

LOADING AND BRACING (CL & LCL) IN BOXCARS* OF MXU-787 AIRFOIL GROUP PACKED IN CNU-592 SHIPPING AND STORAGE CONTAINERS

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

U.S. ARMY MATERIEL COMMAND DRAWING

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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 MXU-787 AIRFOIL GROUP PACKED IN CNU-592 SHIPPING AND STORAGE CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINERS WITH AIRFOIL GROUPS. SEE PAGE 4 AND AIR FORCE DRAWING 879570 FOR DETAILS OF THE CONTAINERS.
- C. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE USED FOR THE SHIPMENT OF THE CONTAINERS WHEN THEY ARE LOADED WITH AN ITEM THAT IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM IDENTIFIED WITHIN THE DRAWING TITLE.
- D. 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.
- E. THE SELECTION OF RAILCARS FOR THE TRANSPORT OF CNU-592 CONTAINERS 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.
- F. 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 16 FOR GUIDANCE.
- G. 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.
- H. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH CONTAINERS OF MXU-787 AIRFOIL GROUPS, 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.

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(GENERAL NOTES CONTINUED)

- J. 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".
- 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 VIEWS 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" 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.
- NAI LS** - - - - - -: ASTM F1667; COMMON STEEL NAIL L (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.
- STAPLE, STRAP** - - - -: COMMERCIAL GRADE.
- WI RE, CARBON STEEL** -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.

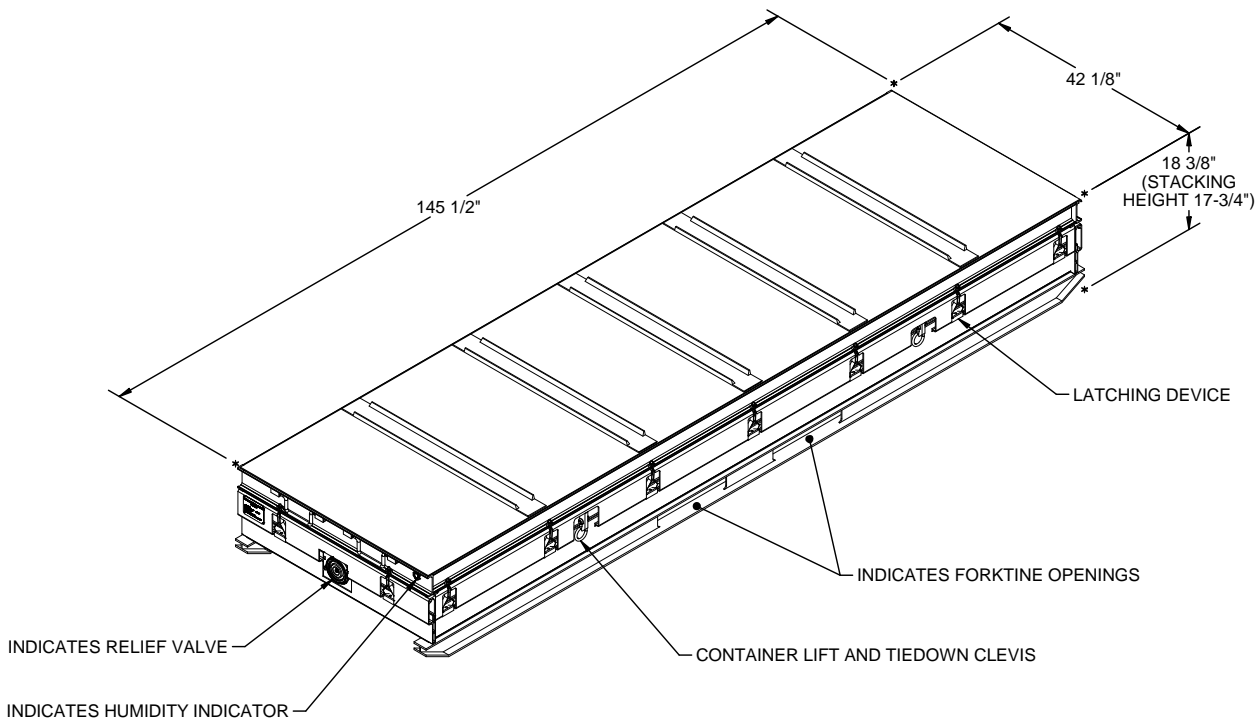
S. FOR CONVENTIONAL TYPE BOXCARS:

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 CONTAINERS IN A CAR, THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL OR CRIB FILL ASSEMBLIES 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 CONTAINERS 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 CONTAINERS. 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 24. 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 NEED 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 CONTAINERS. 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 2" PIECES ARE SPECIFIED FOR STRUT LEDGERS, 2" X 4" MATERIAL MAY BE SUBSTITUTED, IF DESIRED.

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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 COMPLETE ROUNDS. **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 "TYPICAL TYPE A" VIEW ON PAGE 21 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 21, 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. 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 CONTAINERS THAT ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF CONTAINERS 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. 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 14 OR WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGE 12. A FILLER ASSEMBLY MAY ALSO BE USED TO REPLACE ONE CONTAINER, SEE PAGE 10 AND THE DETAILS ON PAGE 24.



CNU-592 CONTAINER

GROSS WEIGHT - - - - - 1,115 LBS (APPROX)
 CUBE - - - - - 65.2 CU FT (APPROX)

UNITIZATION AND HANDLING GUIDANCE

(UNITIZATION AND HANDLING GUIDANCE CONTINUED)

1. STACKING CONTAINERS FOR UNITIZING:

- A. AN UPPER CONTAINER SHOULD BE PLACED AS CLOSE AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE NEXT LOWER CONTAINER.
- B. POSITION THE AFT END OF AN UPPER CONTAINER ABOVE THE AFT END OF THE NEXT LOWER CONTAINER.
- C. THE CONTAINER SKIDS OF AN UPPER CONTAINER SHOULD BE FULLY SEATED AGAINST THE SKID LOCATOR PIECES ON THE COVER OF THE NEXT LOWER CONTAINER.

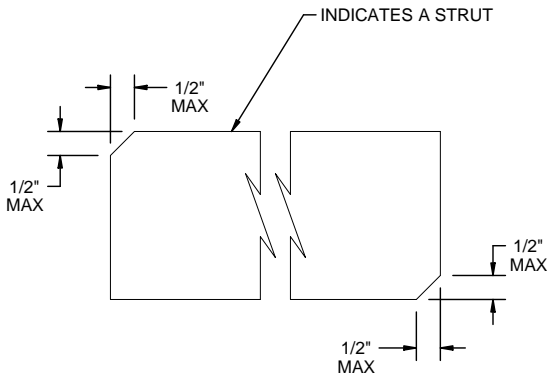
2. INSTALLATION OF UNITIZING STRAPS:

- A. STRAPS WILL BE POSITIONED SO AS TO ENCIRCLE THE CONTAINERS AND SO THAT THE STRAPPING LAYS FLAT AND STRAIGHT WITH THE BODY SURFACE OF THE CONTAINER; I.E., VERTICAL ALONG THE SIDES AND FLAT ACROSS THE TOP AND BOTTOM OF THE STACK.
- B. STRAPPING WILL BE FIRMLY TENSIONED AND EACH END-OVER-END LAP JOINT WILL BE SEALED WITH TWO DOUBLE CRIMPED OR ONE DOUBLE NOTCHED STRAP SEAL(S). SEE GENERAL NOTE "M" ON PAGE 2. THE LAP JOINTS WILL BE MADE ALONG THE SIDE OF THE STACK AS SHOWN. DURING STRAP TENSIONING, CARE SHOULD BE EXERCISED TO ENSURE THAT THE CONTAINERS ARE NOT DAMAGED. EXCESS STRAPPING (STRAP ENDS) SHOULD BE CUT OFF OR BROKEN OFF NEAR THE JOINT SEALS.

3. CONTAINER OR CONTAINER STACK HANDLING:

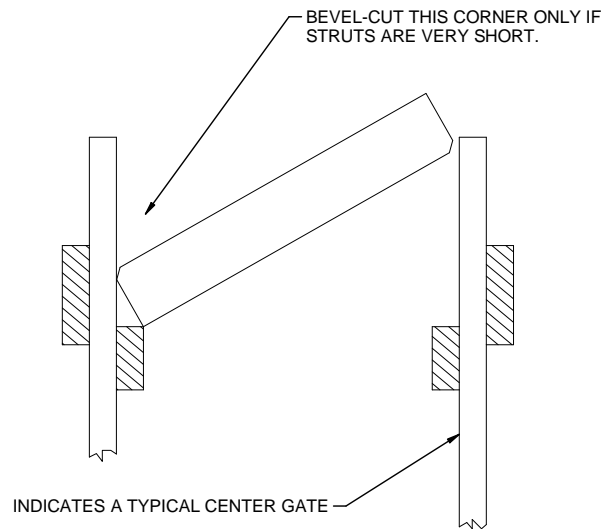
- A. ONLY APPROVED AND APPROPRIATELY SIZED MATERIAL HANDLING EQUIPMENT WILL BE USED FOR HANDLING THE DEPICTED CONTAINERS. APPROVED MATERIAL HANDLING EQUIPMENT (FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, SPREADER BARS, ETC.) IS SPECIFIED ELSEWHERE.
- B. PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.
- C. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, THE CONTAINERS SHOULD BE HANDLED FROM A SIDE POSITION AS MUCH AS POSSIBLE. CARE MUST BE EXERCISED WHEN INSERTING FORKS UNDER A CONTAINER, TO PREVENT DAMAGE TO THE CONTAINER BY THE FORK TINES OR THE FORKLIFT PACKAGE GUARD. IF ONE CONTAINER IS HANDLED BY SLINGING, THE SLING MAY BE ATTACHED TO THE LIFTING POINTS ON THE CONTAINER. DO NOT HANDLE STACKED CONTAINERS WITH A SLING.

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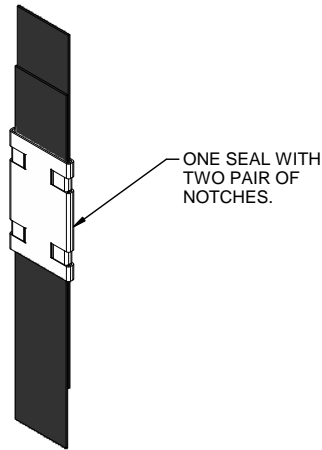
BEVEL CUT

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



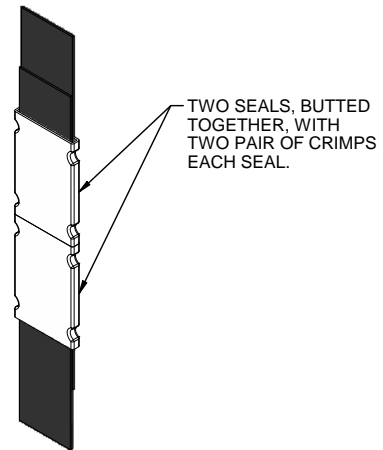
STRUT INSTALLATION

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



STRAP JOINT A

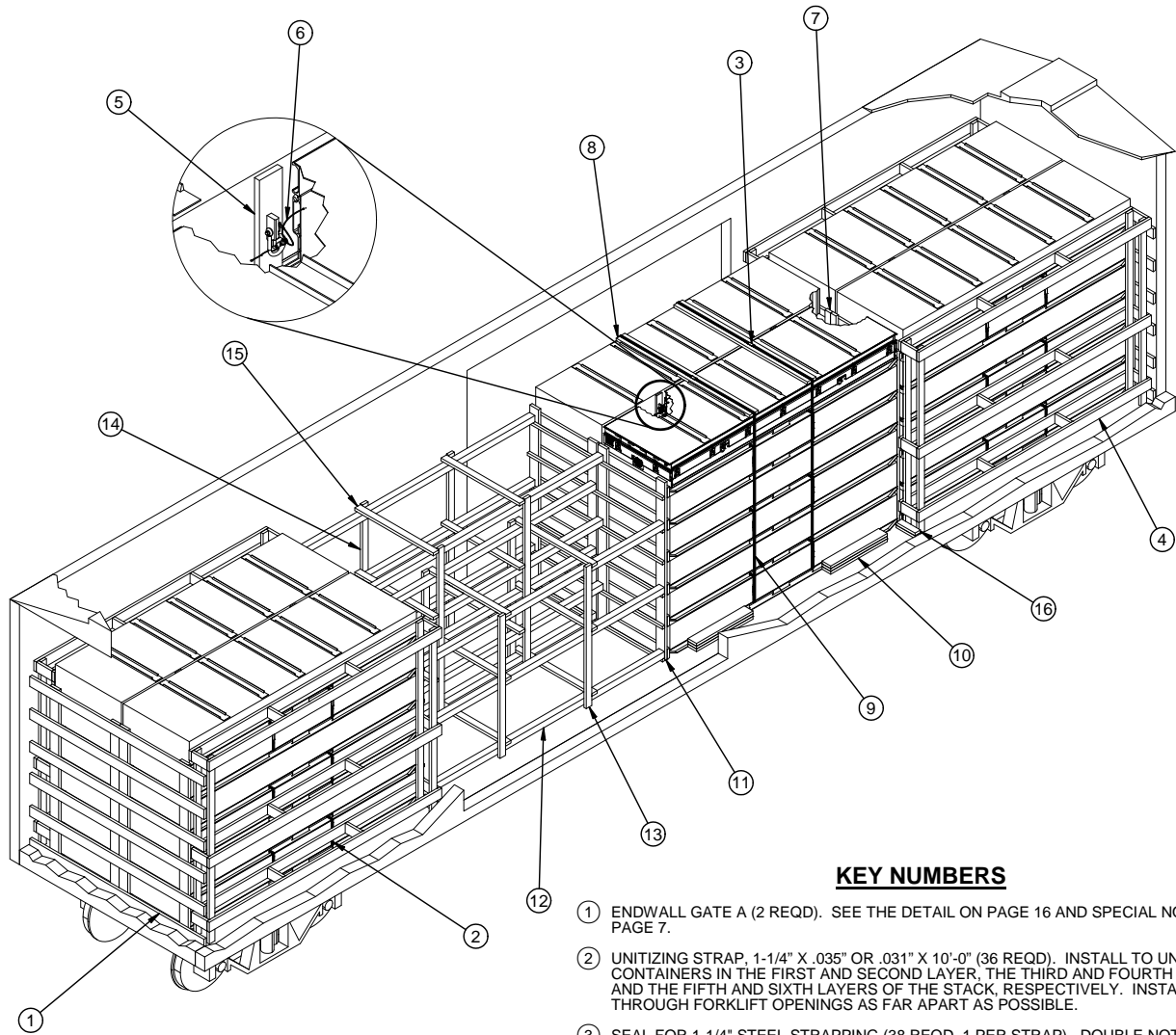
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.



