LOADING AND BRACING* IN SIDE OPENING ISO CONTAINERS OF BLU-109 BOMBS PACKED IN CNU-417 CONTAINERS

INDEX

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

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY
JOINT MUNITIONS COMMAND

WARD.GINA.M.1369379808 Digitally signed by WARD.GINA.M.1369379808 Date: 2022.07.05 15:07:25 -05'00'

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

BRAILSFORD.KEITH.ANTHONY.1028655661 Digitally signed by BRAILSFORD.KEITH.ANTHONY.1028655661 Date: 2022.07.20 11:41:16 -05'00'

DEFENSE AMMUNITION CENTER

CAUTION: VERIFY PRIOR TO USE AT https://www.dau.edu/cop/ammo/pages/default.aspx THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.

DO NOT SCALE

JUNE 2002

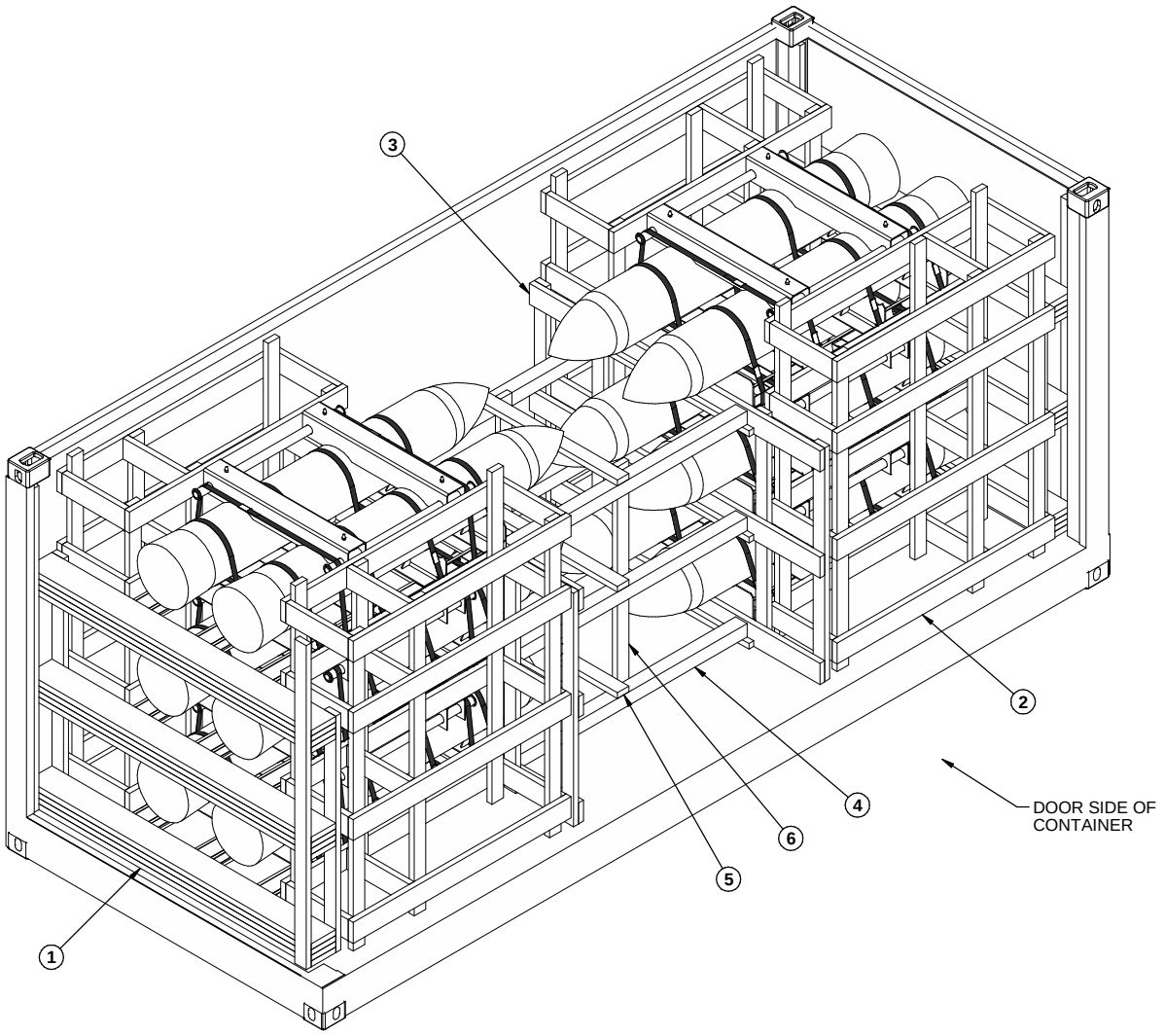
DESIGN ENGINEER	BASIC	LAURA FIEFFER	
	REV.	RICHARD GARSIDE	
ENGINEERING DIVISON		FIEFFER.LAURA.A.1230375727 Digitally signed by FIEFFER.LAURA.A.1230375727 Date: 2022.06.13 15:46:52 -05'00'	
TEST ENGINEER		FELICIANO.ADIN.1259200373 Digitally signed by FELICIANO.ADIN.1259200373 Date: 2022.06.16 13:16:36 -05'00'	
TEST REPORT	NA		
EXPLOSIVE SAFETY DIRECTORATE		FIEFFER.LAURA.A.1230375727 Digitally signed by FIEFFER.LAURA.A.1230375727 Date: 2022.07.05 15:22:13 -05'00'	

