR FOR LOADS OF MORE THAN TWO LAYERS.
3. THE PALLET UNIT SHOWN IN THE TYPICAL LCL LOAD IS AN "OPEN-TYPE" PALLET UNIT HAVING OVERALL DIMENSIONS OF 49-3/4" LONG BY 42-1/8" WIDE BY 32-1/8" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR "OPEN-TYPE" PALLET UNITS OF OTHER SIZES AND FOR BOXED-TYPE PALLET UNITS.
4. "KNEE-BRACE GATE B" WILL BE USED IN LIEU OF "KNEE-BRACE GATE A" WHEN SHIPPING A LOAD HAVING THE ROWS AGAINST THE CAR SIDEWALLS. THE DETAIL FOR KNEE-BRACE GATE B SHOWS THE GATE WHICH WILL BE USED IN A 2-LAYER LOAD. NOTE THAT THE NUMBER OF HORIZONTAL PIECES MUST BE INCREASED WHEN THE GATE IS USED IN A LOAD WHICH CONSISTS OF THREE OR MORE LAYERS.
5. THE "CENTER GATE A", PIECE MARKED 3, IS APPLICABLE FOR THE LOAD SHOWN. IF THE BOTTOM LAYER OF THE LOAD IS HEAVIER, OR IF THE CENTER PORTION OF THE LOAD CONSISTS OF MORE THAN ONE LAYER, A DIFFERENT CENTER GATE WILL BE REQUIRED. SEE THE "CENTER GATE CHART" ON PAGE 38 FOR GATE SELECTION GUIDANCE.
6. A MINIMUM OF TWO (2) SETS OF CROSS BRACES, STRAPPING BOARDS, AND HOLD-DOWN STRAPS, PIECES MARKED 11, 12, AND 14, ARE REQUIRED, WITH AN ADDITIONAL SET BEING APPLIED FOR EVERY 48" OF SPACE BETWEEN THE LOWER END OF THE KNEE-BRACE, PIECE MARKED 8, AND THE CENTER GATE, OR FOR EVERY LOAD UNIT, WHICHEVER IS THE LEAST DIMENSION.
7. DOORWAY PROTECTION, IF SPECIFIED FOR THE LOAD FROM WHICH PALLET UNITS ARE BEING OMITTED, MUST BE PROVIDED WHEN EMPLOYING THE DEPICTED PROCEDURES. REFER TO THE BASIC LOAD PAGES FOR GUIDANCE.
8. PALLET UNITS WILL SHIFT LONGITUDINALLY DURING NORMAL TRANSPORTATION OF A LOAD. IN ORDER TO HELP PREVENT THE BUNDLING STRAPS AND HOLD-DOWN STRAPS, PIECES MARKED 13 AND 14, FROM BECOMING SNAGGED ON ROUGH PORTIONS OF A CAR FLOOR, THE PALLET UNITS MUST BE PLACED UPON PRE-POSITIONED TEMPERED HARDBOARD STRIPS. TWELVE INCH (12") WIDE STRIPS ARE REQUIRED AT THE CAR END WALLS, UNDER THE GATE SIDE OF THE 2-HIGH LOAD UNITS ADJACENT TO THE KNEE-BRACE GATES, PIECES MARKED 2, ADJACENT TO EACH CENTER GATE, AND ALSO BETWEEN EACH PAIR OF HOLD-DOWN STRAPS, PIECES MARKED 14. TWENTY-FOUR INCH (24") WIDE STRIPS

(CONTINUED AT LEFT)

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	14	5
2" X 3"	20	10
2" X 4"	272	182
2" X 6"	330	330
4" X 4"	139	186
4" X 6"	50	100
NAILS	NO. REQD	POUNDS
4d (1-1/2")	148	1/2
10d (3")	96	1-1/2
12d (3-1/4")	16	1/4
16d (3-1/2")	782	17
1/8" TEMPERED HARDBOARD	173 SQ FT	76 LBS
STEEL STRAPPING, 1-1/4" X .035" OR .031"	281 REQD	41 LBS
SEAL FOR 1-1/4" STRAPPING	22 REQD	1 LB
STAPLE FOR 1-1/4" STRAPPING	16 REQD	NIL

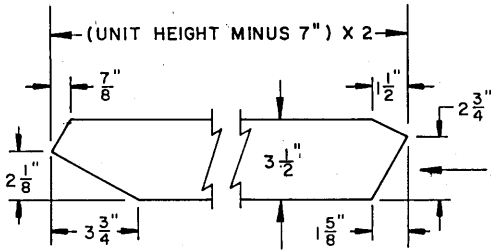
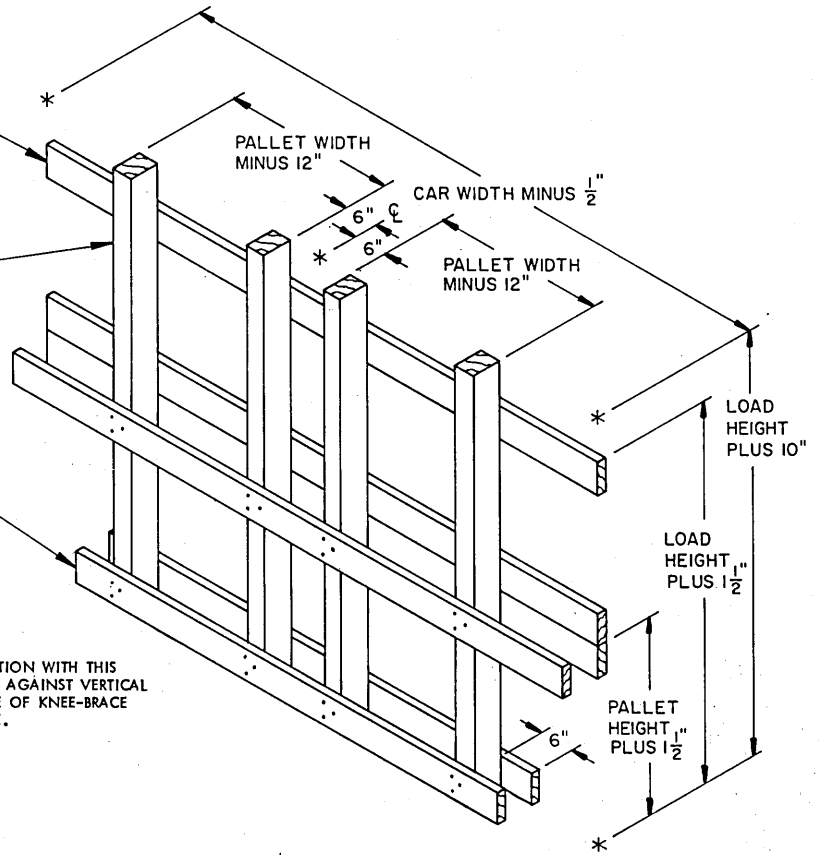
LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	36	51,624 LBS
DUNNAGE		1,764 LBS
TOTAL WEIGHT		53,388 LBS

HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" (4 REQD.). NAIL TO THE VERTICAL PIECES W/3-16d NAILS AT EACH JOINT.

VERTICAL PIECE, 4" X 6" BY LOAD HEIGHT PLUS 10" (4 REQD.). SEE THE "ALT FOR 4" X 6" " DETAIL BELOW IF 4" X 6" MATERIAL IS NOT AVAILABLE.

HORIZONTAL PIECE, 2" X 6" BY LOAD WIDTH (2 REQD.). NAIL TO THE VERTICAL PIECES W/3-16d NAILS AT EACH JOINT.



POSITION WITH THIS FACE AGAINST VERTICAL PIECE OF KNEE-BRACE GATE.

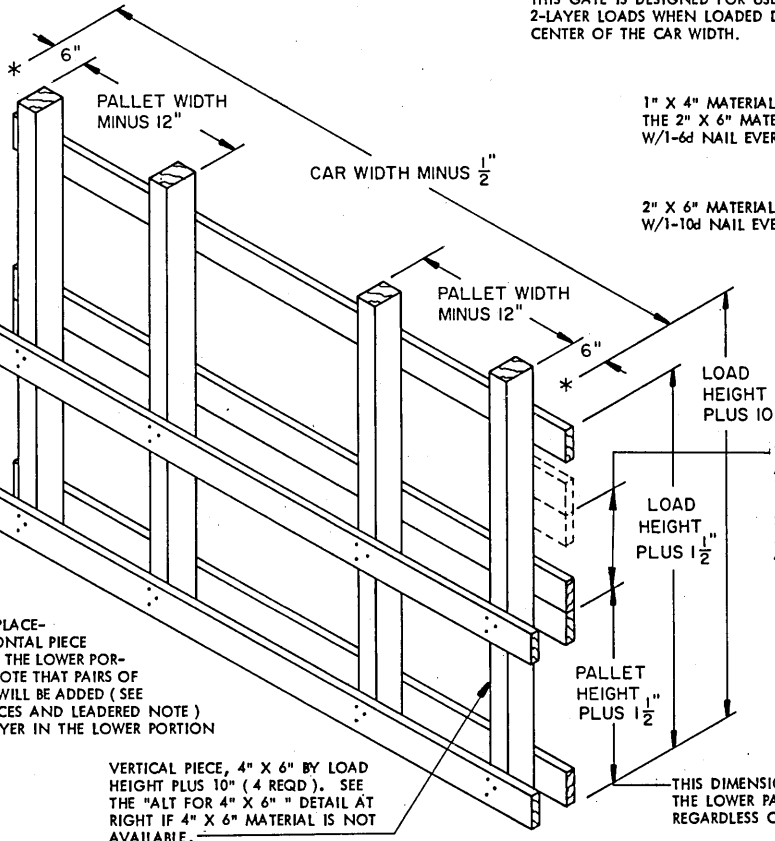
KNEE BRACE

THIS KNEE BRACE IS 4" X 4" MATERIAL AND IS SHOWN IN THE LOAD ON PAGE 26 AS PIECE MARKED ⑥.

KNEE-BRACE GATE A

THIS GATE IS DESIGNED FOR USE ONLY WITH 2-LAYER LOADS WHEN LOADED DOWN THE CENTER OF THE CAR WIDTH.

HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" (6 REQD.). NAIL TO THE VERTICAL PIECES W/3-16d NAILS AT EACH JOINT.



1" X 4" MATERIAL. NAIL TO THE 2" X 6" MATERIAL W/1-6d NAIL EVERY 12".

2" X 6" MATERIAL. LAMINATE W/1-10d NAIL EVERY 6".

ALT FOR 4" X 6"

THIS LAMINATED ASSEMBLY IS FOR USE IF 4" X 6" MATERIAL IS NOT AVAILABLE.

LOAD HEIGHT PLUS 1 1/2"

LOAD HEIGHT PLUS 10"

LOAD HEIGHT PLUS 1 1/2"

THIS DIMENSION WILL BE "PALLET HEIGHT", AND IS APPLICABLE FOR LOADS OF MORE THAN TWO (2) LAYERS. ONE (1) ADDITIONAL PAIR OF HORIZONTAL PIECES ARE REQUIRED ON EACH SIDE FOR A 3-LAYER LOAD, TWO (2) ADDITIONAL PAIRS FOR A 4-LAYER LOAD, AND THREE (3) ADDED PAIRS ARE REQUIRED WHEN THE KNEE-BRACE GATE IS FOR USE IN A 5-LAYER LOAD.

THIS DIMENSION IS APPLICABLE FOR THE PLACEMENT OF THE HORIZONTAL PIECE AGAINST THE TOP OF THE LOWER PORTION OF A LOAD. NOTE THAT PAIRS OF HORIZONTAL PIECES WILL BE ADDED (SEE THE PHANTOMED PIECES AND LEADERED NOTE) FOR EACH ADDED LAYER IN THE LOWER PORTION OF A LOAD.

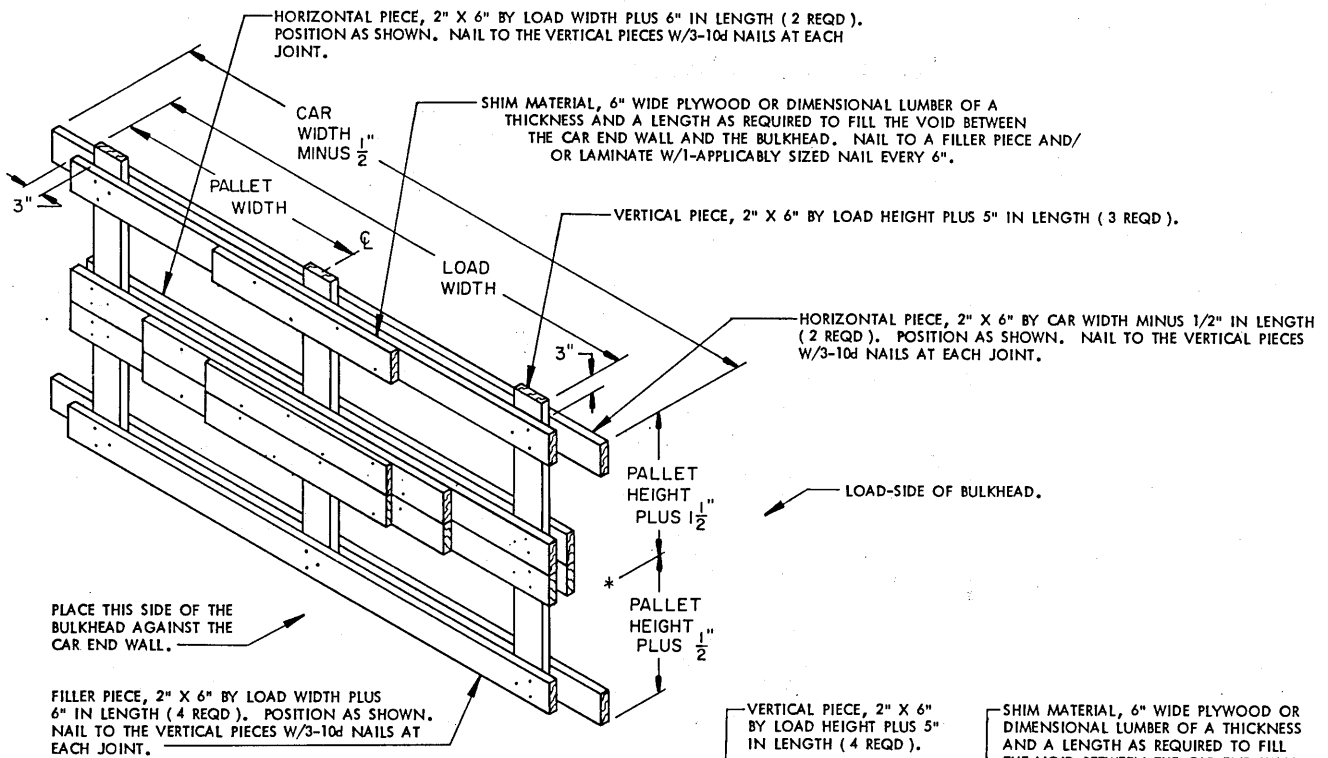
VERTICAL PIECE, 4" X 6" BY LOAD HEIGHT PLUS 10" (4 REQD.). SEE THE "ALT FOR 4" X 6" " DETAIL AT RIGHT IF 4" X 6" MATERIAL IS NOT AVAILABLE.

THIS DIMENSION IS APPLICABLE FOR THE PLACEMENT OF THE LOWER PAIR OF HORIZONTAL PIECES FOR A GATE, REGARDLESS OF THE NUMBER OF LAYERS IN THE LOAD.

