

APPROVED BY
BUREAU OF EXPLOSIVES

D. M. - 1h

DATE 1-30-06

LOADING AND BRACING (CL & LCL) IN BOXCARS* OF JOINT DIRECT ATTACK MUNITION (JDAM) PACKED IN CNU-589 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

APPROVED, U.S. ARMY
FIELD SUPPORT COMMAND

Patrick Dougherty

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NOVEMBER 2005

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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 JOINT DIRECT ATTACK MUNITION (JDAM) IN CNU-589 SHIPPING AND STORAGE CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH JDAM ITEMS. SEE PAGE 4 AND PLASTICS RESEARCH CORPORATION DRAWING 103060-101 FOR DETAILS OF THE CONTAINER.
- 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 BULK HEADS.
- E. THE SELECTION OF RAILCARS FOR THE TRANSPORT OF CNU-589 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 18 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, 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.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

- LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
- STRAPPING, STEEL** - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP** - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
- PLYWOOD** - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- STAPLE, STRAP** - - - : COMMERCIAL GRADE.
- ANTI-CHAFING MATERIAL** - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
- WIRE, CARBON STEEL** - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.080" DIA, GRADE 1006 OR BETTER.
- STRAP, POLYESTER** - - : 5/8" X .035" X 1,400 LB BREAKING STRENGTH, POLYCHEM CORPORATION PRODUCT CODE MPC5835

(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 VIEW FOR CLARITY PURPOSES.
- O. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOXCAR BEING LOADED OR THE QUANTITY TO BE SHIPPED, HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. **NOTE:** 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, 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.
- Q. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.
- R. AS REQUIRED BY THE ASSOCIATION OF AMERICAN RAILROADS (AAR), ALL 1-1/4" AND 2" STEEL STRAPPING USED FOR LOAD RESTRAINT MUST BE MARKED AS SPECIFIED WITHIN THE APPLICABLE AAR RULES GOVERNING LOADING, BLOCKING AND BRACING OF FREIGHT WITHIN THE CONVEYANCE. FOR THE SPECIFIC MARKING SIZE, FREQUENCY, ETC., REQUIRED, REFER TO THE APPROPRIATE AAR LOADING RULES.

(CONTINUED ON PAGE 3)

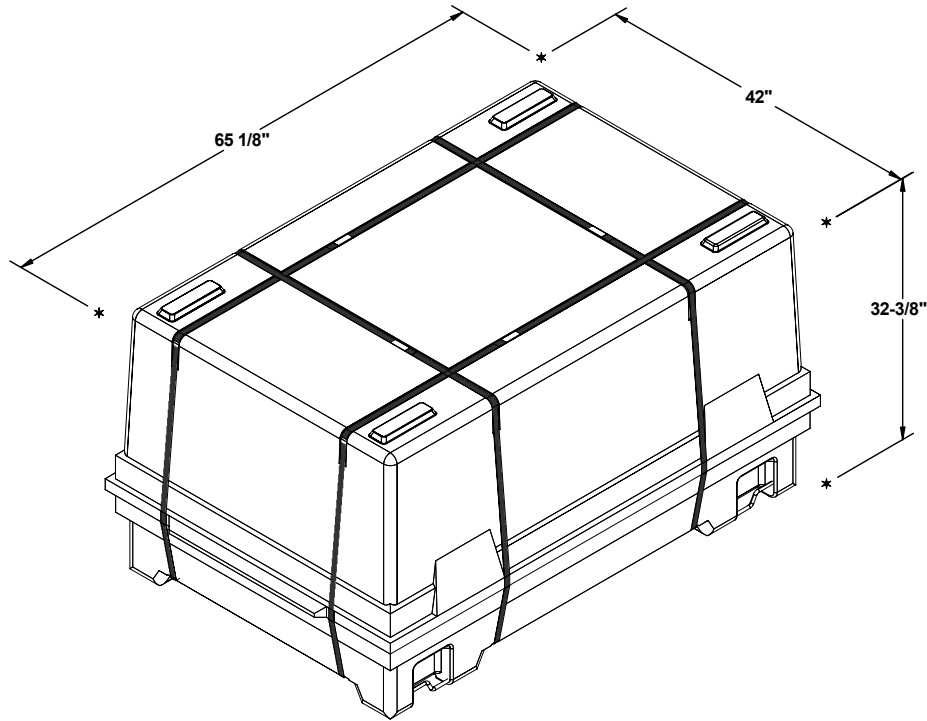
S. FOR CONVENTIONAL TYPE BOXCARS:

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 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 JOINTS BETWEEN THE LAYERS OF 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 8. 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.

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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 24 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 24, 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 16 OR WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGE 15.



CNU-589 CONTAINER

GROSS WEIGHT - - - - - 619 LBS
 CUBE - - - - - 51.4 CU FT

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 UPPER CONTAINER SO THAT THE FEET NEST WITH THE ALIGNMENT LUGS OF THE NEXT LOWER CONTAINER.

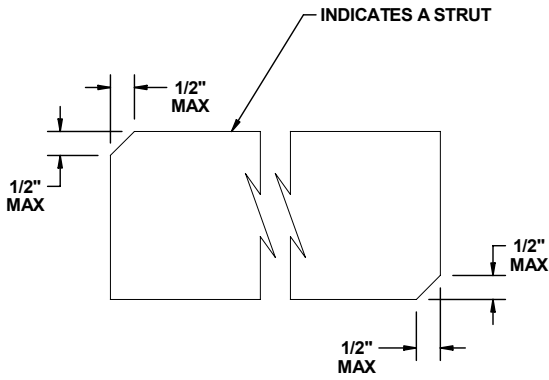
2. INSTALLATION OF UNITIZING STRAPS:

- A. STRAPS WILL BE INSTALLED TO ENCIRCLE THE CONTAINERS WITH THE STRAPPING FLAT AND STRAIGHT WITHIN THE STRAP RECESSES OR SLOTS OF THE CONTAINER; I.E., VERTICAL ALONG THE SIDES AND FLAT ACROSS THE TOP AND BOTTOM OF THE STACK.
- B. TWO STRAPS SHALL BE POSITIONED LATERALLY OR LONGITUDINALLY AS REQUIRED.
- C. STRAPPING WILL BE USED TO SECURE TWO CONTAINERS ONLY. IN ORDER TO UNITIZE A STACK OF 3-HIGH CONTAINERS, INSTALL TWO STRAPS TO ENCIRCLE THE BOTTOM AND MIDDLE CONTAINERS. STACK THE THIRD CONTAINER ON TOP OF THE PREVIOUSLY UNITIZED CONTAINERS AND INSTALL TWO ADDITIONAL STRAPS SECURING THE MIDDLE CONTAINER TO THE TOP CONTAINER.

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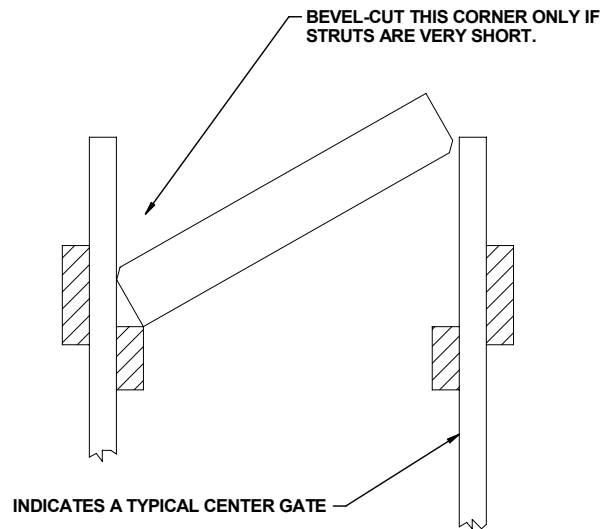
3. CONTAINER OR CONTAINER STACK HANDLING:

- A. ONLY APPROVED AND APPROPRIATELY SIZED MATERIALS 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. **CAUTION:** THE CNU-589 CONTAINER SHELL IS FABRICATED WITH FIBERGLASS AND IS SUSCEPTIBLE TO DAMAGE FROM FORKLIFT TRUCKS. 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.
- C. HANDLING FROM ENDS OF 3-HIGH STACK OF CONTAINERS REQUIRES THE USE OF FORKLIFT EQUIPPED WITH 60" MINIMUM TINE LENGTH OR FORKLIFT EXTENSIONS HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.



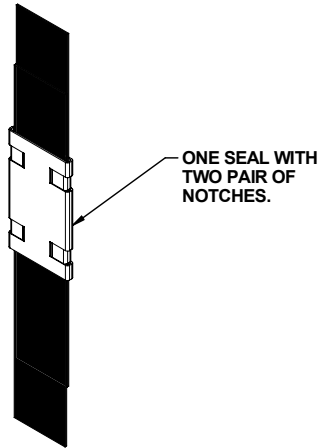
BEVEL CUT

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

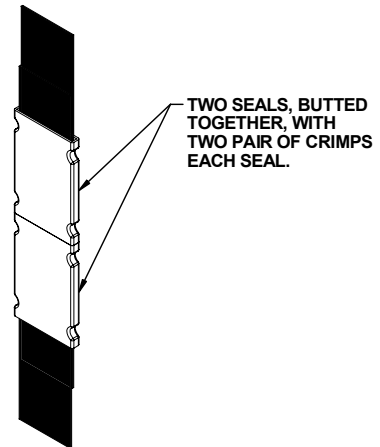


STRUT INSTALLATION

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

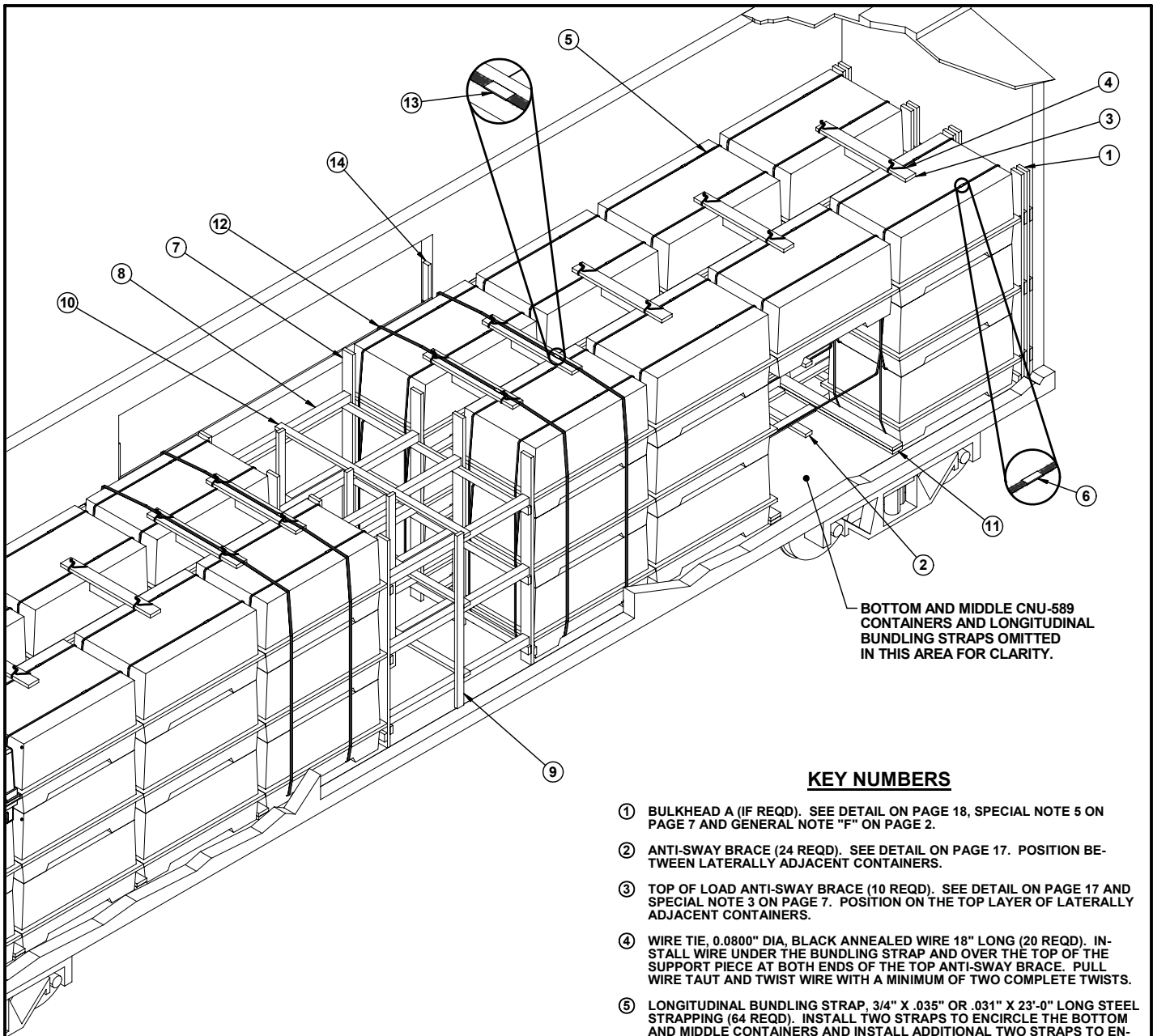


STRAP JOINT A
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.



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

END-OVER-END LAP JOINT DETAILS



BOTTOM AND MIDDLE CNU-589 CONTAINERS AND LONGITUDINAL BUNDLING STRAPS OMITTED IN THIS AREA FOR CLARITY.

KEY NUMBERS

- ① BULKHEAD A (IF REQD). SEE DETAIL ON PAGE 18, SPECIAL NOTE 5 ON PAGE 7 AND GENERAL NOTE "F" ON PAGE 2.
- ② ANTI-SWAY BRACE (24 REQD). SEE DETAIL ON PAGE 17. POSITION BETWEEN LATERALLY ADJACENT CONTAINERS.
- ③ TOP OF LOAD ANTI-SWAY BRACE (10 REQD). SEE DETAIL ON PAGE 17 AND SPECIAL NOTE 3 ON PAGE 7. POSITION ON THE TOP LAYER OF LATERALLY ADJACENT CONTAINERS.
- ④ WIRE TIE, 0.0800" DIA, BLACK ANNEALED WIRE 18" LONG (20 REQD). INSTALL WIRE UNDER THE BUNDLING STRAP AND OVER THE TOP OF THE SUPPORT PIECE AT BOTH ENDS OF THE TOP ANTI-SWAY BRACE. PULL WIRE TAUT AND TWIST WIRE WITH A MINIMUM OF TWO COMPLETE TWISTS.
- ⑤ LONGITUDINAL BUNDLING STRAP, 3/4" X .035" OR .031" X 23'-0" LONG STEEL STRAPPING (64 REQD). INSTALL TWO STRAPS TO ENCIRCLE THE BOTTOM AND MIDDLE CONTAINERS AND INSTALL ADDITIONAL TWO STRAPS TO ENCIRCLE THE MIDDLE AND TOP CONTAINERS.
- ⑥ SEAL FOR 3/4" STEEL STRAPPING (64 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.
- ⑦ CENTER GATE A (2 REQD). SEE THE DETAIL ON PAGE 19. SEE SPECIAL NOTE 8 ON PAGE 7.
- ⑧ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 6'-3-1/2") (12 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑨ VERTICAL STRUT BRACING, 2" X 4" X 6'-8" (4 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑩ HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 3" (REF: 8'-3") (3 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑪ SEPARATOR BLOCKING, 2" X 6" X BY CAR WIDTH MINUS 2" (REF: 8'-4") (DOUBLED) (6 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/8-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST W/8-20d NAILS. SEE SPECIAL NOTE 9 ON PAGE 7.
- ⑫ STRAP, BUNDLING, DOORWAY PROTECTION, 1-1/4" X .035" OR .031" X 34'-8" LONG STEEL STRAPPING (4 REQD). INSTALL LATERALLY TO ENCIRCLE THE CONTAINERS IN THE DOORWAY AREA. APPLY TWO STRAPS TO EACH GROUP OF CONTAINERS WITH EACH STRAP SECURING A TOP OF LOAD ANTI-SWAY BRACE TO THE CONTAINERS. SEE SPECIAL NOTE 3 ON PAGE 7.
- ⑬ 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.
- ⑭ DOORWAY PROTECTION A (1 REQD). SEE THE DETAIL ON PAGE 22 AND SPECIAL NOTE 3 ON PAGE 7.