REVISION NO. 3	JUNE 2022

SEE THE REVISION LISTING ON PAGE 3

CLASS	DIVISION	DRAWING	FILE
19	48	8612	SP15PB6

PROJECT SP 310-95



ISOMETRIC VIEW

KEY NUMBERS

① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.

② SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 5.

③ CENTER GATE (2 REQD). SEE THE DETAIL ON PAGE 5.

④ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 6'-0") (6 REQD). LOCATE APPROXIMATELY 2" IN FROM THE EDGE OF THE STRUT LEDGER ON THE CENTER GATES, ALIGNED WITH THE CONTAINER SKIDS AND FORWARD PLATE. TOENAIL TO THE HORIZONTAL PIECES OF THE CENTER GATES W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 4.

⑤ HORIZONTAL STRUT BRACING, 2" X 4" BY DISTANCE BETWEEN STRUTS (REF: 44") (3 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH END.

⑥ VERTICAL STRUT BRACING, 2" X 4" X 62-1/4" (2 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	24	8
2" X 4"	280	186
2" X 6"	296	296
2" X 8"	172	229
4" X 4"	36	48
NAILS	NO. REQD	POUNDS
10d (3")	972	15
12d (3-1/4")	24	1/2

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-417	6*	26,820 LBS
DUNNAGE		1,551 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		34,421 LBS

*SEE GENERAL NOTE "P" ON PAGE 3.

PROJECT SP 310-95

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 OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO LOADS OF BLU-109 BOMBS PACKED IN CNU-417 CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH THE BOMBS. SEE PAGE 4 AND U.S. AIR FORCE DRAWING 8463212 FOR DETAILS OF THE CONTAINER. **CAUTION**: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE SIDE OPENING ISO CONTAINER MUST NOT BE EXCEEDED.

C. THE LOADS AS SHOWN ARE BASED ON A 6,050 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH SIDE OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-6-1/4" LONG BY 90" WIDE BY 89" HIGH, WITH A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. OLDER/OTHER CONTAINERS MAY HAVE DIFFERENT INSIDE MEASUREMENTS, VERIFY INSIDE CONTAINER DIMENSIONS PRIOR TO FABRICATING DUNNAGE. 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 ALSO BE USED.

D. WHEN LOADING THE UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). 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 SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE LONGITUDINAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE LATERAL PIECES 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 OR BY LAMINATING ADDITIONAL 1" X 4" OR 2" X 4" VERTICAL PIECES TO A CENTER GATE W/5 APPROPRIATELY SIZED NAILS (10d FOR 2" MATERIAL).

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

F. 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.

G. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE ENDWALLS. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE END BLOCKING 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". NOTE THAT SOME CONTAINERS ARE EQUIPPED WITH "TIE-BARS" IN THE CORNER SLOT, WHICH PRECLUDE THE USE OF A FULL HEIGHT FILL PIECE. WHEN "TIE-BARS" ARE PRESENT, THE FILL PIECE MUST BE INSTALLED IN SEGMENTS DESIGNED TO FIT BETWEEN THE "TIE-BARS" VERTICALLY. THE FILL PIECE(S) IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER ENDWALLS ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER ENDWALLS. ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR LONGITUDINAL BLOCKING.

H. 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.

J. **CAUTION**: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.

K. 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.

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.

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

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 LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. ODD QUANTITIES OF CONTAINERS CAN BE LOADED BY USING "LESS-THAN-FULL LOAD PROCEDURE" ON PAGE 7.

