APPROVED BY
BUREAU OF EXPLOSIVES

DATE 1-24-07

LOADING AND BRACING (CL & LCL) IN BOXCARS* OF SMALL DIAMETER BOMB SINGLE WEAPON PACKED ONE PER CNU-659 CONTAINER, PALLETIZED

INDEX

*THIS OUTLOADING DRAWING INCLUDES PROCEDURES FOR CONVENTIONAL TYPE BOXCARS AND CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY
JOINT MUNITIONS COMMAND

APPROVED BY ORDER OF COMMANDING
GENERAL, U.S. ARMY MATERIEL COMMAND

U.S. ARMY DEFENSE AMMUNITION CENTER

CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 34.

DO NOT SCALE

ENGINEER OR TECHNICIAN	BASIC	MELVIN SIX
	REV.	MELVIN SIX
TRANSPORTATION ENGINEERING DIVISON		
VALIDATION ENGINEERING DIVISON		TESTED
ENGINEERING DIRECTORATE		

OCTOBER 2005

REVISION 1 — DECEMBER 2006

SEE THE REVISION LISTING ON PAGE 2

CLASS	DIVISION	DRAWING	FILE
19	48	8827	SP5J36

PROJECT SP 526-05

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 SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF SMALL DIAMETER BOMB SINGLE WEAPONS PACKED ONE GBU-39 BOMB PER CNU-659 CONTAINER. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4, AMC DRAWING 19-48-8826-SP20J1, AND BOEING DRAWING 70P993152-1003 FOR DETAILS OF THE PALLET UNIT AND CONTAINER.

C. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE BOXCARS AND FOR SHIPMENTS IN CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.

D. THE SELECTION OF RAILCARS FOR THE TRANSPORT OF PALLET UNITS 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.

E. WHEN SELECTING RAILCARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOXCARS THAT DO NOT HAVE BOWED ENDWALLS. CARS HAVING BOWED ENDS CAN BE USED, HOWEVER, IF AN ENDWALL IS BOWED OUTWARD MORE THAN 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. REFER TO PAGE 28 FOR GUIDANCE.

F. CONVENTIONAL BOXCARS EQUIPPED WITH SLIDING DOORS HAVE BEEN SHOWN, HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CONVENTIONAL CARS EQUIPPED 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.

G. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLET UNITS, 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.

H. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE. IF THOSE MEMBERS SPECIFICALLY IDENTIFIED AS "STRUTS" WITHIN THE KEY NUMBERS OF A DEPICTED LOAD ARE SPECIFIED TO BE 4" X 4" MATERIAL, IT IS PERMISSIBLE TO USE TWO LAMINATED PIECES OF 2" X 6" MATERIAL IN LIEU OF EACH 4" X 4" STRUT. DOUBLED 2" X 6" STRUTS WILL BE LAMINATED W/1-10d NAIL EVERY 6".

J. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. UNLESS PROHIBITED WITHIN THE SPECIAL NOTES, 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.

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

K. 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.

L. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES THAT ARE TO BE USED IN THE DELINEATED BOXCAR LOADS SHOWN THROUGHOUT THIS DRAWING. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2-1/2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH ASTM F1667 AS NEARLY AS PRACTICABLE. STAPLES THAT ARE LONGER THAN 2-1/2" WILL BE A COMMERCIAL GRADE, OF A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY SENCO PRODUCTS INCORPORATED. NOTE: STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD RESTRAINING FLOOR DUNNAGE APPLICATION.

M. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 5 FOR GUIDANCE.

N. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE BLOCKING COMPONENTS AND OF THE DEPICTED CARS, SUCH AS A CAR SIDEWALL, HAVE BEEN OMITTED FROM THE LOAD VIEW FOR CLARITY PURPOSES.

O. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOXCAR 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 RAILCAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR.

P. CAUTION: WHEN POWER OR PNEUMATIC NAILERS ARE BEING USED IN THE APPLICATION OF NAILED FLOORLINE BLOCKING OR BRACING, PALLET UNITS BEING LOADED INTO THE CONVEYANCE MUST BE POSITIONED TO ALLOW A CLEAR PATH OF EXIT FOR THE OPERATOR AT ALL TIMES, SHOULD AN EMERGENCY EXIT BECOME NECESSARY.

Q. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

R. AS REQUIRED BY THE ASSOCIATION OF AMERICAN RAILROADS (AAR), ALL 1-1/4" AND 2" STEEL STRAPPING USED FOR LOAD RESTRAINT MUST BE MARKED AS SPECIFIED WITHIN THE APPLICABLE AAR RULES GOVERNING LOADING, BLOCKING AND BRACING OF FREIGHT WITHIN THE CONVEYANCE. FOR THE SPECIFIC MARKING SIZE, FREQUENCY, ETC., REQUIRED, REFER TO THE APPROPRIATE AAR LOADING RULES.

(CONTINUED ON PAGE 3)

MATERIAL SPECIFICATIONS

LUMBER	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
NAILS	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
STRAPPING, STEEL	ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
SEAL, STRAP	ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
PLYWOOD	COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
STAPLE, STRAP	COMMERCIAL GRADE.
ANTI-CHAFING MATERIAL	MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
WIRE, CARBON STEEL	ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.

REVISION

REVISION 1, DATED AUGUST 2006, CONSISTS OF:

UPDATING THE WEIGHT OF PALLET UNIT AND DRAWING/PART NUMBER.

(GENERAL NOTES CONTINUED FROM PAGE 2)

S. FOR CONVENTIONAL TYPE BOXCARS:

1. 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 "DOORWAY BLOCKING" PIECES IN THE FULL LOADS AND TO THE NAILING TO THE CAR FLOOR OF THE LCL BRACES AND KNEE BRACE ASSEMBLIES IN THE LESS-THAN-FULL LOADS. 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.

2. NOTICE: WHEN POSITIONING PALLET UNITS IN A CAR, THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL AND 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 JOINTS BETWEEN THE LAYERS OF CONTAINERS ON THE PALLET UNIT. PADDING, OF 2" THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.

3. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN ON PAGE 12. BRACING IS 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 HORIZONTAL STRUT BRACING PIECES FOR THE UPPER LEVEL OF STRUTS FOR ALL BUT THE UPPERMOST TIER OF A LOAD MAY BE DIFFICULT TO APPLY TO THE TOP SURFACES OF THE STRUT AS DEPICTED. STRUT BRACING WILL BE EQUALLY EFFECTIVE IF APPLIED TO THE UNDER SIDE OF THOSE STRUTS.

4. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT APPROXIMATELY 1/4" TO 3/8" LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. MEASUREMENTS FOR STRUT LENGTHS NEEDS TO BE ACCOMPLISHED AT SEVERAL PLACES DURING THE BLOCKING AND BRACING PROCESS. CARE MUST BE EXERCISED WHEN MEASURING FOR AND INSTALLING STRUTS. THE SPECIFIED APPROXIMATE DIMENSION FOR A STRUT LENGTH MAY BE ADJUSTED, AS NECESSARY, TO PROVIDE FOR A TIGHTLY BLOCKED LOAD WITHOUT DISTORTING, DENTING OR OTHERWISE DAMAGING THE PALLET UNITS. ONE END OF THE STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE. THE OTHER END, WHICH CAN BE BEVELED ON THE LOWER CORNER IF DESIRED, WILL THEN BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH END OF THE STRUT 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 5 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.

5. WHERE 2" X 4" PIECES ARE SPECIFIED FOR STRUT LEDGERS, 2" X 2" MATERIAL MAY BE SUBSTITUTED, IF DESIRED.

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

T. FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS:

1. CAUTION: FOR CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS, 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.

2. THE USE OF LOAD DIVIDER EQUIPPED CARS WILL ELIMINATE THE NEED FOR CENTER GATES AND STRUTS, AND GATE HOLD DOWNS (WHEN APPLICABLE) WHICH ARE REQUIRED IN CONVENTIONAL BOXCAR 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 SMALL DIAMETER BOMBS. NOTICE: ONLY CUSHIONED CARS THAT HAVE SLIDING CENTER SILL TYPE CUSHIONED DEVICES OR END-OF-CAR TYPE DEVICES WHICH HAVE AT LEAST 15" OF TRAVEL ARE ACCEPTABLE.

3. IF NAILING TO A CAR SIDEWALL IS NOT REQUIRED, BOXCARS 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 "SIDE FILLER TYPICAL TYPE A" VIEW ON PAGE 33 FOR GUIDANCE. IF THE BACK OF THE SIDE FILLER PANELS ARE REINFORCED WITH VERTICAL AND HORIZONTAL STEEL MEMBERS AS SHOWN IN THE "SIDE FILLER TYPICAL TYPE B" VIEW ON PAGE 33, THE "FILL PIECE" MATERIAL IS NOT REQUIRED.

4. 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.

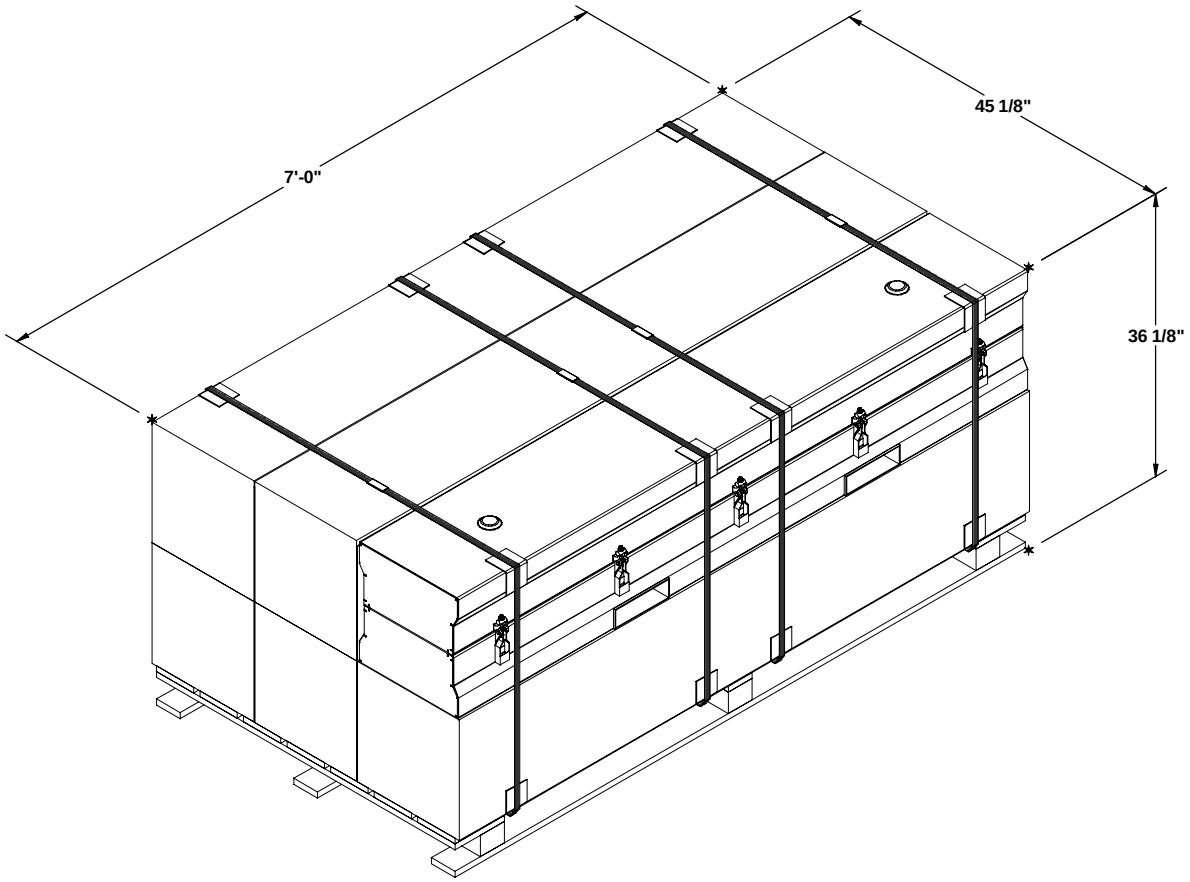
5. A "STRUT ASSEMBLY" MUST BE INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS IF THE CAR CONTAINS HAZARD CLASS AND DIVISION 1.1, 1.2, OR 1.3 EXPLOSIVES AND THE LOAD IN EITHER END OF THE CAR WEIGHS 50,000 POUNDS OR MORE. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF HAZARD CLASS AND DIVISION 1.4 EXPLOSIVES. NOTE THAT THE STRUT ASSEMBLY MAY BE OMITTED FROM LOADS OF HAZARD CLASS AND DIVISION 1.1, 1.2, OR 1.3 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 "T-6" BELOW. DETAILS OF STRUT ASSEMBLIES FOR USE BETWEEN 2-PIECE BULKHEADS AND BETWEEN 1-PIECE BULKHEADS ARE SHOWN ON PAGE 34.

6. THE NORMAL LOADING PATTERN IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS IS TO POSITION THE LADING BETWEEN A CAR ENDWALL AND A LOAD DIVIDER BULKHEAD IN FULL LAYERS. OBVIOUSLY, A LOAD QUANTITY MUST THEN BE A MULTIPLE OF THE NUMBER OF PALLET UNITS THAT ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF PALLET UNITS THAT 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 TIERS 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.

   I. ONE OR MORE RISERS CAN BE POSITIONED WITHIN A LOAD TO INCREASE A LOAD QUANTITY. SEE THE RISER PROCEDURES AND DETAILS ON PAGES 22.

   II. 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 A ONE-HIGH LOADING PATTERN. INSTALL CENTER GATES AND STRUTS AS SHOWN ON PAGE 6 OR 12 OF THE CONVENTIONAL BOXCAR DRAWING HEREIN TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.

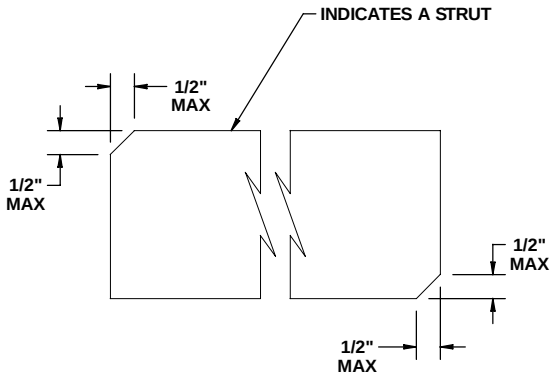
   IV. ONE OR MORE UNITS CAN BE POSITIONED IN CONTACT WITH A LOAD DIVIDER BULKHEAD ON THE CENTER-OF-CAR SIDE. BLOCK AND BRACE WITH LCL BRACES, AS SHOWN ON PAGE 23 OR WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGE 18.



PALLET UNIT DATA

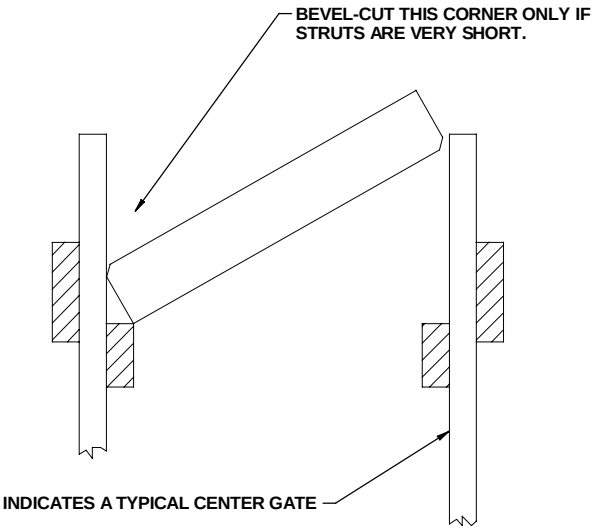
GROSS WEIGHT - - - - - - - - - - - - - 2,489 LBS
CUBE - - - - - - - - - - - - - - - - - 79.2 CU FT

PROJECT SP 526-05



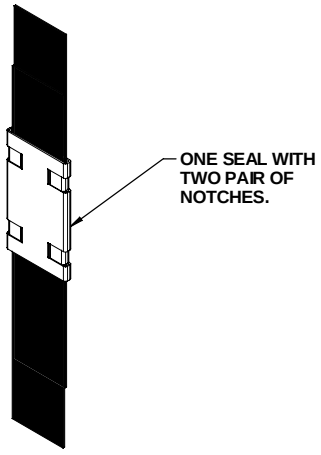
BEVEL CUT

IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE INSTALLING THE STRUTS WITH A "DRIVE" FIT.



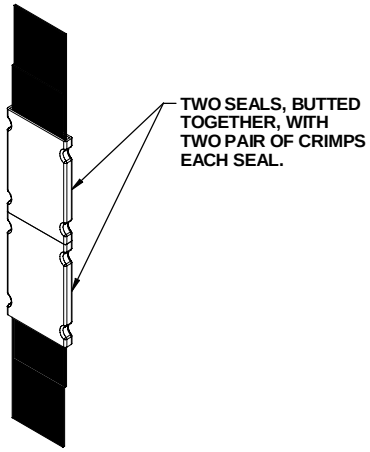
STRUT INSTALLATION

SEE GENERAL NOTE "S" ON PAGE 3 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.



STRAP JOINT A

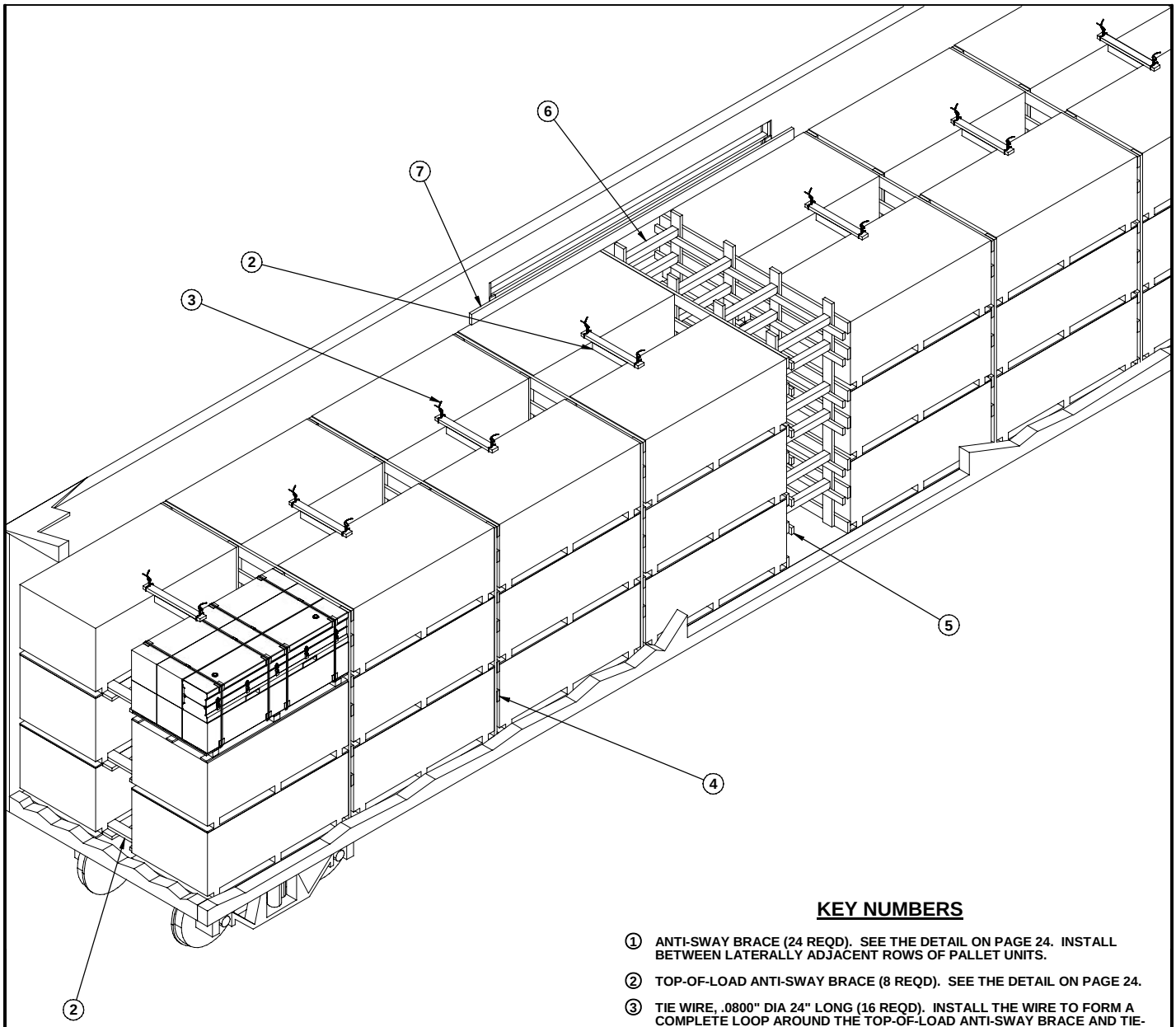
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.



STRAP JOINT B

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

END-OVER-END LAP JOINT DETAILS



ISOMETRIC VIEW

KEY NUMBERS

① ANTI-SWAY BRACE (24 REQD). SEE THE DETAIL ON PAGE 24. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.

② TOP-OF-LOAD ANTI-SWAY BRACE (8 REQD). SEE THE DETAIL ON PAGE 24.

③ TIE WIRE, .0800" DIA 24" LONG (16 REQD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND TIE-DOWN STRAP ON THE PALLET UNIT. BRING ENDS TOGETHER AND TWIST TAUT.

④ SEPARATOR GATE A (6 REQD). SEE THE DETAIL ON PAGE 30. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.

⑤ CENTER GATE A (2 REQD). SEE THE DETAIL ON PAGE 25.

⑥ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 32") (24 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END. SEE THE "BEVEL CUT" DETAIL ON PAGE 5.

⑦ DOORWAY PROTECTION D (2 REQD). SEE THE DETAIL ON PAGE 27 AND SPECIAL NOTE 3 ON PAGE 7.

48 PALLET UNIT LOAD IN A 60'-8" LONG BY 9'-4" WIDE CONVENTIONAL BOXCAR

SPECIAL NOTES:

1. A 48 PALLET UNIT LOAD IS SHOWN IN A 60'-8" LONG BY 9'-4" WIDE CONVENTIONAL BOXCAR EQUIPPED WITH 14'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE TOTAL ACCUMULATED SPACE ACROSS A BOXCAR MUST NOT BE MORE THAN 6". ANTI-SWAY BRACES OR CRIB FILL ASSEMBLIES ARE REQUIRED WHEN THE LATERAL SPACE BETWEEN THE PALLET UNITS EXCEEDS 6", AS MEASURED FROM PALLET UNIT TO PALLET UNIT.

3. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNIT STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. THE WOODEN GATE TYPE OF DOORWAY PROTECTION IN THE LOAD ON PAGE 6 IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NON-NAILABLE DOOR POSTS. REFER TO PAGES 26 AND 27 FOR ALTERNATIVE DOORWAY PROTECTION FOR CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION MUST BE USED. SEE THE LOAD ON PAGE 10 FOR GUIDANCE.

4. FOR SHIPMENT OF A LOAD WHICH CONTAINS FEWER PALLET UNITS THAN WHAT IS SHOWN, SEE THE PROCEDURES CONTAINED ON PAGES 8 THRU 23.

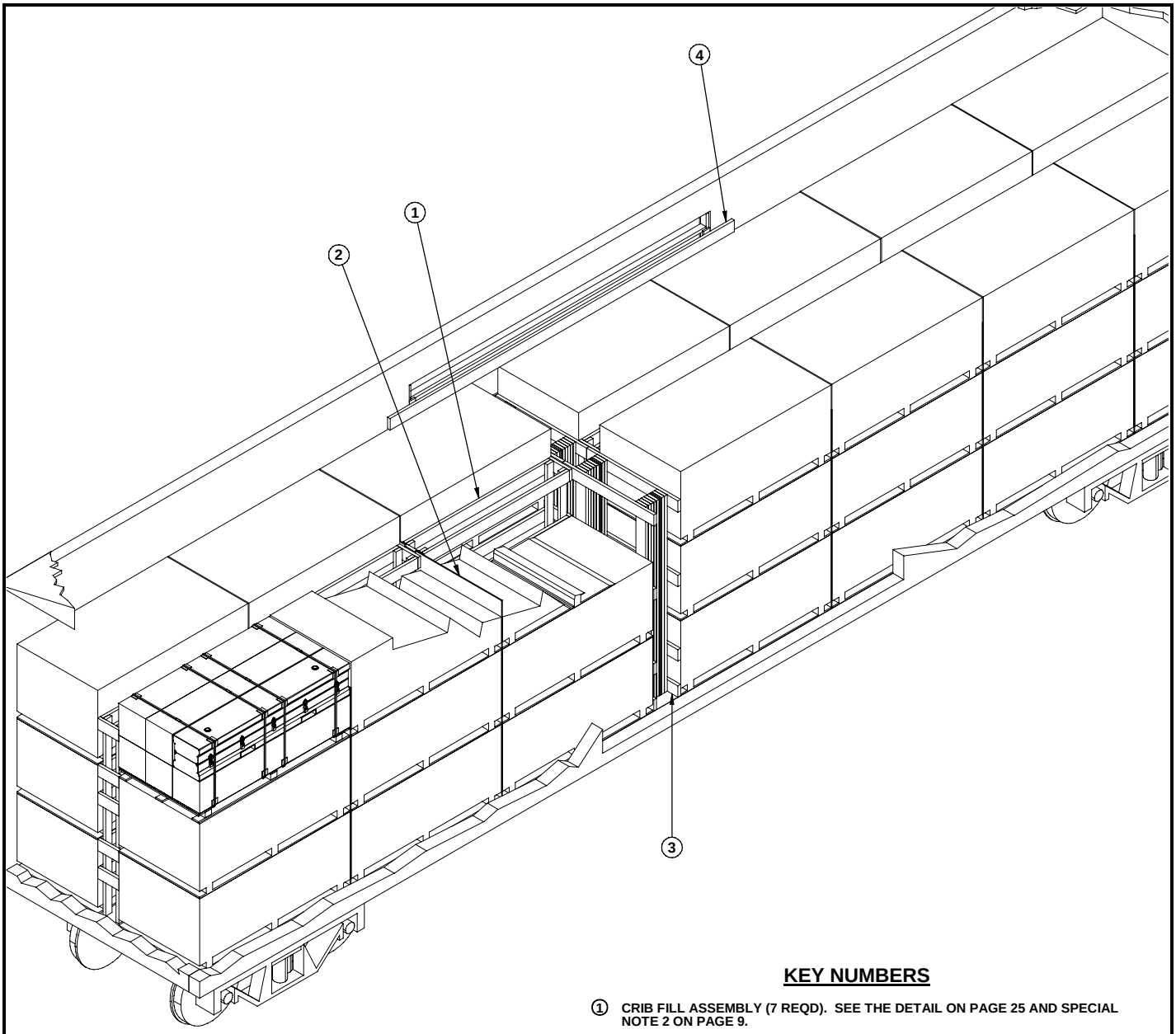
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1″ X 4″	3	1
1″ X 6″	112	56
2″ X 3″	94	47
2″ X 4″	135	90
2″ X 6″	965	965
4″ X 4″	77	105
NAILS	**NO. REQD**	**POUNDS**
6d (2″)	54	1/2
10d (3″)	908	14
12d (3-1/4″)	6	NIL
16d (3-1/2″)	96	2-1/4
WIRE, .008″ DIA - - - 32′ REQD - - - 3/4 LB		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	48	119,472 LBS
DUNNAGE		2,544 LBS
TOTAL WEIGHT		122,016 LBS (APPROX)

48 PALLET UNIT LOAD IN A 60'-8" LONG BY 9'-4" WIDE CONVENTIONAL BOXCAR



ISOMETRIC VIEW

KEY NUMBERS

① CRIB FILL ASSEMBLY (7 REQD). SEE THE DETAIL ON PAGE 25 AND SPECIAL NOTE 2 ON PAGE 9.

② SEPARATOR GATE B (5 REQD). SEE THE DETAIL ON PAGE 30. INSTALL WITH THE TIE PIECES TOWARD THE PALLET UNITS.

③ SOLID FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 31.

④ DOORWAY PROTECTION D (2 REQD). SEE THE DETAIL ON PAGE 27 AND SPECIAL NOTE 3 ON PAGE 9.

42 PALLET LOAD IN A 50'-6" LONG BY 8'-6" WIDE CONVENTIONAL BOXCAR

SPECIAL NOTES:

1. A 42 PALLET UNIT LOAD IS SHOWN IN A 50'-6" LONG BY 8'-6" WIDE CONVENTIONAL BOXCAR EQUIPPED WITH 14'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE TOTAL ACCUMULATED SPACE ACROSS A BOXCAR MUST NOT BE MORE THAN 6". ANTI-SWAY BRACES OR CRIB FILL ASSEMBLIES ARE REQUIRED WHEN THE LATERAL SPACE BETWEEN THE PALLET UNITS EXCEEDS 6", AS MEASURED FROM PALLET UNIT TO PALLET UNIT.

3. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNIT STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. THE WOODEN GATE TYPE OF DOORWAY PROTECTION IN THE LOAD ON PAGE 8 IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NON-NAILABLE DOOR POSTS. REFER TO PAGES 26 AND 27 FOR ALTERNATIVE DOORWAY PROTECTION FOR CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION MUST BE USED. SEE THE LOAD ON PAGE 10 FOR GUIDANCE.

4. FOR SHIPMENTS OF A LOAD WHICH CONTAINS MORE OR FEWER PALLET UNITS THAN WHAT IS SHOWN, SEE THE PROCEDURES ON PAGES 6 AND 10 THRU 23.

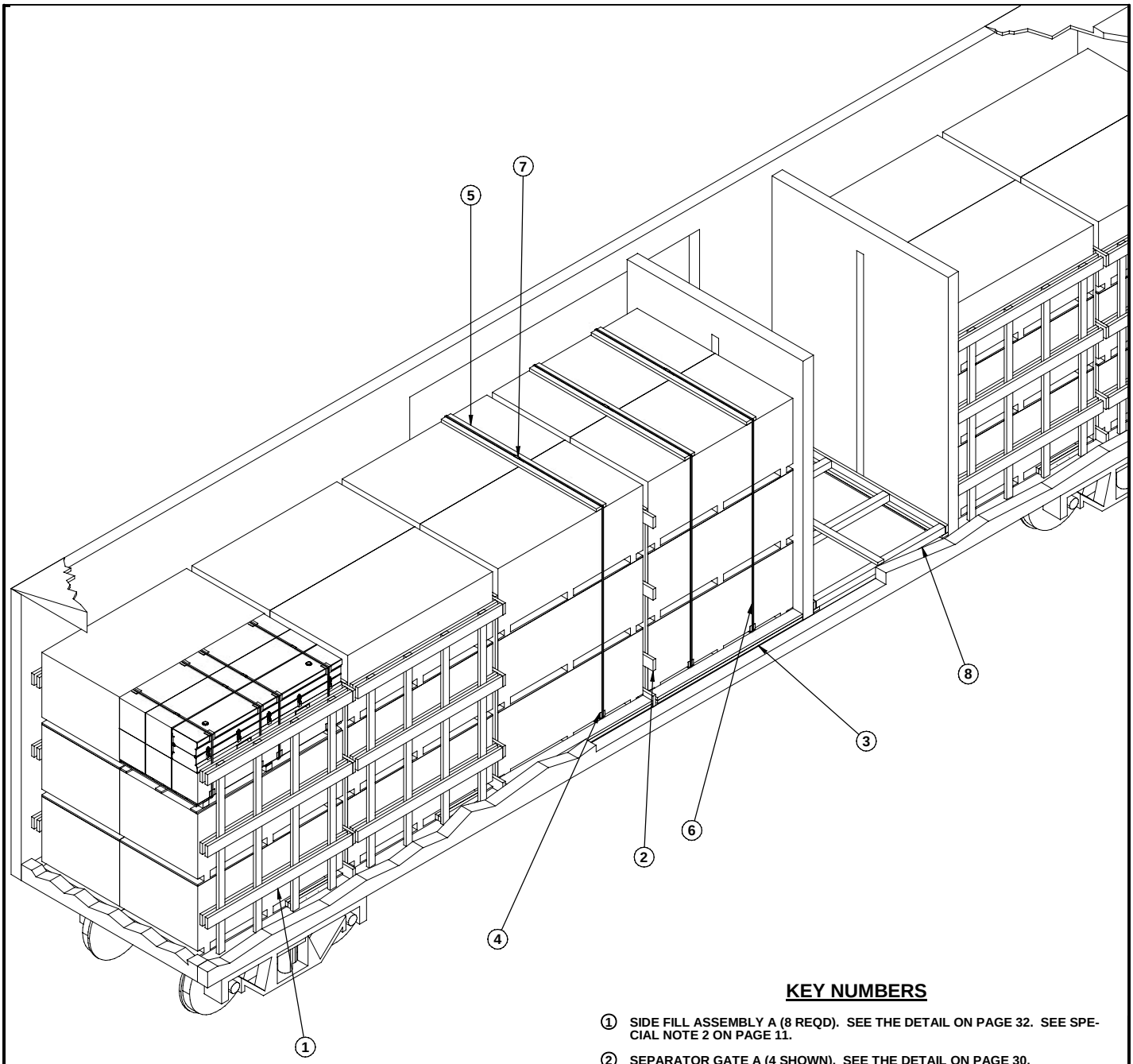
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1″ X 4″	3	1
1″ X 6″	148	74
2″ X 3″	153	77
2″ X 4″	224	150
2″ X 6″	910	910
NAILS	**NO. REQD**	**POUNDS**
6d (2″)	296	1-3/4
10d (3″)	1529	23-3/4
12d (3-1/4″)	6	NIL
PLYWOOD, 1/2″ - - - 320 SQ FT REQD - -		440 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	42	104,538 LBS
DUNNAGE		2,887 LBS
TOTAL WEIGHT		107,425 LBS (APPROX)

42 PALLET LOAD IN A 50'-6" LONG BY 8'-6" WIDE CONVENTIONAL BOXCAR



ISOMETRIC VIEW

KEY NUMBERS

① SIDE FILL ASSEMBLY A (8 REQD). SEE THE DETAIL ON PAGE 32. SEE SPECIAL NOTE 2 ON PAGE 11.

② SEPARATOR GATE A (4 SHOWN). SEE THE DETAIL ON PAGE 30.

③ FLOORLINE BLOCKING, 2" X 4" X 7'-0" (DOUBLED) (4 REQD). POSITION SO AS TO CONTACT THE CONTAINER TO BE PLACED IN THE DOORWAY AREA. NAIL THE FIRST PIECE TO THE CAR FLOOR W/14-16d NAILS. LAMINATE THE SECOND TO THE FIRST IN LIKE MANNER. SEE SPECIAL NOTE 3 ON PAGE 11.

④ FIBERBOARD ANTI-CHAFING MATERIAL (AS REQD). FOLD FIBERBOARD TO FORM A DOUBLE THICKNESS AND PLACE UNDER STRAPPING AT ALL POINTS OF CONTACT WITH THE CONTAINERS.

⑤ STRAPPING BOARD, 2" X 6" X 7'-6" (3 REQD).

⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" X 24'-8" LONG STEEL STRAPPING (3 REQD). INSTALL AS TO ENCIRCLE THE LOAD UNITS IN THE DOORWAY AREA. STAPLE TO THE STRAPPING BOARD W/2 STAPLES. SEE SPECIAL NOTE 3 ON PAGE 11.

⑦ SEAL FOR 1-1/4" STEEL STRAPPING (3 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.

⑧ STRUT ASSEMBLY (1 REQD). SEE THE "STRUT ASSEMBLY FOR 1-PIECE BULKHEADS" DETAIL ON PAGE 34. INSTALL BETWEEN THE LOAD DIVIDER BULKHEADS. SEE SPECIAL NOTE 4 ON PAGE 11.

36 PALLET UNIT LOAD IN A 50'-6" LONG BY 8'-6" WIDE BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS

PROJECT SP 526-05

SPECIAL NOTES:

1. A 36 PALLET UNIT LOAD IS SHOWN IN A 50'-6" LONG BY 8'-6" WIDE CUSHIONED TYPE BOX-CAR EQUIPPED WITH LOAD DIVIDERS AND 14'-0" WIDE THRU DOOR OPENINGS IS SHOWN. BOXCARS OF OTHER DIMENSIONS AND BOXCARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE TOTAL ACCUMULATED SPACE ACROSS A BOXCAR MUST NOT BE MORE THAN 6". SIDE FILL ASSEMBLIES ARE REQUIRED WHEN THE TOTAL SPACE BETWEEN THE PALLET UNITS AND THE SIDE WALLS EXCEEDS 6", AS MEASURED FROM PALLET UNIT TO EACH SIDE WALL.

3. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNIT STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. THE NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS ARE USED IN THE LOAD ON PAGE 10. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH GROUP OF PALLET STACKS AND/OR LOAD UNIT WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" OF THE SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK AND/OR LOAD UNIT WHICH IS RETAINED BY FROM 6" TO ONE-HALF THE PALLET/LOAD UNIT LENGTH OR WIDTH. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING DOORS, A WOODEN GATE TYPE OF DOORWAY PROTECTION SUCH AS SHOWN IN THE LOAD ON PAGE 6, OR ANY OF THE ALTERNATIVES ON PAGES 26 THROUGH 27 MAY BE USED.

4. STRUT ASSEMBLIES ARE REQUIRED WHEN THE LOAD IN EITHER END OF A CAR IS 50,000 POUNDS OR MORE. FOR THE LOAD SHOWN ON PAGE 10, THE STRUT ASSEMBLY WOULD NOT BE REQUIRED IF THE LOAD CONSISTED OF 21 PALLET UNITS OR LESS ON EACH END OF THE BOXCAR.

5. FOR SHIPMENTS OF A LOAD WHICH CONTAINS MORE OR FEWER PALLET UNITS THAN WHAT IS SHOWN SEE THE PROCEDURES ON PAGES 6, 8 AND 12 THRU 23.

BILL OF MATERIAL

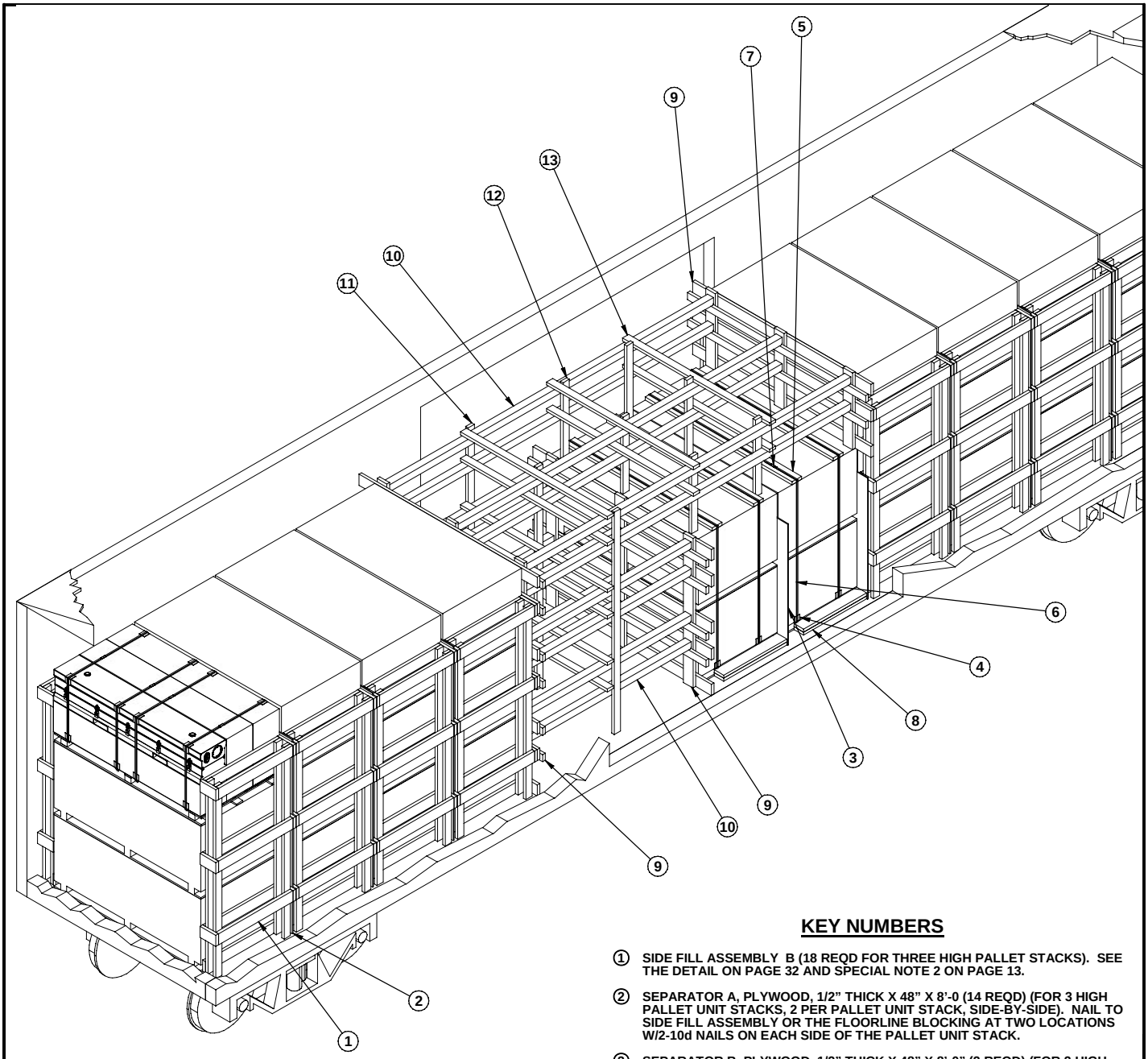
LUMBER	LINEAR FEET	BOARD FEET
1″ X 8″	14	10
2″ X 3″	37	19
2″ X 4″	313	209
2″ X 6″	735	735
4″ X 4″	25	34
NAILS	**NO. REQD**	**POUNDS**
6d (2″)	16	NIL
10d (3″)	942	14-1/2
12d(3-1/4″)	16	1/2
16d (3-1/2″)	112	2-1/2

STEEL STRAPPING, 1-1/4″ - 74′ REQD - - - 11 LBS
SEAL FOR 1-1/4″ STRAPPING - 3 REQD - - - - - NIL
STAPLE, 1-1/4″ - - - - - - 4 REQD - - - - - NIL
ANTI-CHAFING MATERIAL - - AS REQD - - - - - NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	36	89,604 LBS
DUNNAGE		2,037 LBS
TOTAL WEIGHT		91,641 LBS (APPROX)

36 PALLET UNIT LOAD IN A 50'-6" LONG BY 8'-6" WIDE BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS



ISOMETRIC VIEW

KEY NUMBERS

① SIDE FILL ASSEMBLY B (18 REQD FOR THREE HIGH PALLET STACKS). SEE THE DETAIL ON PAGE 32 AND SPECIAL NOTE 2 ON PAGE 13.

② SEPARATOR A, PLYWOOD, 1/2" THICK X 48" X 8'-0 (14 REQD) (FOR 3 HIGH PALLET UNIT STACKS, 2 PER PALLET UNIT STACK, SIDE-BY-SIDE). NAIL TO SIDE FILL ASSEMBLY OR THE FLOORLINE BLOCKING AT TWO LOCATIONS W/2-10d NAILS ON EACH SIDE OF THE PALLET UNIT STACK.

③ SEPARATOR B, PLYWOOD, 1/2" THICK X 48" X 8'-0" (2 REQD) (FOR 2 HIGH PALLET UNIT STACKS, 1 PER PALLET UNIT STACK). NAIL TO SIDE FILL ASSEMBLY AT TWO LOCATIONS W/2-10d NAILS ON EACH SIDE OF THE PALLET UNIT STACK.

④ FIBERBOARD ANTI-CHAFING MATERIAL (AS REQD). FOLD FIBERBOARD TO FORM A DOUBLE THICKNESS AND PLACE UNDER STRAPPING AT ALL POINTS OF CONTACT WITH THE CONTAINERS.

⑤ STRAPPING BOARD, 2" X 6" X 7'-0" (4 REQD).

⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" X 20'-6" LONG STEEL STRAPPING (4 REQD). INSTALL AS TO ENCIRCLE THE LOAD UNITS IN THE DOORWAY AREA. STAPLE TO THE STRAPPING BOARD W/2 STAPLES. SEE SPECIAL NOTE 3 ON PAGE 13.

⑦ SEAL FOR 1-1/4" STEEL STRAPPING (4 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.

⑧ FLOORLINE BLOCKING, 2" X 4" X 36" (DOUBLED) (4 REQD). POSITION SO AS TO CONTACT THE PALLET UNIT TO BE PLACED IN THE DOORWAY AREA. NAIL THE FIRST PIECE TO THE CAR FLOOR W/7-16d NAILS. LAMINATE THE SECOND TO THE FIRST IN LIKE MANNER. SEE SPECIAL NOTE 3 ON PAGE 13.