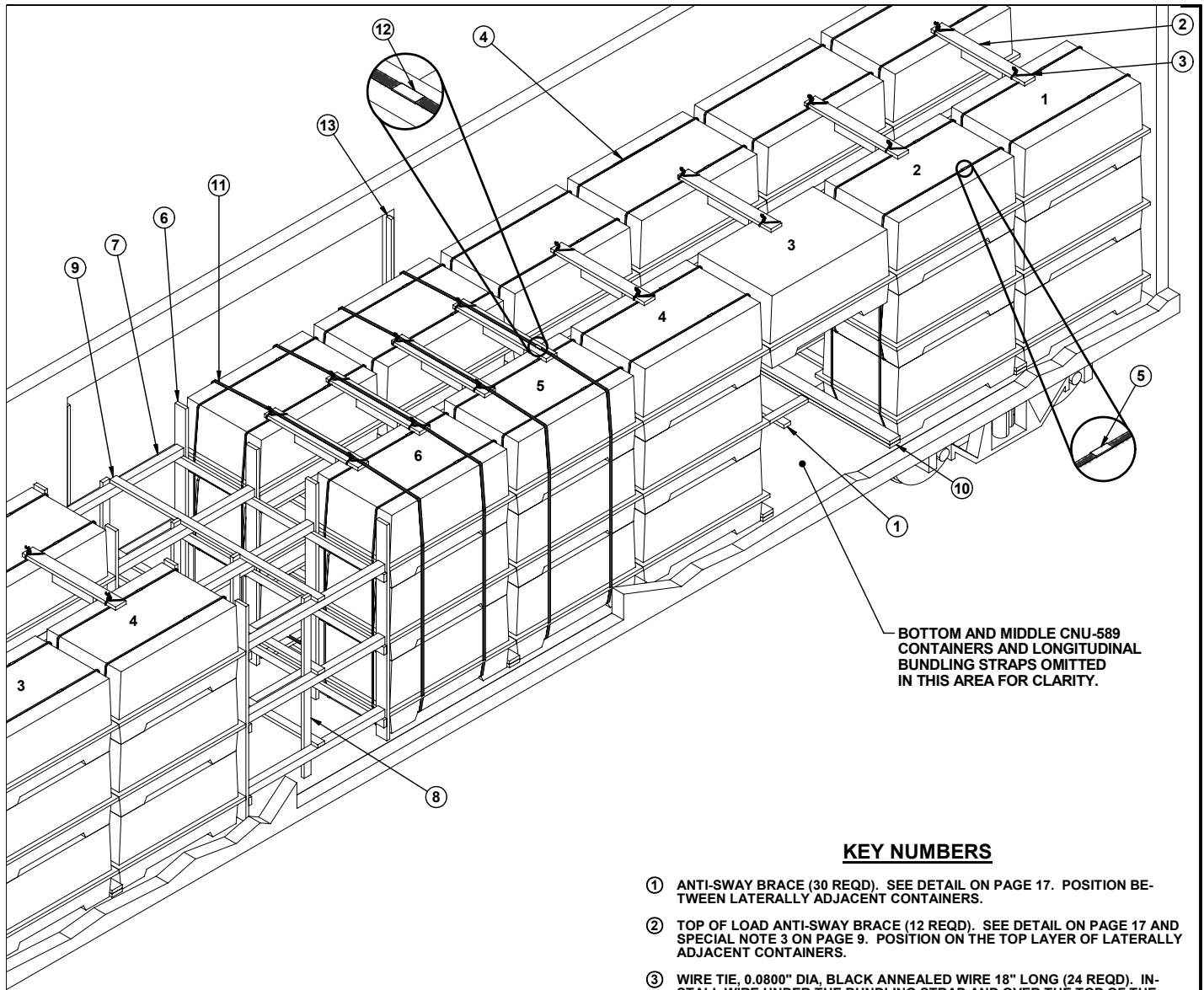
SPECIAL NOTES:

1. A 48 UNIT LOAD OF CNU-589 CONTAINERS IS SHOWN IN A 50'-6" LONG BY 8'-6" WIDE CONVENTIONAL BOXCAR WITH 14'-0" WIDE THROUGH DOORS. BOXCARS OF OTHER DIMENSIONS, AND BOXCARS HAVING WIDER OR NARROWER DOOR OPENINGS, OR OFFSET DOORS CAN BE USED.
2. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING DOORS WHICH DO NOT HAVE NAILABLE DOOR POSTS, REFER TO THE ALTERNATIVE DOORWAY PROTECTION DETAILS ON PAGES 22 AND 23.
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 STACK LENGTH. IN ADDITION, EACH GROUP OF CONTAINER STACKS THAT MEET THE CRITERIA ABOVE, SHALL HAVE TWO DOORWAY PROTECTION BUNDLING STRAPS AND TWO TOP OF LOAD ANTI-SWAY BRACES. THE WOODEN GATE TYPE OF DOORWAY PROTECTION IN THE LOAD ON PAGE 6 IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NON-NAILABLE DOOR POSTS. REFER TO PAGES 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 SPECIAL NOTE 3 ON PAGE 22.
4. FOR SHIPMENTS OF A LOAD WHICH CONTAINS MORE OR LESS CONTAINERS THAN WHAT IS SHOWN, SEE THE PROCEDURES ON PAGES 8 THRU 16.
5. IF THE BOXCAR BEING LOADED HAS BOWED ENDWALLS, WHICH ARE, BOWED OUTWARD 2" OR MORE, EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END OF CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A SQUARED OFF SURFACE FOR THE LOAD AT THE END OF THE CAR. SEE "BULKHEAD A" DETAIL ON PAGE 18 AND GENERAL NOTE "F" ON PAGE 2. A BULKHEAD IS NOT REQUIRED IF THE ENDWALL IS NOT BOWED 2" OR MORE.
6. THE CNU-589 CONTAINERS MAY ALREADY BE STRAPPED WITH LATERALLY POSITIONED BUNDLING STRAPS. THESE STRAPS MAY REMAIN AS IS, HOWEVER, THE ADDITION OF LONGITUDINAL BUNDLING STRAPS AS SHOWN ON PAGE 6 ARE REQUIRED.
7. THE 3/4" STEEL STRAPPING AND SEALS USED FOR LONGITUDINAL BUNDLING STRAPS MAY BE SUBSTITUTED WITH 5/8" X 0.035" POLYESTER STRAPPING, PRODUCT CODE MPC5835 AND SEALED WITH THE BET-700 POWER SEALESS WELDING TOOL. SOURCE OF SUPPLY: POLYCHEM CORPORATION, [HTTP://WWW.POLYCHEM.COM/](http://www.polychem.com/).
8. THE CENTER GATE MAY BE INSTALLED IN TWO SECTIONS (SPLIT) FOR EASE OF INSTALLATION. AFTER INSTALLATION OF THE SPLIT CENTER GATES, TIE PIECES SHALL BE INSTALLED TO JOIN THE TWO SPIT CENTER GATES. SEE THE "TIE PIECE APPLICATION" ON PAGE 21.
9. IF THE BOXCAR BEING LOADED HAS A METAL FLOOR THAT CANNOT BE NAILED, USE THE ALTERNATE SEPARATOR BLOCKING PROCEDURE AS SHOWN ON PAGE 25.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	84	42
2" X 3"	30	15
2" X 4"	470	314
2" X 6"	266	266
4" X 4"	76	101
NAILS	NO. REQD	POUNDS
6d (2")	36	1/4
10d (3")	476	8
16d (3-1/4")	48	1
20d (4")	48	1-1/2
STEEL STRAPPING, 3/4" - 1,472'	REQD - -	139 LBS
SEAL FOR 3/4" STRAPPING - - 64	REQD - -	3/4 LBS
STEEL STRAPPING, 1-1/4" - 139'	REQD - -	20 LBS
SEAL FOR 1-1/4" STRAPPING - 4	REQD - -	1/4 LBS
WIRE, STEEL, 0.080" DIA.- 30'	REQD - - - -	NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-589 CONTAINER - - 48	- - - - -	29,712 LBS
DUNNAGE - - - - -	- - - - -	1,648 LBS
TOTAL WEIGHT - - - - -		31,360 LBS (APPROX)



KEY NUMBERS

- ① ANTI-SWAY BRACE (30 REQD). SEE DETAIL ON PAGE 17. POSITION BETWEEN LATERALLY ADJACENT CONTAINERS.
- ② TOP OF LOAD ANTI-SWAY BRACE (12 REQD). SEE DETAIL ON PAGE 17 AND SPECIAL NOTE 3 ON PAGE 9. POSITION ON THE TOP LAYER OF LATERALLY ADJACENT CONTAINERS.
- ③ WIRE TIE, 0.0800" DIA, BLACK ANNEALED WIRE 18" LONG (24 REQD). INSTALL WIRE UNDER THE BUNDLING STRAP AND OVER THE TOP OF THE SUPPORT PIECE AT BOTH ENDS OF THE TOP ANTI-SWAY BRACE. PULL WIRE TAUT AND TWIST WIRE WITH A MINIMUM OF TWO COMPLETE TWISTS.
- ④ LONGITUDINAL BUNDLING STRAP, 3/4" X .035" OR .031" X 23'-0" LONG STEEL STRAPPING (80 REQD). INSTALL TWO STRAPS TO ENCIRCLE THE BOTTOM AND MIDDLE CONTAINERS AND INSTALL ADDITIONAL TWO STRAPS TO ENCIRCLE THE MIDDLE AND TOP CONTAINERS.
- ⑤ SEAL FOR 3/4" STEEL STRAPPING (80 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.
- ⑥ CENTER GATE A (2 REQD). SEE THE DETAIL ON PAGE 19. SEE SPECIAL NOTE 8 ON PAGE 9.
- ⑦ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 71") (12 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑧ VERTICAL STRUT BRACING, 2" X 4" X 6'-8" (4 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑨ HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 3" (REF: 9'-1") (4 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑩ SEPARATOR BLOCKING, 2" X 6" X BY CAR WIDTH MINUS 2" (REF: 9'-2") (DOUBLED) (8 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/8-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST W/8-20d NAILS. SEE SPECIAL NOTE 9 ON PAGE 9.
- ⑪ STRAP, BUNDLING, DOORWAY PROTECTION, 1-1/4" X .035" OR .031" X 35'-4" LONG STEEL STRAPPING (4 REQD). INSTALL LATERALLY TO ENCIRCLE THE CONTAINERS IN THE DOORWAY AREA. APPLY TWO STRAPS TO EACH GROUP OF CONTAINERS WITH EACH STRAP SECURING A TOP OF LOAD ANTI-SWAY BRACE TO THE CONTAINERS. SEE SPECIAL NOTE 3 ON PAGE 9.
- ⑫ 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.
- ⑬ DOORWAY PROTECTION A (2 REQD). SEE THE DETAIL ON PAGE 22 AND SPECIAL NOTE 3 ON PAGE 9.

SPECIAL NOTES:

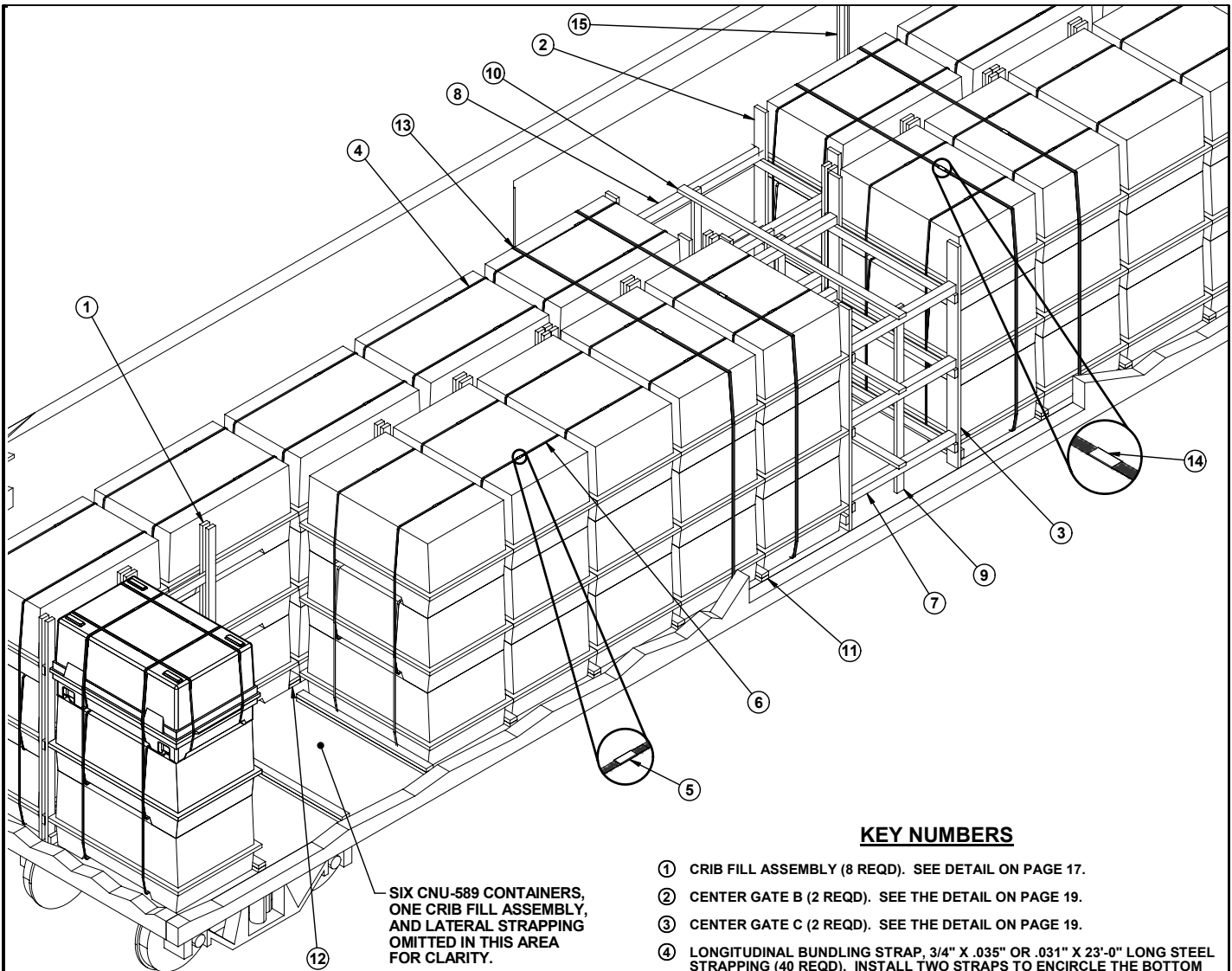
1. A 60 UNIT LOAD OF CNU-589 CONTAINERS IS SHOWN IN A 60'-8" LONG BY 9'-4" WIDE CONVENTIONAL BOXCAR WITH 14'-0" WIDE THROUGH DOORS. BOXCARS OF OTHER DIMENSIONS, AND BOXCARS HAVING WIDER OR NARROWER DOOR OPENINGS, OR OFFSET DOORS CAN BE USED.
2. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING DOORS WHICH DO NOT HAVE NAILABLE DOOR POSTS, REFER TO THE ALTERNATIVE DOORWAY PROTECTION DETAILS ON PAGES 22 AND 23.
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 STACK LENGTH. IN ADDITION, EACH GROUP OF CONTAINER STACKS THAT MEET THE CRITERIA ABOVE, SHALL HAVE TWO DOORWAY PROTECTION BUNDLING STRAPS AND TWO TOP OF LOAD ANTI-SWAY BRACES. 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 SPECIAL NOTE 3 ON PAGE 22.
4. FOR SHIPMENTS OF A LOAD WHICH CONTAINS MORE OR LESS CONTAINERS THAN WHAT IS SHOWN, SEE THE PROCEDURES ON PAGES 6 THRU 16.
5. IF THE BOXCAR BEING LOADED HAS BOWED ENDWALLS, WHICH ARE, BOWED OUTWARD 2" OR MORE, EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END OF CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A SQUARED OFF SURFACE FOR THE LOAD AT THE END OF THE CAR. SEE "BULKHEAD A" DETAIL ON PAGE 18 AND GENERAL NOTE "F" ON PAGE 2. A BULKHEAD IS NOT REQUIRED IF THE ENDWALL IS NOT BOWED 2" OR MORE.
6. THE CNU-589 CONTAINERS MAY ALREADY BE STRAPPED WITH LATERALLY POSITIONED BUNDLING STRAPS. THESE STRAPS MAY REMAIN AS IS, HOWEVER, THE ADDITION OF LONGITUDINAL BUNDLING STRAPS AS SHOWN ON PAGE 8 ARE REQUIRED
7. THE 3/4" STEEL STRAPPING AND SEALS USED FOR LONGITUDINAL BUNDLING STRAPS MAY BE SUBSTITUTED WITH 5/8" X 0.035" POLYESTER STRAPPING, PRODUCT CODE MPC5835 AND SEALED WITH THE BET-700 POWER SEALESS WELDING TOOL. SOURCE OF SUPPLY: POLYCHEM CORPORATION, [HTTP://WWW.POLYCHEM.COM/](http://www.polychem.com/).
8. THE CENTER GATE MAY BE INSTALLED IN TWO SECTIONS (SPLIT) FOR EASE OF INSTALLATION. AFTER INSTALLATION OF THE SPLIT CENTER GATES, TIE PIECES SHALL BE INSTALLED TO JOIN THE TWO SPLIT CENTER GATES. SEE THE "TIE PIECE APPLICATION" ON PAGE 21.
9. IF THE BOXCAR BEING LOADED HAS A METAL FLOOR THAT CANNOT BE NAILED, USE THE ALTERNATE SEPARATOR BLOCKING PROCEDURE AS SHOWN ON PAGE 25.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	84	42
2" X 3"	30	15
2" X 4"	325	217
2" X 6"	165	165
4" X 4"	71	95
NAILS	NO. REQD	POUNDS
6d (2")	36	1/4
10d (3")	484	7-1/2
12d (3-1/4")	48	1
20d (4")	64	2
STEEL STRAPPING, 3/4" - 1,840' REQD - - 164 LBS		
SEAL FOR 3/4" STRAPPING - - 80 REQD - - - 1 LBS		
STEEL STRAPPING, 1-1/4" - 141' REQD - 20-1/4 LBS		
SEAL FOR 1-1/4" STRAPPING - 4 REQD - - 1/4 LBS		
WIRE, STEEL, 0.080" DIA.- -36' REQD - - - - NIL		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-589 CONTAINER	- - 60 - - - - -	37,140 LBS
DUNNAGE	- - - - -	1,263 LBS

TOTAL WEIGHT - - - - - 38,403 LBS (APPROX)



ISOMETRIC VIEW

SIX CNU-589 CONTAINERS,
ONE CRIB FILL ASSEMBLY,
AND LATERAL STRAPPING
OMITTED IN THIS AREA
FOR CLARITY.