KNEE-BRACE GATE B

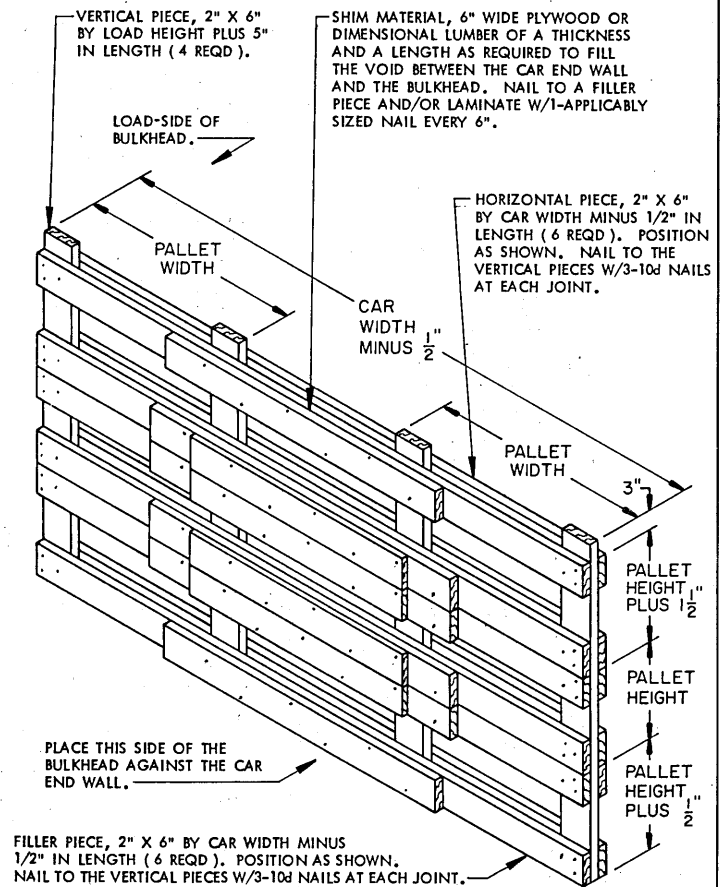
THIS GATE IS DESIGNED FOR USE WITH 2-WIDE LOADS WITH THE ROWS AGAINST THE CAR SIDEWALLS, AND IS SHOWN FOR 2 LAYERS.

KNEE-BRACE GATES



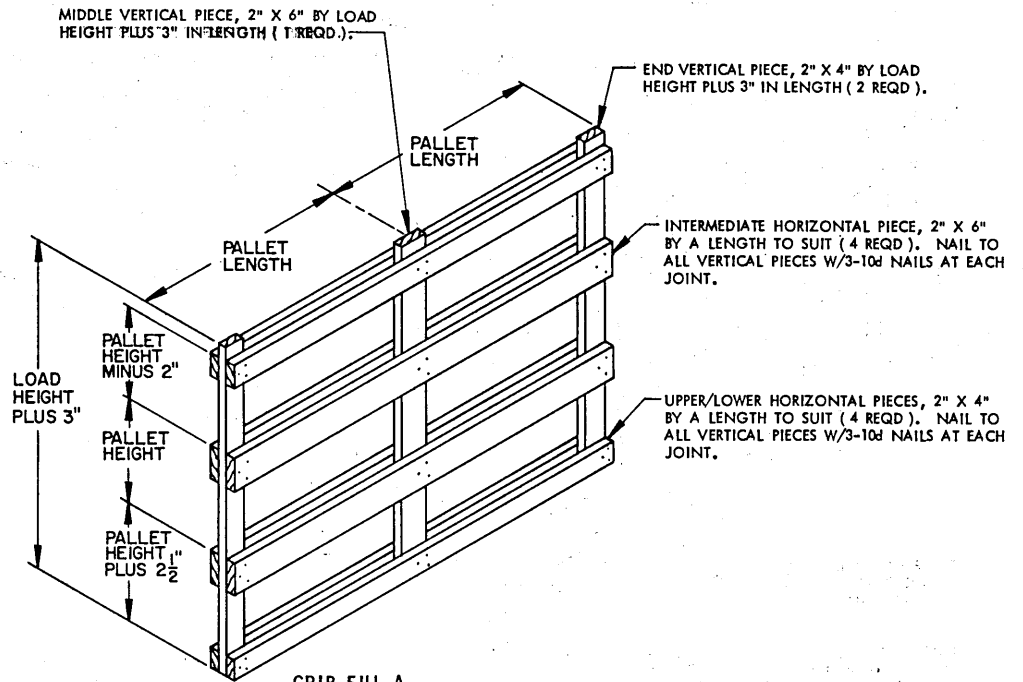
BULKHEAD A

THIS BULKHEAD IS DESIGNED FOR USE IN "SQUARING UP" THE END OF A CAR FOR A 2-LAYER LOAD WHICH IS LOADED THRU THE CENTER OF THE CAR WIDTH.



BULKHEAD B

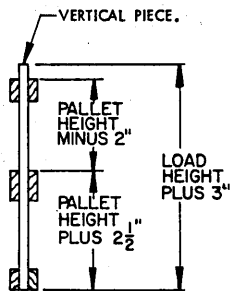
THIS BULKHEAD IS DESIGNED FOR USE IN "SQUARING UP" THE END OF A CAR FOR 3-WIDE LOADS AND FOR LOADS HAVING TWO ROWS AGAINST THE CAR SIDEWALLS. THE BULKHEAD CAN BE ADJUSTED FOR LOADS OTHER THAN 3-HIGH, WHICH IS SHOWN BY THIS DETAIL.



CRIB FILL A

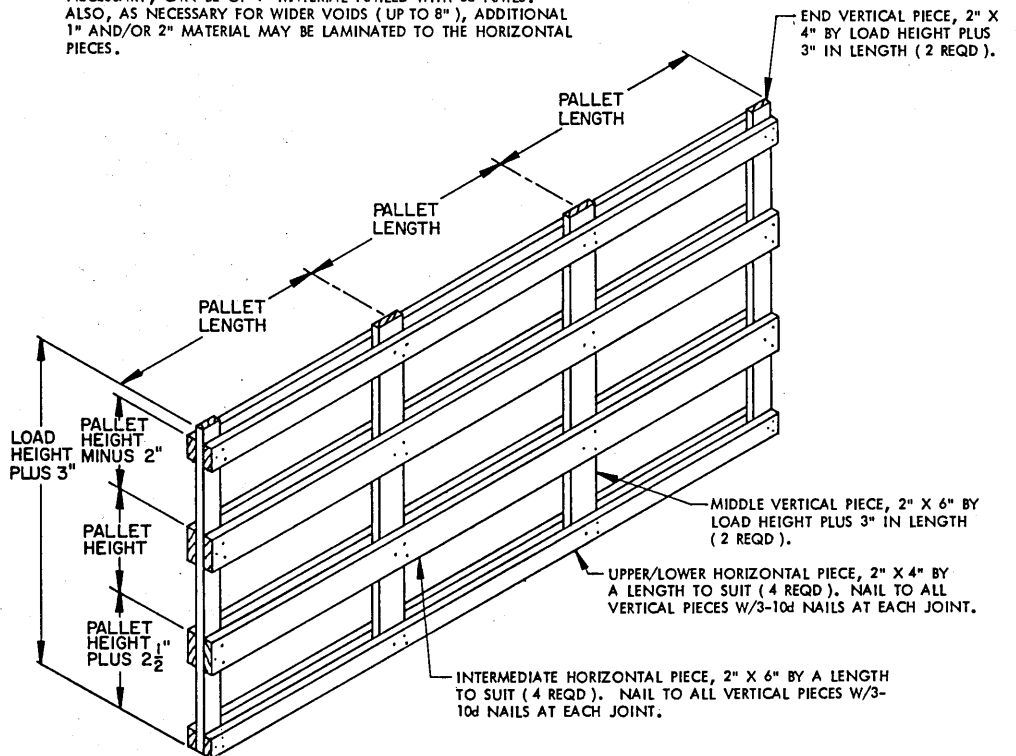
THIS CRIB FILL IS FOR LOADS WHICH ARE THREE (3) PALLET UNITS HIGH. SEE THE "END VIEW" DETAILS BELOW FOR LOCATION OF THE HORIZONTAL PIECES ON ASSEMBLIES FOR 1 AND 2-LAYER LOADS. SEE "NOTE" BELOW. IF A CRIB FILL FOR ONE (1) PALLET LONG IS REQUIRED, OMIT THE MIDDLE VERTICAL PIECE AND CHANGE THE OVERALL LENGTH TO THE LENGTH OF THE UNIT BEING LOADED.

NOTE: IF CRIB FILL ASSEMBLIES ARE FOR USE IN LOADS WHERE THE LATERAL VOID IS SMALL (LESS THAN 4-3/4") THE HORIZONTAL PIECES ON ONE OR BOTH SIDES, AND THE VERTICAL PIECES IF NECESSARY, CAN BE OF 1" MATERIAL NAILED WITH 6d NAILS. ALSO, AS NECESSARY FOR WIDER VOIDS (UP TO 8"), ADDITIONAL 1" AND/OR 2" MATERIAL MAY BE LAMINATED TO THE HORIZONTAL PIECES.



END VIEW

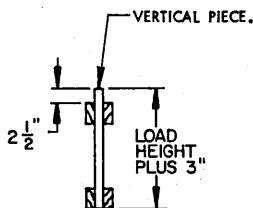
THIS CRIB FILL IS FOR LOADS WHICH ARE TWO (2) PALLET UNITS HIGH.



CRIB FILL B

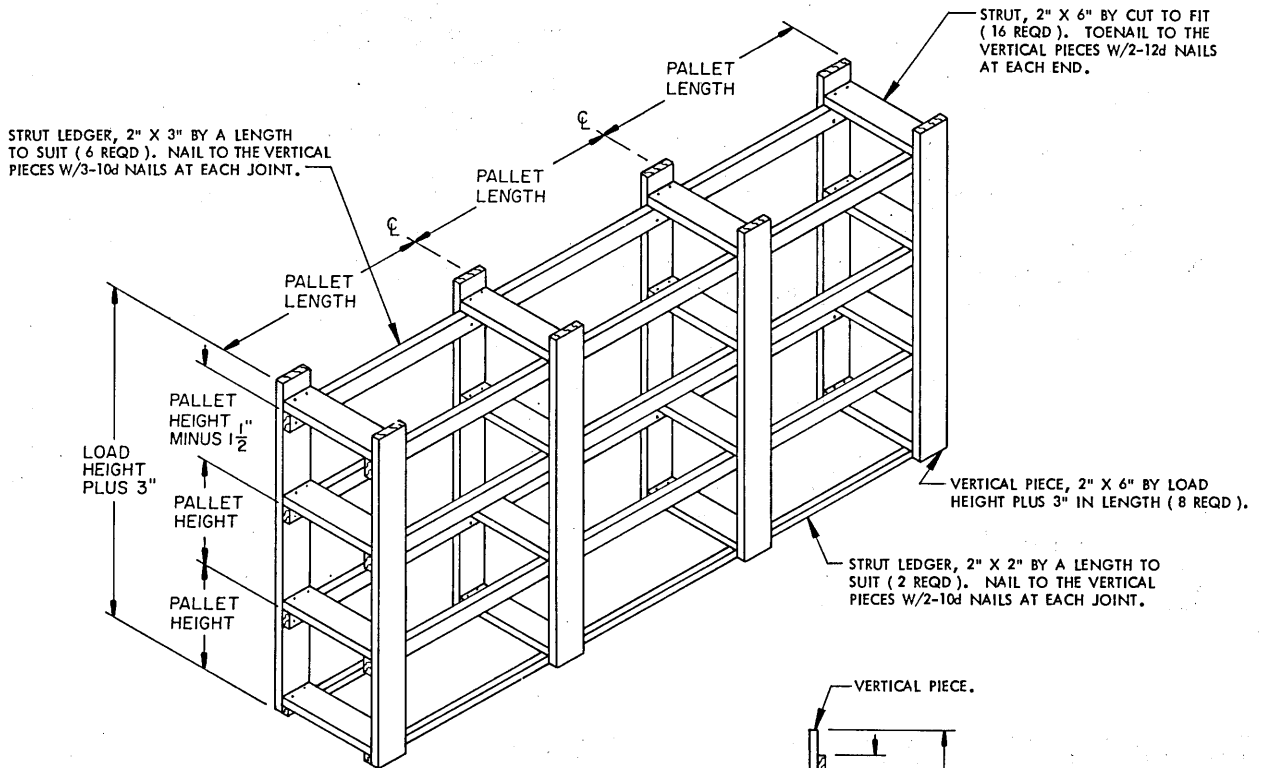
THIS CRIB FILL IS FOR LOADS WHICH ARE THREE (3) PALLET UNITS HIGH. SEE THE "END VIEW" DETAILS AT LEFT FOR LOCATION OF THE HORIZONTAL PIECES ON ASSEMBLIES FOR 1 AND 2-LAYER LOADS. SEE "NOTE" ABOVE.

CRIB FILL



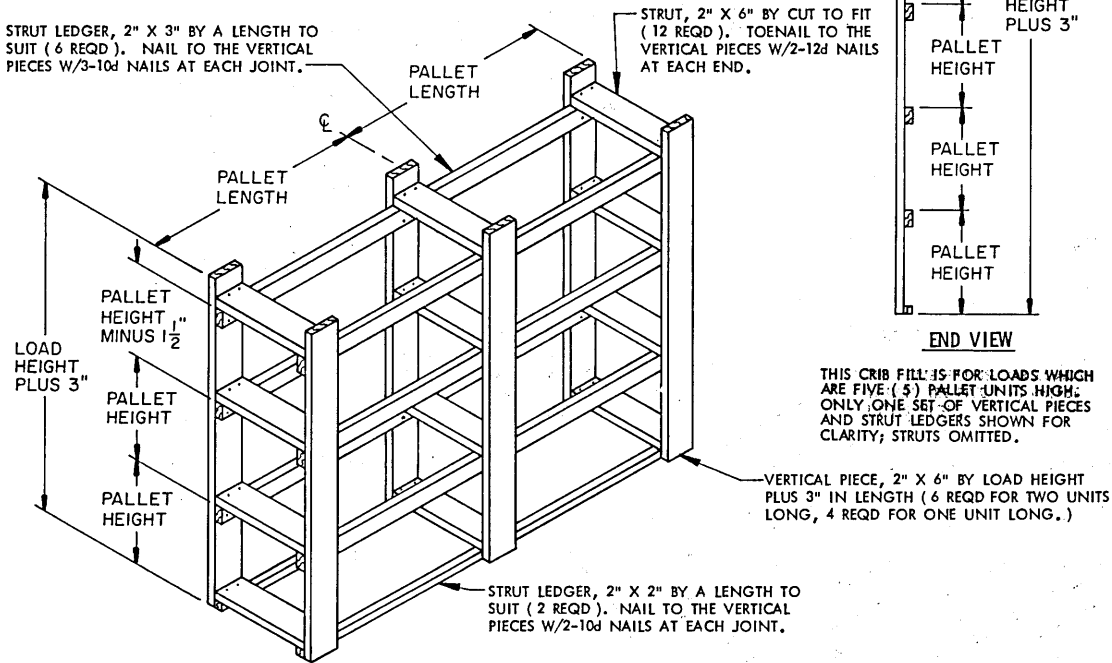
END VIEW

THIS CRIB FILL IS FOR LOADS WHICH ARE ONE (1) PALLET UNIT HIGH.



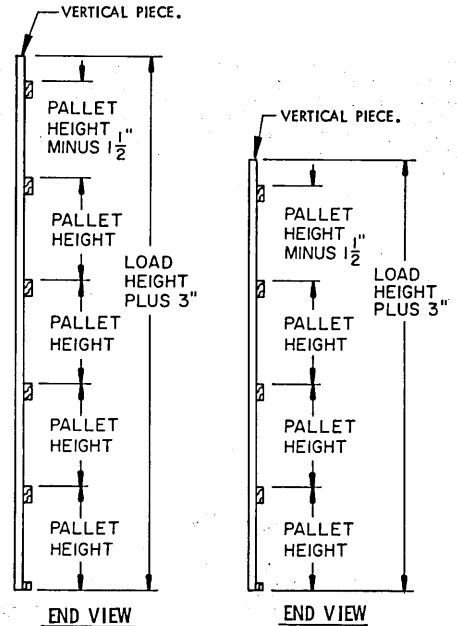
CRIB FILL C

THIS CRIB FILL IS FOR LOADS WHICH ARE THREE (3) PALLET UNITS HIGH. IT CAN BE ADJUSTED FOR USE IN 2-LAYER LOADS, IF DESIRED. SEE THE "END VIEW" DETAILS AT RIGHT WHICH DEPICT STRUT LEDGER HEIGHTS FOR 4 AND 5-LAYER LOADS.