P. THE LOAD AS SHOWN ON PAGE 2 MAY NEED TO BE REDUCED BY ONE LAYER DEPENDING ON THE OPENING HEIGHT OF THE SIDE OPENING ISO CONTAINER. VERIFY THAT THE DOORWAY HEIGHT IS SUFFICIENT TO ALLOW THREE CNU-417 PALLET UNITS TO BE LOADED PRIOR TO BEGINNING OUTLOADING OPERATIONS.

Q. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:

1. PREFABRICATE TWO END BLOCKING ASSEMBLIES, FOUR SIDE FILL ASSEMBLIES, AND TWO CENTER GATES.

2. INSTALL ONE END BLOCKING ASSEMBLY.

3. INSTALL ONE SIDE FILL ASSEMBLY.

4. LOAD THREE CONTAINERS.

5. REPEAT STEPS 2 THRU 4.

6. INSTALL THE TWO CENTER GATES AND SIX STRUTS.

7. INSTALL THE HORIZONTAL AND VERTICAL STRUT BRACING.

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.
WIRE, CARBON STEEL - :	ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.

REVISIONS

REVISION NO. 1, DATED NOVEMBER 2013, CONSISTS OF:

1. DECREASE IN SIDE FILL ASSEMBLY LATERAL PIECE LENGTH FROM 21" TO 19", IN SIDE FILL ASSEMBLY ON PAGE 5.

2. CHANGE IN "BILL OF MATERIAL" AND "LOAD AS SHOWN" ON PAGE 2, CORRESPONDING TO CHANGE IN LATERAL PIECE LENGTH.

REVISION NO. 2, DATED OCTOBER 2020, CONSISTS OF:

1. ADDING "LESS-THAN-FULL LOAD PROCEDURES" AND FILLER ASSEMBLY ON PAGE 7, AND UPDATING GENERAL NOTE "O" ABOVE TO ALLOW SHIPMENT OF ODD QUANTITIES.

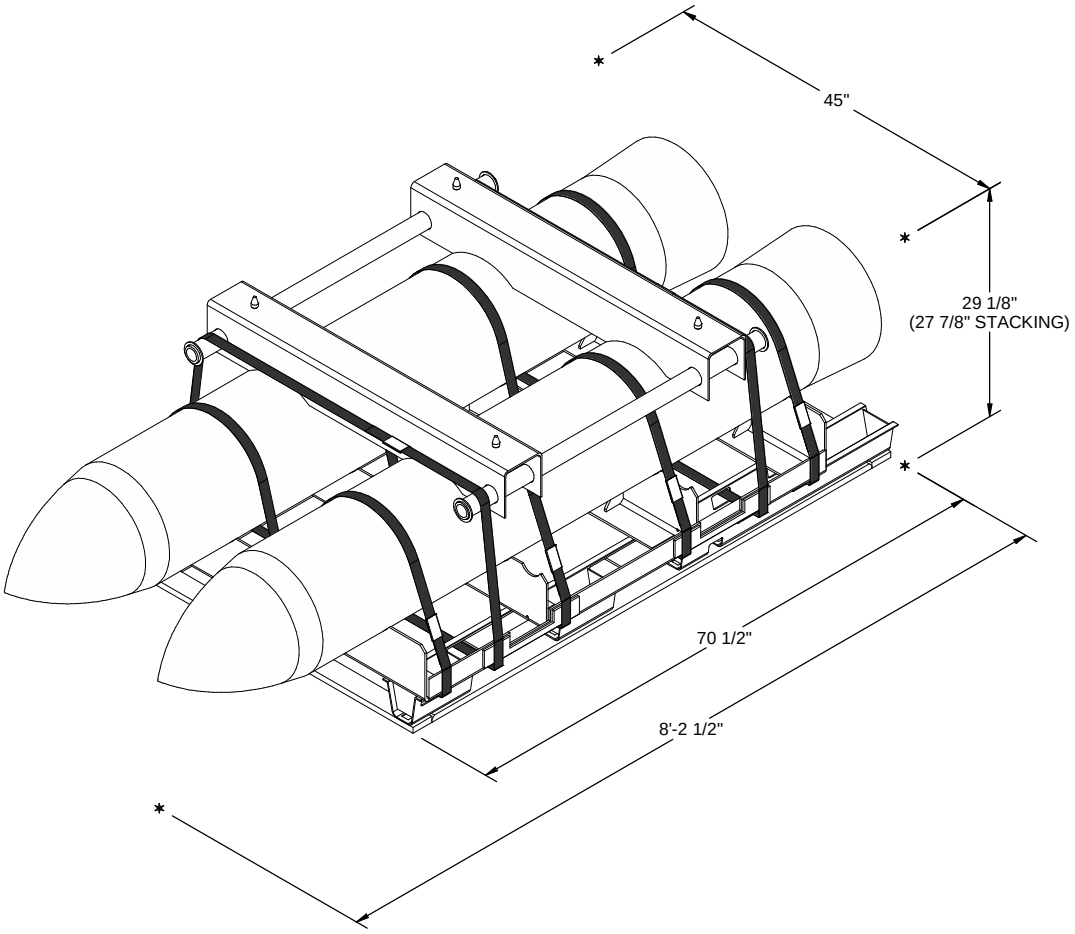
2. CHANGED POSITIONING OF BEAM ASSEMBLIES ON END BLOCKING ASSEMBLY, SHOWN IN THE LOADS ON PAGES 2 AND 7, AND IN THE DETAILS ON PAGE 6.