KEY NUMBERS

- ① CRIB FILL ASSEMBLY (8 REQD). SEE DETAIL ON PAGE 17.
- ② CENTER GATE B (2 REQD). SEE THE DETAIL ON PAGE 19.
- ③ CENTER GATE C (2 REQD). SEE THE DETAIL ON PAGE 19.
- ④ LONGITUDINAL BUNDLING STRAP, 3/4" X .035" OR .031" X 23'-0" LONG STEEL STRAPPING (40 REQD). INSTALL TWO STRAPS TO ENCIRCLE THE BOTTOM AND MIDDLE CONTAINERS AND INSTALL ADDITIONAL TWO STRAPS TO ENCIRCLE THE MIDDLE AND TOP CONTAINERS.
- ⑤ SEAL FOR 3/4" STEEL STRAPPING (104 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.
- ⑥ LATERAL BUNDLING STRAP, 3/4" X .035" OR .031" X 18'-0" LONG STEEL STRAPPING (64 REQD). INSTALL TWO STRAPS TO ENCIRCLE THE BOTTOM AND MIDDLE CONTAINERS AND INSTALL ADDITIONAL TWO STRAPS TO ENCIRCLE THE MIDDLE AND TOP CONTAINERS.
- ⑦ STRUT, SHORT SIDE, 4" X 4" BY CUT-TO-FIT (REF: 53") (6 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑧ STRUT, LONG SIDE, 4" X 4" BY CUT-TO-FIT (REF: 73") (6 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑨ VERTICAL STRUT BRACING, 2" X 4" X 6'-8" (4 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑩ HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 3" (REF: 9'-1") (3 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑪ SEPARATOR BLOCKING A, 2" X 6" X 60" (DOUBLED) (14 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST W/8-20d NAILS. SEE SPECIAL NOTE 8 ON PAGE 11.
- ⑫ SEPARATOR BLOCKING B, 2" X 4" X 42" (DOUBLED) (8 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST W/8-20d NAILS. SEE SPECIAL NOTE 8 ON PAGE 11.
- ⑬ STRAP, BUNDLING, DOORWAY PROTECTION, 1-1/4" X .035" OR .031" X 35'-4" LONG STEEL STRAPPING (4 REQD). INSTALL Laterally TO ENCIRCLE THE CONTAINERS IN THE DOORWAY AREA. APPLY TWO STRAPS TO EACH GROUP OF CONTAINERS WITH EACH STRAP SECURING A TOP OF LOAD ANTI-SWAY BRACE TO THE CONTAINERS. SEE SPECIAL NOTE 3 ON PAGE 11.
- ⑭ 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.
- ⑮ DOORWAY PROTECTION A (2 REQD). SEE THE DETAIL ON PAGE 22 AND SPECIAL NOTE 3 ON PAGE 11.

SPECIAL NOTES:

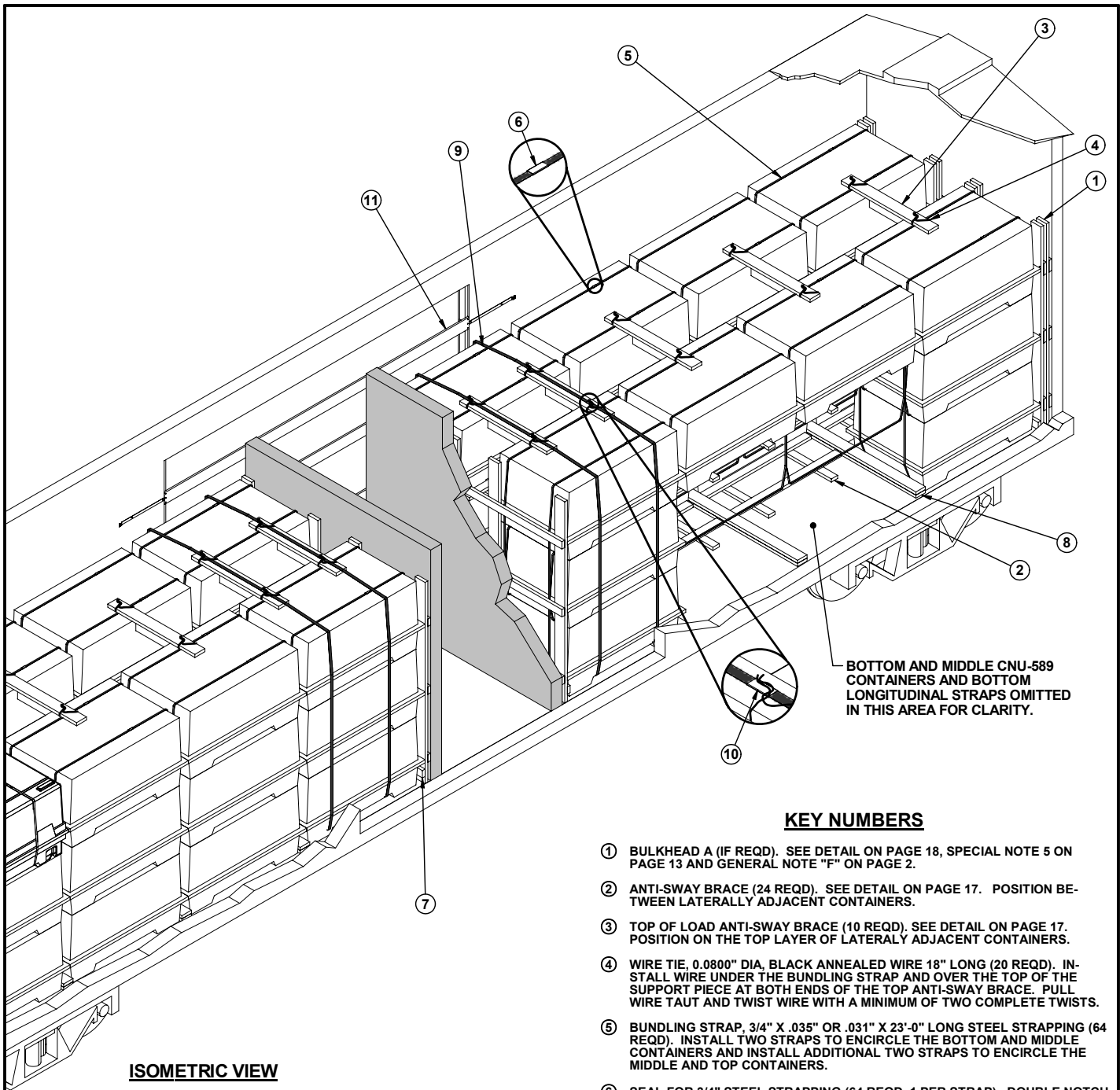
1. A 78 UNIT LOAD IS SHOWN IN A 60'-8" LONG BY 9'-4" WIDE CONVENTIONAL BOXCAR EQUIPPED WITH 14'-0" WIDE THROUGH DOORS. CARS OF OTHER DIMENSIONS, AND BOXCARS HAVING WIDER OR NARROWER DOOR OPENINGS, OR OFFSET DOORS CAN BE USED.
2. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING DOORS WHICH DO NOT HAVE NAILABLE DOOR POSTS, REFER TO THE ALTERNATIVE DOORWAY PROTECTION DETAILS ON PAGES 22 AND 23.
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 STACK LENGTH. IN ADDITION, EACH GROUP OF CONTAINER STACKS THAT MEET THE CRITERIA ABOVE, SHALL HAVE TWO DOORWAY PROTECTION BUNDLING STRAPS AND TWO TOP OF LOAD ANTI-SWAY BRACES. 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 SPECIAL NOTE 3 ON PAGE 22.
4. FOR SHIPMENTS OF A LOAD WHICH CONTAINS MORE OR LESS CONTAINERS THAN WHAT IS SHOWN, SEE THE PROCEDURES ON PAGES 6 THRU 16.
5. IF THE BOXCAR BEING LOADED HAS BOWED ENDWALLS, WHICH ARE, BOWED OUTWARD 2" OR MORE, EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END OF CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A SQUARED OFF SURFACE FOR THE LOAD AT THE END OF THE CAR. SEE "BULKHEAD A" DETAIL ON PAGE 18 AND GENERAL NOTE "F" ON PAGE 2. A BULKHEAD IS NOT REQUIRED IF THE ENDWALL IS NOT BOWED 2" OR MORE.
6. THE CNU-589 CONTAINERS MAY ALREADY BE STRAPPED WITH LATERALLY POSITIONED BUNDLING STRAPS. THESE STRAPS MAY REMAIN AS IS, HOWEVER, THE ADDITION OF LONGITUDINAL AND LATERAL BUNDLING STRAPS AS SHOWN ON PAGE 10 ARE REQUIRED
7. THE 3/4" STEEL STRAPPING AND SEALS USED FOR LONGITUDINAL BUNDLING STRAPS MAY BE SUBSTITUTED WITH 5/8" X 0.035" POLYESTER STRAPPING, PRODUCT CODE MPC5835 AND SEALED WITH THE BET-700 POWER SEALESS WELDING TOOL. SOURCE OF SUPPLY: POLYCHEM CORPORATION, [HTTP://WWW.POLYCHEM.COM/](http://www.polychem.com/).
8. IF THE BOXCAR BEING LOADED HAS A METAL FLOOR THAT CANNOT BE NAILED, USE THE ALTERNATE SEPARATOR BLOCKING PROCEDURE AS SHOWN ON PAGE 25.
9. CRIB FILL ASSEMBLIES ARE REQUIRED WHEN THE TOTAL LATERAL SPACE BETWEEN THE CONTAINERS EXCEEDS 6", AS MEASURED FROM CONTAINER TO CONTAINER.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	42	21
2" X 3"	15	8
2" X 4"	262	175
2" X 6"	82	82
4" X 4"	63	84
NAILS	NO. REQD	POUNDS
6d (2-1/2")	18	1/4
10d (3")	396	6
16d (3-1/4")	48	1
20d (4")	88	2
STEEL STRAPPING, 3/4" - 2,039' REQD - - 182 LBS		
SEAL FOR 3/4" STRAPPING - 104 REQD - 1-1/4 LBS		
STEEL STRAPPING, 1-1/4" - 115' REQD - 16-1/2 LBS		
SEAL FOR 1-1/4" STRAPPING - 4 REQD - - 1/4 LBS		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-589 CONTAINER	- - 78 - - - - -	48,282 LBS
DUNNAGE	- - - - -	949 LBS

TOTAL WEIGHT - - - - - 49,231 LBS (APPROX)



ISOMETRIC VIEW

BOTTOM AND MIDDLE CNU-589 CONTAINERS AND BOTTOM LONGITUDINAL STRAPS OMITTED IN THIS AREA FOR CLARITY.

KEY NUMBERS

- ① BULKHEAD A (IF REQD). SEE DETAIL ON PAGE 18, SPECIAL NOTE 5 ON PAGE 13 AND GENERAL NOTE "F" ON PAGE 2.
- ② ANTI-SWAY BRACE (24 REQD). SEE DETAIL ON PAGE 17. POSITION BETWEEN LATERALLY ADJACENT CONTAINERS.
- ③ TOP OF LOAD ANTI-SWAY BRACE (10 REQD). SEE DETAIL ON PAGE 17. POSITION ON THE TOP LAYER OF LATERALLY ADJACENT CONTAINERS.
- ④ WIRE TIE, 0.0800" DIA, BLACK ANNEALED WIRE 18" LONG (20 REQD). INSTALL WIRE UNDER THE BUNDLING STRAP AND OVER THE TOP OF THE SUPPORT PIECE AT BOTH ENDS OF THE TOP ANTI-SWAY BRACE. PULL WIRE TAUT AND TWIST WIRE WITH A MINIMUM OF TWO COMPLETE TWISTS.
- ⑤ BUNDLING STRAP, 3/4" X .035" OR .031" X 23'-0" LONG STEEL STRAPPING (64 REQD). INSTALL TWO STRAPS TO ENCIRCLE THE BOTTOM AND MIDDLE CONTAINERS AND INSTALL ADDITIONAL TWO STRAPS TO ENCIRCLE THE MIDDLE AND TOP CONTAINERS.
- ⑥ SEAL FOR 3/4" STEEL STRAPPING (64 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 5.
- ⑦ CENTER GATE A (2 REQD). SEE THE DETAIL ON PAGE 19. SEE SPECIAL NOTE 6 ON PAGE 13.
- ⑧ SEPARATOR BLOCKING, 2" X 6" X BY CAR WIDTH MINUS 2" (REF: 9'-0") (DOUBLED) (6 REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/8-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST W/8-20d NAILS. SEE SPECIAL NOTE 7 ON PAGE 13.
- ⑨ STRAP, DOORWAY PROTECTION, 1-1/4" X .035" OR .031" X 35'-10" LONG STEEL STRAPPING (4 REQD). INSTALL LATERALLY TO ENCIRCLE THE CONTAINERS IN THE DOORWAY AREA. APPLY TWO STRAPS TO EACH GROUP OF CONTAINERS WITH EACH STRAP SECURING A TOP OF LOAD ANTI-SWAY BRACE TO THE CONTAINERS. SEE SPECIAL NOTE 3 ON PAGE 13.
- ⑩ 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.
- ⑪ DOORWAY PROTECTION B (2 REQD). SEE THE DETAIL ON PAGE 22 AND SPECIAL NOTE 3 ON PAGE 13.

