APPROVED BY
BUREAU OF EXPLOSIVES

DATE 9/7/2001

LOADING AND BRACING (CL & LCL) IN BOXCARS● OF JSOW (AGM-154) MISSILES PACKED IN CNU-575/E SHIPPING AND STORAGE CONTAINERS

INDEX

● INCLUDES CONVENTIONAL TYPE BOXCARS AND CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY
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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 OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE FOR LOADS OF JSOW MISSILES PACKED IN CNU-575/E CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH MISSILE INSTALLED. SEE PAGE 4 FOR DETAILS OF THE 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 CONTAINERS OF JSOW MISSILES 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, BUT 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 20 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 CNU-575/E CONTAINERS, 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".

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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).
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.
STRAPPING, STEEL - -:	ASTM D3953; FLAT STRAPPING, TYPE 1 OR 2, 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.

(GENERAL NOTES CONTINUED)

J. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OR SIDEWALL OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS OR SIDEWALL BOARDS. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH, ONTO, OR RIGHT BESIDE A NAIL IN A LOWER PIECE.

K. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH 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 WHICH 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.

L. 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.

M. 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.

N. 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.

O. CAUTION: WHEN POWER OR PNEUMATIC NAILERS ARE BEING USED IN THE APPLICATION OF NAILED FLOORLINE BLOCKING OR BRACING, CONTAINERS 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.

P. 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.

Q. 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.

R. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

(CONTINUED ON PAGE 3)

(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. SEE GENERAL NOTE "J" ON PAGE 2.

2. NOTICE: WHEN POSITIONING CONTAINERS IN A CAR, THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL OR EACH OTHER 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, SUCH AS THE ENDS OF THE CONTAINER SIDEWALLS. 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 BY KEY NUMBERS ⑦ AND ⑧ ON PAGE 6. 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 HORIZONTAL PIECE 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 HORIZONTAL PIECE 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 19 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.

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(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 THE CONTAINERS. 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 27 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 27, THE "FILL PIECE" MATERIAL IS NOT REQUIRED.

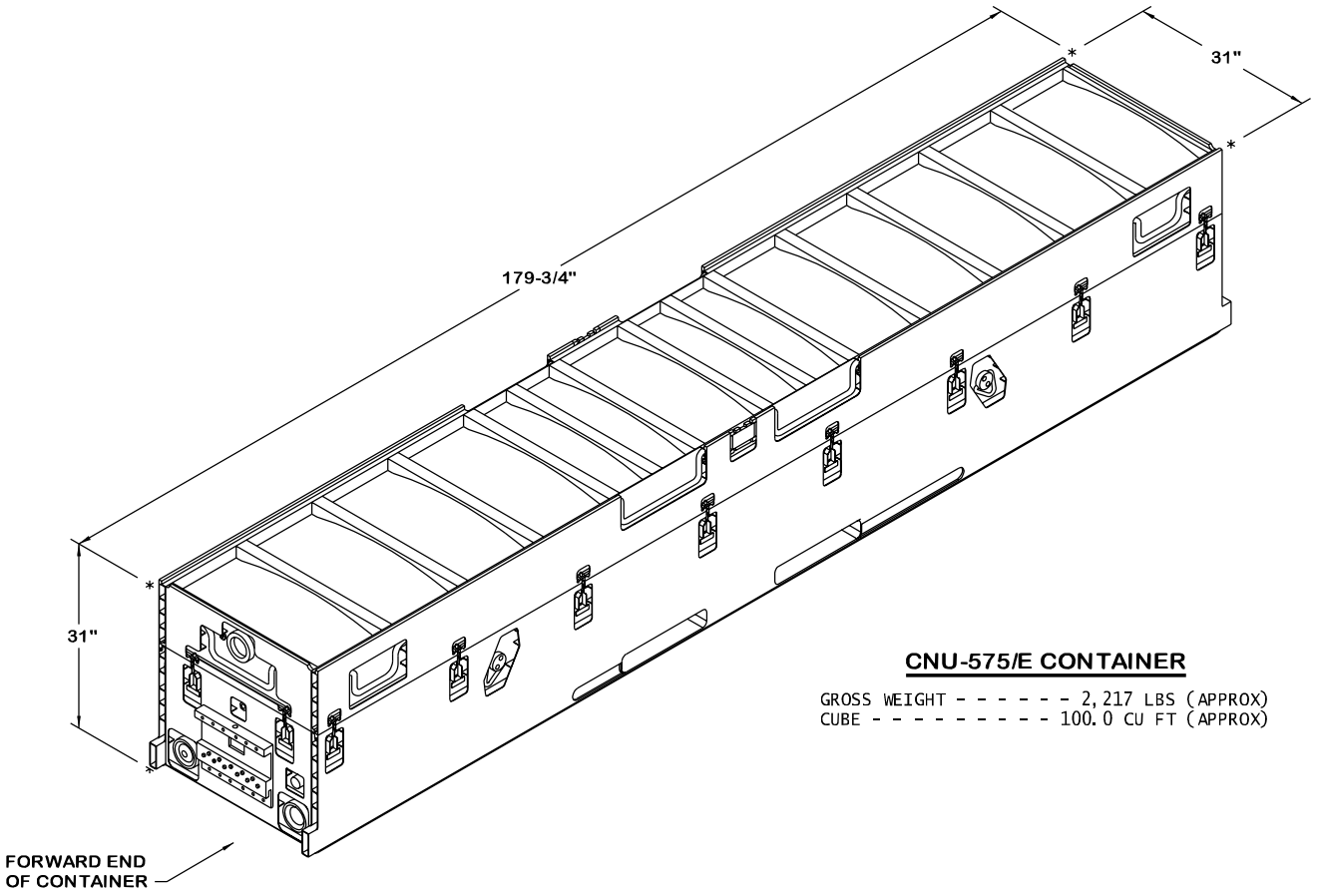
4. NOTICE: AFTER THE LOAD DIVIDER BULKHEADS ARE POSITIONED AGAINST THE LADING, AND THE LOCKING PINS ARE ENGAGED IN THE HOLES OF THE RAILS, THE LOWER LOCKING PINS MUST BE INSPECTED TO ENSURE THAT THE PINS ARE FULLY ENGAGED IN THE LOCKING HOLES. IF THE PINS ARE NOT FULLY SEATED IN THE LOCKING HOLES, THE 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 WHICH ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF CONTAINERS WHICH IS FULL CAR WIDTH BY FULL LOAD HEIGHT BY ONE UNIT IN LENGTH. IF THE QUANTITY TO BE SHIPPED CANNOT BE ATTAINED BY ADJUSTING THE NUMBER OF 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.

   (A) EITHER OF THE TYPICAL LCL METHODS DEPICTED ON PAGES 10-13 MAY BE USED TO ADJUST A LOAD QUANTITY DOWNWARD BY OTHER THAN A MULTIPLE OF A LOAD UNIT. SEE THE PROCEDURES ON THOSE PAGES FOR GUIDANCE.

   (B) 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 8 OF THE CONVENTIONAL BOXCAR DRAWING HEREIN TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.

   (C) ONE OR MORE UNITS CAN BE POSITIONED IN CONTACT WITH A LOAD DIVIDER BULKHEAD ON THE CENTER-OF-CAR SIDE. BLOCK AND BRACE WITH FLOORLINE BLOCKING AS SHOWN ON PAGE 18.



CNU-575/E CONTAINER

GROSS WEIGHT - - - - - - - 2,217 LBS (APPROX)
CUBE - - - - - - - - - - 100.0 CU FT (APPROX)

UNITIZATION AND HANDLING NOTES

1. STACKING CONTAINERS FOR LOADING.

   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 1-1/4" X .035" OR .031" UNITIZING STRAPPING.

   A. ONE SET OF TWO UNITIZING STRAPS IS REQUIRED FOR A STACK OF THREE CONTAINERS (AS SHOWN IN THE "CONTAINER STACKING DETAIL" ON PAGE 5). A STACK OF TWO CONTAINERS ALSO REQUIRES ONE SET.

   B. EACH SET OF UNITIZING STRAPS SHOULD BE POSITIONED AROUND THE CONTAINERS AS SHOWN IN THE "CONTAINER STACKING DETAIL" ON PAGE 5. PLACE STRAPPING THROUGH FORK LIFT OPENINGS AS FAR APART AS OPENINGS PERMIT, AND PLACE SO THAT STRAPPING LAYS FLAT AND STRAIGHT WITH THE BODY SURFACES OF THE CONTAINERS; i.e., VERTICAL ALONG SIDES AND STRAIGHT ACROSS TOP AND BOTTOM OF THE STACK.

   C. STRAPPING WILL BE FIRMLY TENSIONED AND EACH END-OVER-END LAP JOINT WILL BE SEALED IN THE MANNER DEPICTED IN THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5. THE LAP JOINTS WILL BE MADE ALONG THE SIDE OF THE STACK. 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.

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(UNITIZATION AND HANDLING NOTES CONTINUED)

3. CONTAINER OR CONTAINER STACK HANDLING.

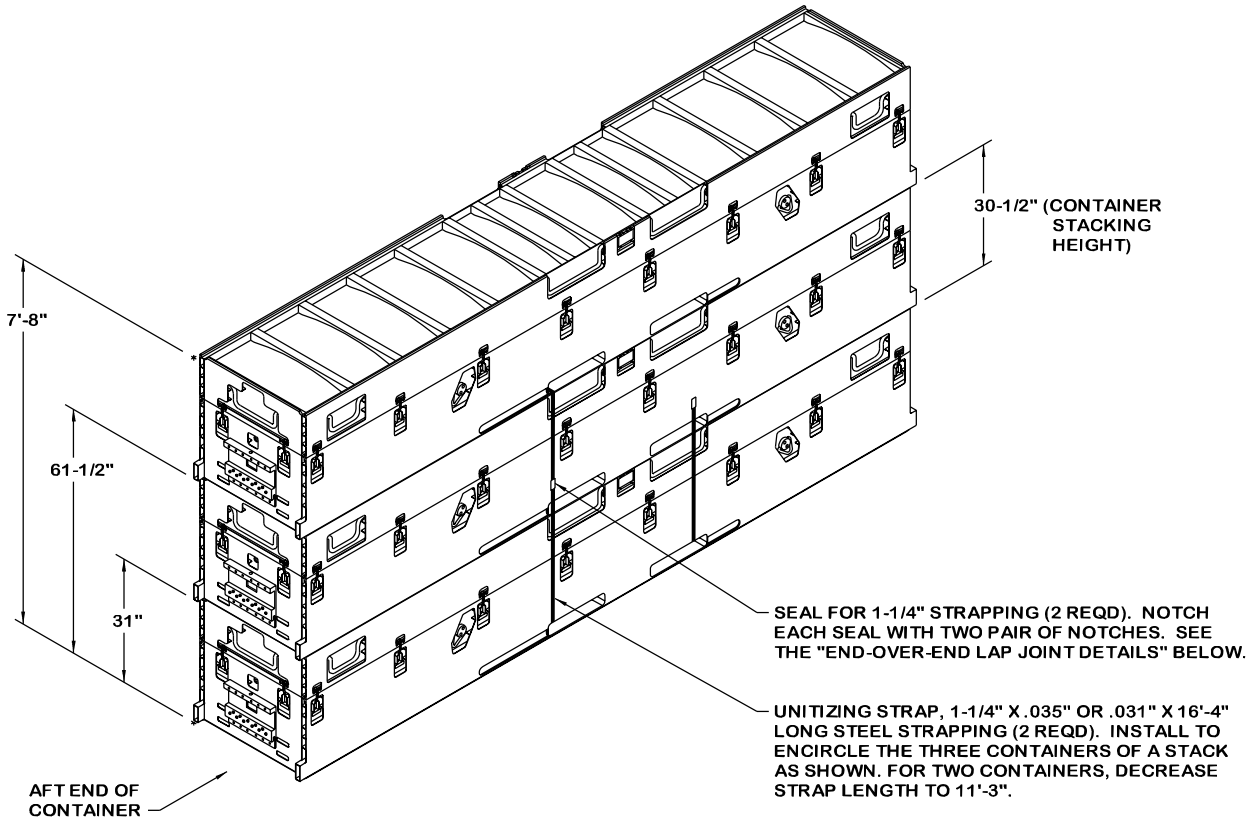
   NOTES: (1) APPROVED MATERIAL HANDLING EQUIPMENT (FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, SPREADER BARS, etc.) IS SPECIFIED ELSEWHERE.

   (2) PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.

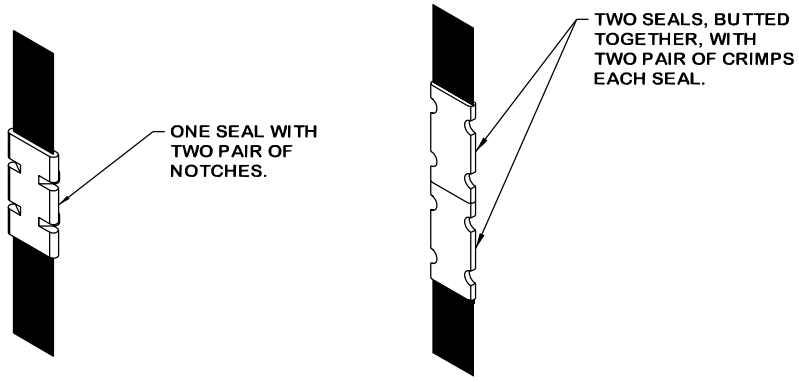
   A. ONLY APPROVED AND APPROPRIATELY SIZED MATERIALS HANDLING EQUIPMENT WILL BE USED FOR HANDLING THE DEPICTED CONTAINERS.

   B. 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. FOR VERY SHORT "INCHING" SPEED MOVEMENTS, SUCH AS WILL BE EXPERIENCED DURING BOXCAR LOADING, A UNITIZED CONTAINER STACK MAY BE HANDLED BY INSERTING THE FORKS OF A FORKLIFT TRUCK INTO THE FORK RECEPTACLES OF AN UPPER CONTAINER. IF ONE CONTAINER IS HANDLED BY SLINGING, THE SLING MAY BE ATTACHED TO THE LIFTING POINTS ON THE CONTAINER. HOWEVER, IF A TWO OR THREE-HIGH STACK IS HANDLED BY SLINGING, DO NOT ATTACH THE SLING TO THE LIFTING POINTS ON A CONTAINER. THE SLING USED MUST BE OF SUCH A DESIGN THAT THE LIFTING IS DONE ON THE BOTTOM OF THE LOWEST CONTAINER.

   C. WHEN UNLOADING CONTAINERS, REMOVE THE LATERAL DUNNAGE, AND SHIFT THE NEAR END OF THE CONTAINER STACK TOWARDS THE CENTER OF THE BOXCAR. ATTACH A CHAIN FROM THE CONTAINER LIFTING POINT ON ONE SIDE OF THE CONTAINER, AROUND THE FORKLIFT MAST, TO THE CONTAINER LIFTING POINT ON THE OPPOSITE SIDE OF THE CONTAINER. SLIGHTLY ELEVATE AND INSERT THE FORK TINES UNDER THE END OF THE CONTAINER STACK AND SLOWLY DRAG THE CONTAINER STACK REARWARD UNTIL IT CAN BE HANDLED FROM THE SIDE, TAKING CARE NOT TO DAMAGE THE CONTAINERS.



CONTAINER STACKING DETAIL



STRAP JOINT A

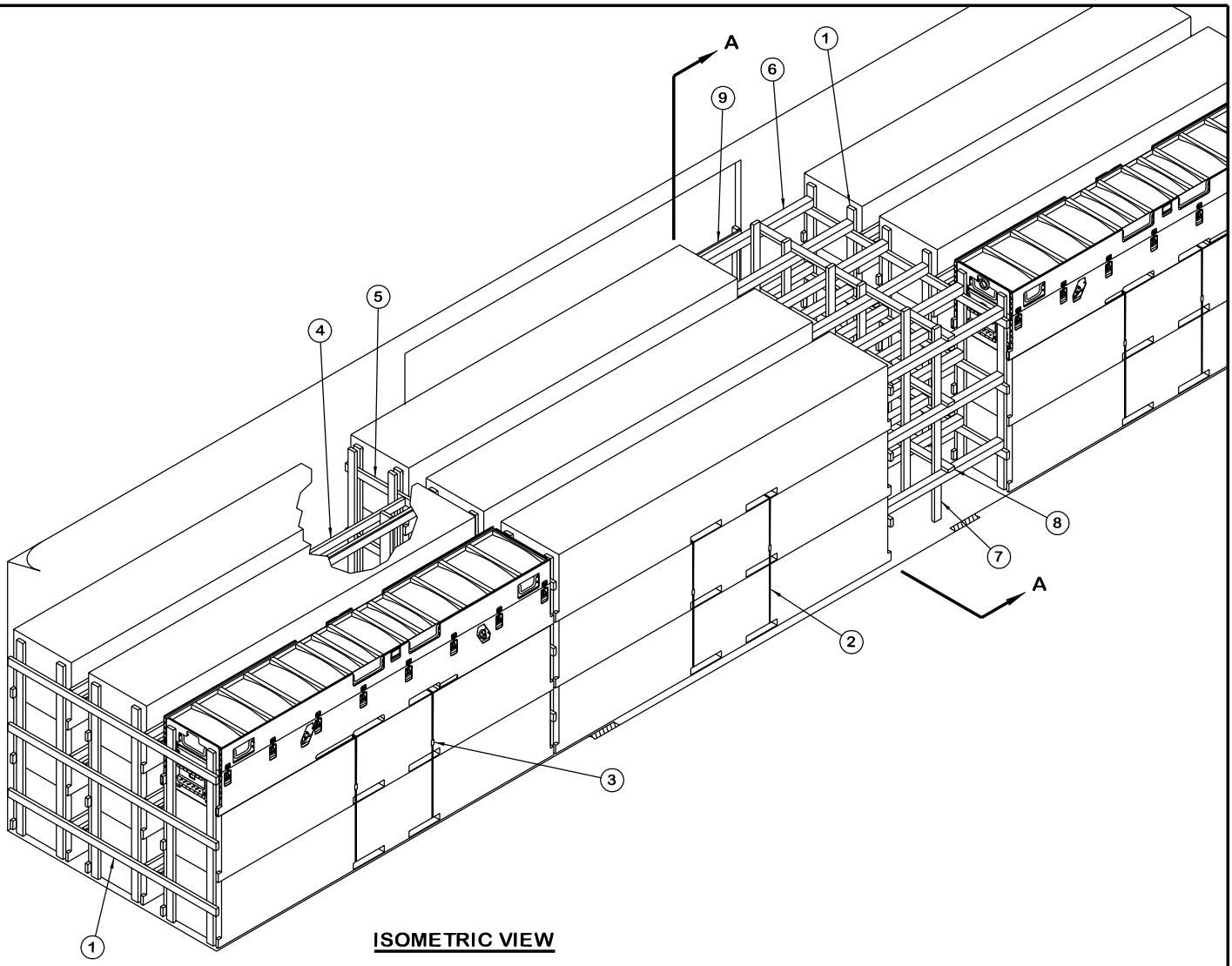
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.