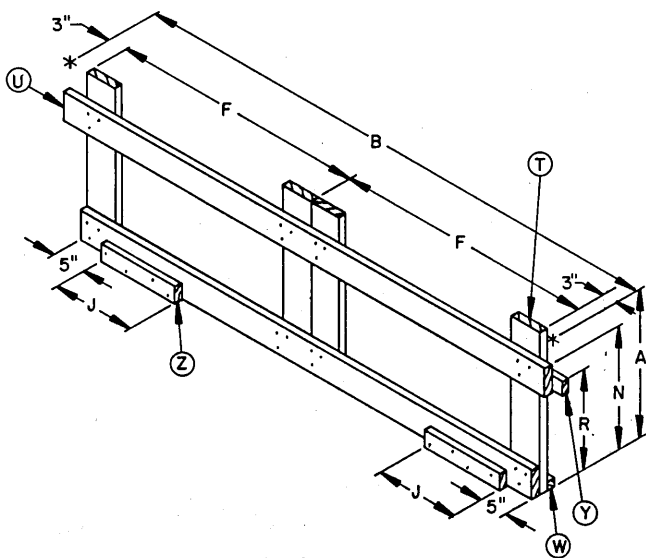
CRIB FILL D

THIS CRIB FILL IS FOR LOADS WHICH ARE FIVE (5) PALLET UNITS HIGH. IT CAN BE ADJUSTED FOR USE IN A 2-LAYER LOAD, IF DESIRED. SEE THE "END VIEW" DETAILS ABOVE WHICH DEPICT STRUT LEDGER HEIGHTS FOR 4 AND 5-LAYER LOADS. IF A CRIB FILL FOR ONE (1) PALLET LONG IS REQUIRED, OMIT THE CENTER VERTICAL PIECES AND THE FOUR (4) CENTRALLY LOCATED STRUTS; CHANGE THE OVERALL LENGTH TO THE LENGTH OF THE UNIT BEING LOADED.



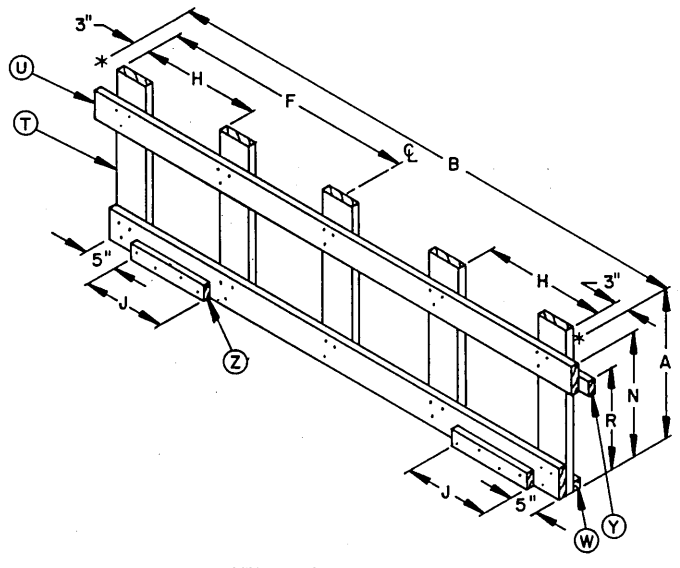
THIS CRIB FILL IS FOR LOADS WHICH ARE FIVE (5) PALLET UNITS HIGH. ONLY ONE SET OF VERTICAL PIECES AND STRUT LEDGERS SHOWN FOR CLARITY; STRUTS OMITTED.

THIS CRIB FILL IS FOR LOADS WHICH ARE FOUR (4) PALLET UNITS HIGH. ONLY ONE SET OF VERTICAL PIECES AND STRUT LEDGERS SHOWN FOR CLARITY; STRUTS OMITTED.



CENTER GATE A

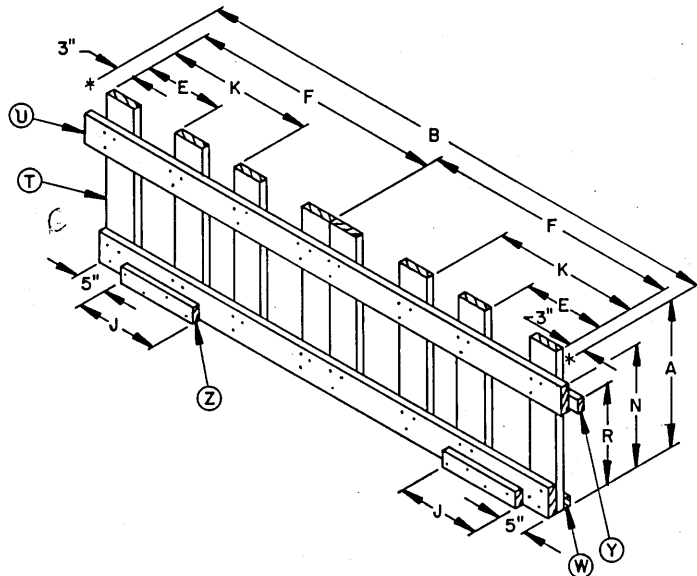
THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 1-HIGH CENTERED LOAD USING EIGHT (8) STRUTS.



CENTER GATE B

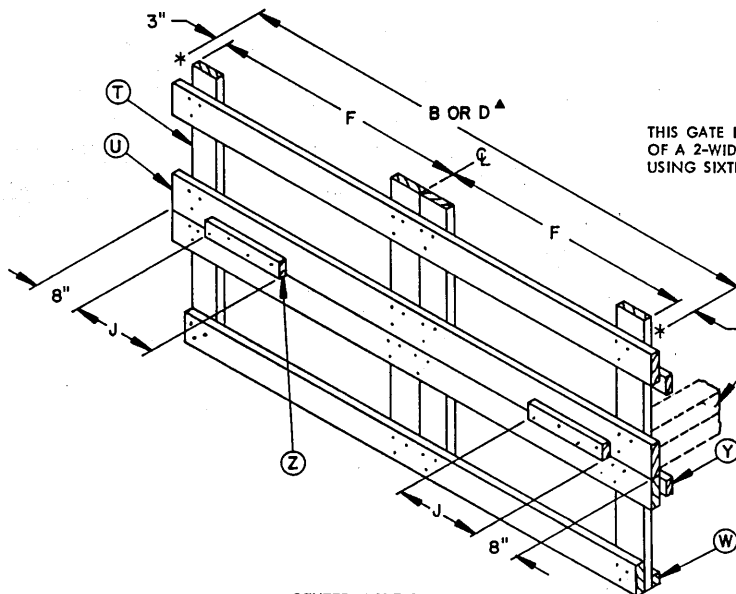
THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 1-HIGH CENTERED LOAD USING TEN (10) STRUTS.

NOTE: REFER TO THE "CENTER GATE DIMENSION CHART" ON PAGE 33 FOR A DESCRIPTION OF THE DIMENSIONS REPRESENTED BY LETTERS ON THE GATE VIEWS. THE "CENTER GATE MATERIAL AND NAILING CHART" ON PAGE 33 INDICATES MATERIAL SIZE AND PROPER NAILING OF THE KEY LETTERED PIECES. SEE THE "CENTER GATE CHART" ON PAGE 38 FOR FURTHER GUIDANCE IN THE PROPER SELECTION OF A CENTER GATE.



CENTER GATE C

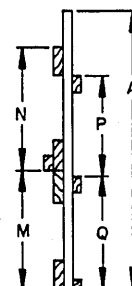
THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 1-HIGH CENTERED LOAD USING SIXTEEN (16) STRUTS.



CENTER GATE D

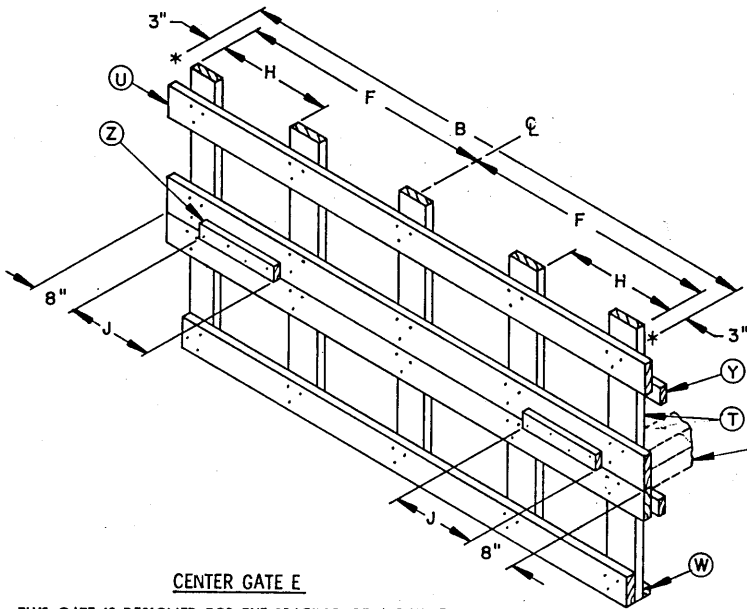
THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 2-HIGH CENTERED LOAD USING EIGHT (8) STRUTS PER LAYER, SIXTEEN (16) TOTAL. SEE NOTE "▲".

INDICATES PROPER POSITIONING OF STRUTS (ONE ON TOP OF THE OTHER) AT THE CENTER LEVEL.

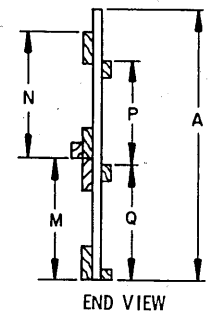


END VIEW

CENTER GATES A THRU D



INDICATES PROPER POSITIONING OF STRUTS (ONE ON TOP OF THE OTHER) AT THE CENTER LEVEL.



CENTER GATE E

THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 2-HIGH CENTERED LOAD USING TEN (10) STRUTS PER LAYER, TWENTY (20) TOTAL.

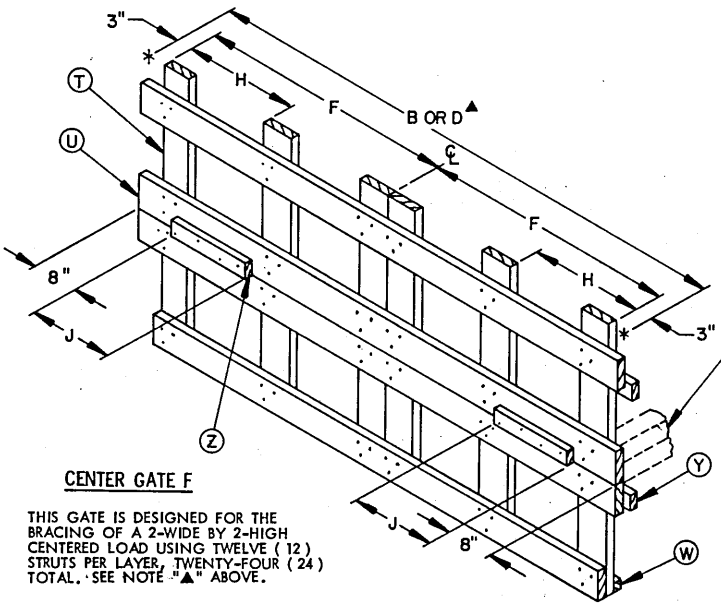
CENTER GATE MATERIAL AND NAILING CHART							
PIECE LETTER	IDENTIFICATION	MATERIAL	GATE	NO. REQD	NAIL TO	NAILS	
						SIZE	NO.
T	VERTICAL PIECE	2" X 6"	A, D B, E F	4 5 6	---	---	---
U	HORIZONTAL PIECE	2" X 6"	C	8	T	16d*	3 PER JOINT
W	STRUT LEDGER	2" X 2" BY LOAD WIDTH	A, B, C, D, E, F	1	T	16d*	3 PER JOINT
Y	STRUT LEDGER	2" X 3" BY LOAD WIDTH PLUS 6"	A, B, C D, E, F	2 2	T	16d*	2 PER JOINT
Z	GATE HOLD DOWN	2" X 3"	ALL	2	U	16d*	1 EVERY 4"

*CLINCH EXPOSED NAIL POINTS.

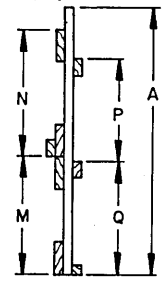
CENTER GATE DIMENSION CHART	
DIM	DESCRIPTION
A	LOAD HEIGHT PLUS 6" (MIN)
B	CAR WIDTH MINUS 1/2"▲
D	ONE-HALF PALLET UNIT WIDTH MINUS 9"
E	PALLET UNIT WIDTH*
F	ONE-HALF PALLET UNIT WIDTH MINUS 2-1/2"
H	15" FOR "OPEN-TYPE"; ONE-HALF PALLET UNIT WIDTH MINUS 9" FOR BOXED-TYPE
J	ONE-HALF PALLET UNIT WIDTH PLUS 3-1/2"
K	PALLET UNIT HEIGHT PLUS 1/2"
M	PALLET UNIT HEIGHT PLUS 1-1/2"
N	PALLET UNIT HEIGHT MINUS 1"
O	PALLET UNIT HEIGHT MINUS 1/2"
P	PALLET UNIT HEIGHT MINUS 1"
Q	PALLET UNIT HEIGHT MINUS 2"
R	PALLET UNIT HEIGHT MINUS 2-1/2"

● ADD 1-3/4" TO THE PALLET UNIT WIDTH DIMENSION WHEN THE GATES ARE TO BE USED IN LOADS WHERE THERE ARE SPACERS ADJACENT TO THE CENTER GATES AS TYPICALLY SHOWN BY PIECES MARKED (1) IN THE LOAD SHOWN ON PAGE 10.

▲ CENTER GATES D WILL BE CAR WIDTH MINUS 1/2" IN LENGTH WHEN THE GATES ARE FOR USE WITH 2-LAYER LOADS FOR THE PROCEDURES ON PAGES 8 AND 16. CENTER GATES F WILL BE CAR WIDTH MINUS 1/2" IN LENGTH FOR USE WITH 2-LAYER LOADS FOR THE PROCEDURES ON PAGES 8 AND 16. WHEN CENTER GATES D AND SIXTEEN STRUTS ARE NOT ADEQUATE, AS PER THE "CENTER GATE CHART" ON PAGE 38.



INDICATES PROPER POSITIONING OF STRUTS (ONE ON TOP OF THE OTHER) AT THE CENTER LEVEL.



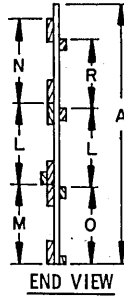
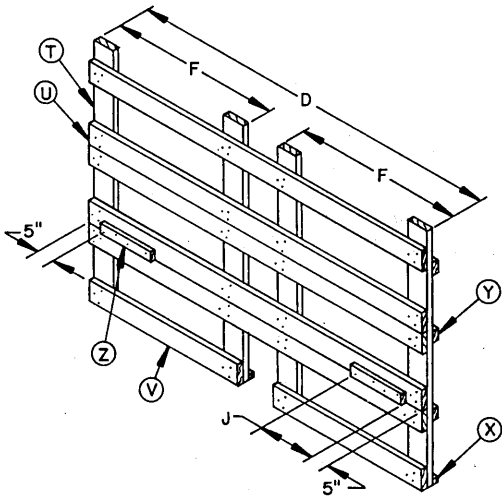
CENTER GATE F

THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 2-HIGH CENTERED LOAD USING TWELVE (12) STRUTS PER LAYER, TWENTY-FOUR (24) TOTAL. SEE NOTE "▲" ABOVE.