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 ENDWALL GATE A (2 REQD). SEE THE DETAIL ON PAGE 16 AND SPECIAL NOTE 2 ON PAGE 7.
- ② UNITIZING STRAP, 1-1/4" X .035" OR .031" X 10'-0" (36 REQD). INSTALL TO UNITIZE THE CONTAINERS IN THE FIRST AND SECOND LAYER, THE THIRD AND FOURTH LAYERS, AND THE FIFTH AND SIXTH LAYERS OF THE STACK, RESPECTIVELY. INSTALL THROUGH FORKLIFT OPENINGS AS FAR APART AS POSSIBLE.
- ③ SEAL FOR 1-1/4" STEEL STRAPPING (38 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.
- ④ CRIB FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 17 AND SPECIAL NOTE 4 ON PAGE 7.
- ⑤ ANTI-CHAFING BOARD, 1" X 4" X 8'-10" (6 REQD). POSITION ANTI-CHAFING BOARD APPROXIMATELY 34" FROM EACH END OF THE CONTAINER STACK.
- ⑥ TIE WIRE, .0800" DIA 24" LONG (12 REQD, 2 PER ANTI-CHAFING BOARD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE ANTI-CHAFING BOARD AND LIFTING CLEVIS ON THE CONTAINERS. BRING ENDS TOGETHER AND TWIST TAUT.
- ⑦ SEPARATOR GATE A (1 REQD). SEE THE DETAIL ON PAGE 20. POSITION BETWEEN LOAD UNITS WITH THE HORIZONTAL PIECES AGAINST THE SKIDS OF THE ALREADY LOADED CONTAINERS.
- ⑧ STRAPPING BOARD, 2" X 6" X 7'-1" (2 REQD).
- ⑨ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" X 32'-6" LONG STEEL STRAPPING (2 REQD). INSTALL TWO STRAPS THRU THE FORKLIFT POCKETS OF THE BOTTOM CONTAINER TO ENCIRCLE ALL CONTAINERS. SEE SPECIAL NOTE 5 ON PAGE 7.
- ⑩ SIDE BLOCKING, 2" X 6" X 36" (TRIPLED) (4 REQD). LAMINATE THE FIRST PIECE TO THE BOXCAR FLOOR W/8-16d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST AND THE THIRD PIECE TO THE SECOND W/8-16d NAILS.
- ⑪ CENTER GATE A (2 REQD). SEE THE DETAIL ON PAGE 18. SEE GENERAL NOTE S.3 ON PAGE 3.
- ⑫ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 12'-10") (12 REQD). ALTERNATE STRUT INSTALLATION BETWEEN LAYERS AND ROWS, AS DETAILED ON PAGE 18. TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END. SEE GENERAL NOTE S.3 ON PAGE 3.
- ⑬ VERTICAL STRUT BRACING, 2" X 4" BY A LENGTH TO EXTEND 2" ABOVE THE TOP STRUT (REF: 6'-6") (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑭ VERTICAL STRUT BRACING, 2" X 4" BY A LENGTH TO EXTEND 2" ABOVE THE TOP STRUT (REF: 8'-0") (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑮ HORIZONTAL STRUT BRACING, 2" X 4" BY DISTANCE BETWEEN VERTICAL STRUT BRACINGS (REF: 5'-0") (12 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTE S.3 ON PAGE 3.
- ⑯ CRIB FILL STOP PIECE, 2" X 4" X 18" (DOUBLED) (4 REQD). LAMINATE THE FIRST PIECE TO THE BOXCAR FLOOR W/3-16d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST W/3-16d NAILS.

SPECIAL NOTES:

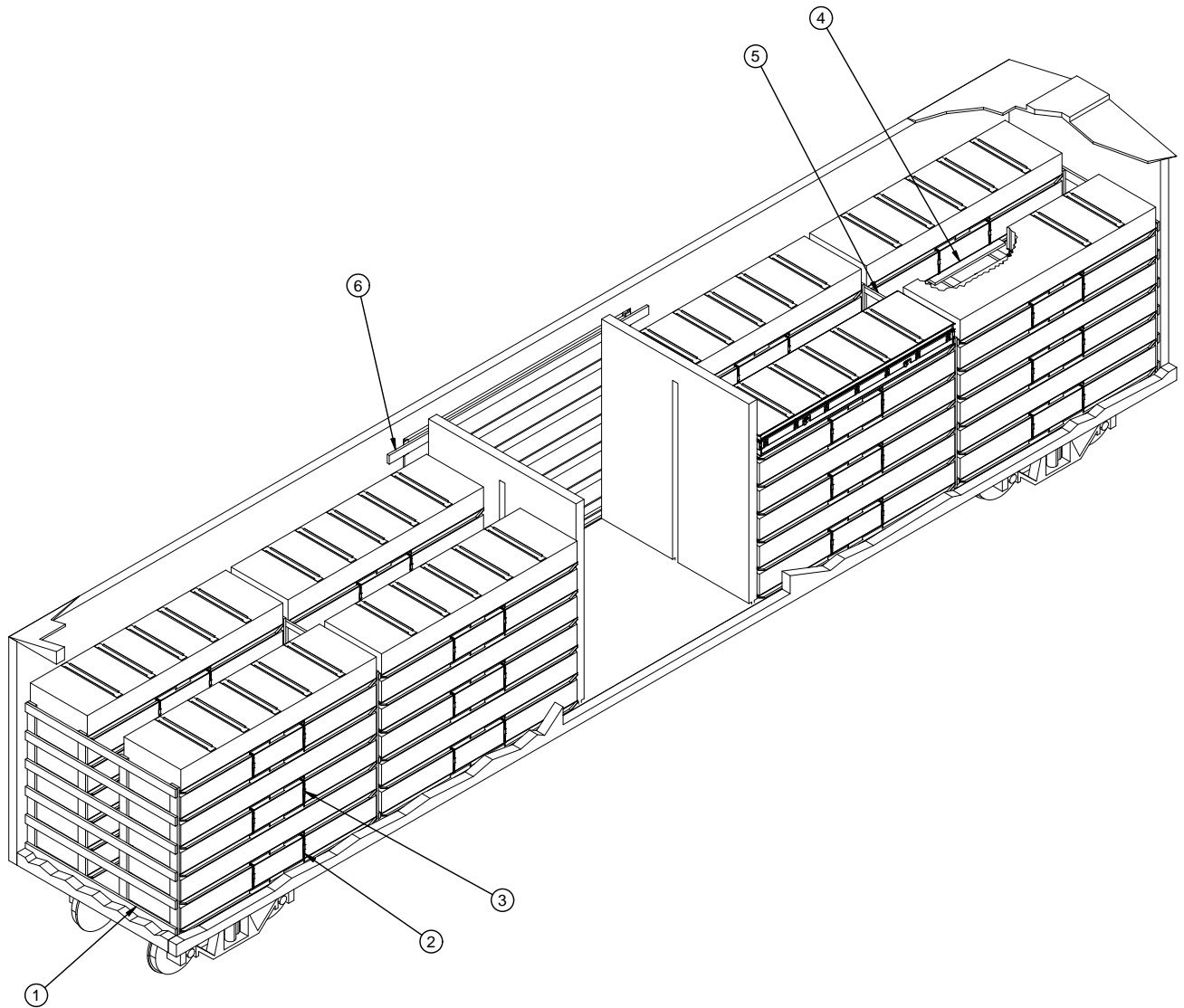
1. A 36 CONTAINER LOAD IS SHOWN IN A 50'-6" LONG BY 9'-4" WIDE CONVENTIONAL BOXCAR EQUIPPED WITH 14'-0" WIDE STAGGERED DOOR OPENINGS. BOXCARS OF OTHER DIMENSIONS AND BOXCARS HAVING WIDER, NARROWER OR THROUGH DOOR OPENINGS CAN BE USED.
2. IF THE CAR TO BE LOADED HAS NAILABLE ENDWALLS, BATTENS MAY BE NAILED TO THE ENDWALL IN LIEU OF USING THE ENDWALL GATE. POSITION AT THE HEIGHTS SHOWN FOR THE ENDWALL GATE AND NAIL TO THE CAR ENDWALL W/1-10d NAIL EVERY 12".
3. CONTAINERS SHOULD BE STACKED IN THE DOORWAY AREA OF THE CAR FOR UNITIZING. AFTER THE STACK IS COMPLETED AND THE UNITIZING STRAPS HAVE BEEN INSTALLED, THE CONTAINER STACK CAN BE PARTIALLY LIFTED FROM THE END AND PUSHED INTO PLACE.
4. CRIB FILL ASSEMBLIES ARE REQUIRED WHEN THE TOTAL LATERAL SPACE ACROSS THE WIDTH OF THE LOAD EXCEEDS 6", AS MEASURED FROM CONTAINERS TO EACH SIDE WALL.
5. DOORWAY PROTECTION IS REQUIRED FOR ALL CONTAINERS STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. DOORWAY PROTECTION WILL CONSIST OF NAILED FLOORLINE BLOCKING, STRAPPING BOARDS, AND DOORWAY PROTECTION STRAPS ENCIRCLING THE LOAD UNIT. TWO STRAPS ARE REQUIRED AROUND A LOAD UNIT WHICH IS NOT RETAINED BY AT LEAST SIX INCHES OF THE CAR SIDEWALL. ONE STRAP IS REQUIRED AROUND A LOAD UNIT WHICH IS RETAINED BY AT LEAST SIX INCHES BUT LESS THAN HALF OF THE CONTAINER LENGTH. IF THE CAR BEING LOADED IS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS, A WOODEN GATE TYPE OF DOORWAY PROTECTION MAY BE USED. SEE DETAILS ON PAGES 22 AND 23.
6. FOR SHIPMENTS OF A LOAD WHICH CONTAINS MORE OR FEWER CONTAINERS THAN WHAT IS SHOWN, SEE THE PROCEDURES ON PAGES 8 THRU 15.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	53	18
2" X 2"	86	29
2" X 4"	290	193
2" X 6"	712	712
4" X 4"	154	205
NAI LS	NO. REQD	POUNDS
10d (3")	996	15-1/2
16d (3-1/2")	168	3-3/4
STEEL STRAPPING, 1-1/4" - 425'	REQD - -	65 LBS
SEAL FOR 1-1/4" STRAPPING - 38	REQD - -	1-3/4 LBS
WI RE, .0800" DIA - - - - - 24'	REQD - -	1/2 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-592 CONTAINER - - 36	- - - - -	40,140 LBS
DUNNAGE - - - - -	- - - - -	2,402 LBS
TOTAL WEIGHT - - - - -		42,542 LBS (APPROX)



ISOMETRIC VIEW

KEY NUMBERS

- ① ENDWALL GATE B (2 REQD). SEE THE DETAIL ON PAGE 16 AND SPECIAL NOTE 2 ON PAGE 9.
- ② UNITIZING STRAP, 1-1/4" X .035" OR .031" X 10'-0" (48 REQD). INSTALL TO UNITIZE THE CONTAINERS IN THE FIRST AND SECOND LAYER, THE THIRD AND FOURTH LAYERS, AND THE FIFTH AND SIXTH LAYERS OF THE STACK, RESPECTIVELY. INSTALL THROUGH FORKLIFT OPENINGS AS FAR APART AS POSSIBLE.
- ③ SEAL FOR 1-1/4" STEEL STRAPPING (48 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.
- ④ ANTI-SWAY BRACE (12 REQD, WITH 41" RETAINER PIECE, 3 PER STACK OF CONTAINERS). INSTALL BETWEEN THE LATERALLY ADJACENT CONTAINERS IN THE FIRST, THIRD AND FIFTH LAYERS. SEE THE DETAIL ON PAGE 17 AND SPECIAL NOTE 4 ON PAGE 9.
- ⑤ SEPARATOR GATE B (2 REQD). SEE THE DETAIL ON PAGE 20. POSITION BETWEEN LOAD UNITS WITH THE HORIZONTAL PIECES AGAINST THE SKIDS OF THE ALREADY LOADED CONTAINERS.
- ⑥ DOORWAY PROTECTION D (2 REQD). SEE THE DETAIL ON PAGE 23 AND SPECIAL NOTE 5 ON PAGE 9.

**48 CONTAINER LOAD IN A 60'-8" LONG BY 9'-4" WIDE
BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS**

SPECIAL NOTES:

1. A 48 CONTAINER LOAD IS SHOWN IN A 60'-8" LONG BY 9'-4" WIDE CUSHIONED TYPE BOXCAR EQUIPPED WITH LOAD DIVIDERS AND 14'-0" WIDE THROUGH DOOR OPENINGS. BOXCARS OF OTHER DIMENSIONS AND BOXCARS HAVING WIDER, NARROWER OR OFFSET DOOR OPENINGS CAN BE USED.
2. IF THE CAR TO BE LOADED HAS NAILABLE ENDWALLS, BATTENS MAY BE NAILED TO THE ENDWALL IN LIEU OF USING THE ENDWALL GATE. POSITION AT THE HEIGHTS SHOWN FOR THE ENDWALL GATE AND NAIL TO THE CAR ENDWALL W/1-10d NAIL EVERY 12".
3. CONTAINERS SHOULD BE STACKED IN THE DOORWAY AREA OF THE CAR FOR UNITIZING. AFTER THE STACK IS COMPLETED AND THE UNITIZING STRAPS HAVE BEEN INSTALLED, THE CONTAINER STACK CAN BE PARTIALLY LIFTED FROM THE END AND PUSHED INTO PLACE.
4. CRIB FILL ASSEMBLIES OR ANTI-SWAY BRACES ARE REQUIRED WHEN THE TOTAL LATERAL SPACE BETWEEN THE CONTAINERS EXCEEDS 6", AS MEASURED FROM CONTAINER TO LATERALLY ADJACENT CONTAINER. ANTI-SWAY BRACES MUST BE USED FOR EVERY LAYER OF CONTAINERS IF CONTAINER INTERLOCKS ARE NOT UTILIZED AND CONTAINERS ARE NOT UNITIZED.
5. DOORWAY PROTECTION IS REQUIRED FOR ALL CONTAINER 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 22 AND 23 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 STRAPS MUST BE USED. SEE THE LOAD ON PAGE 6 FOR GUIDANCE.
6. FOR SHIPMENTS OF A LOAD WHICH CONTAINS FEWER CONTAINERS THAN WHAT IS SHOWN, SEE THE PROCEDURES ON PAGES 6 AND 10 THRU 15.

