LOADING AND BRACING⊕ IN HALF-HIGH ISO CONTAINERS OF CBU ITEMS PACKED IN CNU-147 (TWIN PACK) SHIPPING AND STORAGE CONTAINERS

INDEX

⊕ THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL, MOTOR, OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND

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DO NOT SCALE

JULY 2014

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TEST REPORT	NA	
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CLASS	DIVISION	DRAWING	FILE
19	48	8620	SP15A5

PROJECT SP 318-95

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 CBU ITEMS PACKED IN CNU-147 (TWIN PACK) CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH CBU ITEMS. SEE PAGE 3 FOR DETAILS OF THE CONTAINER. **CAUTION**: REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE EXCEEDED.

C. THE LOAD AS SHOWN IS BASED ON A 4,800 POUND 20' LONG BY 8' WIDE BY 4'-3" HIGH END OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-2-1/2" LONG BY 92-1/2" WIDE BY 40-1/2" HIGH NEAR THE SIDE RAILS (MAXIMUM HEIGHT IS GREATER TOWARD THE CENTER OF THE CONTAINER) AND A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT, HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. **NOTICE**: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.

D. WHEN LOADING CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES AND SIDEWALLS). THE UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS NOT TO EXCEED 1-1/2". EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE VERTICAL PIECES ON THE SIDE FILL ASSEMBLIES OR TO THE LONGITUDINAL PIECES ON THE CRIB FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS, LENGTH AND/OR QUANTITY OF THE VERTICAL OR HORIZONTAL PIECES IN THE SIDE FILL ASSEMBLIES OR THE LENGTH OF THE LATERAL PIECES IN THE CRIB FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE CONTAINER. THE LOADS MUST BE AS TIGHT AS POSSIBLE LONGITUDINALLY, BUT THE VOID MUST NOT EXCEED 3/4" OVERALL. EXCESSIVE SLACK CAN BE ELIMINATED EITHER BY INCREASING THE LENGTH OF THE STRUTS INSTALLED BETWEEN THE STRUT GATE ASSEMBLY AND THE REAR BLOCKING ASSEMBLY, OR BY INSTALLING 4" WIDE BY 39-1/2" LONG FILL MATERIAL.

E. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. 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.

F. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE FORWARD AND REAR WALLS. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE FORWARD STRUT ASSEMBLIES TO PROVIDE A FLAT SURFACE FOR THE BUFFER PIECES. A PIECE OF 2" X 4", 2" X 3" OR A SPECIAL WIDTH PIECE CUT-TO-FIT CAN BE USED. THIS FILL PIECE WILL BE NAILED WITH ONE APPROPRIATELY SIZED NAIL EVERY 12". THIS FILL PIECE IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER FORWARD WALL ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER FORWARD WALL, ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR FORWARD LONGITUDINAL BLOCKING. NOTE: THE REAR CORNER POSTS IN THE HALF-HIGH CONTAINER WILL PROJECT INTO THE LOAD AREA SUFFICIENTLY TO ALLOW THE FILL PIECES AND THE STRUT GATE ASSEMBLY TO BEAR AGAINST THE EDGE OF THE END DOOR/RAMP.

G. WHETHER A CONTAINER IS FULL OR IS LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CONTAINER.

H. **CAUTION**: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.

J. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

K. **MAXIMUM LOAD WEIGHT CRITERIA**:

THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY "WEIGHT LAWS" OF CERTAIN STATES. ALSO, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY OTHER WEIGHT RESTRICTIONS IMPOSED ON THE INTERMODAL CONTAINER SYSTEM.

(CONTINUED AT RIGHT)

(**GENERAL NOTES CONTINUED**)

L. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:

1. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.

2. THE LOAD LIMIT OF A T/COFC RAILCAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.

M. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.

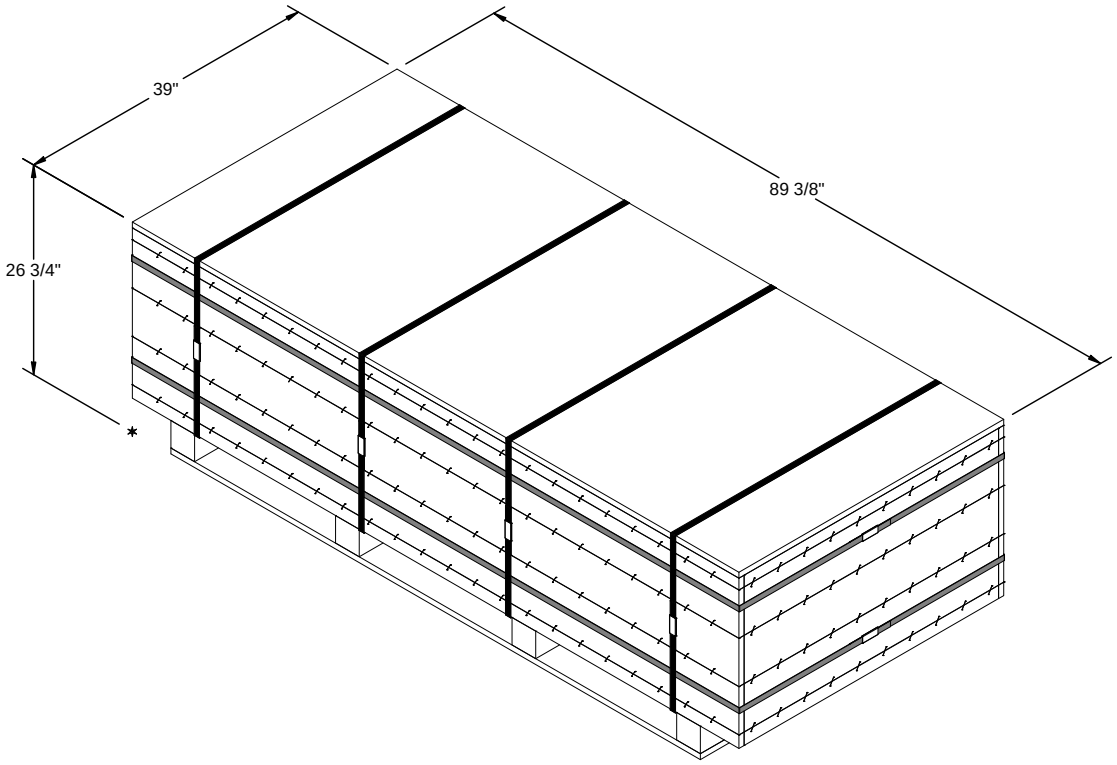
N. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

O. THE QUANTITY OF CONTAINERS SHOWN IN THE LOADS ON PAGES 4 AND 6 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE “LESS-THAN-FULL LOAD PROCEDURE” ON PAGES 11 OR 12.

P. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.

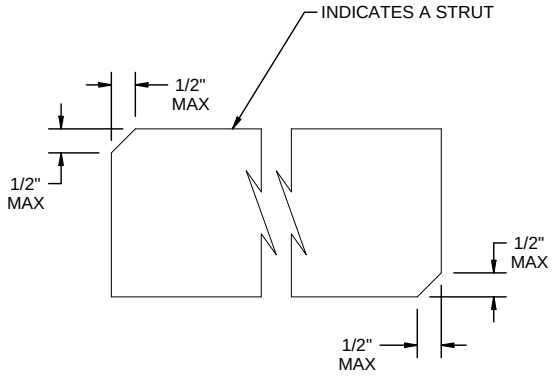
MATERIAL SPECIFICATIONS

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.



CNU-147 CONTAINER

GROSS WEIGHT - - - - - - - - - - - - - 1,855 LBS (APPROX)
CUBE - - - - - - - - - - - - - - - - - 54.0 CU FT (APPROX)



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.

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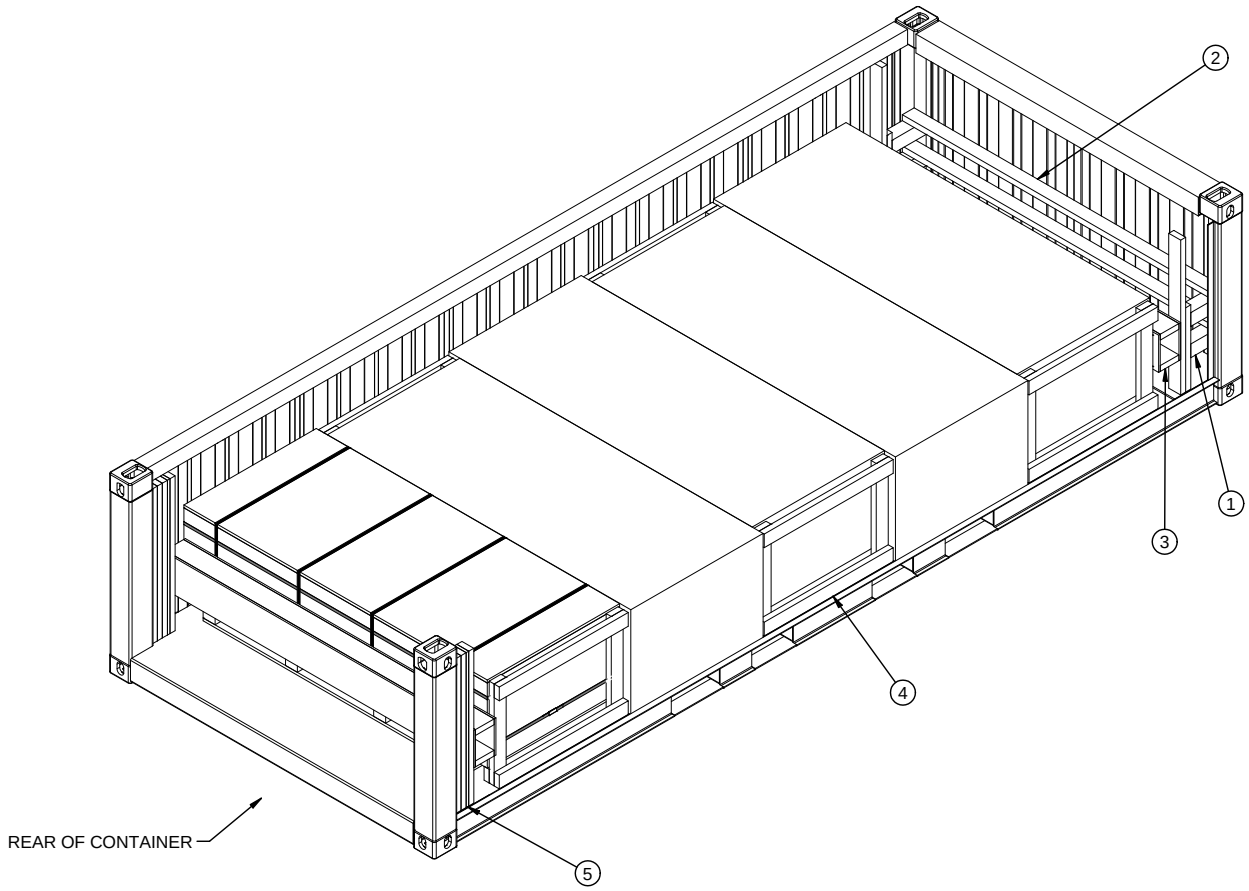

ISOMETRIC VIEW

KEY NUMBERS

① FORWARD STRUT ASSEMBLY A (2 REQD). SEE THE DETAIL ON PAGE 9.

② SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7-1/2") (2 REQD). NAIL TO THE STRUTS OF THE FORWARD STRUT ASSEMBLIES W/2-10d NAILS AT EACH END.

③ FORWARD/REAR BLOCKING ASSEMBLY A (2 REQD). SEE THE DETAIL ON PAGE 8. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECE OF THE FORWARD STRUT ASSEMBLIES W/3-10d NAILS.

④ SIDE FILL ASSEMBLY (5 REQD). SEE THE DETAIL ON PAGE 9.

⑤ FILL MATERIAL, 4" WIDE BY 39-1/2" LONG MATERIAL (AS REQD). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/4 NAILS OF A SUITABLE SIZE (10d FOR 2" THICK MATERIAL). NAIL EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR MANNER. **NOTE**: MULTIPLE PIECES MAY BE LAMINATED TOGETHER FIRST AND THEN TOENAILED TO THE REAR BLOCKING ASSEMBLY. SEE THE "DETAIL A" ON PAGE 12.

RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD ON PAGE 4

1. PREFABRICATE TWO FORWARD STRUT ASSEMBLIES “A”, TWO FORWARD/REAR BLOCKING ASSEMBLIES “A”, AND FIVE SIDE FILL ASSEMBLIES.
2. INSTALL THE TWO FORWARD STRUT ASSEMBLIES AND THE SPREADER PIECES.
3. INSTALL THE FORWARD BLOCKING ASSEMBLY.
4. LOAD ONE CNU-147 CONTAINER AND INSTALL ONE SIDE FILL ASSEMBLY.
5. REPEAT STEP 4 FOUR TIMES, ALTERNATING THE LATERAL VOID AS DEPICTED.
6. INSTALL THE REAR BLOCKING ASSEMBLY AND FILL MATERIAL.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	7	3
2" X 4"	127	85
2" X 6"	31	31
4" X 4"	4	5
NAILS	**NO. REQD**	**POUNDS**
6d (2")	100	3/4
10d (3")	92	1-1/2
12d (3-1/4")	16	1/4
PLYWOOD, 1/2" - - - 24.15 SQ FT REQD - - 33.20 LBS		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU CONTAINER	5	9,275 LBS
DUNNAGE		284 LBS
CONTAINER		4,800 LBS
TOTAL WEIGHT		14,359 LBS (APPROX)

5-UNIT CONTAINER CROSSWISE LOAD

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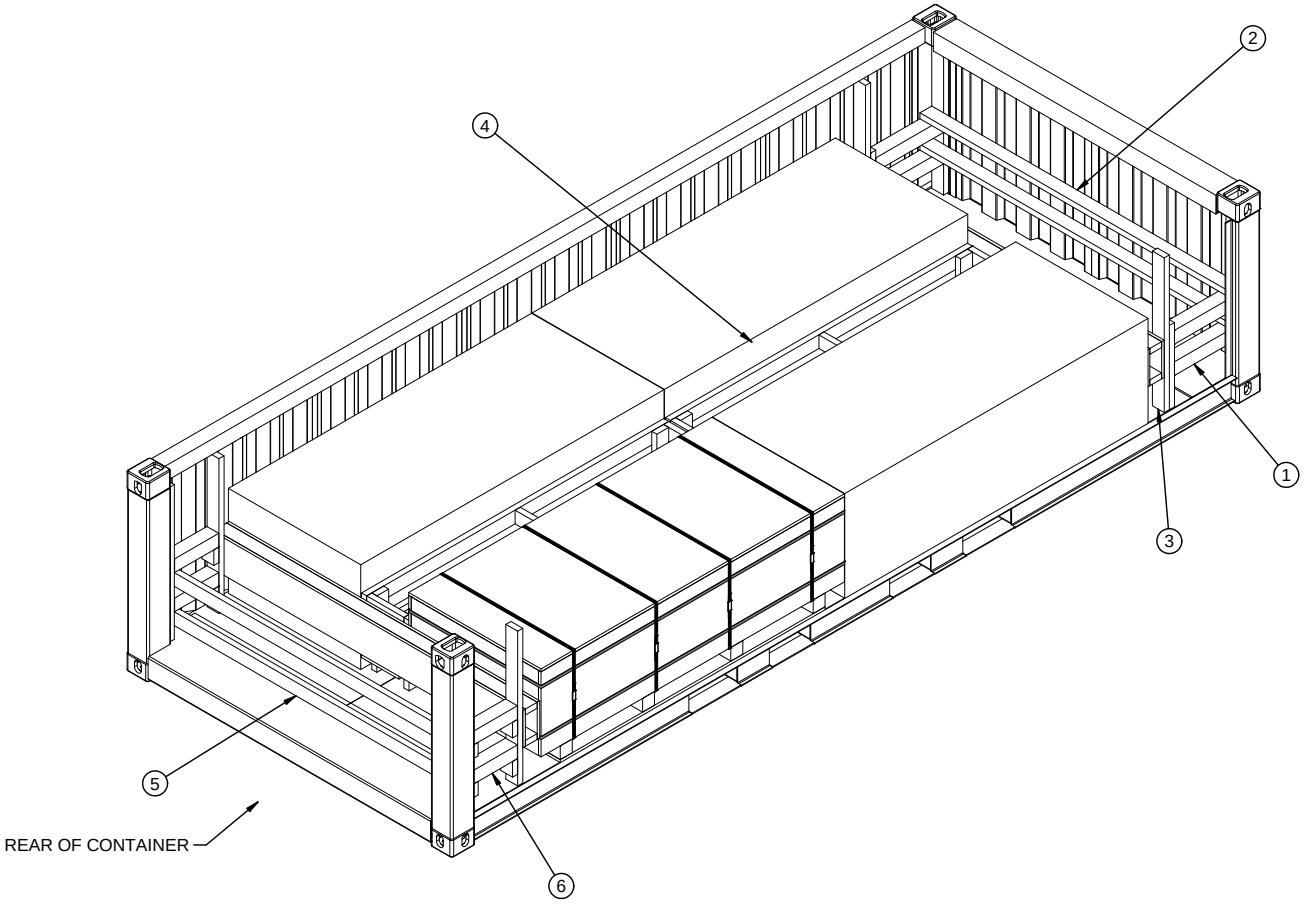

ISOMETRIC VIEW

KEY NUMBERS

① FORWARD STRUT ASSEMBLY B (2 REQD). SEE THE DETAIL ON PAGE 9.

② SPREADER PIECE, 2" X 4" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-7-1/2") (2 REQD). NAIL TO THE STRUTS OF THE FORWARD STRUT ASSEMBLIES W/2-10d NAILS AT EACH END.

③ FORWARD/REAR BLOCKING ASSEMBLY B (2 REQD). SEE THE DETAIL ON PAGE 8. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECE OF THE FORWARD STRUT ASSEMBLIES W/3-10d NAILS. **NOTE**: STRUT LEDGERS ARE ONLY REQUIRED ON THE REAR BLOCKING ASSEMBLY DEPICTED ABOVE. DO NOT INSTALL STRUT LEDGERS ON THE FORWARD BLOCKING ASSEMBLY.

④ CRIB FILL ASSEMBLY (2 REQD). INSTALL THE END WITH HOLD-DOWN PIECE AGAINST THE FORWARD & REAR BLOCKING ASSEMBLIES. SEE THE DETAIL ON PAGE 10.

⑤ STRUT GATE ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 10.

⑥ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 13") (4 REQD). TOENAIL TO THE BUFFER PIECE OF THE REAR BLOCKING ASSEMBLY AND THE STRUT GATE ASSEMBLY W/2-12d NAILS AT EACH END. SEE THE "DETAIL B" ON PAGE 12 AND THE "BEVEL-CUT" DETAIL ON PAGE 3.

4-UNIT CONTAINER LENGTHWISE LOAD

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RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD ON PAGE 6

1. PREFABRICATE TWO FORWARD STRUT ASSEMBLIES “B”, TWO FORWARD/REAR BLOCKING ASSEMBLIES “B”, TWO CRIB FILL ASSEMBLIES, AND ONE STRUT GATE ASSEMBLY.
2. INSTALL THE TWO FORWARD STRUT ASSEMBLIES AND THE SPREADER PIECES.
3. INSTALL THE FORWARD BLOCKING ASSEMBLY.
4. LOAD TWO CNU-147 CONTAINERS AND INSTALL ONE CRIB FILL ASSEMBLY.
5. REPEAT STEP 4 AND INSTALL THE REAR BLOCKING ASSEMBLY.
6. INSTALL THE STRUT GATE ASSEMBLY AND THE FOUR STRUTS.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	179	120
4" X 4"	11	15
NAILS	**NO. REQD**	**POUNDS**
6d (2")	96	3/4
10d (3")	136	2-1/4
12d (3-1/4")	32	1/2
PLYWOOD, 3/4" - - - 24.15 SQ FT REQD - - 49.80 LBS		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU CONTAINER	4	7,420 LBS
DUNNAGE		324 LBS
CONTAINER		4,800 LBS
TOTAL WEIGHT		12,544 LBS (APPROX)

4-UNIT CONTAINER LENGTHWISE LOAD

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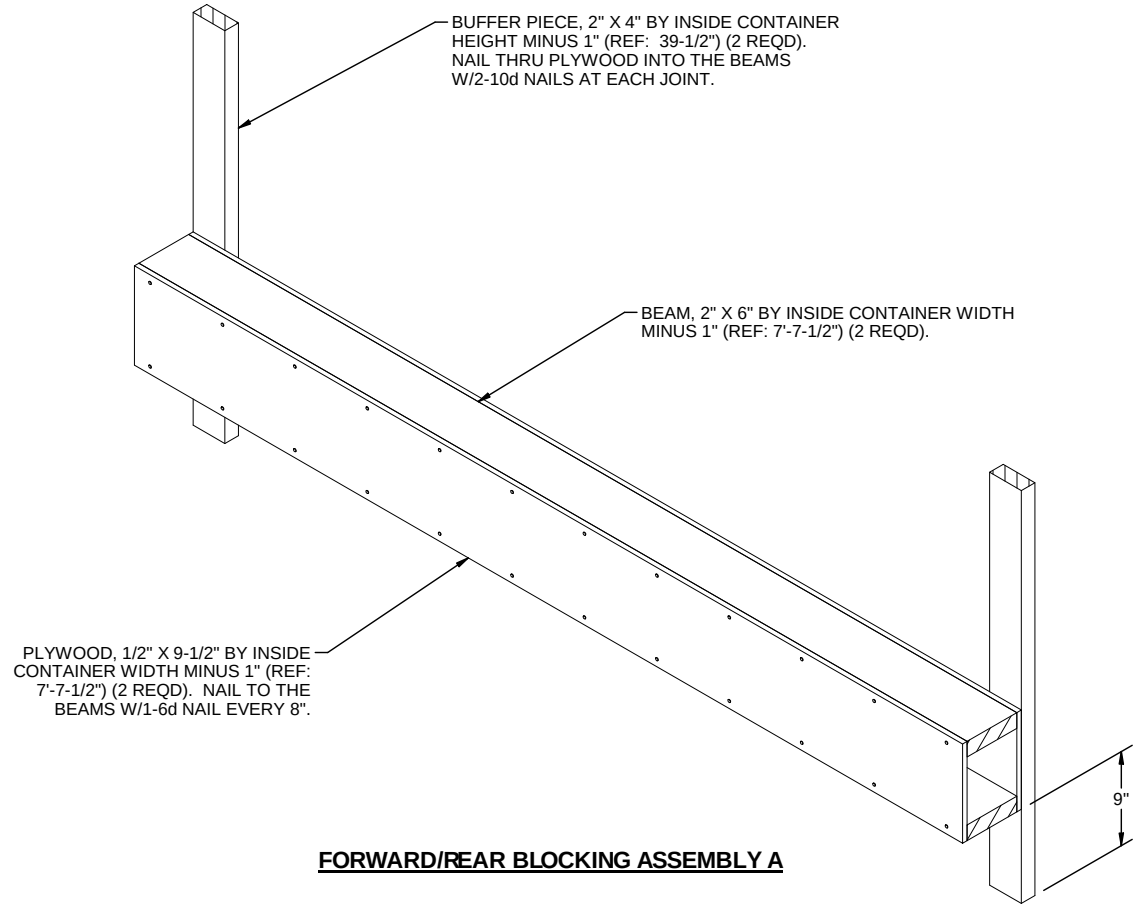
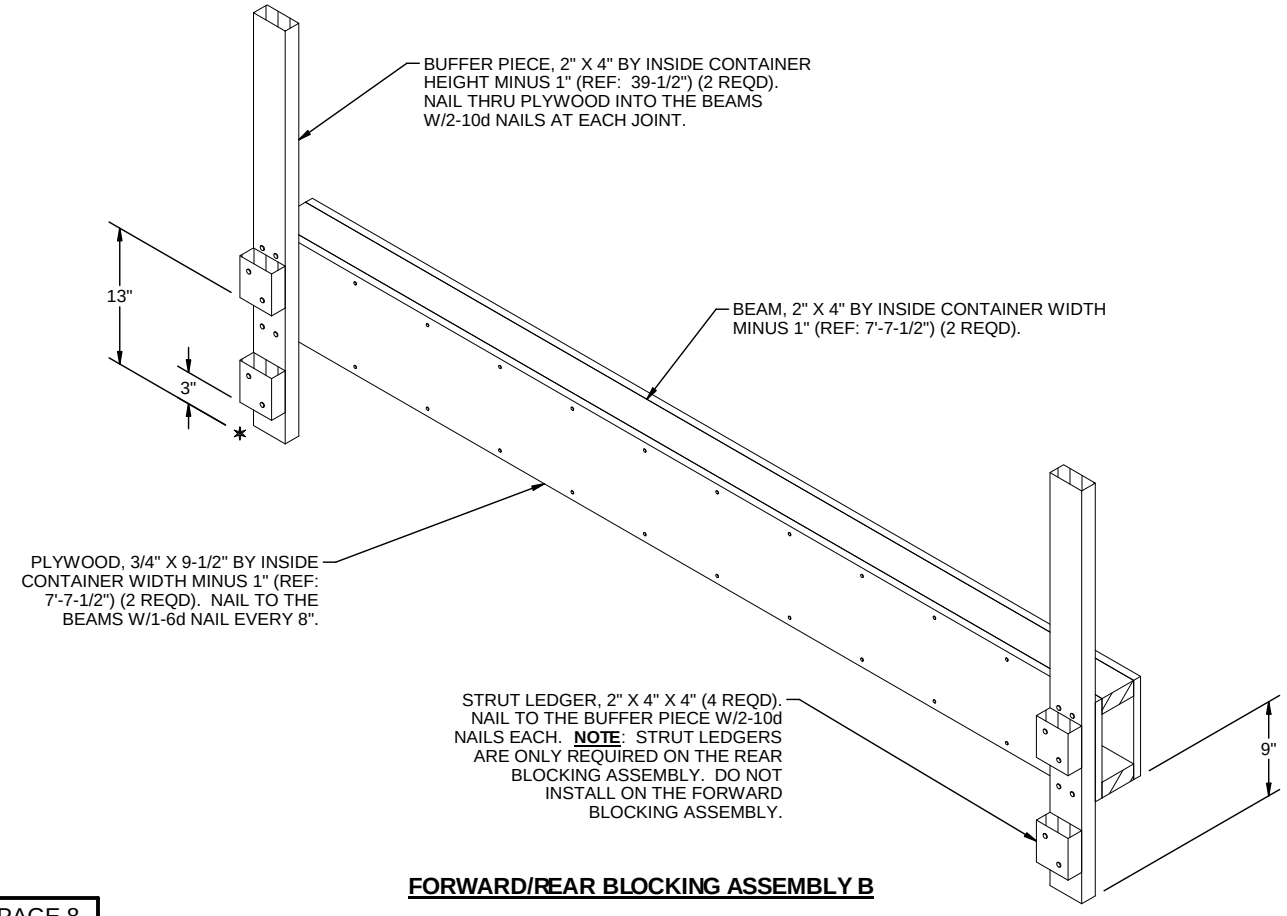
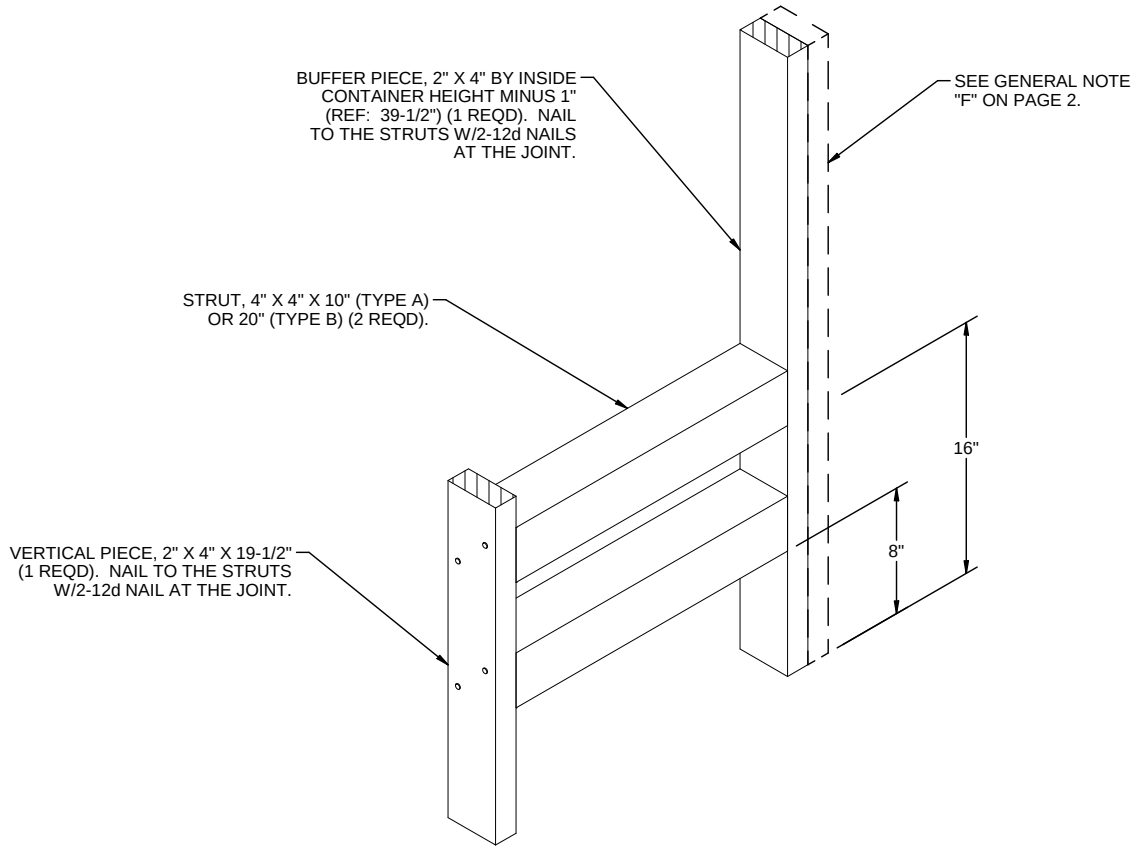


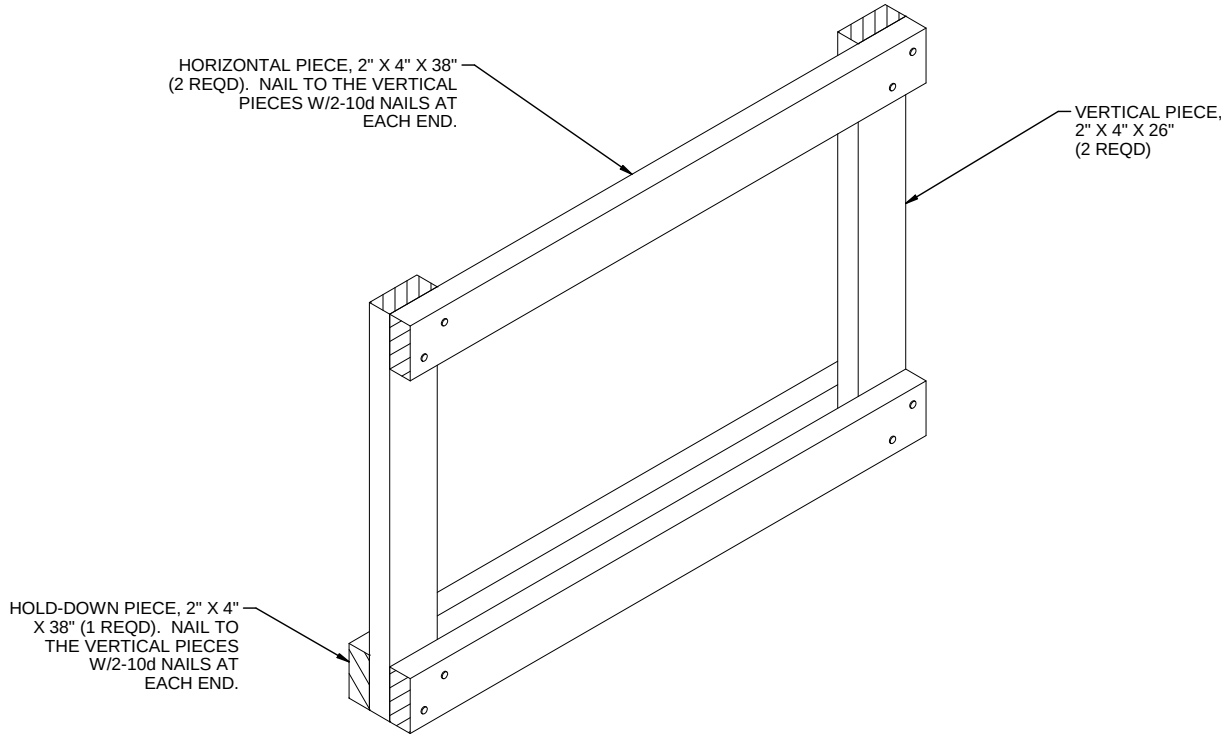
FORWARD/REAR BLOCKING ASSEMBLY A



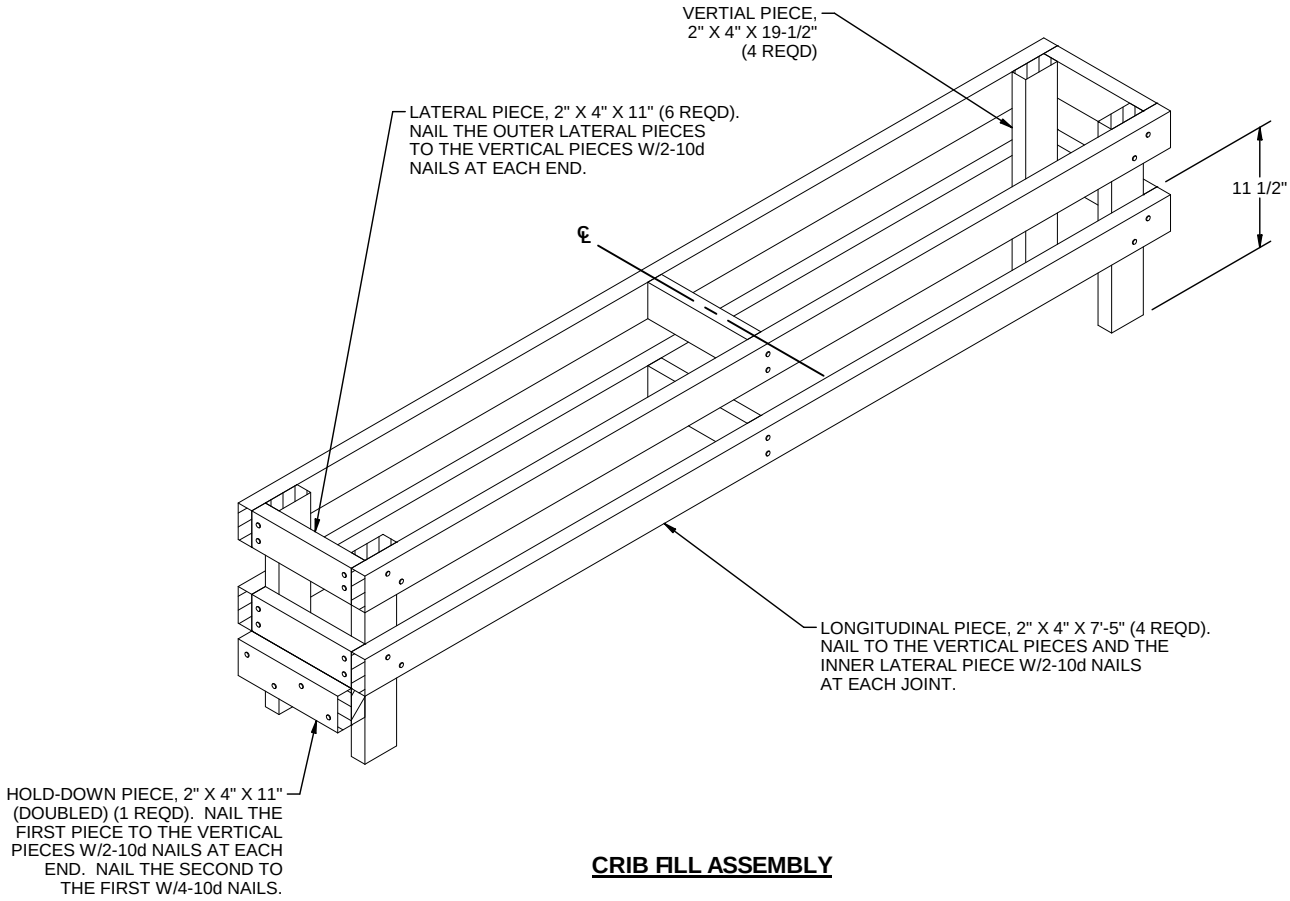
FORWARD/REAR BLOCKING ASSEMBLY B



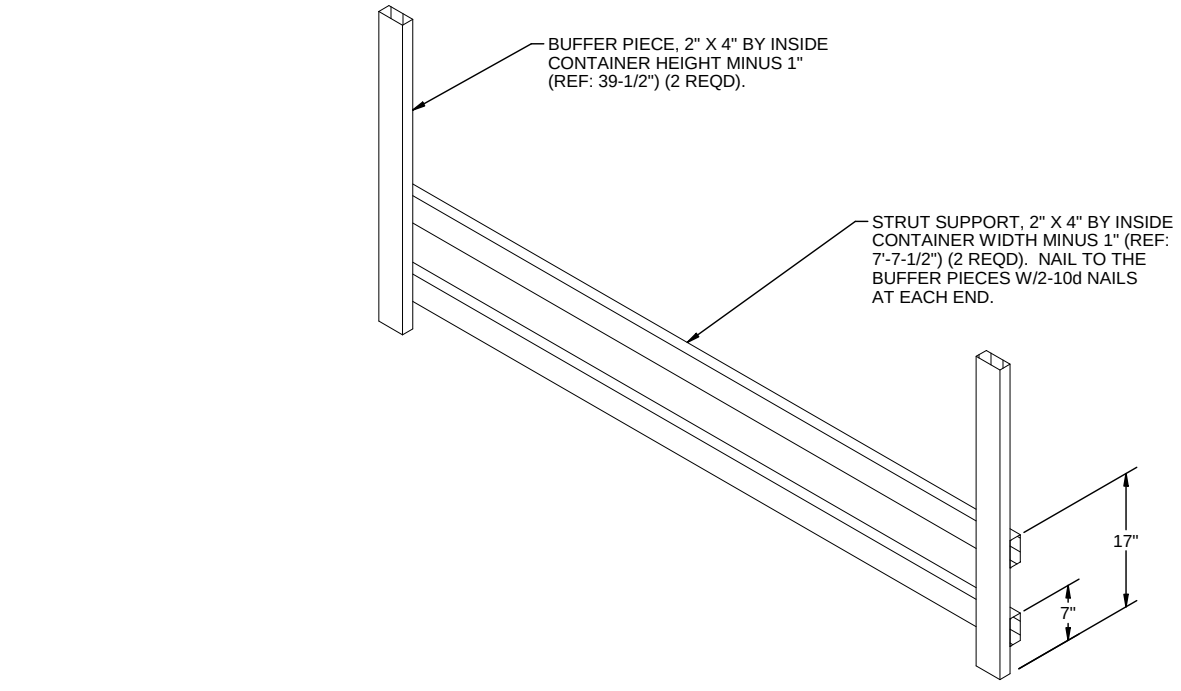
FORWARD STRUT ASSEMBLY A/B



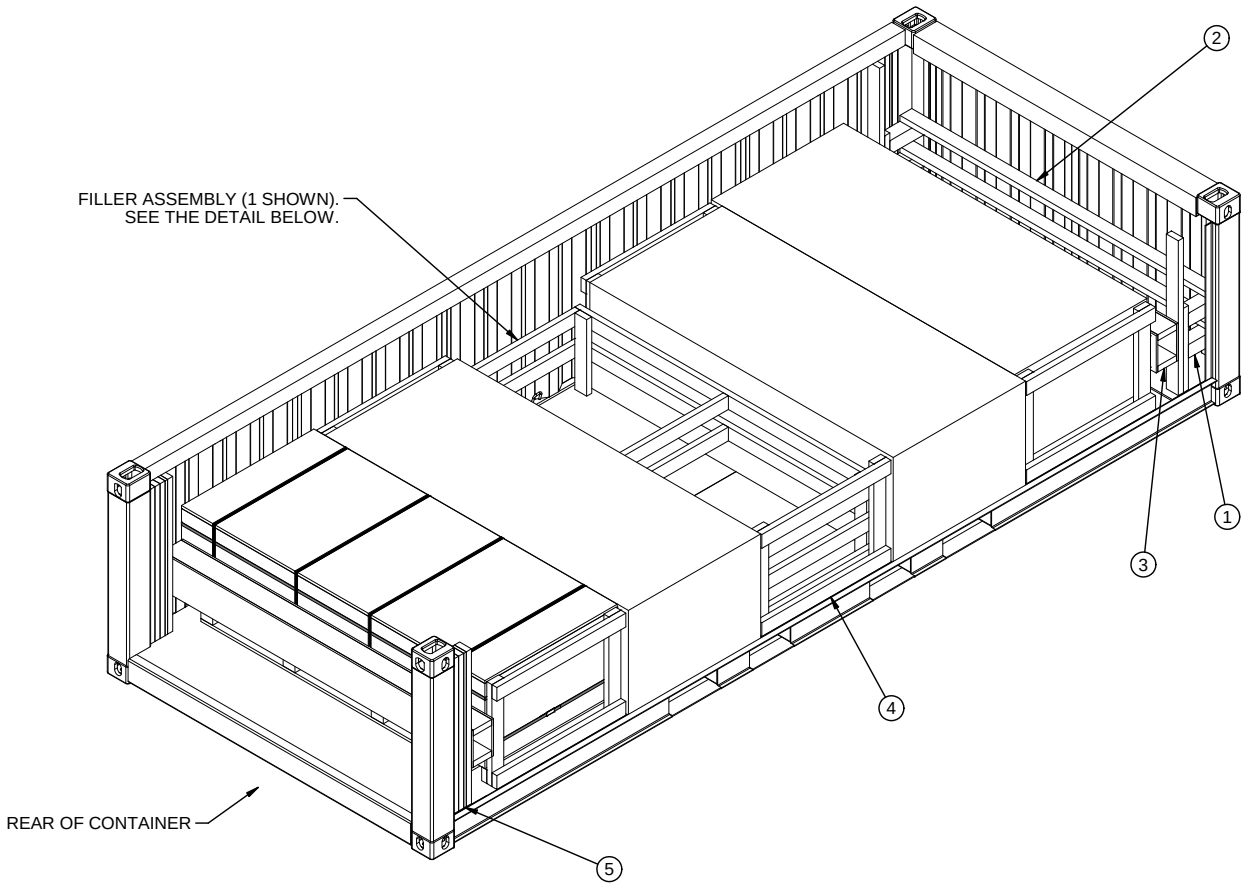
SIDE FILL ASSEMBLY



CRIB FILL ASSEMBLY

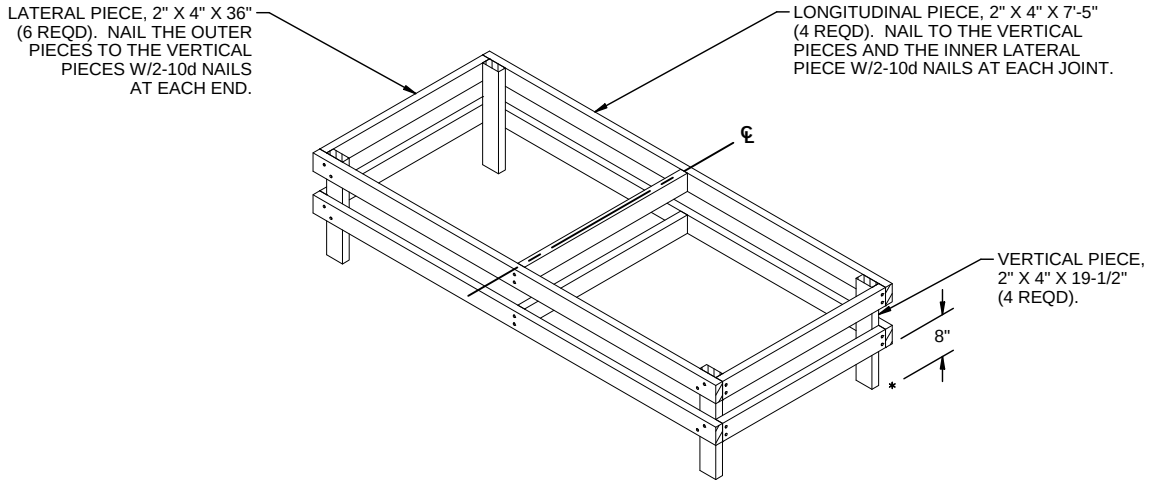


STRUT GATE ASSEMBLY



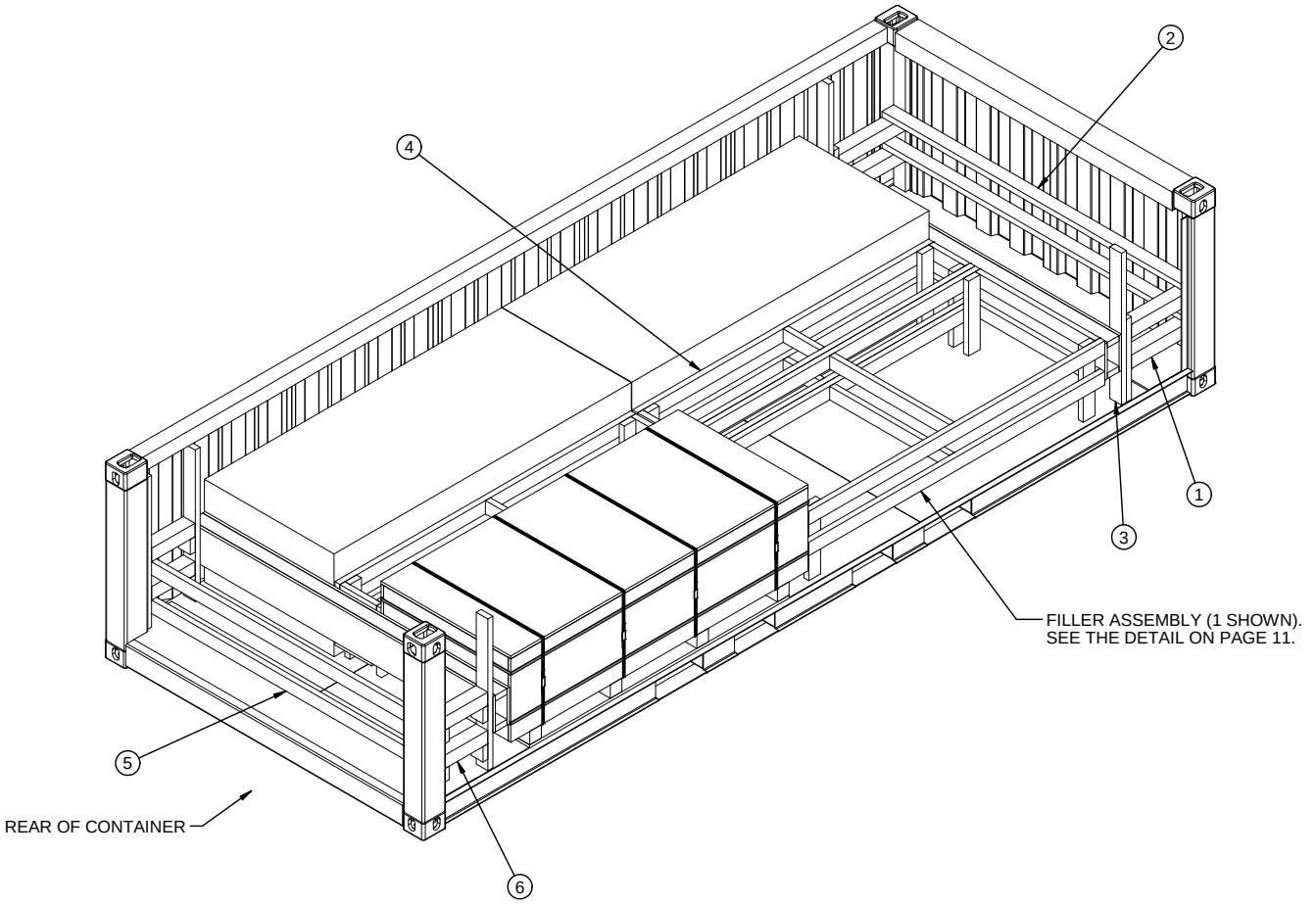
LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 4. SEE GENERAL NOTES "G" AND "O" ON PAGE 2.



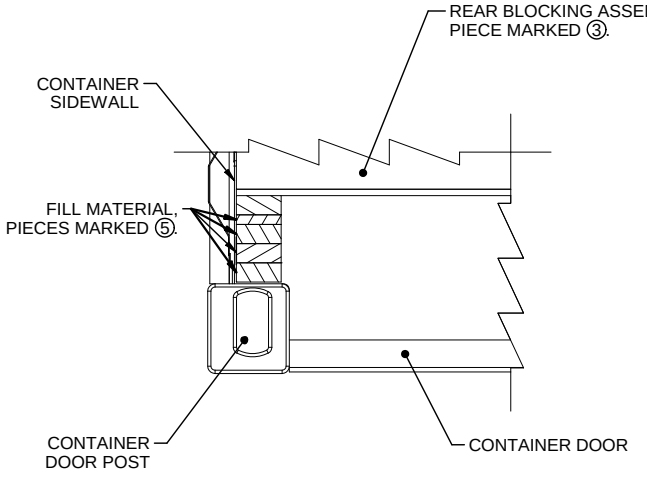
FILLER ASSEMBLY

THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN PLACE OF AN OMITTED CNU-147 CONTAINER.



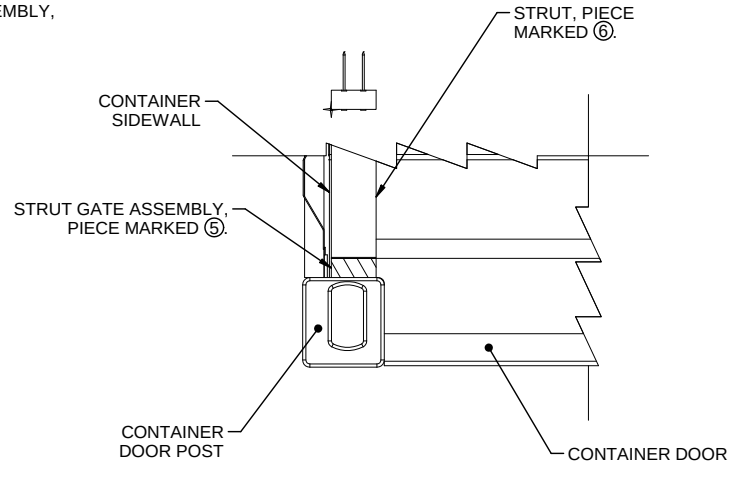
LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 6. SEE GENERAL NOTES "G" AND "O" ON PAGE 2.



DETAIL A

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE FILL MATERIAL PIECES. KEY NUMBERS REFER TO THE KEY NUMBERS ON PAGE 4.



DETAIL B

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE STRUT GATE ASSEMBLY. KEY NUMBERS REFER TO THE KEY NUMBERS ON PAGE 6.