CENTER GATES E AND F

END VIEW

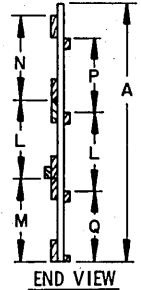
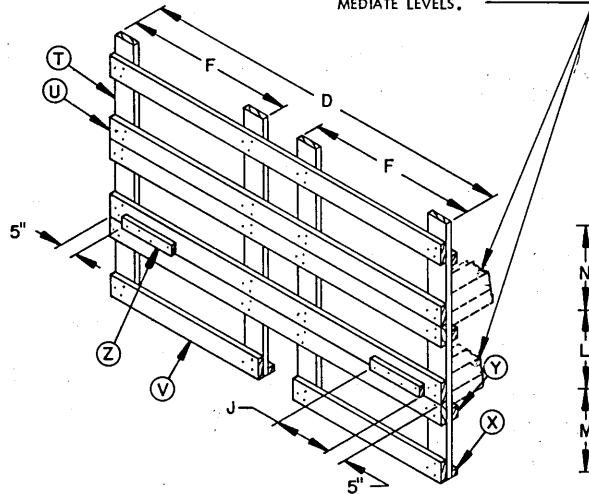
NOTE: REFER TO THE "CENTER GATE DIMENSION CHART" ON PAGE 35 FOR A DESCRIPTION OF THE DIMENSIONS REPRESENTED BY LETTERS ON THE GATE VIEWS. THE "CENTER GATE MATERIAL AND NAILING CHART" ON PAGE 35 INDICATES MATERIAL SIZE AND PROPER NAILING OF THE KEY LETTERED PIECES. SEE THE "CENTER GATE CHART" ON PAGE 38 FOR FURTHER GUIDANCE IN THE PROPER SELECTION OF A CENTER GATE.



CENTER GATE G

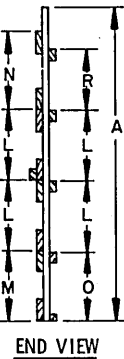
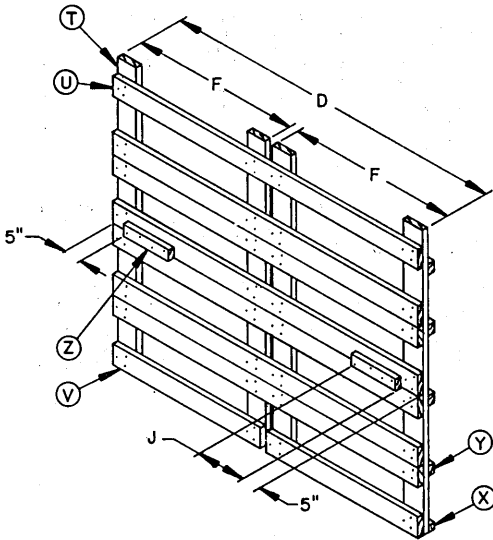
THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 3-HIGH LOAD USING SIXTEEN (16) STRUTS. NOTE THAT THE ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.

INDICATES PROPER POSITIONING OF STRUTS (ONE ON TOP OF THE OTHER) AT THE INTERMEDIATE LEVELS.



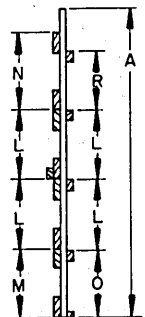
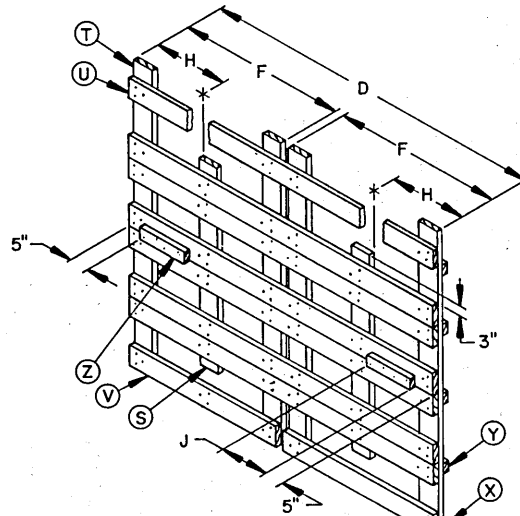
CENTER GATE H

THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 3-HIGH LOAD USING EIGHT (8) STRUTS PER LAYER, TWENTY-FOUR (24) TOTAL. NOTE THAT THE ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.



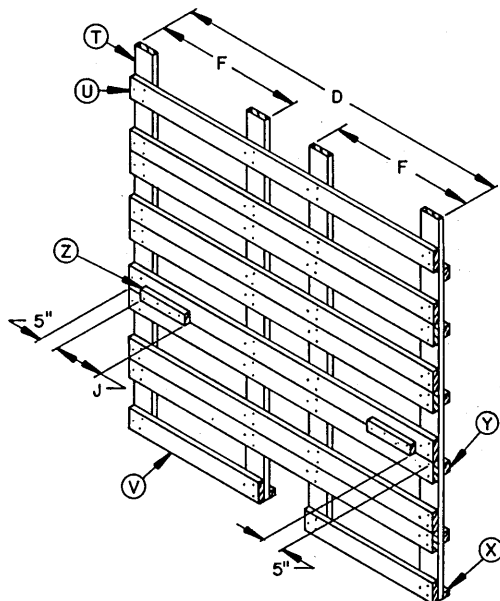
CENTER GATE J

THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 4-HIGH LOAD USING TWENTY (20) STRUTS. NOTE THAT THE ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.



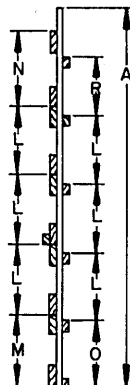
CENTER GATE K

THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 4-HIGH LOAD USING TWENTY-SIX (26) STRUTS. NOTE THAT THE ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.



CENTER GATE L

THIS GATE IS DESIGNED FOR THE BRACING OF A 2-WIDE BY 5-HIGH LOAD USING TWENTY-FOUR (24) STRUTS. NOTE THAT THE ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.



END VIEW

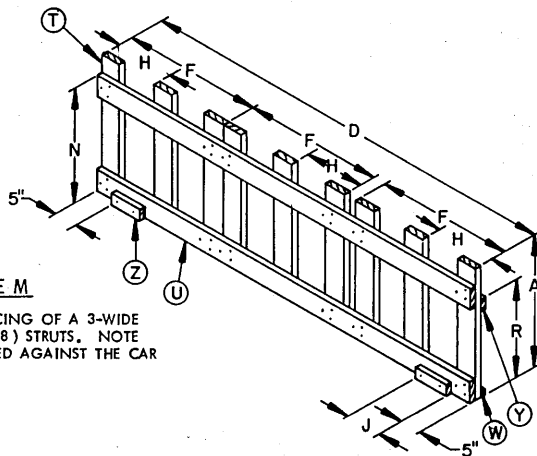
CENTER GATE MATERIAL AND NAILING CHART

PIECE LETTER	IDENTIFICATION	MATERIAL	GATE	NO. REQD	NAIL TO	NAILS	
						SIZE	NO.
S	VERTICAL PIECE	2" X 6" BY TWO UNIT HEIGHTS PLUS 17"	K	2	---	---	---
T	VERTICAL PIECE	2" X 6"	G,H,J K,L M	4 4 9	---	---	---
U	HORIZONTAL PIECE	2" X 6" BY CAR WIDTH MINUS 1/2"	G,H M	5 2	T	16d*	3 PER JOINT
V	HORIZONTAL PIECE	2" X 6" BY PALLET WIDTH	J,K L	7 9	T	16d*	3 PER JOINT
W	STRUT LEDGER	2" X 2" BY CAR WIDTH MINUS 1/2"	G,H,J K,L M	2 2 1	T	16d*	3 PER JOINT
X	STRUT LEDGER	2" X 2" BY PALLET WIDTH	G,H,J K,L	2 2	T	16d*	3 PER JOINT
Y	STRUT LEDGER	2" X 3" BY CAR WIDTH MINUS 1/2"	M	1	T	16d*	2 PER JOINT
Z	HOLD DOWN	2" X 3"	G,H J,K L ALL	3 4 5 2	T T T U	16d*	2 PER JOINT 2 PER JOINT 2 PER JOINT 1 EVERY 4"

CENTER GATE DIMENSION CHART

DIM	DESCRIPTION
A	LOAD HEIGHT PLUS 6" (MIN).
D	CAR WIDTH MINUS 1/2".
F	PALLET UNIT WIDTH.
H	ONE-HALF PALLET UNIT WIDTH MINUS 2-1/2".
J	15" FOR "OPEN-TYPE"; ONE-HALF PALLET UNIT WIDTH MINUS 9" FOR BOXED -TYPE.
L	PALLET UNIT HEIGHT.
M	PALLET UNIT HEIGHT PLUS 1/2".
N	PALLET UNIT HEIGHT PLUS 1-1/2".
O	PALLET UNIT HEIGHT MINUS 1/2".
P	PALLET UNIT HEIGHT MINUS 1".
Q	PALLET UNIT HEIGHT MINUS 2".
R	PALLET UNIT HEIGHT MINUS 2-1/2".

* CLINCH EXPOSED NAIL POINTS.



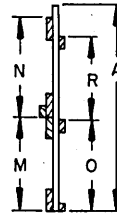
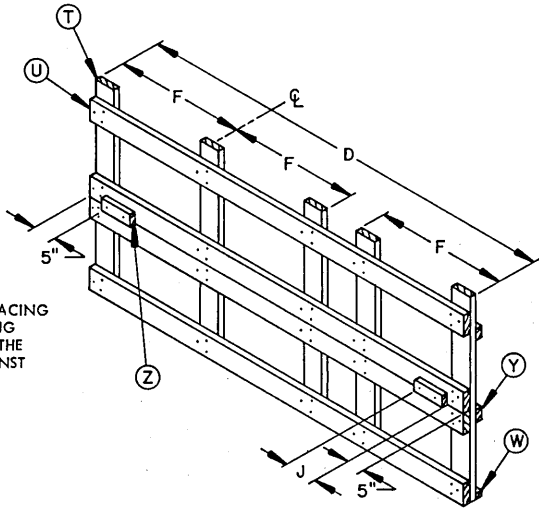
CENTER GATE M

THIS GATE IS DESIGNED FOR THE BRACING OF A 3-WIDE BY 1-HIGH LOAD USING EIGHTEEN (18) STRUTS. NOTE THAT THE OUTER ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.

CENTER GATES L AND M

CENTER GATE N

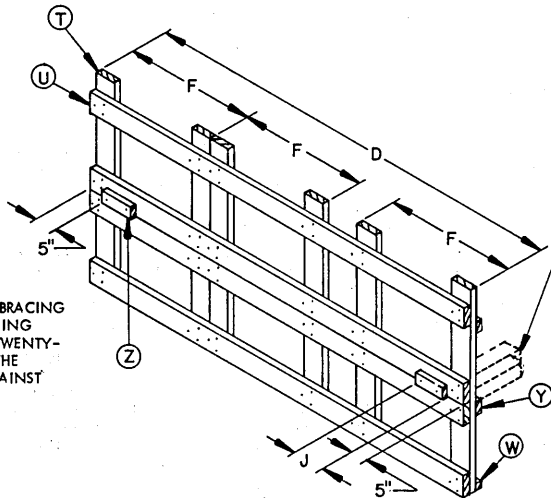
THIS GATE IS DESIGNED FOR THE BRACING OF A 3-WIDE BY 2-HIGH LOAD USING FIFTEEN (15) STRUTS. NOTE THAT THE OUTER ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.



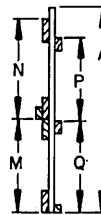
END VIEW

CENTER GATE O

THIS GATE IS DESIGNED FOR THE BRACING OF A 3-WIDE BY 2-HIGH LOAD USING TWELVE (12) STRUTS PER LAYER, TWENTY-FOUR (24) TOTAL. NOTE THAT THE OUTER ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.



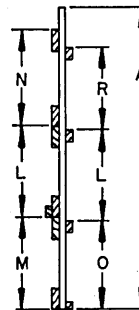
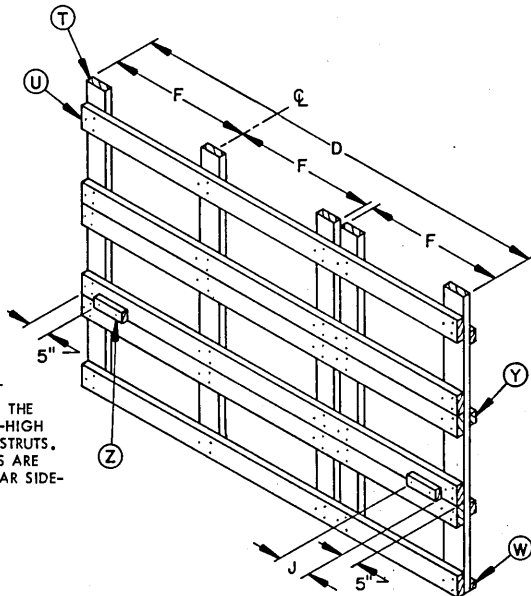
INDICATES PROPER POSITIONING OF STRUTS (ONE ON TOP OF THE OTHER) AT THE CENTER LEVEL.



END VIEW

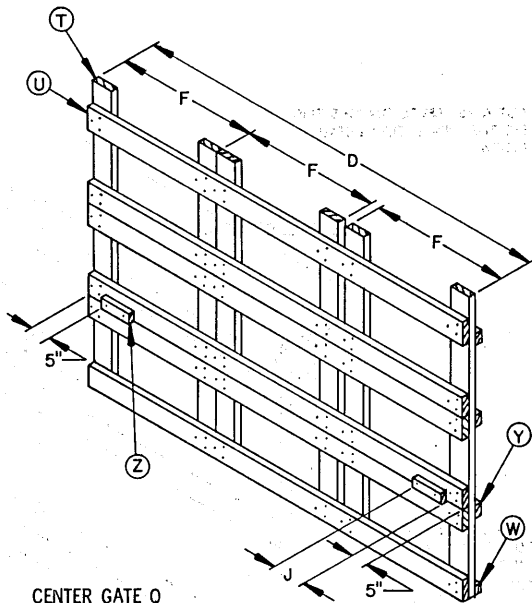
CENTER GATE P

THIS GATE IS DESIGNED FOR THE BRACING OF A 3-WIDE BY 3-HIGH LOAD USING TWENTY (20) STRUTS. NOTE THAT THE OUTER ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.



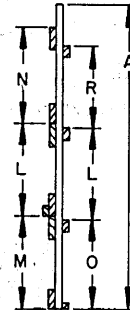
END VIEW

NOTE: REFER TO THE "CENTER GATE DIMENSION CHART" ON PAGE 37 FOR A DESCRIPTION OF THE DIMENSIONS REPRESENTED BY LETTERS ON THE GATE VIEWS. THE "CENTER GATE MATERIAL AND NAILING CHART" ON PAGE 37 INDICATES MATERIAL SIZE AND PROPER NAILING OF THE KEY LETTERED PIECES. SEE THE "CENTER GATE CHART" ON PAGE 38 FOR FURTHER GUIDANCE IN THE PROPER SELECTION OF A CENTER GATE.



CENTER GATE Q

THIS GATE IS DESIGNED FOR THE BRACING OF A 3-WIDE BY 3-HIGH LOAD USING TWENTY-FOUR (24) STRUTS. NOTE THAT THE OUTER ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.