3. CHANGED POSITIONING OF HORIZONTAL PIECES ON CENTER GATE, SHOWN IN THE LOADS ON PAGES 2 AND 7, AND IN THE DETAILS ON PAGE 5.

4. CHANGED "BILL OF MATERIAL" AND "LOAD AS SHOWN" ON PAGE 2, CORRESPONDING TO CHANGES IN END BLOCKING ASSEMBLY AND CENTER GATE.

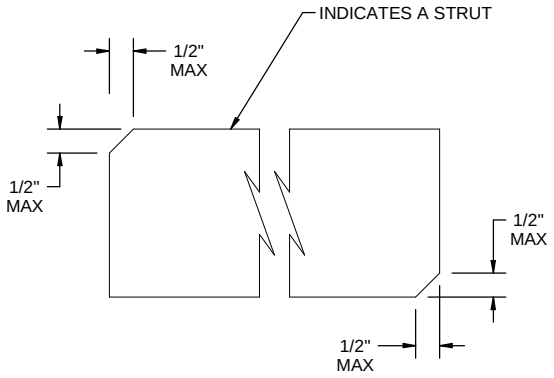
REVISION NO. 3, DATED OCTOBER 2021, CONSISTS OF:

ADDING "DISTRIBUTION STATEMENT A" TO COVER PAGE.



BLU-109 BOMBS IN CNU-417 CONTAINERS

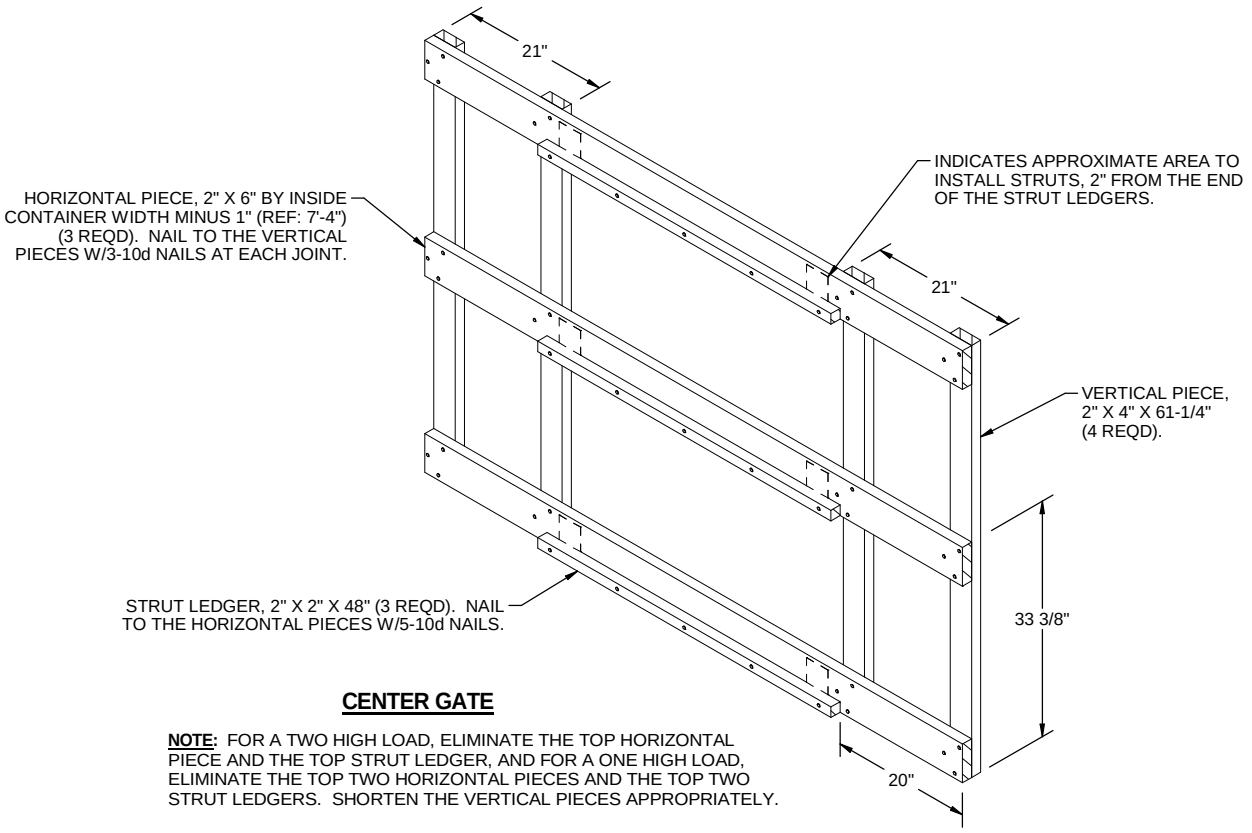
GROSS WEIGHT - - - - - - - - - 4,470 LBS (APPROX)
CUBE - - - - - - - - - - - - - 74.8 CU FT (APPROX)