SPECIAL NOTES:

1. A 48 UNIT LOAD IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CUSHIONED TYPE BOXCAR EQUIPPED WITH LOAD DIVIDERS AND 14'-0" WIDE STAGGERED DOOR OPENINGS. BOXCARS OF OTHER DIMENSIONS AND BOXCARS HAVING WIDER DOOR OPENINGS OR THROUGH DOORS CAN BE USED.
2. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING DOORS WHICH DO NOT HAVE NAILABLE DOOR POSTS, REFER TO THE ALTERNATIVE DOORWAY PROTECTION DETAILS ON PAGES 22 AND 23.
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 STACK LENGTH. THE WOODEN GATE TYPE OF DOOR-WAY PROTECTION IN THE LOAD ON PAGE 12 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 SPECIAL NOTE 3 ON PAGE 22.
4. FOR SHIPMENTS OF A LOAD WHICH CONTAINS MORE OR FEWER CONTAINERS THAN WHAT IS SHOWN, SEE THE PROCEDURES ON PAGES 6 THRU 16.
5. IF THE BOXCAR BEING LOADED HAS BOWED ENDWALLS, WHICH ARE, BOWED OUTWARD 2" OR MORE, EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END OF CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A SQUARED OFF SURFACE FOR THE LOAD AT THE END OF THE CAR. SEE "BULKHEAD A" DETAIL ON PAGE 15 AND GENERAL NOTE "F" ON PAGE 2.
6. THE CENTER GATE MAY BE INSTALLED IN TWO SECTIONS (SPLIT) FOR EASE OF INSTALLATION. AFTER INSTALLATION OF THE SPLIT CENTER GATES, TIE PIECES SHALL BE INSTALLED TO JOIN THE TWO SPIT CENTER GATES. SEE THE TIE PIECE APPLICATION ON PAGE 21.
7. IF THE BOXCAR BEING LOADED HAS A METAL FLOOR THAT CANNOT BE NAILED, USE THE ALTERNATE SEPARATOR BLOCKING PROCEDURE AS SHOWN ON PAGE 25.

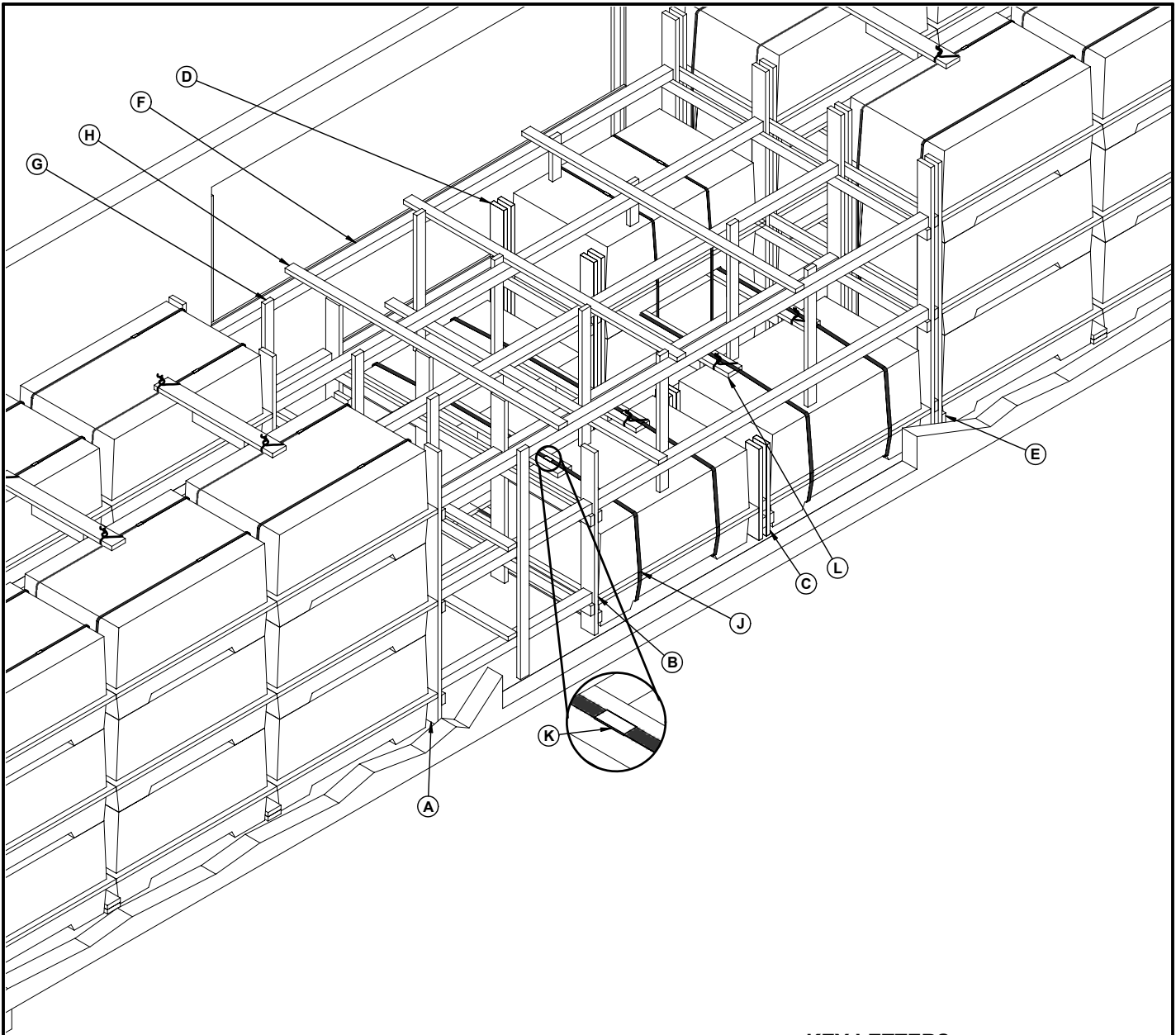
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	84	42
2" X 3"	30	15
2" X 4"	417	278
2" X 6"	188	188
NAILS	NO. REQD	POUNDS
6d (2")	120	3/4
10d (3")	390	6
20d (4")	48	1-1/2
STEEL STRAPPING, 3/4" -	1,472 REQD	- - 131 LBS
SEAL FOR 3/4" STRAPPING	- - 64 REQD	- - 3/4 LBS
STEEL STRAPPING, 1-1/4" -	174' REQD	- - - 25 LBS
SEAL FOR 1-1/4" STRAPPING	- 4 REQD	- - 1/4 LBS
WIRE, STEEL, 0.080" DIA.-	30' REQD	- - - - NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-589 CONTAINER	- - 48	- - - - 29,712 LBS
DUNNAGE	- - - - -	- - - - 1,211 LBS

TOTAL WEIGHT - - - - - 30,923 LBS (APPROX)

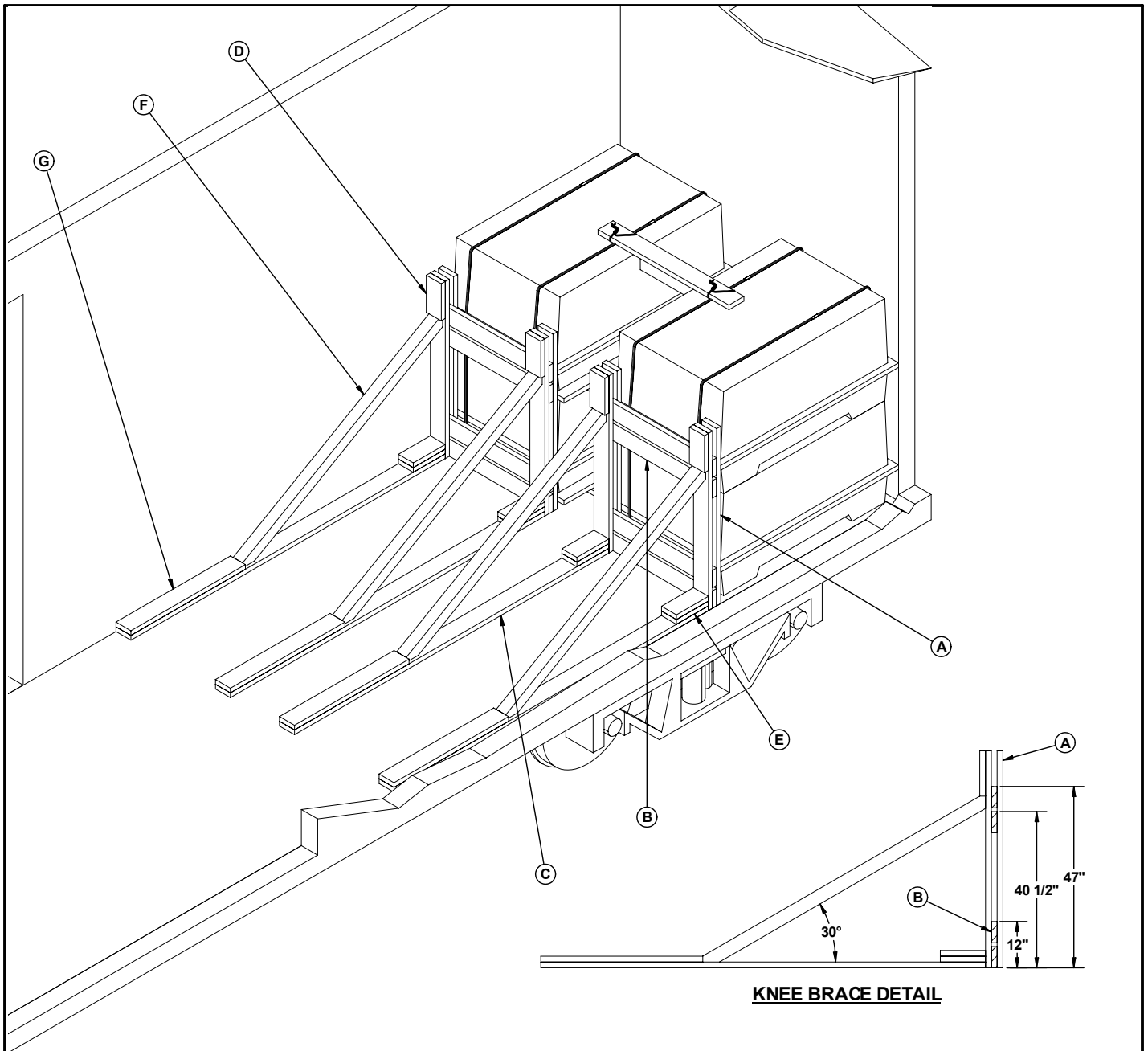


SHOWN. CARS OF OTHER WIDTHS AND CARS HAVING METAL LININGS MAY BE USED.

2. THE LCL SHOWN DEPICTING THE CENTER PORTION OF THE LOAD IN THE DOORWAY AREA IS TYPICAL. THE CENTER GATES AND SEPARATOR GATES SELECTED FOR THE LOAD AS SHOWN MAY NEED TO BE SUBSTITUTED FOR OTHER GATES SHOWN ON PAGES 19 AND 20 TO SUIT THE QUANTITY AND ARRANGEMENT OF CNU-589 CONTAINERS.
3. THE KEY LETTERS AS CALLED OUT ON THIS PAGE REFLECT THE PARTS AND ASSEMBLIES REQUIRED FOR RESTRAINING THE CENTER PORTION (DOORWAY AREA) OF THIS LOAD ONLY. SEE PAGE 6 FOR ADDITIONAL PARTS AND ASSEMBLIES REQUIRED TO SECURE THE REMAINDER OF THE LOAD.
4. A SEPARATOR GATE IS REQUIRED WHEN THE LOAD BEARS AGAINST BOTH SIDES OF THE GATE. CENTER GATES SHALL BE USED WHERE STRUTS ARE REQUIRED. **NOTE:** CENTER GATES MAY REQUIRE THE REMOVAL OF ONE OR MORE STRUT LEDGERS DEPENDING ON THE CONFIGURATION OF THE LOAD. SEE CENTER GATE "E" ON PAGE 20.

KEY LETTERS

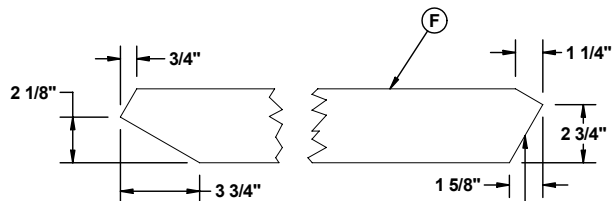
- (A) CENTER GATE A (1 REQD). SEE THE DETAIL ON PAGE 19.
- (B) CENTER GATE D (1 REQD). SEE THE DETAIL ON PAGE 20.
- (C) SEPARATOR GATE A (1 REQD). SEE THE DETAIL ON PAGE 20.
- (D) SEPARATOR GATE B (1 REQD). SEE THE DETAIL ON PAGE 20.
- (E) CENTER GATE E (1 REQD). SEE THE DETAIL ON PAGE 20.
- (F) STRUT, 4" X 4" BY CUT-TO-FIT (VARIOUS LENGTHS) (12 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- (G) VERTICAL STRUT BRACING, 2" X 4" BY LENGTH AS REQUIRED (12 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- (H) HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 3" (REF: 8'-11") (6 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- (J) STRAP, DOORWAY PROTECTION, 1-1/4" X .035" OR .031" X 25'-2" LONG STEEL STRAPPING (4 REQD). INSTALL LATERALLY TO ENCIRCLE THE CONTAINERS IN THE DOORWAY AREA. APPLY TWO STRAPS TO EACH GROUP OF CONTAINER WITH EACH STRAP SECURING A TOP OF LOAD ANTI-SWAY BRACE TO THE CONTAINERS. SEE SPECIAL NOTE 3 ON PAGE 7.
- (K) 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.
- (L) TOP OF LOAD ANTI-SWAY BRACE (4 REQD). POSITION ON THE TOP LAYER OF LATERALLY ADJACENT PALLET UNITS.



KNEE BRACE DETAIL

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE BOXCAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS AND CARS HAVING METAL LININGS MAY BE USED.
2. THE LOAD SHOWN DEPICTING THE KNEE BRACE METHOD OF PARTIAL-LAYER BRACING IS TYPICAL. THE QUANTITY MAY BE ADJUSTED TO SUIT, PROVIDED THE LIMITATIONS OF THE KNEE BRACE AS SET FORTH IN SPECIAL NOTE 3 ARE NOT EXCEEDED.
3. ONE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING 8,500 POUNDS.

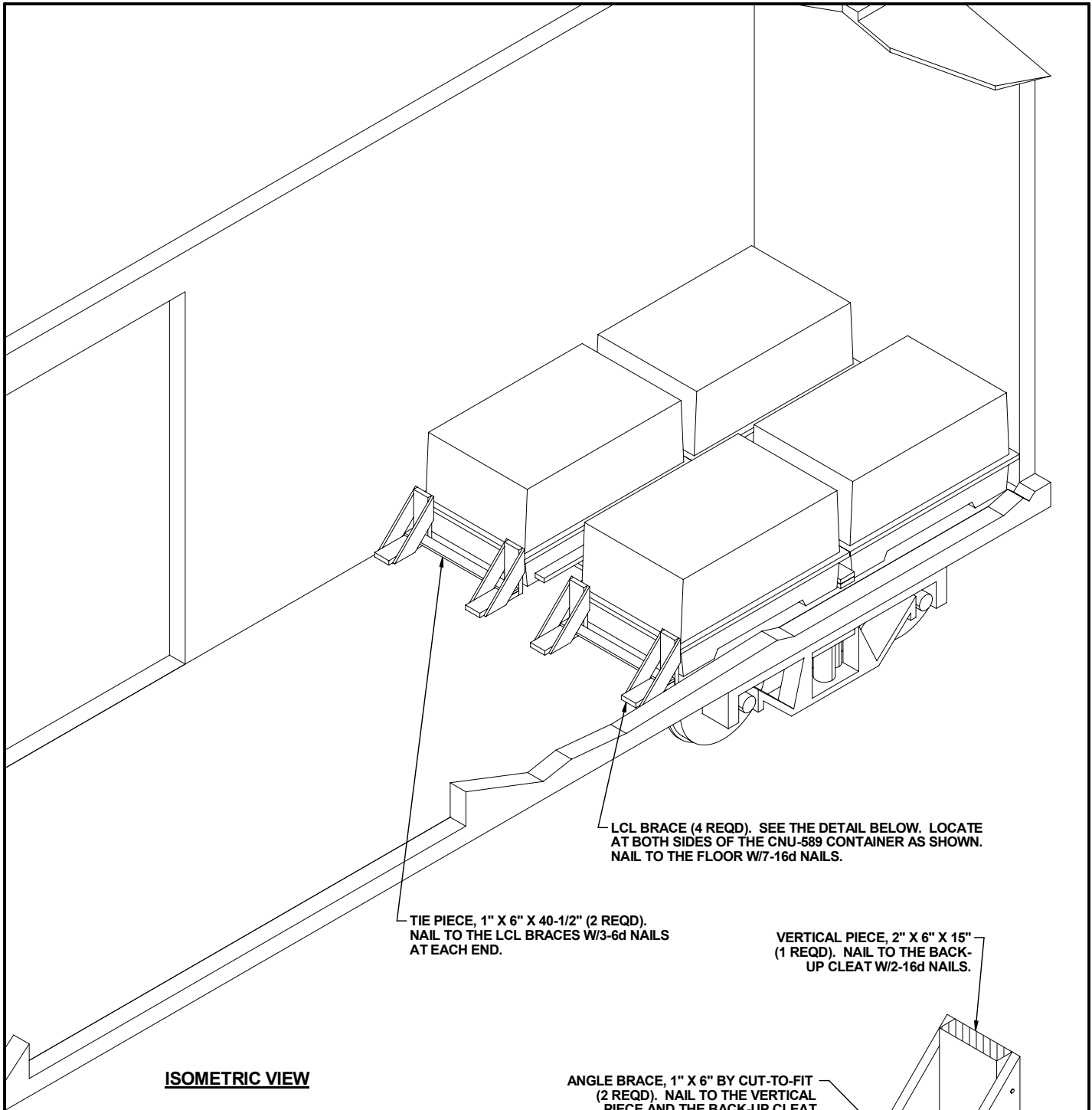


THIS PIECE MUST BE INSTALLED SO THAT THIS BEARING SURFACE WILL BE IN CONTACT WITH THE VERTICAL PIECE.