STRAP JOINT B

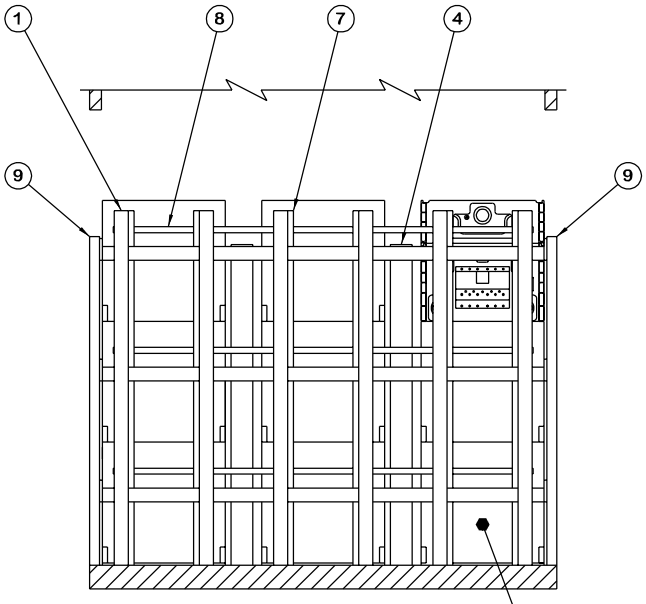
METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

END-OVER-END LAP JOINT DETAILS

SEE GENERAL NOTE "L" ON PAGE 2.



ISOMETRIC VIEW



SECTION A-A

KEY NUMBERS

(1) END GATE/CENTER GATE (4 REQD). SEE THE DETAIL ON PAGE 20. POSITION WITH THE HORIZONTAL PIECES AGAINST THE CAR END-WALL OR AWAY FROM THE INSTALLED CONTAINERS.

(2) UNITIZING STRAP, 1-1/4" X .035" OR.031" X 16'-4" LONG STEEL STRAPPING (18 REQD). SEE THE "CONTAINER STACKING DETAIL" ON PAGE 5. SEE SPECIAL NOTE 2 ON PAGE 7.

(3) SEAL FOR 1-1/4" UNITIZING STRAP (18 REQD). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.

(4) CRIB FILL A (6 REQD). SEE THE DETAIL ON PAGE 22. SEE SPECIAL NOTE 4 ON PAGE 7.

(5) SEPARATOR GATE (1 REQD). SEE THE DETAIL ON PAGE 21.

(6) STRUT, 4" X 4" X CUT-TO-FIT (REF: 64-1/4") (18 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "S.3" AND "S.4" ON PAGE 3.

(7) VERTICAL STRUT BRACING, 2" X 4" X 7'-6" (6 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

(8) HORIZONTAL STRUT BRACING, 2" X 4" X 8'-10" (3 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

(9) DOORWAY PROTECTION A (2 REQD). SEE THE DETAIL ON PAGE 24. NAIL TO THE DOOR POSTS W/12d NAILS. SEE SPECIAL NOTE 3 ON PAGE 7.

27-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOXCAR

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-4" WIDE WOOD-LINED CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 15'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED, ALTHOUGH NARROWER DOOR OPENINGS WILL BE DIFFICULT TO UTILIZE. SEE GENERAL NOTE "D" ON PAGE 2.

2. CONTAINERS MUST 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, AS APPLICABLE, BE PARTIALLY LIFTED FROM THE END AND PUSHED INTO PLACE. USE CARE SO AS NOT TO DAMAGE THE CONTAINERS. NOTE: A STACK OF TWO OR MORE CONTAINERS OR A STACK CONTAINING A FILLER ASSEMBLY MUST BE UNITIZED.

3. 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 CONTAINER LENGTH. THE WOODEN GATE TYPE OF DOORWAY PROTECTION, SHOWN AS PIECE MARKED ⑨ IN THE LOAD ON PAGE 6, IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS. REFER TO PAGES 24 AND 25 FOR ALTERNATIVE DOORWAY PROTECTION FOR CARS EQUIPPED WITH CONVENTIONAL SLIDING AND PLUG DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS BUT DOES NOT HAVE NAILABLE SIDEWALLS, NAILED FLOORLINE BLOCKING, SPACER ASSEMBLIES, AND LOAD BUNDLING STRAPS MUST BE USED. SEE THE LOADS ON PAGES 8 AND 12 FOR GUIDANCE.

4. THE DETAIL FOR CRIB FILL "A" SPECIFIES THE USE OF 2" X 6" VERTICAL PIECES FOR A 9'-4" WIDE CAR AND 2" X 8" VERTICAL PIECES FOR 9'-6" WIDE CARS. CRIB FILL "C", DETAILED ON PAGE 23, CAN BE USED FOR 8'-6" WIDE CARS. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN 2". TO SATISFY THIS REQUIREMENT, THE WIDTH OF CRIB FILL "A" CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OR ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES.

5. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A 3-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF NINE UNITS, A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF SIX UNITS, OR A 1-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF THREE UNITS BY OMITTING ONE OR MORE UNITS FROM THE CENTER PORTION OF THE LOAD, OR THE ENTIRE TOP TIER OR TIERS CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGES 10 THRU 18 FOR GUIDANCE.

6. A MAXIMUM OF 18 CONTAINERS, FOR AN APPROXIMATE LADING WEIGHT OF 39,906 POUNDS, CAN BE LOADED INA 40'-6" LONG CAR BY USING THE DEPICTED PROCEDURES. A MAXIMUM OF 27 CONTAINERS, FOR A LADING WEIGHT OF APPROXIMATELY 59,859 POUNDS, CAN BE LOADED IN A 60'-8" LONG BOXCAR BY USING THE DEPICTED METHODS.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	269	90
1" X 6"	90	45
2" X 3"	28	14
2" X 4"	1018	679
2" X 6"	162	162
4" X 4"	96	129

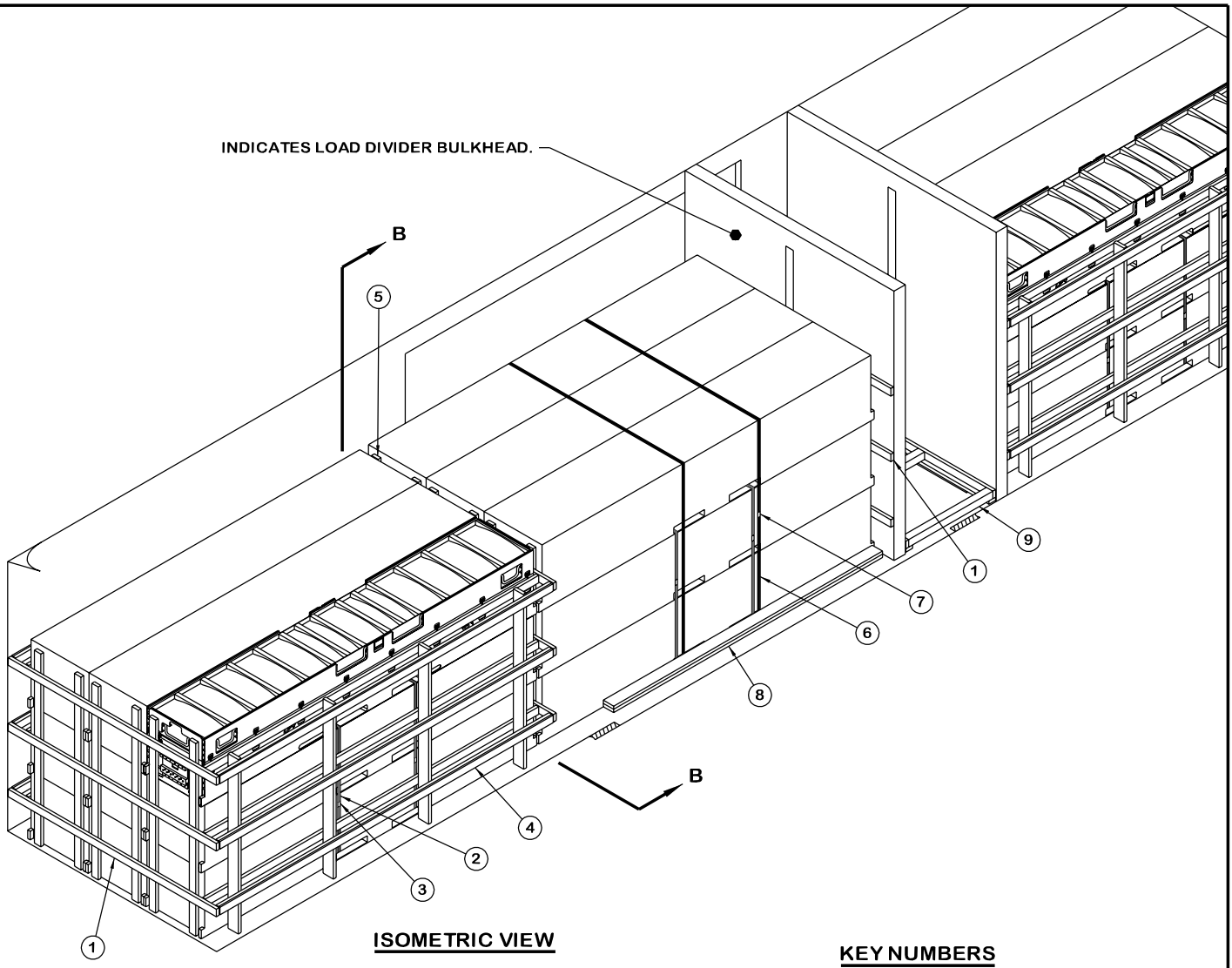
NAILS	NO. REQD	POUNDS
6d (2")	306	1-3/4
10d (3")	612	9-1/2
12d (3-1/4")	28	1/2
16d (3-1/2")	72	1-1/2

STEEL STRAPPING, 1-1/4" - 294.00' REQD - - - 42.0 LBS
SEAL FOR 1-1/4" STRAPPING - - 18 REQD - - - 0.8 LB

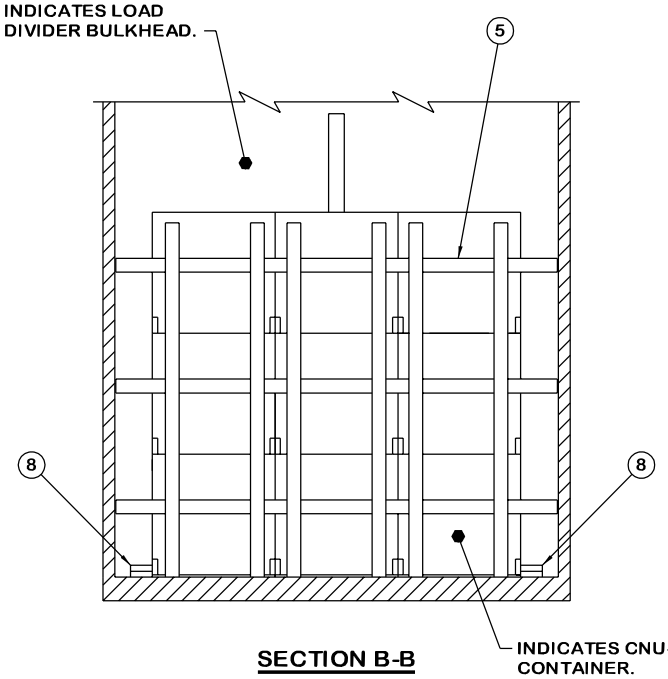
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	27	59,859 LBS
DUNNAGE		2,294 LBS
TOTAL WEIGHT		62,153 LBS (APPROX)

27-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOXCAR



ISOMETRIC VIEW



SECTION B-B

KEY NUMBERS

1. END GATE/CENTER GATE (4 REQD). SEE THE DETAIL ON PAGE 20. POSITION WITH THE HORIZONTAL PIECES AGAINST THE CAR END-WALL OR AWAY FROM THE INSTALLED CONTAINERS.
2. UNITIZING STRAP, 1-1/4" X .035" OR.031" X 16'-4" LONG STEEL STRAPPING (18 REQD). SEE THE "CONTAINER STACKING DETAIL" ON PAGE 5. SEE SPECIAL NOTE 2 ON PAGE 9.
3. SEAL FOR 1-1/4" UNITIZING STRAP (18 REQD). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.
4. SIDE FILL A (4 REQD). SEE THE DETAIL ON PAGE 22. SEE SPECIAL NOTE 4 ON PAGE 9.
5. SEPARATOR GATE (1 REQD). SEE THE DETAIL ON PAGE 21.
6. BUNDLING STRAP, 1-1/4" X .035" OR .031" X 31'-8" LONG STEEL STRAPPING (2 REQD). INSTALL TO ENCIRCLE ALL CONTAINERS IN THE DOORWAY AREA. SEE SPECIAL NOTE 3 ON PAGE 9.
7. SEAL FOR 1-1/4" BUNDLING STRAP (2 REQD). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE THE "END-OVER-END LAP JOINT DETAIL" ON PAGE 5. INSTALL THE SEAL FOR ONE STRAP ON THE OPPOSITE SIDE OF CAR FROM THE SEAL FOR THE OTHER STRAP.
8. FLOORLINE BLOCKING, 2" X 6" X 12'-0" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/14-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTES "J" ON PAGE 2 AND "S.1" ON PAGE 3. SEE SPECIAL NOTE 3 ON PAGE 9.
9. STRUT ASSEMBLY (1 REQD). SEE THE DETAILS ON PAGE 26. SEE SPECIAL NOTE 6 ON PAGE 9.

27-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-4" WIDE WOOD-LINED CUSHIONED BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS AND 15'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED, ALTHOUGH NARROWER DOOR OPENINGS WILL BE DIFFICULT TO UTILIZE. SEE GENERAL NOTE "D" ON PAGE 2.

2. CONTAINERS MUST 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, AS APPLICABLE, BE PARTIALLY LIFTED FROM THE END AND PUSHED INTO PLACE. USE CARE SO AS NOT TO DAMAGE THE CONTAINERS. NOTE: A STACK OF TWO OR MORE CONTAINERS OR A STACK CONTAINING A FILLER ASSEMBLY MUST BE UNITIZED.

3. 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 CONTAINER LENGTH. THE DEPICTED DOORWAY PROTECTION CONSISTS OF FLOORLINE BLOCKING, PIECE MARKED ⑧, AND BUNDLING STRAPS, PIECE MARKED ⑥. THIS DOORWAY PROTECTION IS APPLICABLE FOR BOXCARS EQUIPPED WITH EITHER SLIDING TYPE OR PLUG TYPE DOORS OR A COMBINATION THEREOF. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING TYPE DOORS, WOODEN DOOR GATES, SHOWN AS PIECE MARKED ⑨ IN THE LOAD ON PAGE 6, OR ANY OF THE ALTERNATIVES ON PAGES 24 AND 25, MAY BE USED. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS BUT DOES NOT HAVE NAILABLE SIDEWALLS, NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS MUST BE USED.

4. THE DETAIL FOR SIDE FILL "A" SPECIFIES THE USE OF 2" X 6" VERTICAL PIECES FOR A 9'-4" WIDE CAR AND 2" X 8" VERTICAL PIECES FOR 9'-6" WIDE CARS. SIDE FILL "C", DETAILED ON PAGE 23, CAN BE USED FOR 8'-6" WIDE CARS. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN 2". TO SATISFY THIS REQUIREMENT, THE WIDTH OF SIDE FILL "A" CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OR ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES.

5. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A 3-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF NINE UNITS, A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF SIX UNITS, OR A 1-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF THREE UNITS BY OMITTING ONE OR MORE UNITS FROM THE CENTER PORTION OF THE LOAD, OR THE ENTIRE TOP TIER OR TIERS CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGES 10 THRU 18 FOR GUIDANCE.

6. THE STRUT ASSEMBLY, SHOWN AS PIECE MARKED ⑨, IS SHOWN FOR INFORMATIONAL PURPOSES AND IS ONLY 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. SEE THE DETAILS ON PAGE 26.

7. A MAXIMUM OF 18 CONTAINERS, FOR AN APPROXIMATE LADING WEIGHT OF 39,906 POUNDS, CAN BE LOADED INA 40'-6" LONG CAR BY USING THE DEPICTED PROCEDURES. A MAXIMUM OF 27 CONTAINERS, FOR A LADING WEIGHT OF APPROXIMATELY 59,859 POUNDS, CAN BE LOADED IN A 60'-8" LONG BOXCAR BY USING THE DEPICTED METHODS.