⑨ CENTER GATE B (1 REQD FOR THREE HIGH PALLET UNIT STACKS, 1 REQD FOR TWO HIGH PALLET UNIT STACKS, AND 1 REQD FOR ONE HIGH PALLET UNIT STACKS). SEE THE DETAIL ON PAGE 25.

(KEY NUMBERS CONTINUED)

⑩ STRUT, 4" X 4" BY CUT-TO-FIT (12 REQD FOR THE SPACE BETWEEN THE THREE HIGH PALLET UNIT STACKS AND TWO HIGH PALLET STACKS, REF: 7'-11") (6 REQD FOR TOP STRUT LAYER, REF: 15'-6"). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END. SEE DETAIL ON PAGE 5.

⑪ VERTICAL STRUT BRACING A, 2" X 4" X 9'-2" (4 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

⑫ VERTICAL STRUT BRACING B, 2" X 4" X 38" (8 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

⑬ HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 2" (9 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

31 PALLET UNIT LOAD IN A 50'-6" LONG BY 8'-6" WIDE CONVENTIONAL BOXCAR

PROJECT SP 526-05

SPECIAL NOTES:

1. A 31 PALLET UNIT LOAD IS SHOWN IN A 50'-6" LONG BY 8'-6" WIDE CONVENTIONAL TYPE BOXCAR WITH 14'-0" WIDE THRU DOOR OPENINGS IS SHOWN. BOXCARS OF OTHER DIMENSIONS AND BOXCARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE TOTAL ACCUMULATED SPACE ACROSS A BOXCAR MUST NOT BE MORE THAN 6". SIDE FILL ASSEMBLIES ARE REQUIRED WHEN THE TOTAL SPACE BETWEEN THE PALLET UNITS AND THE SIDE WALLS EXCEEDS 6", AS MEASURED FROM PALLET UNIT TO EACH SIDE WALL.

3. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNIT STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. THE NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS ARE USED IN THE LOAD ON PAGE 12. REFER TO PAGES 26 AND 27 FOR ALTERNATIVE DOORWAY PROTECTION FOR CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS.

4. A MAXIMUM OF SEVEN PALLET UNITS ON EACH LAYER, FOR A LADING WEIGHT OF APPROXIMATELY 16,373 POUNDS, CAN BE LOADED BETWEEN THE CENTER GATE AND THE BOXCAR ENDWALL. SEE THE "CENTER GATE B" DETAIL, NOTE 2 ON PAGE 25.

5. FOR SHIPMENTS OF A LOAD WHICH CONTAINS MORE OR FEWER PALLET UNITS THAN WHAT IS SHOWN SEE THE PROCEDURES ON PAGES 6 THRU 10 AND 14 THRU 23.

BILL OF MATERIAL

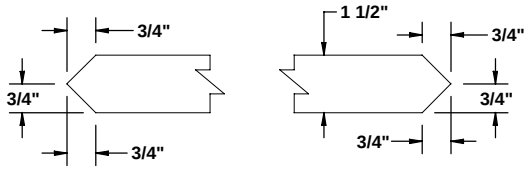
LUMBER	LINEAR FEET	BOARD FEET
2" X 3"	12	6
2" X 4"	822	548
2" X 6"	697	697
4" X 4"	187	250
NAILS	**NO. REQD**	**POUNDS**
10d (3")	1767	27-1/4
16d (3-1/2")	72	1-3/4

STEEL STRAPPING, 1-1/4" - 82' REQD - - - 12 LBS
SEAL FOR 1-1/4" STRAPPING - 2 REQD - - - - - NIL
STAPLE, 1-1/4" - - - - - - 4 REQD - - - - - NIL
PLYWOOD, 1/2" - - - 544 SQ FT REQD - - - 748 LBS
ANTI-CHAFING MATERIAL - - AS REQD - - - - - NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNITS	31	77,159 LBS
DUNNAGE		3,790 LBS
TOTAL WEIGHT		80,949 LBS (APPROX)

31 PALLET UNIT LOAD IN A 50'-6" LONG BY 8'-6" WIDE CONVENTIONAL BOXCAR



DIAGONAL BRACE

ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-4" WIDE CONVENTIONAL WOOD-LINED BOXCAR IS SHOWN. CARS OF OTHER WIDTHS MAY BE USED.
2. THE K-BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING SHOWN MAY BE USED IN WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL SECOND TIER OR FIRST TIER. THE TYPE "A" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 8,000 LBS OR NOT MORE THAN THREE PALLET UNITS.
3. 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 5, 6, 7, 9, 11, AND 14 MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT HORIZONTAL WALL CLEAT MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING (REF: 54") TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE. LAMINATE THE SECOND PIECE OF THE DOUBLED HORIZONTAL WALL CLEAT 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 58-7/8" LONG IN LIEU OF 60" WHEN THE HORIZONTAL WALL CLEAT IS DOUBLED.
4. THE CENTER CLEAT WILL BE 14" LONG FOR AN 8'-6" WIDE CAR, 22" LONG FOR A 9'-2", AND 24" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.

KEY NUMBERS

(1) ANTI-SWAY BRACE (4 REQD). SEE THE DETAIL ON PAGE 24. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.

(2) TOP-OF-LOAD ANTI-SWAY BRACE (3 REQD). SEE THE DETAIL ON PAGE 24.

(3) SEPARATOR GATE B (2 SHOWN). SEE THE DETAIL ON PAGE 30. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.

(4) TIE WIRE, .0800" DIA 24" LONG (6 REQD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND TIEDOWN STRAP ON THE PALLET UNIT. BRING ENDS TOGETHER AND TWIST TAUT.

(5) SUPPORT CLEAT, 2" X 4" X 6" (2 REQD). NAIL TO THE SIDEWALL W/3-12d NAILS. POSITION AS TO CENTER LOAD BEARING PIECE AND CROSS CAR BRACE ACROSS CONTAINER ANGLE SUPPORT PIECES. SEE SPECIAL NOTE 3 AT LEFT.

(6) LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT-TO-FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE W/1-12d NAIL EVERY 6".

(7) CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT-TO-FIT) (2 REQD).

(8) CENTER CLEAT, 2" X 4" X 14" (2 REQD). NAIL TO THE CROSS CAR BRACE W/4-16d NAILS. SEE SPECIAL NOTE 4 AT LEFT.

(9) SPACER CLEAT, 2" X 4" X 14-1/2" (2 REQD). NAIL TO THE CAR SIDE-WALL W/4-12d NAILS.

(10) HORIZONTAL WALL CLEAT, 2" X 4" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/6-12d NAILS.

(11) POCKET CLEAT, 2" X 4" X 12" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT W/4-16d NAILS.

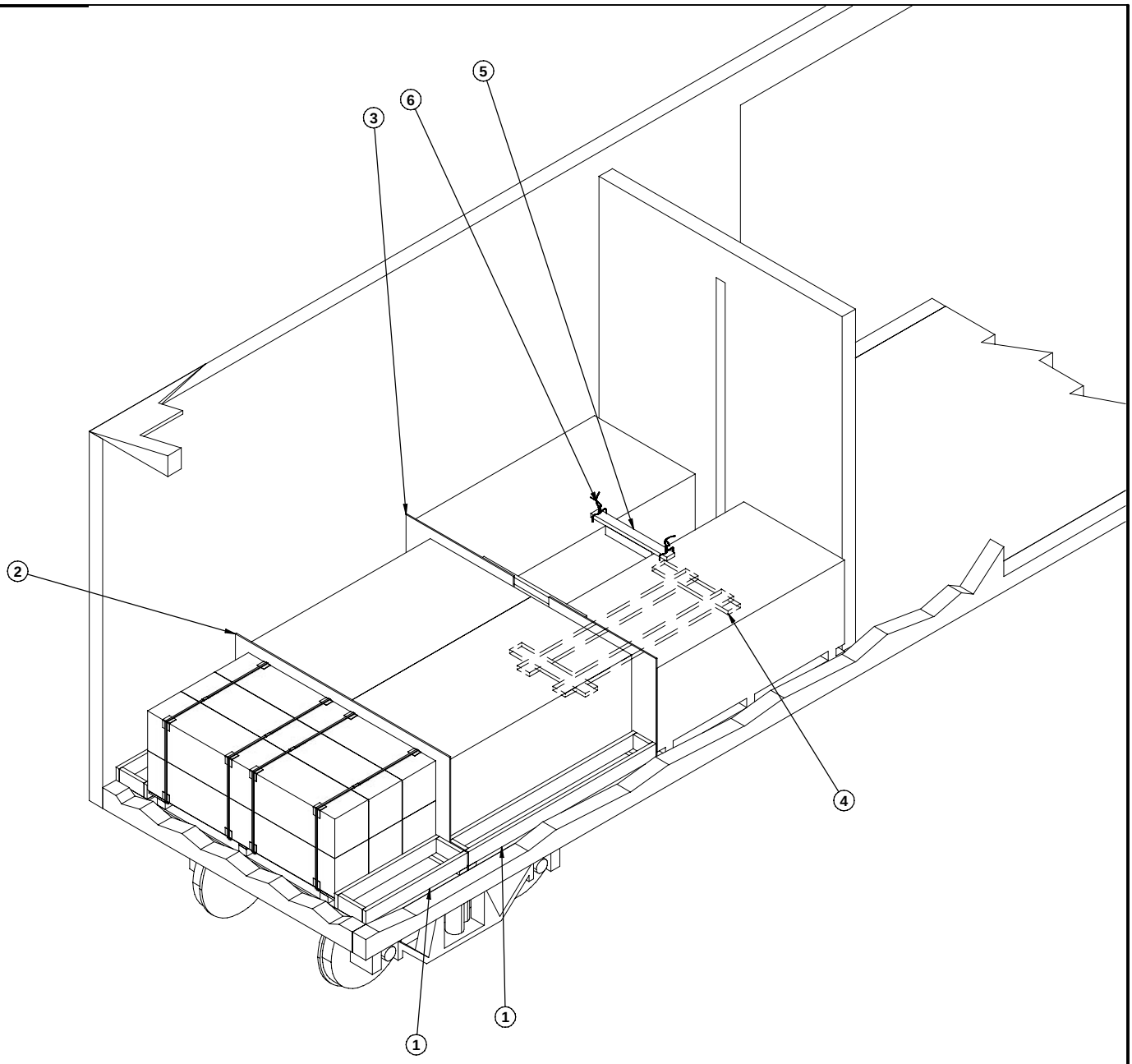
(12) DIAGONAL BRACE, 2" X 4" X 60" (4 REQD). SEE THE DETAIL ABOVE FOR BEVEL CUTS REQUIRED. TOENAIL TO THE HORIZONTAL WALL CLEAT, AND TO THE CROSS CAR BRACE W/2-16d NAILS AT EACH END.

(13) BACK-UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT W/8-16d NAILS.

(14) HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDE-WALL W/5-12d NAILS.

TYPICAL LCL USING K-BRACE

PROJECT SP 526-05



ISOMETRIC VIEW

SPECIAL NOTES:

1. THESE PROCEDURES SPECIFY REQUIREMENTS FOR OMITTING A PALLET UNIT FROM A 1-LAYER LOAD. THESE PROCEDURES MAY BE APPLIED TO A 2-LAYER LOAD AS SEEN ON PAGES 6 – 11.
2. EXERCISE CARE WHEN POSITIONING THE PALLET UNIT AGAINST THE END WALL OF THE BOXCAR TO ASSURE THAT IT IS CENTERED LATERALLY IN THE CAR.

KEY NUMBERS

① SIDE BLOCKING ASSEMBLY, (4 REQD, 2 FOR THE LENGTHWISE PALLET UNIT AND 2 FOR THE LATERALLY ADJACENT PALLET UNITS). SEE DETAIL ON PAGE 31.

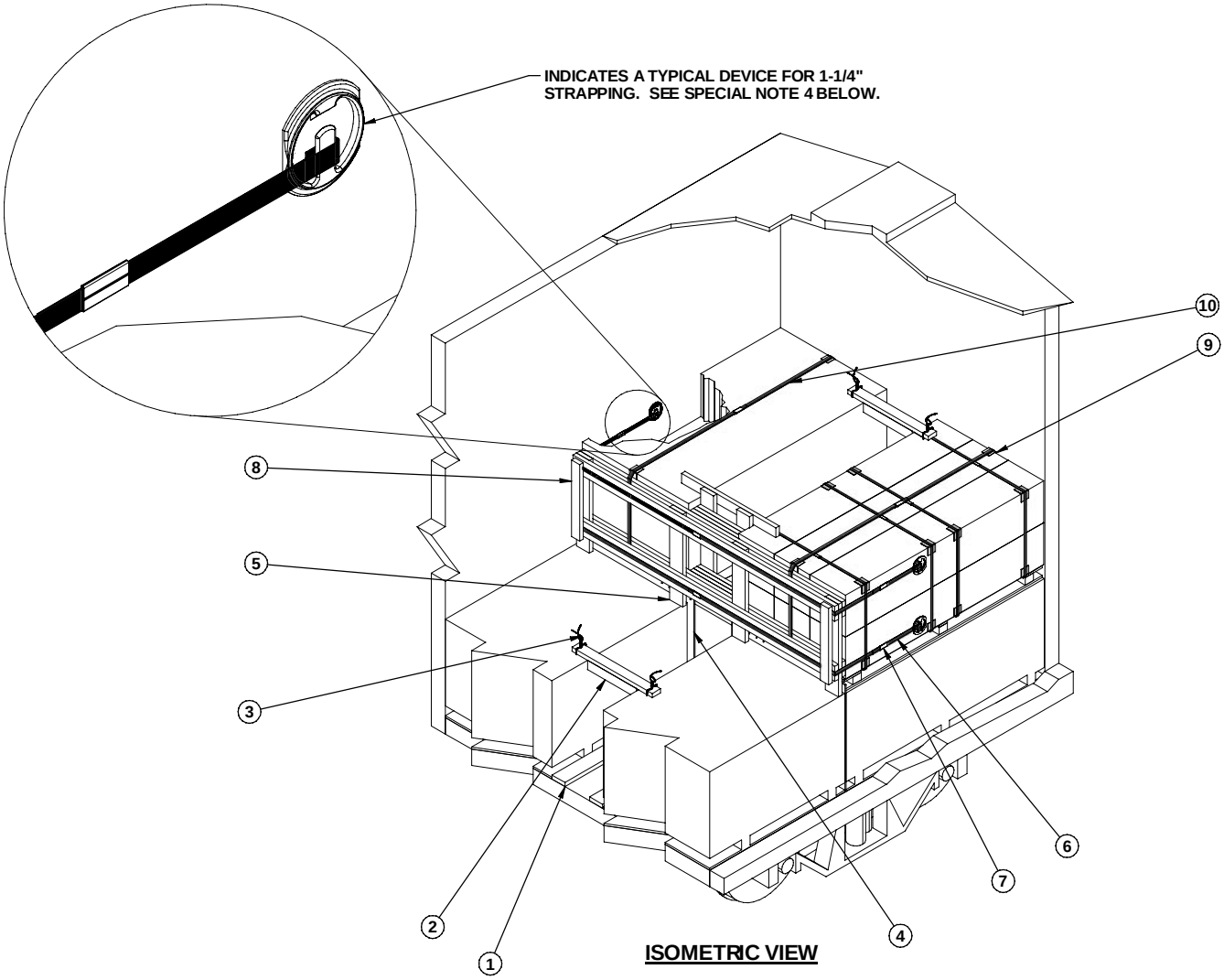
② SEPARATOR, PLYWOOD, 1/2" X 40" X 8'-0" (1 REQD). NAIL TO SIDE BLOCKING ASSEMBLY W/2-6d NAILS ON EACH SIDE.

③ SEPARATOR GATE B (2 REQD). SEE THE DETAIL ON PAGE 30. INSTALL AS SHOWN. NAIL SEPARATOR GATE B TO BLOCKING PIECES AS SHOWN W/4-6d NAILS.

④ ANTI-SWAY BRACE (1 REQD). SEE THE DETAIL ON PAGE 24. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.

⑤ TOP-OF-LOAD ANTI-SWAY BRACE (1 REQD). SEE THE DETAIL ON PAGE 24.

⑥ TIE WIRE, .0800" DIA 24" LONG (6 REQD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND TIE-DOWN STRAP ON THE PALLET. BRING ENDS TOGETHER AND TWIST TAUT.



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-4" WIDE ALL METAL BOXCAR WITH STRAP ANCHOR DEVICES AND HAVING AN AAR MECHANICAL DESIGNATION CLASS OF XL IS SHOWN. CARS OF OTHER WIDTHS MAY BE USED.
2. THE BULKHEAD GATE METHOD OF PARTIAL-LAYER BRACING IS ONLY APPLICABLE FOR USE IN LOADS OF LENGTHWISE POSITIONED PALLET UNITS AS SHOWN IN THE VIEW ABOVE. PARTIAL LAYERS OF CROSSWISE PALLET UNITS WILL NOT BE RETAINED BY THE BULKHEAD GATE METHOD.
3. A BULKHEAD GATE USED IN CONJUNCTION WITH THREE BULKHEAD STRAPS WILL RETAIN UP TO 7,500 POUNDS OF LADING; A BULKHEAD GATE WITH TWO STRAPS WILL RETAIN NOT MORE THAN 5,000 POUNDS, TWO PALLET UNITS. A BULKHEAD GATE USED IN CONJUNCTION WITH THREE BULKHEAD STRAPS WILL RETAIN UP TO 7,500 POUNDS OF LADING, THREE PALLET UNITS. AN ADDITIONAL SET OF HORIZONTAL PIECES WILL NEED TO BE ADDED FOR THE THIRD STRAP.
4. THE ANCHOR DEVICES TO BE USED FOR ATTACHMENT OF THE BULKHEAD STRAPS MUST BE LOCATED AT LEAST 36" TOWARD THE CAR END WALL FROM THE OPPOSITE-THE-LOAD SIDE OF THE BULKHEAD GATE.
5. THE STRAPPING BOARDS ON A BULKHEAD GATE ARE TO BE ALIGNED AS NEARLY AS POSSIBLE WITH THE ANCHOR DEVICES IN THE CAR TO WHICH THE BULKHEAD STRAPS ARE ATTACHED. TOLERANCES ARE SPECIFIED ON THE END VIEW OF THE BULKHEAD GATE DETAIL ON PAGE 17 FOR THE LOCATION OF THE HORIZONTAL PIECES IN RELATION TO THE LOCATION OF THE STRAPPING BOARDS. THE STRAPPING BOARDS/HORIZONTAL PIECES SHOULD BE LOCATED WITHIN THESE TOLERANCES. IF THIS IS NOT POSSIBLE, ADDITIONAL HORIZONTAL PIECES MUST BE APPLIED, AS NECESSARY TO PROVIDE PROPER BEARING AGAINST THE PALLET UNIT.

KEY NUMBERS

(1) ANTI-SWAY BRACE (2 SHOWN). SEE THE DETAIL ON PAGE 24. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.

(2) TOP-OF-LOAD ANTI-SWAY BRACE (2 SHOWN). SEE THE DETAIL ON PAGE 24.

(3) TIE WIRE, .0800" DIA 24" LONG (4 REQD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND TIE-DOWN STRAP ON THE PALLET UNIT. BRING ENDS TOGETHER AND TWIST TAUT.

(4) SEPARATOR GATE B (2 SHOWN). SEE THE DETAIL ON PAGE 30.

(5) BULKHEAD GATE (1 REQD). SEE THE DETAIL ON PAGE 17. SEE SPECIAL NOTE 3 AT LEFT.

(6) BULKHEAD STRAP, 1-1/4" X .031" OR .035" BY LENGTH TO SUIT STEEL STRAPPING (2 REQD). INSTALL FROM TWO EQUAL LENGTH PIECES. ATTACH TO AN ANCHOR WITH ONE SEAL. SEE SPECIAL NOTES 3 AND 4 AT LEFT.

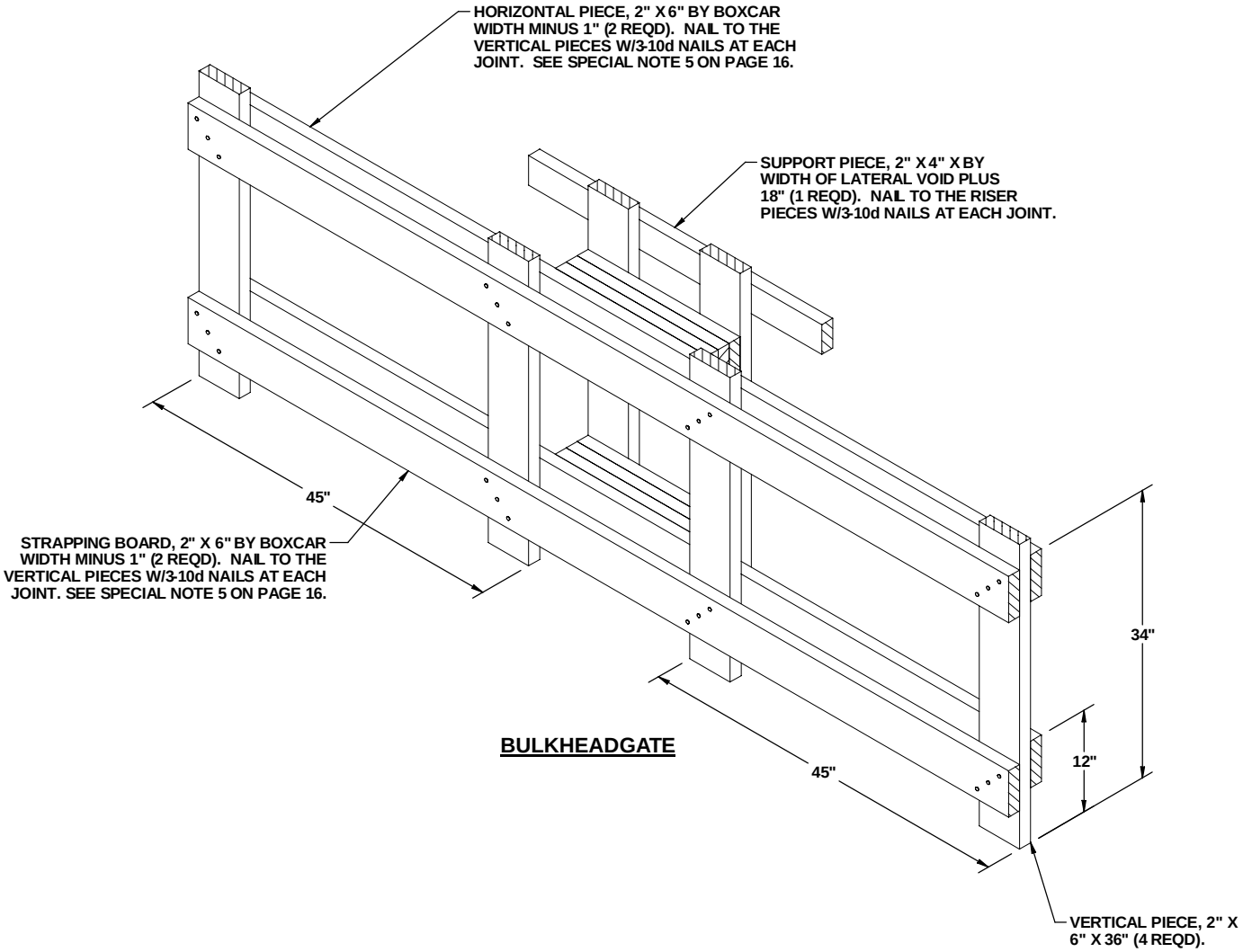
(7) SEAL FOR 1-1/4" STEEL STRAPPING (8 REQD). DOUBLE CRIMP EACH SEAL.