BRACE
4" X 4" MATERIAL

KEY LETTERS (FOR ONE KNEE BRACE)

- (A) VERTICAL PIECE, 2" X 6" X 56" (4 REQD). NAIL TO A FLOOR CLEAT W/3-16d NAILS.
- (B) HORIZONTAL PIECE, 2" X 6" X 42" (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT. SEE KNEE BRACE DETAIL ABOVE.
- (C) FLOOR CLEAT, 2" X 6" X 9'-7" (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 7'-1" (2 REQD). SEE THE DETAIL BELOW FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT W/2-16d NAILS.
- (G) BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE FLOOR CLEAT W/6-40d NAILS.



ISOMETRIC VIEW

SPECIAL NOTES:

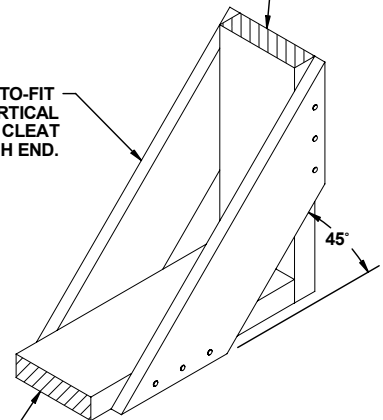
1. AN 8'-6" WIDE CONVENTIONAL TYPE BOXCAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. THE LOAD SHOWN DEPICTING THE LCL BRACE METHOD OF PARTIAL-LAYER BRACING IS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER QUANTITIES AS LONG AS THE CAPACITY OF THE BRACES IS NOT EXCEEDED. SEE SPECIAL NOTE 3.
3. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 8,000 POUNDS OF LADING. A MINIMUM OF TWO BRACES MUST BE USED FOR LONGITUDINAL BRACING. BRACES MAY BE ADDED FOR LONGITUDINAL BRACING AS NECESSARY.

ANGLE BRACE, 1" X 6" BY CUT-TO-FIT (2 REQD). NAIL TO THE VERTICAL PIECE AND THE BACK-UP CLEAT W/3-8d NAILS AT EACH END.

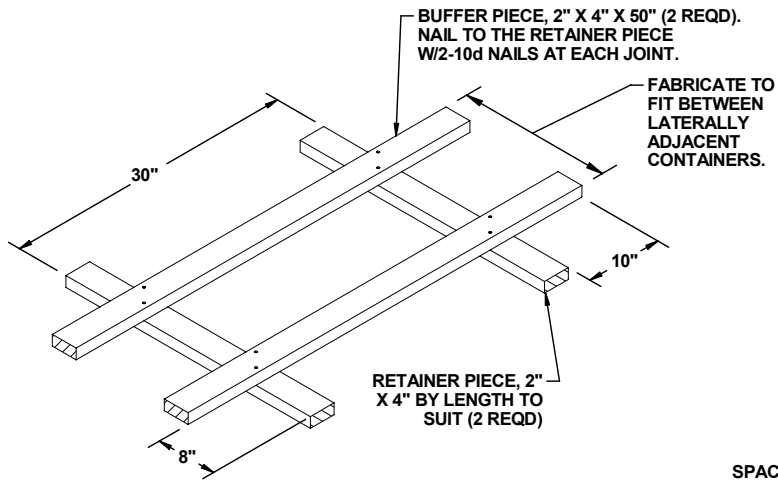
VERTICAL PIECE, 2" X 6" X 15" (1 REQD). NAIL TO THE BACK-UP CLEAT W/2-16d NAILS.

BACK-UP CLEAT, 2" X 6" X 15" (1 REQD).

LCL BRACE

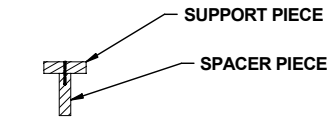


TYPICAL LCL USING LCL BRACES

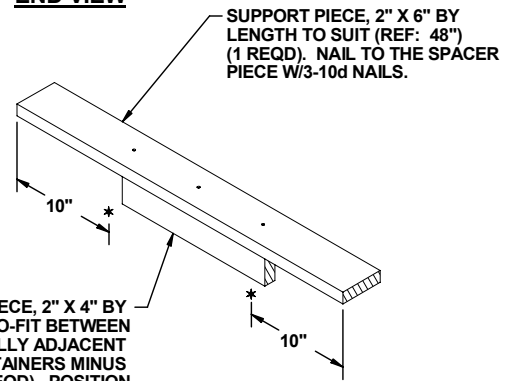


ANTI-SWAY BRACE

NOTE: FABRICATE THE THE ANTI-SWAY BRACE BY NAILING ONE BUFFER PIECE TO THE TWO RETAINER PIECES. NAIL THE SECOND BUFFER PIECE TO THE RETAINER PIECES AFTER THE ANTI-SWAY BRACE IS PLACED IN POSITION, BETWEEN CONTAINERS IN THE RAIL CAR LOAD.

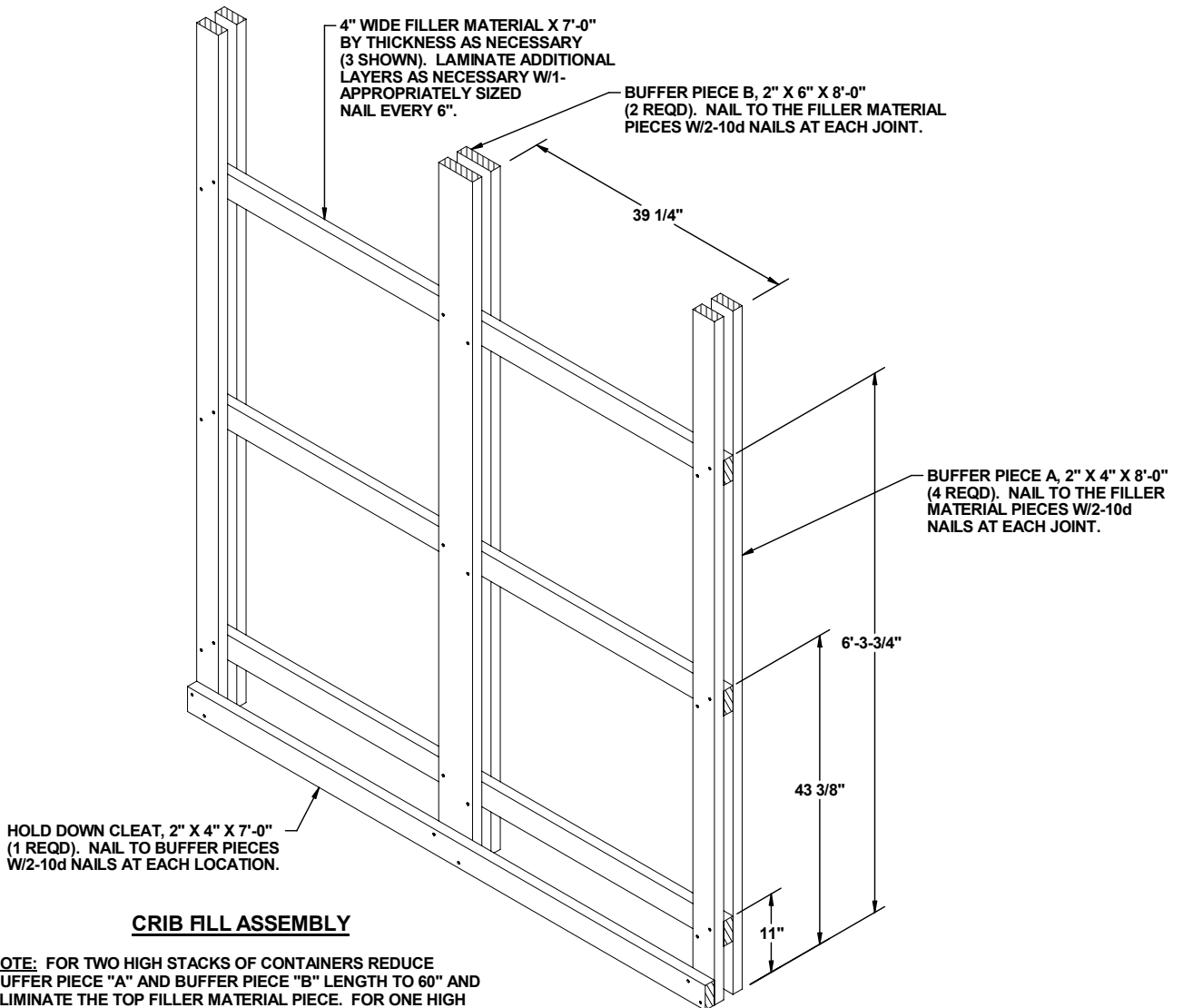


END VIEW



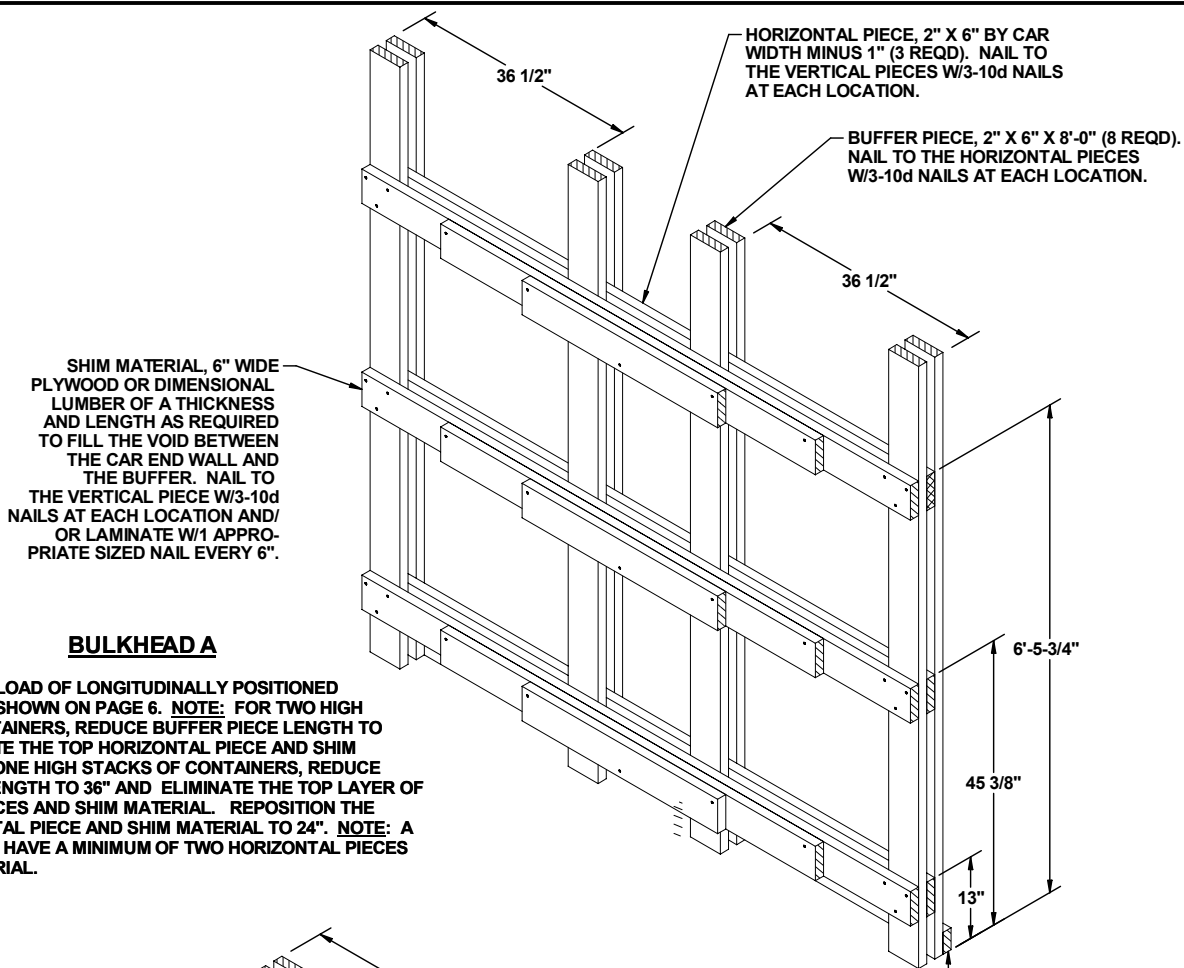
SPACER PIECE, 2" X 4" BY CUT-TO-FIT BETWEEN LATERALLY ADJACENT CONTAINERS MINUS 1/4" (1 REQD). POSITION AS TO BE CENTERED UNDER THE SUPPORT PIECE. SEE THE "END VIEW" DETAIL ABOVE.

TOP OF LOAD ANTI-SWAY BRACE



CRIB FILL ASSEMBLY

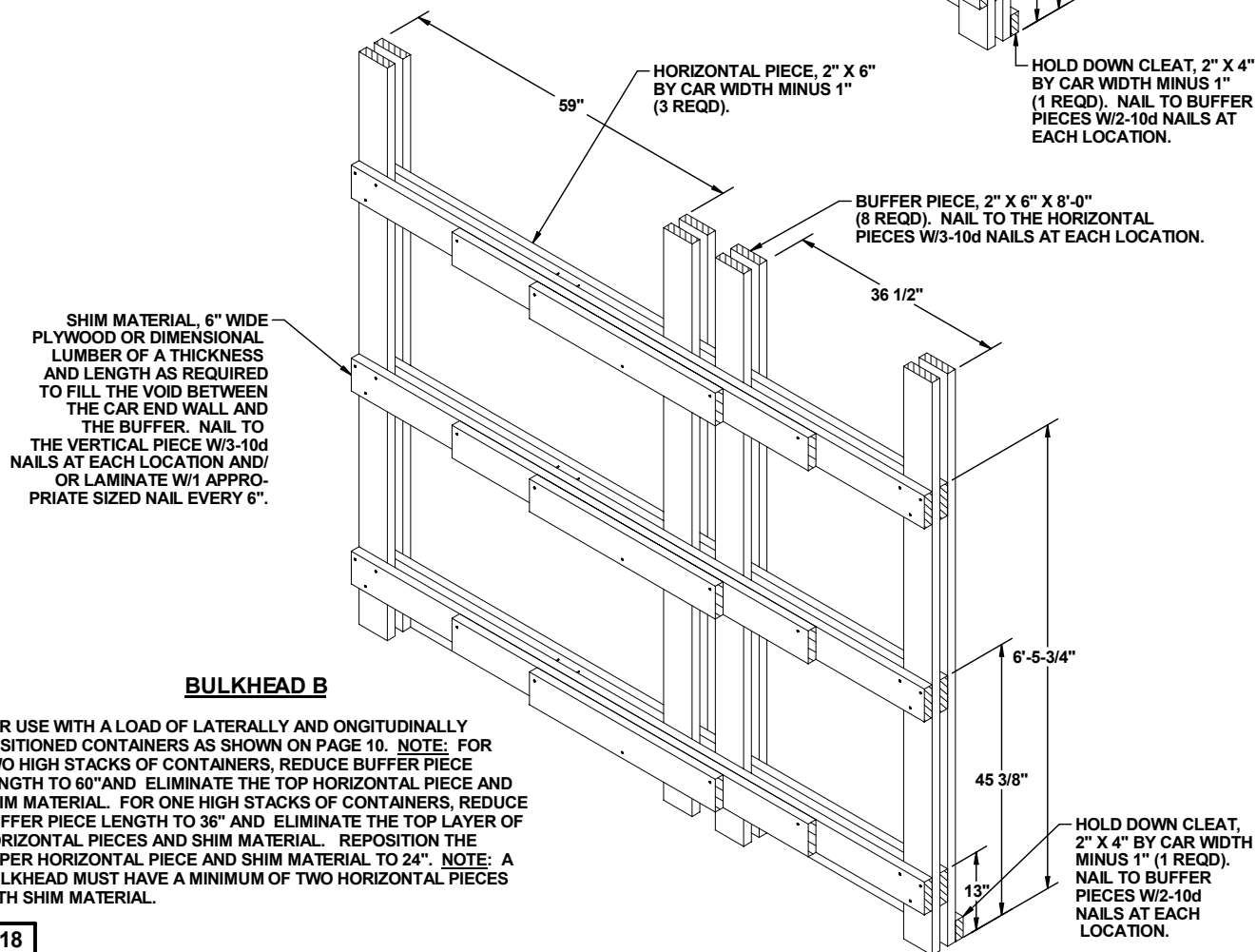
NOTE: FOR TWO HIGH STACKS OF CONTAINERS REDUCE BUFFER PIECE "A" AND BUFFER PIECE "B" LENGTH TO 60" AND ELIMINATE THE TOP FILLER MATERIAL PIECE. FOR ONE HIGH STACK OF CONTAINERS, REDUCE BUFFER PIECE "A" AND BUFFER PIECE "B" LENGTH TO 36" AND ELIMINATE THE TOP TWO FILLER MATERIAL PIECES.