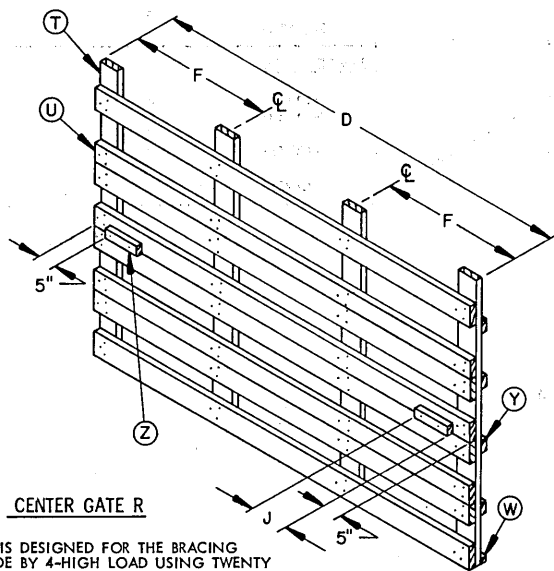


END VIEW

CENTER GATE MATERIAL AND NAILING CHART							
PIECE LETTER	IDENTIFICATION	MATERIAL	GATE	NO. REQD	NAIL TO	NAILS	
						SIZE	NO.
T	VERTICAL PIECE	2" X 6"	R	4	---	---	---
U	HORIZONTAL PIECE	2" X 6"	N,P	5	---	---	---
			O,Q	6	---	---	---
W	STRUT LEDGER	2" X 2" BY CAR WIDTH MINUS 1/2"	P,Q	4	T	16d*	3 PER JOINT
			R	6	T	16d*	3 PER JOINT
Y	STRUT LEDGER	2" X 3" BY CAR WIDTH MINUS 1/2"	R	8	T	16d*	2 PER JOINT
Z	GATE HOLD DOWN	2" X 3"	N,O	3	T	16d*	2 PER JOINT
			R	2	T	16d*	2 PER JOINT
			ALL	4	T	16d*	1 EVERY 4"

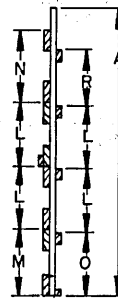
CENTER GATE DIMENSION CHART	
DIM	DESCRIPTION
A	LOAD HEIGHT PLUS 6" (MIN)
D	CAR WIDTH MINUS 1/2"
F	PALLET UNIT WIDTH
J	15" FOR "OPEN-TYPE"; ONE-HALF PALLET UNIT WIDTH MINUS 9" FOR BOXED-TYPE
L	PALLET UNIT HEIGHT
M	PALLET UNIT HEIGHT PLUS 1/2"
N	PALLET UNIT HEIGHT PLUS 1-1/2"
O	PALLET UNIT HEIGHT MINUS 1/2"
P	PALLET UNIT HEIGHT MINUS 1"
Q	PALLET UNIT HEIGHT MINUS 2"
R	PALLET UNIT HEIGHT MINUS 2-1/2"

*CLINCH EXPOSED NAIL POINTS



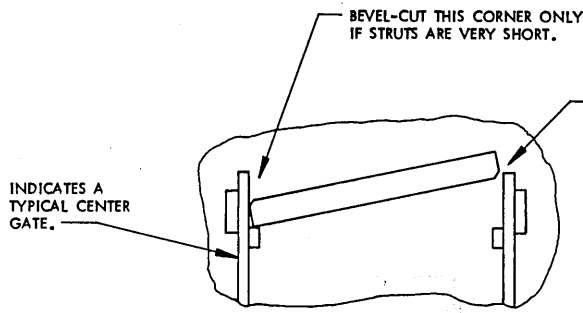
CENTER GATE R

THIS GATE IS DESIGNED FOR THE BRACING OF A 3-WIDE BY 4-HIGH LOAD USING TWENTY (20) STRUTS. NOTE THAT THE OUTER ROWS ARE POSITIONED AGAINST THE CAR SIDEWALLS.



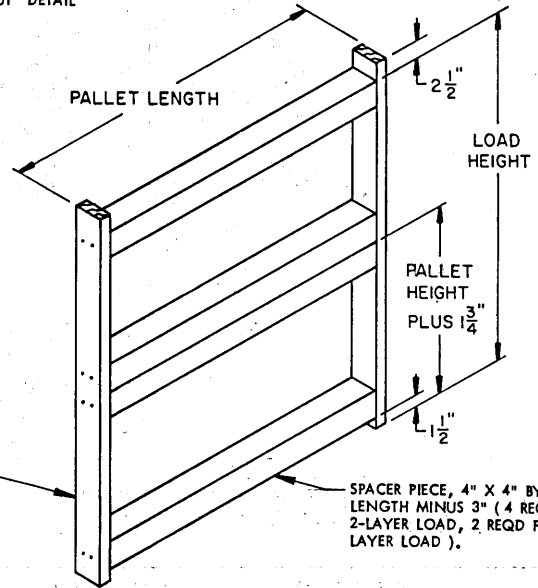
END VIEW

CENTER GATES Q AND R



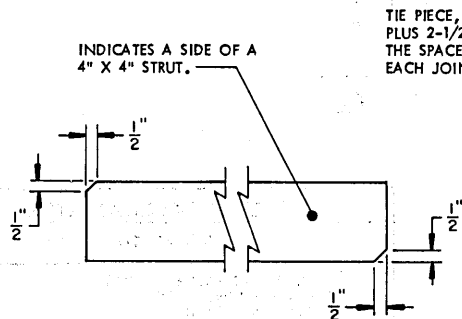
STRUT INSTALLATION

SEE GENERAL NOTE "G" ON PAGE 5 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.



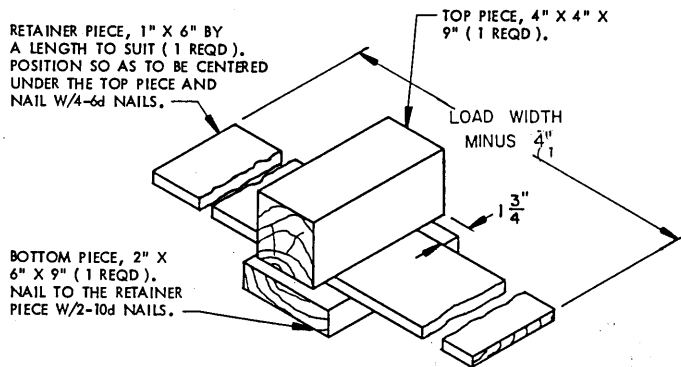
SPACER A

THE SPACER SHOWN IS FOR A 2-LAYER LOAD; ADJUST THE HEIGHT FOR USE IN A 1-LAYER LOAD. THIS SPACER IS FOR USE IN THE LOADS ON PAGES 10 AND 18 AND IS IDENTIFIED THEREIN AS PIECE MARKED ①.



BEVEL CUT

BEVEL CUTTING THE STRUTS AS SPECIFIED WILL FACILITATE INSTALLING THE STRUTS WITH A "DRIVE FIT". **CAUTION:** DO NOT BEVEL A CORNER MORE THAN ONE-HALF INCH (1/2").

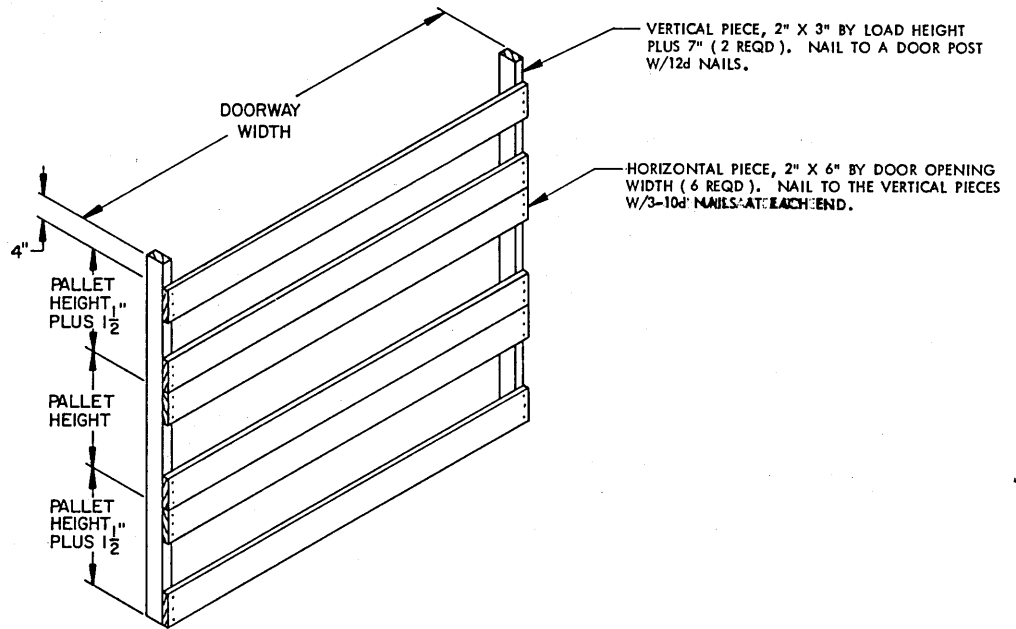


STRAP PURCHASE BLOCK

THIS STRAP PURCHASE BLOCK IS FOR USE IN THE LOAD ON PAGE 6 AND IS IDENTIFIED THEREIN AS PIECE MARKED ⑤.

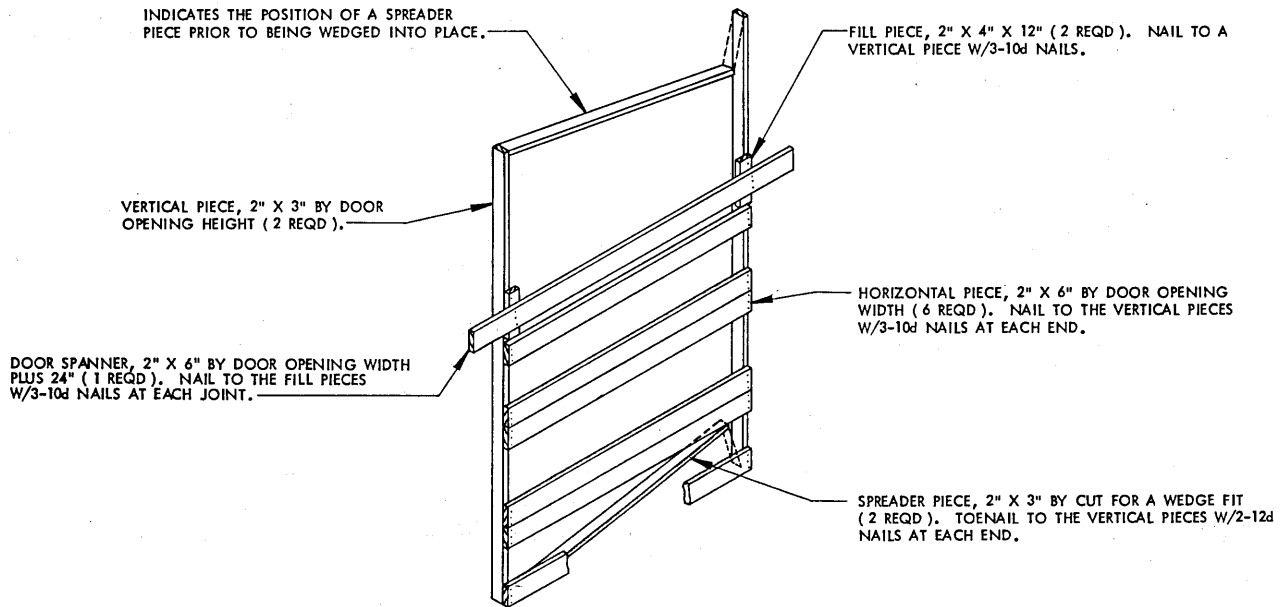
CENTER GATE CHART

LOAD CONFIGURATION	CENTER GATE	MAX LOAD IN ONE END	
		40' CAR	50' CAR
2-WIDE LOADS			
1-LAYER	A	24,500	49,000
	B	30,600	61,200
2-LAYERS	C	49,000	98,000
	D	49,000	98,000
3-LAYERS	E	61,200	LOAD LIMIT
	F	73,500	LOAD LIMIT
4-LAYERS	G	49,000	98,000
	H	73,500	LOAD LIMIT
5-LAYERS	J	61,200	LOAD LIMIT
	K	79,600	LOAD LIMIT
L		73,500	LOAD LIMIT
	3-WIDE LOADS		
1-LAYER	M	36,700	73,500
2-LAYERS	N	45,900	91,800
3-LAYERS	O	73,500	LOAD LIMIT
	P	61,200	LOAD LIMIT
4-LAYERS	Q	73,500	LOAD LIMIT
	R	61,200	LOAD LIMIT



DOORWAY PROTECTION A

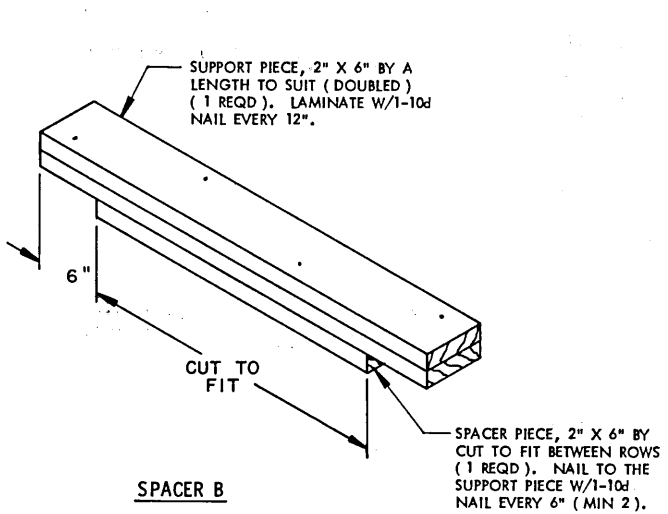
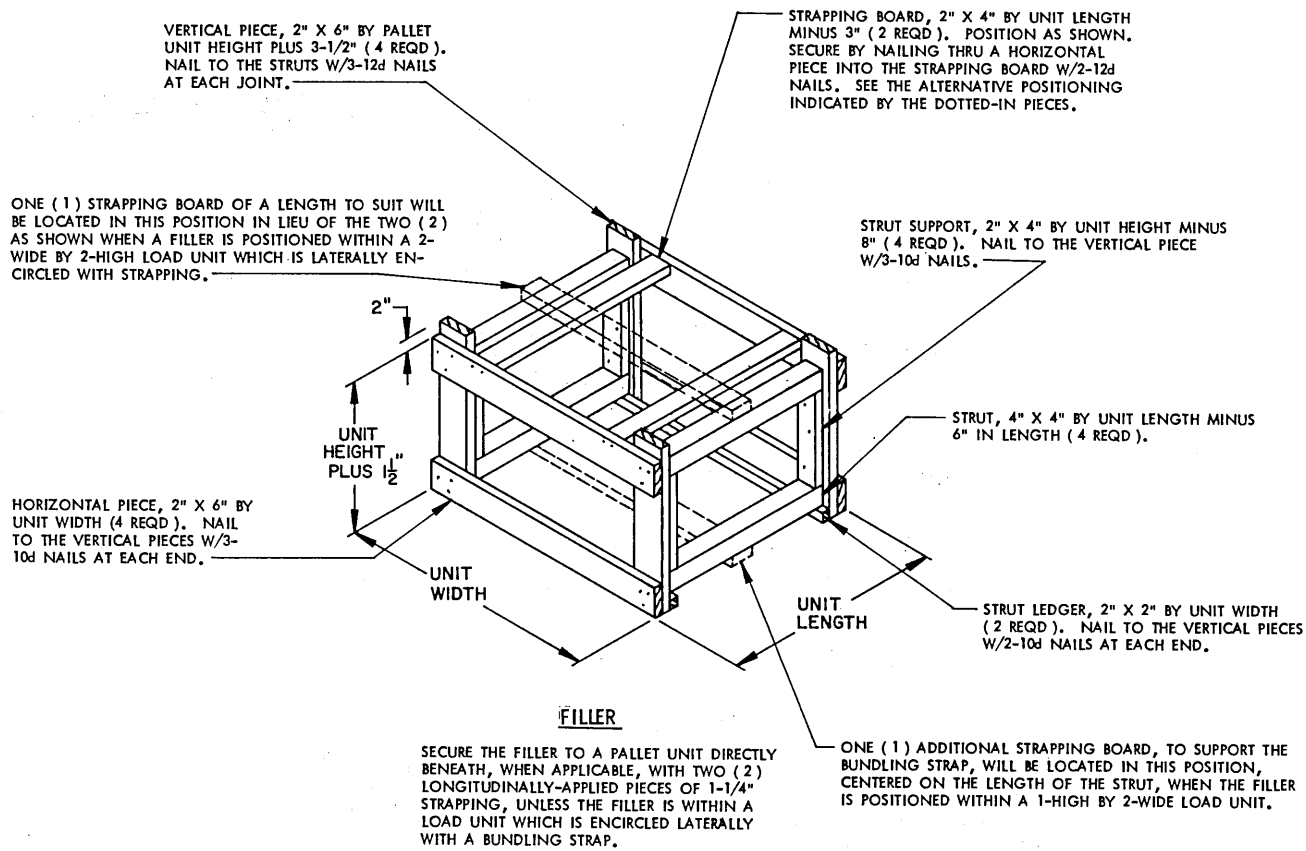
THE DOORWAY PROTECTION SHOWN IS FOR A 3-LAYER LOAD. THE ASSEMBLY IS ADAPTABLE FOR 2, 4, OR 5-LAYER LOADS BY ADJUSTING THE NUMBER OF HORIZONTAL PIECES. THIS ASSEMBLY IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE WOODEN, OR ARE STEEL AND HAVE HOLES IN WHICH TO ACCOMPLISH THE NAILING OF THE VERTICAL PIECES. IF THE DOOR POSTS ARE NOT NAILABLE, REFER TO THE "DOORWAY PROTECTION B" DETAIL BELOW.