(8) STRAP RETAINER, 2" X 4" X 28" (2 REQD). NAIL TO THE BULKHEAD GATE W/2-12d NAILS ABOVE AND BELOW EACH BULKHEAD STRAP.

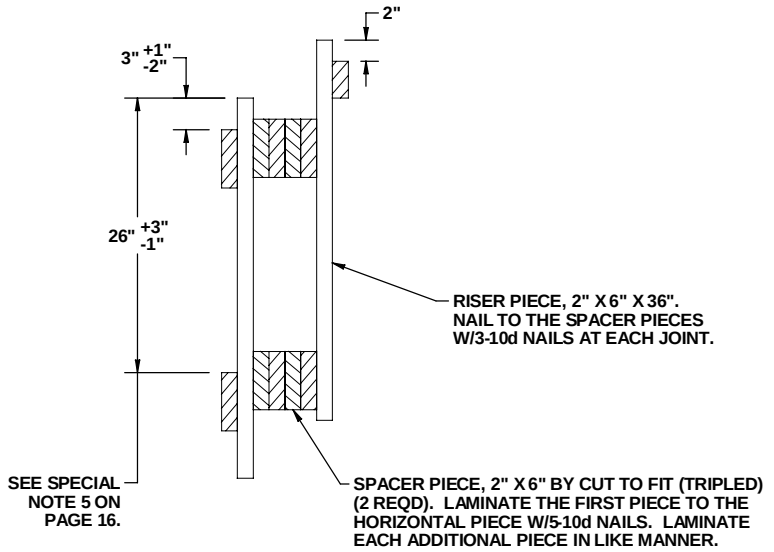
(9) EDGE PROTECTOR, FIBERBOARD (4 REQD). INSTALL UNDER BUNDLING STRAPS TO PROTECT CONTAINERS.

(10) BUNDLING STRAP, 1-1/4" X .031" OR .035" X 20'-6" (2 REQD). ENCIRCLE THE PALLET UNIT AND THE HORIZONTAL PIECES OF THE BULKHEAD GATE. TENSION AND SEAL AFTER TENSIONING THE BULKHEAD STRAPS.

TYPICAL LCL USING BULKHEAD GATE

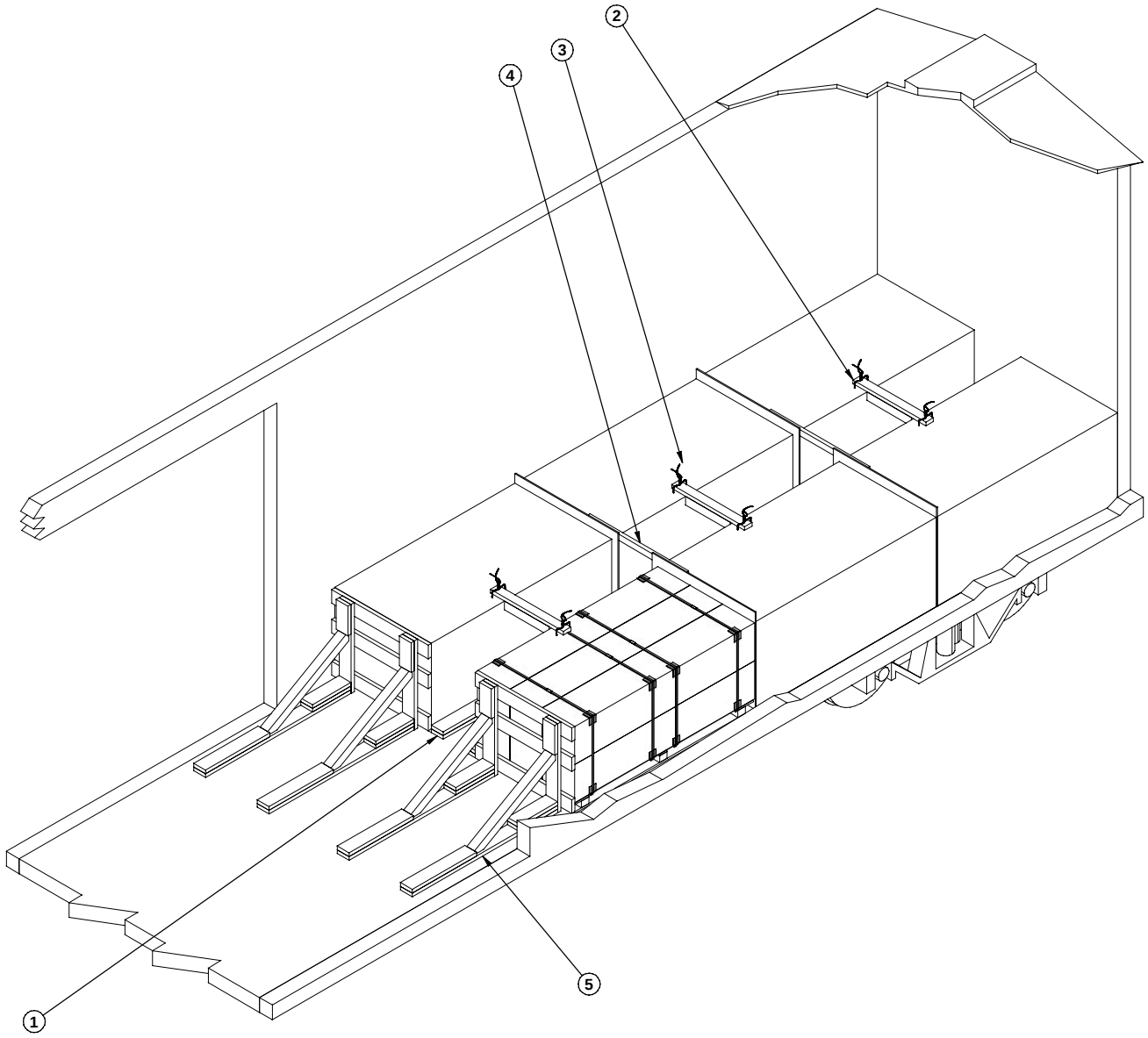


BULKHEADGATE



END VIEW

TYPICAL LCL USING BULKHEAD GATE



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-4" WIDE CONVENTIONAL TYPE BOXCAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER MAY BE USED.
2. THE LOAD SHOWN DEPICTING THE KNEE BRACE METHOD OF PARTIAL-LAYER BRACING IS TYPICAL. THE QUANTITY MAY BE ADJUSTED TO SUIT, PROVIDED THE LIMITATIONS OF THE KNEE BRACE AS SET FORTH IN SPECIAL NOTE 3 ARE NOT EXCEEDED.
3. A KNEE BRACE ASSEMBLY WILL BE USED FOR EACH ROW OF CONTAINERS. ONE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN 8,500 POUNDS OR THREE PALLET UNITS.
4. WHEN USING CRIB FILL OR SIDE FILL ASSEMBLIES WITH KNEE BRACE ASSEMBLIES, PROVISIONS MUST BR MADE TO PREVENT LONGITUDINAL MOVEMENT OF THE CRIB FILL OR SIDE FILL ASSEMBLIES.

KEY NUMBERS

① SIDE BLOCKING, 2" X 4" X 6'-0" (DOUBLED) (6 REQD). NAIL THE FIRST PIECE TO THE BOXCAR FLOOR W/5-16d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST PIECE W/5-16d NAILS.

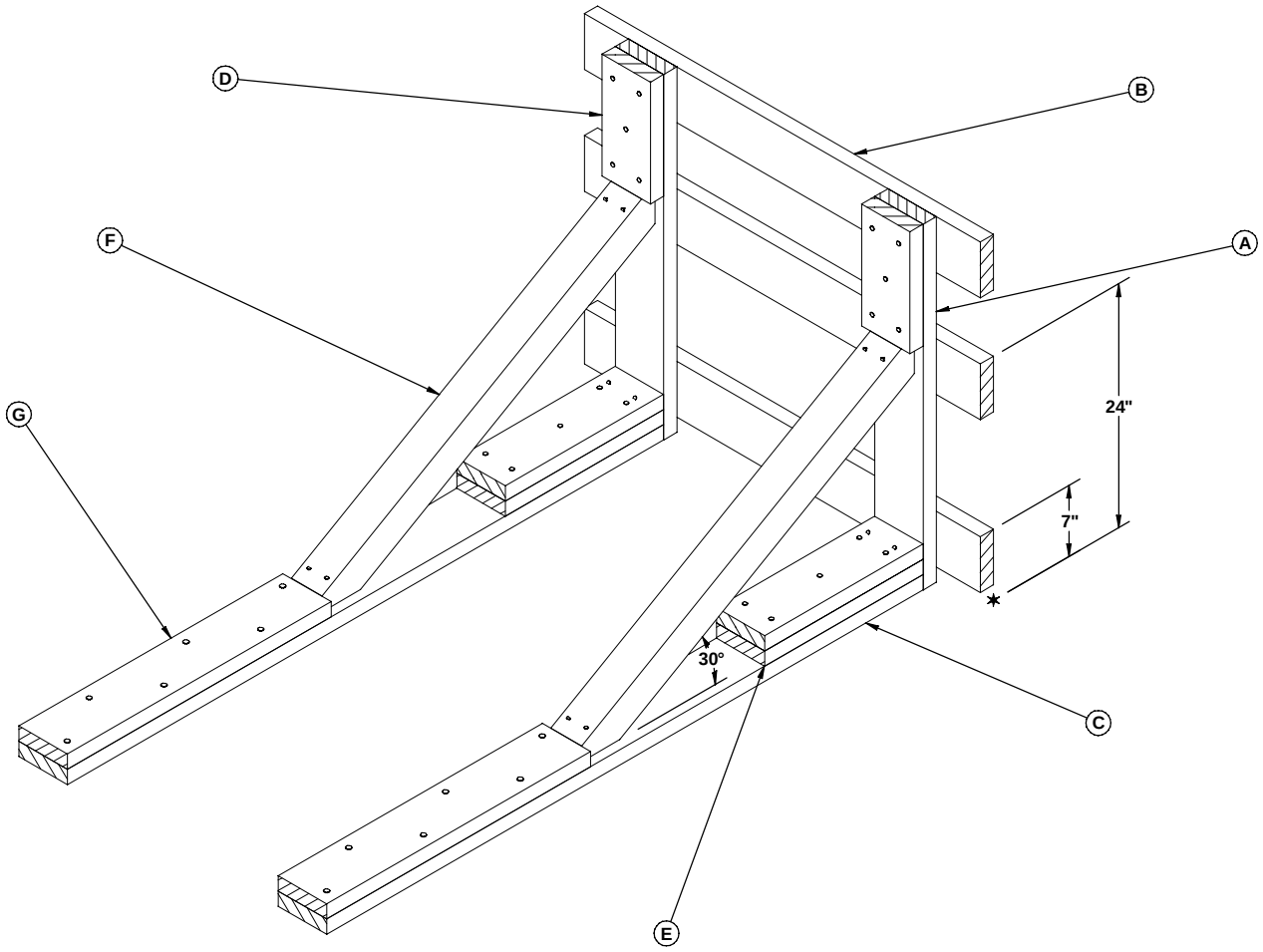
② TOP-OF-LOAD ANTI-SWAY BRACE (3 REQD). SEE THE DETAIL ON PAGE 24.

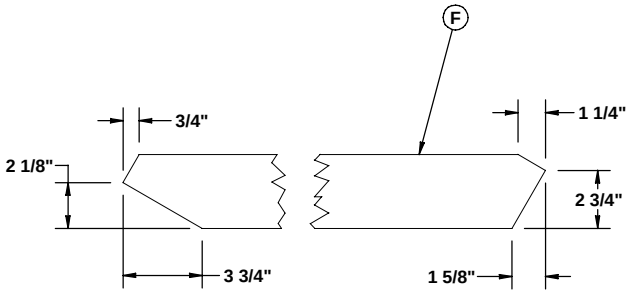
③ TIE WIRE, .0800" DIA 60" LONG (6 REQD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND A TIEDOWN STRAP. BRING ENDS TOGETHER AND TWIST TAUT.

④ SEPARATOR GATE B (2 REQD). SEE DETAIL ON PAGE 30.

⑤ KNEE BRACE ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 19.

TYPICAL LCL USING KNEE BRACE





BRACE

KEY LETTERS

Ⓐ VERTICAL PIECE, 2" X 6" X 36" (2 REQD). NAIL TO A FLOOR CLEAT W/3-16d NAILS.

Ⓑ HORIZONTAL PIECE, 2" X 6" X 43" (3 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

Ⓒ FLOOR CLEAT, 2" X 6" X 68" (2 REQD). NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".

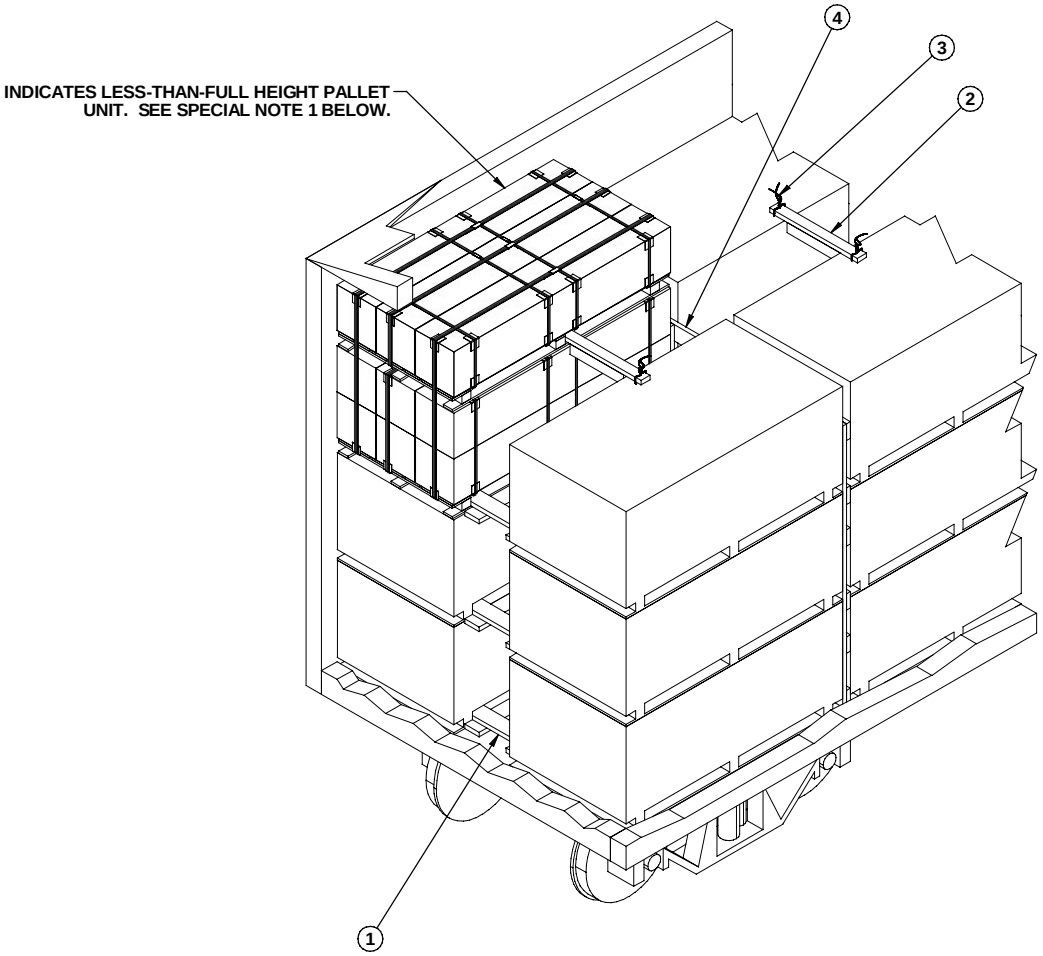
Ⓓ HOLD-DOWN CLEAT, 2" X 6" X 12" (2 REQD). NAIL TO A VERTICAL PIECE W/5-10d NAILS.

Ⓔ POCKET CLEAT, 2" X 6" X 18" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT W/5-16d NAILS. NAIL THE SECOND PIECE IN A LIKE MANNER AND TOENAIL THE SECOND PIECE TO THE FIRST TO THE VERTICAL PIECE W/2-16d NAILS.

Ⓕ BRACE, 4" X 4" X 44" (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT W/2-16d NAIL.

Ⓖ BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE FLOOR CLEAT W/6-40d NAILS.

TYPICAL LCL USING KNEE BRACE



ISOMETRIC VIEW

SPECIAL NOTES:

1. FOR SECUREMENT OF PARTIAL PALLET UNIT ON TOP OF A FULL-HEIGHT PALLET UNIT, SEE PAGE 23.
2. SHIPMENTS OF SMALL DIAMETER BOMBS SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER PALLET UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS THAN FULL PALLET WITHIN A UNITS PER LOAD. THE PROCEDURES ON THIS PAGE AND ON PAGE 23 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF PARTIAL UNITS.
3. THE PARTIAL PALLET UNIT IS SHOWN IN THE END OF THE CAR ONLY AS A TYPICAL LOCATION. THE PARTIAL PALLET UNIT MAY BE POSITIONED ANYWHERE IN THE LENGTH OF THE LOAD EXCEPT WITHIN THE DOORWAY AREA.
4. THE PROCEDURES SHOWN ON THIS PAGE ARE ONLY APPLICABLE TO PARTIAL PALLET UNITS CONSISTING OF ONE LAYER OF CONTAINERS.
5. THE SHIPMENT OF A PARTIAL PALLET UNIT AS SHOWN ABOVE IS APPLICABLE FOR LOADS IN CONVENTIONAL BOXCARS AND BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.

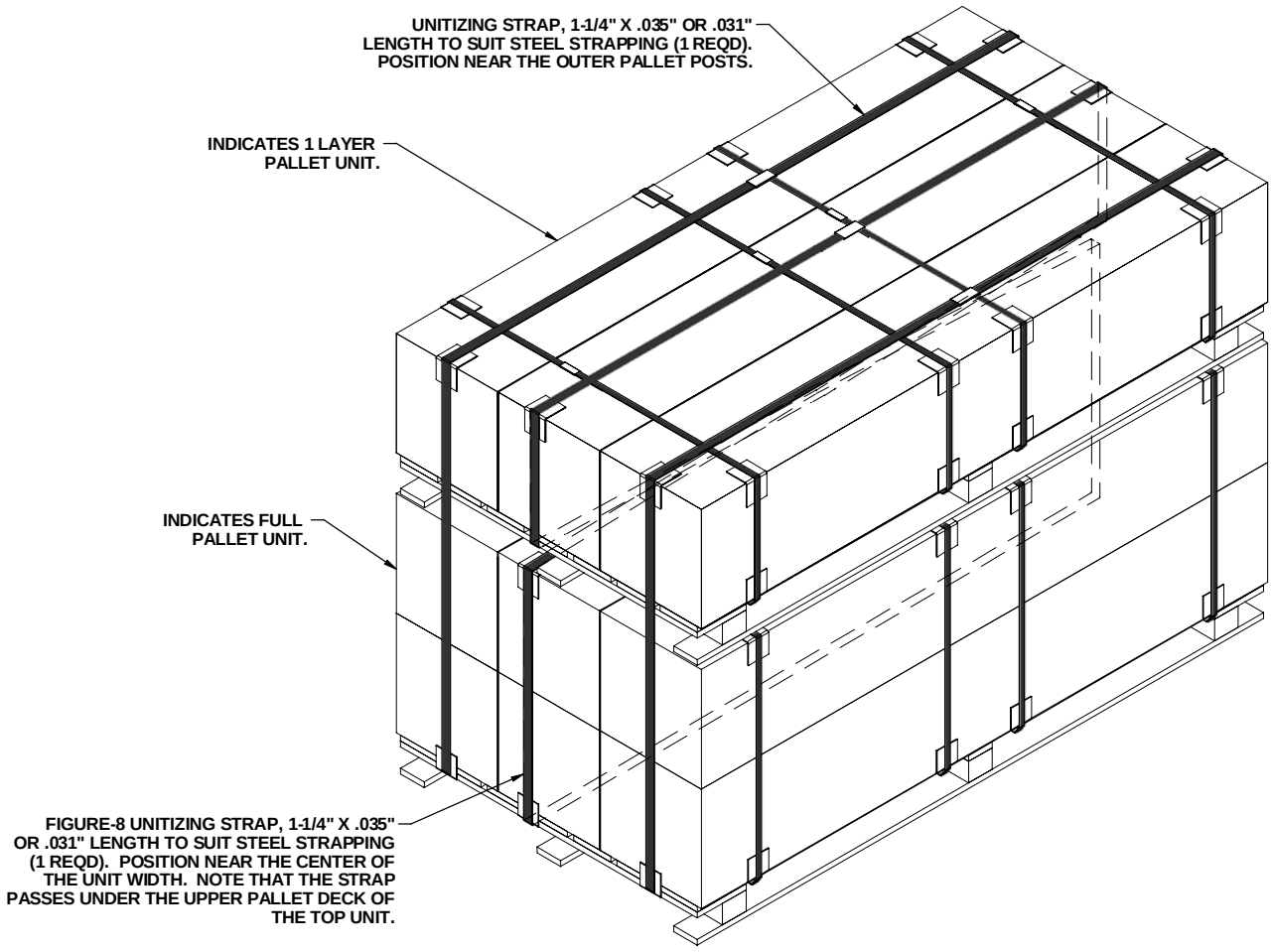
KEY NUMBERS

① ANTI-SWAY BRACE (6 SHOWN). SEE THE DETAIL ON PAGE 24. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.