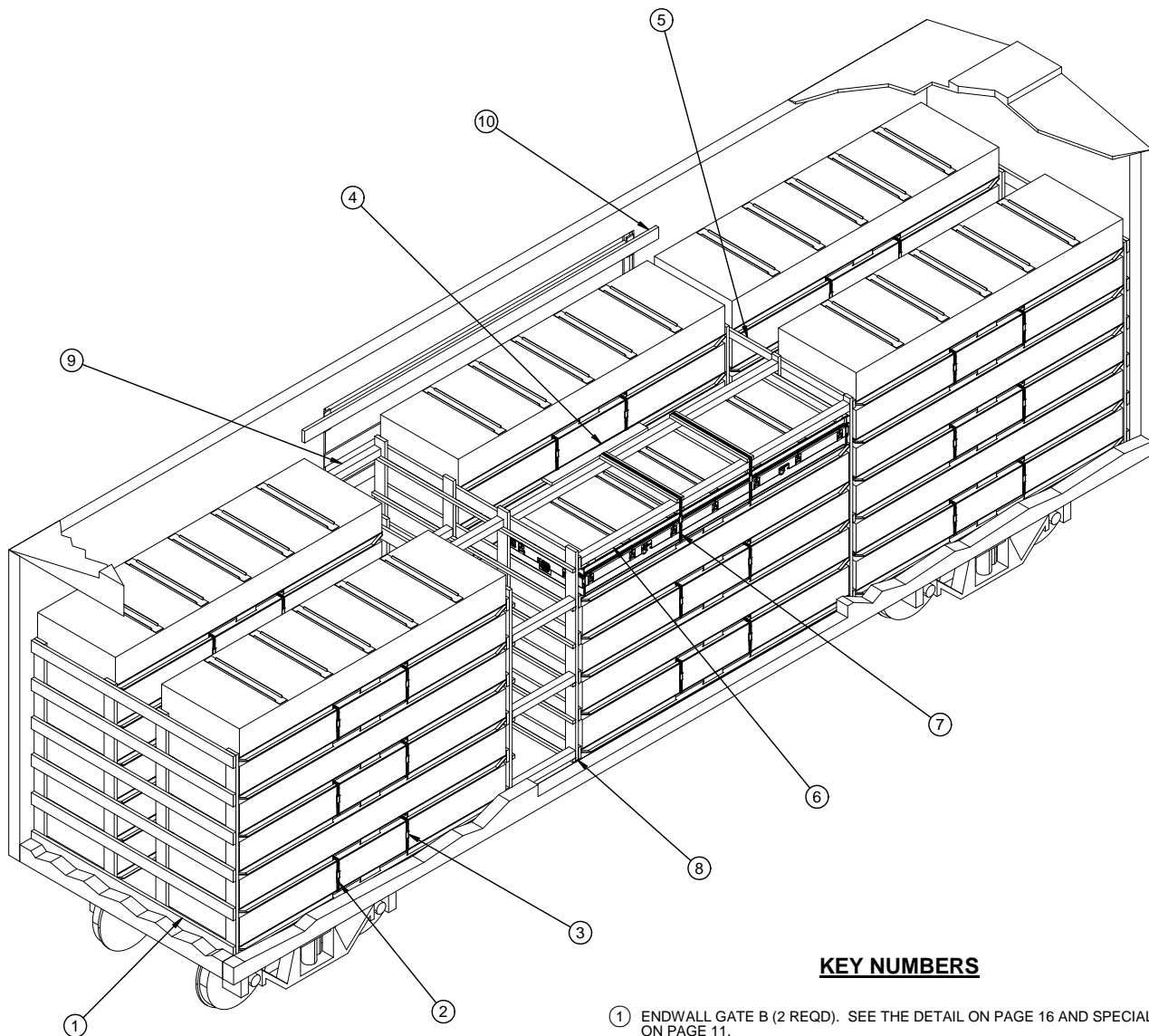
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	3	1
1" X 6"	168	84
2" X 4"	216	144
2" X 6"	392	392
NAI LS	NO. REQD	POUNDS
6d (2")	88	1/2
10d (3")	352	5-1/2
12d (3-1/4")	12	1/4
STEEL STRAPPING, 1-1/4" - 480' REQD - -		73 LBS
SEAL FOR 1-1/4" STRAPPING - 48 REQD - -		2-1/4 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-592 CONTAINER - -	48 - - - - -	53,520 LBS
DUNNAGE - - - - -	- - - - -	1,324 LBS
TOTAL WEIGHT - - - - -		54,844 LBS (APPROX)

**48 CONTAINER LOAD IN A 60'-8" LONG BY 9'-4" WIDE
BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS**



ISOMETRIC VIEW

KEY NUMBERS

- ① ENDWALL GATE B (2 REQD). SEE THE DETAIL ON PAGE 16 AND SPECIAL NOTE 2 ON PAGE 11.
- ② UNITIZING STRAP, 1-1/4" X .035" OR .031" X 10'-0" (34 REQD). INSTALL TO UNITIZE THE CONTAINERS IN THE FIRST AND SECOND LAYER, THE THIRD AND FOURTH LAYERS, AND THE FIFTH AND SIXTH LAYERS OF THE STACK, RESPECTIVELY. INSTALL THROUGH FORKLIFT OPENINGS AS FAR APART AS POSSIBLE.
- ③ SEAL FOR 1-1/4" STEEL STRAPPING (36 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.
- ④ ANTI-SWAY BRACE (9 REQD, WITH 39" RETAINER PIECE, 3 PER STACK OF CONTAINERS). INSTALL BETWEEN THE LATERALLY ADJACENT CONTAINERS IN THE FIRST, THIRD AND FIFTH LAYERS. SEE THE DETAIL ON PAGE 17 AND SPECIAL NOTE 4 ON PAGE 11.
- ⑤ SEPARATOR GATE B (1 REQD). SEE THE DETAIL ON PAGE 20. POSITION BETWEEN LOAD UNITS WITH THE HORIZONTAL PIECES AGAINST THE SKIDS OF THE ALREADY LOADED CONTAINERS.
- ⑥ FILLER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 24.
- ⑦ FILLER ASSEMBLY STRAP, 1-1/4" X .035" OR .031" X 11'-0" LONG STEEL STRAPPING (2 REQD). INSTALL STRAPS THRU THE END POCKETS OF THE TOP CONTAINER TO ENCIRCLE THE CONTAINER AND THE FILLER ASSEMBLY.
- ⑧ CENTER GATE B (2 REQD). SEE THE DETAIL ON PAGE 19.
- ⑨ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 34-1/2") (12 REQD). ALTERNATE STRUT INSTALLATION BETWEEN LAYERS AND ROWS, AS DETAILED ON PAGE 19. TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑩ DOORWAY PROTECTION D (2 REQD). SEE THE DETAIL ON PAGE 23 AND SPECIAL NOTE 5 ON PAGE 11.

SPECIAL NOTES:

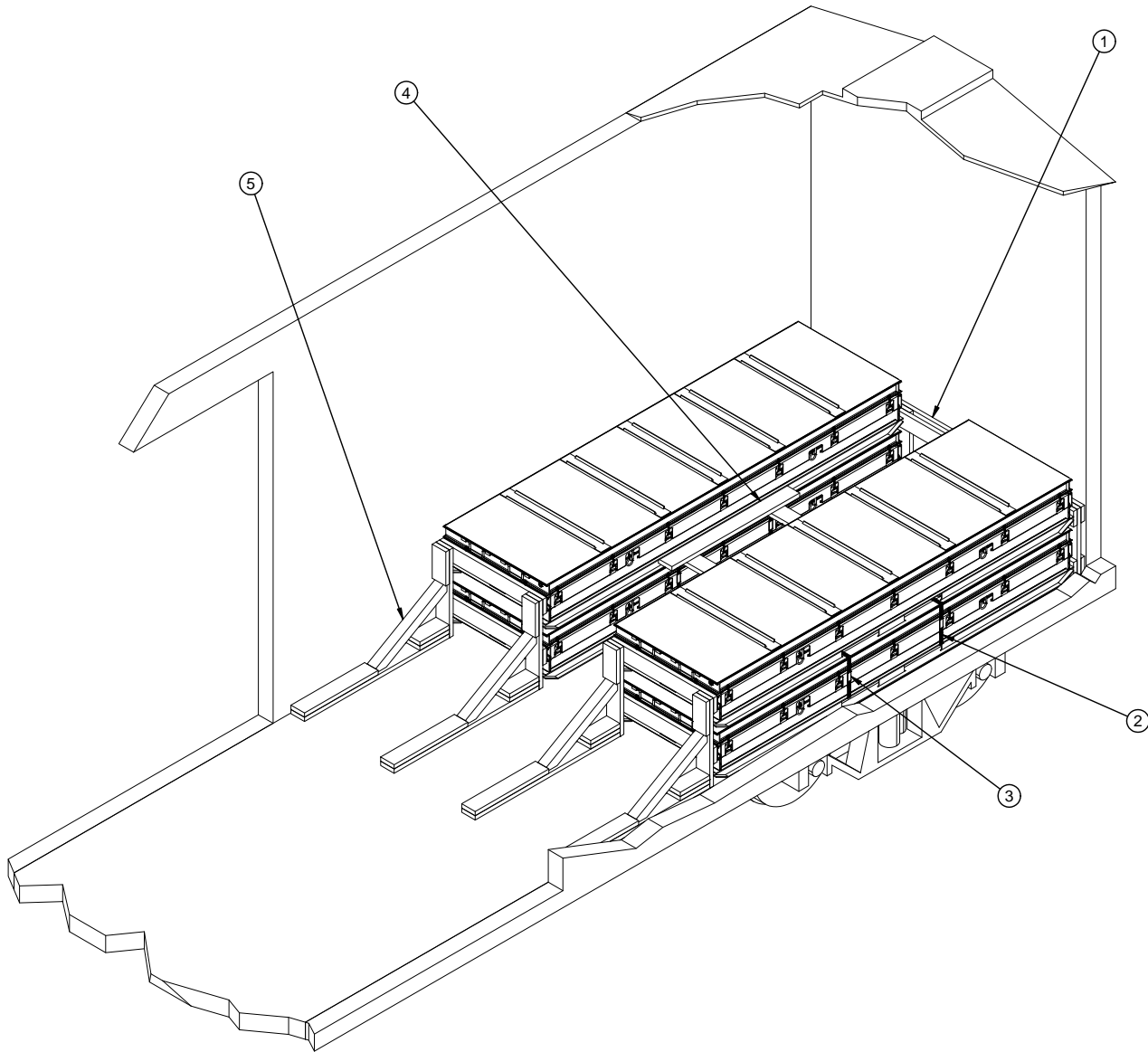
1. A 35 CONTAINER LOAD IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOXCAR EQUIPPED WITH 14'-0" WIDE THROUGH DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER, NARROWER OR OFFSET DOOR OPENINGS CAN BE USED.
2. IF THE CAR TO BE LOADED HAS NAILABLE ENDWALLS, BATTENS MAY BE NAILED TO THE ENDWALL IN LIEU OF USING THE ENDWALL GATE. POSITION AT THE HEIGHTS SHOWN FOR THE ENDWALL GATE AND NAIL TO THE CAR ENDWALL W/1-10d NAIL EVERY 12".
3. CONTAINER SHOULD BE STACKED IN THE DOORWAY AREA OF THE CAR FOR UNITIZING. AFTER THE STACK IS COMPLETED AND THE UNITIZING STRAPS HAVE BEEN INSTALLED, THE CONTAINER STACK CAN BE PARTIALLY LIFTED FROM THE END AND PUSHED INTO PLACE.
4. CRIB FILL ASSEMBLIES OR ANTI-SWAY BRACES ARE REQUIRED WHEN THE TOTAL SPACE BETWEEN THE CONTAINERS EXCEEDS 6", AS MEASURED FROM CONTAINER TO LATERALLY ADJACENT CONTAINER. ANTI-SWAY BRACES MUST BE USED FOR EVERY LAYER OF CONTAINERS IF CONTAINER INTERLOCKS ARE NOT UTILIZED AND CONTAINERS ARE NOT UNITIZED.
5. DOORWAY PROTECTION IS REQUIRED FOR ALL CONTAINER 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 10 IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NON-NAILABLE DOOR POSTS. REFER TO PAGES 22 AND 23 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 STRAPS MUST BE USED. SEE THE LOAD ON PAGE 6 FOR GUIDANCE.
6. FOR SHIPMENT OF A LOAD WHICH CONTAINS MORE OR FEWER CONTAINERS THAN WHAT IS SHOWN, SEE THE PROCEDURES CONTAINED ON PAGES 6, 8, 12, 14 AND 15.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	3	1
1" X 6"	168	84
2" X 2"	109	37
2" X 4"	180	120
2" X 6"	515	515
4" X 4"	59	79
NAI LS	NO. REQD	POUNDS
6d (2")	88	1/2
10d (3")	576	9
12d (3-1/4")	12	1/4
16d (3-1/2")	48	1-1/4
STEEL STRAPPING, 1-1/4" - 362' REQD - -		55 LBS
SEAL FOR 1-1/4" STRAPPING - 36 REQD - -		1-3/4 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-592 CONTAINER	- - 35 - - - - -	39,025 LBS
DUNNAGE	- - - - -	1,740 LBS
TOTAL WEIGHT - - - - -		40,765 LBS (APPROX)