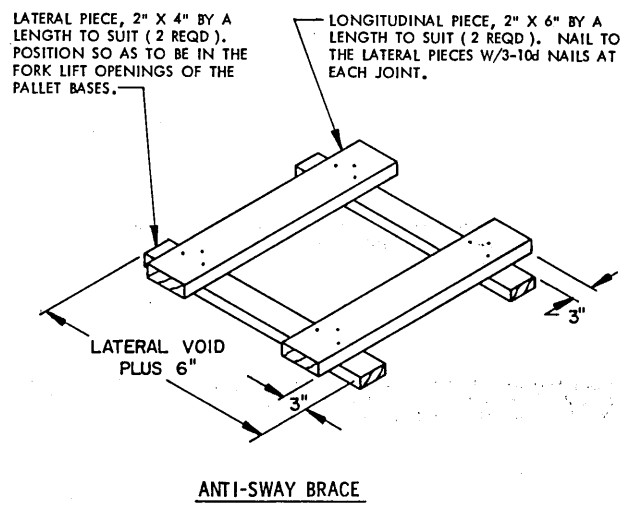
DOORWAY PROTECTION B

THIS DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE STEEL AND ARE WITHOUT HOLES FOR NAILING INTO. THE "DOORWAY PROTECTION A" AS DETAILED ABOVE MAY BE USED IF THE DOOR POSTS ARE NAILABLE. THE DOORWAY PROTECTION SHOWN IS FOR A 3-LAYER LOAD. THE ASSEMBLY IS ADAPTABLE FOR 2, 4, OR 5-LAYER LOADS BY ADJUSTING THE NUMBER OF HORIZONTAL PIECES.

DOORWAY PROTECTION



THIS SPACER IS FOR USE BETWEEN THE TOPS OF Laterally ADJACENT ROWS OF PALLET UNITS IN THE DOORWAY AREA OF A CAR IN CONJUNCTION WITH DOORWAY PROTECTION STRAPS. SEE PIECE MARKED ⑤ ON PAGE 8 FOR A TYPICAL INSTALLATION.



THIS ASSEMBLY MAY BE USED FOR LATERAL BRACING IN LIEU OF USING CRIB FILL IN THE LOADS SHOWN ON PAGES 8, 16, AND 42 WHEN THE BASES OF THE PALLET UNITS BEING SHIPPED ARE OF THE TYPE WHICH ARE PROVIDED WITH FORK LIFT OPENINGS FOR 4-WAY PICKUP.

GENERAL NOTES

(FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS)

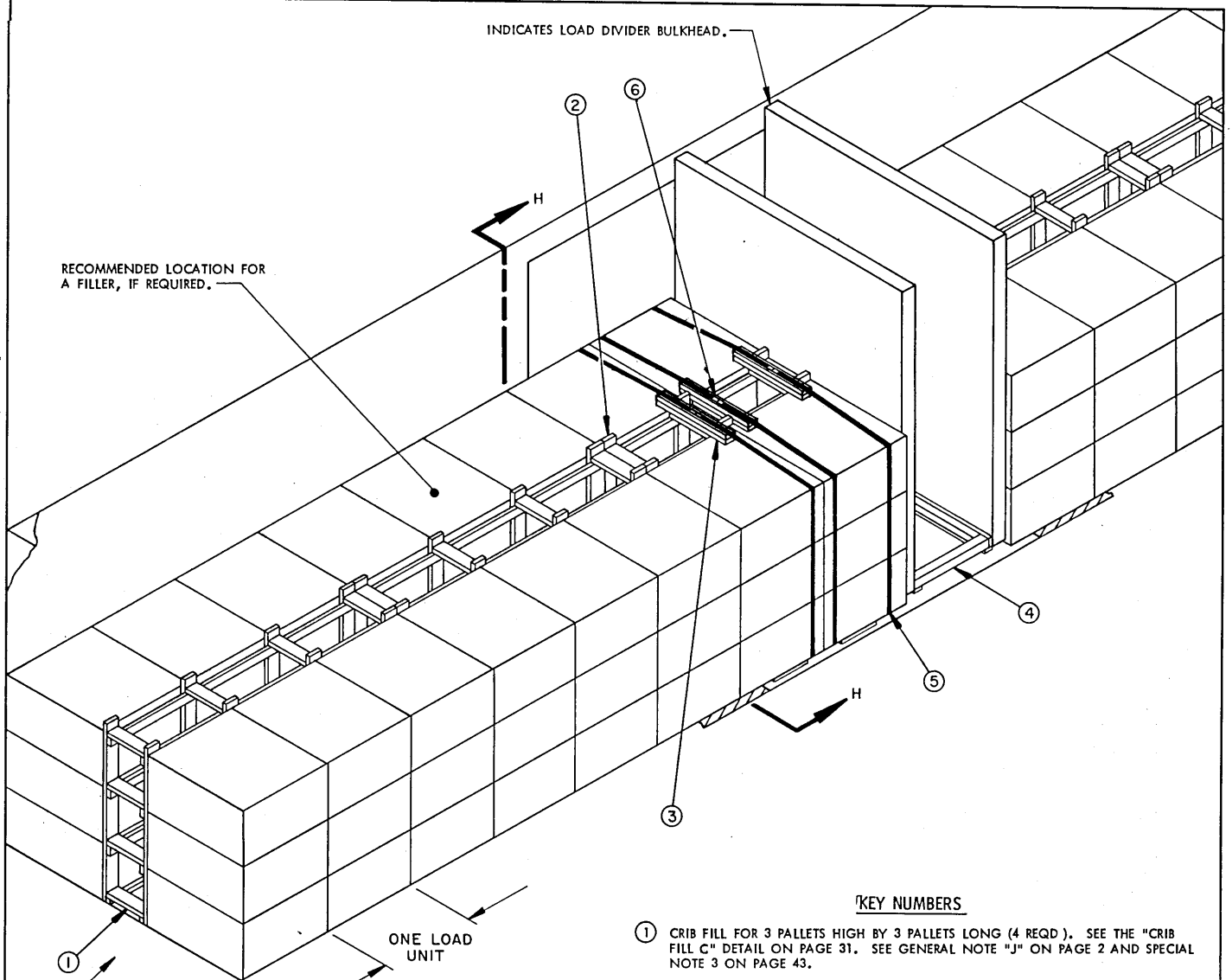
(GENERAL NOTES CONTINUED)

- A. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 42 AND 43 ARE FOR CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. **CAUTION:** ONLY CARS EQUIPPED WITH LOAD DIVIDERS MANUFACTURED BY EVANS, EQUIPCO, OR PRECO MAY BE USED. LOAD DIVIDERS MANUFACTURED BY TRANSCO ARE NOT ACCEPTABLE, WHETHER OF ALUMINUM OR STEEL CONSTRUCTION. THE DEPICTED PROCEDURES ARE APPLICABLE FOR CARS OF VARIOUS LENGTHS AND WIDTHS. THE AAR MECHANICAL DESIGNATION CLASS FOR THESE CARS, AS IDENTIFIED IN THE "OFFICIAL RAILWAY EQUIPMENT REGISTER" WILL BE RBL, XL, OR XLI.
- B. THE USE OF LOAD DIVIDER EQUIPPED CARS WILL ELIMINATE THE NEED FOR CENTER GATES AND STRUTS WHICH ARE REQUIRED IN CONVENTIONAL BOX CAR LOADS. THIS WILL ACCOUNT FOR A CONSIDERABLE SAVING IN MATERIAL AND LABOR COSTS. THEREFORE, EVERY EFFORT SHOULD BE MADE TO ACQUIRE CUSHIONED CARS EQUIPPED WITH LOAD DIVIDERS FOR SHIPMENT OF AMMUNITION ITEMS.
- C. LOAD DIVIDER CARS MAY BE EQUIPPED EITHER WITH CONVENTIONAL SLIDING DOORS OR WITH PLUG DOORS. **CAUTION:** DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF CAR SEALS, A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO, AND IN CONJUNCTION WITH, EACH CAR SEAL USED TO SEAL THE CAR. THE WIRE WILL BE THREADED THRU THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- D. REFER TO GENERAL NOTE "F" ON PAGE 2 FOR BASIC CAR SELECTION REQUIREMENTS. **NOTICE:** ONLY CUSHIONED CARS THAT HAVE SLIDING CENTER SILL TYPE CUSHIONING DEVICES OR END-OF CAR TYPE DEVICES WHICH HAVE AT LEAST FIFTEEN INCHES (15") OF TRAVEL ARE ACCEPTABLE.
- E. WHEN SELECTING RAILCARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS. CARS WITH BOWED ENDS CAN BE USED, HOWEVER, IF AN END WALL IS BOWED OUTWARD MORE THAN TWO INCHES (2"), EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END-OF-CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A "SQUARED OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR. SEE THE "BULKHEAD A" AND BULKHEAD B" DETAILS ON PAGE 29 FOR GUIDANCE.
- F. IF NAILING TO A CAR SIDEWALL IS NOT REQUIRED, BOX CARS EQUIPPED WITH ADJUSTABLE SIDE FILLERS THAT HAVE 3/8" OR THICKER PANELS MAY BE USED. HOWEVER, THESE SIDE FILLERS MUST NOT BE USED FOR LATERAL BLOCKING; THEY MUST BE RETRACTED AND LOCKED AGAINST THE CAR SIDEWALL. A "FILL PIECE" MUST BE INSTALLED IN THE VOID BETWEEN THE CAR SIDEWALL AND THE SIDE FILLER PANEL. SEE THE "TYPICAL TYPE A" VIEW ON PAGE 46 FOR GUIDANCE. IF THE BACK OF THE SIDE FILLER PANELS ARE REINFORCED WITH VERTICAL AND HORIZONTAL STEEL MEMBERS AS SHOWN IN THE "TYPICAL TYPE B" VIEW ON PAGE 46, THE "FILL PIECE" MATERIAL IS NOT REQUIRED.
- G. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. WHEN POSSIBLE TO DO SO, A FULL LOAD SHOULD BE BUILT USING AN OFFSET LOADING PATTERN. FOR INSTANCE, A LOAD CONSISTING OF AN EVEN NUMBER OF LOAD UNITS AND HAVING TWO MORE LOAD UNITS IN ONE END OF THE CAR THAN IN THE OPPOSITE END, OR A LOAD CONSISTING OF AN ODD NUMBER OF LOAD UNITS AND HAVING ONE OR THREE MORE LOAD UNITS IN ONE END THAN IN THE OTHER, IS CONSIDERED TO BE AN OFFSET LOAD. SEE GENERAL NOTE "Q".
- H. TO LOAD THE PALLET UNITS THAT EXTEND INTO THE DOORWAY AREA OF THE CAR, IT WILL BE NECESSARY TO HANDLE THE UNITS FROM A SIDE POSITION WITH THE TINES OF A FORKLIFT TRUCK UNDER THE 4 BY 4 SKIDS OF THE PALLET. AFTER A PALLET HAS BEEN LOCATED IN ITS APPROXIMATE SHIPPING POSITION IT WILL BE LOWERED TO REST ON THE FLOOR OF THE CAR OR A FIRST LAYER UNIT ON THE FAR SIDE OF THE CAR AND ON A SHORT 4 BY 4 BLOCK ON THE NEAR SIDE. THE BLOCK WILL FACILITATE WITHDRAWAL OF THE FORKLIFT TINES. THE FORKLIFT TINES WILL THEN BE PLACED UNDER THE EDGE OF THE PALLET COVER ASSEMBLY AND USED TO RAISE THE PALLET UNIT JUST ENOUGH TO ALLOW FOR THE REMOVAL OF THE 4 BY 4 BLOCK. AFTER THE PALLET UNIT HAS BEEN LOWERED, IT WILL BE INCHED INTO ITS SHIPPING POSITION.
- J. **NOTICE:** AFTER THE LOAD DIVIDER BULKHEADS ARE POSITIONED AGAINST THE LADING, AND THE LOCKING PINS ARE ENGAGED IN THE HOLES OF THE RAILS, THE LOWER LOCKING PINS MUST BE INSPECTED TO ENSURE THAT THE PINS ARE FULLY ENGAGED IN THE LOCKING HOLES. IF THE PINS ARE NOT FULLY SEATED IN THE LOCKING HOLES, THE LINKAGE MECHANISM WILL BE ADJUSTED AS REQUIRED SO THAT THE PINS WILL BE FULLY SEATED INTO THE LOCKING HOLES OF THE LOWER RAILS. IF PRESENT, DEBRIS MUST BE REMOVED FROM BENEATH THE LOCKING HOLES WHICH HAVE BEEN SELECTED FOR SECURING A LOAD DIVIDER BULKHEAD.
- K. A "STRUT ASSEMBLY" MUST BE INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS IF THE CAR CONTAINS CLASS A OR CLASS B EXPLOSIVES AND THE LOAD IN EITHER END OF THE CAR WEIGHS 50,000 POUNDS OR MORE. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF CLASS C EXPLOSIVES OR EMPTY PROJECTILES (METAL PARTS). **NOTE** THAT THE STRUT ASSEMBLY MAY BE OMITTED FROM LOADS OF CLASS A OR B EXPLOSIVES WEIGHING 50,000 POUNDS WHEN THE LADING AND ADEQUATE BLOCKING AND BRACING ARE POSITIONED TO COMPLETELY FILL THE SPACE BETWEEN THE INSTALLED BULKHEADS AS SPECIFIED IN GENERAL NOTE "L-2" AT RIGHT. DETAILS OF STRUT ASSEMBLIES FOR USE BETWEEN 2-PIECE BULKHEADS AND BETWEEN 1-PIECE BULKHEADS ARE SHOWN ON PAGE 44. IN THE EVENT THAT A STRUT ASSEMBLY IS OF SUCH A LENGTH THAT THE 4" X 4" STRUTS OF THE ASSEMBLY ARE LONGER THAN 12'-0", A SPECIAL HOLD-DOWN ASSEMBLY MUST BE USED. SEE THE "STRUT ASSEMBLY HOLD-DOWN" DETAILS ON PAGE 45 FOR GUIDANCE.
- L. THE NORMAL LOADING PATTERN IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS IS TO POSITION THE LADING BETWEEN A CAR END WALL AND A LOAD DIVIDER BULKHEAD IN FULL LAYERS. OBVIOUSLY, A LOAD QUANTITY MUST THEN BE A MULTIPLE OF THE NUMBER OF PALLET UNITS WHICH ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF PALLETS WHICH IS FULL CAR WIDTH BY FULL LOAD HEIGHT BY ONE UNIT IN LENGTH. IF THE QUANTITY TO BE SHIPPED CANNOT BE ATTAINED BY ADJUSTING THE NUMBER OF LAYERS IN ONE OR BOTH ENDS OF A CAR, OR BY ADJUSTING THE NUMBER OF LOAD UNITS IN EITHER END OF THE CAR, ONE OF THE FOLLOWING PROCEDURES MUST BE USED IN ORDER TO OBTAIN THE DESIRED QUANTITY.
 - 1. ONE OR MORE FILLERS CAN BE USED IN THE PLACE OF OMITTED PALLET UNITS TO ADJUST A QUANTITY DOWNWARD BY OTHER THAN A MULTIPLE OF A FULL LOAD UNIT. SEE THE FILLER ASSEMBLY DETAIL ON PAGE 40.
 - 2. AT LOCATION (S) WHERE K-BRACES MIGHT NORMALLY BE USED IN A LOAD IN A CONVENTIONAL CAR, LOAD DIVIDER BULKHEADS CAN BE POSITIONED. LOADING CAN THEN CONTINUE TOWARD THE CENTER OF THE CAR FROM EACH INSTALLED LOAD DIVIDER BULKHEAD, IN AN EVEN LAYER. INSTALL CENTER GATES AND STRUTS AS PROVIDED FOR WITHIN THE SPECIAL NOTES FOR THE APPLICABLE CONVENTIONAL BOX CAR DRAWING HEREIN, TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.
 - 3. IF THE HEIGHT OF THE PALLET UNITS BEING SHIPPED IS 24" OR LESS, ONE OR MORE UNITS CAN BE POSITIONED IN CONTACT WITH A LOAD DIVIDER BULKHEAD ON THE CENTER-OF-CAR SIDE. BLOCK AND BRACE WITH LCL BRACES AS SHOWN ON PAGE 24.
- M. **CAUTION:** CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS MUST NOT BE USED FOR SHIPMENT OF EXPLOSIVES SUCH AS DYNAMITE, TNT, BLACK POWDER, SMOKELESS POWDER (PROPELLANT EXPLOSIVES), TETRYL AND SIMILAR EXPLOSIVES (EXCEPT AS A COMPONENT PART OF AMMUNITION OR PROPELLING CHARGES) WHICH ARE LIABLE TO SIFT OR BECOME LODGED IN THE MECHANISM OF THE LOADING AND BRACING DEVICE IN THE EVENT OF A CONTAINER FAILURE.
- N. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOX CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. **NOTICE:** A SHIPMENT WILL BE POSITIONED IN THE RAIL CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR. SEE GENERAL NOTE "Q".
- O. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLET UNITS OF PROJECTILES, 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.
- P. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND A NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDEWALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED TO THE NAILING OF THE SIDE BLOCKING PIECES IN A FULL LOAD AND TO THE NAILING TO THE CAR FLOOR OF LCL BRACES IF USED. IF A NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE APPLICABLE KEY NUMBERS. SEE GENERAL NOTE "J" ON PAGE 2.
- Q. **CAUTION:** THE TOTAL WEIGHT OF A LOAD IN A CAR MUST NOT EXCEED THE LOAD LIMIT WHICH IS STENCILED ON THE SIDE OF THE CAR. ALSO, THE LOAD WEIGHT ON ONE TRUCK MUST NOT EXCEED ONE-HALF OF THE STENCILED LOAD LIMIT. THE CENTER OF GRAVITY (CG) OF A LOAD HAVING AN EQUAL NUMBER OF UNITS IN EACH END OF THE CAR WILL BE AT THE LONGITUDINAL CENTER OF THE CAR AND THEREFORE THE TOTAL WEIGHT OF THE LADING AND DUNNAGE MAY EQUAL BUT MUST NOT EXCEED THE STENCILED LOAD LIMIT. HOWEVER, FOR A LOAD CONSTRUCTED IN AN OFFSET LOADING PATTERN, THE CG WILL BE LOCATED TOWARD THE LONG-LOAD END FROM THE LONGITUDINAL CENTER OF THE CAR SO NATURALLY THE LONG-LOAD END WILL BE THE HEAVIEST. THE TOTAL WEIGHT OF THE LADING AND DUNNAGE MUST THEN BE SOMETHING LESS THAN THE STENCILED LOAD LIMIT. TO DETERMINE THE PORTION OF THE WEIGHT OF THE OFFSET SECTION OF THE LOAD WHICH WILL BE TRANSMITTED TO EACH END OF A CAR, REFER TO GENERAL NOTES "K-1" AND "K-2" ON PAGE 5.
- R. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTION ON PAGE 43.