② TOP-OF-LOAD ANTI-SWAY BRACE (2 SHOWN). SEE THE DETAIL ON PAGE 24.

③ TIE WIRE, .0800" DIA 24" LONG (4 REQD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND TIE-DOWN STRAP ON THE PALLET UNITS. BRING ENDS TOGETHER AND TWIST TAUT.

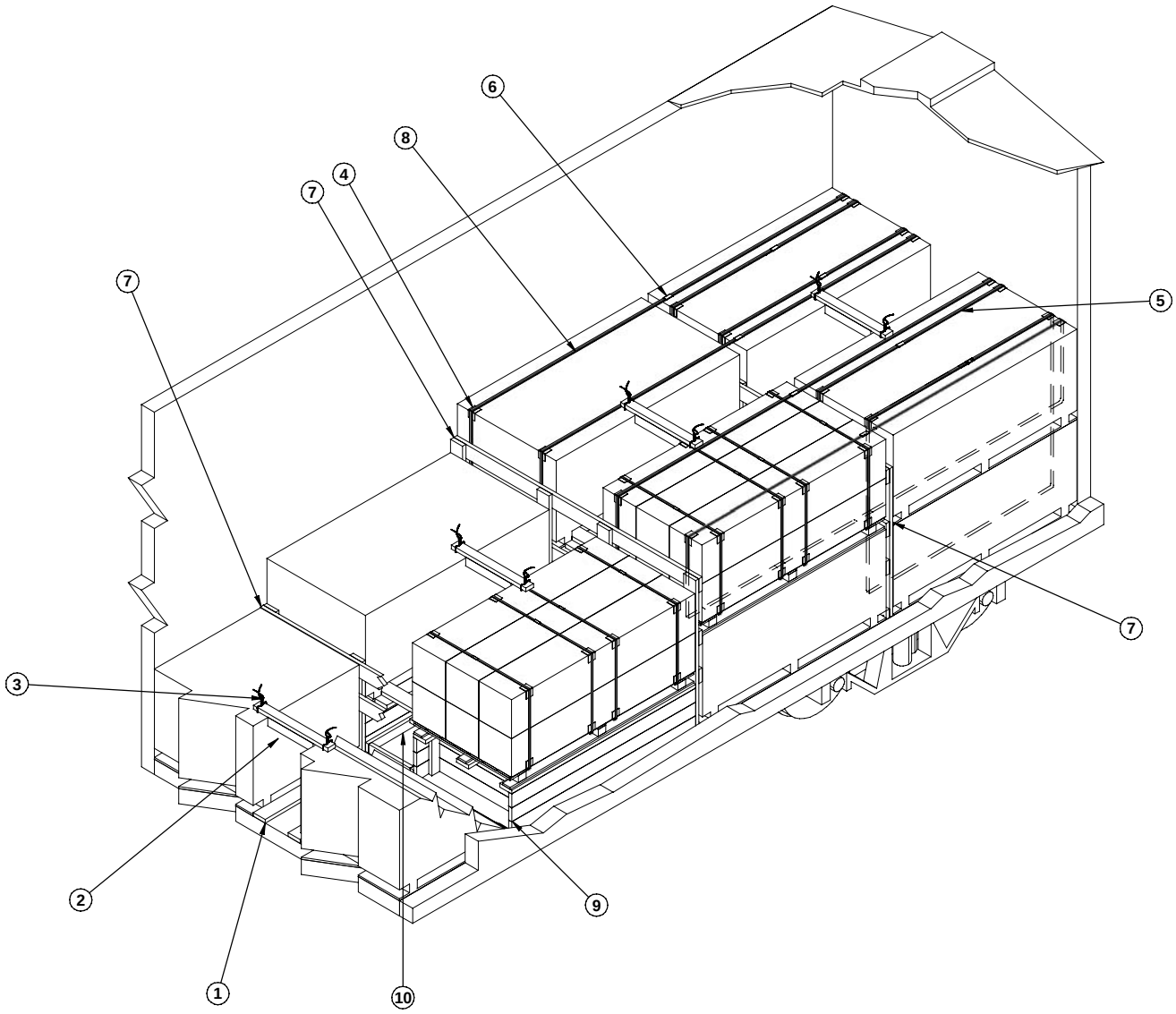
④ SEPARATOR GATE A (1 SHOWN). SEE THE DETAIL ON PAGE 30. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.



SECUREMENT OF A PARTIAL PALLET UNIT ON TOP OF A FULL PALLET UNIT

SPECIAL NOTES:

1. SHIPMENTS OF SMALL DIAMETER BOMBS SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER PALLET UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS THAN FULL PALLET WITHIN A UNITS PER LOAD. THE PROCEDURES ON THIS PAGE AND ON PAGE 22 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF PARTIAL UNITS.
2. THE PROCEDURES SHOWN ON THIS PAGE ARE ONLY APPLICABLE TO PARTIAL PALLET UNITS CONSISTING OF ONE LAYER OF CONTAINERS.



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-4" WIDE CONVENTIONAL TYPE BOXCAR IS SHOWN. CARS OF OTHER WIDTHS MAY BE USED.
2. THE LOAD SHOWN DEPICTING THE RISER METHOD OF PARTIAL-LAYER BRACING IS TYPICAL. THE QUANTITY MAY BE ADJUSTED TO SUIT.

KEY NUMBERS

(1) ANTI-SWAY BRACE (6 REQD). SEE THE DETAIL ON PAGE 24. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS.

(2) TOP-OF-LOAD ANTI-SWAY BRACE (4 REQD). SEE THE DETAIL ON PAGE 24.

(3) TIE WIRE, .0800" DIA 24" LONG (8 REQD, 2 PER TOP-OF-LOAD ANTI-SWAY BRACE). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE TOP-OF-LOAD ANTI-SWAY BRACE AND TIEDOWN STRAP ON THE PALLET UNIT. BRING ENDS TOGETHER AND TWIST TAUT.

(4) EDGE PROTECTOR, FIBERBOARD (AS REQD). INSTALL UNDER UNITIZING STRAPS TO PROTECT PALLET UNITS.

(5) VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 26'-6" LONG STEEL STRAPPING (4 REQD). INSTALL THE STRAPS THROUGH THE PALLET OF THE LOWER PALLET UNIT AND OVER THE TOP OF THE UPPER PALLET UNIT TO ENCIRCLE BOTH PALLET UNITS.

(6) SEAL FOR 1-1/4" STEEL STRAPPING (8 REQD). DOUBLE CRIMP EACH SEAL.

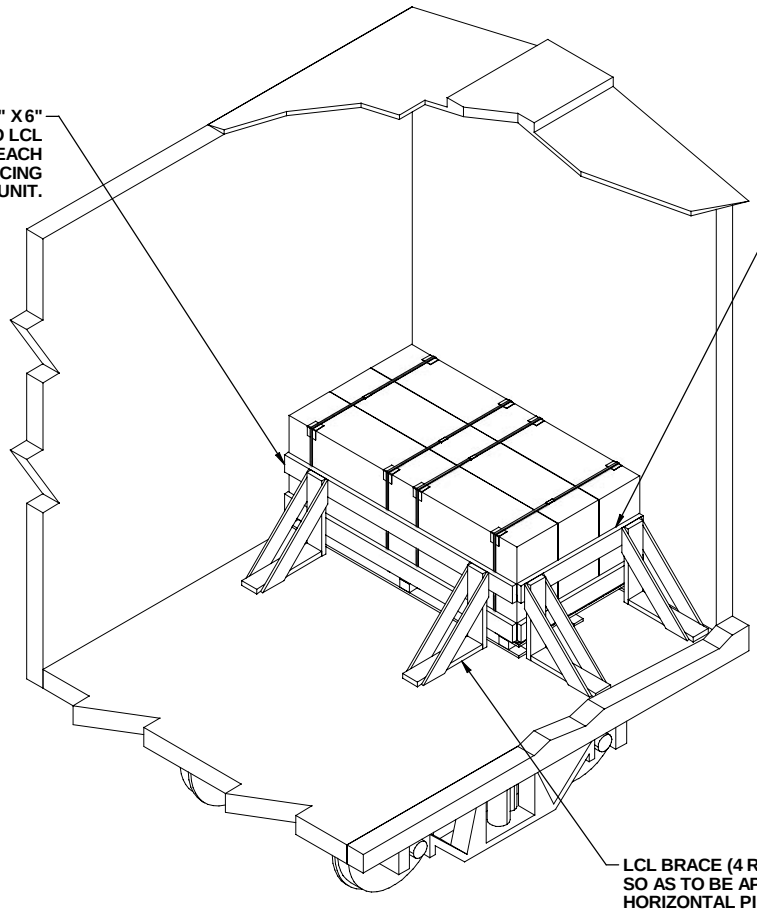
(7) SEPARATOR GATE A (2 REQD BETWEEN THE TWO HIGH STACKS OF PALLET UNITS AND BETWEEN THE RISERED ONE HIGH AND TWO HIGH PALLET UNITS, ONE REQD BETWEEN THE ONE HIGH STACKS OF PALLET UNITS). SEE THE DETAIL ON PAGE 30.

(8) HORIZONTAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 34'-6" LONG STEEL STRAPPING (4 REQD). INSTALL THE STRAPS TO ENCIRCLE THE LONGITUDINALLY ADJACENT PALLET UNITS IN THE TOP LAYER.

(9) RISER ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 29.

(10) RISER RETAINER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 29.

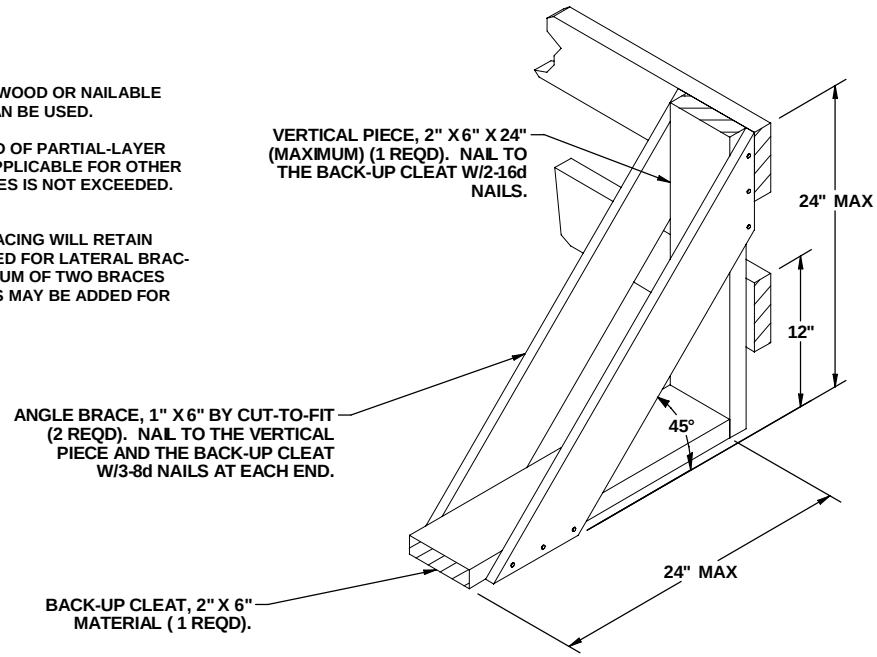
TYPICAL LCL USING RISERS



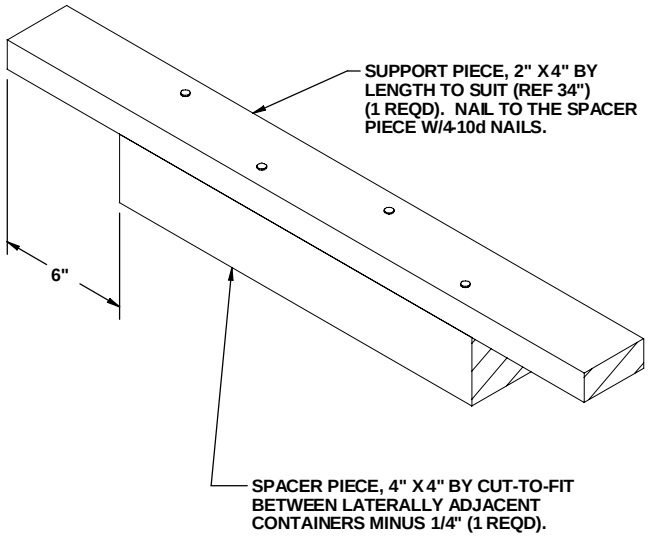
ISOMETRIC VIEW

SPECIAL NOTES:

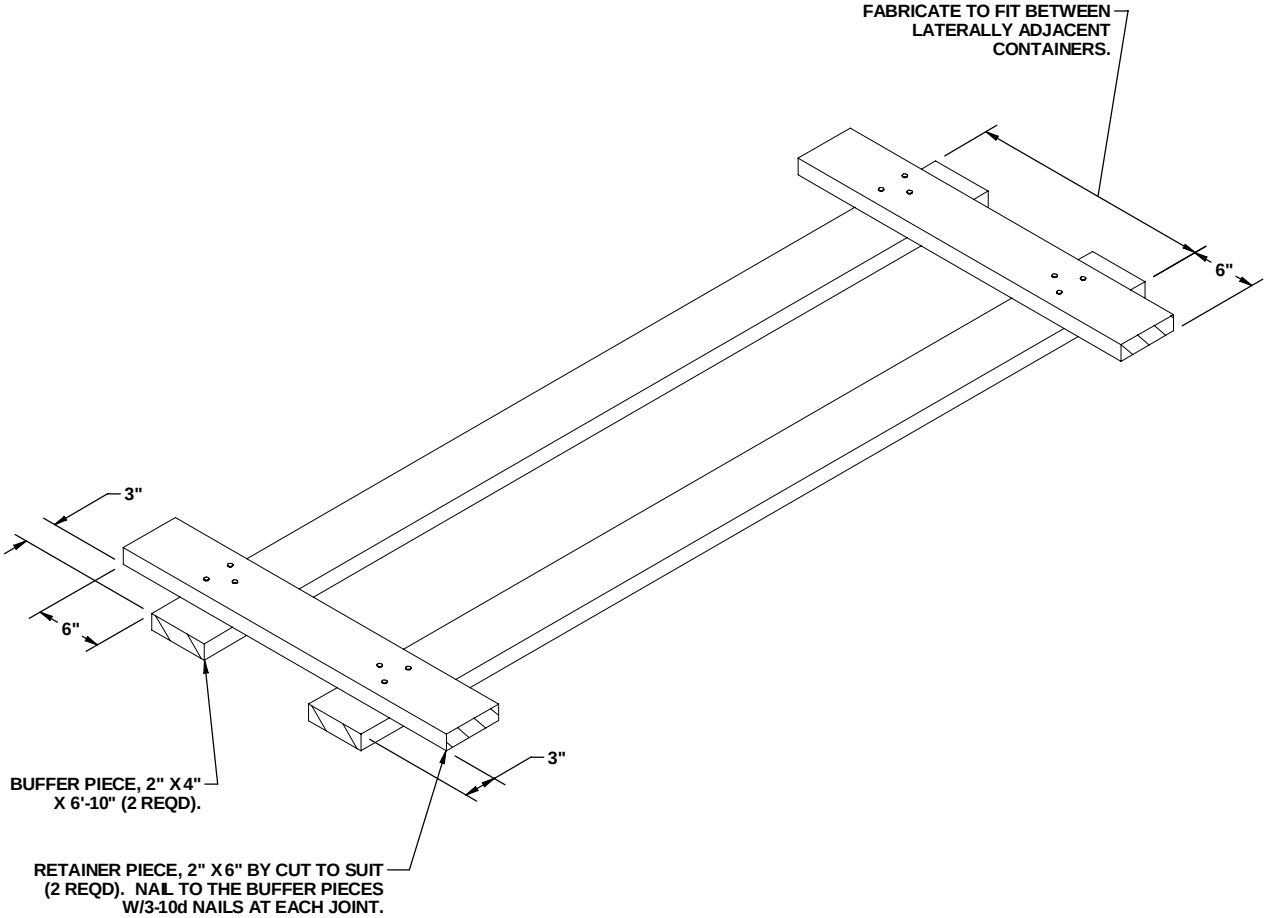
1. A 9'-4" WIDE CONVENTIONAL TYPE BOXCAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. THE LOAD SHOWN DEPICTING THE LCL BRACE METHOD OF PARTIAL-LAYER BRACING IS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER QUANTITIES AS LONG AS THE CAPACITY OF THE BRACES IS NOT EXCEEDED. SEE SPECIAL NOTE 3.
3. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 8,000 POUNDS OF LADING. A MINIMUM OF TWO BRACES MUST BE USED FOR LONGITUDINAL BRACING. BRACES MAY BE ADDED FOR LONGITUDINAL BRACING AS NECESSARY.



TYPICAL LCL USING LCL BRACE

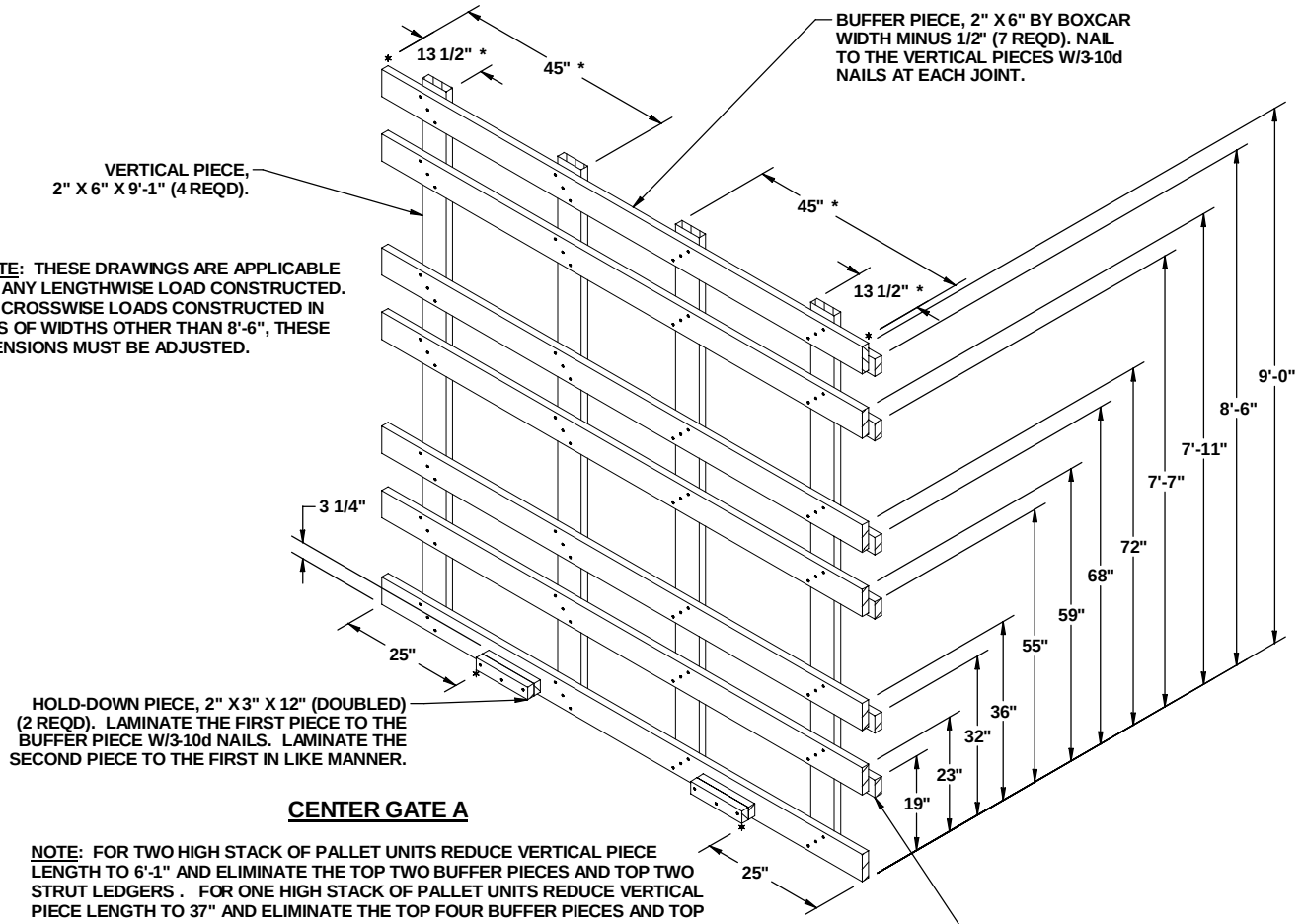


TOP OF LOAD ANTI-SWAY BRACE



ANTI-SWAY BRACE

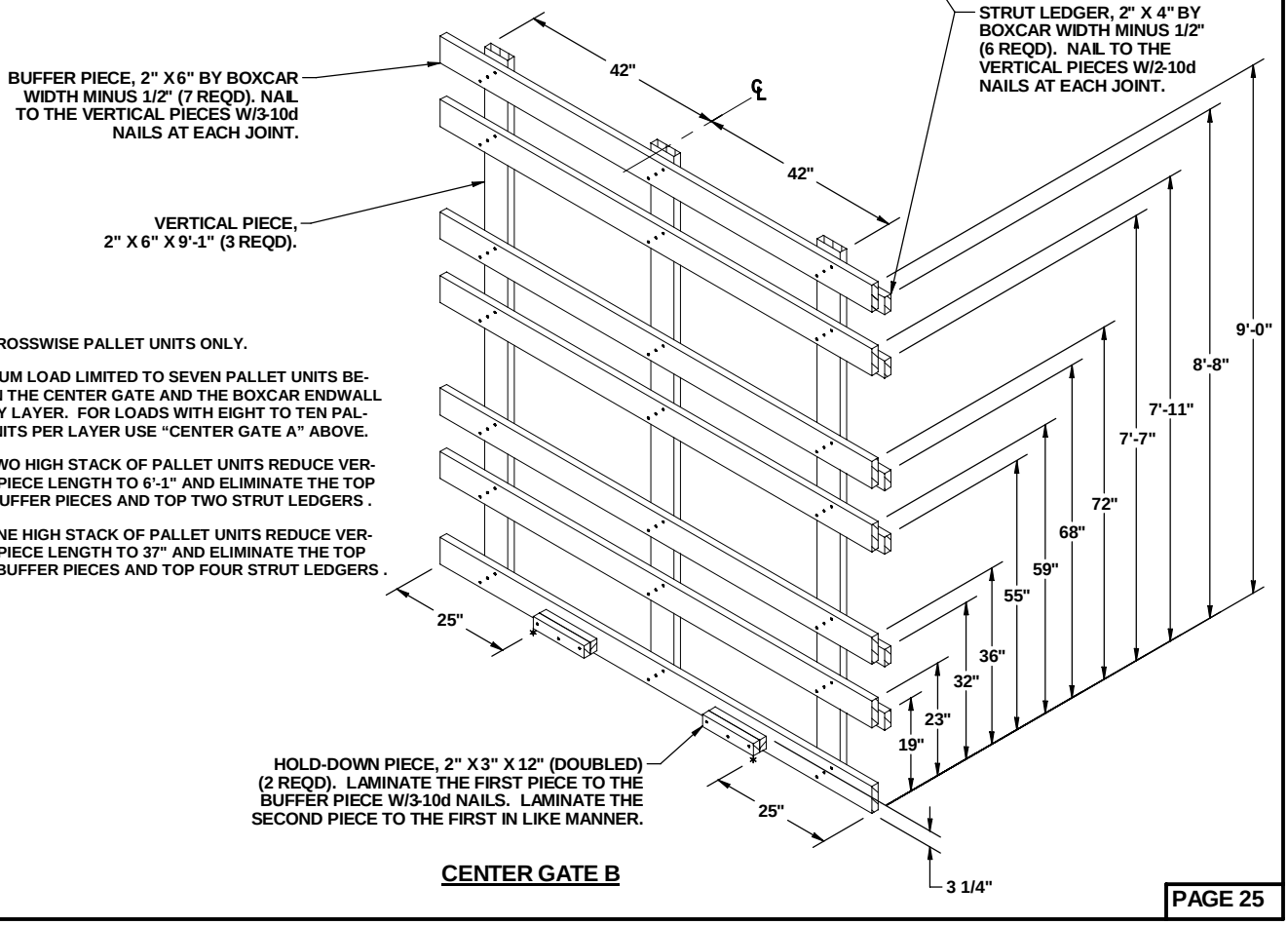
NOTE: THE ANTI-SWAY BRACE CAN BE PARTIALLY ASSEMBLED ONE BUFFER PIECE CAN BE NAILED TO BOTH RETAINER PIECES. THE LONG ENDS OF THE ASSEMBLY CAN THEN BE INSTALLED INTO THE FORKLIFT OPENING OF A LOADED PALLET UNIT PRIOR TO POSITIONING OF THE LATERALLY ADJACENT PALLET UNIT.