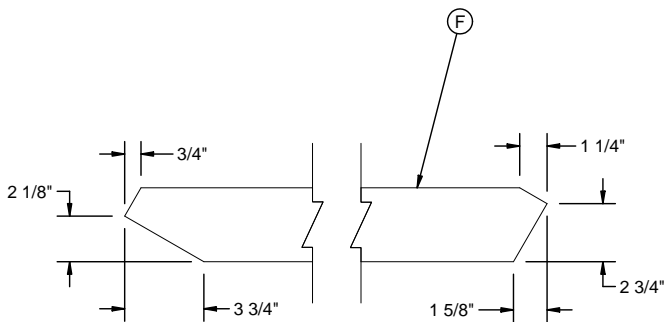
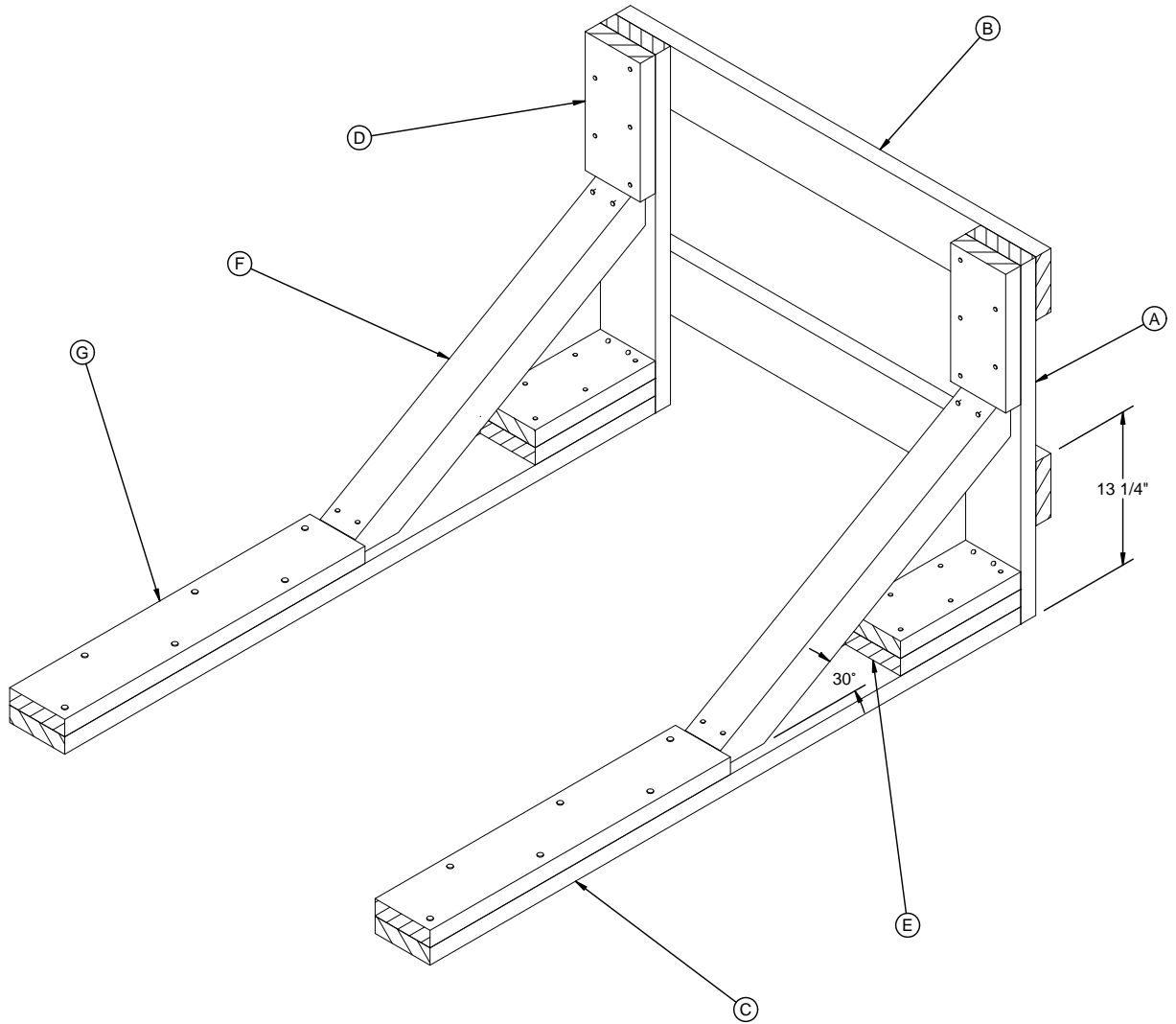
ISOMETRIC VIEW

SPECIAL NOTES:

1. A FOUR CONTAINER LOAD IS SHOWN IN A 9'-4" WIDE CONVENTIONAL TYPE BOX-CAR HAVING A WOOD OR NAILABLE METAL FLOOR. CARS OF OTHER WIDTHS AND CARS HAVING METAL LININGS MAY BE USED.
2. IF THE CAR TO BE LOADED HAS NAILABLE ENDWALLS, BATTENS MAY BE NAILED TO THE ENDWALL IN LIEU OF USING THE ENDWALL GATE. POSITION AT THE HEIGHTS SHOWN FOR THE ENDWALL GATE AND NAIL TO THE CAR ENDWALL W/1-10d NAIL EVERY 12".
3. 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 4 ARE NOT EXCEEDED.
4. A KNEE BRACE ASSEMBLY WILL BE USED FOR EACH ROW OF CONTAINERS. ONE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LOAD OF NOT MORE THAN 8,500 POUNDS OR FOUR CONTAINERS.
5. WHEN USING CRIB FILL OR SIDE FILL ASSEMBLIES WITH KNEE BRACE ASSEMBLIES, PROVISIONS MUST BE MADE TO PREVENT LONGITUDINAL MOVEMENT OF THE CRIB FILL OR SIDE FILL ASSEMBLIES.
6. CONTAINERS WILL NOT BE STACKED MORE THAN TWO LAYERS HIGH FOR BRACING WITH KNEE BRACES.

KEY NUMBERS

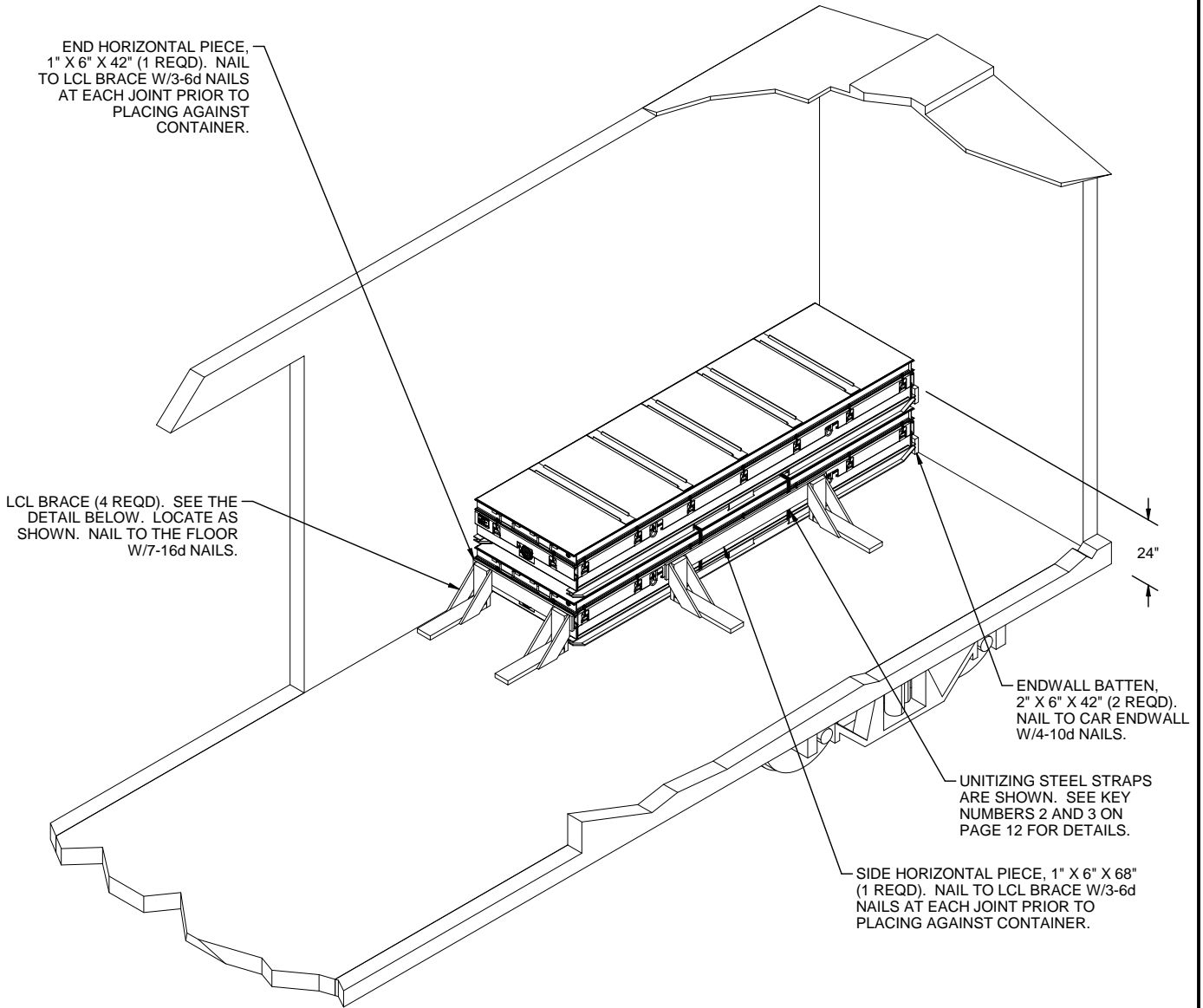
- ① ENDWALL GATE B (1 REQD). SEE THE DETAIL ON PAGE 16 AND SPECIAL NOTE 2 AT LEFT.
- ② UNITIZING STRAP, 1-1/4" X .035" OR .031" X 10'-0" LONG STEEL STRAPPING (4 REQD). INSTALL TO UNITIZE THE CONTAINER IN THE FIRST LAYER OF THE STACK TO THE CONTAINER IN THE SECOND LAYER OF THE STACK. INSTALL THROUGH FORKLIFT OPENINGS AS FAR AS POSSIBLE.
- ③ 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.
- ④ ANTI-SWAY BRACE (1 REQD, WITH 41" RETAINER PIECE). SEE THE DETAIL ON PAGE 17. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF CONTAINERS IN THE UPPER LAYER.
- ⑤ KNEE BRACE ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 13.



BRACE

KEY LETTERS

- (A) VERTICAL PIECE, 2" X 6" X 31" (2 REQD). NAIL TO A FLOOR CLEAT W/3-16d NAILS.
- (B) HORIZONTAL PIECE, 2" X 6" X 42" (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.
- (C) FLOOR CLEAT, 2" X 6" X 59" (2 REQD). NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".
- (D) HOLD-DOWN CLEAT, 2" X 6" X 12" (2 REQD). NAIL TO A VERTICAL PIECE W/5-10d NAILS.
- (E) POCKET CLEAT, 2" X 6" X 12" (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 VERTICAL PIECE W/2-16d NAILS.
- (F) BRACE, 4" X 4" X 34" (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT W/2-16d NAILS EACH.
- (G) BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE FLOOR CLEAT W/6-40d NAILS.



END HORIZONTAL PIECE, 1" X 6" X 42" (1 REQD). NAIL TO LCL BRACE W/3-6d NAILS AT EACH JOINT PRIOR TO PLACING AGAINST CONTAINER.

LCL BRACE (4 REQD). SEE THE DETAIL BELOW. LOCATE AS SHOWN. NAIL TO THE FLOOR W/7-16d NAILS.

ENDWALL BATTEN, 2" X 6" X 42" (2 REQD). NAIL TO CAR ENDWALL W/4-10d NAILS.

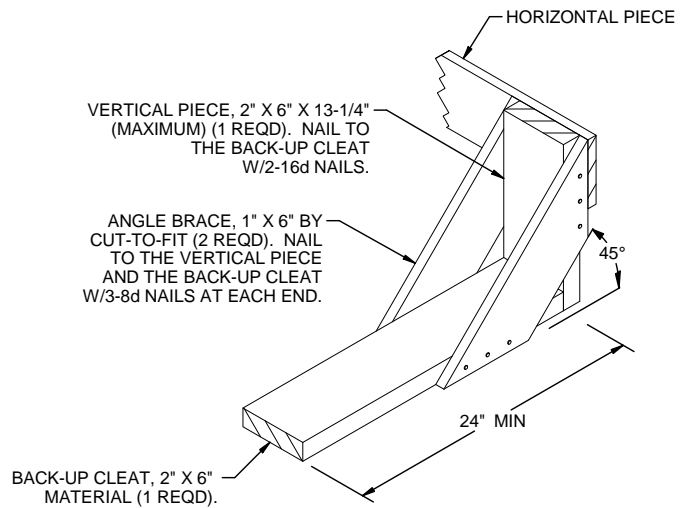
UNITIZING STEEL STRAPS ARE SHOWN. SEE KEY NUMBERS 2 AND 3 ON PAGE 12 FOR DETAILS.

SIDE HORIZONTAL PIECE, 1" X 6" X 68" (1 REQD). NAIL TO LCL BRACE W/3-6d NAILS AT EACH JOINT PRIOR TO PLACING AGAINST CONTAINER.

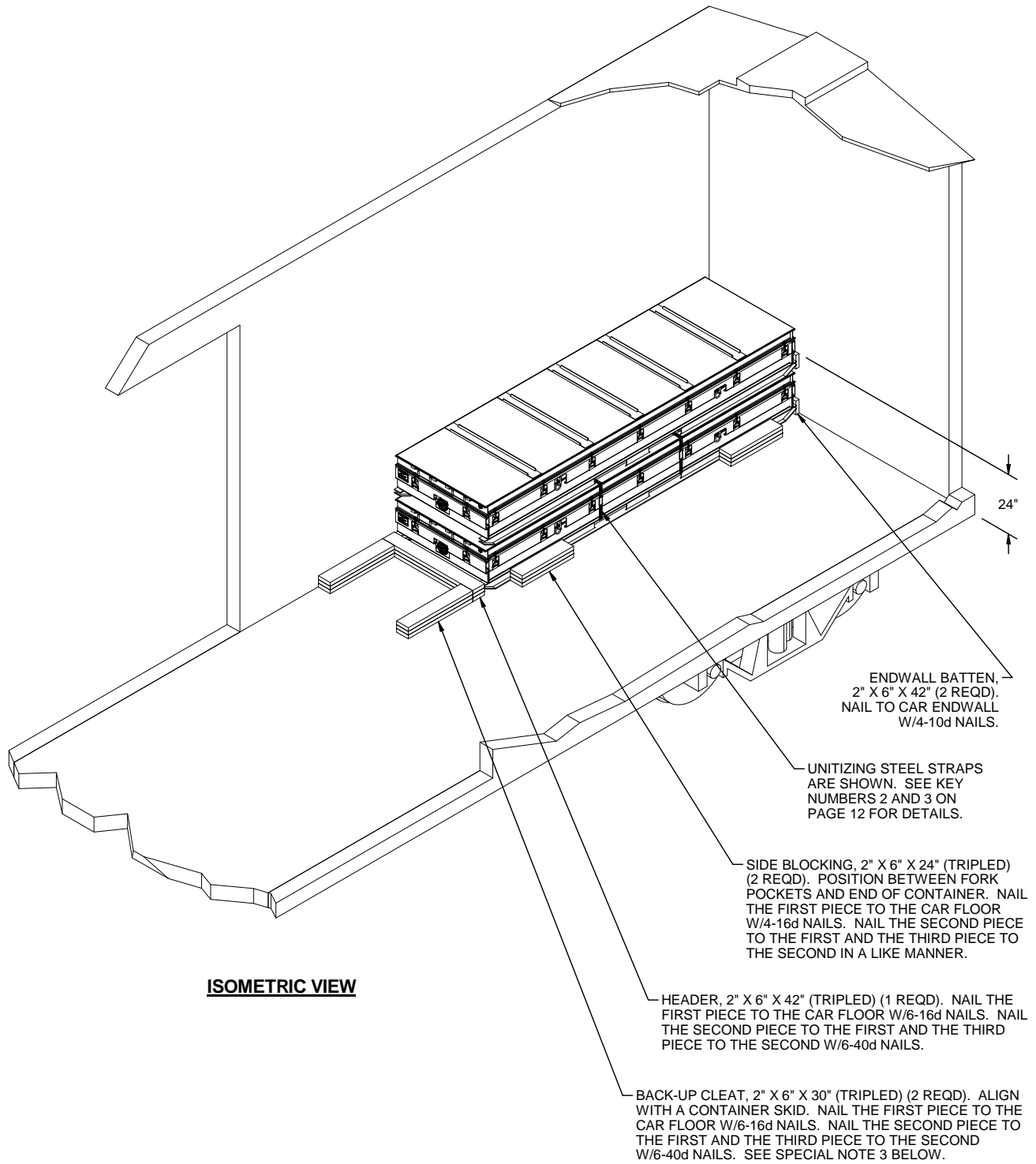
ISOMETRIC VIEW

SPECIAL NOTES:

1. AN 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 EACH MUST BE USED FOR LONGITUDINAL AND LATERAL BRACING. BRACES MAY BE ADDED FOR LONGITUDINAL BRACING AS NECESSARY.