(CONTINUED AT RIGHT)

INDICATES LOAD DIVIDER BULKHEAD.

RECOMMENDED LOCATION FOR A FILLER, IF REQUIRED.

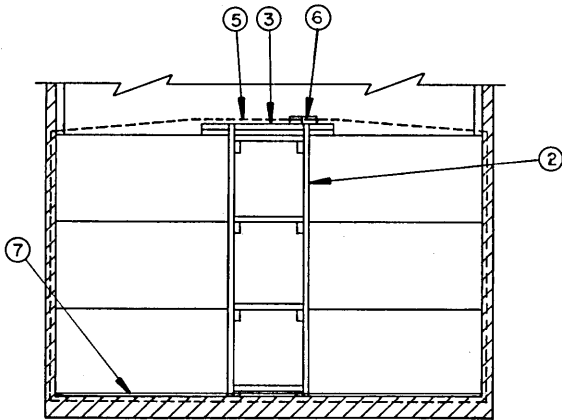


ISOMETRIC VIEW

IF THE END WALL OF A CAR IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE APPLICABLE BULKHEAD DETAIL ON PAGE 29.

KEY NUMBERS

- ① CRIB FILL FOR 3 PALLET HIGH BY 3 PALLET LONG (4 REQD). SEE THE "CRIB FILL C" DETAIL ON PAGE 31. SEE GENERAL NOTE "J" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 43.
- ② CRIB FILL FOR 3 PALLET HIGH BY 2 PALLET LONG (1 REQD). SEE "CRIB FILL D" DETAIL ON PAGE 31.
- ③ SPACER (3 REQD). SEE THE "SPACER B" DETAIL ON PAGE 40. SEE SPECIAL NOTE 4 ON PAGE 43.
- ④ STRUT ASSEMBLY FOR 1-PIECE BULKHEADS (1 REQD). SEE THE DETAIL ON PAGE 44. SEE GENERAL NOTE "K" ON PAGE 41.
- ⑤ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (3 REQD). PRE-POSITION SO AS TO ENCIRCLE THE LOAD UNITS IN THE DOORWAY AREA. SECURE TO PIECE MARKED ③ W/2 STAPLES. SEE PIECE MARKED ⑦.
- ⑥ SEAL FOR 1-1/4" STRAPPING (6 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- ⑦ TEMPERED HARDBOARD STRIP, 1/8" THICK BY 18" WIDE BY CAR WIDTH IN LENGTH (2 REQD). PRE-POSITION AS SHOWN BY THE "PREPARATION OF CAR FLOOR "B"" DETAIL ON PAGE 8. NAIL TO THE CAR FLOOR W/12-4d NAILS. SEE SPECIAL NOTE 8 ON PAGE 43.



SECTION H-H

TYPICAL 84-UNIT LOAD (2-WIDE X 3-HIGH) OF "OPEN-TYPE" OR BOXED-TYPE PALLET UNITS

IN A 50'-6" L X 9'-2" W BOXCAR EQUIPPED WITH LOAD DIVIDERS,

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS, AND WITH 10'-6" WIDE DOOR OPENINGS IS SHOWN. CARS WHICH ARE SLIGHTLY DIFFERENT IN LENGTH OR OF OTHER WIDTHS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN ALSO BE USED.
2. THE TYPICAL "OPEN-TYPE" PALLET UNIT SHOWN HAS OVERALL DIMENSIONS OF 38-1/8" LONG BY 44-3/4" WIDE BY 20-7/16" HIGH AND AN ESTIMATED WEIGHT OF 1,588 POUNDS. THE PROCEDURES ARE ALSO APPLICABLE FOR ALL THE OTHER "OPEN-TYPE" PALLET UNITS AS DETAILED BY PICATINNY ARSENAL DRAWING NO. F-8837835, AND FOR THE BOXED-TYPE PALLET UNITS AS DETAILED BY ORDNANCE CORPS DRAWING NO. F-7548604.
3. A 2-WIDE BY 3-HIGH BY 14-LONG LOAD IS SHOWN AS A TYPICAL LOAD. LOAD DIVIDER CARS CAN BE USED FOR ANY OF THE LOAD CONFIGURATIONS SHOWN FOR THE CONVENTIONAL TYPE BOX CARS ON PAGES 6 THRU 9 AND 12 THRU 17. ALTHOUGH NOT FORBIDDEN, IT WILL PROBABLY NOT BE NECESSARY TO USE THE "3 AND 2-WIDE BY 2-HIGH" PROCEDURES SHOWN ON PAGES 10 AND 11 AND PAGES 18 AND 19 IN OBTAINING THE DESIRED QUANTITY TO BE SHIPPED.
4. WHEN THE LOAD CONFIGURATION BEING USED CONSISTS OF TWO ROWS, ONE AGAINST EACH CAR SIDEWALL AS SHOWN, OR CONSISTS OF THREE ROWS WIDE, AND THE LOAD EXTENDS INTO THE DOORWAY AREA OF THE CAR, DOORWAY PROTECTION IS REQUIRED. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE PALLET UNIT LENGTH. DOORWAY PROTECTION IN THE DEPICTED LOAD IS PROVIDED BY THE SPACERS, PIECES MARKED (3), AND THE DOORWAY PROTECTION STRAPS, PIECES MARKED (5). TWO (2) STRAPS AND SPACERS ARE REQUIRED AROUND A LOAD UNIT WHICH IS NOT RETAINED BY AT LEAST SIX INCHES (6") OF THE CAR SIDEWALL ON BOTH SIDES OF THE LOAD, AND ONE (1) STRAP AND SPACER ARE REQUIRED AROUND A LOAD UNIT WHICH IS RETAINED BY AT LEAST SIX INCHES (6") BUT LESS THAN HALF OF THE UNIT LENGTH. NOTE THAT PIECES MARKED (3) AND (5) IN THE DEPICTED LOAD ARE ONLY APPLICABLE FOR USE IN CARS EQUIPPED WITH PLUG TYPE DOORS. THESE PIECES WILL NOT BE USED IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS; THE WOODEN GATE TYPE MUST BE USED INSTEAD. REFER TO THE "DOORWAY PROTECTION A" AND "DOORWAY PROTECTION B" DETAILS ON PAGE 39 FOR CONSTRUCTION GUIDANCE.
5. DOORWAY PROTECTION FOR A 3-WIDE LOAD IN CARS EQUIPPED WITH PLUG TYPE DOORS, WHEN THE LATERAL VOID REQUIRES THE USE OF CRIB FILL, WILL BE AS SHOWN FOR THE 2-WIDE LOAD SHOWN ON PAGE 42 AND AS SPECIFIED IN SPECIAL NOTE 4 ABOVE. FOR A 3-WIDE LOAD WHICH DOES NOT REQUIRE CRIB FILL, OMIT THE SPACERS, PIECES MARKED (3) BUT INSTALL THE DOORWAY PROTECTION STRAPS, ONE (1) OR TWO (2) PER LOAD UNIT, AS APPLICABLE. THE WOODEN GATE TYPE DOORWAY PROTECTION MUST BE USED IN LIEU OF THE DOORWAY PROTECTION STRAPS AND SPACERS IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. SEE THE "DOORWAY PROTECTION A" AND "DOORWAY PROTECTION B" DETAILS ON PAGE 39 FOR CONSTRUCTION GUIDANCE.
6. SEE GENERAL NOTE "L" ON PAGE 41 FOR GUIDANCE IN ADJUSTING A LOAD QUANTITY.
7. THE LOAD CAPACITY CHARTS SHOWN FOR THE 50'-6" LONG CUSHIONED TYPE BOX CARS ON PAGES 13, 15, AND 17 MAY BE USED AS GUIDANCE IN PLANNING A LOAD.
8. PALLET UNITS WILL SHIFT LONGITUDINALLY DURING NORMAL TRANSPORTATION OF A LOAD. IN ORDER TO HELP PREVENT THE DOORWAY PROTECTION STRAPS, PIECES MARKED (5), FROM BECOMING SNAGGED ON ROUGH PORTIONS OF A CAR FLOOR, THE PALLET UNITS IN THE DOORWAY OF A CAR EQUIPPED WITH PLUG DOORS MUST BE PLACED UPON PRE-POSITIONED TEMPERED HARDBOARD STRIPS. SEE THE "PREPARATION OF CAR FLOOR "B"" DETAIL ON PAGE 8 FOR GUIDANCE. NOTE THAT THE NAILS FOR SECURING THE HARDBOARD STRIPS TO THE CAR FLOOR SHOULD BE LOCATED SO AS NOT TO BE UNDER THE PALLET SKIDS WHEN THE UNITS ARE POSITIONED IN THE CAR.

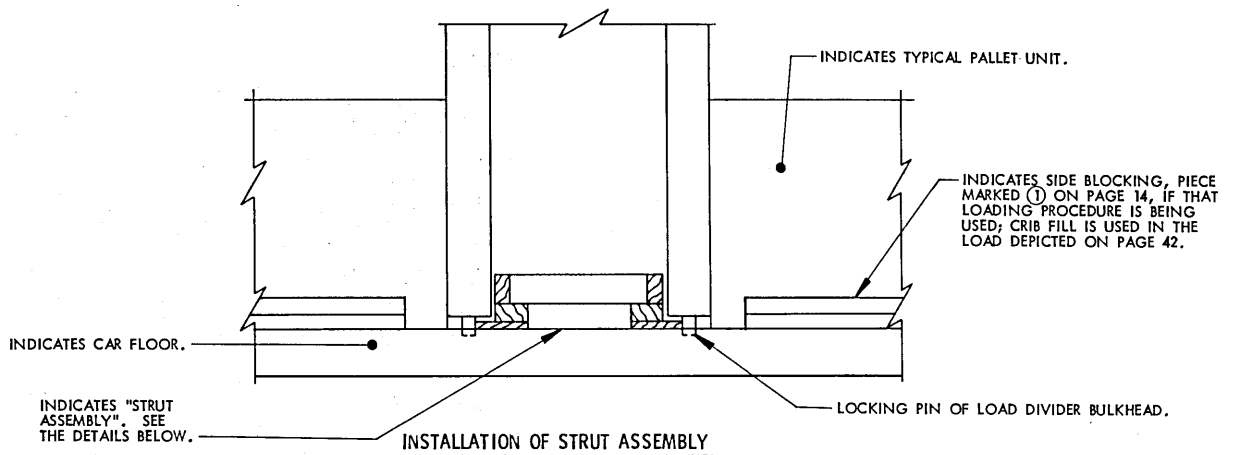
BILL OF MATERIAL (TYPICAL)

LUMBER	LINEAR FEET	BOARD FEET
1" X 8"	16	11
2" X 2"	89	30
2" X 3"	267	134
2" X 4"	37	25
2" X 6"	337	337
4" X 4"	20	27
NAILS	NO. REQD	POUNDS
4d (1-1/2")	24	NIL
6d (2")	14	1/4
10d (3")	436	6-3/4
12d (3-1/4")	320	5-1/2
1/8" TEMPERED HARDBOARD	-----28 SQ FT	13 LBS
STEEL STRAPPING, 1-1/4" X .035" OR .031"	-----93' REQD	14 LBS
SEAL FOR 1-1/4" STRAPPING	-----6 REQD	1/2 LB
STAPLE FOR 1-1/4" STRAPPING	-----6 REQD	NIL