* NOTE: THESE DRAWINGS ARE APPLICABLE FOR ANY LENGTHWISE LOAD CONSTRUCTED. FOR CROSSWISE LOADS CONSTRUCTED IN CARS OF WIDTHS OTHER THAN 8'-6", THESE DIMENSIONS MUST BE ADJUSTED.

CENTER GATE A

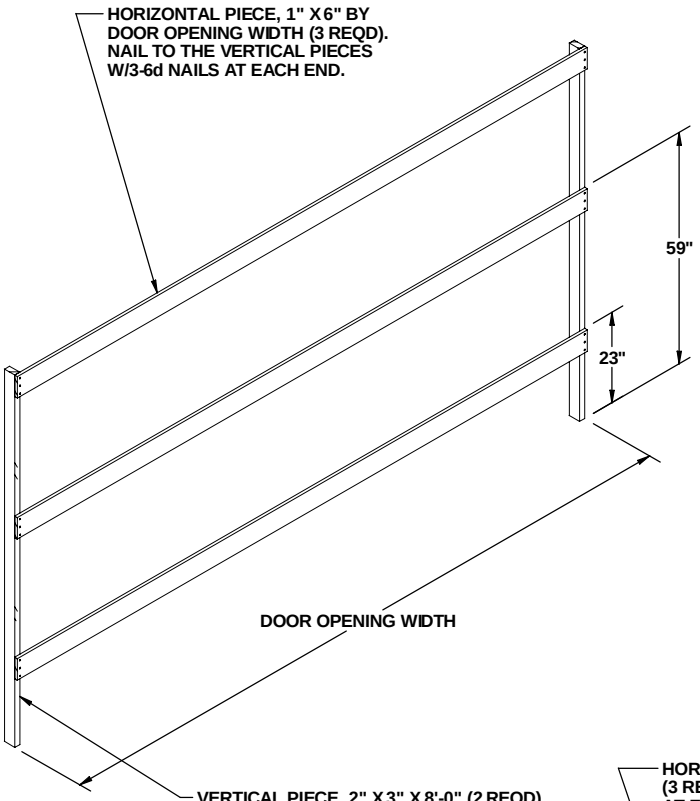
NOTE: FOR TWO HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 6'-1" AND ELIMINATE THE TOP TWO BUFFER PIECES AND TOP TWO STRUT LEDGERS . FOR ONE HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 37" AND ELIMINATE THE TOP FOUR BUFFER PIECES AND TOP FOUR STRUT LEDGERS .



NOTES:

1. FOR CROSSWISE PALLET UNITS ONLY.
2. MAXIMUM LOAD LIMITED TO SEVEN PALLET UNITS BETWEEN THE CENTER GATE AND THE BOXCAR ENDWALL ON ANY LAYER. FOR LOADS WITH EIGHT TO TEN PALLET UNITS PER LAYER USE "CENTER GATE A" ABOVE.
3. FOR TWO HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 6'-1" AND ELIMINATE THE TOP TWO BUFFER PIECES AND TOP TWO STRUT LEDGERS .
4. FOR ONE HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 37" AND ELIMINATE THE TOP FOUR BUFFER PIECES AND TOP FOUR STRUT LEDGERS .

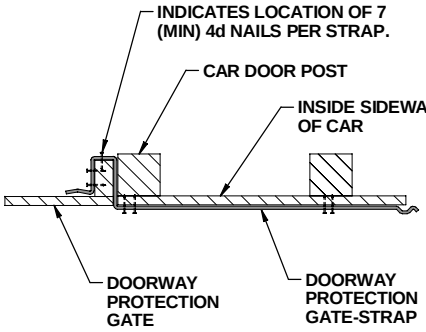
CENTER GATE B



DOORWAY PROTECTION A

SEE SPECIAL NOTES 1 AND 6 AT RIGHT.

DOORWAY PROTECTION-GATE STRAP, 1-1/4" X .035" OR .031" X 3'-0" (REF) NAIL-ON TYPE STEEL STRAPPING (2 REQD PER LAYER OF LOAD). NAIL TO GATE AND CAR SIDEWALL AS SHOWN IN VIEW "A" BELOW. NOTE: TYPE 1 STRAPPING MAY BE PUNCHED FOR NAILING IF TYPE 2 STRAPPING IS NOT AVAILABLE.

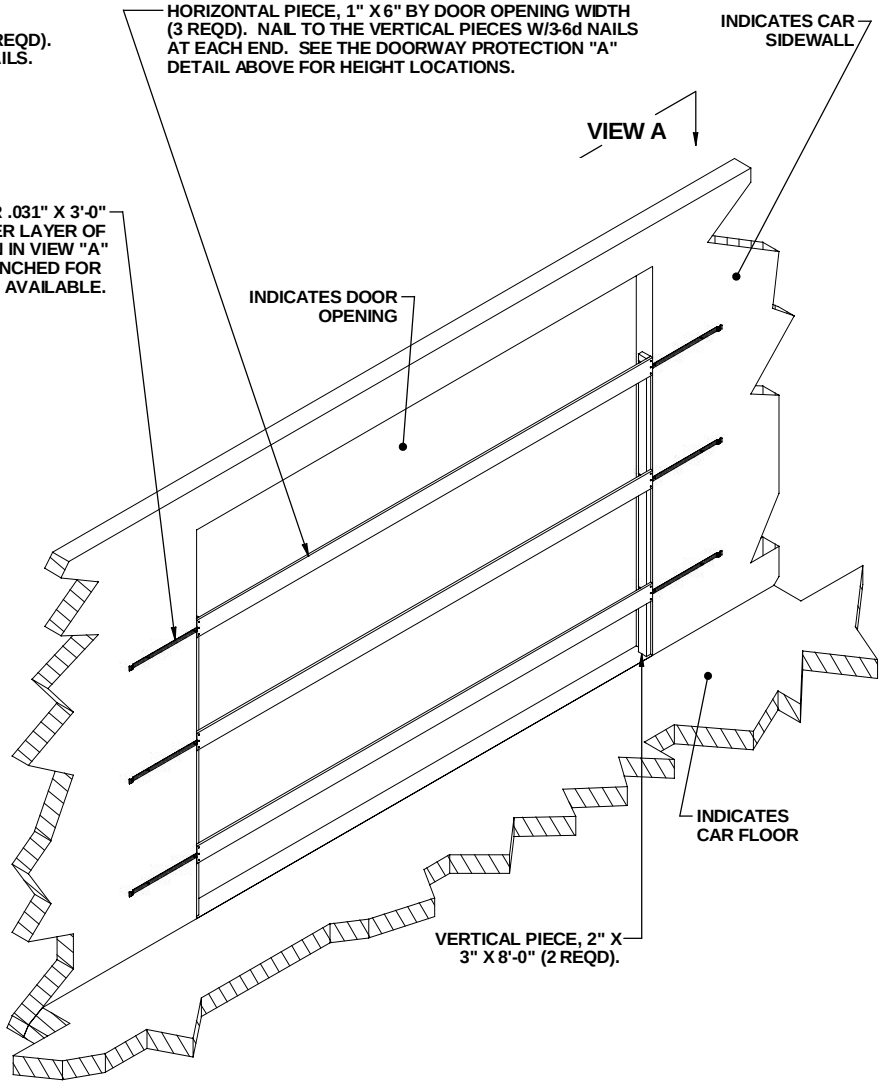


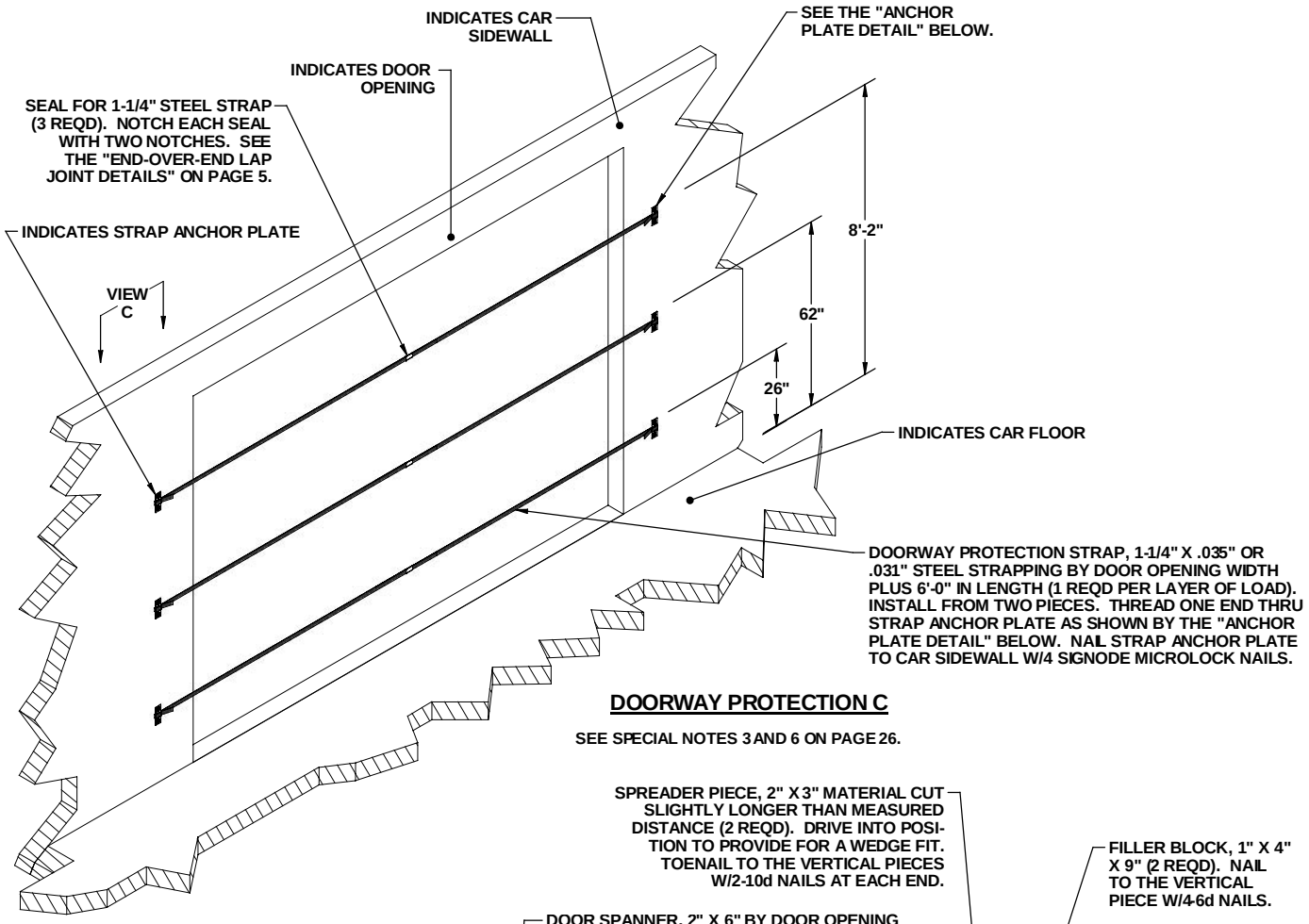
VIEW A

THIS DEPICTS THE LOCATION OF THE NAILS FOR SECURING THE DOORWAY PROTECTION GATE STRAP. NOTE THAT THE STRAPS MUST BE APPLIED TO THE CAR SIDE WALL PRIOR TO POSITIONING THE ADJACENT CONTAINERS.

SPECIAL NOTES:

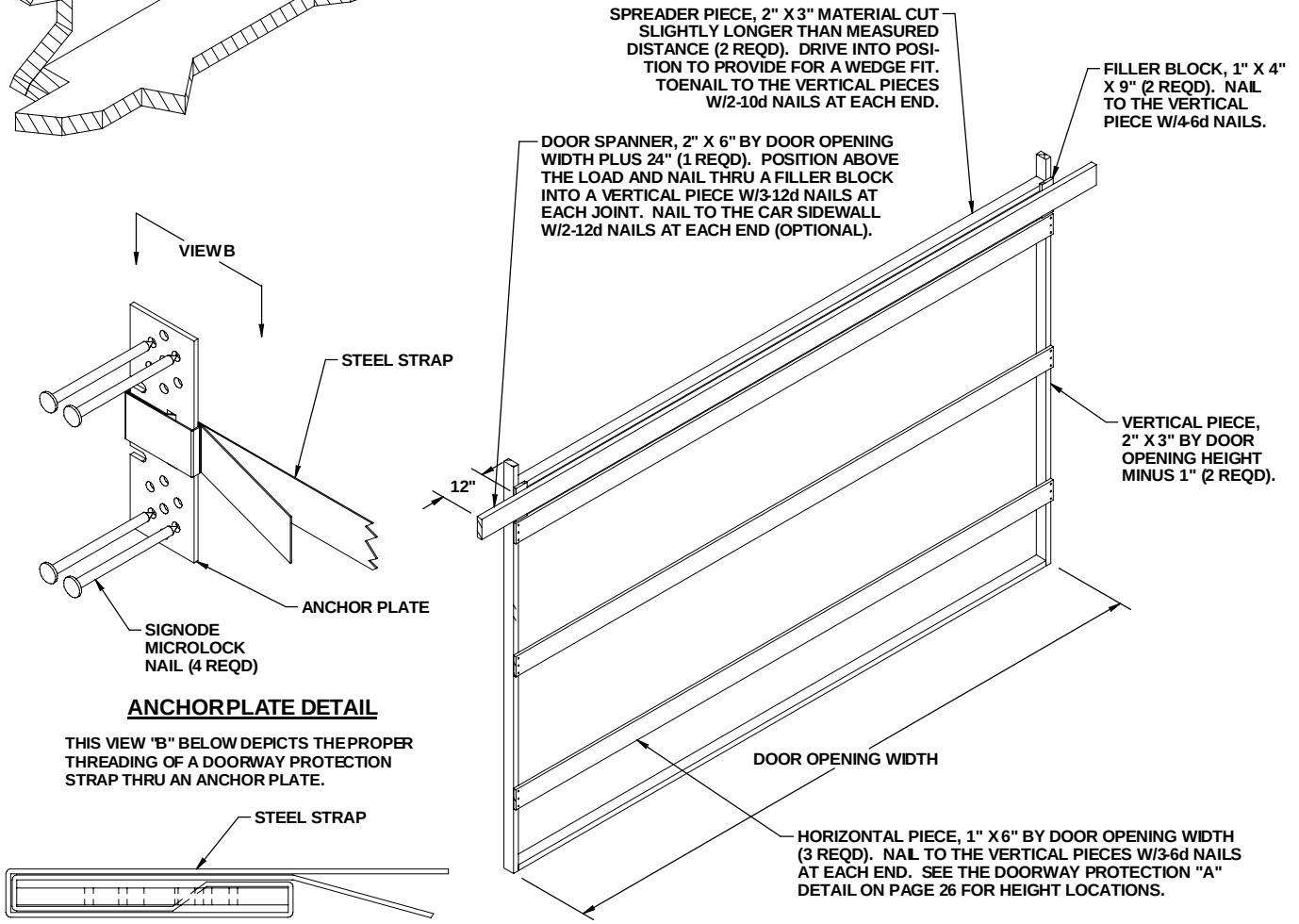
1. DOORWAY PROTECTION "A" IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS.
2. DOORWAY PROTECTION "B" IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE STEEL WITHOUT NAILING HOLES AND THE CAR SIDEWALLS ARE NAILABLE.
3. DOORWAY PROTECTION "C" IS FOR USE IN CARS EQUIPPED WITH EITHER PLUG TYPE DOORS OR CONVENTIONAL SLIDING DOORS, BUT ONLY IF THE CAR IS EQUIPPED WITH NAILABLE SIDEWALLS. IF THE CAR IS EQUIPPED WITH SPECIAL ANCHOR RODS IN THE CAR DOOR POSTS, THE DOORWAY PROTECTION STRAPS MAY BE SECURED TO THESE RODS IN LIEU OF ATTACHING TO THE CAR SIDEWALL WITH STRAP ANCHOR PLATES.
4. DOORWAY PROTECTION "D" IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS, WHEN THE DOOR POSTS ARE NOT NAILABLE. IF THE CAR HAS NAILABLE SIDEWALLS, NAIL-ON TYPE STRAPPING MAY BE USED TO SECURE THE GATE IN LIEU OF USING THE SPREADER PIECES. SEE THE DOORWAY PROTECTION "B" DETAIL FOR GUIDANCE.
5. NAILED FLOORLINE BLOCKING AND BUNDLING STRAPS ARE REQUIRED FOR DOORWAY PROTECTION IF NONE OF THE ABOVE METHODS CAN BE USED. SEE THE LOAD ON PAGE 10 FOR GUIDANCE.
6. THE VIEWS ON PAGES 26 AND 27 DEPICT DOORWAY PROTECTION FOR A THREE-LAYER LOAD. FOR A TWO-LAYER LOAD, ELIMINATE THE TOP HORIZONTAL PIECE AND/OR STRAP AND REDUCE THE HEIGHT OF THE VERTICAL PIECES TO 6'-2". FOR A ONE-LAYER LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND/OR STRAPS AND REDUCE THE HEIGHT OF THE VERTICAL PIECES TO 38". FOR DOORWAY PROTECTION "D", MOVE THE SPANNER BY AN APPROPRIATE DISTANCE.





DOORWAY PROTECTION C

SEE SPECIAL NOTES 3 AND 6 ON PAGE 26.



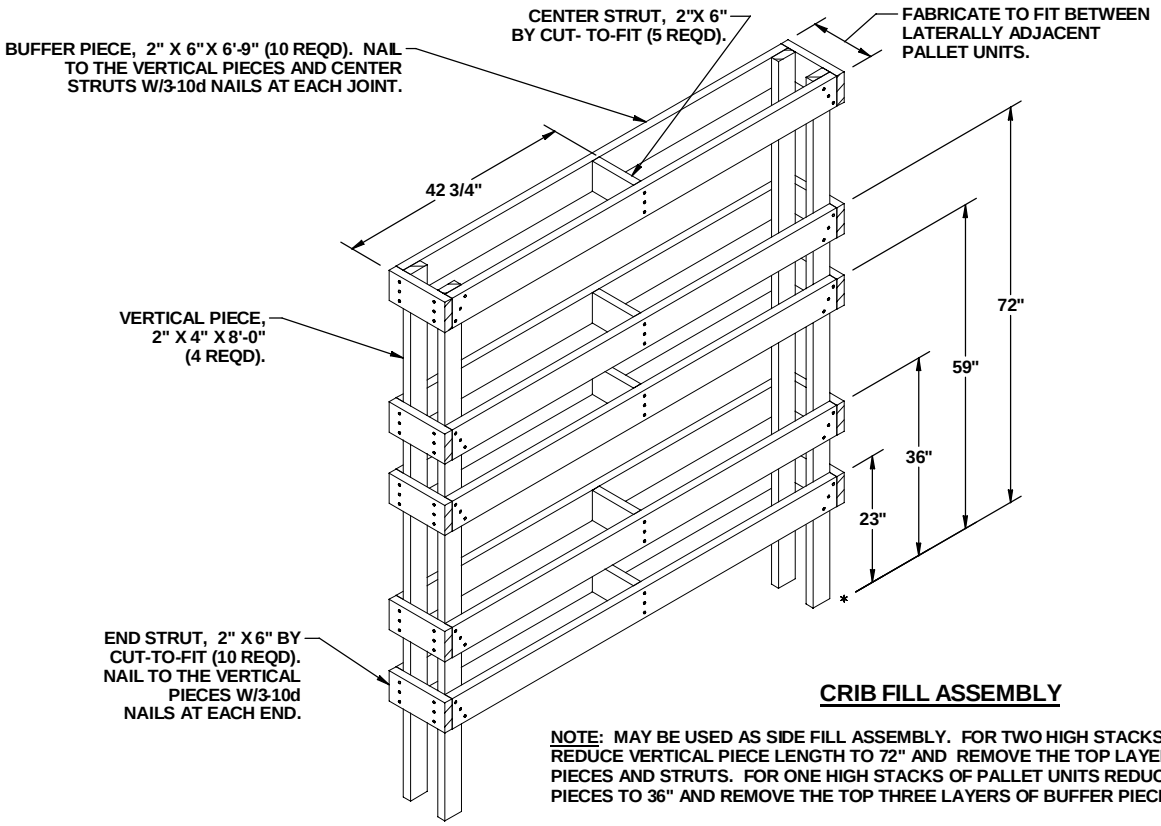
ANCHOR PLATE DETAIL

THIS VIEW "B" BELOW DEPICTS THE PROPER THREADING OF A DOORWAY PROTECTION STRAP THRU AN ANCHOR PLATE.