TYPICAL LCL USING LCL BRACES

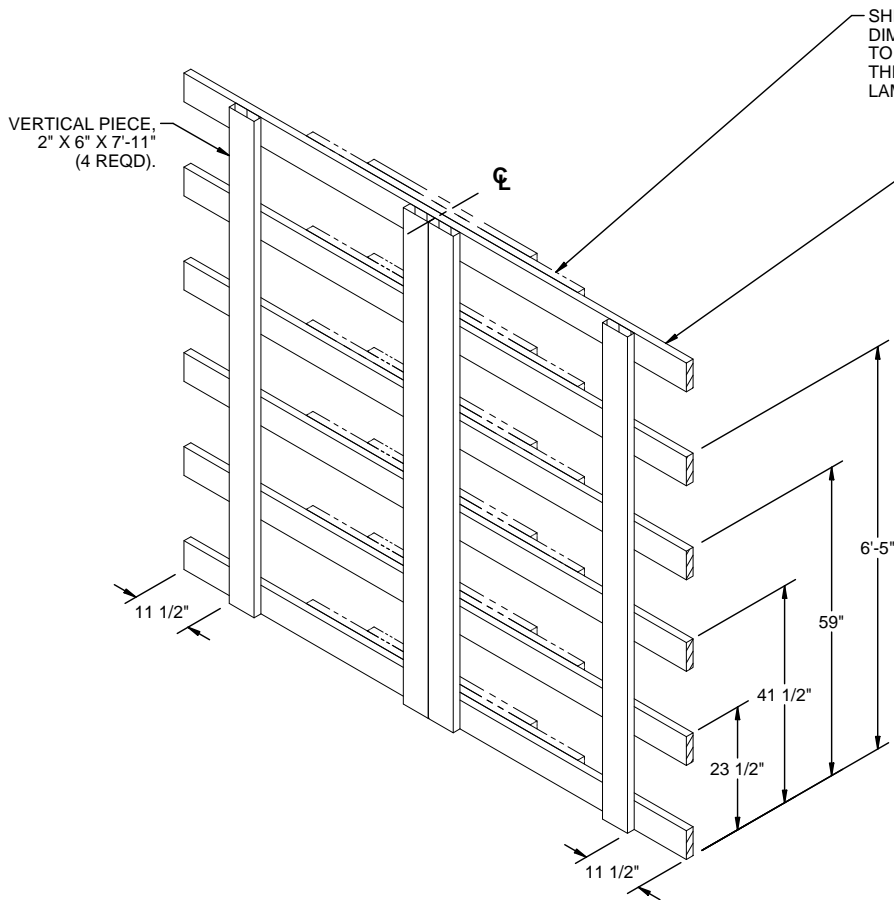


ISOMETRIC VIEW

SPECIAL NOTES:

1. AN 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 FLOORLINE BLOCKING METHOD OF PARTIAL-LAYER BRACING IS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER QUANTITIES AS LONG AS THE CAPACITY OF THE FLOORLINE BLOCKING IS NOT EXCEEDED. SEE SPECIAL NOTE 3.
3. TWO 30" LONG BACK-UP CLEATS ARE ADEQUATE FOR RETAINING NOT MORE THAN 9,000 POUNDS. THIS WILL BE NOT MORE THAN SEVEN CONTAINERS.

TYPICAL LCL USING FLOORLINE BLOCKING



SHIM MATERIAL, AS REQUIRED, 6" WIDE PLYWOOD OR DIMENSIONAL LUMBER OF A THICKNESS AND LENGTH TO FILL THE VOID BETWEEN THE CAR ENDWALL AND THE BULKHEAD. NAIL TO THE BUFFER PIECE AND/OR LAMINATE W/1 APPLICABLY SIZED NAIL EVERY 6".

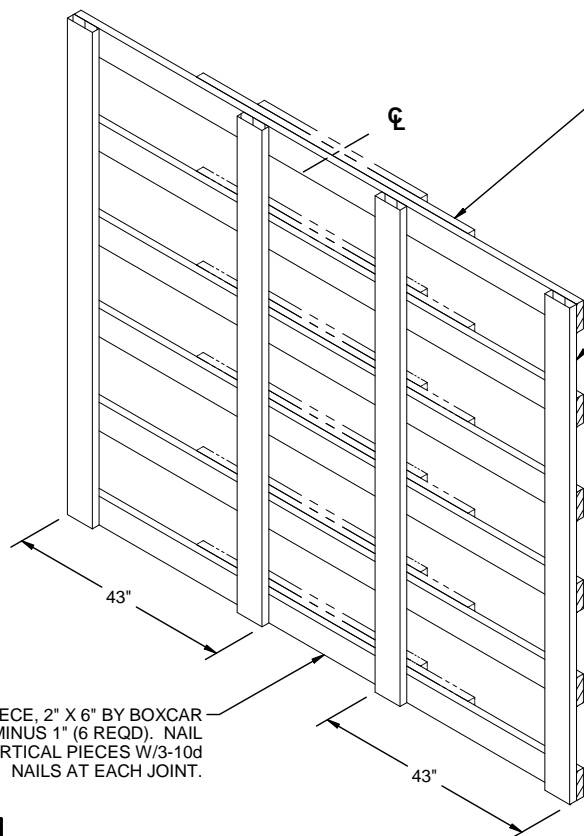
VERTICAL PIECE, 2" X 6" X 7'-11" (4 REQD).

BUFFER PIECE, 2" X 6" BY BOXCAR WIDTH MINUS 1" (6 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

ENDWALL GATE A

NOTES:

1. FOR USE WITH BOXCAR LOADS USING SIDE BLOCKING (SIDE VOID).
2. FOR A FIVE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 6'-5" AND ELIMINATE TOP BUFFER PIECE.
3. FOR A FOUR HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 59" AND ELIMINATE TOP TWO BUFFER PIECES.
4. FOR A THREE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 41-1/2" AND ELIMINATE TOP THREE BUFFER PIECES.
5. FOR A TWO HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 23-1/2" AND ELIMINATE TOP FOUR BUFFER PIECES.
6. FOR A ONE HIGH LOAD ELIMINATE ALL FOUR VERTICAL PIECES AND ELIMINATE TOP FIVE BUFFER PIECES.



SHIM MATERIAL, AS REQUIRED, 6" WIDE PLYWOOD OR DIMENSIONAL LUMBER OF A THICKNESS AND LENGTH TO FILL THE VOID BETWEEN THE CAR ENDWALL AND THE BULKHEAD. NAIL TO THE BUFFER PIECE AND/OR LAMINATE W/1 APPLICABLY SIZED NAIL EVERY 6".

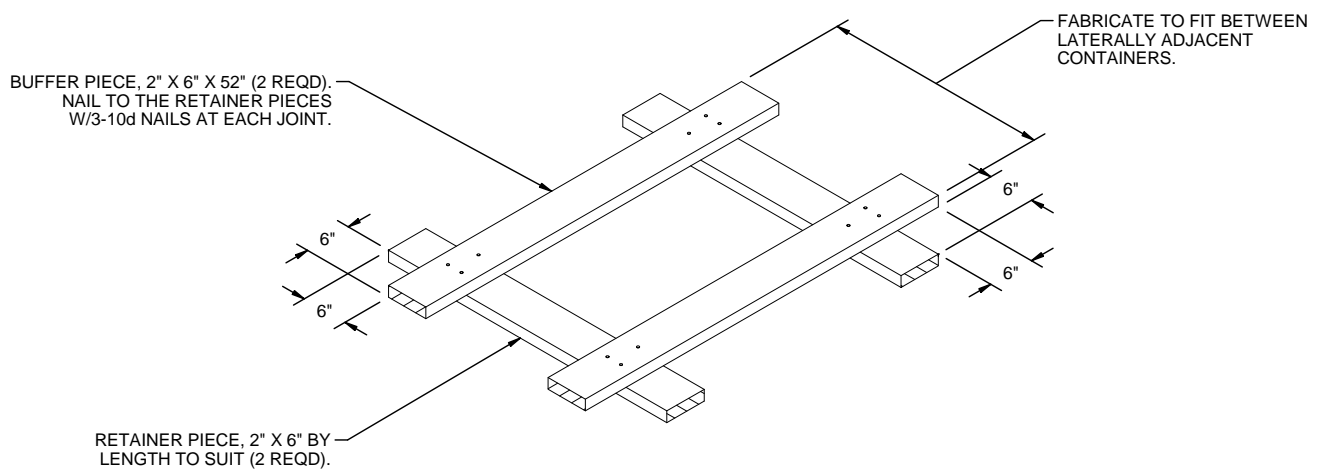
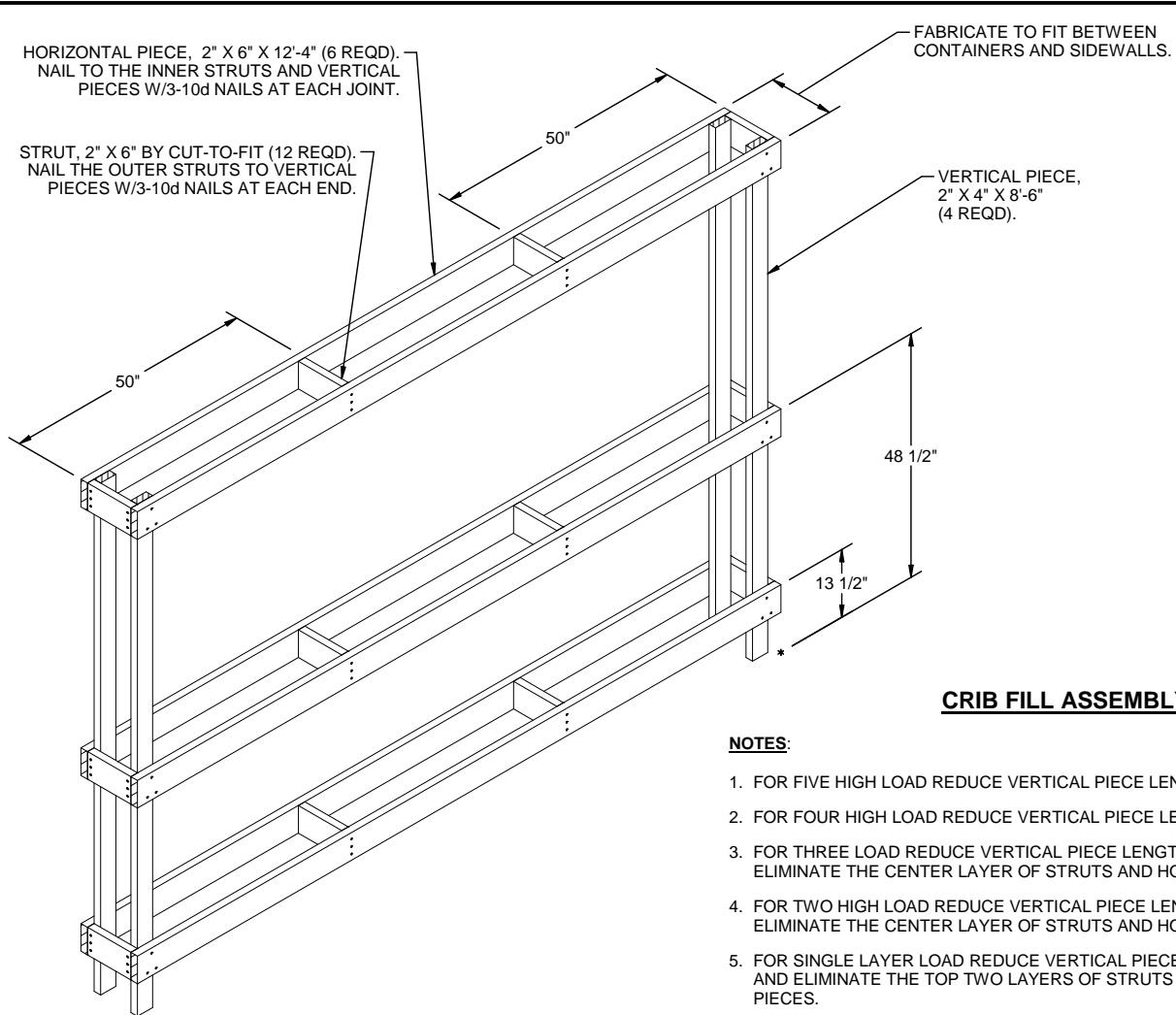
VERTICAL PIECE, 2" X 6" X 7'-11" (4 REQD).