SHIM MATERIAL, 6" WIDE PLYWOOD OR DIMENSIONAL LUMBER OF A THICKNESS AND LENGTH AS REQUIRED TO FILL THE VOID BETWEEN THE CAR END WALL AND THE BUFFER. NAIL TO THE VERTICAL PIECE W/3-10d NAILS AT EACH LOCATION AND/OR LAMINATE W/1 APPROPRIATE SIZED NAIL EVERY 6".

BULKHEAD A

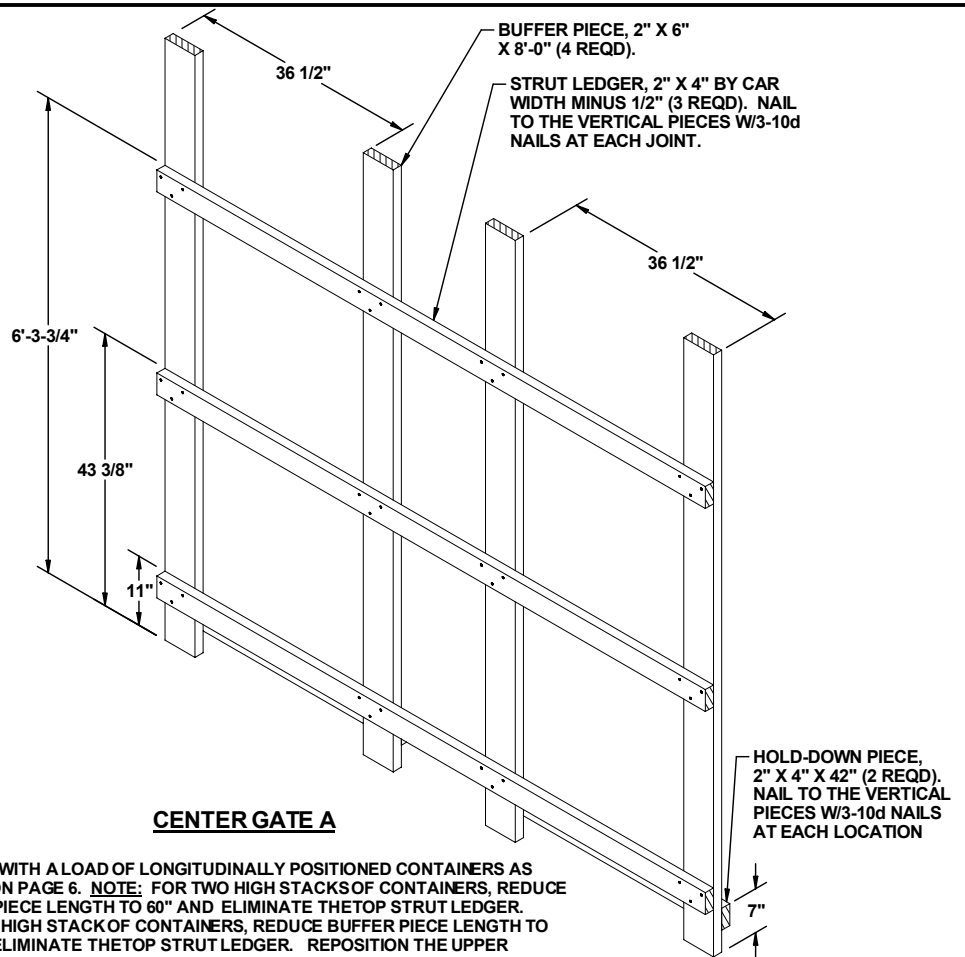
FOR USE WITH A LOAD OF LONGITUDINALLY POSITIONED CONTAINERS AS SHOWN ON PAGE 6. NOTE: FOR TWO HIGH STACKS OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 60" AND ELIMINATE THE TOP HORIZONTAL PIECE AND SHIM MATERIAL. FOR ONE HIGH STACKS OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 36" AND ELIMINATE THE TOP LAYER OF HORIZONTAL PIECES AND SHIM MATERIAL. REPOSITION THE UPPER HORIZONTAL PIECE AND SHIM MATERIAL TO 24". NOTE: A BULKHEAD MUST HAVE A MINIMUM OF TWO HORIZONTAL PIECES WITH SHIM MATERIAL.



SHIM MATERIAL, 6" WIDE PLYWOOD OR DIMENSIONAL LUMBER OF A THICKNESS AND LENGTH AS REQUIRED TO FILL THE VOID BETWEEN THE CAR END WALL AND THE BUFFER. NAIL TO THE VERTICAL PIECE W/3-10d NAILS AT EACH LOCATION AND/OR LAMINATE W/1 APPROPRIATE SIZED NAIL EVERY 6".

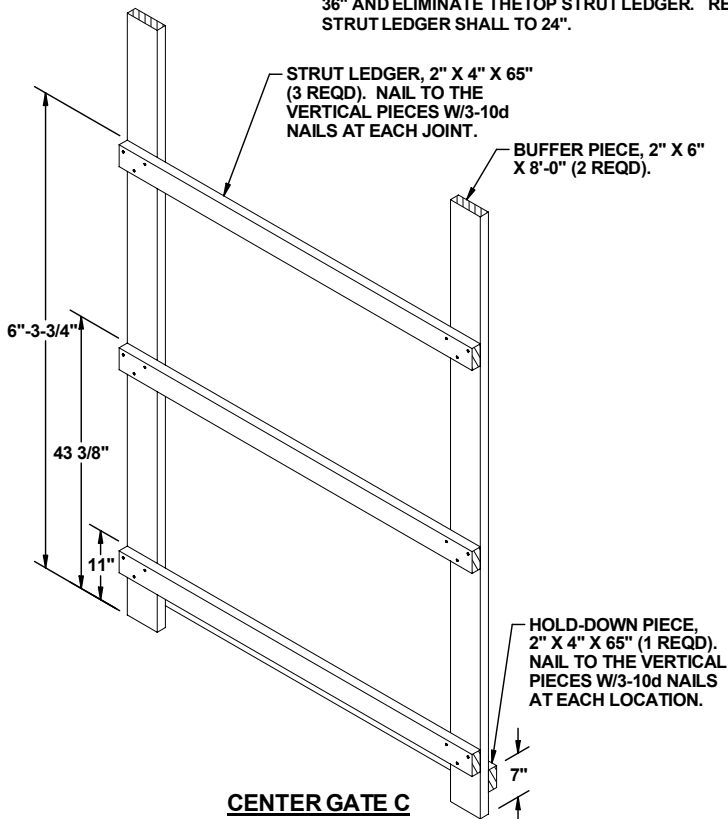
BULKHEAD B

FOR USE WITH A LOAD OF LATERALLY AND LONGITUDINALLY POSITIONED CONTAINERS AS SHOWN ON PAGE 10. NOTE: FOR TWO HIGH STACKS OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 60" AND ELIMINATE THE TOP HORIZONTAL PIECE AND SHIM MATERIAL. FOR ONE HIGH STACKS OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 36" AND ELIMINATE THE TOP LAYER OF HORIZONTAL PIECES AND SHIM MATERIAL. REPOSITION THE UPPER HORIZONTAL PIECE AND SHIM MATERIAL TO 24". NOTE: A BULKHEAD MUST HAVE A MINIMUM OF TWO HORIZONTAL PIECES WITH SHIM MATERIAL.



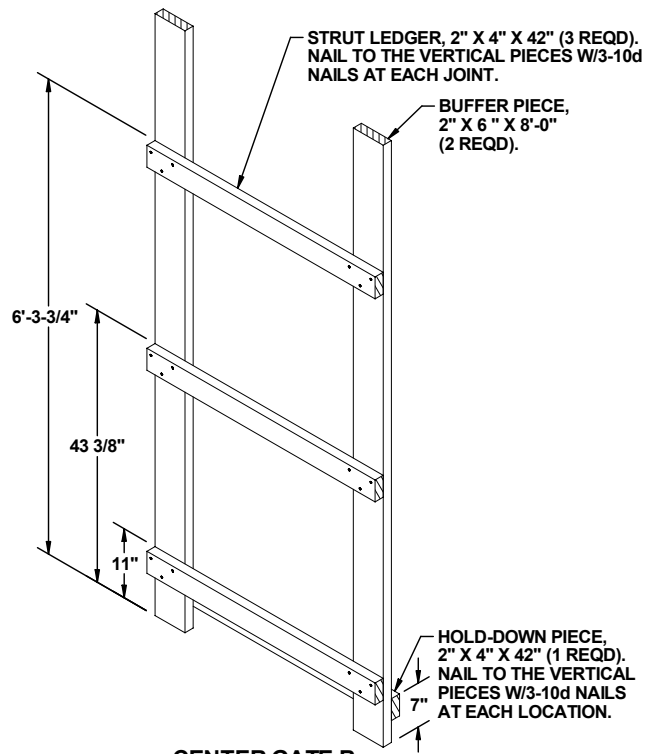
CENTER GATE A

FOR USE WITH A LOAD OF LONGITUDINALLY POSITIONED CONTAINERS AS SHOWN ON PAGE 6. NOTE: FOR TWO HIGH STACKS OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 60" AND ELIMINATE THE TOP STRUT LEDGER. FOR ONE HIGH STACK OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 36" AND ELIMINATE THE TOP STRUT LEDGER. REPOSITION THE UPPER STRUT LEDGER SHALL TO 24".



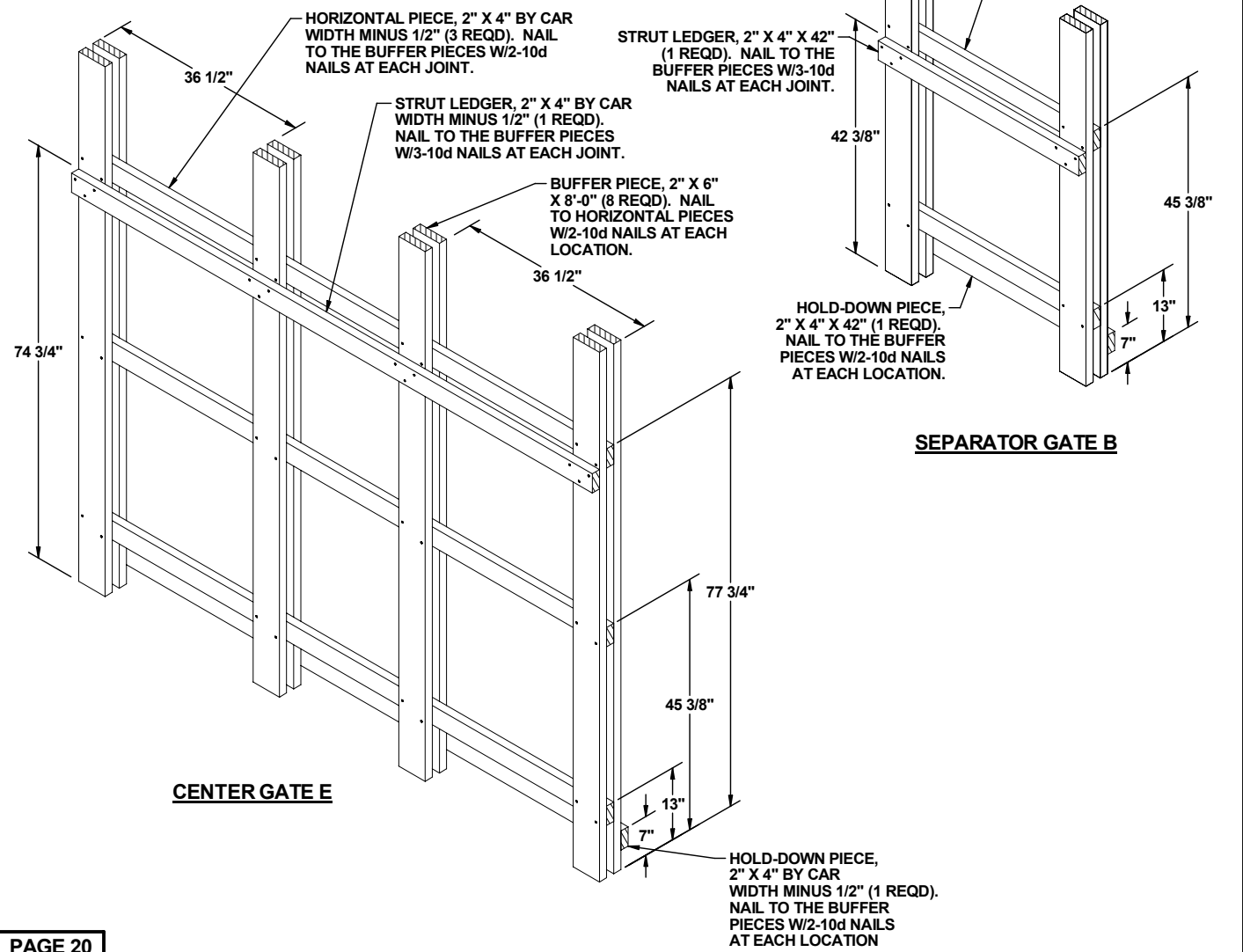
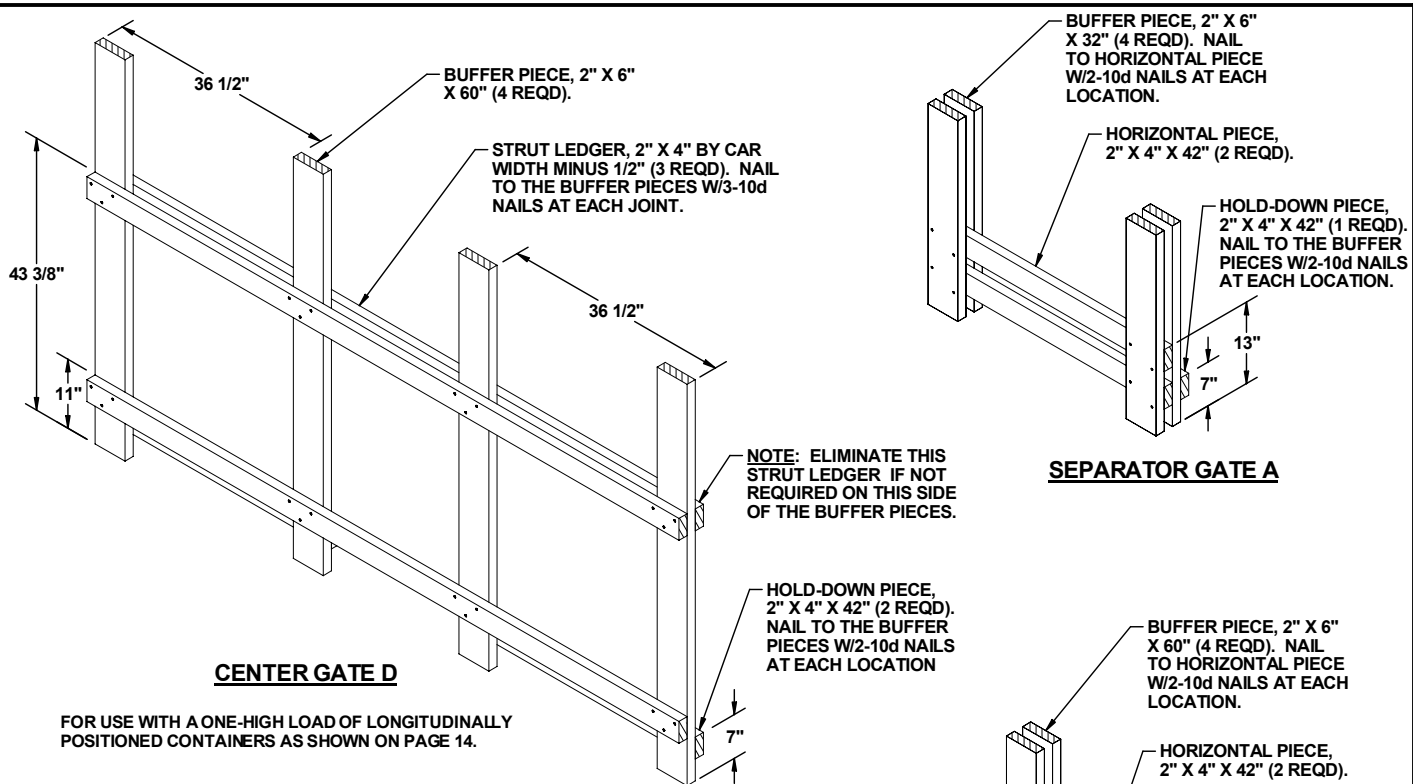
CENTER GATE C