BEVEL CUT

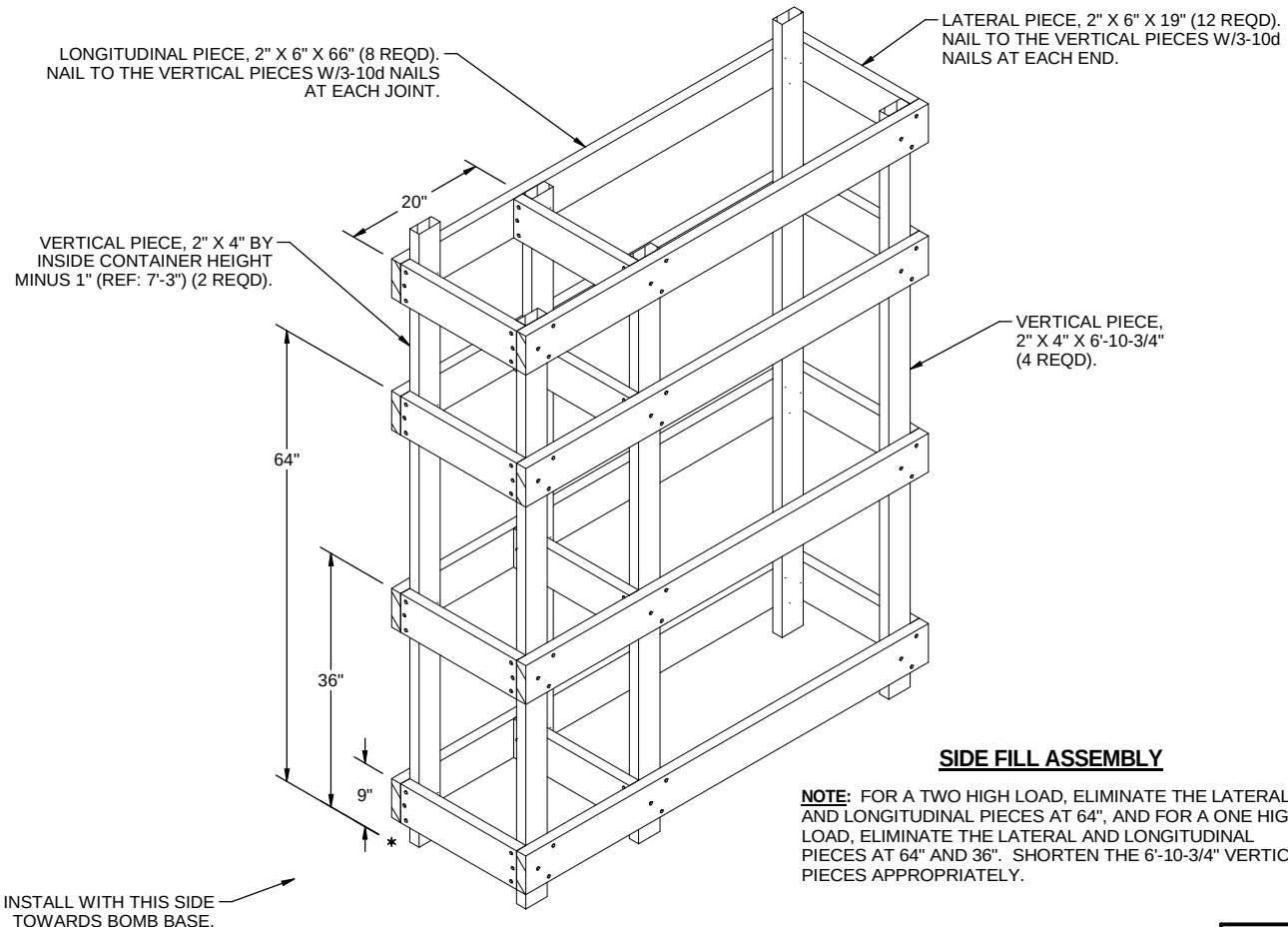
IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE INSTALLING THE STRUTS WITH A "DRIVE" FIT.

PROJECT SP 310-95



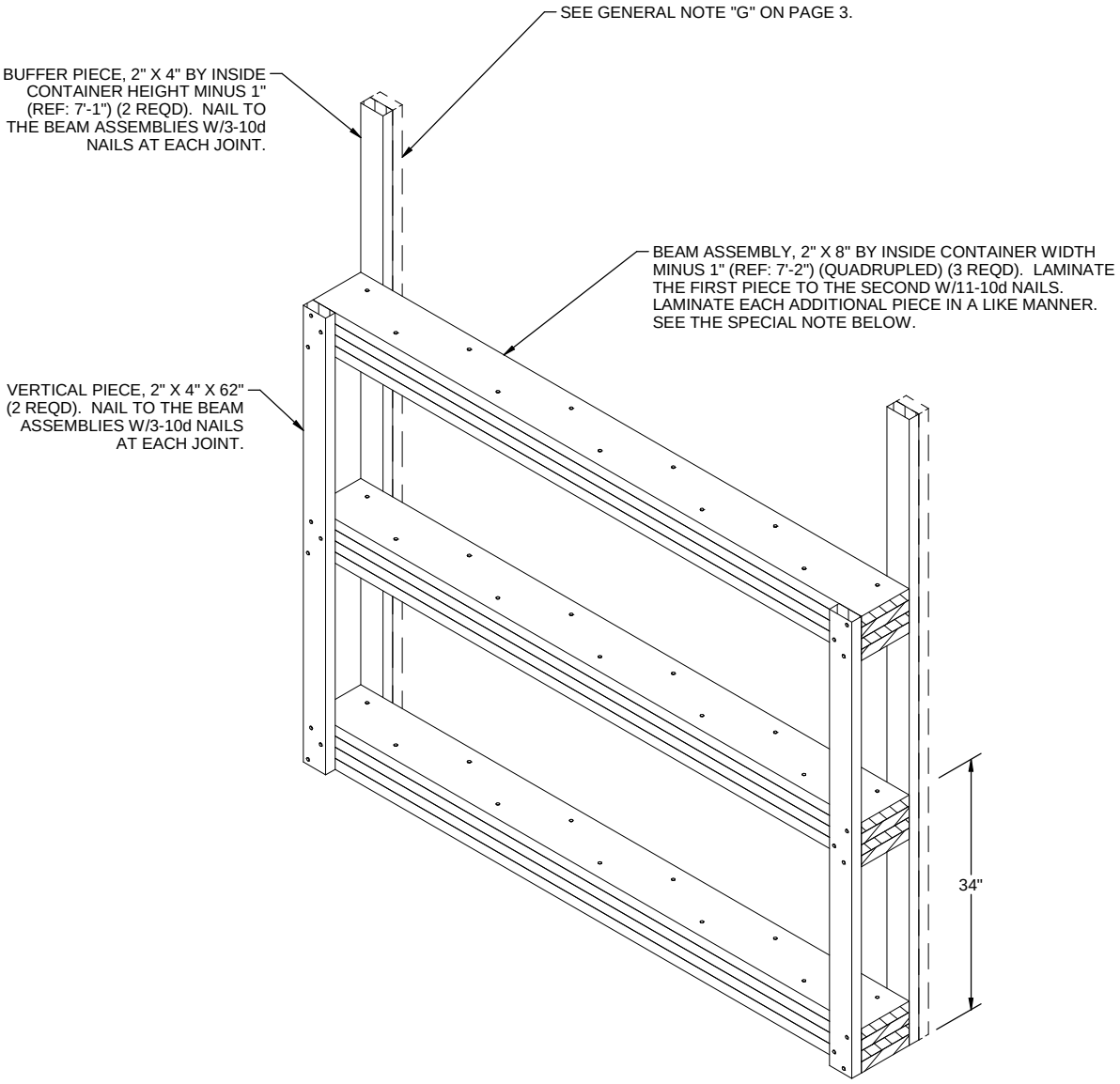
CENTER GATE

NOTE: FOR A TWO HIGH LOAD, ELIMINATE THE TOP HORIZONTAL PIECE AND THE TOP STRUT LEDGER, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES AND THE TOP TWO STRUT LEDGERS. SHORTEN THE VERTICAL PIECES APPROPRIATELY.



SIDE FILL ASSEMBLY

NOTE: FOR A TWO HIGH LOAD, ELIMINATE THE LATERAL AND LONGITUDINAL PIECES AT 64", AND FOR A ONE HIGH LOAD, ELIMINATE THE LATERAL AND LONGITUDINAL PIECES AT 64" AND 36". SHORTEN THE 6'-10-3/4" VERTICAL PIECES APPROPRIATELY.

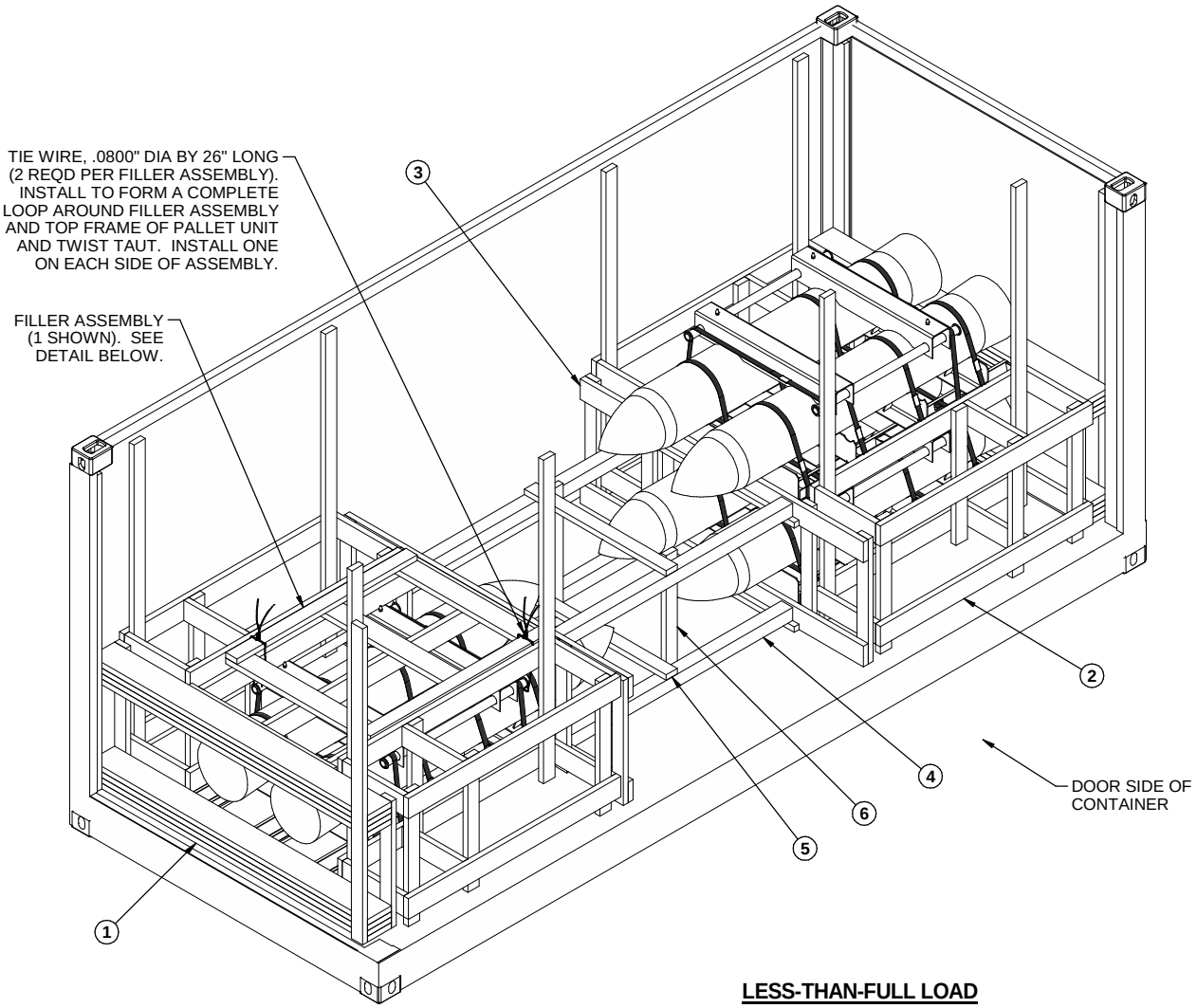


END BLOCKING ASSEMBLY

NOTE: FOR A TWO HIGH LOAD, ELIMINATE THE TOP BEAM ASSEMBLY, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES. SHORTEN THE VERTICAL PIECES APPROPRIATELY.

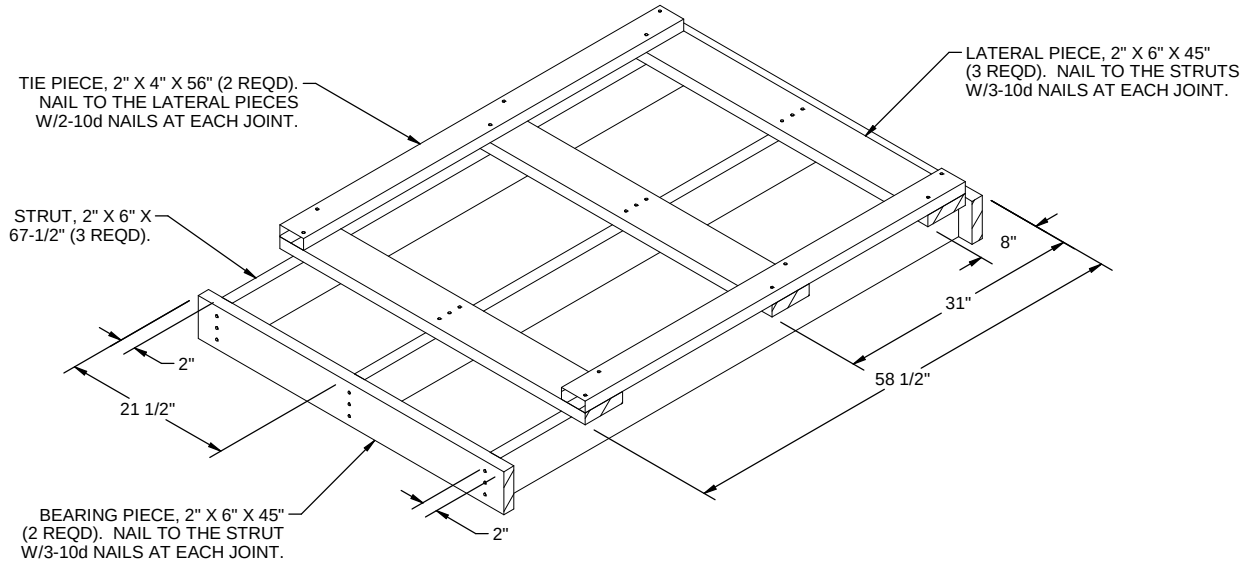
SPECIAL NOTE:

THE END BLOCKING ASSEMBLY DEPICTED ABOVE MAY BE CONSTRUCTED USING PLYWOOD AND 2" X 6" BEAMS, IF DESIRED. AN END BLOCKING ASSEMBLY CONSTRUCTED USING PLYWOOD AND 2" X 6" BEAMS SHOULD BE A "CONFIGURATION D" ASSEMBLY (3/4" PLYWOOD WITH TRIPLED 2" X 6" BEAMS, WITH THE TOP OF THE BEAM ASSEMBLIES LOCATED AT 22", 50" AND 6'-6"). SEE THE DETAILS IN AMC DRAWING 19-48-4267-15PA1002 BEFORE ATTEMPTING CONSTRUCTION.



LESS-THAN-FULL LOAD

NOTE: THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (ODD NUMBER OF PALLET UNITS). KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. SEE GENERAL NOTE "H" ON PAGE 3.



FILLER ASSEMBLY