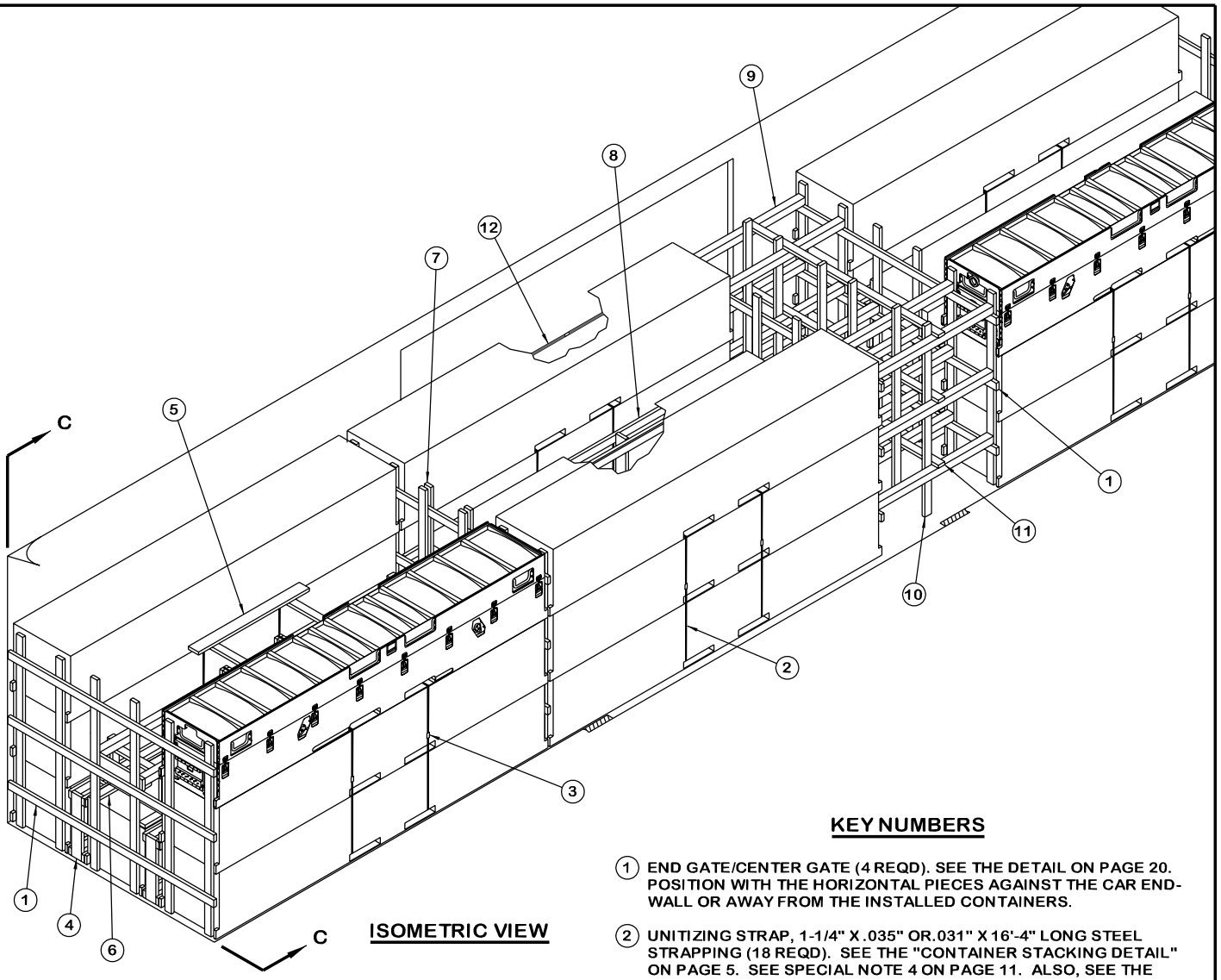
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	179	60
2" X 4"	767	512
2" X 6"	156	156
NAILS	**NO. REQD**	**POUNDS**
6d (2")	180	1
10d (3")	408	6-1/2
16d (3-1/2")	56	1-1/4
STEEL STRAPPING, 1-1/4" - 357.33' REQD - - - 51.1 LBS		
SEAL FOR 1-1/4" STRAPPING - - 20 REQD - - - 0.9 LB		

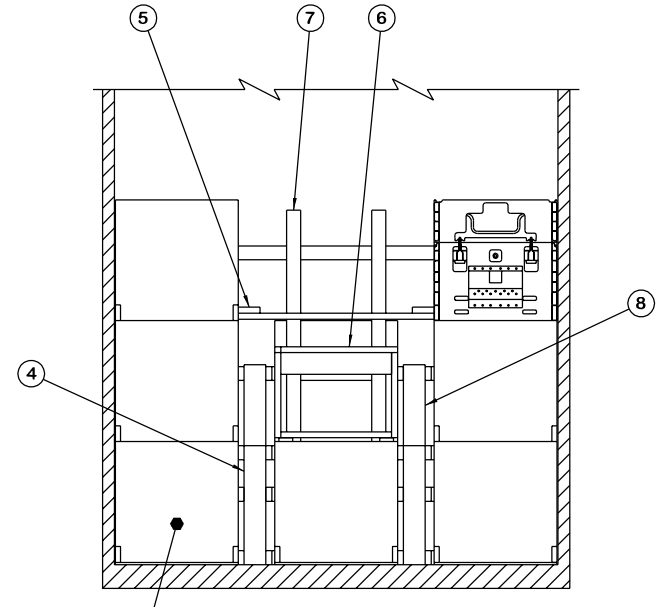
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	27	59,859 LBS
DUNNAGE		1,517 LBS
TOTAL WEIGHT		61,376 LBS (APPROX)

27-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS



ISOMETRIC VIEW



SECTION C-C

END GATES AND STRUT
BRACING ARE NOT SHOWN.

KEY NUMBERS

(1) END GATE/CENTER GATE (4 REQD). SEE THE DETAIL ON PAGE 20. POSITION WITH THE HORIZONTAL PIECES AGAINST THE CAR END-WALL OR AWAY FROM THE INSTALLED CONTAINERS.

(2) UNITIZING STRAP, 1-1/4" X .035" OR.031" X 16'-4" LONG STEEL STRAPPING (18 REQD). SEE THE "CONTAINER STACKING DETAIL" ON PAGE 5. SEE SPECIAL NOTE 4 ON PAGE 11. ALSO, SEE THE "FILLER ASSEMBLY" DETAIL ON PAGE 14.

(3) SEAL FOR 1-1/4" UNITIZING STRAP (18 REQD). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE THE "CONTAINER STACKING DETAIL" AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.

(4) CRIB FILL B (2 REQD). SEE THE DETAIL ON PAGE 23. SEE SPECIAL NOTE 6 ON PAGE 11.

(5) ANTI-SWAY BRACE (1 REQD). SEE THE DETAIL ON PAGE 19. SEE SPECIAL NOTE 8 ON PAGE 11.

(6) FILLER ASSEMBLY (1 REQD). SEE THE DETAILS ON PAGES 14 AND 15. SEE SPECIAL NOTE 7 ON PAGE 11.

(7) SEPARATOR GATE (1 REQD). SEE THE DETAIL ON PAGE 21.

(8) CRIB FILL A (4 REQD). SEE THE DETAIL ON PAGE 22. SEE SPECIAL NOTE 6 ON PAGE 11.

(9) STRUT, 4" X 4" X CUT-TO-FIT (REF: 64-1/4") (16 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "S.3" AND "S.4" ON PAGE 3.

(10) VERTICAL STRUT BRACING, 2" X 4" X 7'-6" (6 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

(11) HORIZONTAL STRUT BRACING, 2" X 4" X 8'-10" (3 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

(12) DOORWAY PROTECTION C (2 REQD). SEE THE DETAIL ON PAGE 25. SEE SPECIAL NOTE 5 ON PAGE 11.

23-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOXCAR

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-4" WIDE WOOD-LINED CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 15'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED, ALTHOUGH NARROWER DOOR OPENINGS WILL BE DIFFICULT TO UTILIZE. SEE GENERAL NOTE "D" ON PAGE 2.

2. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF CONTAINERS FROM THE CENTER ROW IS SHOWN AS TYPICAL. THE PRINCIPLES MAY ALSO BE APPLIED FOR A TWO-HIGH LOAD. SEE THE LOAD ON PAGE 12.

3. ALL THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO OMIT PART OR THE ENTIRE CENTER ROW OF CONTAINERS ARE SHOWN.

4. CONTAINERS MUST 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, AS APPLICABLE, BE PARTIALLY LIFTED FROM THE END AND PUSHED INTO PLACE. USE CARE SO AS NOT TO DAMAGE THE CONTAINERS. NOTE: A STACK OF TWO OR MORE CONTAINERS OR A STACK CONTAINING A FILLER ASSEMBLY MUST BE 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 CONTAINER LENGTH. THE DEPICTED DOORWAY PROTECTION CONSISTS OF 1-1/4" STEEL STRAPPING ATTACHED TO ANCHOR PLATES IN/ON THE CAR SIDEWALL. THIS DOORWAY PROTECTION IS APPLICABLE FOR BOXCARS EQUIPPED WITH EITHER SLIDING TYPE OR PLUG TYPE DOORS OR A COMBINATION THEREOF. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING TYPE DOORS, WOODEN DOOR GATES, SHOWN AS PIECE MARKED ⑨ IN THE LOAD ON PAGE 6, OR ANY OF THE ALTERNATIVES ON PAGES 24 AND 25, MAY BE USED. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS BUT DOES NOT HAVE NAILABLE SIDEWALLS, NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS MUST BE USED (SEE THE LOADS ON PAGES 8 AND 12).

6. THE DETAILS FOR CRIB FILL "A" AND CRIB FILL "B" SPECIFY THE USE OF 2" X 6" VERTICAL PIECES FOR A 9'-4" WIDE CAR AND 2" X 8" VERTICAL PIECES FOR 9'-6" WIDE CARS. CRIB FILL "C", DETAILED ON PAGE 23, CAN BE USED FOR 8'-6" WIDE CARS. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN 2". TO SATISFY THIS REQUIREMENT, THE WIDTHS OF CRIB FILL "A" AND CRIB FILL "B" CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OR ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES.

7. A FILLER ASSEMBLY (OR ASSEMBLIES), PIECE MARKED ⑥ ON PAGE 10, IS REQUIRED IN THE CENTER ROW WHEN A LAYER IS NOT FULL, IN ORDER TO FILL THAT LAYER. IF AN ENTIRE LAYER IS OMITTED FROM THE CENTER ROW, NO FILLER ASSEMBLIES ARE REQUIRED.

8. ANTI-SWAY BRACES, PIECE MARKED ⑤ ON PAGE 10, ARE REQUIRED WHEN OUTER STACKS ARE TWO OR MORE CONTAINERS HIGHER THAN THE CENTER STACK. IF THE LOAD CONSISTS ONLY OF OUTER STACKS, TWO ANTI-SWAY BRACES ARE REQUIRED; ONE AT THE TOP OF THE STACKS AND ONE AT THE BOTTOM.

9. IT IS NOT PERMITTED TO STACK CONTAINERS IN A ROW MORE THAN ONE CONTAINER HIGHER THAN ANY OTHER STACK IN THAT ROW.

10. THE DEPICTED LOAD CAN BE REDUCED OR INCREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE ENTIRE CENTER ROW CAN BE OMITTED OR PREFERABLY, THE TOP TIER CAN BE OMITTED AND THE PROCEDURES ON PAGE 6 CAN BE FOLLOWED. FOR OTHER METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGES 12 THRU 14 FOR GUIDANCE.

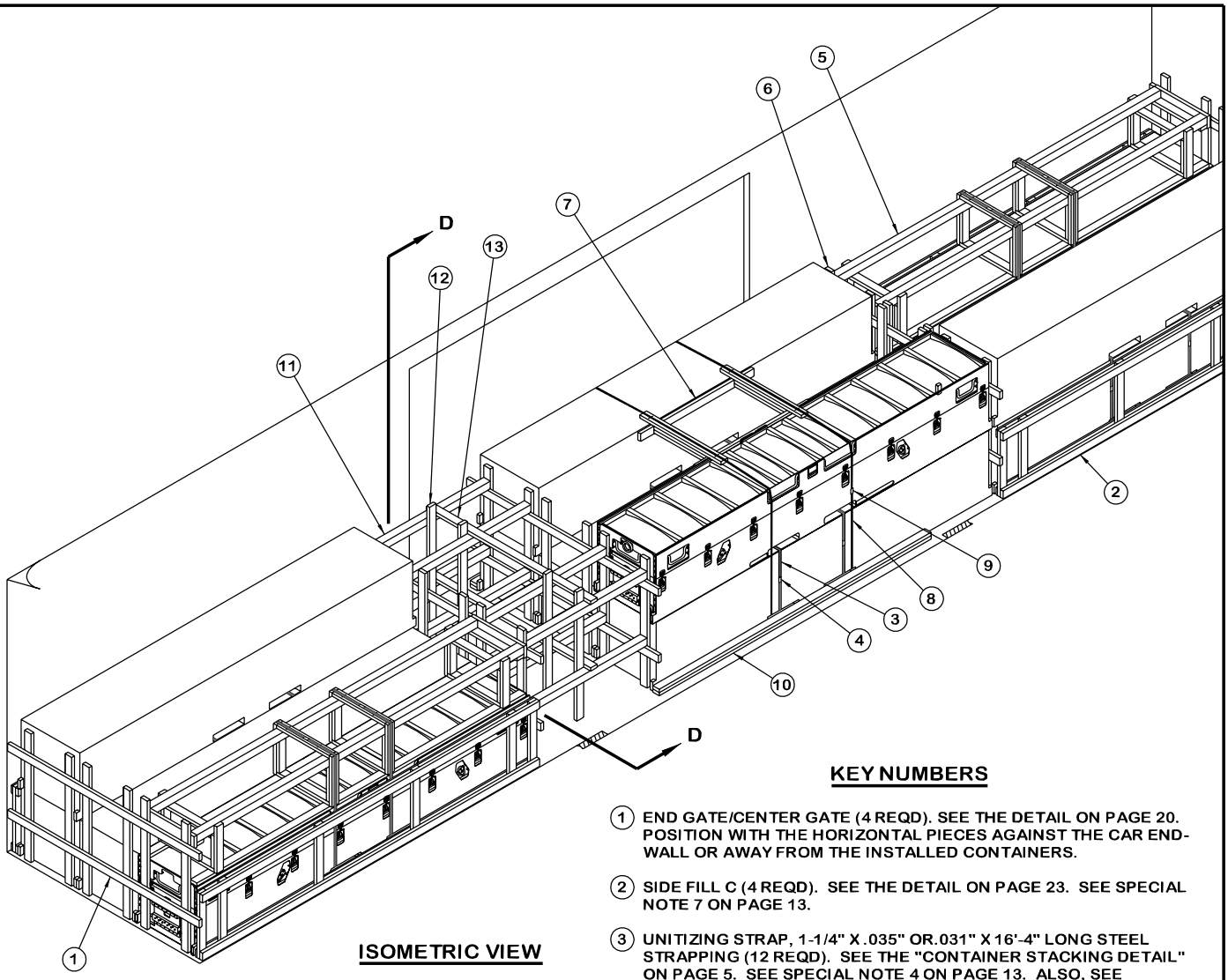
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	179	60
2" X 4"	928	619
2" X 6"	106	106
4" X 4"	115	153
NAILS	**NO. REQD**	**POUNDS**
6d (2")	240	1-1/2
10d (3")	686	10-3/4
16d (3-1/2")	112	2-1/2
MICROLOCK	48	1

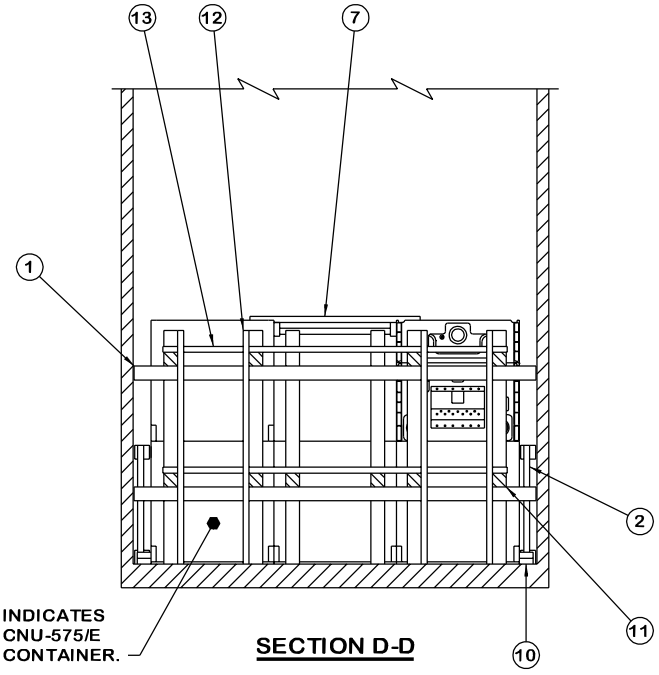
STEEL STRAPPING, 1-1/4" - 396.75'	REQD - - -	56.7 LBS
SEAL FOR 1-1/4" STRAPPING - - 21	REQD - - -	1.1 LB
STAPLE, 15/16" X 1-1/4" - - - 4	REQD - - - - -	NIL
ANCHOR PLATE, 2" X 2" X 1/8" - 12	REQD - - -	3.1 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	23	50,991 LBS
DUNNAGE		1,953 LBS
TOTAL WEIGHT		52,944 LBS (APPROX)



ISOMETRIC VIEW



SECTION D-D

KEY NUMBERS

(1) END GATE/CENTER GATE (4 REQD). SEE THE DETAIL ON PAGE 20. POSITION WITH THE HORIZONTAL PIECES AGAINST THE CAR END-WALL OR AWAY FROM THE INSTALLED CONTAINERS.

(2) SIDE FILL C (4 REQD). SEE THE DETAIL ON PAGE 23. SEE SPECIAL NOTE 7 ON PAGE 13.

(3) UNITIZING STRAP, 1-1/4" X .035" OR.031" X 16'-4" LONG STEEL STRAPPING (12 REQD). SEE THE "CONTAINER STACKING DETAIL" ON PAGE 5. SEE SPECIAL NOTE 4 ON PAGE 13. ALSO, SEE THE "FILLER ASSEMBLY" DETAIL ON PAGE 14.

(4) SEAL FOR 1-1/4" UNITIZING STRAP (12 REQD). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE THE "CONTAINER STACKING DETAIL" AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.

(5) FILLER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGES 14 AND 15. SEE SPECIAL NOTE 8 ON PAGE 13.

(6) SEPARATOR GATE (1 REQD). SEE THE DETAIL ON PAGE 21.

(7) SPACER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 19. SEE SPECIAL NOTE 6 ON PAGE 13.

(8) BUNDLING STRAP, 1-1/4" X .035" OR .031" X 26'-10" LONG STEEL STRAPPING (2 REQD). INSTALL TO ENCIRCLE ALL CONTAINERS IN THE DOORWAY AREA. SEE SPECIAL NOTE 5 ON PAGE 13.

(9) SEAL FOR 1-1/4" BUNDLING STRAP (2 REQD). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5. INSTALL THE SEAL FOR ONE STRAP ON THE OPPOSITE SIDE OF CAR FROM THE SEAL FOR THE OTHER STRAP.

(10) FLOORLINE BLOCKING, 2" X 4" X 12'-0" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/14-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTES "J" ON PAGE 2 AND "S.1" ON PAGE 3. SEE SPECIAL NOTE 5 ON PAGE 13.

(11) STRUT, 4" X 4" X CUT-TO-FIT (REF: 64-1/4") (10 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "S.3" AND "S.4" ON PAGE 3.

(12) VERTICAL STRUT BRACING, 2" X 4" X 59" (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 10 ON PAGE 13.

(13) HORIZONTAL STRUT BRACING, 2" X 4" X 7'-6"" (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

13-UNIT LOAD IN A 50'-6" LONG BY 8'-6" WIDE BOXCAR

SPECIAL NOTES:

1. A 50'-6" LONG BY 8'-6" WIDE WOOD-LINED CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 15'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED, ALTHOUGH NARROWER DOOR OPENINGS WILL BE DIFFICULT TO UTILIZE. SEE GENERAL NOTE "D" ON PAGE 2.

2. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF CONTAINERS FROM THE CENTER ROW AND FROM THE TOP LAYER ARE SHOWN AS TYPICAL. THE PRINCIPLES MAY ALSO BE APPLIED FOR A THREE-HIGH LOAD. SEE THE LOAD ON PAGE 10.

3. ALL THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO OMIT THE CENTER ROW AND PART OF THE TOP LAYER OF CONTAINERS ARE SHOWN.

4. CONTAINERS MUST 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, AS APPLICABLE, BE PARTIALLY LIFTED FROM THE END AND PUSHED INTO PLACE. USE CARE SO AS NOT TO DAMAGE THE CONTAINERS. NOTE: A STACK OF TWO OR MORE CONTAINERS OR A STACK CONTAINING A FILLER ASSEMBLY MUST BE 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 CONTAINER LENGTH. THE DEPICTED DOORWAY PROTECTION CONSISTS OF FLOORLINE BLOCKING, PIECE MARKED ⑩, BUNDLING STRAPS, PIECE MARKED ⑧, AND A SPACER ASSEMBLY, PIECE MARKED ⑦. THIS DOORWAY PROTECTION IS APPLICABLE FOR BOXCARS EQUIPPED WITH EITHER SLIDING TYPE OR PLUG TYPE DOORS OR A COMBINATION THEREOF. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING TYPE DOORS, WOODEN DOOR GATES, SHOWN AS PIECE MARKED ⑨ IN THE LOAD ON PAGE 6, OR ANY OF THE ALTERNATIVES ON PAGES 24 AND 25, MAY BE USED. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS BUT DOES NOT HAVE NAILABLE SIDEWALLS, NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS MUST BE USED.

6. SPACER ASSEMBLIES, PIECE MARKED ⑦ ON PAGE 12, ARE REQUIRED FOR BUNDLING MULTIPLE STACKS OF CONTAINERS WHEN A CONTAINER IS OMITTED FROM THE CENTER STACK. THE SPACER ASSEMBLY IS NOT REQUIRED FOR STACKS THAT ARE NOT BUNDLED. SEE SPECIAL NOTE 8 ON PAGE 11.

7. THE DETAIL FOR SIDE FILL "C" SPECIFIES THE USE OF 2" X 4" VERTICAL PIECES FOR AN 8'-6" WIDE CAR. SIDE FILL "B", DETAILED ON PAGE 23, CAN BE USED FOR 9'-4" AND 9'-6" WIDE CARS. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN 2". TO SATISFY THIS REQUIREMENT, THE WIDTH OF SIDE FILL "C" CAN BE ADJUSTED BY CHANGING THE THICKNESS OF THE VERTICAL PIECES AND/OR BY ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES.

8. A FILLER ASSEMBLY (OR ASSEMBLIES), PIECE MARKED ⑤ ON PAGE 12, IS REQUIRED IN A ROW WHEN A LAYER IN THAT ROW IS NOT FULL, IN ORDER TO FILL THAT LAYER. IF AN ENTIRE LAYER IS OMITTED FROM A ROW, NO FILLER ASSEMBLIES ARE REQUIRED.

9. IT IS NOT PERMITTED TO STACK CONTAINERS IN A ROW MORE THAN ONE CONTAINER HIGHER THAN ANY OTHER STACK IN THAT ROW.

10. IT IS DESIRABLE, BUT NOT NECESSARY, TO INSTALL VERTICAL STRUT BRACING FOR THE TWO STRUTS IN THE CENTER ROW OF THE LOAD SHOWN.

11. THE DEPICTED LOAD CAN BE REDUCED OR INCREASED TO SUIT THE QUANTITY TO BE SHIPPED. REFER TO THE LOAD ON PAGE 10 FOR OTHER METHODS OF REDUCING A LOAD OR REFER TO THE LOADS ON PAGES 6 AND 8 FOR PROCEDURES FOR FULL LOADS. FOR OTHER TYPICAL LCL PROCEDURES, REFER TO PAGES 16 THRU 18 FOR GUIDANCE.

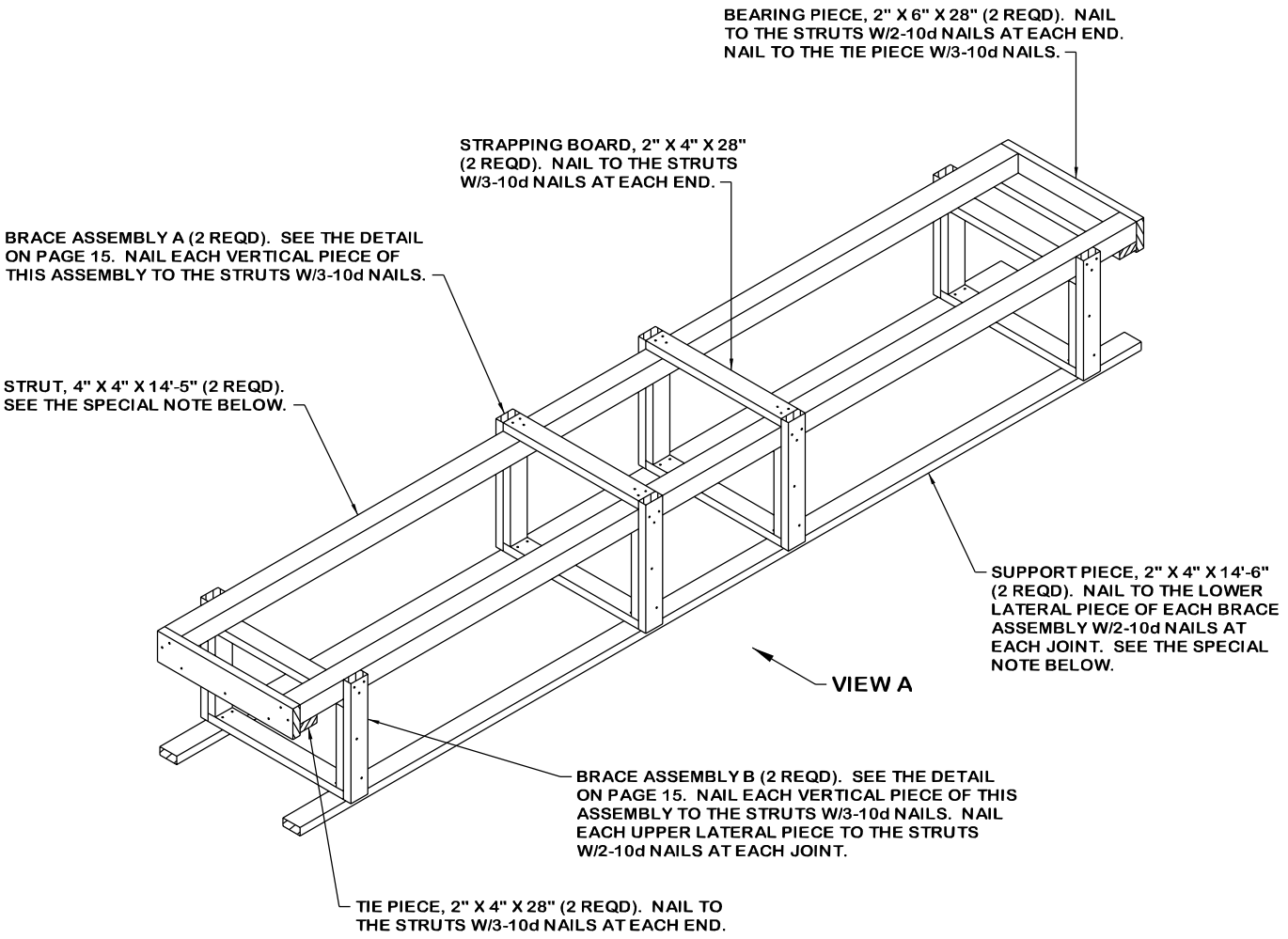
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	119	40
2" X 4"	705	470
4" X 4"	111	148
NAILS	**NO. REQD**	**POUNDS**
6d (2")	64	1/2
10d (3")	524	8
16d (3-1/2")	96	2-1/4

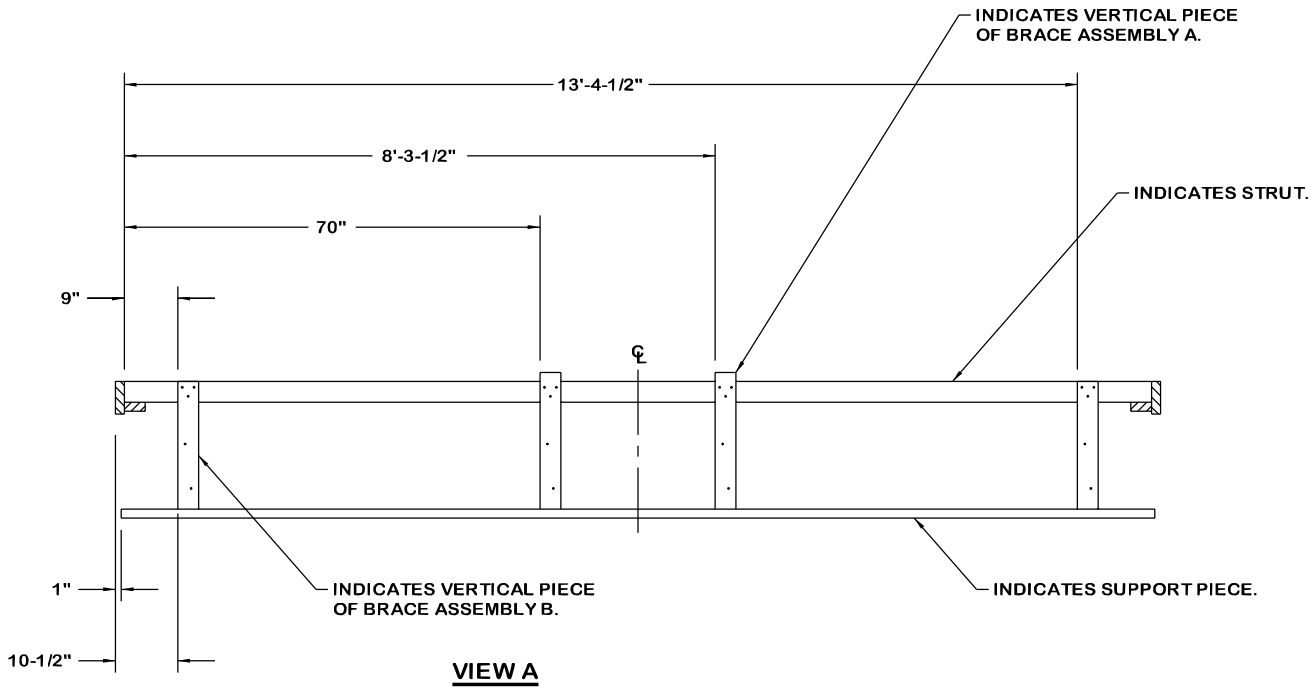
STEEL STRAPPING, 1-1/4" - 203.17' REQD - - - 29.0 LBS
SEAL FOR 1-1/4" STRAPPING - - 14 REQD - - - 0.6 LB
STAPLE, 15/16" X 1-1/4" - - - 8 REQD - - - - - NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	13	28,821 LBS
DUNNAGE		1,357 LBS
TOTAL WEIGHT		30,178 LBS (APPROX)



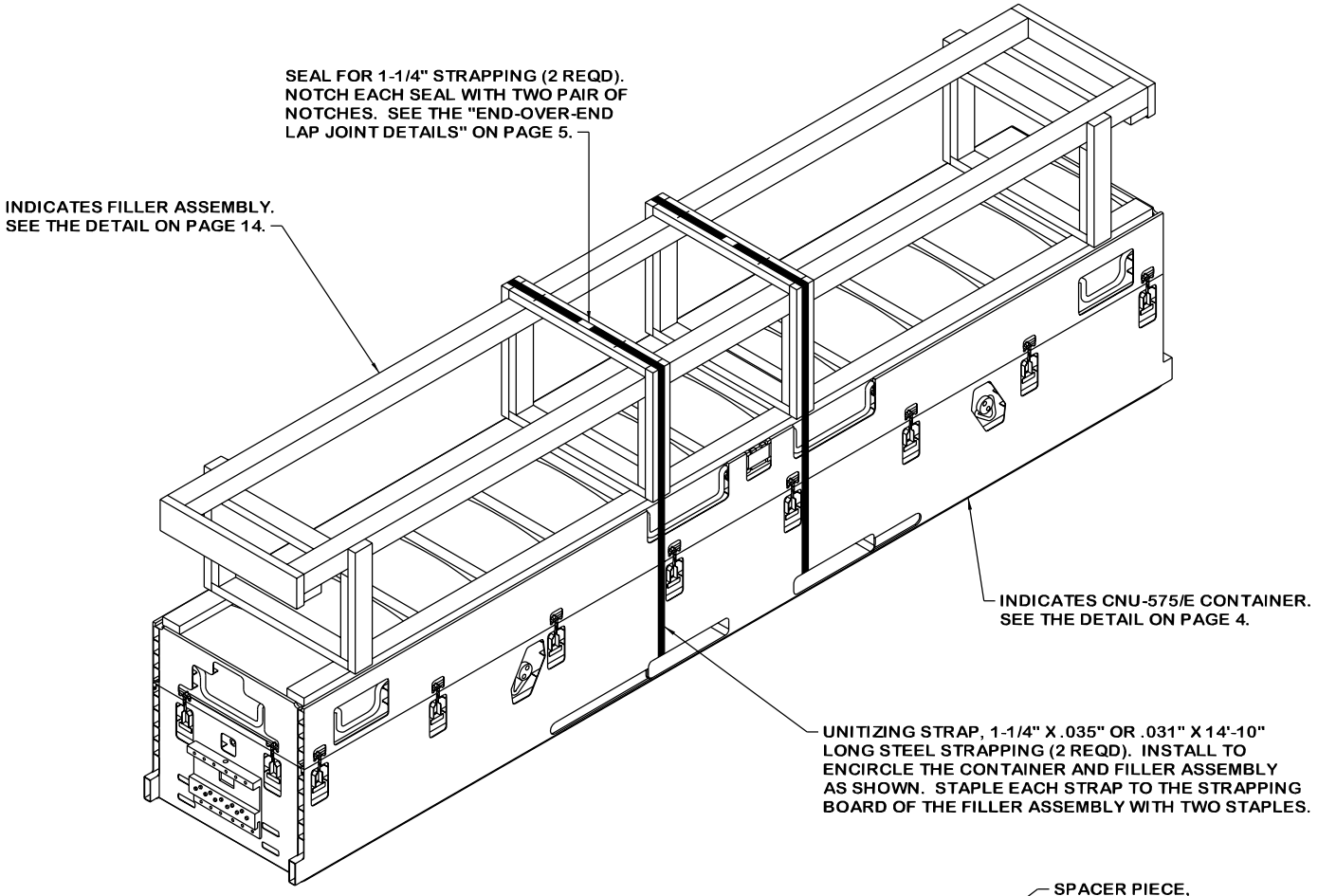
FILLER ASSEMBLY



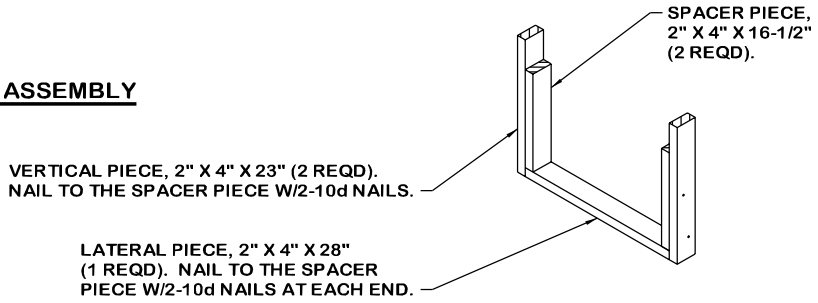
VIEW A

SPECIAL NOTE: THE CENTERLINE OF A SUPPORT PIECE MUST BE IN LINE WITH THE CENTERLINE OF THE STRUT DIRECTLY ABOVE THAT SUPPORT PIECE AS SHOWN IN VIEW "A" ABOVE.

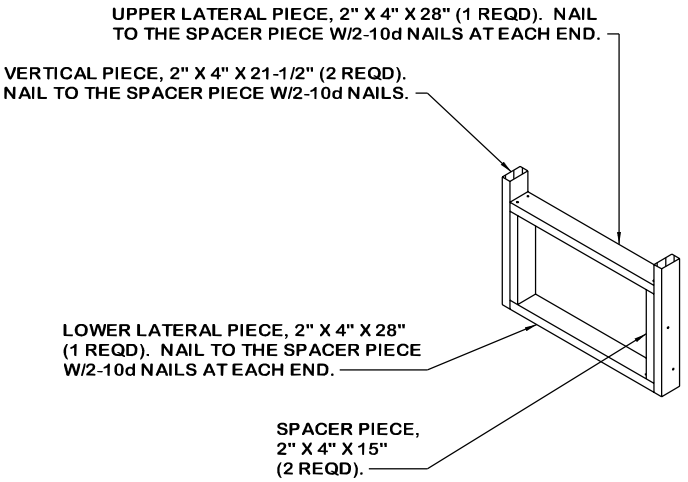
OMITTED CONTAINER FILLER ASSEMBLY DETAILS



APPLICATION OF FILLER ASSEMBLY



BRACE ASSEMBLY A

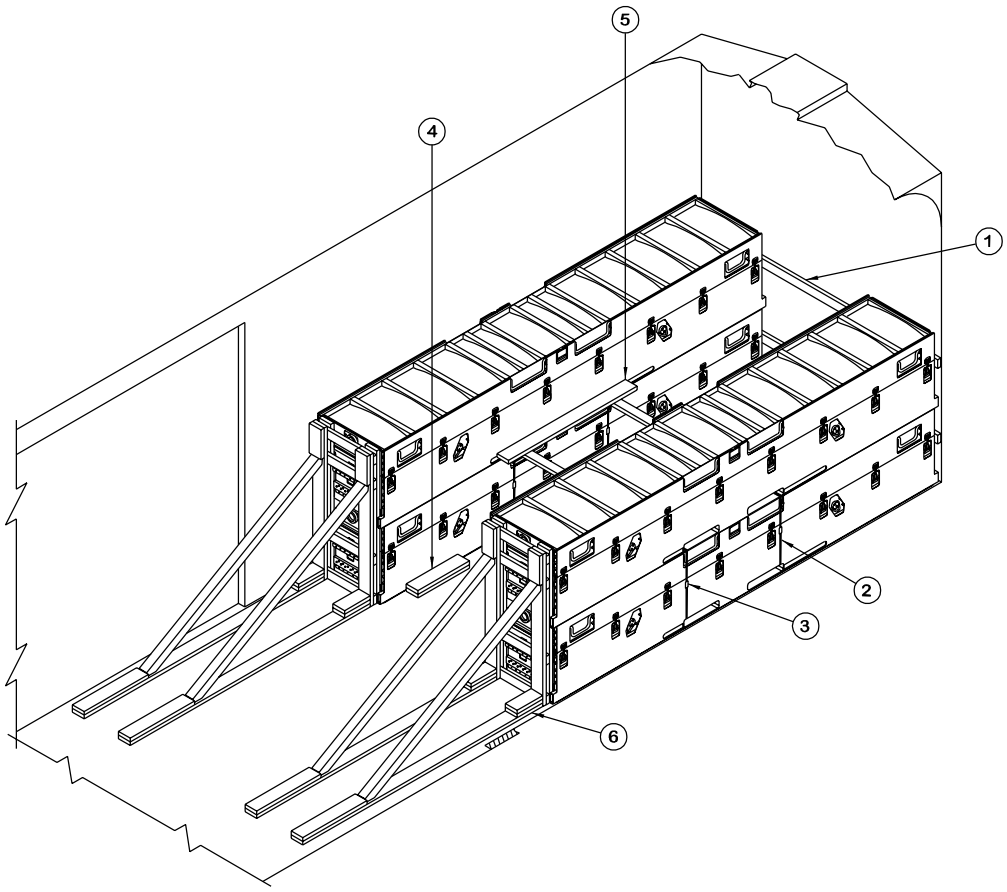


BRACE ASSEMBLY B

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	79	53
2" X 6"	5	5
4" X 4"	29	38
NAILS	NO. REQD	POUNDS
10d (3")	126	2
STEEL STRAPPING, 1-1/4" - 29.75' REQD - - - 4.3 LBS		
SEAL FOR 1-1/4" STRAPPING - - 2 REQD - - - - - NIL		
STAPLE, 15/16" X 1-1/4" - - - 4 REQD - - - - - NIL		

OMITTED CONTAINER FILLER ASSEMBLY DETAILS



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 4-UNIT LOAD IS SHOWN IN A 9'-4" WIDE CONVENTIONAL BOXCAR USING THE KNEE BRACE METHOD OF LOAD RESTRAINT. CARS OF OTHER WIDTHS MAY BE USED.
2. THE CENTER TWO VERTICAL PIECES OF THE END GATE ARE NOT REQUIRED IF THERE ARE NO CONTAINERS IN THE CENTER ROW.
3. CONTAINERS MUST 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, AS APPLICABLE, BE PARTIALLY LIFTED FROM THE END AND PUSHED INTO PLACE. USE CARE SO AS NOT TO DAMAGE THE CONTAINERS. NOTE: A STACK OF TWO OR MORE CONTAINERS MUST BE UNITIZED.
4. IF DESIRED, AN ANTI-SWAY BRACE, PIECE MARKED ⑤, MAY BE INSTALLED BETWEEN LATERALLY ADJACENT CONTAINERS IN THE BOTTOM LAYER IN LIEU OF USING THE NAILED SIDE BLOCKING, PIECES MARKED ④.
5. ANTI-SWAY BRACES, PIECE MARKED ⑤, ARE REQUIRED FOR UPPER LAYERS OF CONTAINERS WHEN LATERALLY ADJACENT STACKS OF CONTAINERS ARE NOT AGAINST EACH OTHER AND WHEN THE STACKS ARE MORE THAN ONE LAYER HIGH.
6. ONE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LOAD OF NOT MORE THAN 8,500 POUNDS.

KEY NUMBERS

① END GATE (1 REQD). SEE THE DETAIL ON PAGE 20. POSITION WITH THE HORIZONTAL PIECES AGAINST THE CAR ENDWALL. SEE SPECIAL NOTE 2 AT LEFT.

② UNITIZING STRAP, 1-1/4" X .035" OR.031" X 11'-3" LONG STEEL STRAPPING (4 REQD). SEE THE "CONTAINER STACKING DETAIL" ON PAGE 5. SEE SPECIAL NOTE 3 AT LEFT.

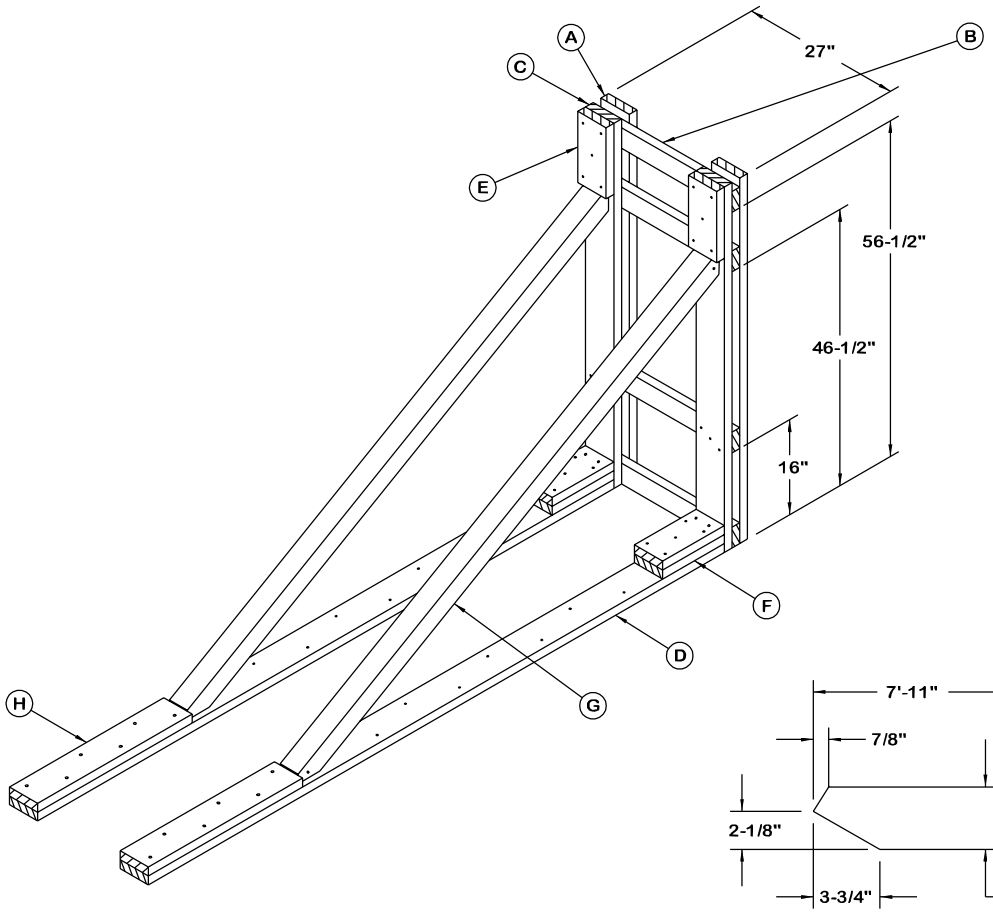
③ SEAL FOR 1-1/4" UNITIZING STRAP (4 REQD). NOTCH EACH SEAL WITH TWO PAIR OF NOTCHES. SEE THE "CONTAINER STACKING DETAIL" AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.

④ SIDE BLOCKING, 2" X 6" X 24" (DOUBLED) (4 REQD). POSITION PARALLEL WITH THE SIDE OF THE CONTAINER AND WITHIN 12" OF THE END OF THE CONTAINER. NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE 4 AT LEFT.

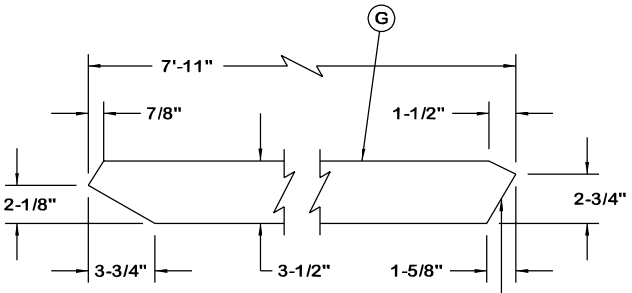
⑤ ANTI-SWAY BRACE (1 REQD). SEE THE DETAIL ON PAGE 19. SEE SPECIAL NOTE 5 AT LEFT.

⑥ KNEE BRACE ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 17.

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



KNEE BRACE ASSEMBLY



THE BRACE MUST BE INSTALLED SO THAT THIS BEARING SURFACE WILL BE IN CONTACT WITH THE VERTICAL PIECE MARKED Ⓒ.

BRACE BEVEL DETAIL

4" X 4" MATERIAL

KEY LETTERS

Ⓐ LOAD BEARING PIECE, 2" X 6" X 61-1/2" (2 REQD).

Ⓑ TIE PIECE, 2" X 4" X 27" (4 REQD). NAIL TO THE LOAD BEARING PIECE, PIECE MARKED Ⓐ, W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTES "J" AND "K" ON PAGE 2.

Ⓒ VERTICAL PIECE, 2" X 6" X 61-1/2" (2 REQD). NAIL TO THE FLOOR CLEAT, PIECE MARKED Ⓓ, W/2-16d NAILS. NAIL TO THE TIE PIECES W/3-10d NAILS AT EACH JOINT.

Ⓓ FLOOR CLEAT, 2" X 6" X 9'-4" (2 REQD). NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8". SEE GENERAL NOTE "S.1" ON PAGE 3.

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

Ⓕ POCKET CLEAT, 2" X 6" X 12" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED Ⓓ, W/5-16d NAILS. NAIL THE SECOND PIECE IN A LIKE MANNER AND TOENAIL THE SECOND PIECE TO THE VERTICAL PIECE, PIECE MARKED Ⓒ, W/2-16d NAILS.

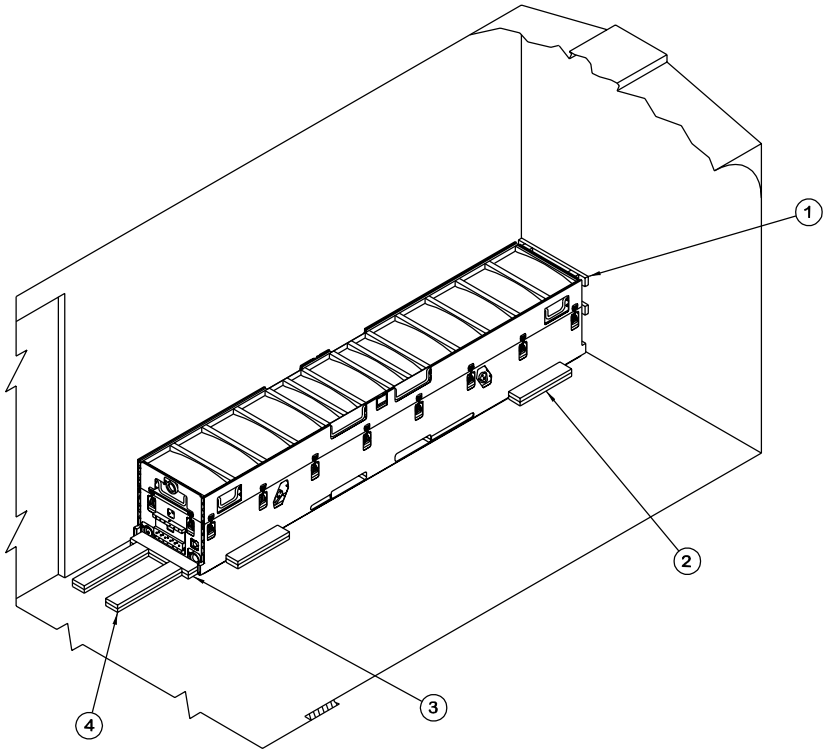
Ⓖ BRACE, 4" X 4" X 7'-11" (2 REQD). SEE THE DETAIL ABOVE FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT, PIECES MARKED Ⓒ AND Ⓓ, W/2-16d NAILS.

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

BILL OF MATERIAL ●

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	9	6
2" X 6"	50	50
4" X 4"	16	21
NAILS	**NO. REQD**	**POUNDS**
10d (3")	58	1
16d (3-1/2")	64	1-1/2
40d (5")	12	3/4

● THIS BILL OF MATERIAL IS FOR ONE KNEE BRACE ASSEMBLY.



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-4" WIDE CONVENTIONAL BOXCAR IS SHOWN. CARS OF OTHER WIDTHS MAY BE USED.
2. THE PROCEDURES SHOWN ARE ONLY FOR USE IN BOXCARS HAVING WOODEN OR NAILABLE METAL FLOORS. SEE GENERAL NOTE "S.1" ON PAGE 3.
3. THE CONTAINER MAY BE POSITIONED ANYWHERE IN THE CAR. IF THE CONTAINER IS NOT POSITIONED AGAINST THE END AND SIDEWALLS OF THE CAR, ADDITIONAL SIDE BLOCKING, HEADERS, AND/OR BACK-UP CLEATS WILL BE REQUIRED AND THE ENDGATE MAY BE ELIMINATED, DEPENDING UPON THE LOCATION OF THE CONTAINER WITHIN THE CAR.
4. IF MORE THAN ONE CONTAINER IS TO BE TRANSPORTED, THE LOAD SHOULD BE FORMED IN ROWS, WITH THE CONTAINERS POSITIONED AGAINST OPPOSITE SIDEWALLS.
5. THE LOAD AS SHOWN IS ADEQUATE FOR RETAINING 9,000 POUNDS, OR THREE CONTAINERS LONGITUDINALLY.

KEY NUMBERS

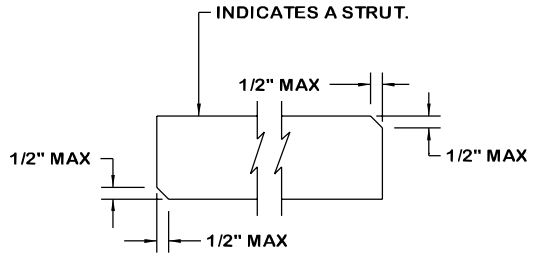
(1) ALTERNATIVE END GATE (1 REQD). SEE THE DETAIL ON PAGE 21. POSITION WITH THE HORIZONTAL PIECES AGAINST THE CAR ENDWALL.

(2) SIDE BLOCKING, 2" X 6" X 24" (DOUBLED) (4 REQD). POSITION PARALLEL WITH THE SIDE OF THE CONTAINER AND WITHIN 12" OF THE END OF THE CONTAINER. NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

(3) HEADER, 2" X 6" X 27" (DOUBLED) (1 REQD). INSTALL AGAINST THE CONTAINER ENDWALL. NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

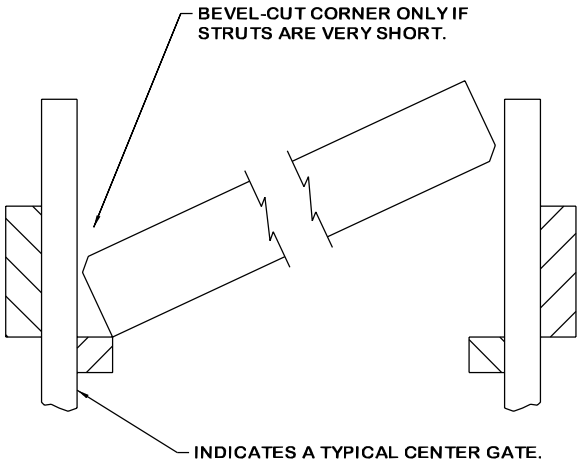
(4) BACK-UP CLEAT, 2" X 6" X 30" (DOUBLED) (2 REQD). INSTALL AGAINST THE HEADER, PIECE MARKED (3), WITH THE OUTSIDE EDGE OF THE BACK-UP CLEAT 3" FROM THE END OF THE HEADER. NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/6-40d NAILS.

TYPICAL LCL LOAD USING NAILED BLOCKING METHOD OF PARTIAL-LAYER BRACING



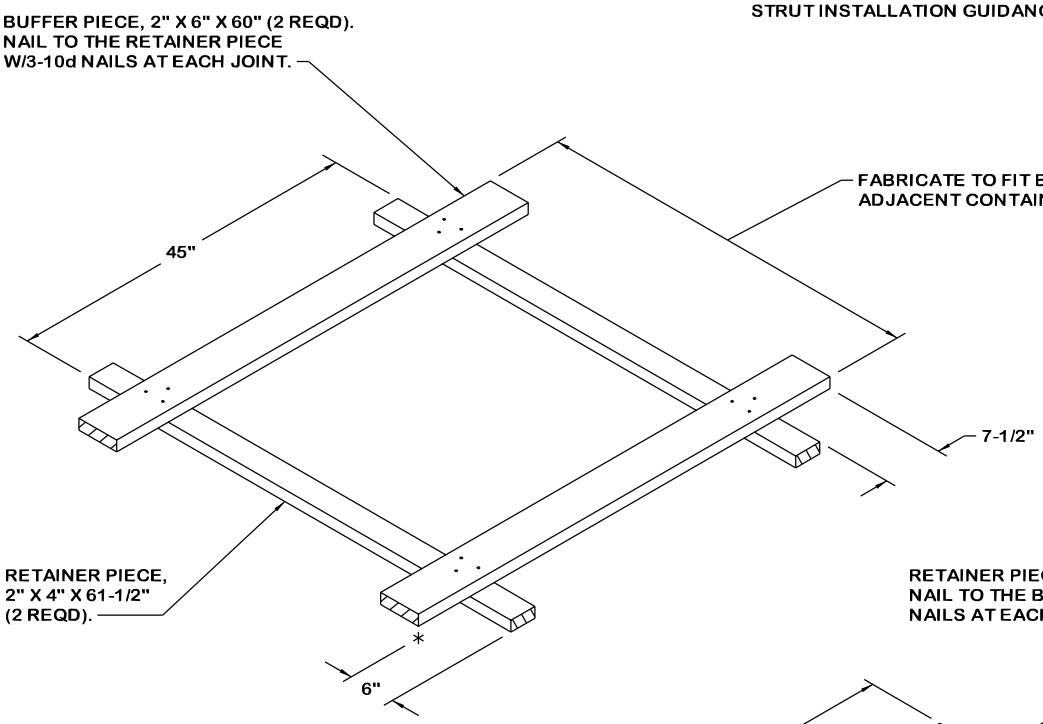
BEVEL-CUT

IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT CENTER-GATE-TO-CENTER-GATE FIT.



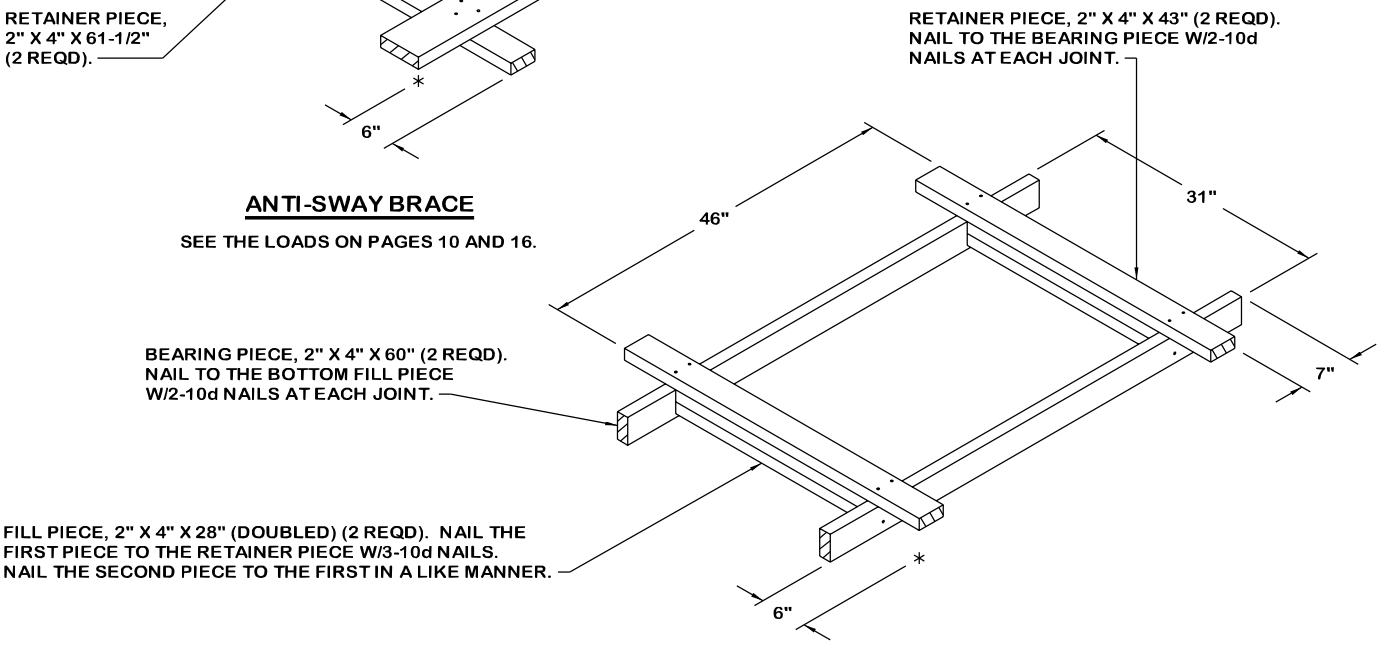
STRUT INSTALLATION

SEE GENERAL NOTE "S.4" ON PAGE 3 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.



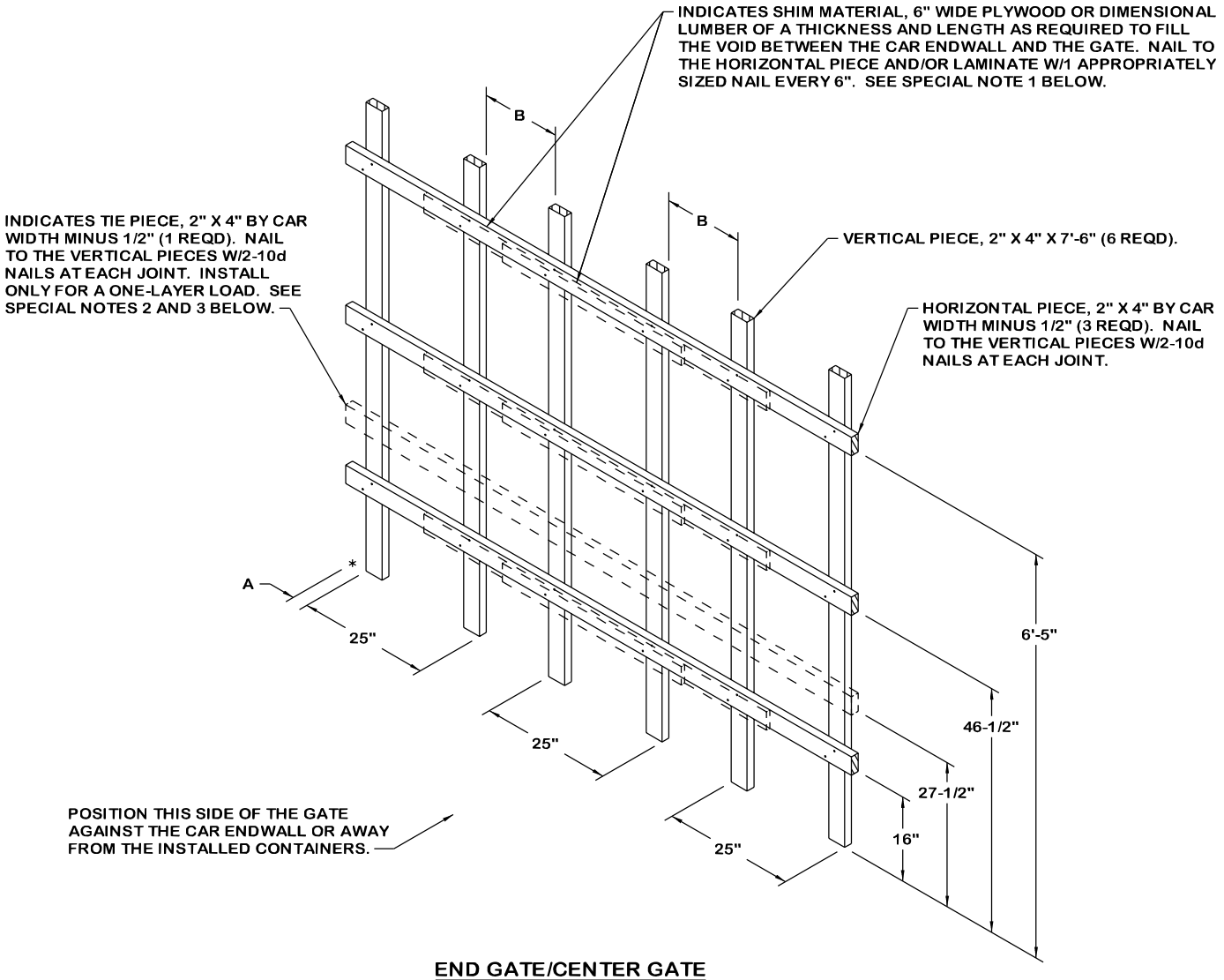
ANTI-SWAY BRACE

SEE THE LOADS ON PAGES 10 AND 16.



SPACER ASSEMBLY

SEE THE LOAD ON PAGE 12.



END GATE/CENTER GATE

SEE CHART NO. 1 BELOW FOR DIMENSIONS "A" AND "B". THE GATE SHOWN IS FOR A THREE-LAYER LOAD. FOR ONE AND TWO-LAYER LOADS, SEE SPECIAL NOTE 2 BELOW.

CHART NO. 1
LOCATIONS OF VERTICAL PIECES

	BOXCAR WIDTH	CONTAINER STACKS SEPARATED ●	CONTAINER STACKS ADJACENT ●●
A	9'-6"	3"	13-1/4" ▲
B	9'-6"	16-1/4" ▲	6"
A	9'-4"	3"	12-1/4" ▲
B	9'-4"	15-1/4" ▲	6"
A	9'-2"	3"	11-1/4" ▲
B	9'-2"	14-1/4" ▲	6"
A	8'-6"	3"	7-1/4" ▲
B	8'-6"	10-1/4" ▲	6"

● SEE THE LOAD ON PAGE 6 FOR AN EXAMPLE.
●● SEE THE LOAD ON PAGE 8 FOR AN EXAMPLE.
▲ SEE SPECIAL NOTE 4 AT RIGHT.

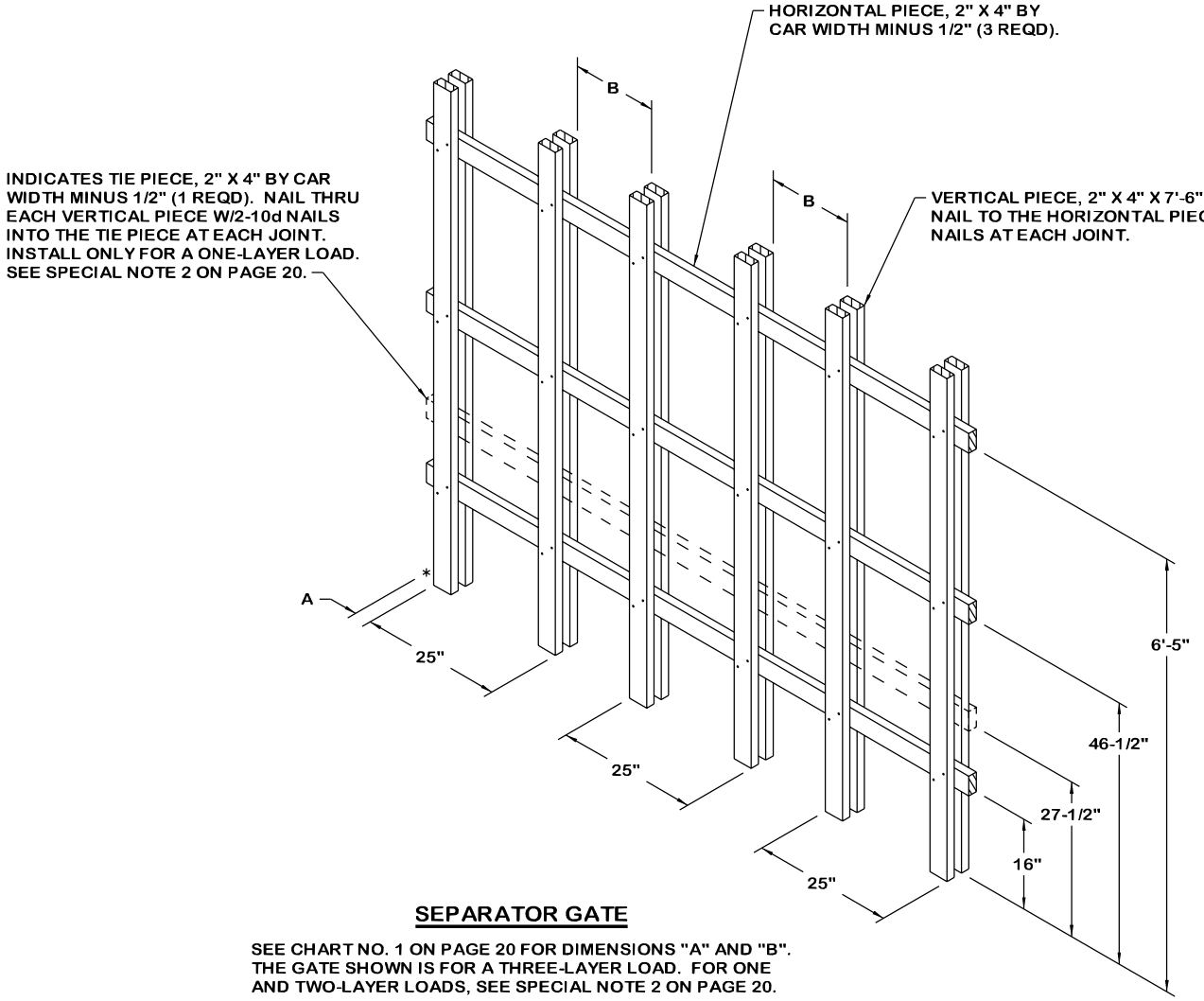
SPECIAL NOTES:

1. IF A BOXCAR TO BE LOADED HAS BOWED ENDWALLS WHICH ARE BOWED OUTWARD MORE THAN TWO INCHES FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, THE END GATE ADJACENT TO AN END-WALL MUST HAVE SHIM MATERIAL INSTALLED TO PROVIDE A "SQUARED-OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR.

2. THE END GATE/CENTER GATE OR SEPARATOR GATE SHOWN IS FOR A THREE-LAYER LOAD. FOR A TWO-LAYER LOAD, ELIMINATE THE TOP HORIZONTAL PIECE AND REDUCE THE HEIGHT OF THE VERTICAL PIECES TO 60". FOR A ONE-LAYER LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES, REDUCE THE HEIGHT OF THE VERTICAL PIECES TO 31", AND INSTALL THE TIE PIECE.

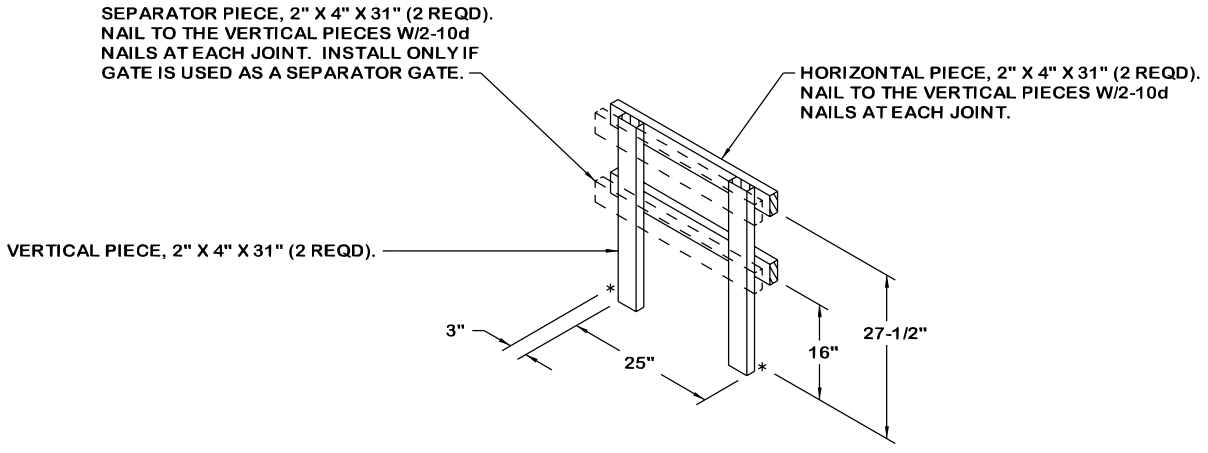
3. SHIM MATERIAL ON THE TIE PIECE (FOR A ONE-LAYER LOAD) IS NOT SHOWN IN THE VIEW DEPICTED ABOVE FOR CLARITY PURPOSES. IF SHIM MATERIAL IS REQUIRED, IT MUST BE INSTALLED ON THE TIE PIECE FOR THE END GATE/CENTER GATE AS WELL AS THE HORIZONTAL PIECE.

4. DUE TO THE VARIANCE IN CONTAINER PLACEMENT AND THE WIDTHS OF RAILCARS, FIELD CHECK THE DIMENSIONS, MARKED IN CHART NO. 1 WITH ▲, TO ENSURE A CORRECT INTERFACE BETWEEN THE CONTAINERS AND THE END GATE/CENTER GATE OR SEPARATOR GATE.



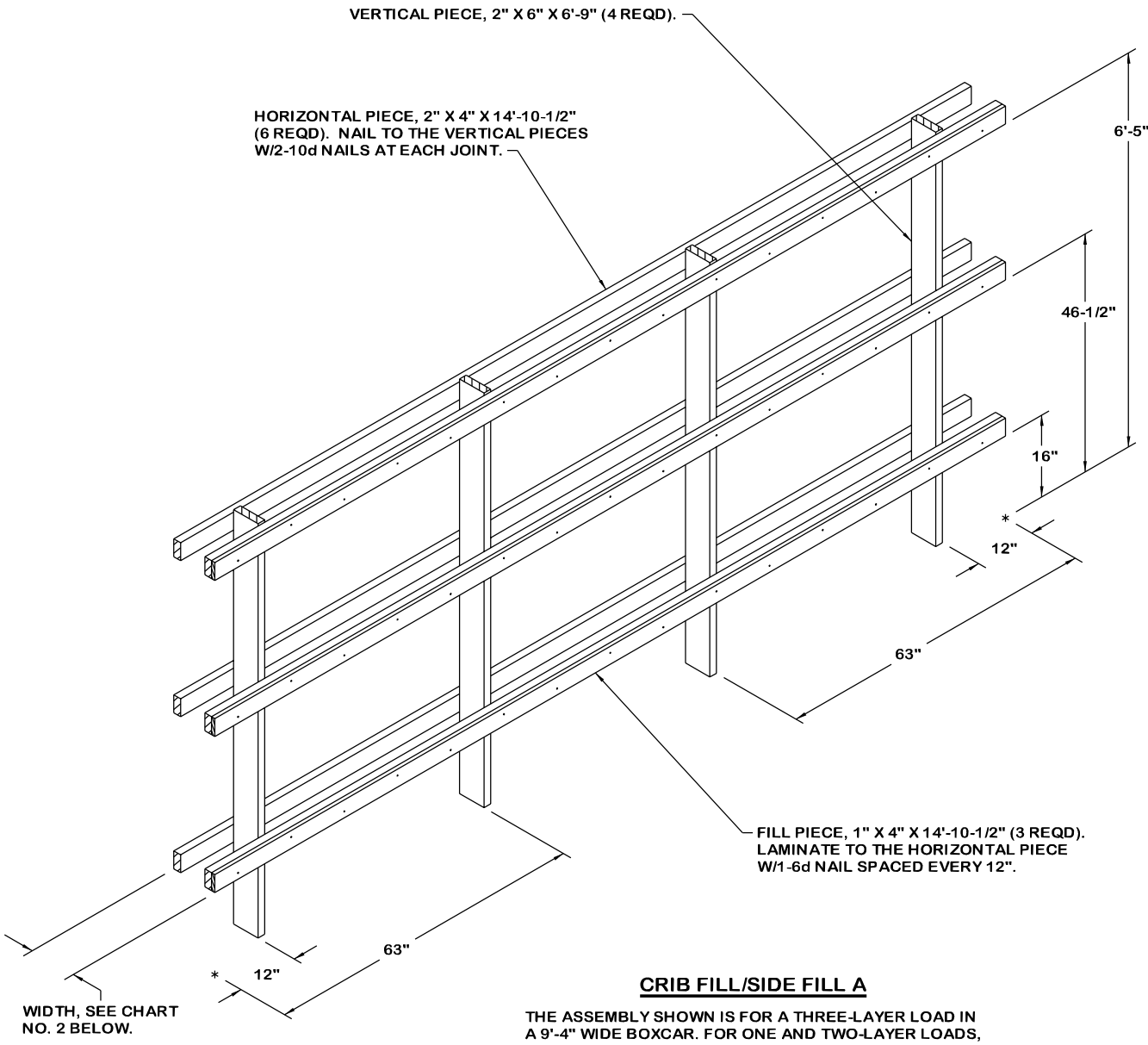
SEPARATOR GATE

SEE CHART NO. 1 ON PAGE 20 FOR DIMENSIONS "A" AND "B". THE GATE SHOWN IS FOR A THREE-LAYER LOAD. FOR ONE AND TWO-LAYER LOADS, SEE SPECIAL NOTE 2 ON PAGE 20.



ALTERNATIVE END GATE/SEPARATOR GATE

THIS GATE MAY BE USED FOR CAR ENDWALL BLOCKING OF A SINGLE-LAYER CONTAINER OR TWO LONGITUDINALLY ADJACENT SINGLE-LAYER CONTAINERS. SEE THE LOAD ON PAGE 18 FOR AN EXAMPLE. IT MAY ALSO BE USED AS A SEPARATOR GATE BETWEEN TWO LONGITUDINALLY ADJACENT SINGLE-LAYER CONTAINERS IF THE SEPARATOR PIECES ARE INSTALLED. NOTE: IF USED AS END BLOCKING AGAINST A CAR ENDWALL, SHIM MATERIAL MAY BE REQUIRED. SEE SPECIAL NOTE 1 ON PAGE 20.



CRIB FILL/SIDE FILL A

THE ASSEMBLY SHOWN IS FOR A THREE-LAYER LOAD IN A 9'-4" WIDE BOXCAR. FOR ONE AND TWO-LAYER LOADS, SEE SPECIAL NOTE 1 BELOW. FOR OTHER WIDTH BOXCARS, SEE CHART NO. 2 AND SPECIAL NOTE 2 BELOW.

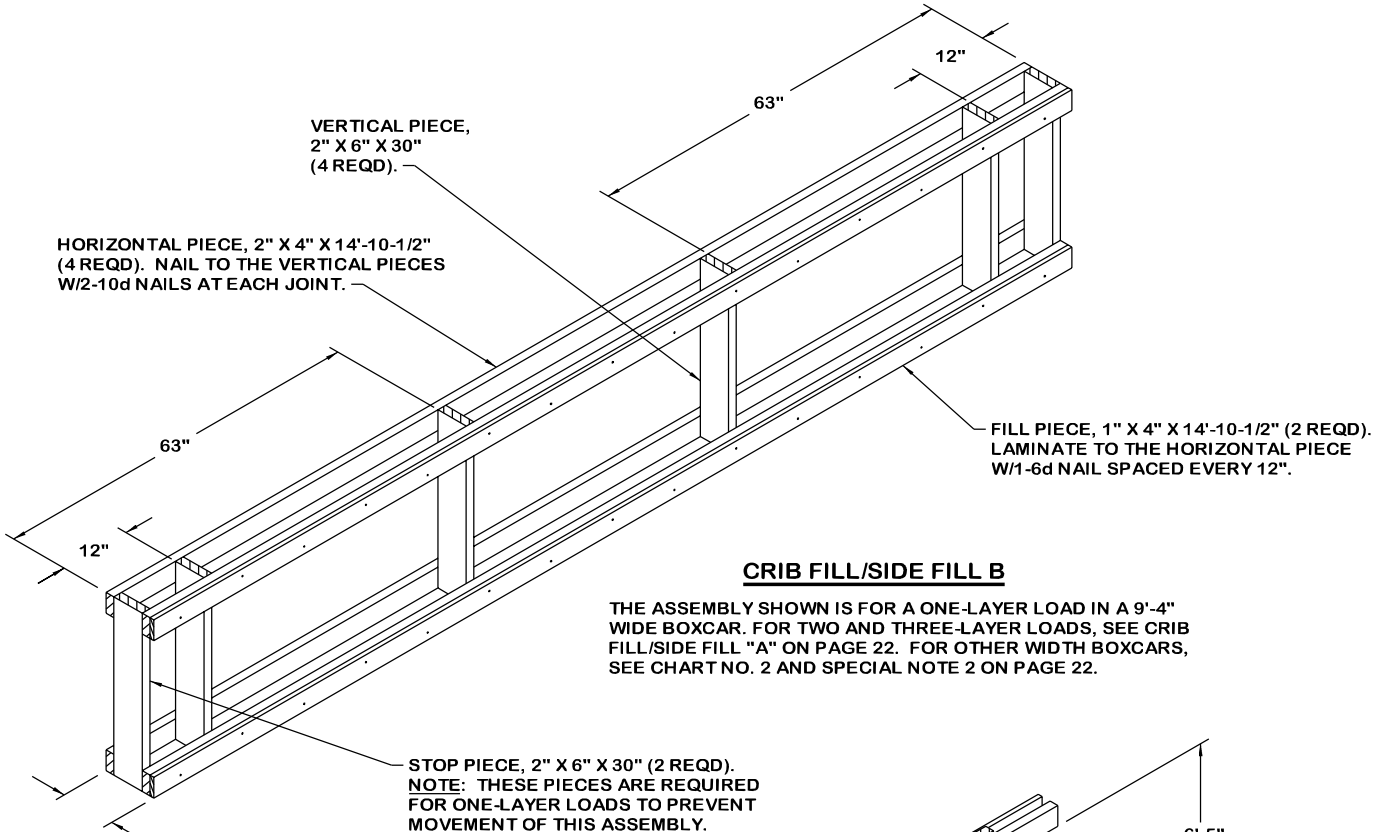
CHART NO. 2
CRIB FILL/SIDE FILL WIDTHS

BOXCAR WIDTH	VERTICAL PIECE	HORIZONTAL PIECES	FILL PIECE●	WIDTH
9'-6"	2" X 8"	2 2" X 4"	NONE	10-1/4"
9'-4"	2" X 6"	2 2" X 4"	1" X 4"	9-1/4"
9'-2"	2" X 6"	1 2" X 4" 1 1" X 4"	NONE	7-3/4"
8'-6"	SEE CRIB FILL/SIDE FILL "C" ON PAGE 23.			

●SEE SPECIAL NOTE 3 AT RIGHT.

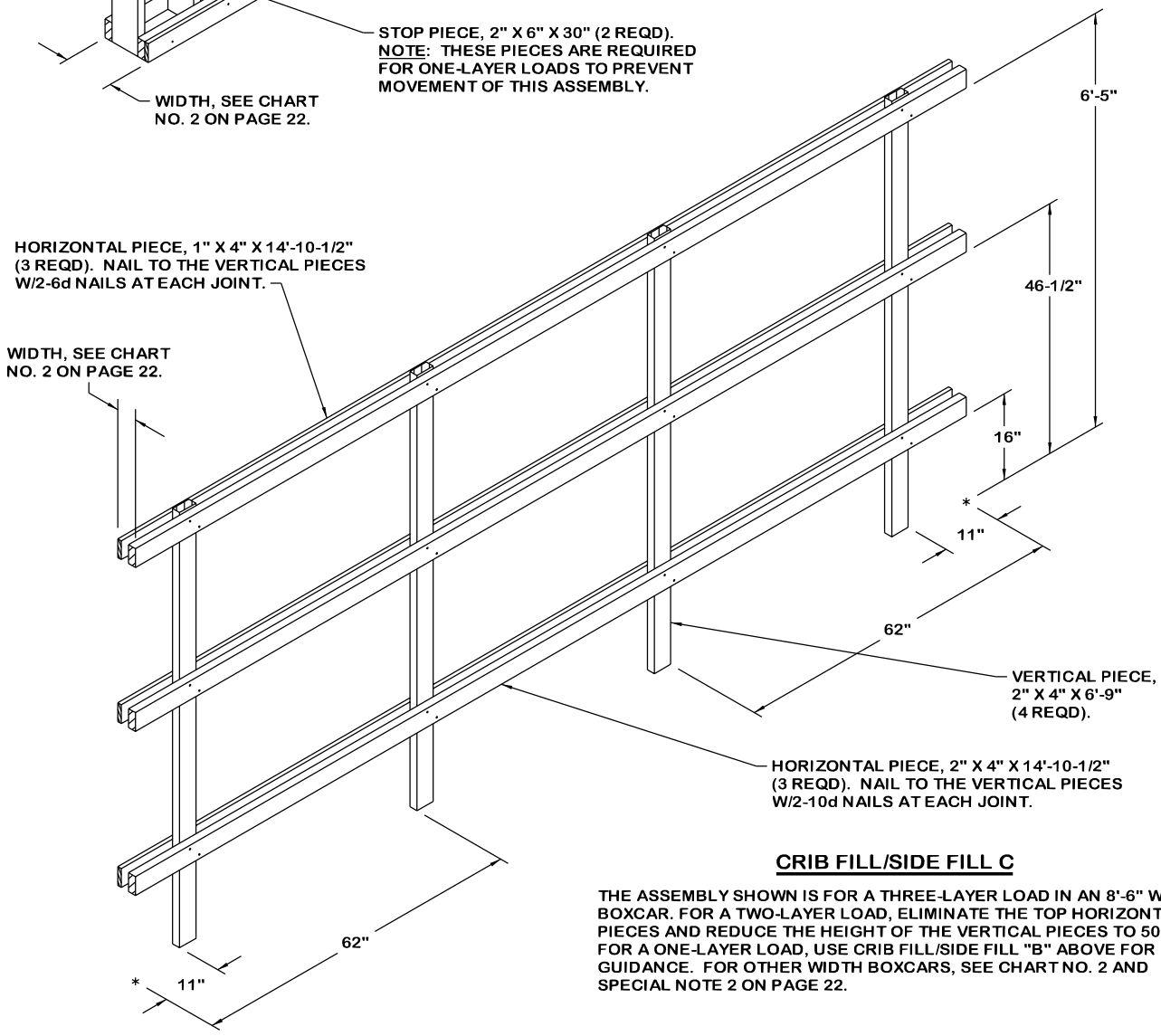
SPECIAL NOTES:

1. THE ASSEMBLY SHOWN IS FOR A THREE-LAYER LOAD. FOR A TWO-LAYER LOAD, ELIMINATE THE TOP HORIZONTAL PIECES AND REDUCE THE HEIGHT OF THE VERTICAL PIECES TO 50". FOR A ONE-LAYER LOAD, USE CRIB FILL/SIDE FILL "B", DEPICTED ON PAGE 23.
2. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN 2". TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE CRIB FILL/SIDE FILL ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OR ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES. SEE CHART NO. 2 AT LEFT FOR GUIDANCE.
3. DUE TO THE VARIANCE IN CONTAINER PLACEMENT AND THE WIDTHS OF RAILCARS, FIELD CHECK THE WIDTH OF THE SPACE TO BE FILLED. THE THICKNESS OF THE FILL PIECES GIVEN IN CHART NO. 2 MAY BE ADJUSTED OR ADDITIONAL FILL PIECES ADDED TO ENSURE THAT THE SPACE IS FILLED ADEQUATELY.



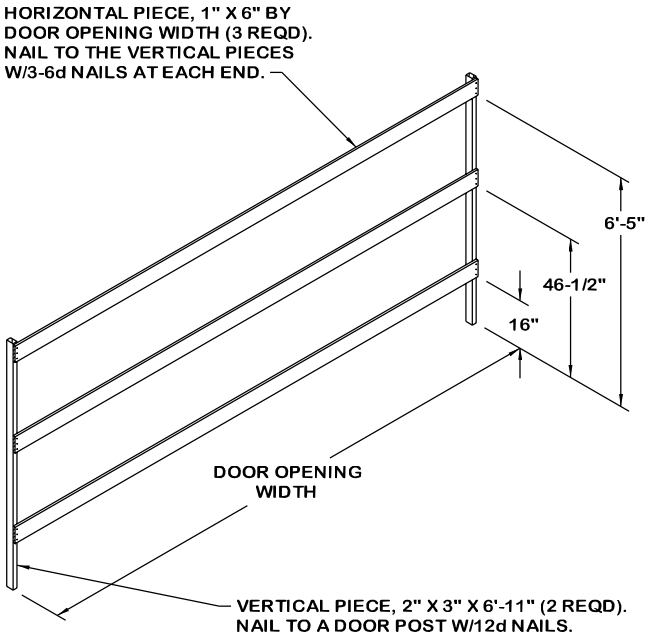
CRIB FILL/SIDE FILL B

THE ASSEMBLY SHOWN IS FOR A ONE-LAYER LOAD IN A 9'-4" WIDE BOXCAR. FOR TWO AND THREE-LAYER LOADS, SEE CRIB FILL/SIDE FILL "A" ON PAGE 22. FOR OTHER WIDTH BOXCARS, SEE CHART NO. 2 AND SPECIAL NOTE 2 ON PAGE 22.



CRIB FILL/SIDE FILL C

THE ASSEMBLY SHOWN IS FOR A THREE-LAYER LOAD IN AN 8'-6" WIDE BOXCAR. FOR A TWO-LAYER LOAD, ELIMINATE THE TOP HORIZONTAL PIECES AND REDUCE THE HEIGHT OF THE VERTICAL PIECES TO 50". FOR A ONE-LAYER LOAD, USE CRIB FILL/SIDE FILL "B" ABOVE FOR GUIDANCE. FOR OTHER WIDTH BOXCARS, SEE CHART NO. 2 AND SPECIAL NOTE 2 ON PAGE 22.

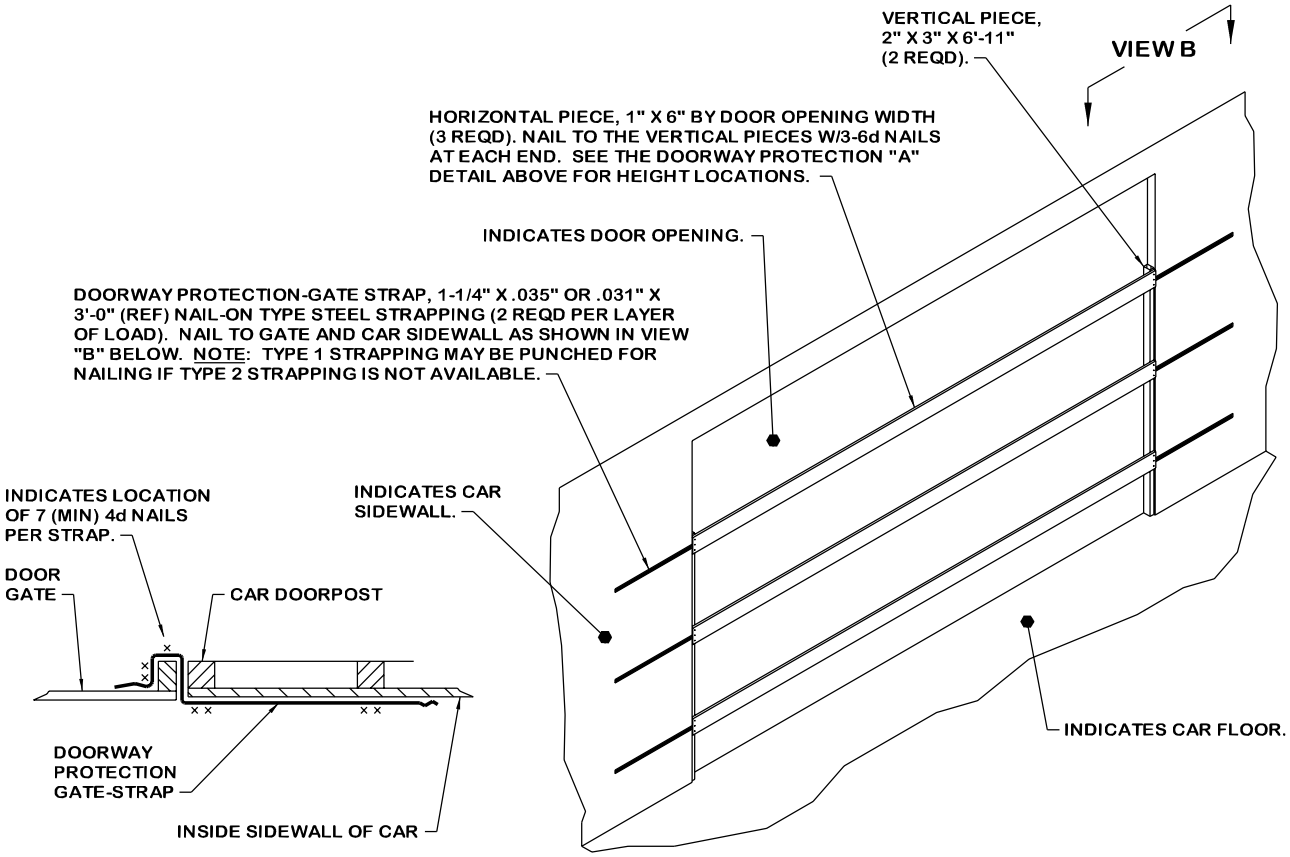


DOORWAY PROTECTION A

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 AND BUNDLING STRAPS ARE REQUIRED FOR DOORWAY PROTECTION IF NONE OF THE ABOVE METHODS CAN BE USED. SEE THE LOADS ON PAGES 8 AND 12 FOR GUIDANCE.
6. THE VIEWS ON PAGES 24 AND 25 DEPICT DOOR 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 BY 30-1/2". FOR A ONE-LAYER LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND/OR STRAPS AND REDUCE THE HEIGHT OF THE VERTICAL PIECES BY 61". FOR DOORWAY PROTECTION "D", MOVE THE SPANNER BY AN APPROPRIATE DISTANCE.

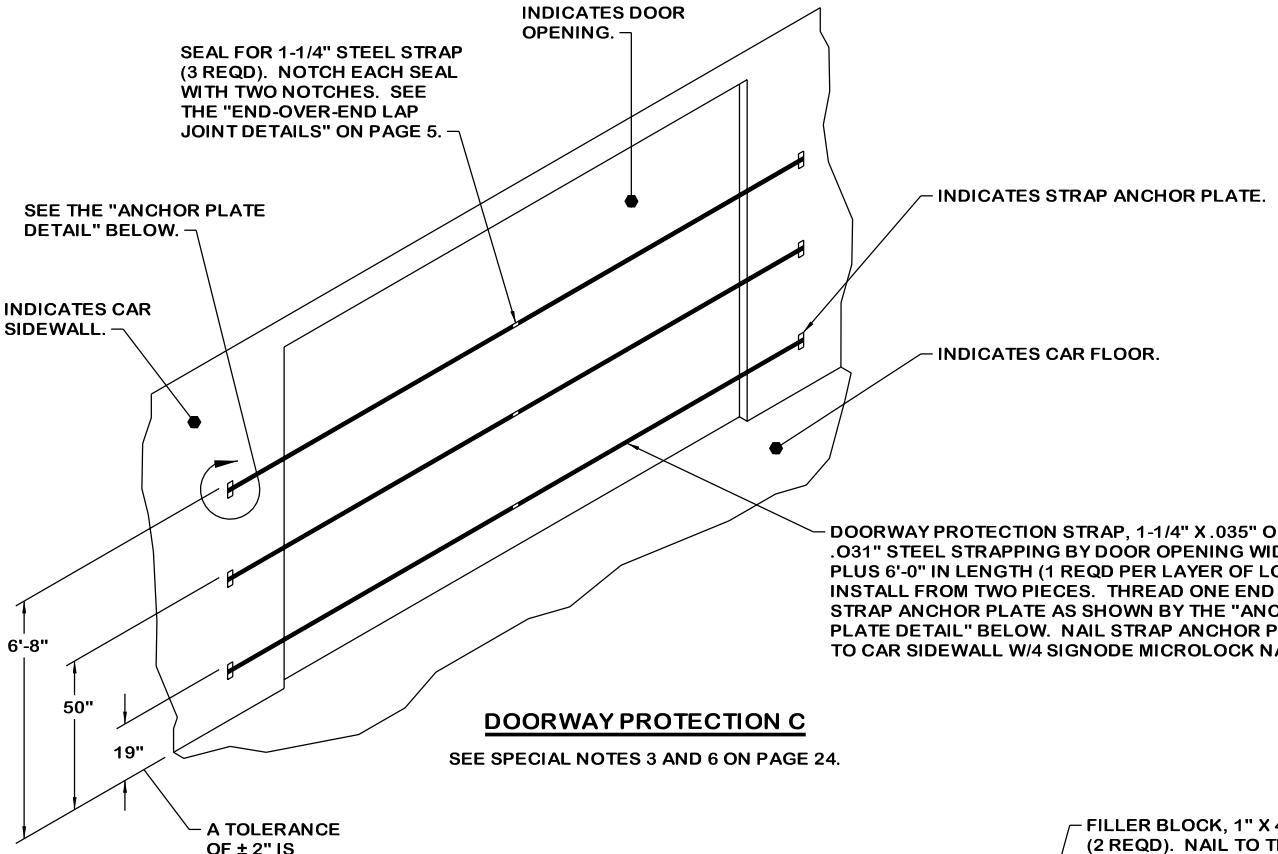


VIEW B

THIS VIEW 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.

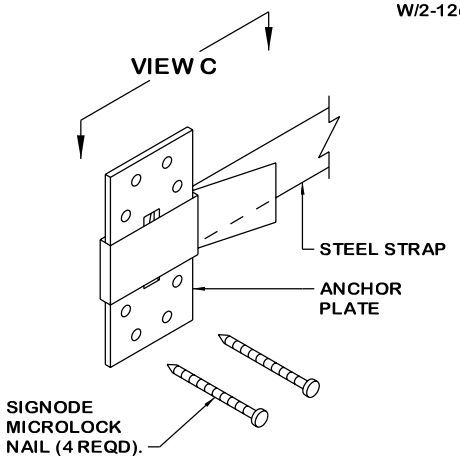
DOORWAY PROTECTION B

SEE SPECIAL NOTES 2 AND 6 ABOVE.



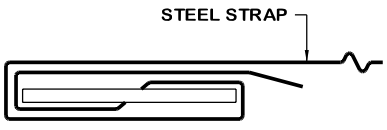
DOORWAY PROTECTION C

SEE SPECIAL NOTES 3 AND 6 ON PAGE 24.

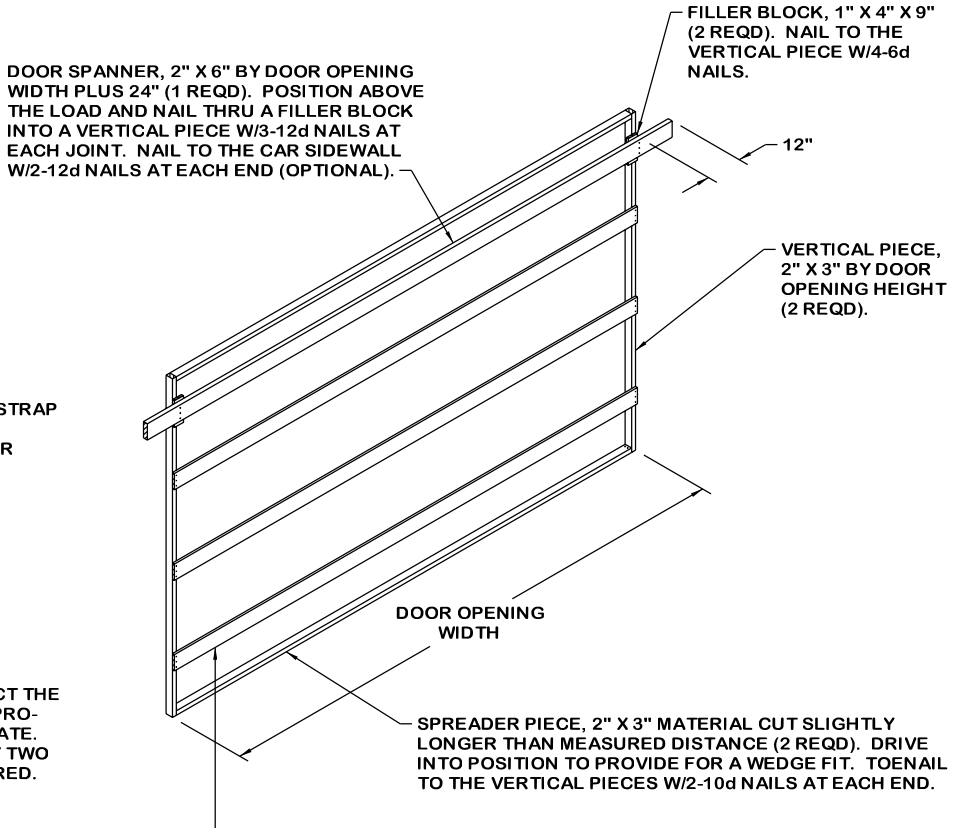


ANCHOR PLATE DETAIL

THIS VIEW AND VIEW "C" BELOW DEPICT THE PROPER THREADING OF A DOORWAY PROTECTION STRAP THRU AN ANCHOR PLATE.
NOTE: FOR CLARITY PURPOSES, ONLY TWO NAILS ARE SHOWN. FOUR ARE REQUIRED.

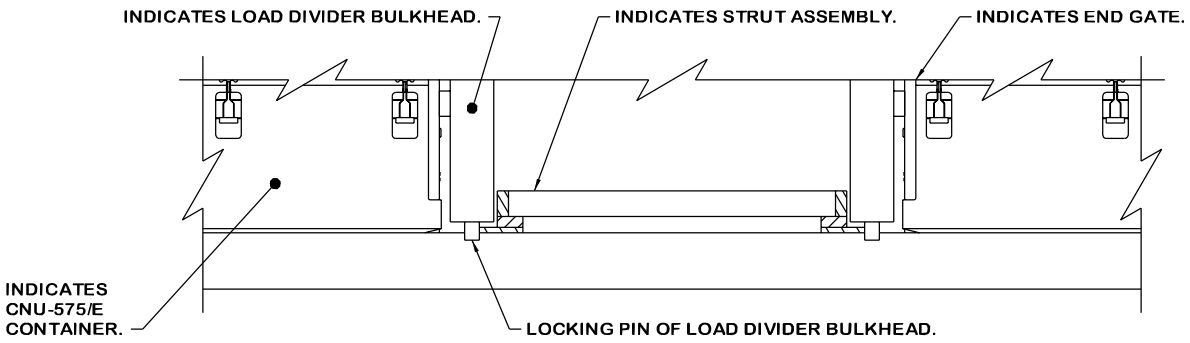


VIEW C



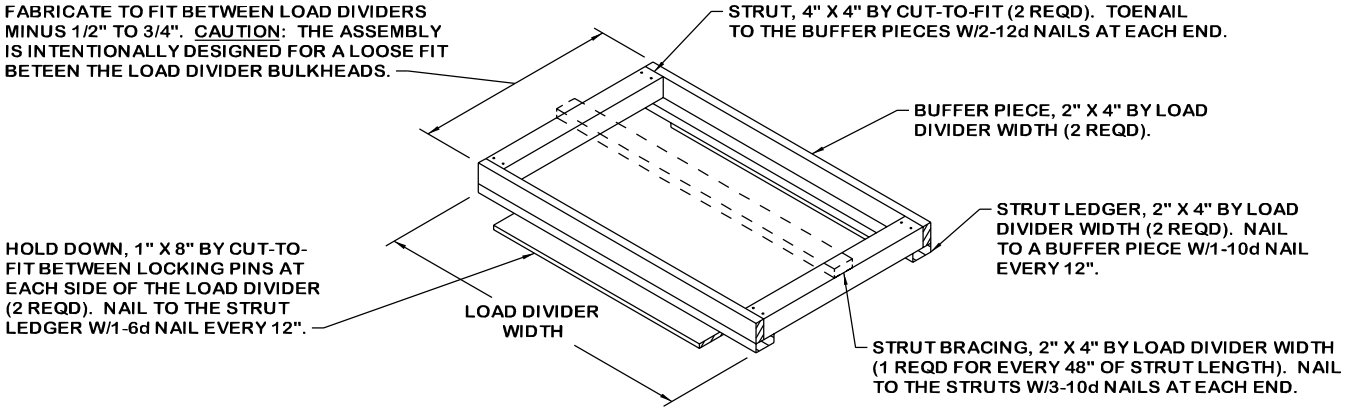
DOORWAY PROTECTION D

SEE SPECIAL NOTES 4 AND 6 ON PAGE 24.



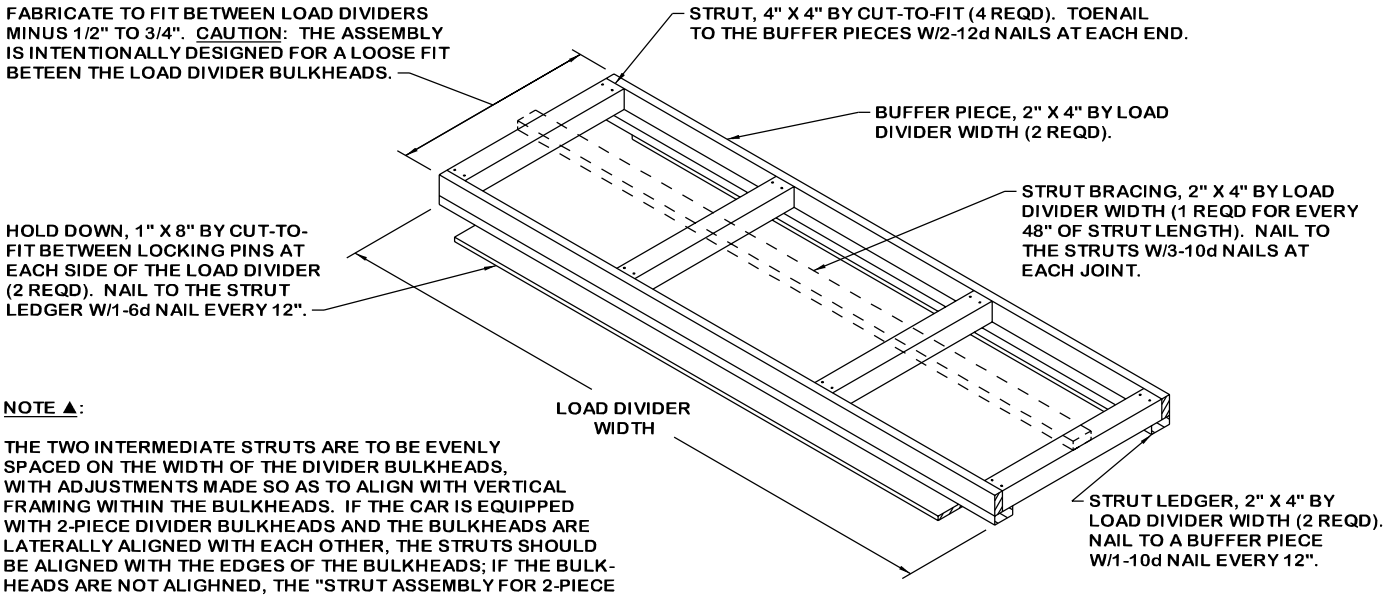
INSTALLATION OF STRUT ASSEMBLY

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.

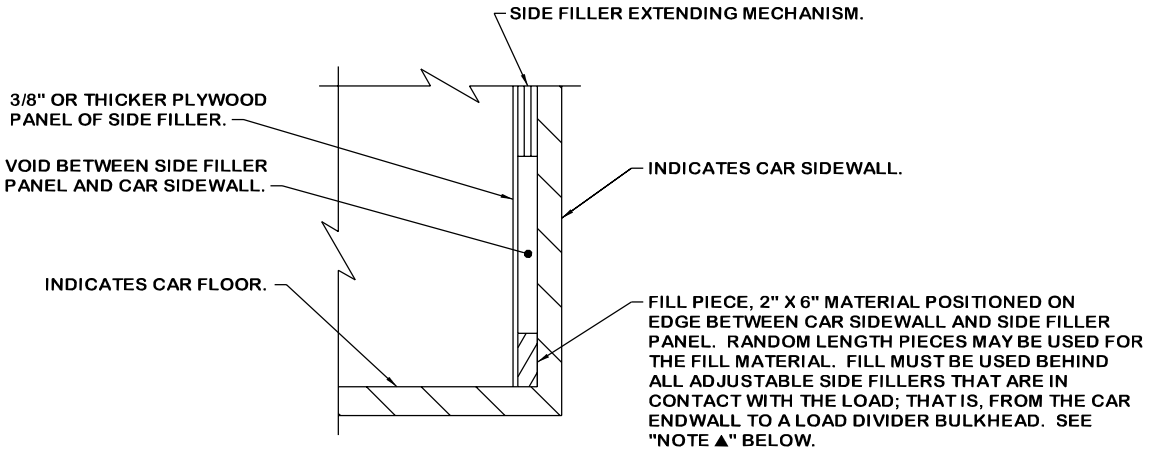


NOTE ▲:

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 ALIGHNED, 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.

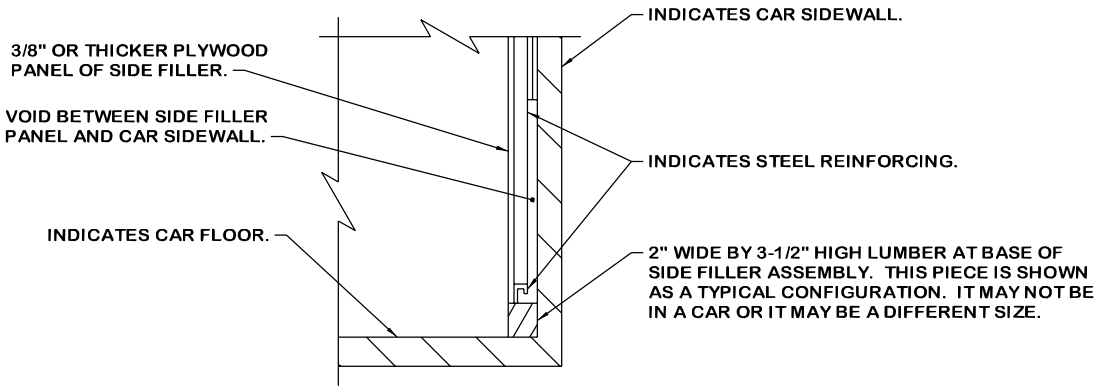


SIDE FILLER TYPICAL TYPE A

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.