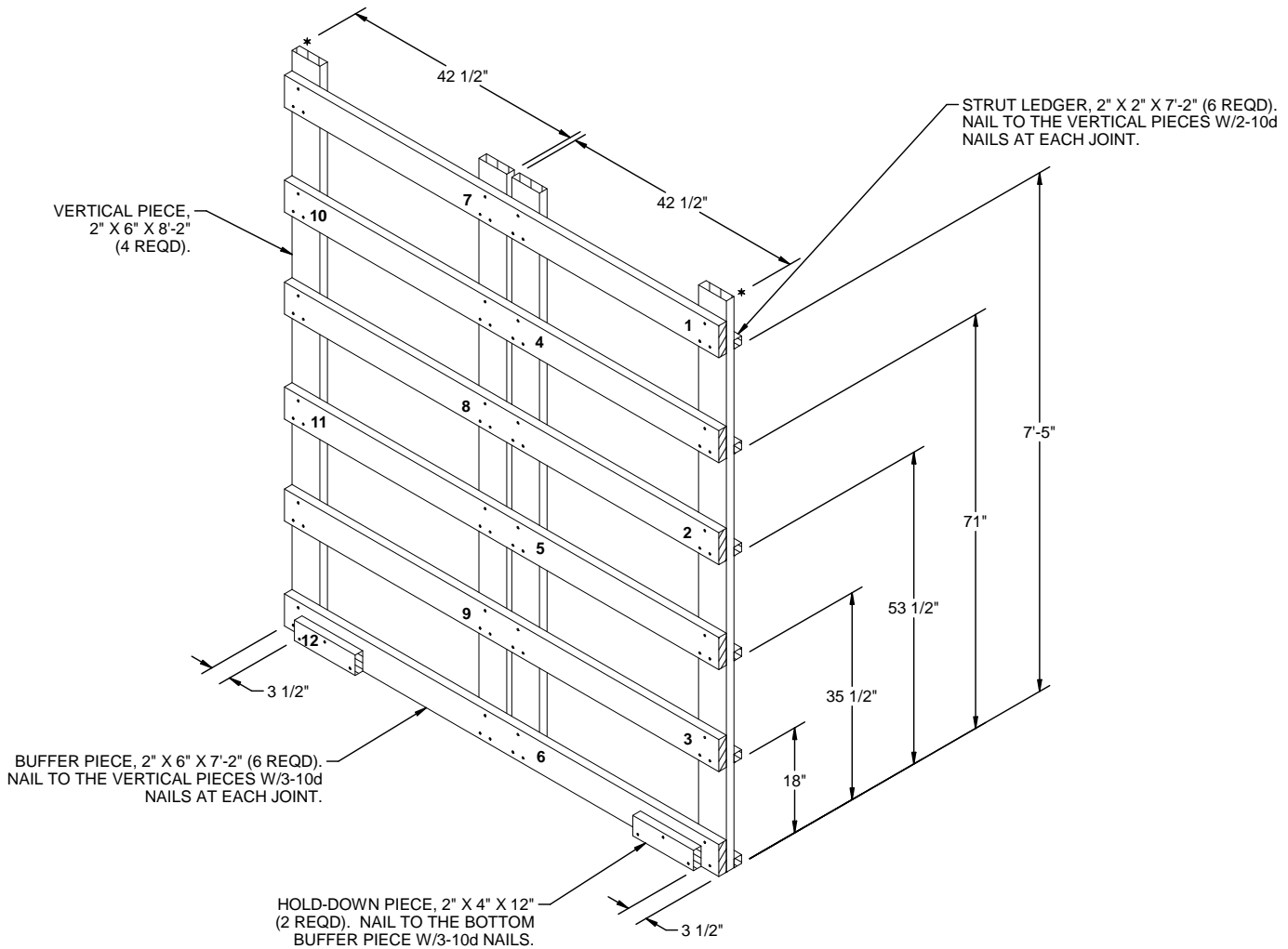
BUFFER PIECE, 2" X 6" BY BOXCAR WIDTH MINUS 1" (6 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

ENDWALL GATE B

NOTES:

1. FOR USE WITH BOXCAR LOADS USING CENTER BLOCKING (CENTER VOID).
2. SEE THE ENDWALL GATE "A" DETAIL ABOVE FOR HEIGHT LOCATIONS.
3. FOR A FIVE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 6'-5" AND ELIMINATE TOP BUFFER PIECE.
4. FOR A FOUR HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 59" AND ELIMINATE TOP TWO BUFFER PIECES.
5. FOR A THREE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 41-1/2" AND ELIMINATE TOP THREE BUFFER PIECES.
6. FOR A TWO HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 23-1/2" AND ELIMINATE TOP FOUR BUFFER PIECES.
7. FOR A ONE HIGH LOAD ELIMINATE ALL FOUR VERTICAL PIECES AND ELIMINATE TOP FIVE BUFFER PIECES.

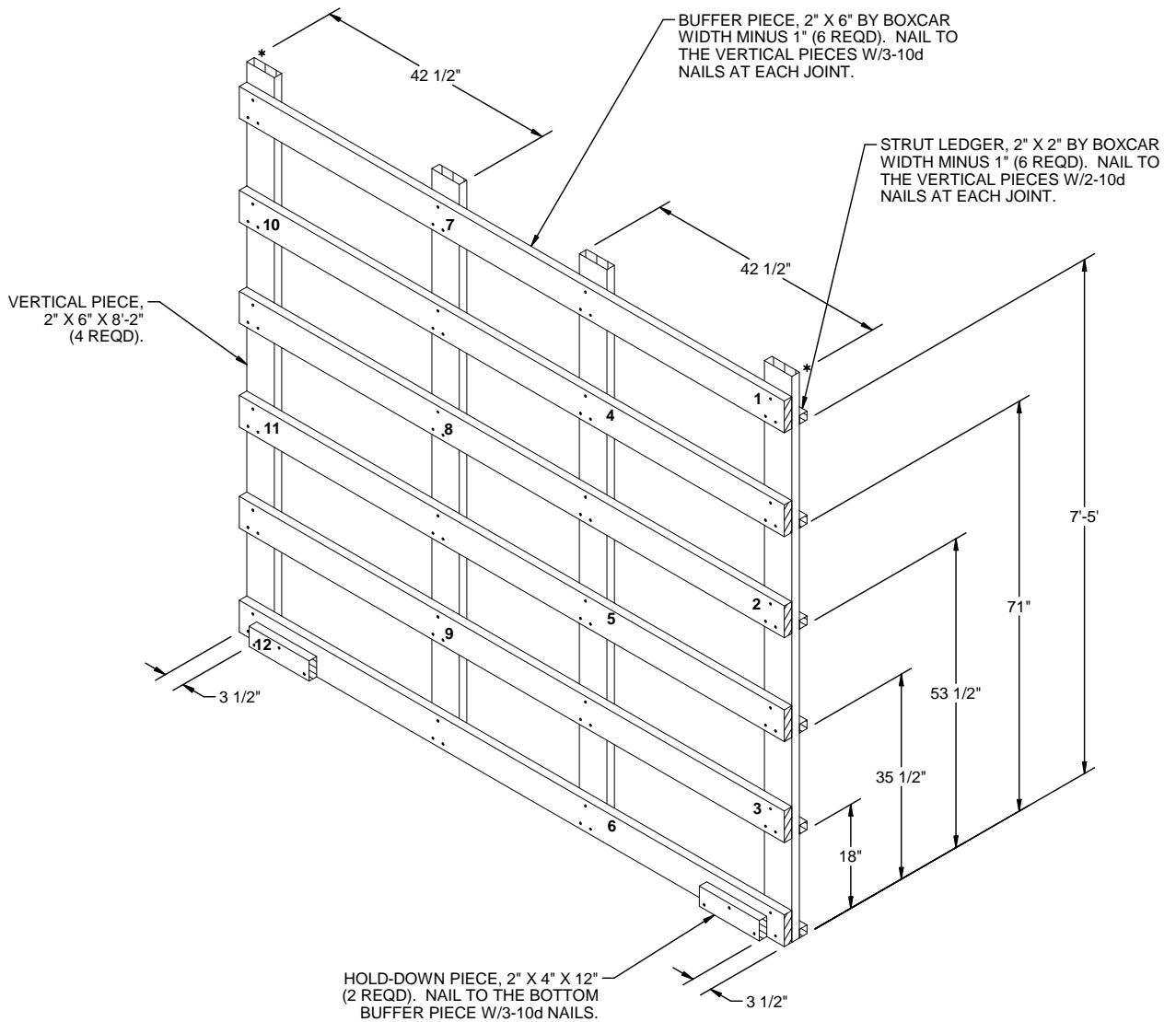




CENTER GATE A

NOTES:

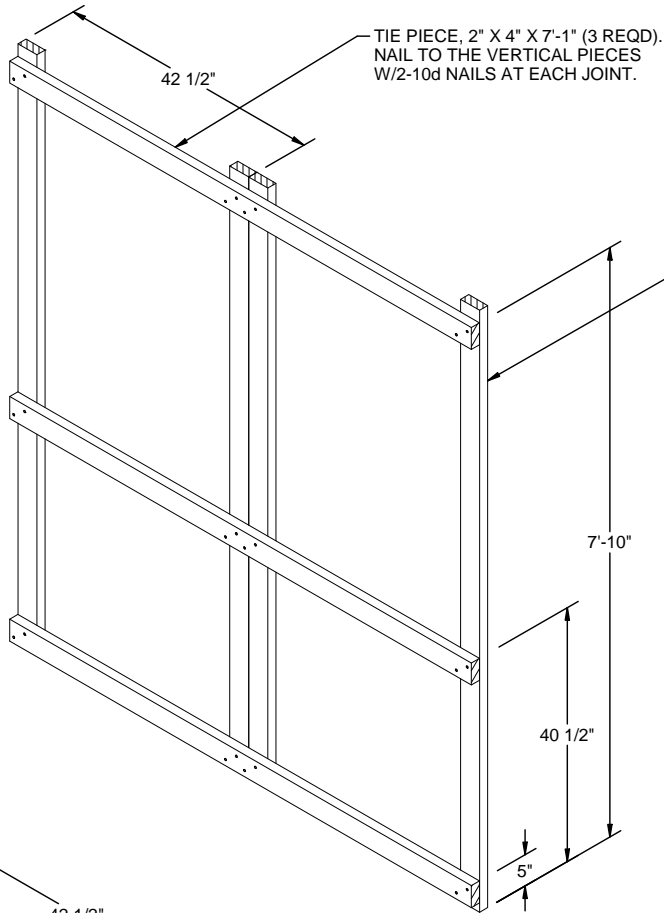
1. FOR USE WITH BOXCAR LOADS USING SIDE BLOCKING (SIDE VOID).
2. ALTERNATE STRUT INSTALLATION, AS DEPICTED WITH THE NUMBERS IN THE DETAIL ABOVE. INSTALL STRUTS AT THE SECOND, FOURTH AND SIXTH HEIGHT LOCATIONS FOR THE FIRST VERTICAL PIECE, AND AT THE FIRST, THIRD, AND FIFTH HEIGHT LOCATIONS FOR THE SECOND VERTICAL PIECE. REPEAT FOR THE SECOND CONTAINER ROW.
3. FOR A FIVE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 6'-8" AND ELIMINATE THE TOP BUFFER PIECE AND THE TOP STRUT LEDGER.
4. FOR A FOUR HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 62" AND ELIMINATE THE TOP TWO BUFFER PIECES AND THE TOP TWO STRUT LEDGERS.
5. FOR A THREE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 44" AND ELIMINATE THE TOP THREE BUFFER PIECES AND THE TOP THREE STRUT LEDGERS.
6. FOR A TWO HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 27" AND ELIMINATE THE TOP FOUR BUFFER PIECES AND THE TOP FOUR STRUT LEDGERS.
7. FOR A ONE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 9" AND ELIMINATE THE TOP FIVE BUFFER PIECES AND THE TOP FIVE STRUT LEDGERS.



CENTER GATE B

NOTES:

1. FOR USE WITH BOXCAR LOADS USING CENTER BLOCKING (CENTER VOID).
2. ALTERNATE STRUT INSTALLATION, AS DEPICTED WITH THE NUMBERS IN THE DETAIL ABOVE. INSTALL STRUTS AT THE SECOND, FOURTH AND SIXTH HEIGHT LOCATIONS FOR THE FIRST VERTICAL PIECE, AND AT THE FIRST, THIRD, AND FIFTH HEIGHT LOCATIONS FOR THE SECOND VERTICAL PIECE. REPEAT FOR THE SECOND CONTAINER ROW.
3. FOR A FIVE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 6'-8" AND ELIMINATE THE TOP BUFFER PIECE AND THE TOP STRUT LEDGER.
4. FOR A FOUR HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 62" AND ELIMINATE THE TOP TWO BUFFER PIECES AND THE TOP TWO STRUT LEDGERS.
5. FOR A THREE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 44" AND ELIMINATE THE TOP THREE BUFFER PIECES AND THE TOP THREE STRUT LEDGERS.
6. FOR A TWO HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 27" AND ELIMINATE THE TOP FOUR BUFFER PIECES AND THE TOP FOUR STRUT LEDGERS.
7. FOR A ONE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 9" AND ELIMINATE THE TOP FIVE BUFFER PIECES AND THE TOP FIVE STRUT

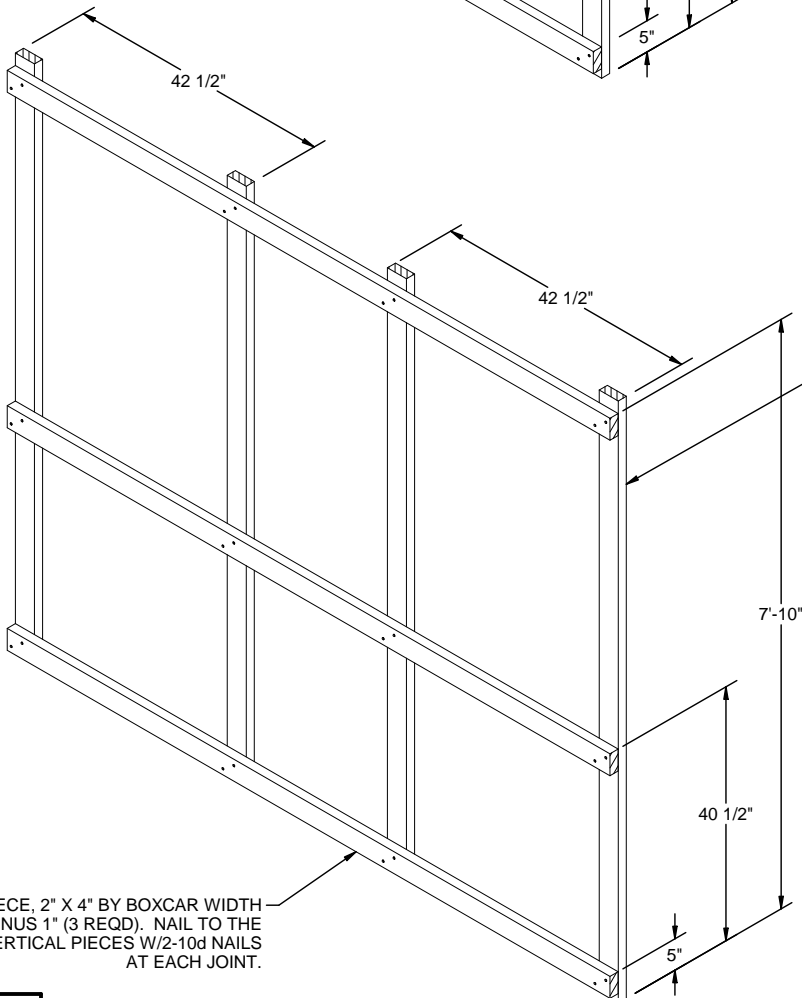


VERTICAL PIECE,
2" X 4" X 8' -0"
(4 REQD).

SEPARATOR GATE A

NOTES:

1. FOR USE WITH BOXCAR LOADS USING SIDE BLOCKING (SIDE VOID).
2. FOR A FIVE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 6'-6" AND LOWER TOP TIE PIECE TO 6'-4" FROM THE BOTTOM.
3. FOR A FOUR HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 60-1/2" AND LOWER TOP TIE PIECE TO 58-1/2" FROM THE BOTTOM.
4. FOR A THREE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 42-1/2" AND ELIMINATE TOP TIE PIECE.
5. FOR A TWO HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 25", ELIMINATE TOP TIE PIECE AND LOWER CENTER TIE PIECE TO 23" FROM THE BOTTOM.
6. FOR A ONE HIGH LOAD REPLACE THE SEPARATOR GATE WITH ONE SEPARATOR PIECE (2" X 6" X 7'-1") (DOUBLED). NAIL THE SECOND PIECE TO THE FIRST W/8-10d NAILS.



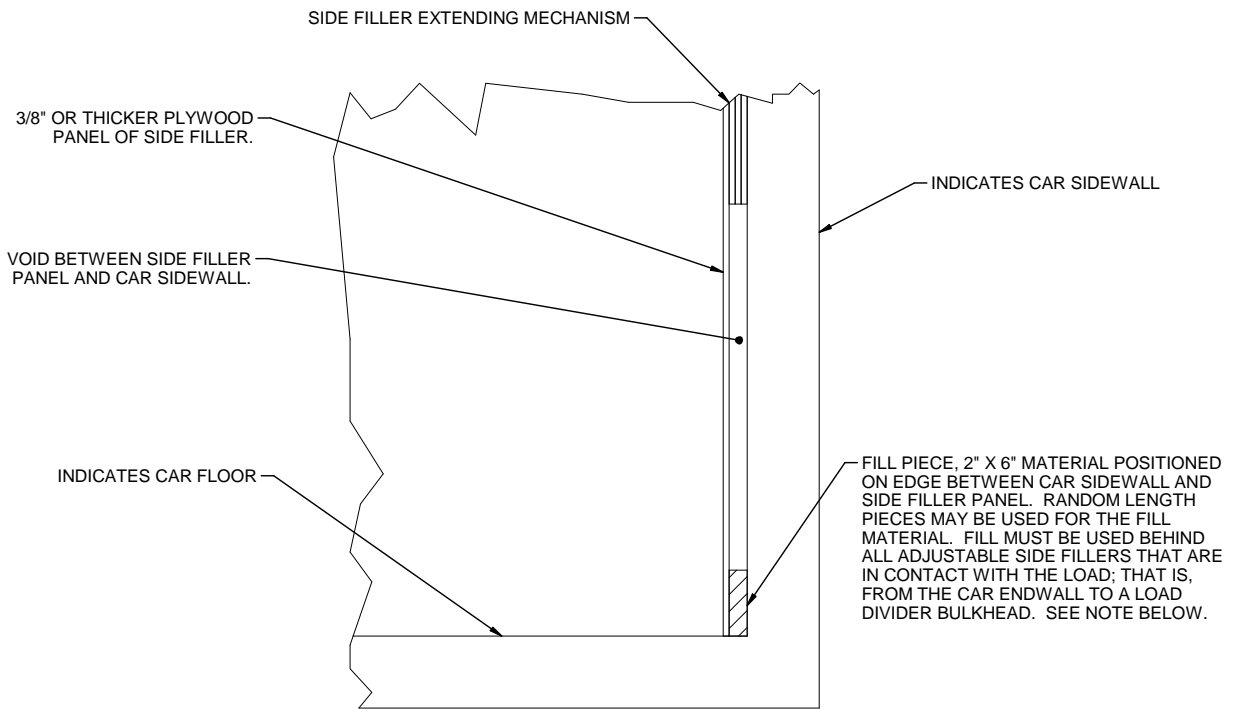
VERTICAL PIECE,
2" X 4" X 8' -0"
(4 REQD).

SEPARATOR GATE B

NOTES:

1. FOR USE WITH BOXCAR LOADS USING CENTER BLOCKING (CENTER VOID).
2. FOR A FIVE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 6'-6" AND LOWER TOP TIE PIECE TO 6'-4" FROM THE BOTTOM.
3. FOR A FOUR HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 60-1/2" AND LOWER TOP TIE PIECE TO 58-1/2" FROM THE BOTTOM.
4. FOR A THREE HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 42-1/2" AND ELIMINATE TOP TIE PIECE.
5. FOR A TWO HIGH LOAD REDUCE VERTICAL PIECE LENGTH TO 25", ELIMINATE TOP TIE PIECE AND LOWER CENTER TIE PIECE TO 23" FROM THE BOTTOM.
6. FOR A ONE HIGH LOAD REPLACE THE SEPARATOR GATE WITH ONE SEPARATOR PIECE (2" X 6" BY BOXCAR WIDTH MINUS 1/2") (DOUBLED). NAIL THE SECOND PIECE TO THE FIRST W/8-10d NAILS.

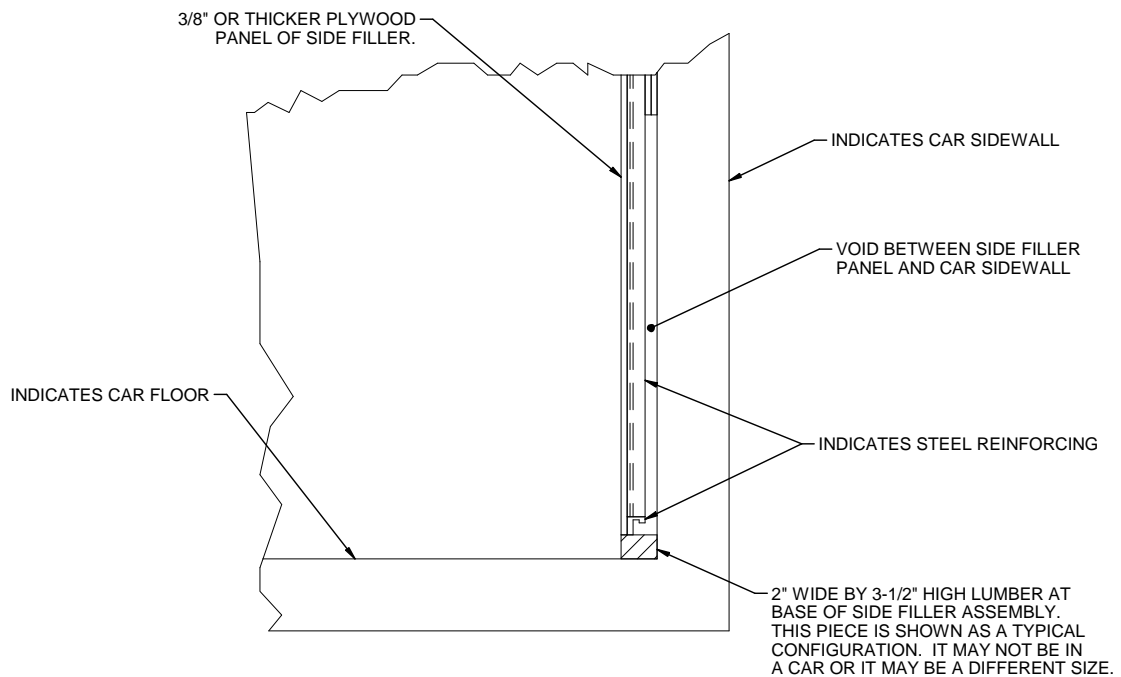
TIE PIECE, 2" X 4" BY BOXCAR WIDTH
MINUS 1" (3 REQD). NAIL TO THE
VERTICAL PIECES W/2-10d NAILS
AT EACH JOINT.



TYPICAL TYPE A

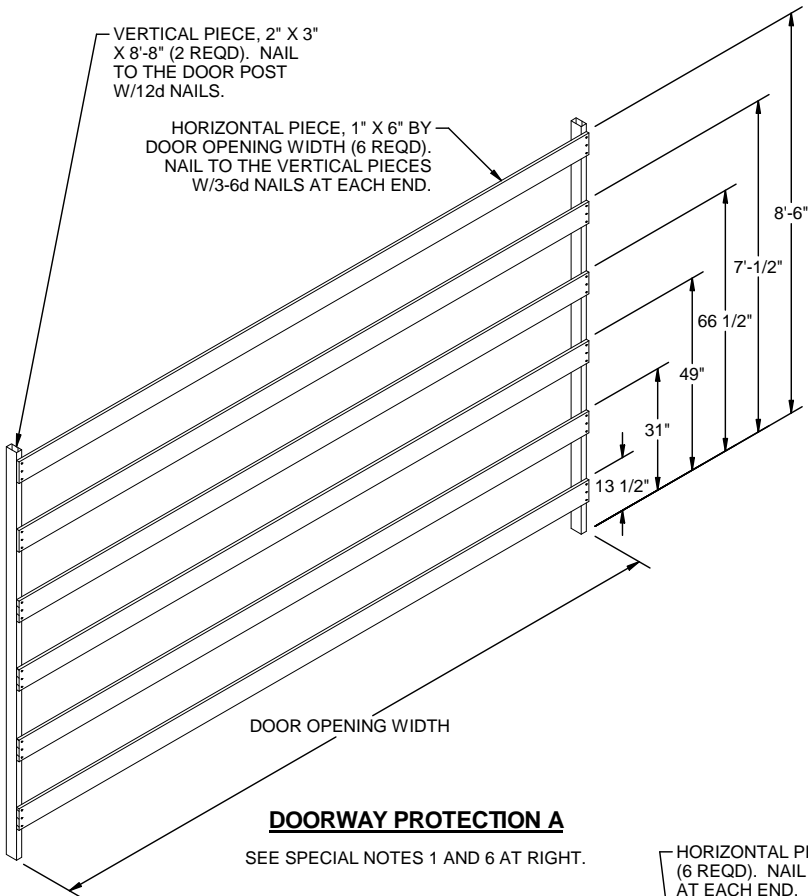
THIS VIEW SHOWS THE INSTALLATION OF A "FILL PIECE" IN A CAR EQUIPPED WITH A STANDARD ADJUSTABLE SIDE FILLER

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".



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.



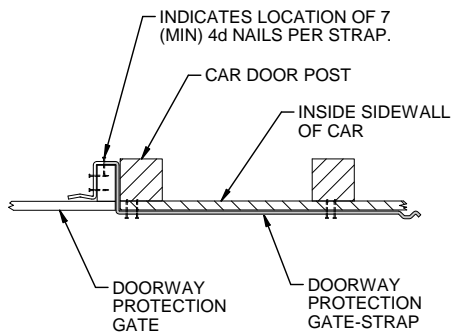
DOORWAY PROTECTION A

SEE SPECIAL NOTES 1 AND 6 AT RIGHT.

SPECIAL NOTES:

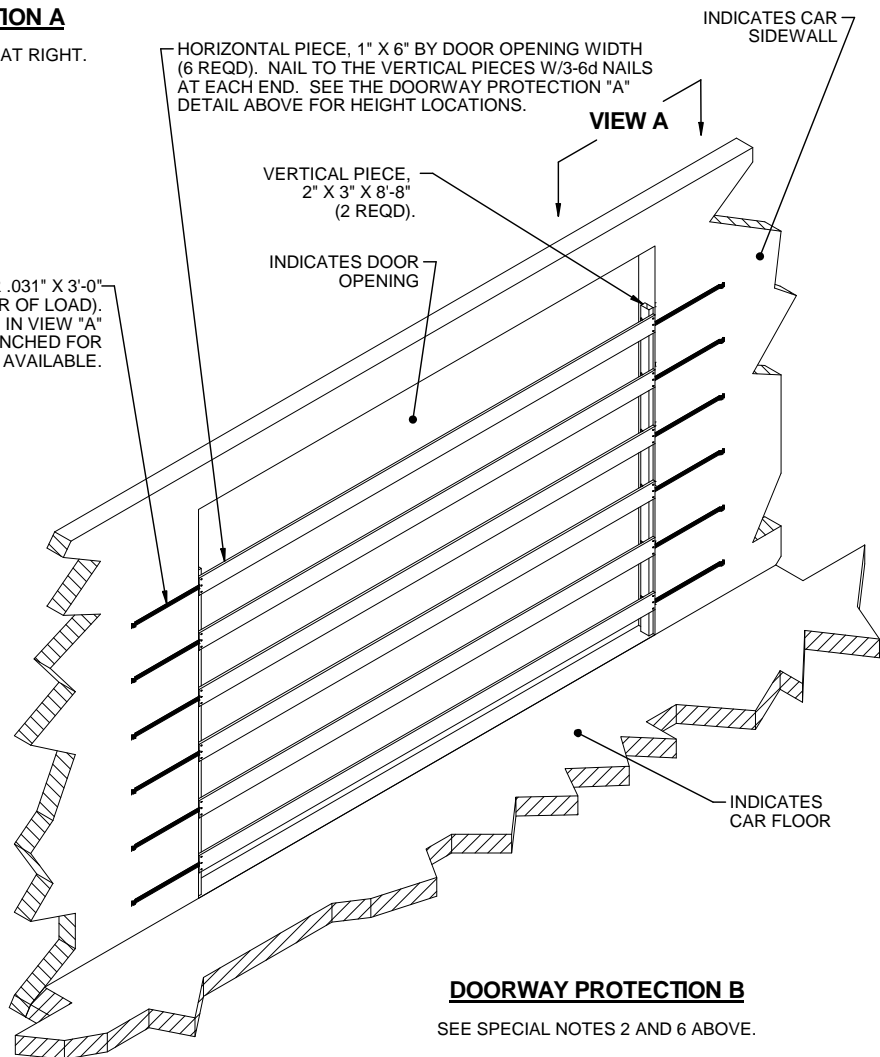
1. DOORWAY PROTECTION "A" IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS.
2. DOORWAY PROTECTION "B" IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE STEEL WITHOUT NAILING HOLES AND THE CAR SIDEWALLS ARE NAILABLE.
3. DOORWAY PROTECTION "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, STRAPPING BOARDS, AND BUNDLING STRAPS ARE REQUIRED FOR DOORWAY PROTECTION IF NONE OF THE ABOVE METHODS CAN BE USED.
6. THE VIEWS ON PAGES 22 AND 23 DEPICT DOORWAY PROTECTION FOR A SIX-LAYER LOAD. FOR EACH REDUCTION IN NUMBER OF LOAD LAYERS, ELIMINATE THE APPROPRIATE TOP HORIZONTAL PIECES AND/OR STRAPS AND REDUCE THE VERTICAL PIECES BY 18". FOR DOORWAY PROTECTION "D", MOVE THE SPANNER BY AN APPROPRIATE DISTANCE.