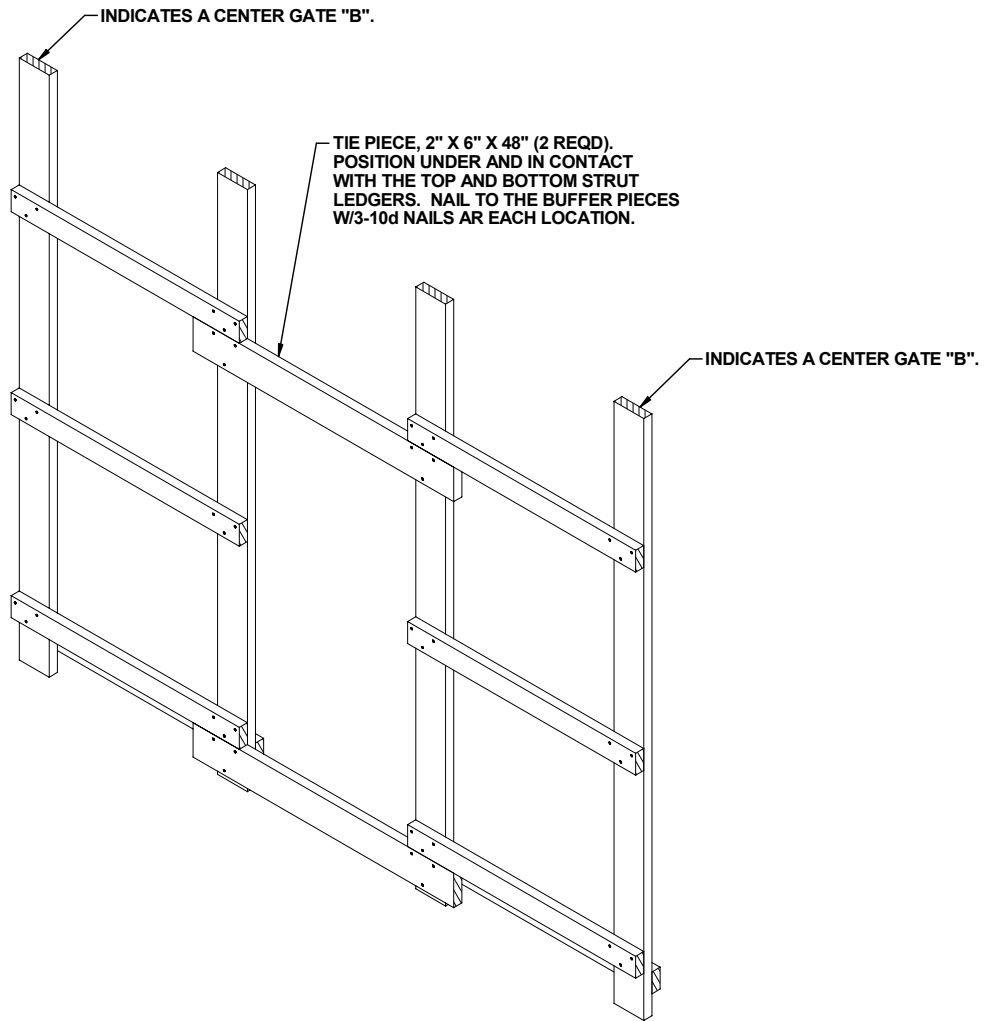
FOR USE WITH A LOAD OF Laterally POSITIONED CONTAINERS AS SHOWN ON PAGE 10. NOTE: FOR TWO HIGH STACKS OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 60" AND ELIMINATE THE TOP STRUT LEDGER. FOR ONE HIGH STACK OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 36" AND ELIMINATE THE TOP STRUT LEDGER. REPOSITION THE UPPER STRUT LEDGER SHALL TO 24".



CENTER GATE B

FOR USE WITH THE LONGITUDINALLY POSITIONED CONTAINERS AS SHOWN IN THE LOAD ON PAGE 10 AND FOR USE AS A SPLIT CENTER GATE "A". NOTE: FOR TWO HIGH STACKS OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 60" AND ELIMINATE THE TOP STRUT LEDGER. FOR ONE HIGH STACK OF CONTAINERS, REDUCE BUFFER PIECE LENGTH TO 36" AND ELIMINATE THE TOP STRUT LEDGER. REPOSITION THE UPPER STRUT LEDGER TO 24".



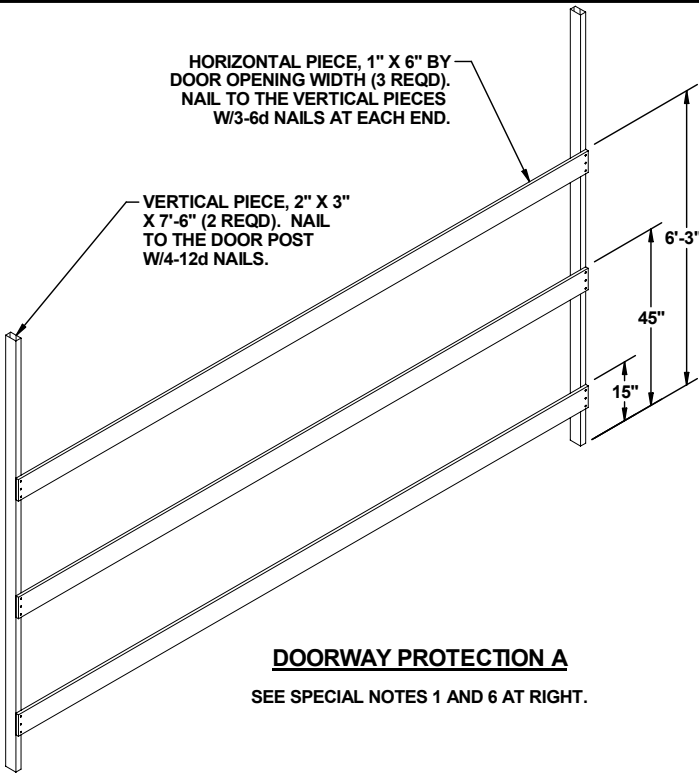


TIE PIECE APPLICATION

THIS PROCEDURE IS APPLICABLE FOR USE WITH TWO SPLIT CENTER GATES. NOTE THAT THE TIE PIECES SHOULD BE APPLIED AFTER THE GATES AND STRUTS HAVE BEEN INSTALLED. THIS PROCEDURE IS ALSO APPLICABLE FOR JOINING TWO SPLIT SEPARATOR GATES.

HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (3 REQD). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH END.

VERTICAL PIECE, 2" X 3" X 7'-6" (2 REQD). NAIL TO THE DOOR POST W/4-12d NAILS.



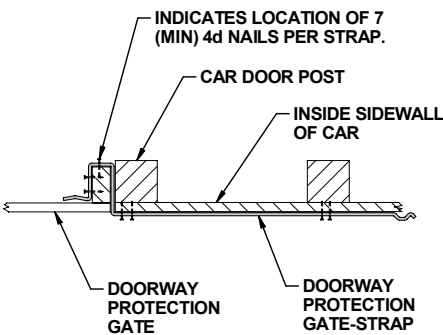
DOORWAY PROTECTION A

SEE SPECIAL NOTES 1 AND 6 AT RIGHT.

SPECIAL NOTES:

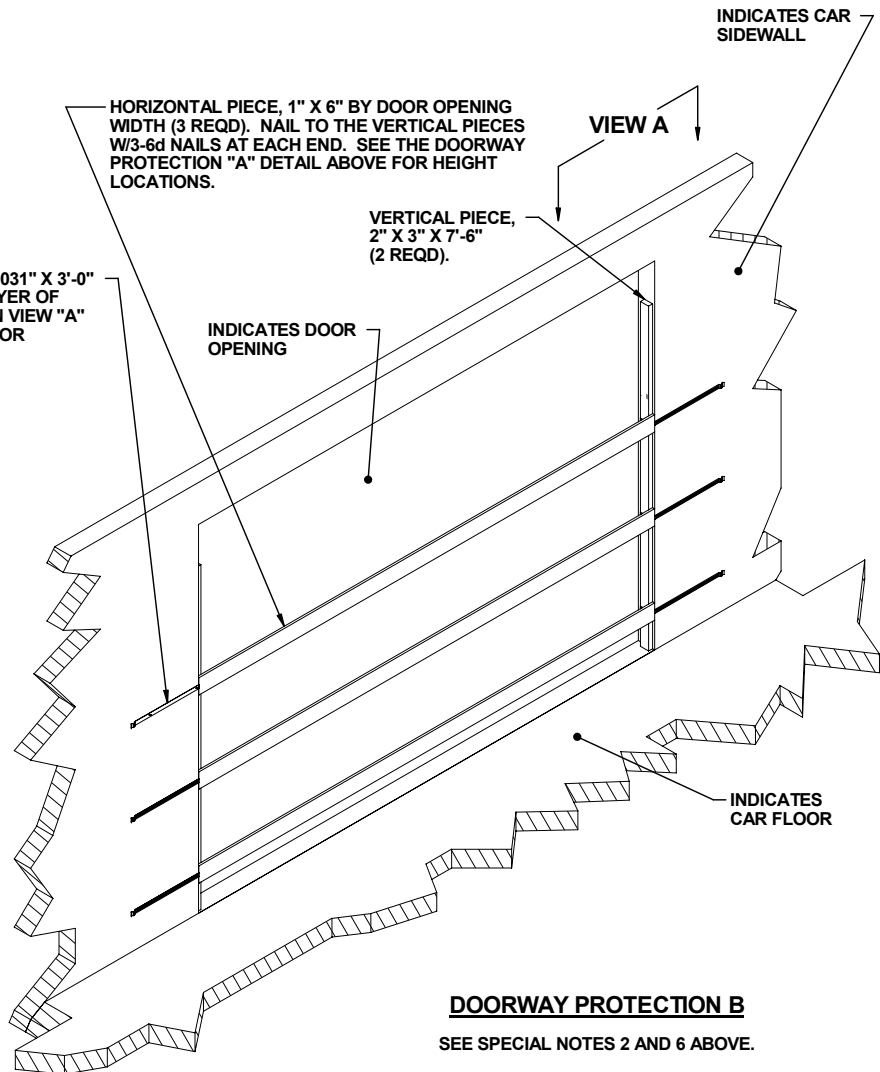
1. DOORWAY PROTECTION "A" IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS.
2. DOORWAY PROTECTION "B" IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE STEEL WITHOUT NAILING HOLES AND THE CAR SIDEWALLS ARE NAILABLE.
3. DOORWAY PROTECTION "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 LOAD ON PAGE 6 FOR GUIDANCE.
6. THE VIEWS ON PAGES 22 AND 23 DEPICT DOORWAY PROTECTION FOR A THREE-LAYER LOAD. FOR A TWO-LAYER LOAD, ELIMINATE THE TOP HORIZONTAL PIECE AND/OR STRAP AND REDUCE THE HEIGHT OF THE VERTICAL PIECES BY 31". FOR A ONE-LAYER LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND/OR STRAPS AND REDUCE THE HEIGHT OF THE VERTICAL PIECES BY 62". 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 SIDE WALL PRIOR TO POSITIONING THE ADJACENT CONTAINERS.



DOORWAY PROTECTION B

SEE SPECIAL NOTES 2 AND 6 ABOVE.

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

INDICATES DOOR OPENING

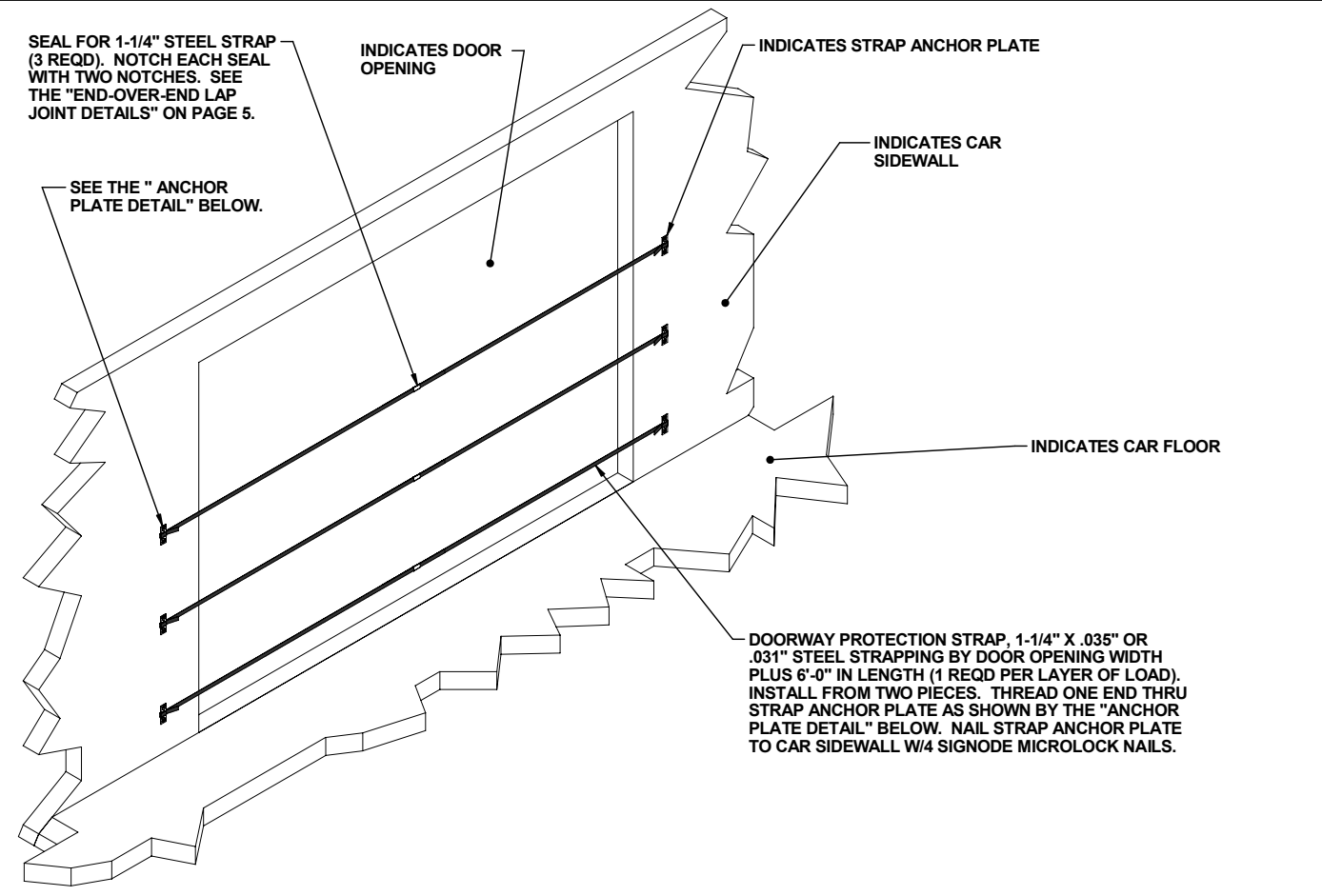
INDICATES STRAP ANCHOR PLATE

INDICATES CAR SIDEWALL

SEE THE "ANCHOR PLATE DETAIL" BELOW.