LOAD AS SHOWN (TYPICAL)

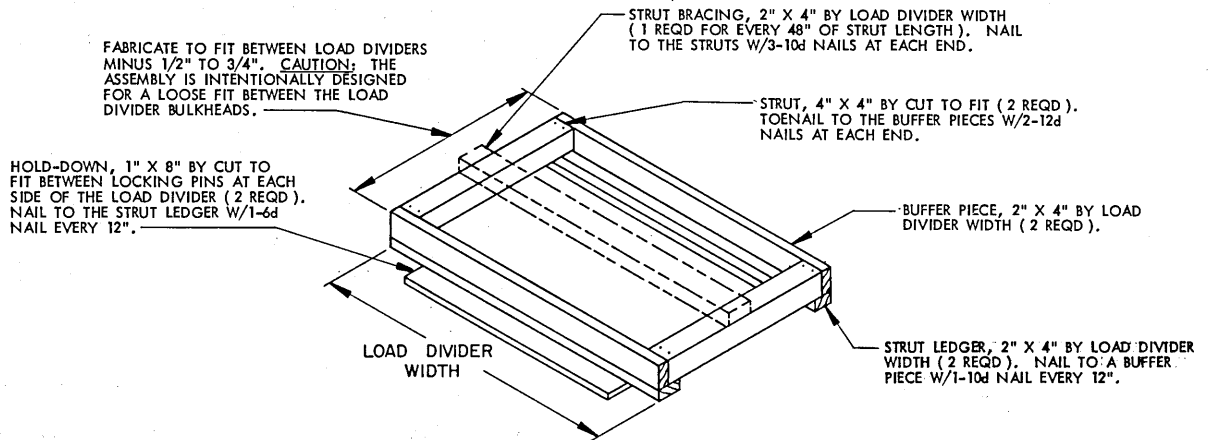
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	-----84	133,392 LBS
DUNNAGE	-----	1,168 LBS
TOTAL WEIGHT	-----	134,560 LBS

TYPICAL 84-UNIT LOAD (2-WIDE X 3- HIGH) OF "OPEN-TYPE OR BOXED-TYPE PALLET UNITS
IN A 50'-6" L X 9'-2" W BOXCAR EQUIPPED WITH LOAD DIVIDERS



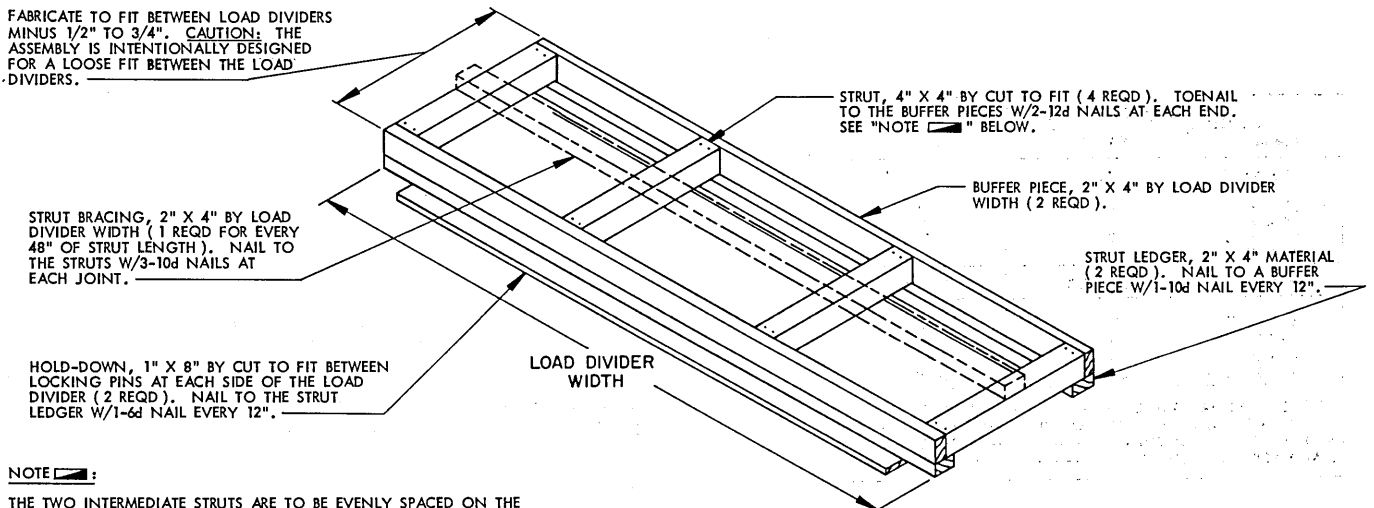
INSTALLATION OF STRUT ASSEMBLY

THIS VIEW SHOWS THE STRUT ASSEMBLY INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS. NOTE THE 1/2" TO 3/4" (TOTAL) SPACE INTENTIONALLY PROVIDED BETWEEN THE ASSEMBLY AND THE BULKHEADS.



STRUT ASSEMBLY FOR 2-PIECE BULKHEADS

A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS OF CLASS A OR CLASS B EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF CLASS C EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD. IF A STRUT ASSEMBLY IS LONGER THAN 12'-0", THE ASSEMBLY MUST BE HELD DOWN IN THE CENTER. SEE THE DETAILS ON PAGE 45 FOR GUIDANCE.

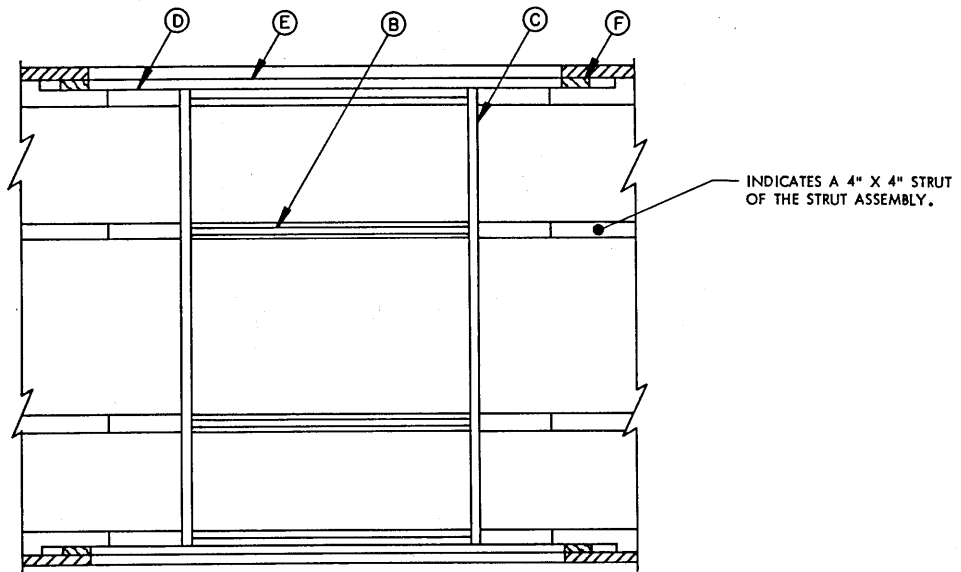


NOTE []:

THE TWO INTERMEDIATE STRUTS ARE TO BE EVENLY SPACED ON THE WIDTH OF THE DIVIDER BULKHEADS, WITH ADJUSTMENTS MADE SO AS TO ALIGN WITH VERTICAL FRAMING WITHIN THE BULKHEADS. IF THE CAR IS EQUIPPED WITH 2-PIECE DIVIDER BULKHEADS AND THE BULKHEADS ARE LATERALLY ALIGNED WITH EACH OTHER, THE STRUTS SHOULD BE ALIGNED WITH THE EDGES OF THE BULKHEADS; IF THE BULKHEADS ARE NOT ALIGNED, THE "STRUT ASSEMBLY FOR 2-PIECE BULKHEADS" MUST BE USED. SEE THE DETAIL ABOVE.

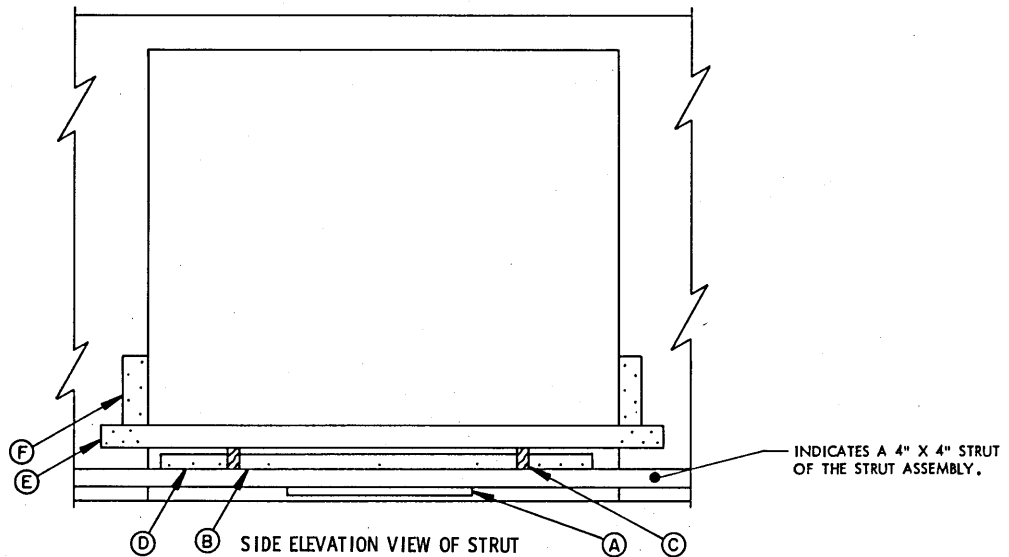
STRUT ASSEMBLY FOR 1-PIECE BULKHEADS

A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS OF CLASS A OR CLASS B EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF CLASS C EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD. IF A STRUT ASSEMBLY IS LONGER THAN 12'-0", THE ASSEMBLY MUST BE HELD DOWN IN THE CENTER. SEE THE DETAILS ON PAGE 45 FOR GUIDANCE.



PLAN VIEW OF STRUT
ASSEMBLY HOLD DOWN

THIS PLAN VIEW AND THE SIDE ELEVATION VIEW BELOW DEPICT THE HOLD-DOWN BLOCKING WHICH IS REQUIRED WHEN THE STRUTS OF THE "STRUT ASSEMBLY" USED IN A LOAD DIVIDER CAR ARE LONGER THAN 12'-0". NOTE THAT THE SPECIAL STRUT HOLD-DOWN AND THE STRUT ASSEMBLY ARE ONLY REQUIRED IF THE LOAD BEHIND EITHER BULKHEAD IS MORE THAN 30,000 POUNDS, AND ONLY FOR LOADS OF CLASS A OR CLASS B EXPLOSIVES.

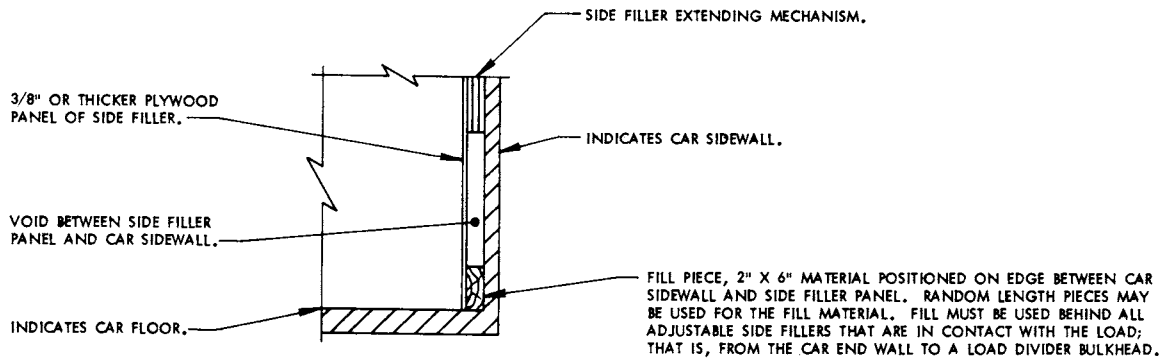


SIDE ELEVATION VIEW OF STRUT
ASSEMBLY HOLD DOWN

KEY LETTERS

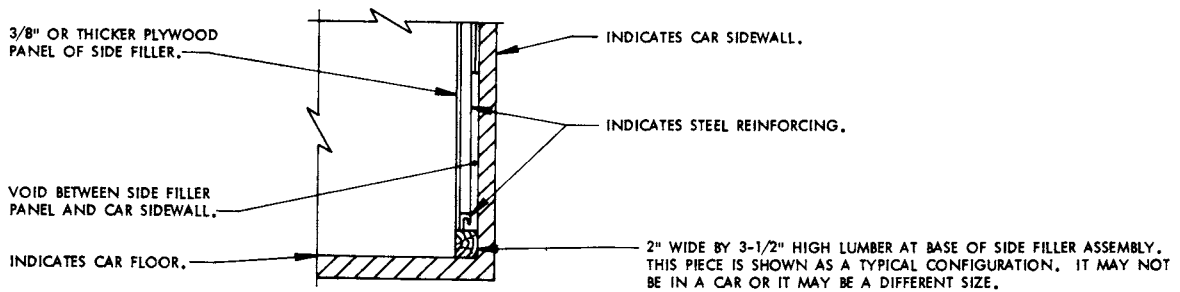
- (A) FILLER PIECE, 2" X 4" X 48" (4 REQD). POSITION SO AS TO BE CENTERED IN THE DOORWAY AREA AND NAIL TO THE BOTTOM SURFACE OF A STRUT W/4-10d NAILS.
- (B) SPACER PIECE, 2" X 4" X 72" (4 REQD). POSITION ON EDGE AND SO AS TO BE CENTERED IN THE DOORWAY AREA AND TOENAIL TO A STRUT W/3-12d NAILS ON EACH SIDE.
- (C) HOLD-DOWN PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT IF THE CAR HAS PLUG DOORS, OR 2" X 6" BY CAR WIDTH PLUS 4" IF THE CAR HAS CONVENTIONAL SLIDING DOORS) (2 REQD). NAIL TO EACH PIECE MARKED (B) W/2-12d NAILS AND TOENAIL TO THE STRUTS W/2-12d NAILS AT EACH JOINT.
- (D) BRACE PIECE, 4" X 4" X 18" (8 REQD). POSITION AGAINST A PIECE MARKED (C) AND TOENAIL TO A STRUT W/3-12d NAILS ON EACH SIDE.
- (E) DOOR SPANNER PIECE, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD). NAIL TO A CAR DOOR POST/SIDE WALL OR TO A NAILING STRIP W/5-12d NAILS AT EACH END. NOTE: PRIOR TO NAILING THESE PIECES IN PLACE, THE STRUTS OF THE STRUT ASSEMBLY ARE TO BE PRESSED DOWNWARD UNTIL THE PIECES MARKED (A) ARE TOUCHING OR ARE ALMOST TOUCHING THE FLOOR OF THE CAR.
- (F) HOLD-DOWN CLEAT, 2" X 6" X 18" (4 REQD). NAIL TO A CAR DOOR POST/SIDE WALL OR TO A NAILING STRIP W/5-12d NAILS.

STRUT ASSEMBLY HOLD DOWN



TYPICAL TYPE A

THIS VIEW SHOWS THE INSTALLATION OF A "FILL PIECE" IN A CAR EQUIPPED WITH A STANDARD ADJUSTABLE SIDE FILLER.



TYPICAL TYPE B

THIS VIEW SHOWS A TYPICAL SECTION OF A CAR EQUIPPED WITH HEAVY DUTY, STEEL REINFORCED, ADJUSTABLE SIDE FILLERS. A "FILL PIECE", AS SHOWN IN THE "TYPICAL TYPE A" DETAIL ABOVE, IS NOT REQUIRED IN CARS SO EQUIPPED.