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.



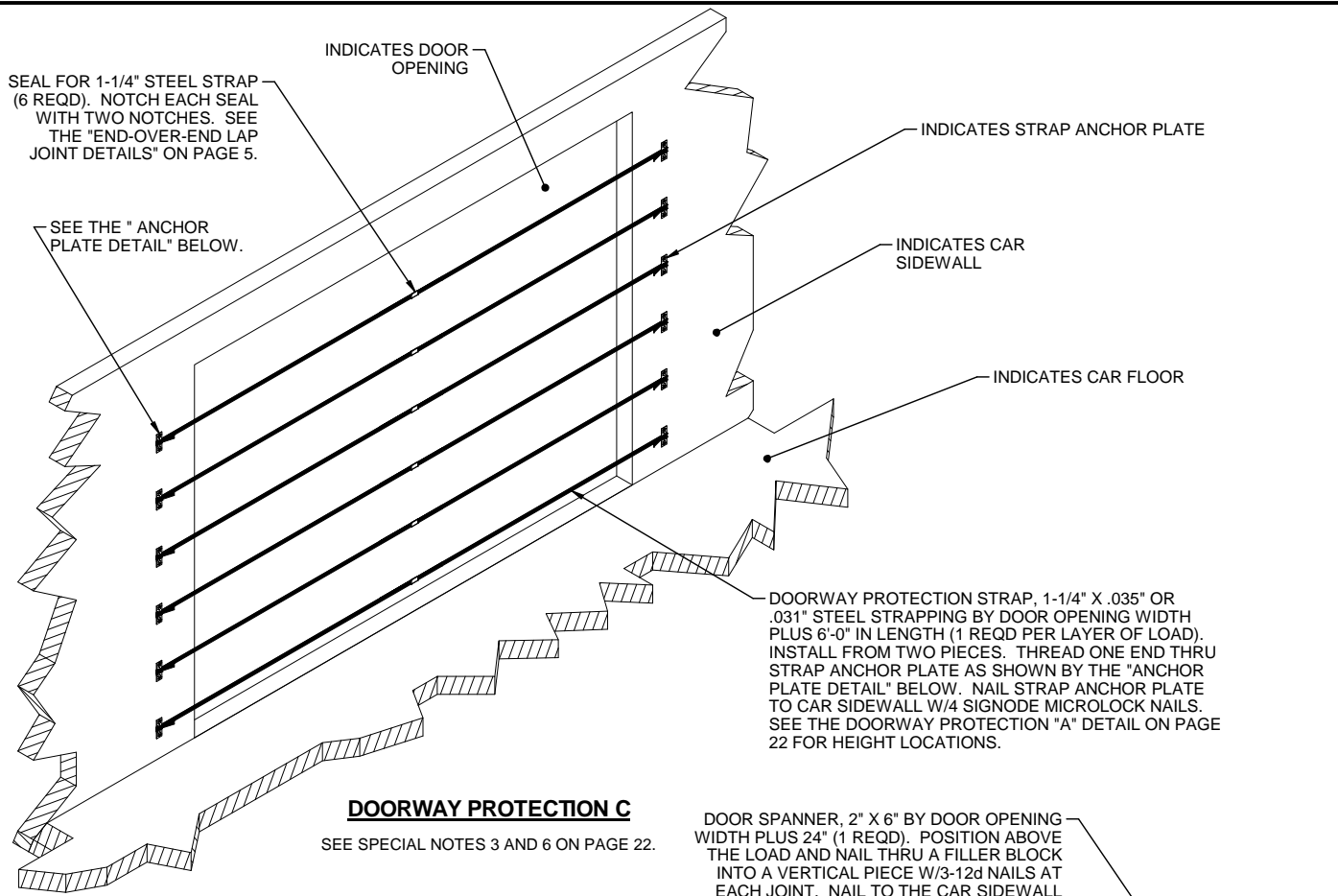
VIEW A

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



DOORWAY PROTECTION B

SEE SPECIAL NOTES 2 AND 6 ABOVE.

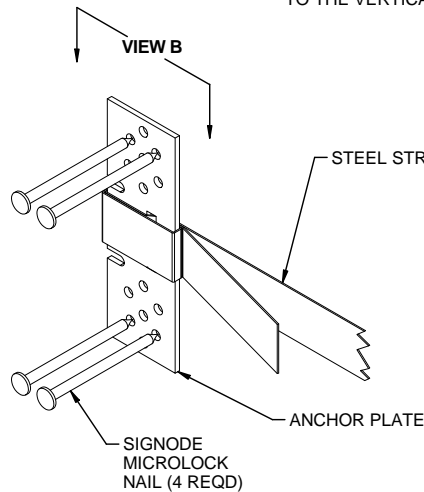


DOORWAY PROTECTION C

SEE SPECIAL NOTES 3 AND 6 ON PAGE 22.

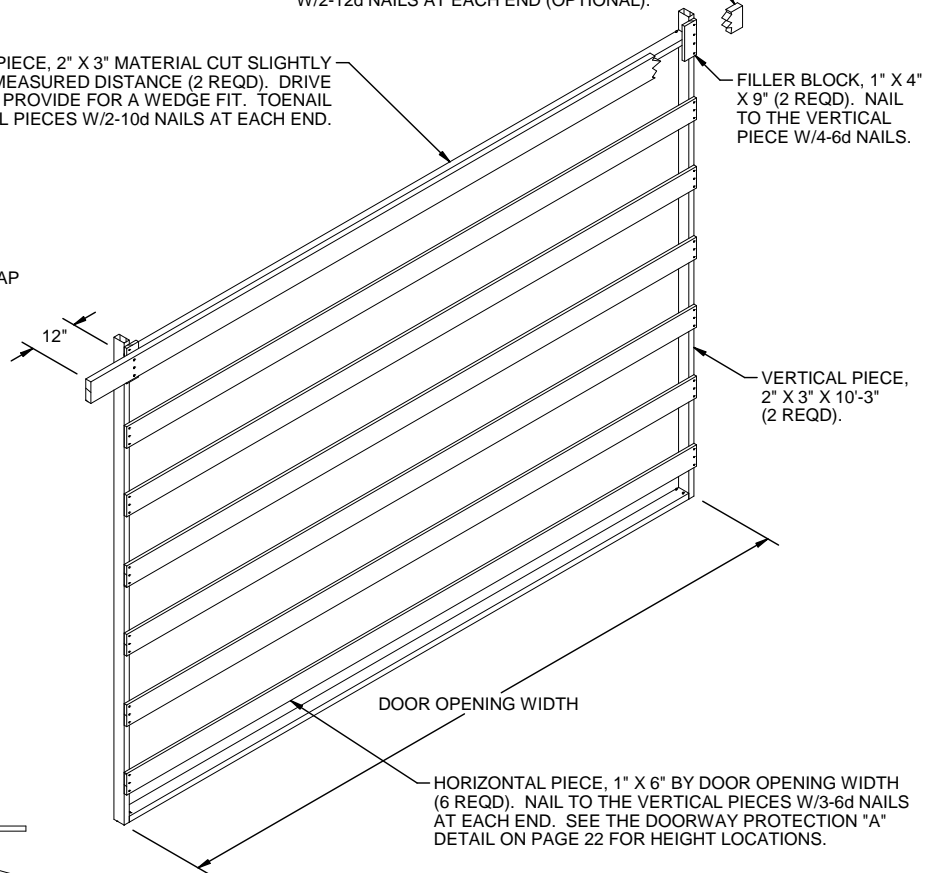
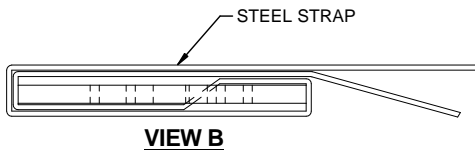
DOOR SPANNER, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (1 REQD). POSITION ABOVE THE LOAD AND NAIL THRU A FILLER BLOCK INTO A VERTICAL PIECE W/3-12d NAILS AT EACH JOINT. NAIL TO THE CAR SIDEWALL W/2-12d NAILS AT EACH END (OPTIONAL).

SPREADER PIECE, 2" X 3" MATERIAL CUT SLIGHTLY LONGER THAN MEASURED DISTANCE (2 REQD). DRIVE INTO POSITION TO PROVIDE FOR A WEDGE FIT. TOENAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.



ANCHOR PLATE DETAIL

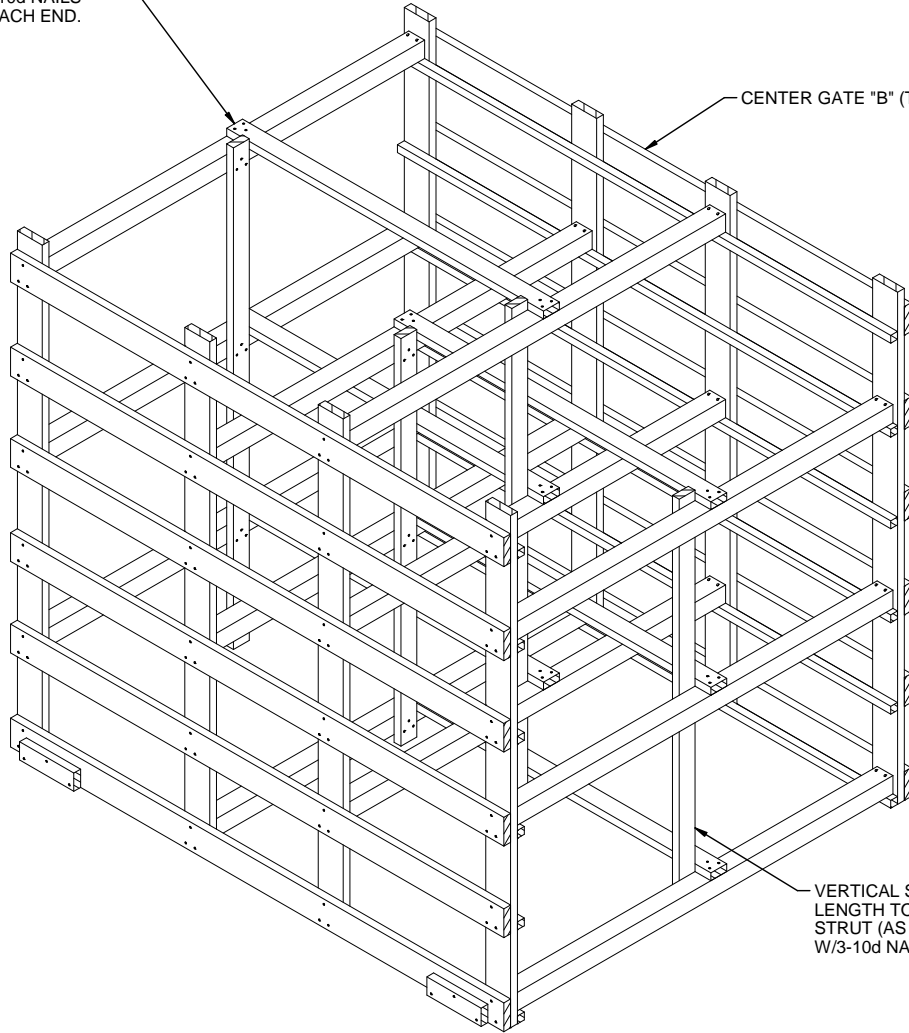
THIS VIEW "B" BELOW DEPICTS THE PROPER THREADING OF A DOORWAY PROTECTION STRAP THRU AN ANCHOR PLATE.



DOORWAY PROTECTION D

SEE SPECIAL NOTES 4 AND 6 ON PAGE 22.

HORIZONTAL STRUT BRACING,
2" X 4" BY DISTANCE BETWEEN
STRUTS (AS REQD). NAIL TO
THE STRUTS W/3-10d NAILS
AT EACH END.



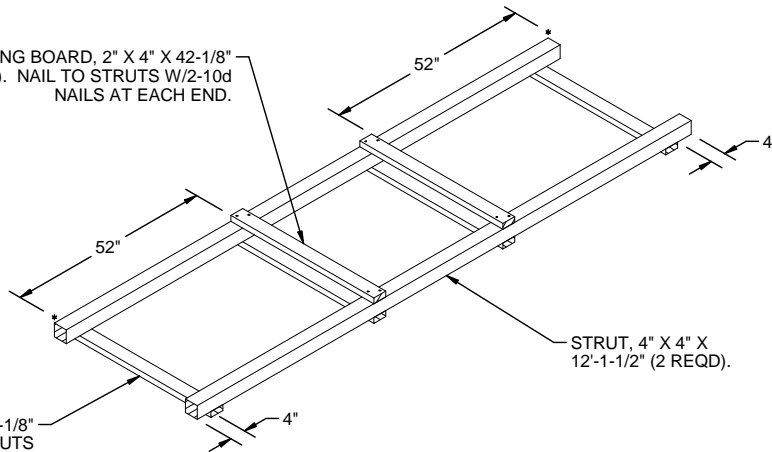
CENTER GATE "B" (TYPICAL)

VERTICAL STRUT BRACING, 2" X 4" BY A
LENGTH TO EXTEND 2" ABOVE THE TOP
STRUT (AS REQD). NAIL TO THE STRUTS
W/3-10d NAILS AT EACH JOINT.

TYPICAL STRUT BRACING

SEE GENERAL NOTE "S.3" ON PAGE 3.

STRAPPING BOARD, 2" X 4" X 42-1/8"
(2 REQD). NAIL TO STRUTS W/2-10d
NAILS AT EACH END.



STRUT, 4" X 4" X
12'-1-1/2" (2 REQD).

LATERAL PIECE, 2" X 4" X 42-1/8"
(4 REQD). NAIL TO STRUTS
W/3-10d NAILS AT EACH END.

FILLER ASSEMBLY

(USED TO REPLACE A CONTAINER)