VIEW B

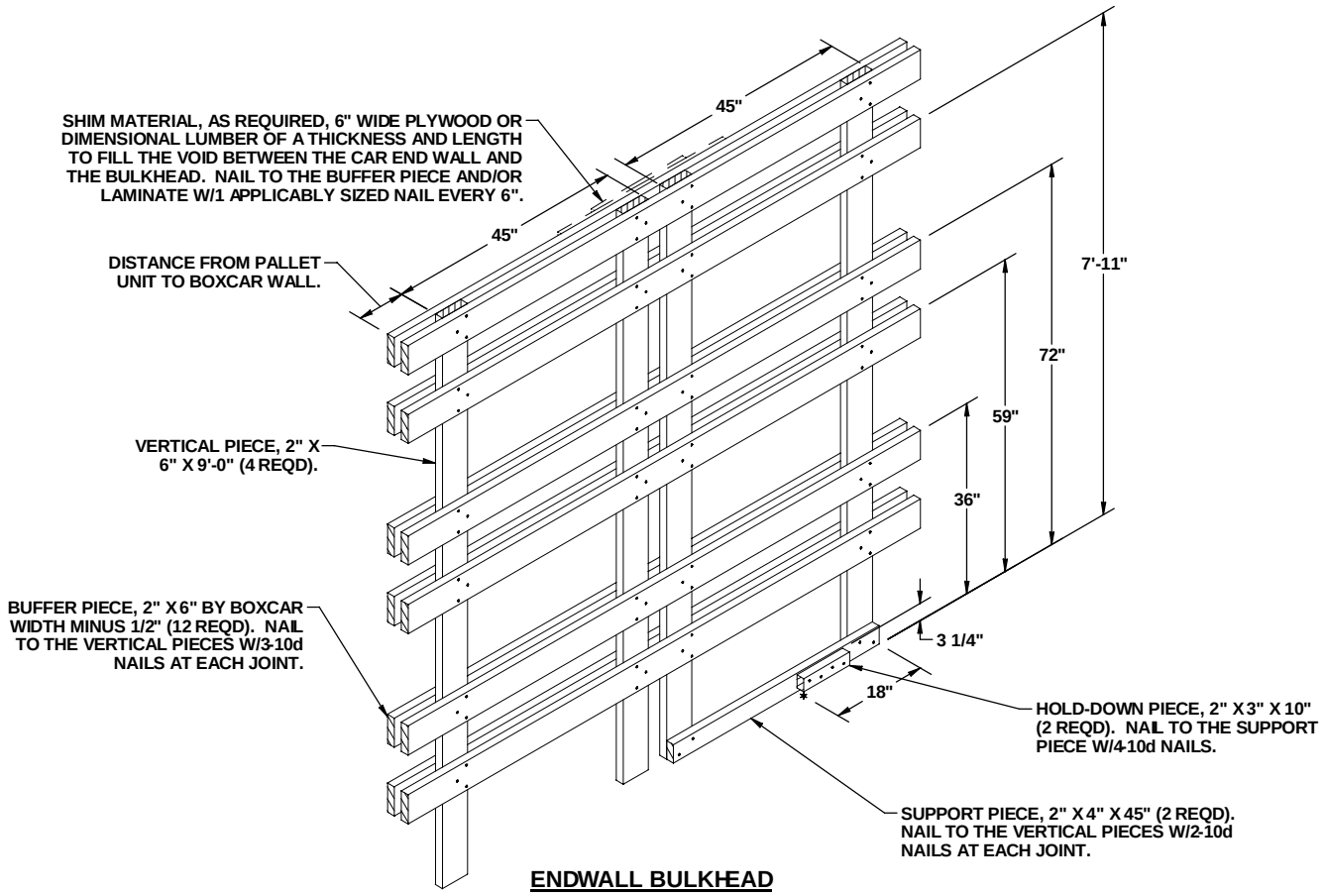
DOORWAY PROTECTION D

SEE SPECIAL NOTES 4 AND 6 ON PAGE 26.



CRIB FILL ASSEMBLY

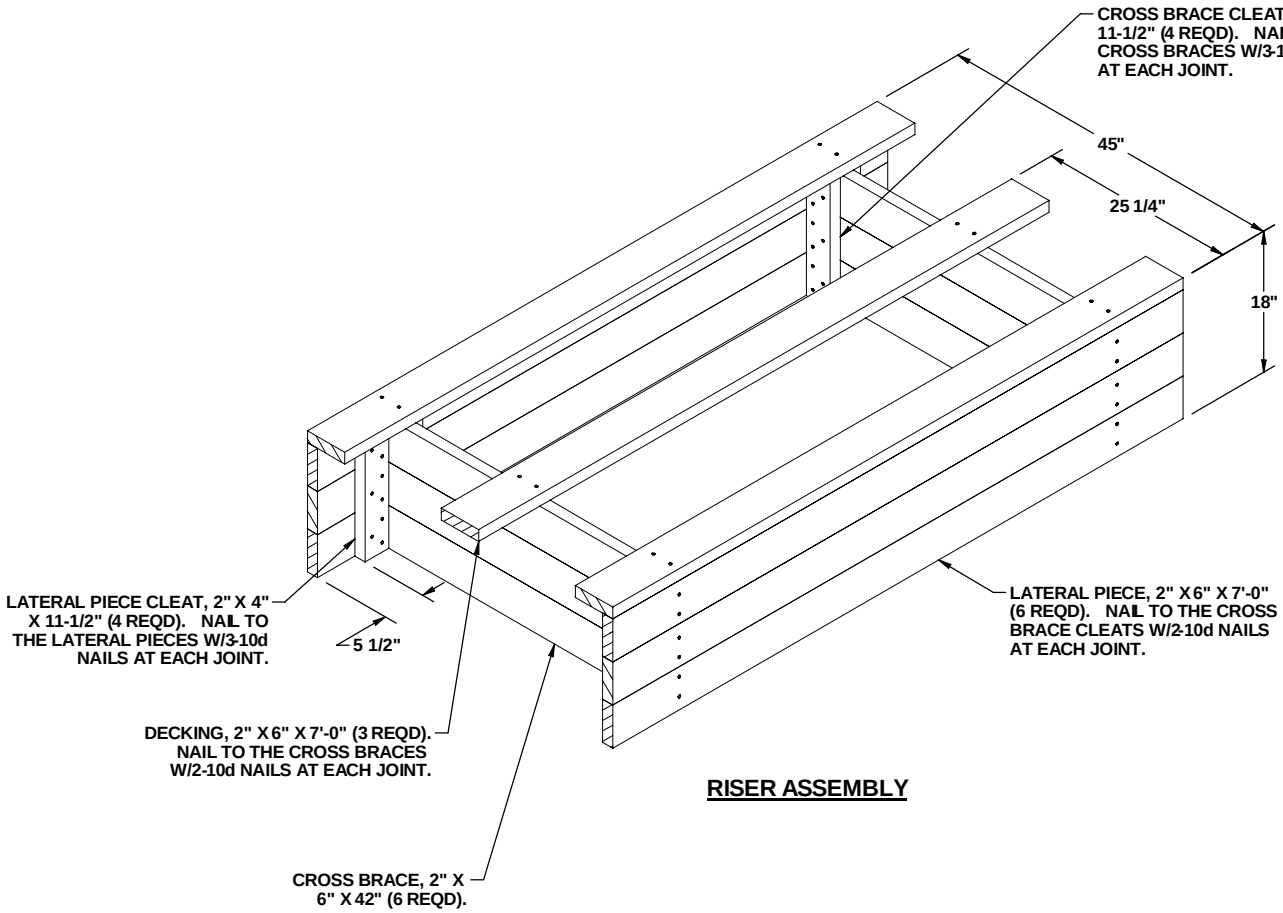
NOTE: MAY BE USED AS SIDE FILL ASSEMBLY. FOR TWO HIGH STACKS OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 72" AND REMOVE THE TOP LAYER OF BUFFER PIECES AND STRUTS. FOR ONE HIGH STACKS OF PALLET UNITS REDUCE THE VERTICAL PIECES TO 36" AND REMOVE THE TOP THREE LAYERS OF BUFFER PIECES AND STRUTS.



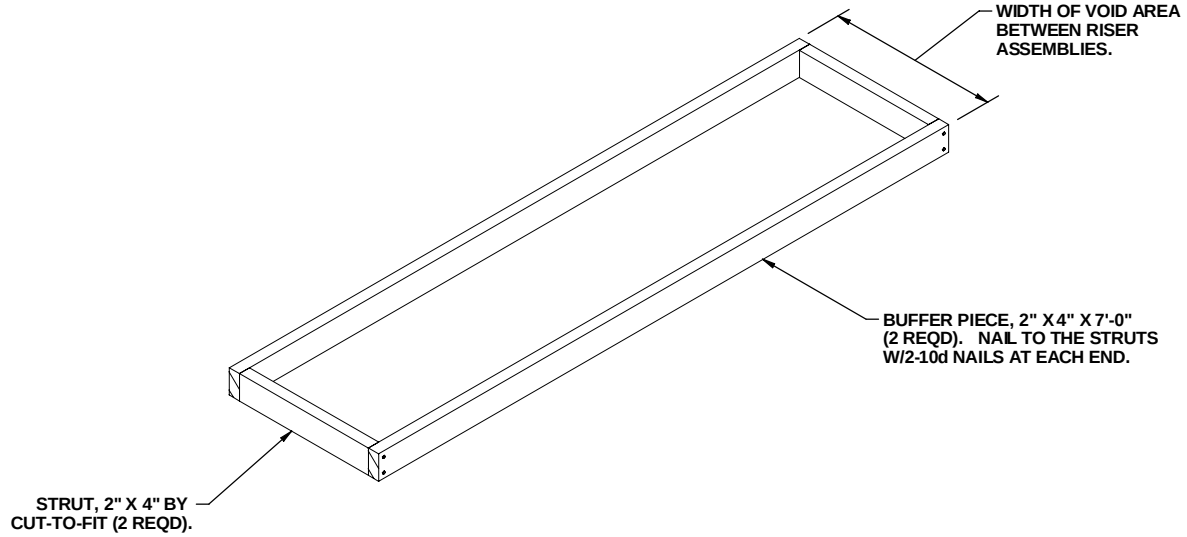
ENDWALL BULKHEAD

(OPTIONAL: USE IF BOXCAR ENDWALL IS BOWED OUTWARD MORE THAN 2")

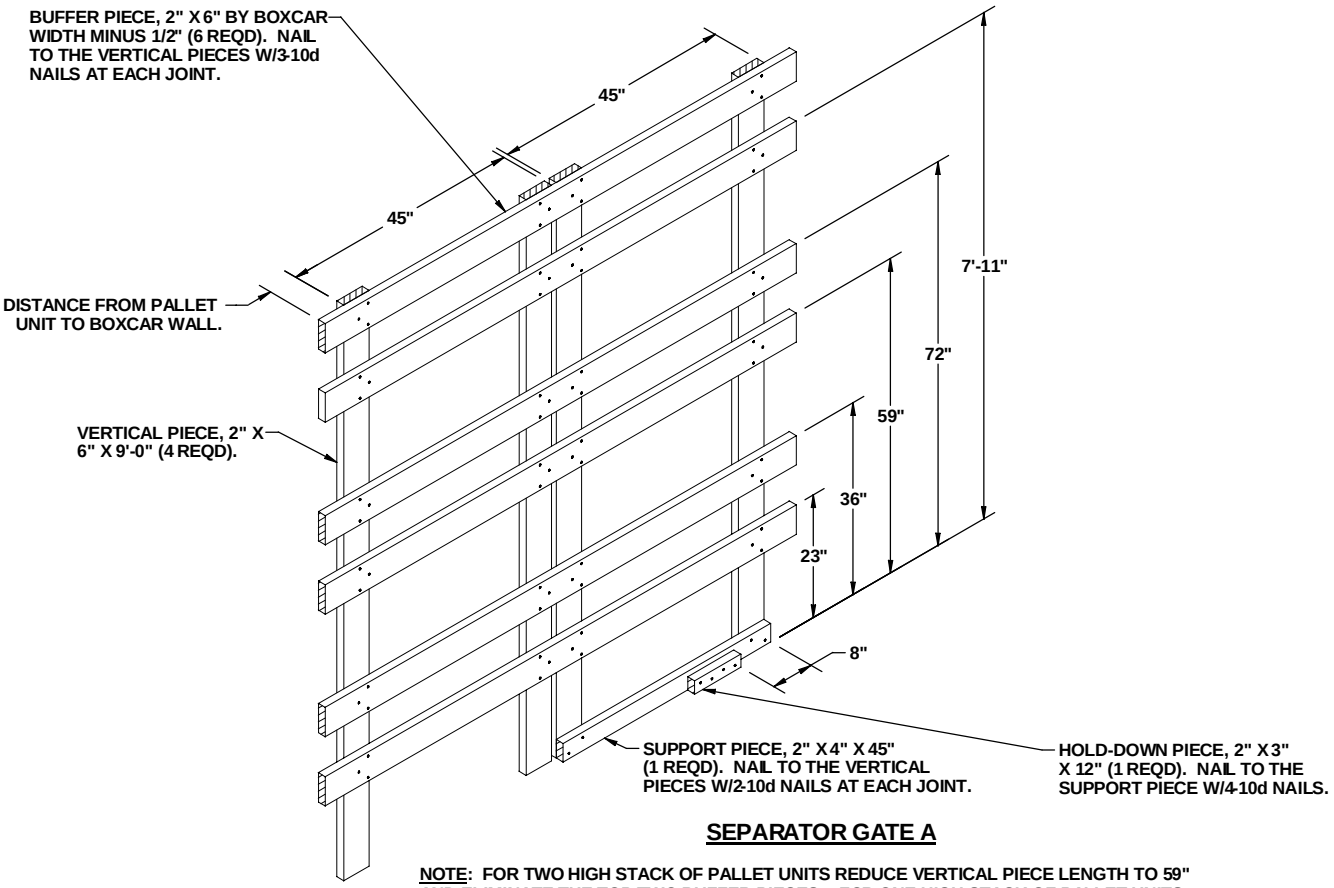
NOTE: FOR TWO HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 72" AND ELIMINATE THE TOP FOUR BUFFER PIECES. FOR ONE HIGH STACK OF PALLET UNITS REDUCE VERTICAL BOARD LENGTH TO 36" AND ELIMINATE THE TOP EIGHT BUFFER PIECES.



RISER ASSEMBLY

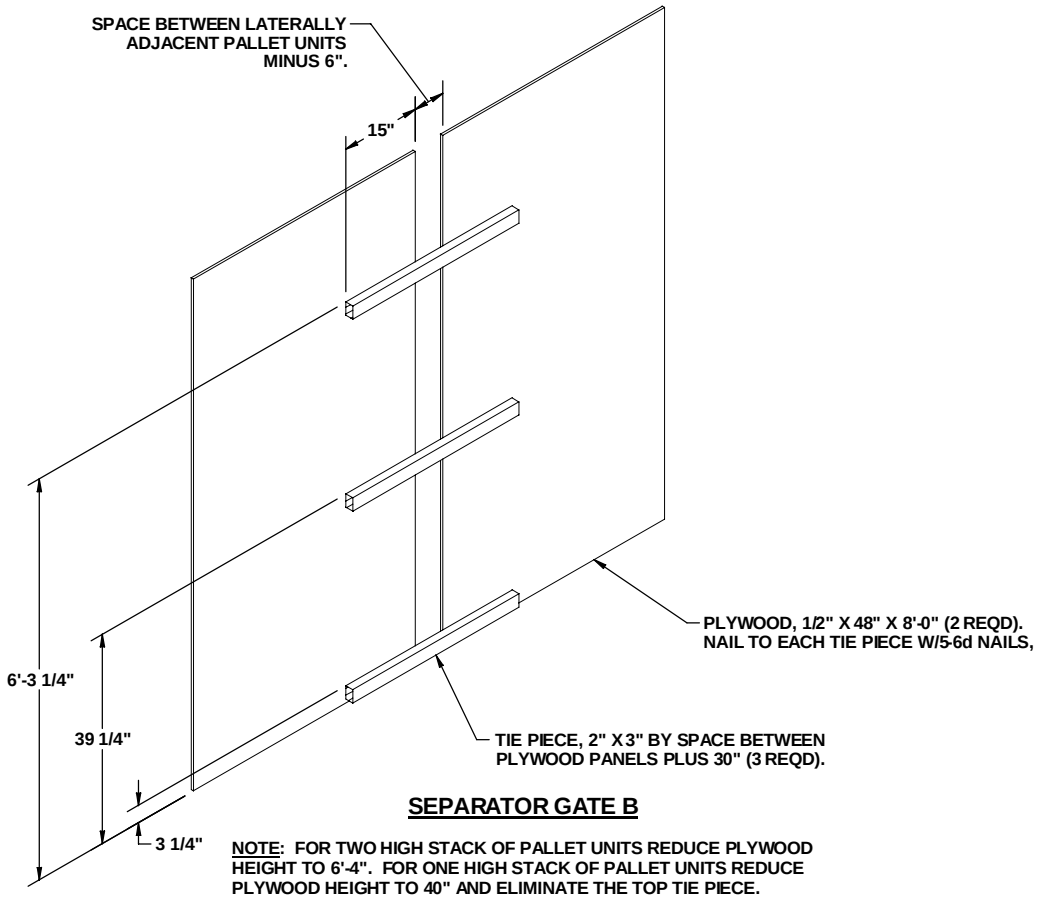


RISER RETAINER ASSEMBLY



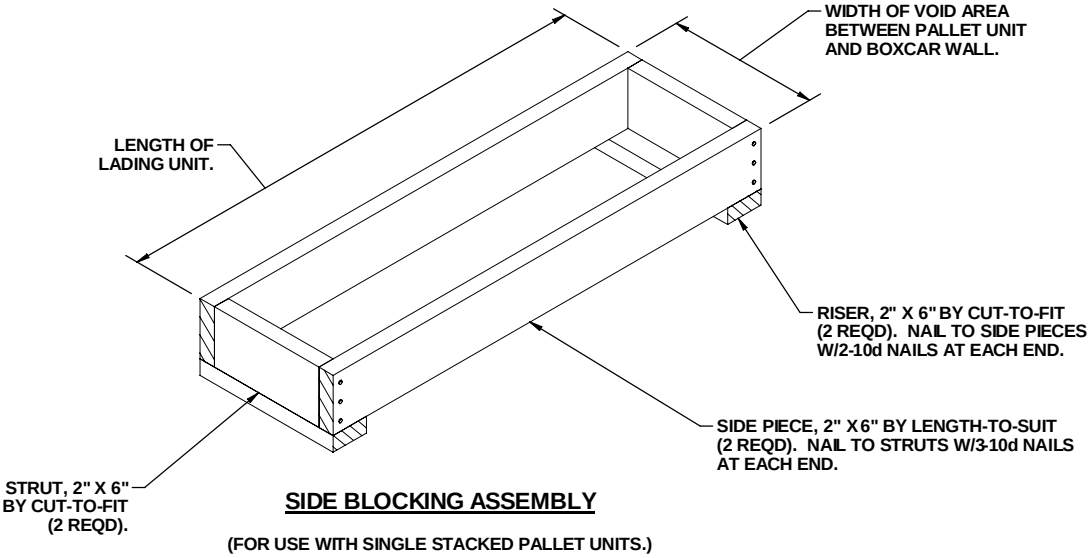
SEPARATOR GATE A

NOTE: FOR TWO HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 59" AND ELIMINATE THE TOP TWO BUFFER PIECES. FOR ONE HIGH STACK OF PALLET UNITS REDUCE VERTICAL BOARD LENGTH TO 36" AND ELIMINATE THE TOP FOUR BUFFER PIECES.



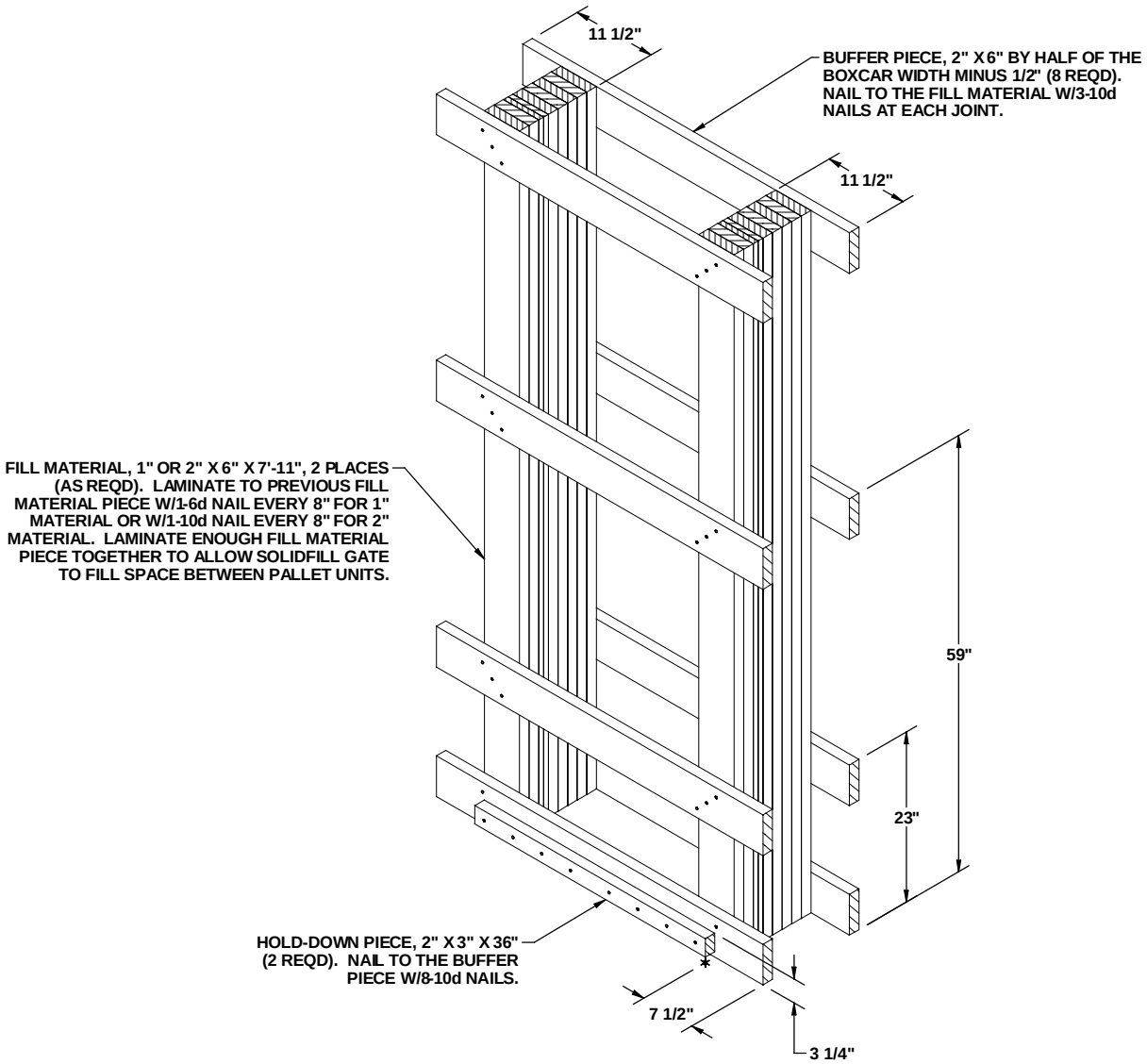
SEPARATOR GATE B

NOTE: FOR TWO HIGH STACK OF PALLET UNITS REDUCE PLYWOOD HEIGHT TO 6'-4". FOR ONE HIGH STACK OF PALLET UNITS REDUCE PLYWOOD HEIGHT TO 40" AND ELIMINATE THE TOP TIE PIECE.



