

PATRIOT

LOADING AND BRACING• IN SIDE OPENING ISO CONTAINERS OF PATRIOT ADVANCED CAPABILITY-3 (PAC-3) MISSILE SEGMENT ENHANCEMENT (MSE) COMPLETE ROUND, PACKED IN MISSILE CANISTER (SHIPPING, STORAGE AND LAUNCH CANISTER)

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• 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

<p style="text-align: center;">APPROVED, U.S. ARMY AVIATION AND MISSILE COMMAND</p> <p>OCONNOR.DOUGL AS.LEO.114058225 1</p> <p><small>Digitally signed by OCONNOR.DOUGLAS.LEO.114 0582251 Date: 2018.01.29 12:47:06 -06'00'</small></p>	<p>CAUTION: VERIFY PRIOR TO USE AT HTTPS://MHP.REDSTONE.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8.</p>																						
<p style="text-align: center;">APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND</p> <p>SHIMP.UPTON .R.1231257183</p> <p><small>Digitally signed by SHIMP.UPTON.R.1231257183 DN: cn=PKI, ou=USA, cn=SHIMP.UPTON.R.1231257183 Date: 2018.02.05 10:04:08 -06'00'</small></p> <p style="text-align: center;">U.S. ARMY DEFENSE AMMUNITION CENTER</p>	<p>DO NOT SCALE</p>	<p style="font-size: 24pt;">JANUARY 2018</p>																					
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">DESIGN ENGINEER</td> <td style="width: 10%; text-align: center;">BASIC</td> <td colspan="2" style="text-align: center;">RICHARD GARSIDE</td> </tr> <tr> <td></td> <td style="text-align: center;">REV.</td> <td colspan="2"></td> </tr> </table>	DESIGN ENGINEER	BASIC	RICHARD GARSIDE			REV.			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> <tr> <td style="text-align: center;">CLASS</td> <td style="text-align: center;">DIVISION</td> <td style="text-align: center;">DRAWING</td> <td style="text-align: center;">FILE</td> </tr> <tr> <td style="text-align: center;">19</td> <td style="text-align: center;">48</td> <td style="text-align: center;">8242</td> <td style="text-align: center;">GM15PA9</td> </tr> </table>							CLASS	DIVISION	DRAWING	FILE	19	48	8242
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<p style="text-align: center;">ENGINEERING DIVISON</p> <p style="text-align: center;">TEST ENGINEER</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">TEST REPORT</td> <td style="width: 10%; text-align: center;">NA</td> <td colspan="2"></td> </tr> </table> <p style="text-align: center;">EXPLOSIVE SAFETY DIRECTORATE</p>	TEST REPORT	NA			<p style="text-align: center;">FIEFFER.LAUR A.A.1230375727</p> <p style="text-align: center;">FELICIANO.AD IN.1259200373</p> <p style="text-align: center;">THOMAS.CARL.ANT HONY.1104621372</p>	<p><small>Digitally signed by FIEFFER.LAURA.1230375727 DN: cn=US, ou=US, Government, ou=DoD, ou=PKI, ou=USA, cn=FIEFFER.LAURA.1230375727 Date: 2018.01.29 13:45:33 -06'00'</small></p> <p><small>Digitally signed by FELICIANO.ADM.1259200373 DN: cn=US, ou=US, Government, ou=DoD, ou=PKI, ou=USA, cn=FELICIANO.ADM.1259200373 Date: 2018.01.29 08:57:48 -06'00'</small></p> <p><small>Digitally signed by THOMAS.CARL.ANTHONY.1104621372 DN: cn=US, ou=US, Government, ou=DoD, ou=PKI, ou=USA, cn=THOMAS.CARL.ANTHONY.1104621372 Date: 2018.01.29 10:50:56 -06'00'</small></p>																	
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GENERAL NOTES

(GENERAL NOTES CONTINUED)

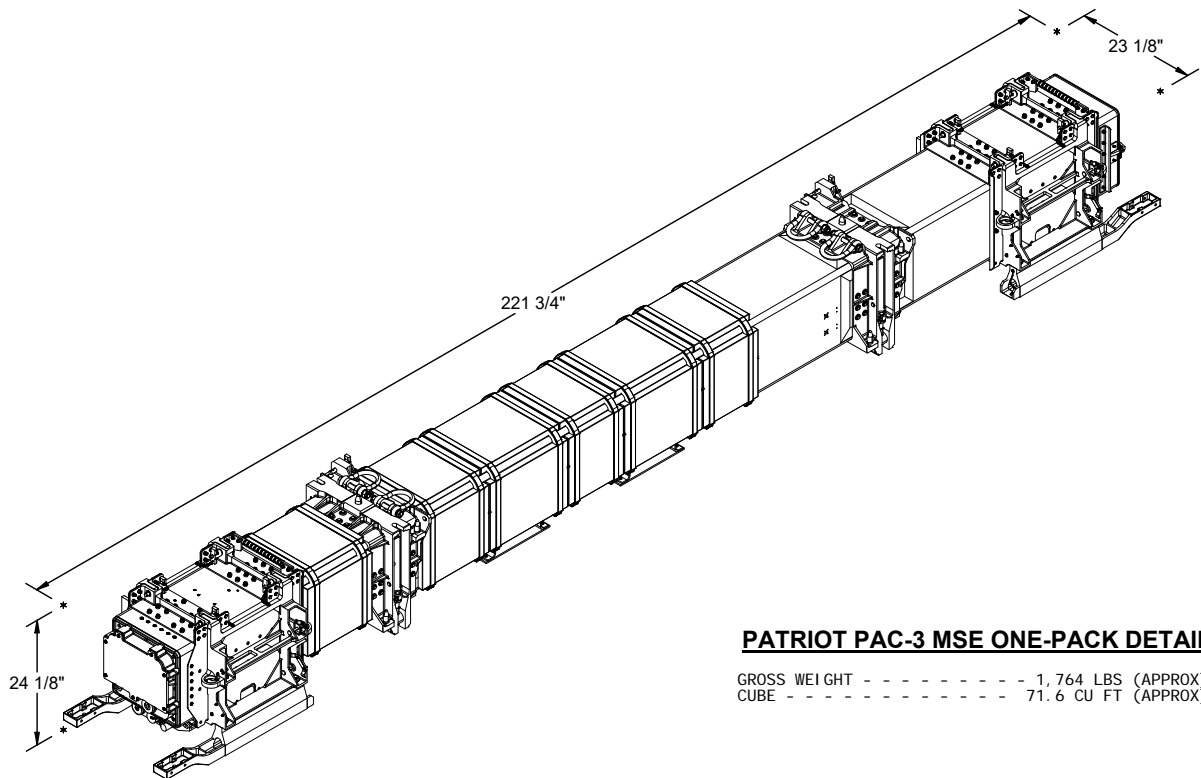
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF PATRIOT PAC-3 MSE COMPLETE ROUND, PACKED IN THE MISSILE CANISTER. SUBSEQUENT REFERENCE TO CANISTER HEREIN MEANS CANISTER WITH MISSILE ITEMS. SEE PAGE 3 AND LOCKHEED MARTIN DRAWINGS 14101275, 14101300, AND 14101310 FOR DETAILS OF THE CANISTER. **CAUTION:** REGARDLESS OF THE QUANTITY OF CANISTERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE SIDE OPENING ISO CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOAD AS SHOWN IS 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" LONG BY 90" WIDE BY 89" HIGH AND A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT. HOWEVER, THE LOADS AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. **NOTICE:** OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED. **CAUTION:** VERIFY PRIOR TO LOADING THAT THE USEABLE INSIDE LENGTH OF THE ISO CONTAINER IS AT LEAST 19'-6".
- D. WHEN LOADING CANISTERS, 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 HEADER PIECES ON THE SIDE BLOCKING ASSEMBLIES AND SIDE SPACER ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE STRUTS IN THE SIDE SPACER ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE CONTAINERS.
- E. 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.
- 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, ON TO, OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- G. IN SOME ISO CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE ENDWALLS. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE VERTICAL PIECES ON THE END BLOCKING ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THE VERTICAL 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 ENDWALL LONGITUDINAL BLOCKING.
- H. WHETHER AN ISO 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 ISO CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- K. PORTIONS OF THE ISO CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- L. THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOAD IS DELINEATED IN THE LOAD VIEW, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOAD 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.
- M. 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.

- N. 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.
- O. 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.
- P. THE QUANTITY OF CANISTERS SHOWN IN THE LOAD ON PAGE 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. ADJUST THE END BLOCKING ASSEMBLIES AND SIDE BLOCKING/SPACER ASSEMBLIES ACCORDINGLY. SEE THE LOADS ON PAGES 6 AND 8.
- Q. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN CANISTERS AND BLOCKING/SPACER ASSEMBLIES, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CANISTER PAINT AND MARKINGS.
- R. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:
 - 1. PREFABRICATE TWO END BLOCKING ASSEMBLIES AND FOUR BLOCKING OR SIDE SPACER ASSEMBLIES.
 - 2. INSTALL THE END BLOCKING ASSEMBLIES, TWO OF THE BLOCKING OR SIDE SPACER ASSEMBLIES, AND THEN THE CANISTERS. CENTER THE CANISTERS LATERALLY TO THE END BLOCKING ASSEMBLIES.
 - 3. INSTALL THE REMAINING TWO BLOCKING OR SIDE SPACER ASSEMBLIES, AND LAMINATE ADDITIONAL PIECES AS NECESSARY TO FILL UNBLOCKED SPACE. SEE GENERAL NOTE "D".

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.
- ANTI-CHAFING MATERIAL - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.

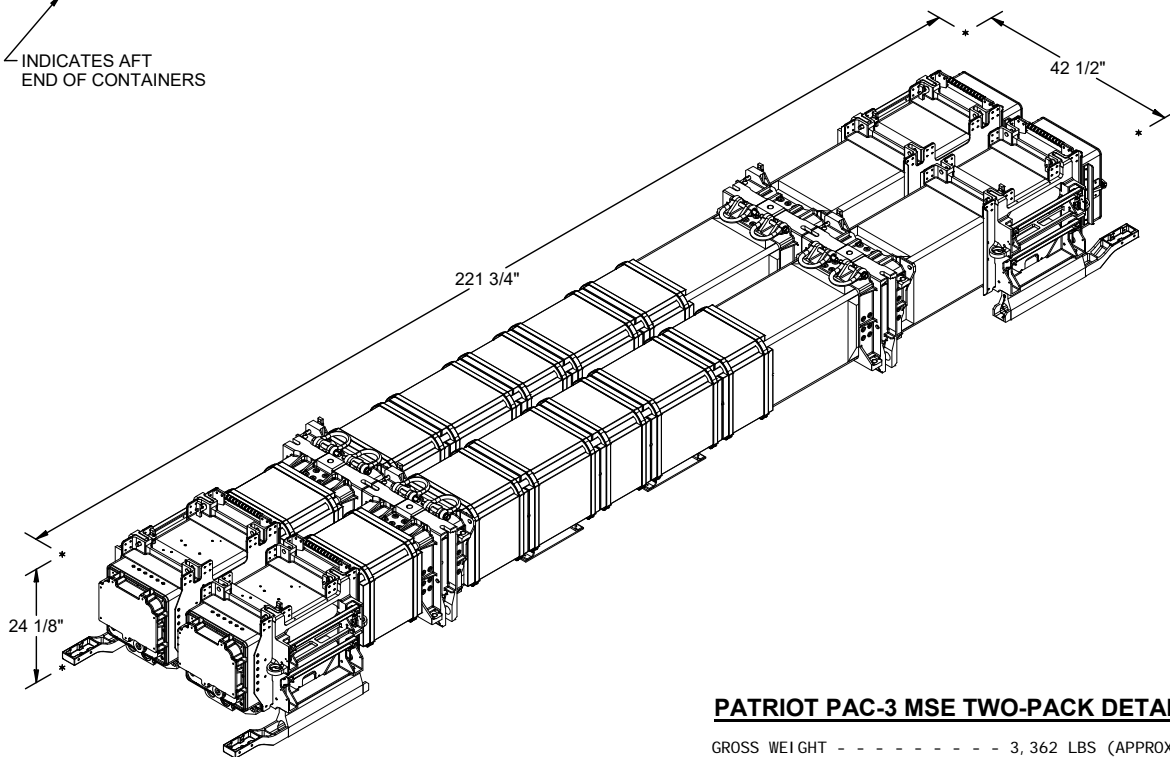
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PATRIOT PAC-3 MSE ONE-PACK DETAIL

GROSS WEIGHT - - - - - 1,764 LBS (APPROX)
 CUBE - - - - - 71.6 CU FT (APPROX)

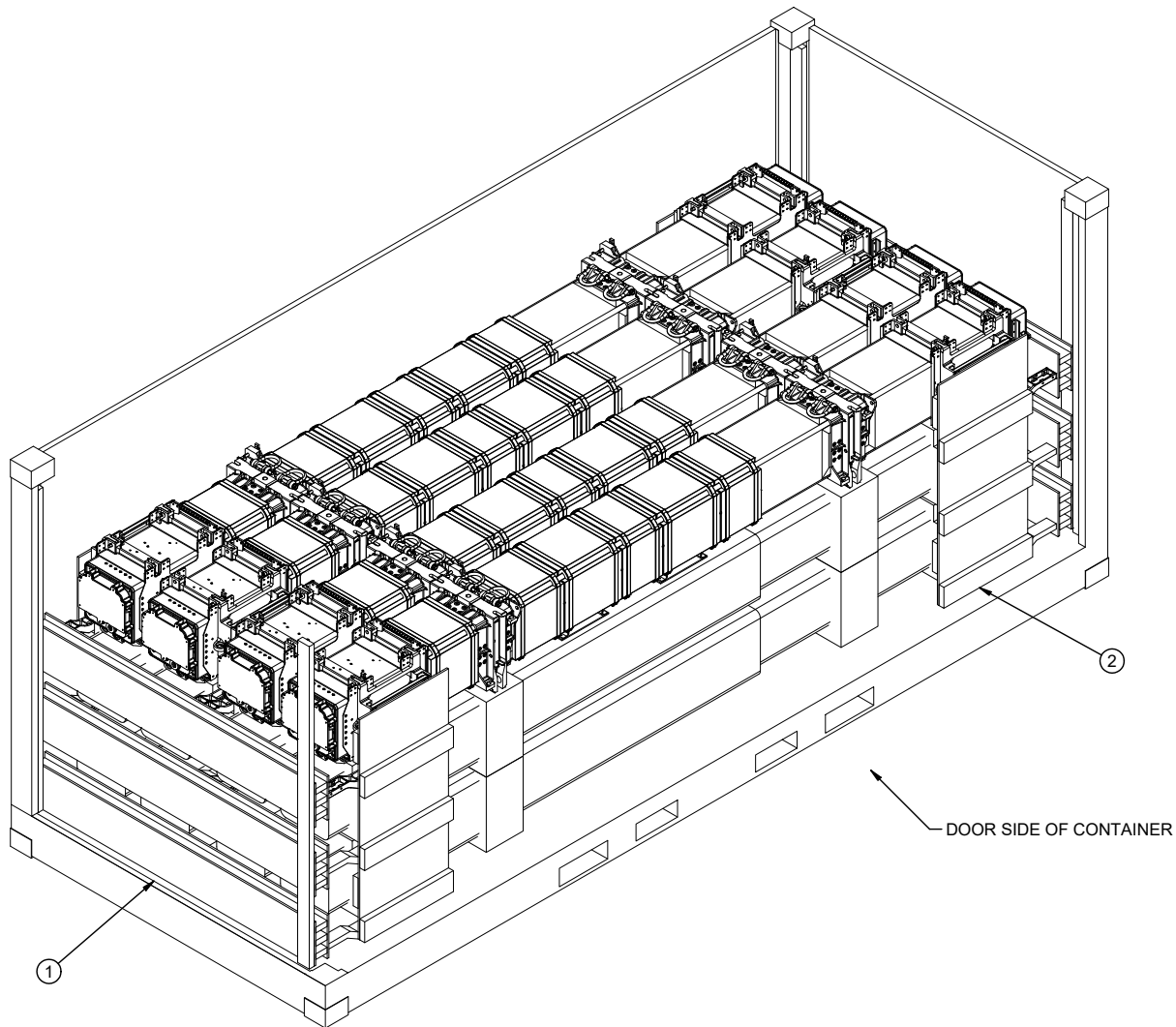
INDICATES AFT
 END OF CONTAINERS



PATRIOT PAC-3 MSE TWO-PACK DETAIL

GROSS WEIGHT - - - - - 3,362 LBS (APPROX)
 CUBE - - - - - 131.6 CU FT (APPROX)

INDICATES AFT
 END OF CONTAINERS



KEY NUMBERS

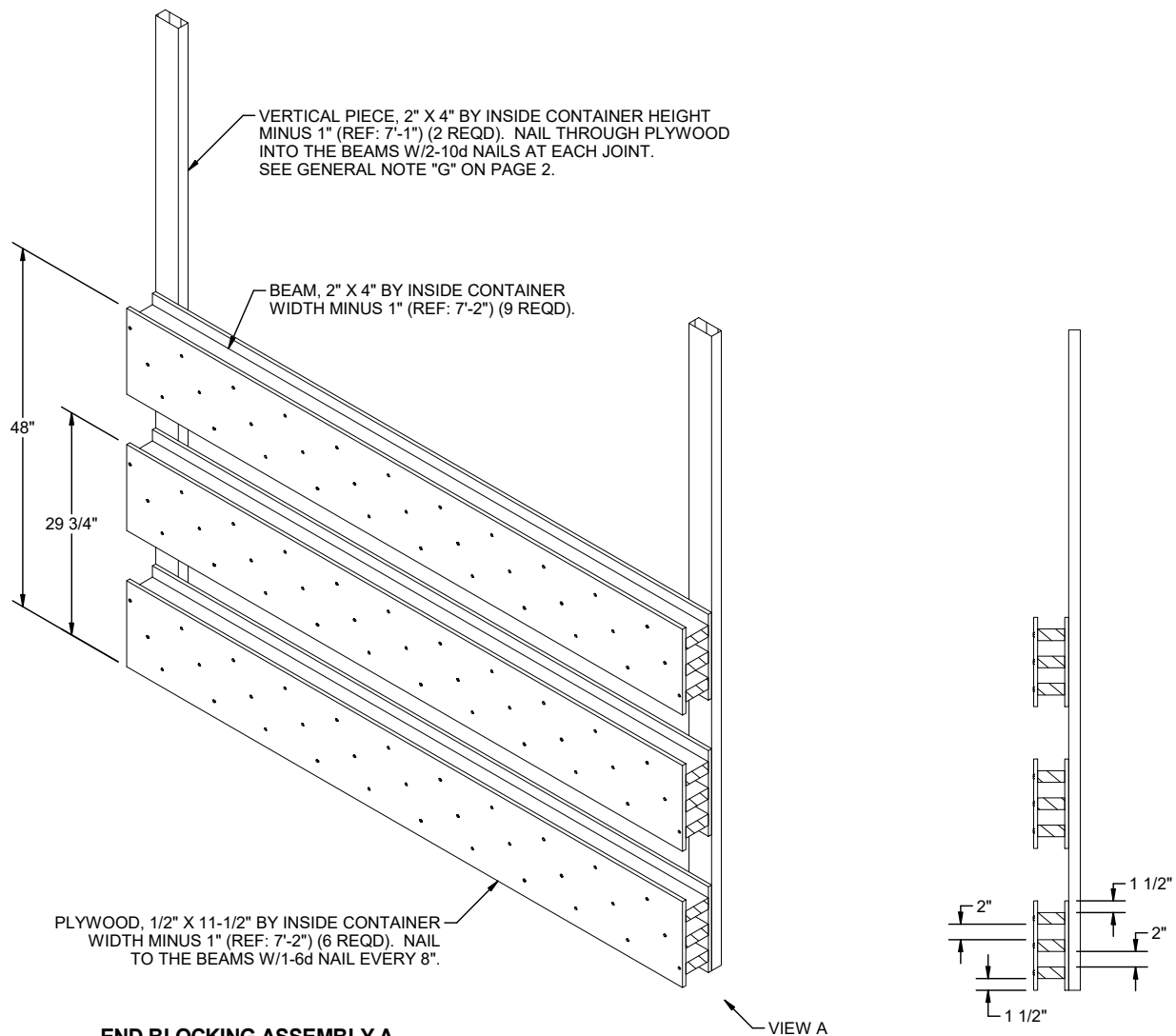
- ① END BLOCKING ASSEMBLY A (2 REQD). SEE DETAIL ON PAGE 5.
- ② SIDE BLOCKING ASSEMBLY (4 REQD). SEE DETAIL ON PAGE 5.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	168	112
2" X 6"	14	14
NAI LS	NO. REQD	POUNDS
6d (2")	396	2-1/4
10d (3")	144	2-1/4
PLYWOOD, 1/2" - - -	125.92 SQ FT REQD - - -	173.14 LBS

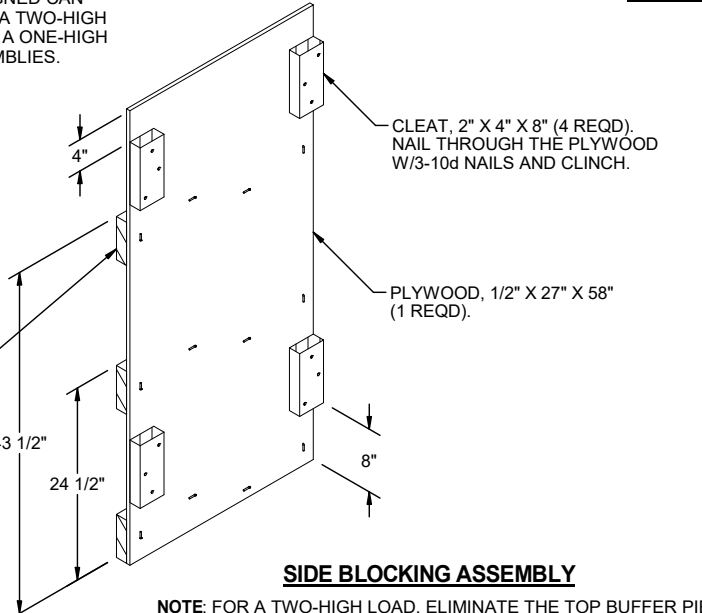
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PAC3 MSE CANISTER	12 - - - - -	20,172 LBS
DUNNAGE	- - - - -	429 LBS
ISO CONTAINER	- - - - -	6,050 LBS
TOTAL WEIGHT - - - - -		26,651 LBS



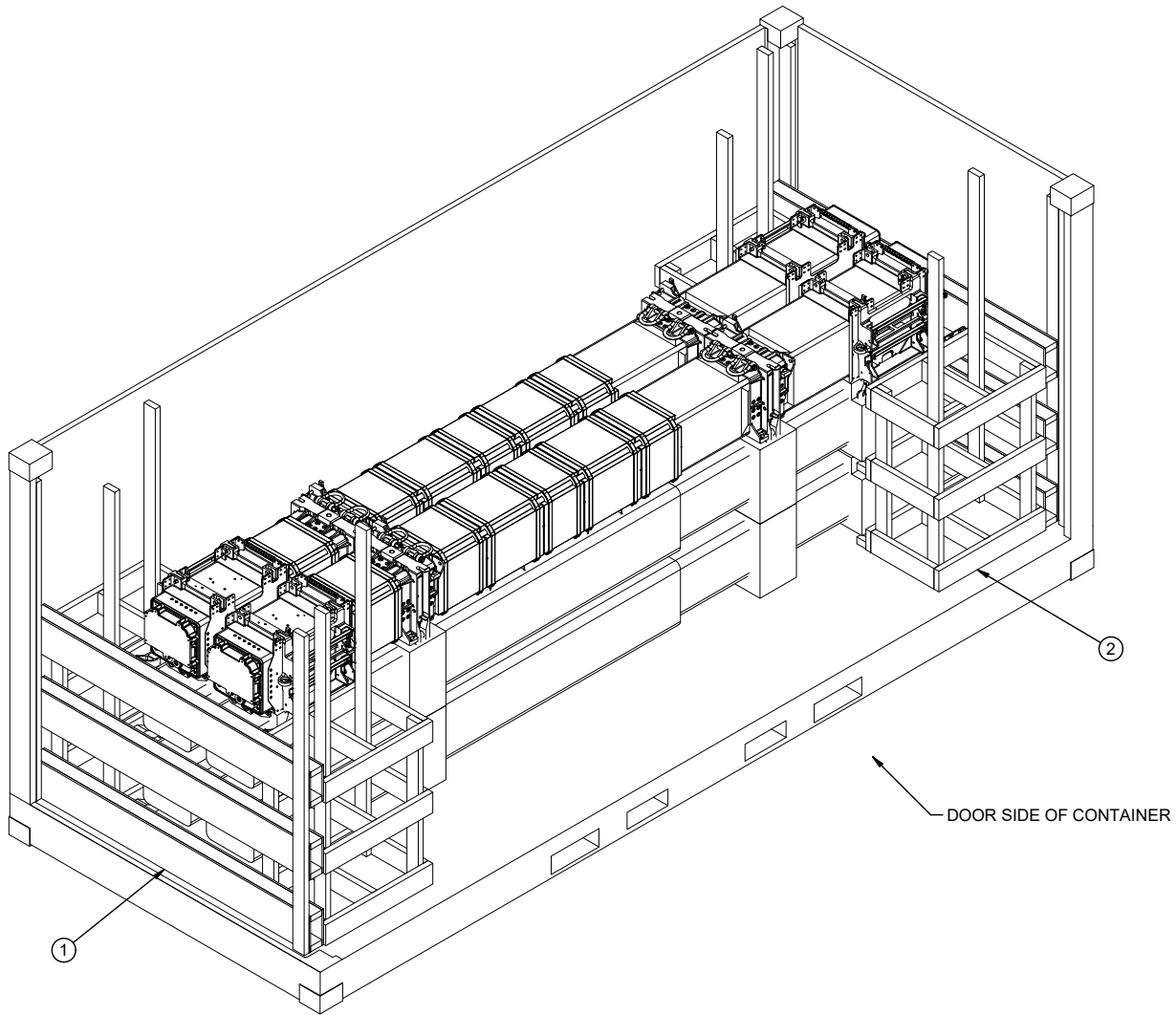
END BLOCKING ASSEMBLY A

NOTE: THIS END BLOCKING ASSEMBLY AS DESIGNED CAN SUPPORT UP TO 24,180 POUNDS OF LADING. FOR A TWO-HIGH LOAD, ELIMINATE THE TOP BEAM ASSEMBLY. FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES.



SIDE BLOCKING ASSEMBLY

NOTE: FOR A TWO-HIGH LOAD, ELIMINATE THE TOP BUFFER PIECE, TOP TWO CLEATS, AND REDUCE PLYWOOD LENGTH TO 39". FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO BUFFER PIECES, TOP TWO CLEATS, AND REDUCE PLYWOOD LENGTH TO 20".



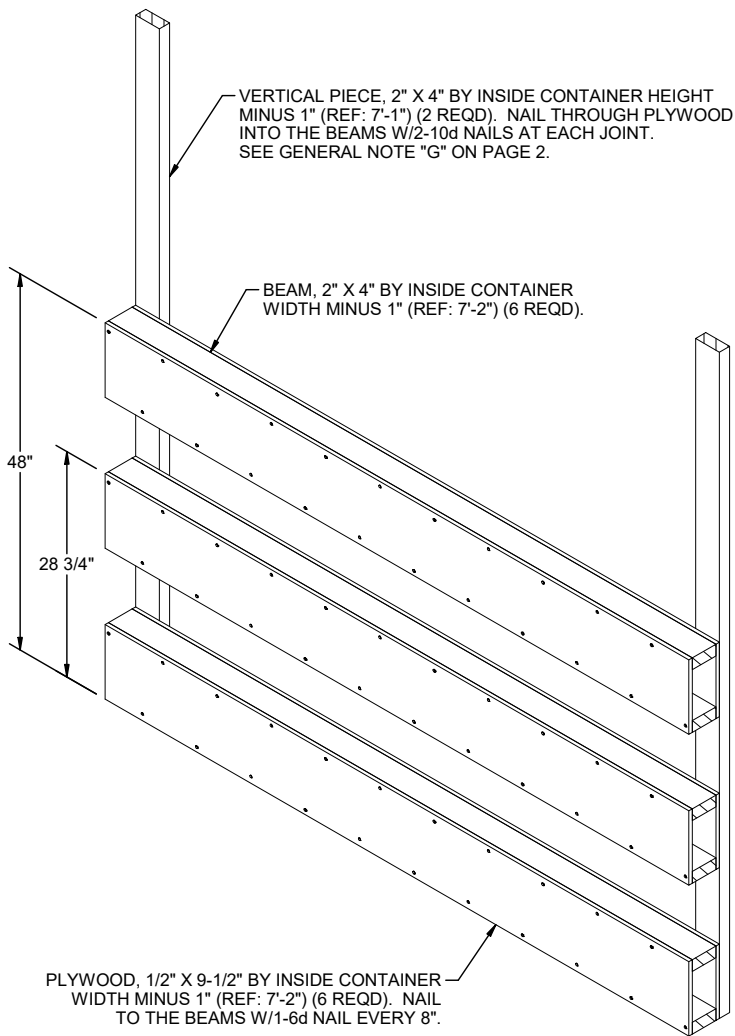
KEY NUMBERS

- ① END BLOCKING ASSEMBLY B (2 REQD). SEE DETAIL ON PAGE 7.
- ② SIDE SPACER ASSEMBLY A (4 REQD). NAIL THRU THE STRUTS INTO THE BOTTOM BEAM OF EACH BEAM ASSEMBLY W/3-10d NAILS. NAILING THE INTERIOR ASSEMBLIES BEFORE LOADING CANISTERS. SEE DETAIL ON PAGE 7.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	201	134
2" X 6"	125	125
NAI LS	NO. REQD	POUNDS
6d (2")	264	1-1/2
10d (3")	360	5-1/2
PLYWOOD, 1/2"	68.1 SQ FT REQD	93.6 LBS

LOAD AS SHOWN

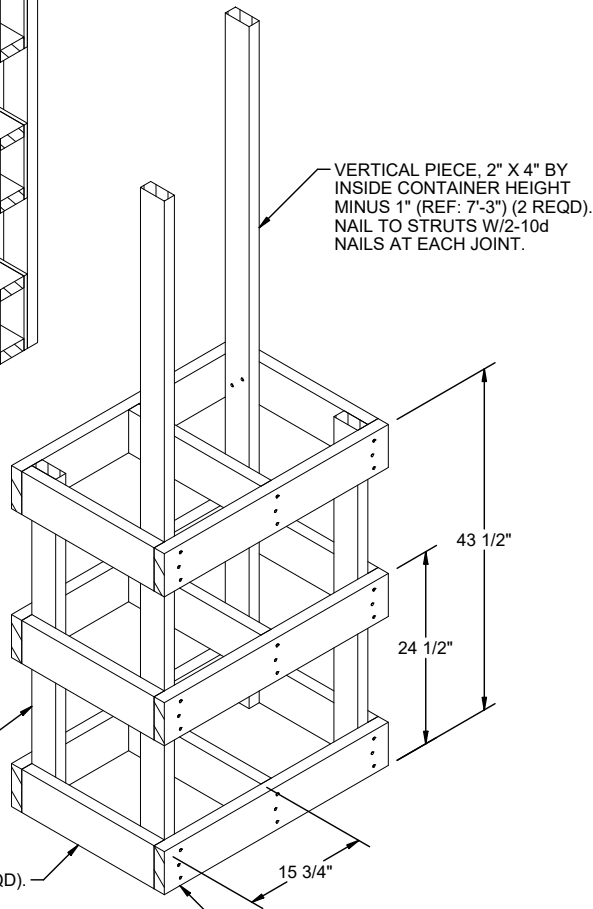
ITEM	QUANTITY	WEIGHT (APPROX)
PAC3 MSE CANISTER	6	10,086 LBS
DUNNAGE		618 LBS
1 SO CONTAINER		6,050 LBS
TOTAL WEIGHT		16,754 LBS



PLYWOOD, 1/2" X 9-1/2" BY INSIDE CONTAINER WIDTH MINUS 1" (REF: 7'-2") (6 REQD). NAIL TO THE BEAMS W/1-6d NAIL EVERY 8".

END BLOCKING ASSEMBLY B

NOTE: THIS END BLOCKING ASSEMBLY AS DESIGNED CAN SUPPORT UP TO 18,975 POUNDS OF LADING. FOR A TWO-HIGH LOAD, ELIMINATE THE TOP BEAM ASSEMBLY. FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES.



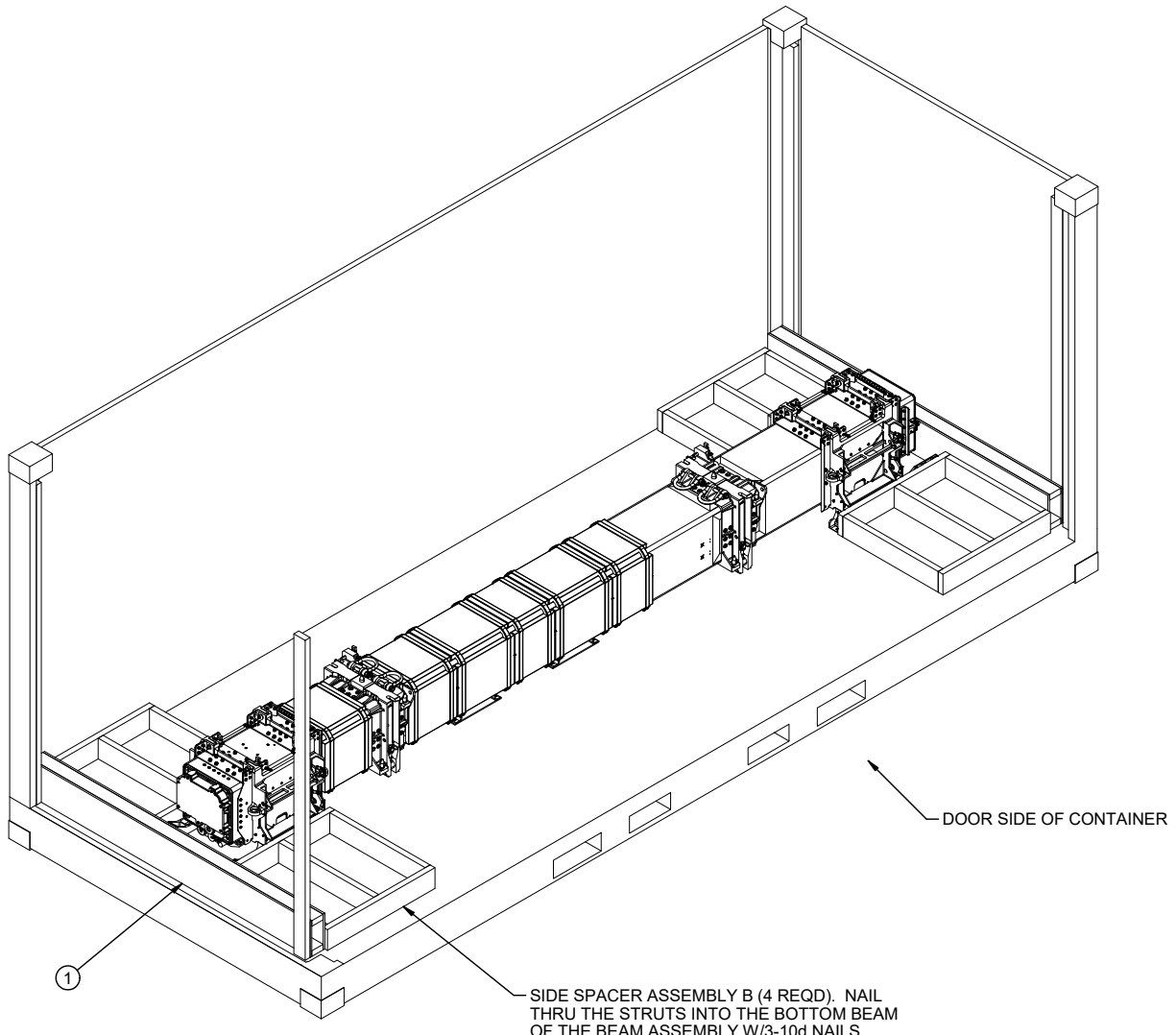
VERTICAL PIECE, 2" X 4" X 43 1/2" (2 REQD). NAIL TO STRUTS W/2-10d NAILS AT EACH JOINT.

STRUT, 2" X 6" X 19 1/2" (9 REQD).

BUFFER PIECE, 2" X 6" X 33" (6 REQD). NAIL TO VERTICAL PIECE W/3-10d NAILS AT EACH JOINT.

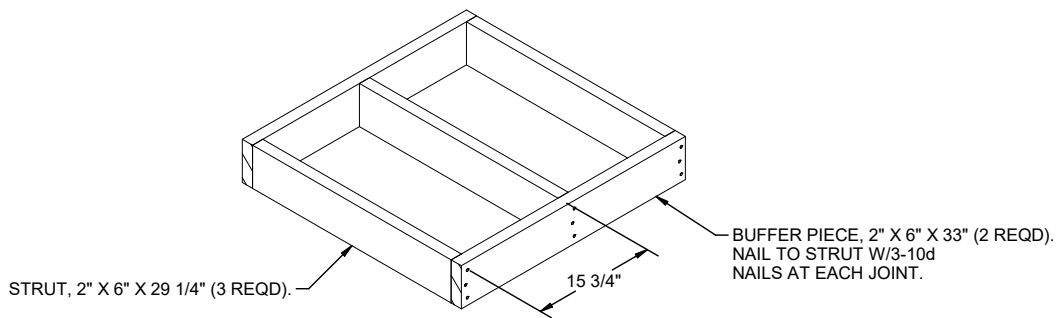
SIDE SPACER ASSEMBLY A

NOTE: FOR A TWO-HIGH LOAD, ELIMINATE THE TOP TWO BUFFER PIECES, TOP THREE STRUTS, AND REDUCE SHORT VERTICAL PIECE LENGTH TO 24 1/2". FOR A ONE-HIGH LOAD, SEE THE "SIDE SPACER ASSEMBLY B" ON PAGE 8.



LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 6.
SEE GENERAL NOTES "H" AND "P" ON PAGE 2.



SIDE SPACER ASSEMBLY B