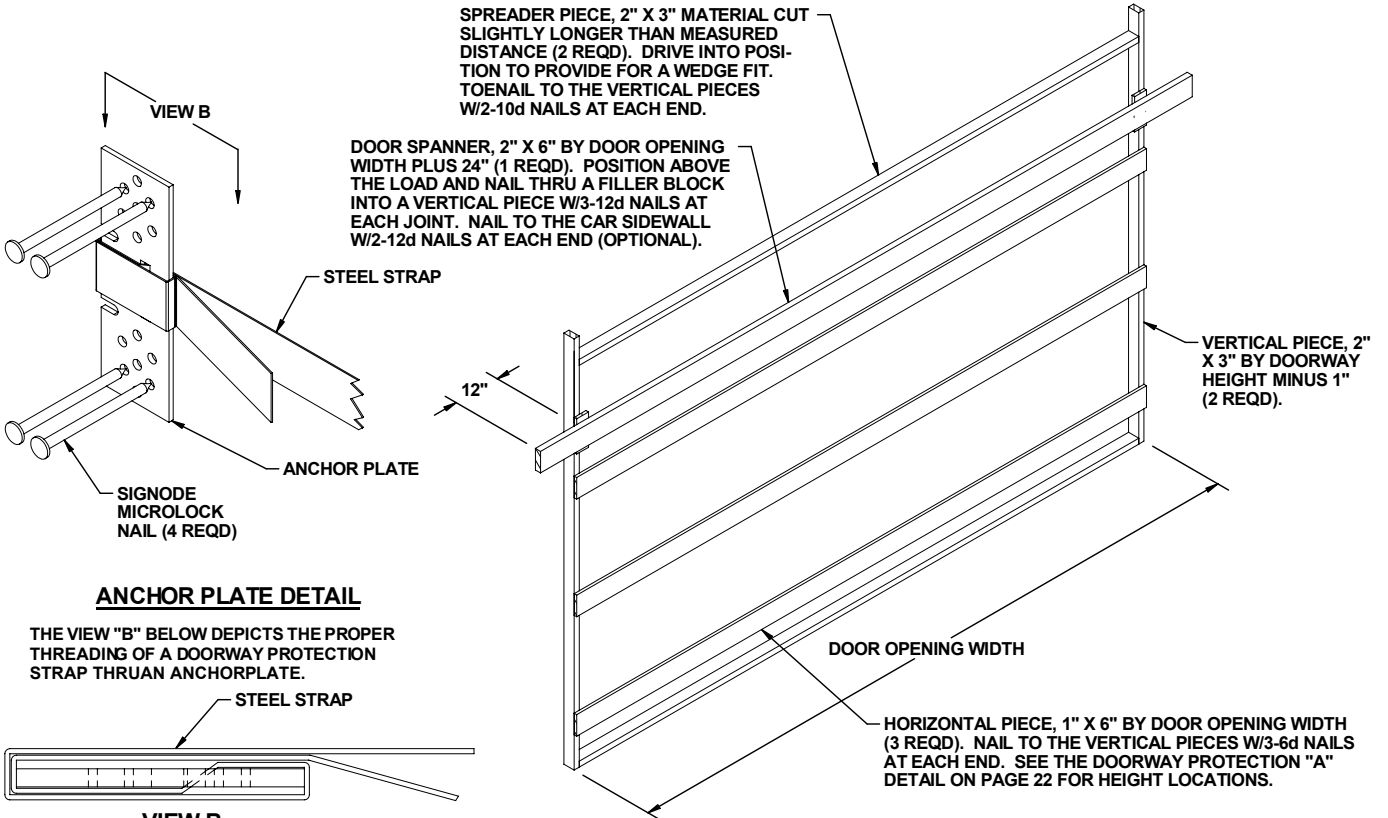
INDICATES CAR FLOOR

DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" STEEL STRAPPING BY DOOR OPENING WIDTH PLUS 6'-0" IN LENGTH (1 REQD PER LAYER OF LOAD). INSTALL FROM TWO PIECES. THREAD ONE END THRU STRAP ANCHOR PLATE AS SHOWN BY THE "ANCHOR PLATE DETAIL" BELOW. NAIL STRAP ANCHOR PLATE TO CAR SIDEWALL W/4 SIGNODE MICROLOCK NAILS.



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.

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).



VIEW B

STEEL STRAP

ANCHOR PLATE

SIGNODE MICROLOCK NAIL (4 REQD)

ANCHOR PLATE DETAIL

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

STEEL STRAP

VIEW B



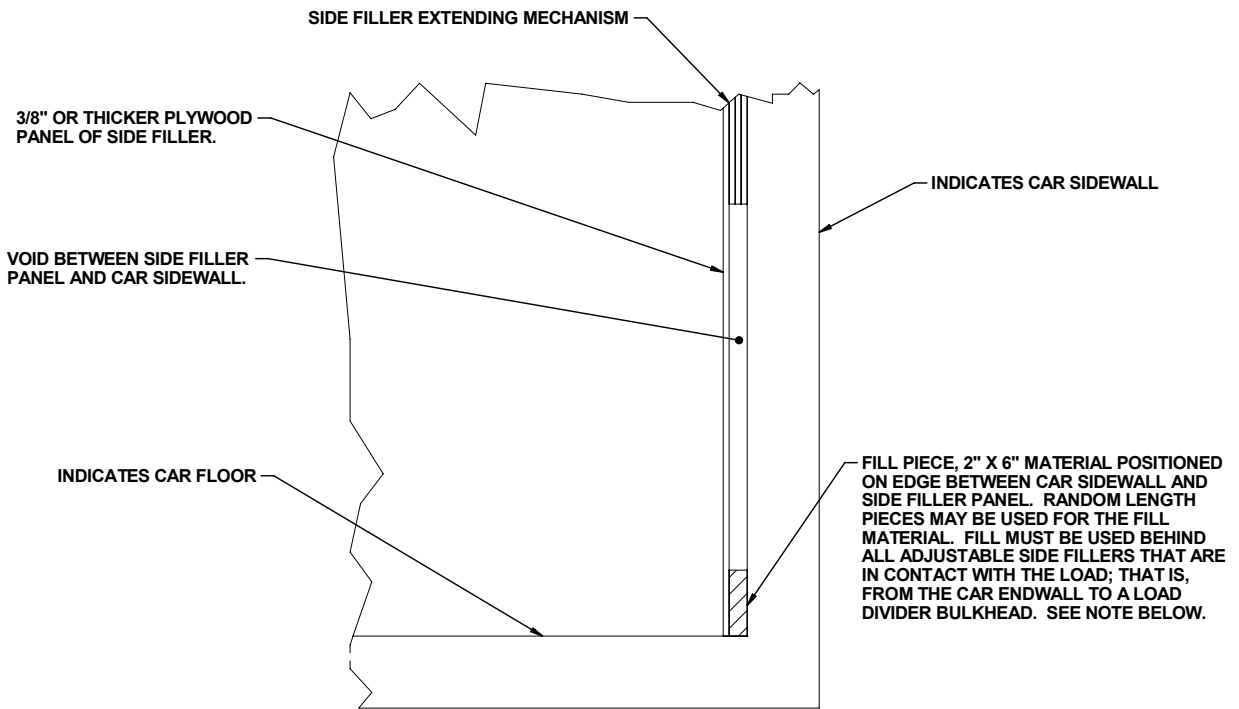
VERTICAL PIECE, 2" X 3" BY DOORWAY HEIGHT MINUS 1" (2 REQD).

DOOR OPENING WIDTH

HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (3 REQD). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH END. SEE THE DOORWAY PROTECTION "A" DETAIL ON PAGE 22 FOR HEIGHT LOCATIONS.

DOORWAY PROTECTION D

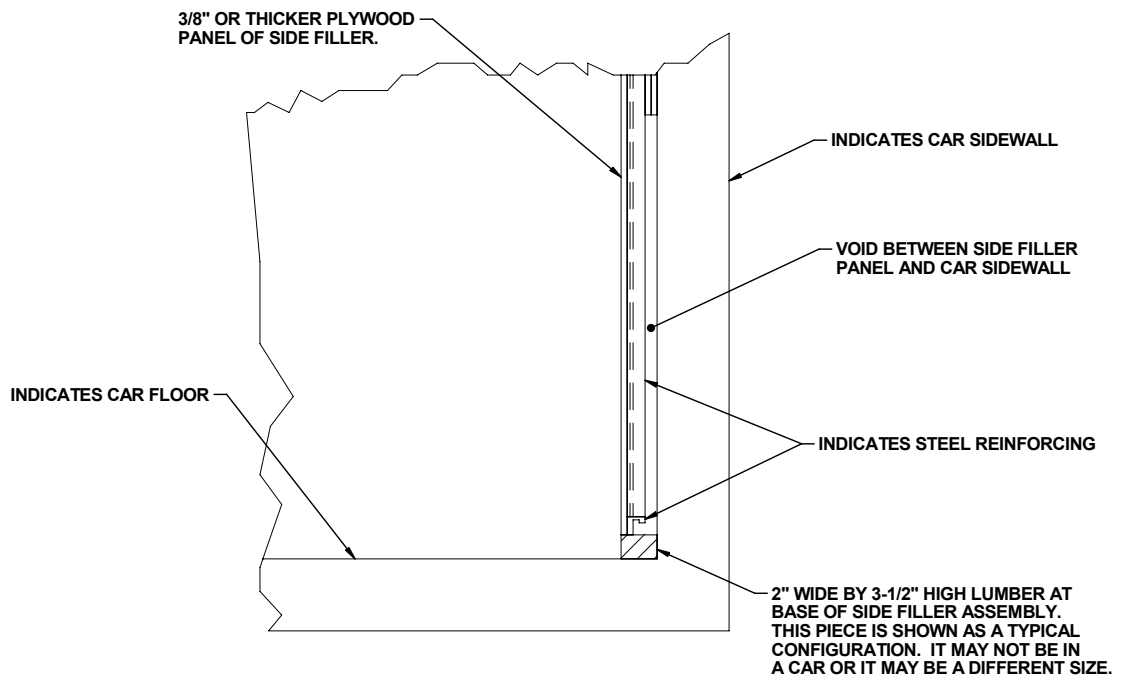
SEE SPECIAL NOTES 4 AND 6 ON PAGE 22.



TYPICAL TYPE A

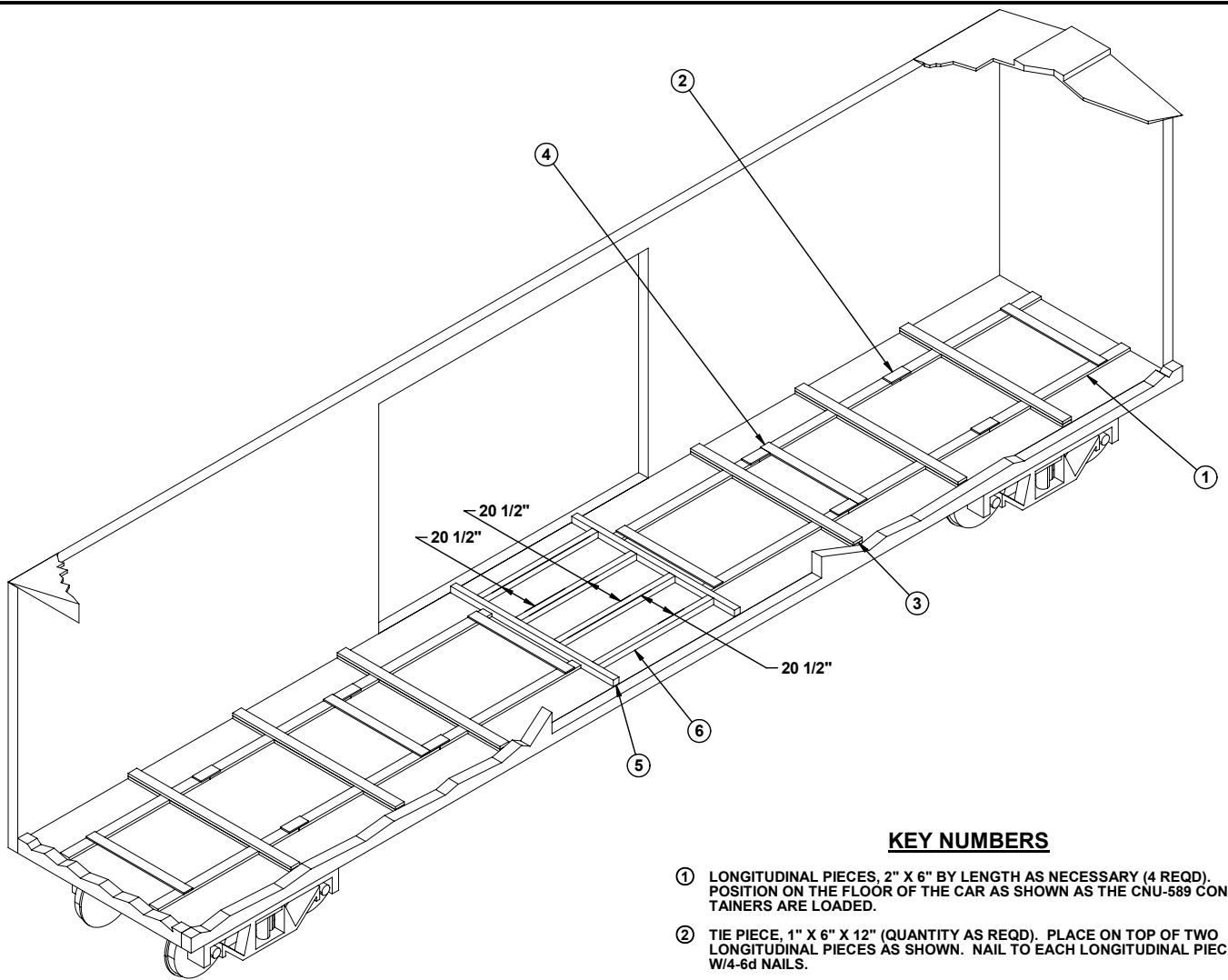
THIS VIEW SHOWS THE INSTALLATION OF A "FILL PIECE" IN A CAR EQUIPPED WITH A STANDARD ADJUSTABLE SIDE FILLER

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".



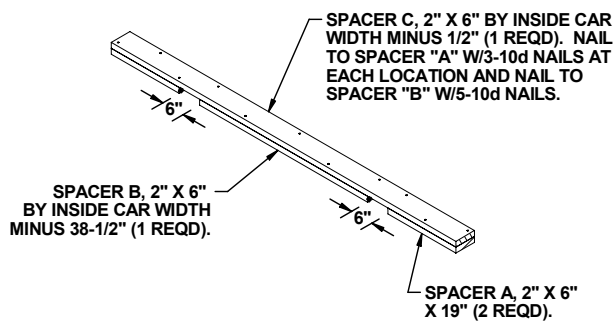
TYPICAL TYPE B

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.



KEY NUMBERS

- ① LONGITUDINAL PIECES, 2" X 6" BY LENGTH AS NECESSARY (4 REQD). POSITION ON THE FLOOR OF THE CAR AS SHOWN AS THE CNU-589 CONTAINERS ARE LOADED.
- ② TIE PIECE, 1" X 6" X 12" (QUANTITY AS REQD). PLACE ON TOP OF TWO LONGITUDINAL PIECES AS SHOWN. NAIL TO EACH LONGITUDINAL PIECE W/4-6d NAILS.
- ③ ALTERNATE SEPARATOR BLOCKING ASSEMBLY (6 REQD). SEE DETAIL BELOW. PLACE OVER THE LONGITUDINAL PIECES AND NAIL W/3-10d NAILS AT EACH LOCATION.
- ④ SPACER PIECE, 1" X 6" BY LENGTH AS NECESSARY (4 REQD). PLACE ACROSS TWO LONGITUDINAL PIECES AS NEEDED TO MAINTAIN SPACING. NAIL TO LONGITUDINAL PIECES W/3-6d NAILS AT EACH END.
- ⑤ BLOCKING PIECE, 4" X 4" BY CAR WIDTH MINUS 1/2" (2 REQD). POSITION UP AGAINST THE LAST GROUP OF CONTAINERS AT EITHER END OF THE CAR.
- ⑥ STRUT, 4" X 4" BY CUT-TO-FIT (4 REQD). TOENAIL TO THE BLOCKING PIECES W/2-16d NAILS AT EACH END.



ALTERNATE SEPARATOR BLOCKING ASSEMBLY

ALTERNATE SEPARATOR BLOCKING PROCEDURE