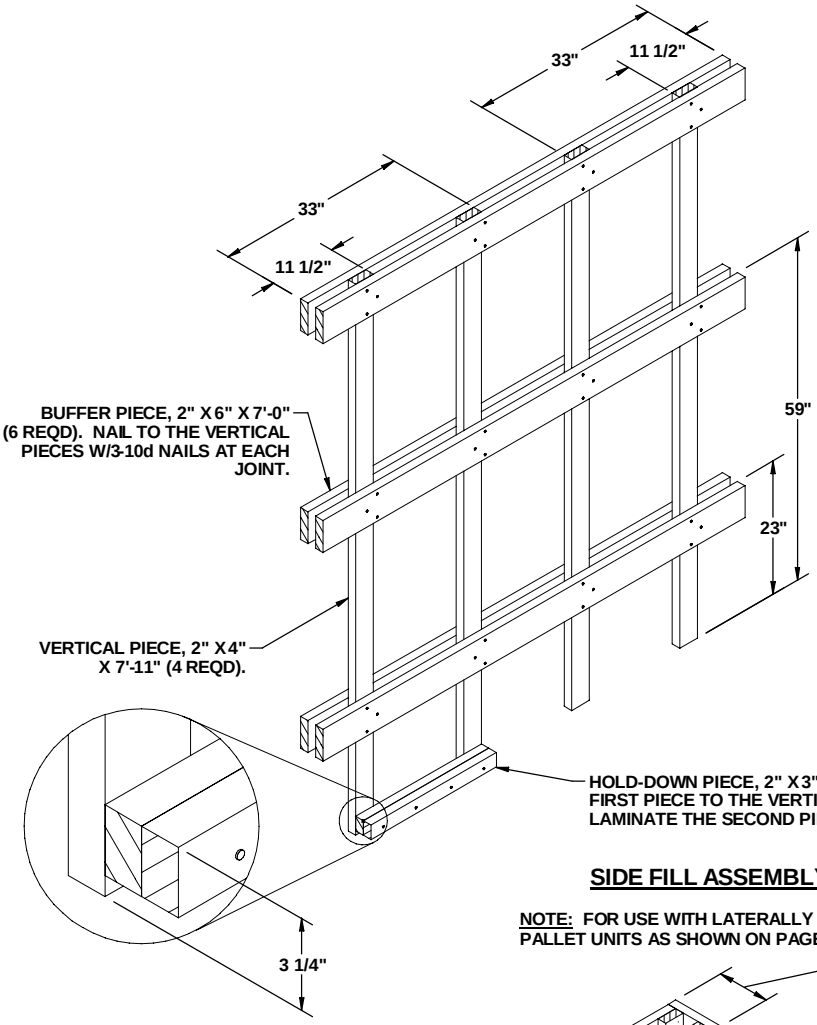
SIDE BLOCKING ASSEMBLY

(FOR USE WITH SINGLE STACKED PALLET UNITS.)



SOLID FILL ASSEMBLY

NOTE: FOR TWO HIGH STACK OF PALLET UNITS REDUCE FILL MATERIAL LENGTH TO 72" AND ELIMINATE THE TOP TWO BUFFER PIECES. FOR ONE HIGH STACK OF PALLET UNITS REDUCE FILL MATERIAL LENGTH TO 36" AND ELIMINATE THE TOP FOUR BUFFER PIECES.

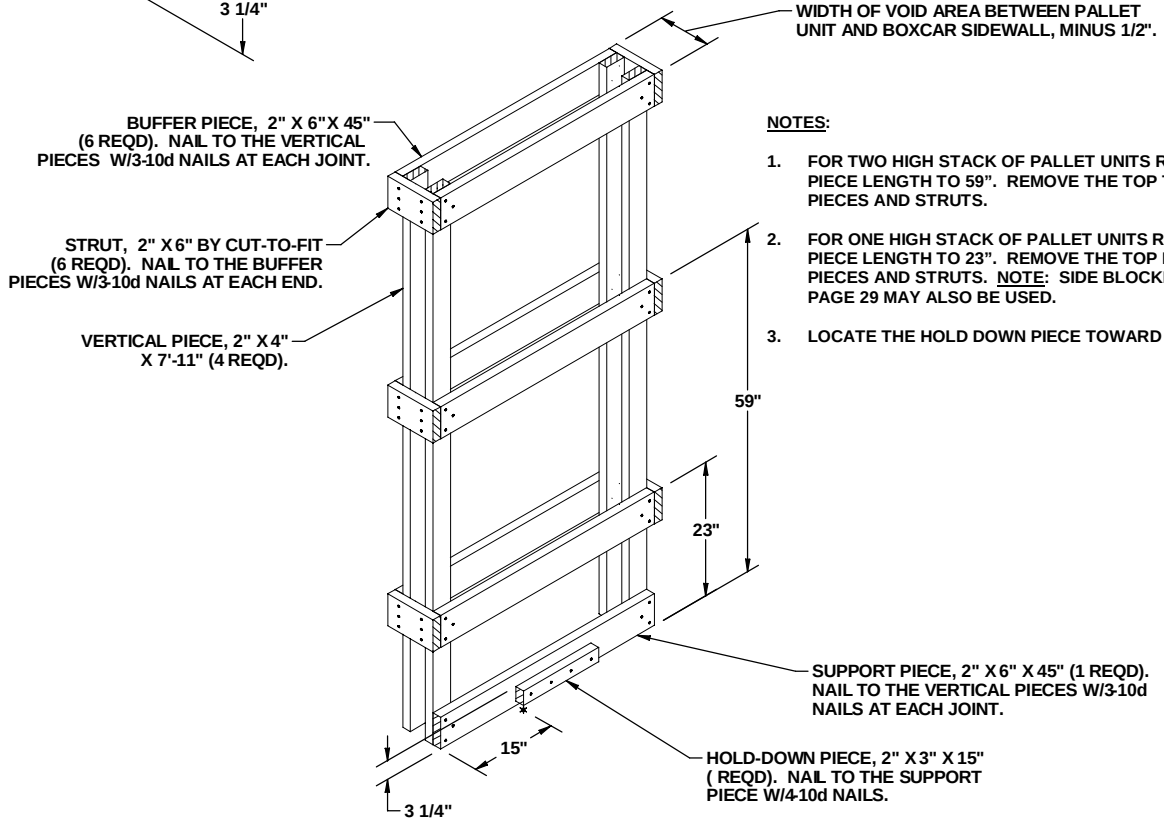


NOTES:

1. SIDE FILL ASSEMBLY MAY BE USED AS A CRIB FILL ASSEMBLY.
2. VERTICAL PIECE CAN BE REPLACED WITH TWO LAMINATED 2" X 4" PIECES OF THE APPROPRIATE LENGTH. LAMINATE 2" X 4" PIECES W/1-10d NAIL EVERY 12". IF NARROWER SIDE FILL ASSEMBLY IS REQUIRED ONE 1" X 4" MAY BE USED.
3. EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE BUFFER PIECES ON THE SIDE FILL ASSEMBLY. LAMINATE EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12".
4. THE BUFFER PIECES CAN BE REPLACED WITH 1" THICK MATERIAL TO REDUCE THE OVERALL THICKNESS OF THE SIDE FILL ASSEMBLY.
5. FOR TWO HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 59". REMOVE THE TOP TWO BUFFER PIECES.
6. FOR ONE HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 23". REMOVE THE TOP FOUR BUFFER PIECES. NOTE: SIDE BLOCKING ASSEMBLY ON PAGE 29 MAY ALSO BE USED.
7. LOCATE THE HOLD DOWN PIECE TOWARD THE PALLET UNIT.

SIDE FILL ASSEMBLY A

NOTE: FOR USE WITH LATERALLY ADJACENT PALLET UNITS AS SHOWN ON PAGE 10.

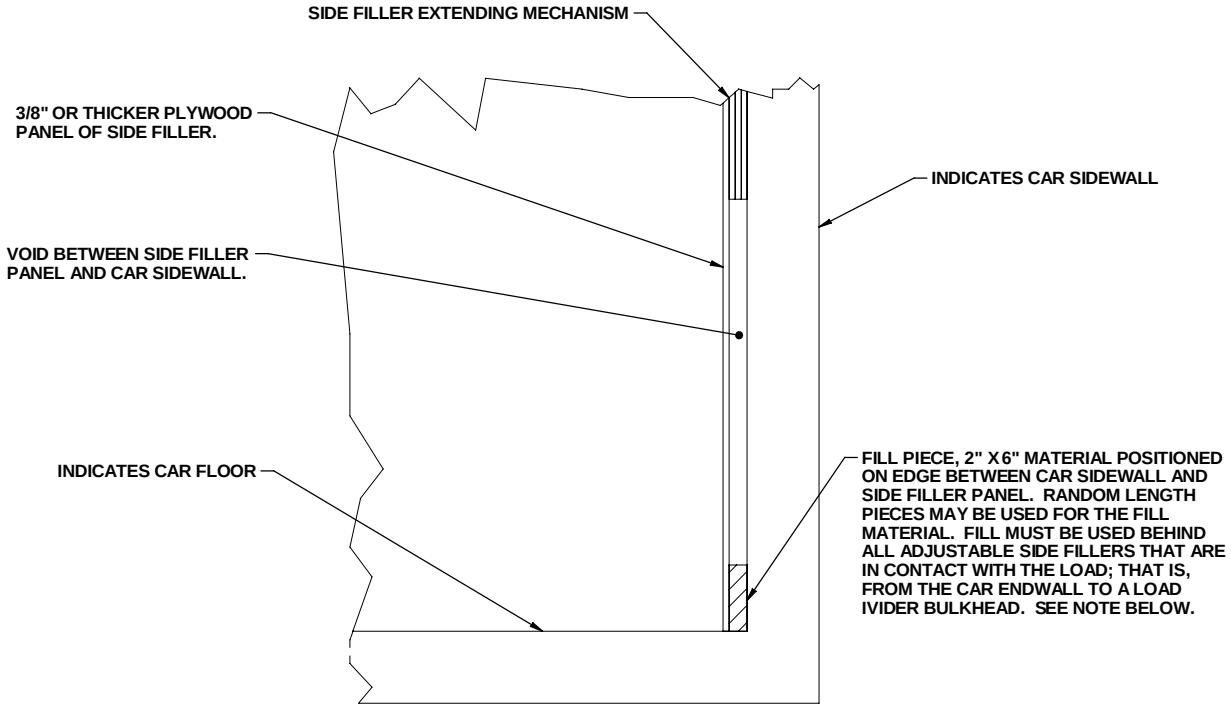


NOTES:

1. FOR TWO HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 59". REMOVE THE TOP TWO BUFFER PIECES AND STRUTS.
2. FOR ONE HIGH STACK OF PALLET UNITS REDUCE VERTICAL PIECE LENGTH TO 23". REMOVE THE TOP FOUR BUFFER PIECES AND STRUTS. NOTE: SIDE BLOCKING ASSEMBLY ON PAGE 29 MAY ALSO BE USED.
3. LOCATE THE HOLD DOWN PIECE TOWARD THE PALLET UNIT.

SIDE FILL ASSEMBLY B

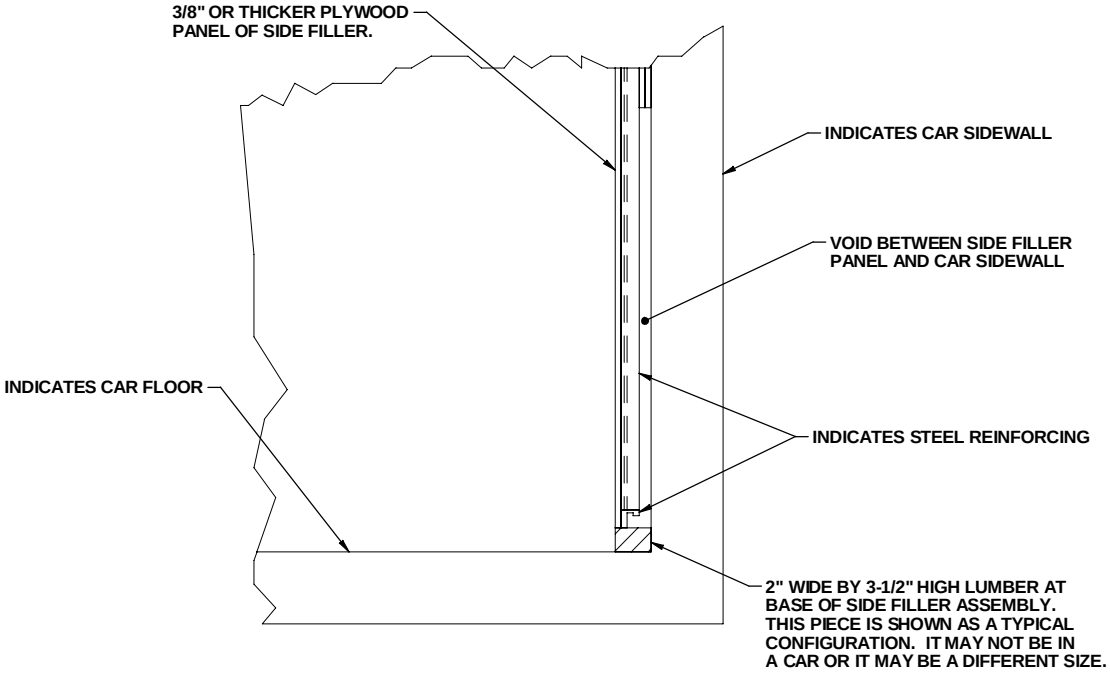
NOTE: FOR USE WITH SINGLE CROSSWISE PALLET UNITS AS SHOWN ON PAGE 12.



SIDE FILLER TYPICAL TYPE A

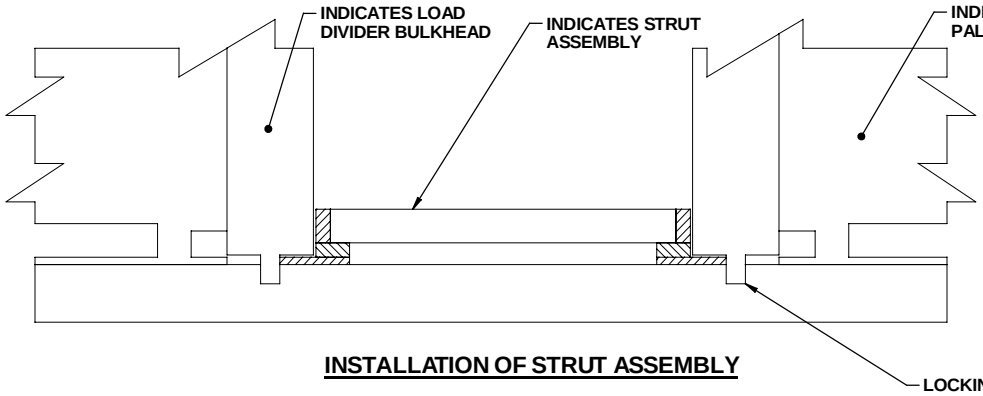
THIS VIEW SHOWS THE INSTALLATION OF A "FILL PIECE" IN A CAR EQUIPPED WITH A STANDARD ADJUSTABLE SIDE FILLER

NOTE:
NAILING OF "FILL PIECES" IS NOT REQUIRED EXCEPT THAT EACH "FILL PIECE" LOCATED NEAREST THE DOOR OPENINGS OF THE CAR WILL BE SECURED AGAINST LONGITUDINAL MOVEMENT W/1-6d NAIL DRIVEN THROUGH THE SIDE FILLER PANEL AND INTO THE "FILL PIECE".



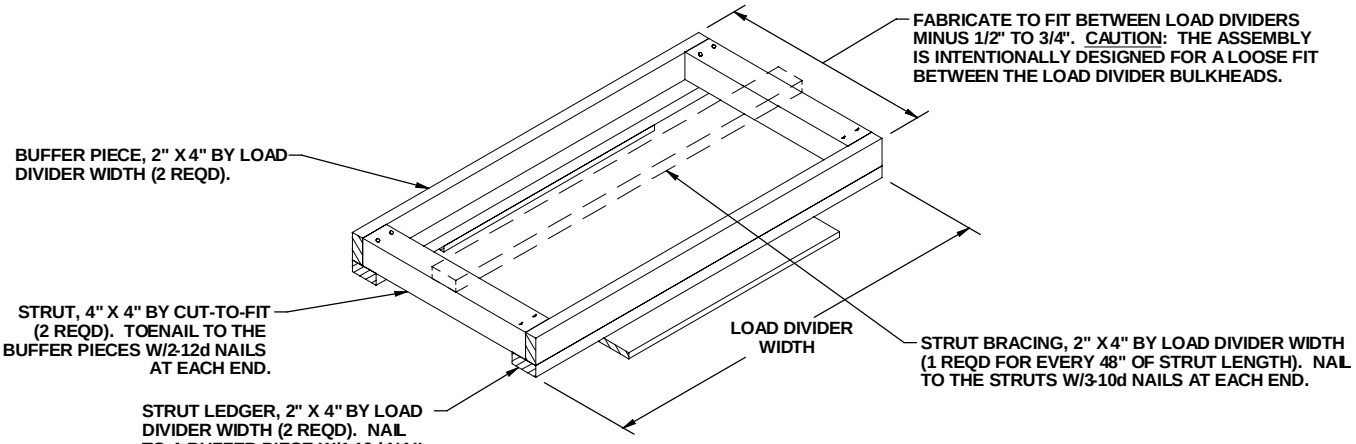
SIDE FILLER TYPICAL TYPE B

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.



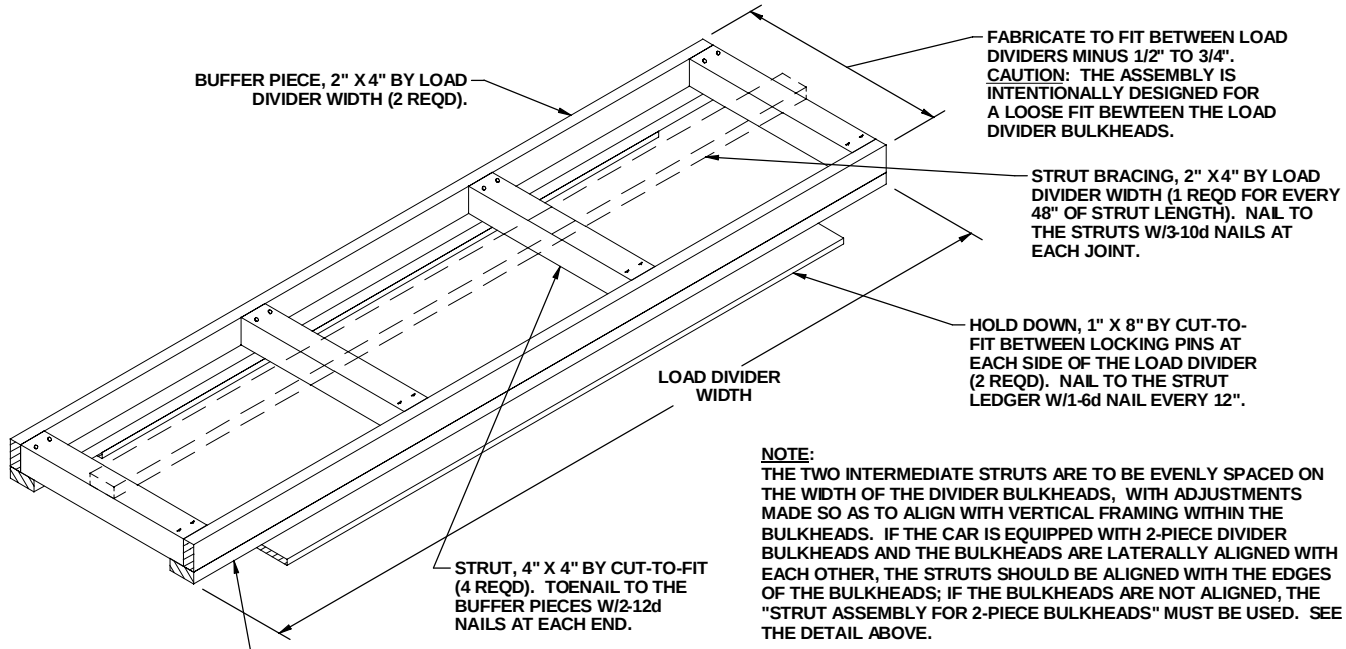
INSTALLATION OF STRUT ASSEMBLY

THIS SIDE ELEVATION 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 HAZARD CLASS AND DIVISION 1.1, 1.2, OR 1.3 EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF HAZARD CLASS AND DIVISION 1.4 EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD. NOTE: TWO ASSEMBLIES AS SHOWN ARE REQUIRED FOR A 2-PIECE BULKHEAD IF NOT LATERALLY ALIGNED. SEE "NOTE" BELOW.



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 HAZARD CLASS AND DIVISION 1.1, 1.2, OR 1.3 EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF HAZARD CLASS AND DIVISION 1.4 EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD.