

# AFT END LOAD RESTRAINT<sup>^</sup> IN END OPENING ISO CONTAINERS\* OF BOXED AMMUNITION AND COMPONENTS ON 4-WAY ENTRY PALLETS AND SKIDDED BASES, USING TY-GARD RESTRAINT MATERIAL

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**^THIS DRAWING IS A SUPPLEMENT TO END OPENING CONTAINER OUTLOADING DRAWINGS, AND AS SUCH, DOES NOT DEPICT COMPLETE OUTLOADING PROCEDURES. SEE GENERAL NOTE "B" ON PAGE 2.**

**DISTRIBUTION STATEMENT A:**

APPROVED FOR PUBLIC RELEASE  
DISTRIBUTION IS UNLIMITED.

**\*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		<b>CAUTION: VERIFY PRIOR TO USE AT <a href="https://www.dau.edu/cop/ammo/pages/default.aspx">https://www.dau.edu/cop/ammo/pages/default.aspx</a> THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 14.</b>				
WARD.GINA. M.1369379808 <small>Digitally signed by WARD.GINA.M.1369379808 Date: 2021.08.02 09:58:22 -05'00'</small>	<b>DO NOT SCALE</b>		<b>JULY 2021</b>			
	DESIGN ENGINEER	BASIC REV.	RICHARD GARSIDE			
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  BRAILSFORD.KEITH H.ANTHONY.10286 55661 <small>Digitally signed by BRAILSFORD.KEITH.ANTHONY.1028655661 Date: 2021.08.02 10:18:51 -05'00'</small>  U.S. ARMY DEFENSE AMMUNITION CENTER	ENGINEERING DIVISON	FIEFFER.LAUR A.A.1230375727 <small>Digitally signed by FIEFFER.LAURA.A.1230375727 Date: 2021.07.27 08:58:03 -05'00'</small>	CLASS	DIVISION	DRAWING	FILE
	TEST ENGINEER	FELICIANO.AD IN.1259200373 <small>Digitally signed by FELICIANO.ADIN.1259200373 Date: 2021.07.27 09:05:49 -05'00'</small>	19	48	4372	15PA1015
	TEST REPORT	18-07	EXPLOSIVE SAFETY DIRECTORATE	FAIRHURST.ROBE RT.JOHN.10157668 80 <small>Digitally signed by FAIRHURST.ROBERT.JOHN.1015766880 Date: 2021.08.02 09:49:52 -05'00'</small>		

**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 RESTRAINT PROCEDURES ARE APPLICABLE TO BOXED AMMUNITION, ON WOODEN PALLETS OR SKIDS, LOADED IN END OPENING ISO CONTAINERS. THE DEPICTED AFT END LOAD RESTRAINT METHODS HEREIN ARE NOT APPROVED FOR USE WITH PALLET UNITS ON METAL PALLETS OR PALLET UNITS WITH METAL TOP LIFT FRAMES, THESE TYPE OF PROCEDURES WILL BE DEPICTED IN SEPARATE DRAWINGS. THE OUTLOADING PROCEDURES HEREIN ARE TYPICAL, AND MAY BE APPLIED TO PALLET OR SKIDDED UNITS OTHER THAN THOSE SHOWN ON PAGE 3. REFER TO THE APPLICABLE AMC 19-48 SERIES DRAWING FOR UNITIZATION PROCEDURES FOR BOXED AMMUNITION ON 4-WAY ENTRY PALLETS OR ON SKIDDED BASES. EXAMPLES OF APPLICABLE UNITIZATION PROCEDURES INCLUDE AMC 19-48-4116/XX-20PA1002 AND AMC 19-48-4138/XX-20PA1000, WHERE THE "XX" INDICATES AN INDIVIDUAL APPENDIX NUMBER. **CAUTION:** REGARDLESS OF THE QUANTITY OF PALLET OR SKIDDED UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOADS AS SHOWN ARE BASED ON A 4,700 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH END OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 93" HIGH, WITH A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. OLDER/OTHER CONTAINERS MAY HAVE A TOTAL INSIDE HEIGHT OF 95", BUT A CLEAR HEIGHT UNDER THE ROOF BOWS OF 93", VERIFY INSIDE CONTAINER HEIGHT 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 BE USED.
- D. COMPLETE OUTLOADING PROCEDURES ARE NOT CONTAINED IN THIS DRAWING AND, AS SUCH, THIS DRAWING SHALL BE USED AS A SUPPLEMENT TO END OPENING ISO CONTAINER OUTLOADING DRAWINGS. IN ADDITION TO THE PROCEDURES DEPICTED IN THIS DRAWING, APPLICABLE END OPENING ISO CONTAINER OUTLOADING DRAWINGS, INCLUDING GENERAL NOTES, MUST BE FOLLOWED.
- E. A COMPLETE SET OF TY-GARD RESTRAINTS WILL CONSIST OF TWO SECTIONS OF TY-GARD DS AND ONE SECTION OF TY-PATCH DS. EACH COMPLETE SET IS CAPABLE OF RESTRAINING A MAXIMUM OF 13,200 POUNDS. SEE THE CHART ON THIS PAGE FOR ALLOWABLE LOADING WEIGHTS.
- F. MARK CONTAINER SIDEWALLS FOR PROPER LOCATION OF TY-GARD. PEEL AND ADHERE TY-GARD TO PRE-MARKED LOCATIONS, TAKING CARE TO FOLLOW THE CONTOUR OF THE CONTAINER CORRUGATIONS. CARE MUST BE USED TO ENSURE A CONSISTENT PRESSURE (APPROXIMATELY 16 PSI) IS APPLIED WHEN AFFIXING THE TY-GARD TO THE ISO CONTAINER. TENSION THE LOAD WITH THE TY-TOOL AND SEAL THE TY-GARD WITH THE TY-PATCH. TY-TAPE WILL THEN BE APPLIED TO VERTICALLY SPAN ALL TY-GARD LAYERS IN AT LEAST TWO LOCATIONS. REFER TO TY-GARD MANUAL 14019090 FOR COMPLETE INSTALLATION INSTRUCTIONS.
- G. IF NECESSARY DUE TO LOAD HEIGHT AND WEIGHT RESTRICTIONS, ONE SET OF TY-GARD DS RESTRAINTS MAY VERTICALLY OVERLAP ANOTHER SET, HOWEVER, OVERLAP WILL NOT EXCEED 6". ALSO, IT MAY BE NECESSARY TO EXTEND THE TY-GARD DS RESTRAINTS ABOVE THE TOP OF THE LOADED PALLET UNITS/SKIDS. THIS EXTENSION IS LIMITED TO 6" ABOVE THE TOP OF THE LOADED UNITS, AND MUST BE SUPPORTED BY THE PLYWOOD GATE.
- H. LOAD HEIGHT MAY EXTEND ABOVE THE PLYWOOD GATE AND TY-GARD MATERIAL, HOWEVER, ONE-HALF OF THE TOP LAYER OF BOXES ON A UNIT MUST BE CAPTURED BY THE GATE.
- J. SOME LOAD CONFIGURATIONS, DUE TO WEIGHT AND HEIGHT LIMITS DELINEATED IN THE CHART ON THIS PAGE, MAY EXCEED THE ALLOWABLE LOADING WEIGHT FOR THE TY-GARD MATERIAL. IN THESE INSTANCES, A LOAD MAY BE DIVIDED INTO TWO LOAD BAYS, WITH EACH LOAD BAY INDEPENDENTLY SECURED WITH SEPARATE SETS OF TY-GARD MATERIAL. SEE THE LOAD ON PAGE 12. EACH LOAD BAY MUST BE TREATED AS A SEPARATE LOADING ENTITY FOR DETERMINING THE REQUIRED NUMBER OF TY-GARD RESTRAINTS. FOR EXAMPLE, IF THE FRONT BAY OF THE TOTAL LOAD WEIGHS 25,000 POUNDS, AND THE REAR BAY OF THE TOTAL LOAD WEIGHS 10,000 POUNDS, THE FRONT LOAD BAY WOULD REQUIRE TWO SETS OF TY-GARD RESTRAINTS AND THE REAR LOAD BAY WOULD REQUIRE ONE SET OF TY-GARD RESTRAINTS. THE TY-GARD RESTRAINT REQUIREMENT FOR EACH BAY MUST ALWAYS BE COMPUTED INDEPENDENTLY.
- K. IF THE HEIGHT OF THE GATE REQUIRED FOR PROPER RESTRAINT OF A LOAD IS MORE THAN THE COMBINED HEIGHT OF THE TY-GARD SETS REQUIRED FOR THE WEIGHT OF THE LOAD, THE POSITION OF EACH TY-GARD SET MAY BE ADJUSTED UP OR DOWN TO AS CLOSE AS POSSIBLE TO CENTER OF A LAYER OF THE LOAD, AS SHOWN ON PAGE 12.
- L. 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.
- M. 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.

- N. **CAUTION:** DO NOT NAIL DUNNAGE MATERIAL TO THE ISO CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- O. PORTIONS OF THE ISO CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE WALLS AND ROOF, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- 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.
- 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. TY-GARD MATERIAL HAS BEEN TESTED AND APPROVED FOR LIMITED USE IN END OPENING ISO CONTAINERS.
- S. IF THE INTERIOR OF THE ISO CONTAINER BEING LOADED HAS TIEDOWN RINGS ALONG THE BASE OF THE SIDE WALLS, THE BOTTOM SET OF TY-GARD RESTRAINTS CAN BE ADJUSTED UPWARD TO CLEAR THE RINGS. IF NECESSARY TO ACHIEVE THIS, OVERLAP TY-GARD SETS OR ADD TO THE HEIGHT OF THE END GATE. SEE GENERAL NOTE "G" FOR DETAILS.
- T. OMITTED UNIT ASSEMBLIES MUST NOT BE PLACED IN ROWS THAT CONTACT END GATES OR CENTER GATES, AND MUST BE CONSTRUCTED AND INSTALLED USING GUIDANCE FROM AMC DRAWING 19-48-4153-15PA1002.
- U. IF TY-GARD MATERIAL IS USED WITH LOADS UP TO 91" WIDE, A SLIP-SHEET MAY BE USED TO PROTECT TY-GARD MATERIAL FROM DAMAGE DURING LOADING. SEE GENERAL NOTE "K" OF AMC DRAWING 19-48-4153-15PA1002. TY-GARD MATERIAL IS NOT RECOMMENDED FOR LOADS WIDER THAN 91".

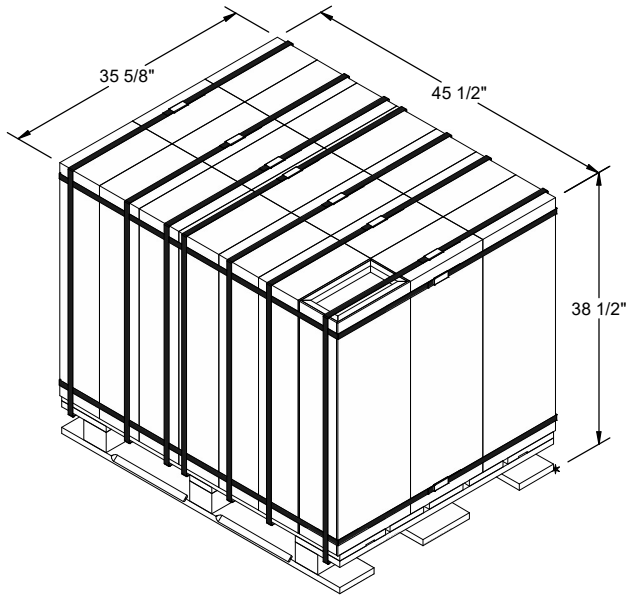
TY-GARD DS STRENGTH RATINGS		
SETS OF TY-GARD	LOAD HEIGHT MIN (INCHES)	ISO CONTAINER CONTENTS MAX (LBS)
1	18	13,200
2	36	26,400
3	54	39,600

**NOTE:** EACH SET CONTAINS TWO SECTIONS OF TY-GARD DS AND ONE SECTION OF TY-PATCH DS. DO NOT CUT TY-GARD DS AND TY-PATCH DS INTO WIDTHS LESS THAN THE STANDARD 24" WIDE.

**MATERIAL SPECIFICATIONS**

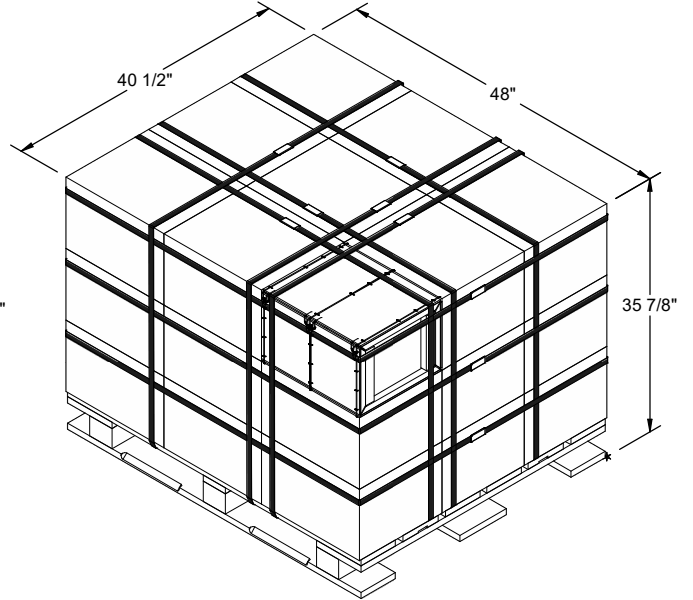
- LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL NLCMS OR NLCMMS).
- PLYWOOD** - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- TY-GARD DS\*** - - - - : 8135-01-585-0512, 24" WIDE.
- TY-PATCH DS\*** - - - - : 8135-01-584-6017, 24" WIDE.
- TY-TAPE DS\*** - - - - : 8135-17-123-0568.
- TY-TOOL DS\*** - - - - : 5120-17-123-0567, 3 PIECES.

(CONTINUED AT RIGHT)



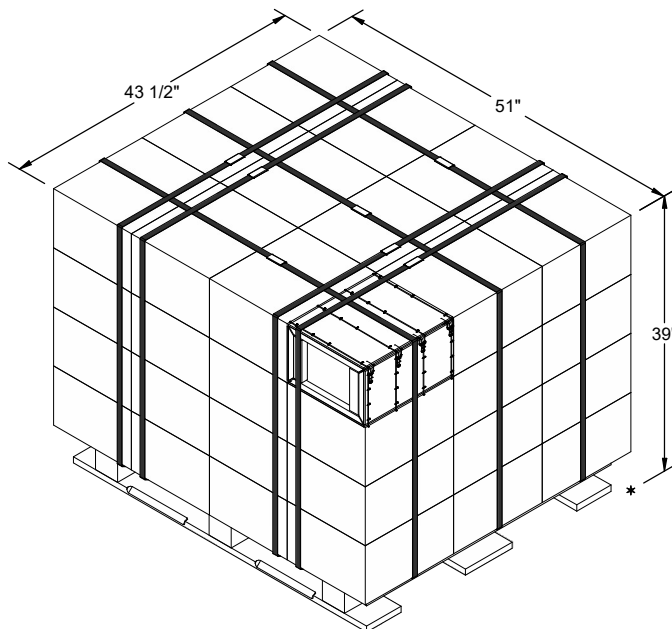
**PALLET UNIT A**

UNIT WEIGHT - - - - - 1,650 LBS (APPROX)  
 CUBE - - - - - 36.1 CU FT (APPROX)



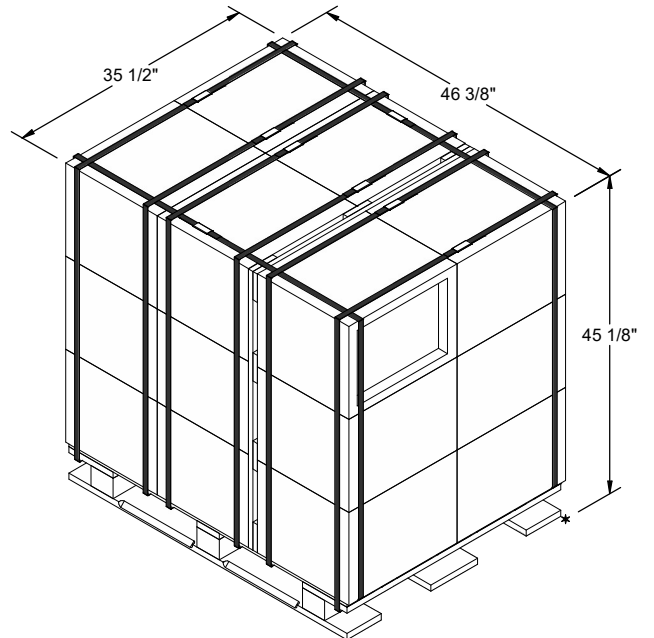
**PALLET UNIT B**

UNIT WEIGHT - - - - - 2,475 LBS (APPROX)  
 CUBE - - - - - 40.4 CU FT (APPROX)



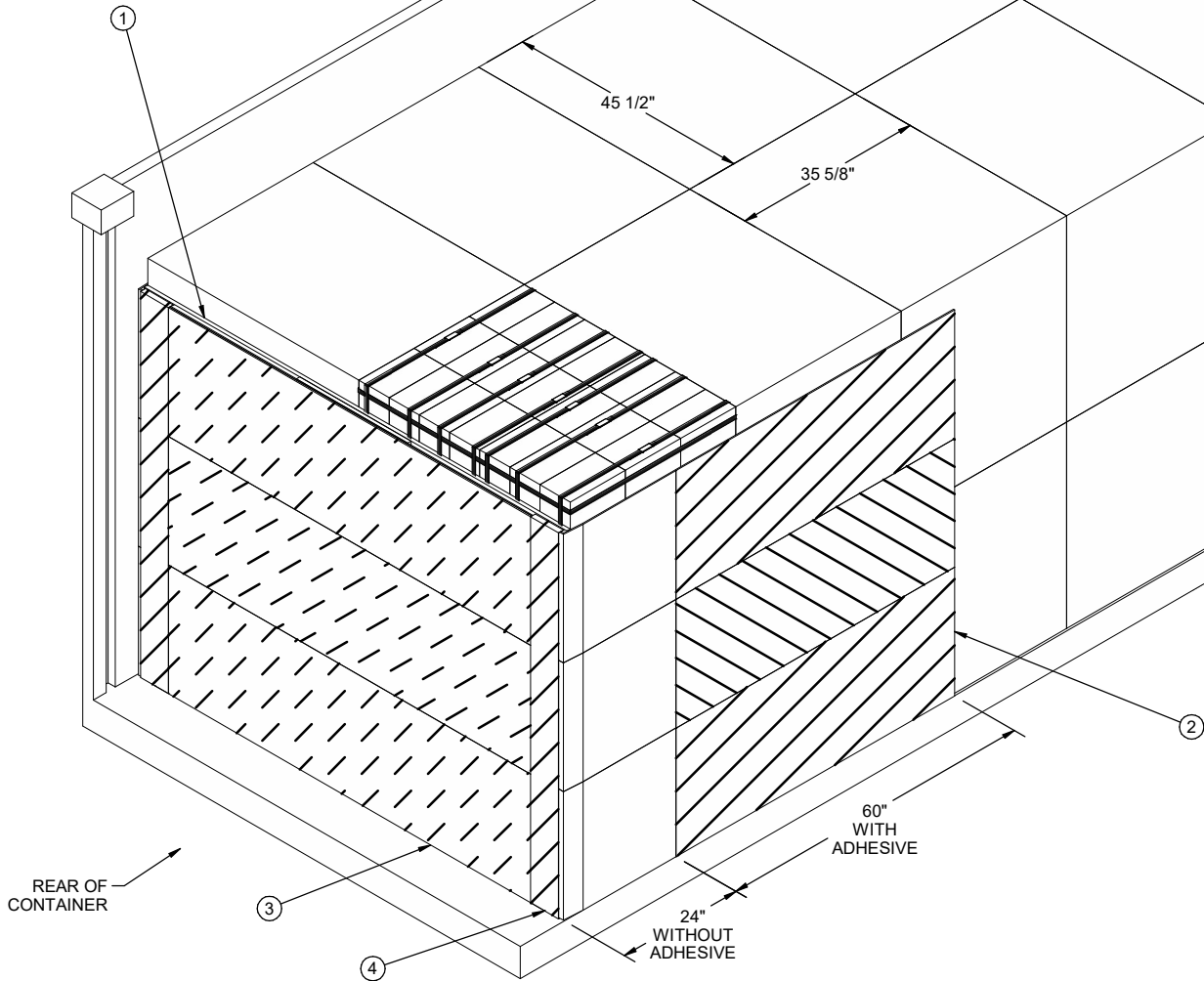
**PALLET UNIT C**

UNIT WEIGHT (PAGE 8) - - - - 2,475 LBS (APPROX)  
 UNIT WEIGHT (PAGE 12) - - - - 3,300 LBS (APPROX)  
 CUBE - - - - - 50.1 CU FT (APPROX)



**PALLET UNIT D**

UNIT WEIGHT - - - - - 2,640 LBS (APPROX)  
 CUBE - - - - - 43.0 CU FT (APPROX)



**ISOMETRIC VIEW**

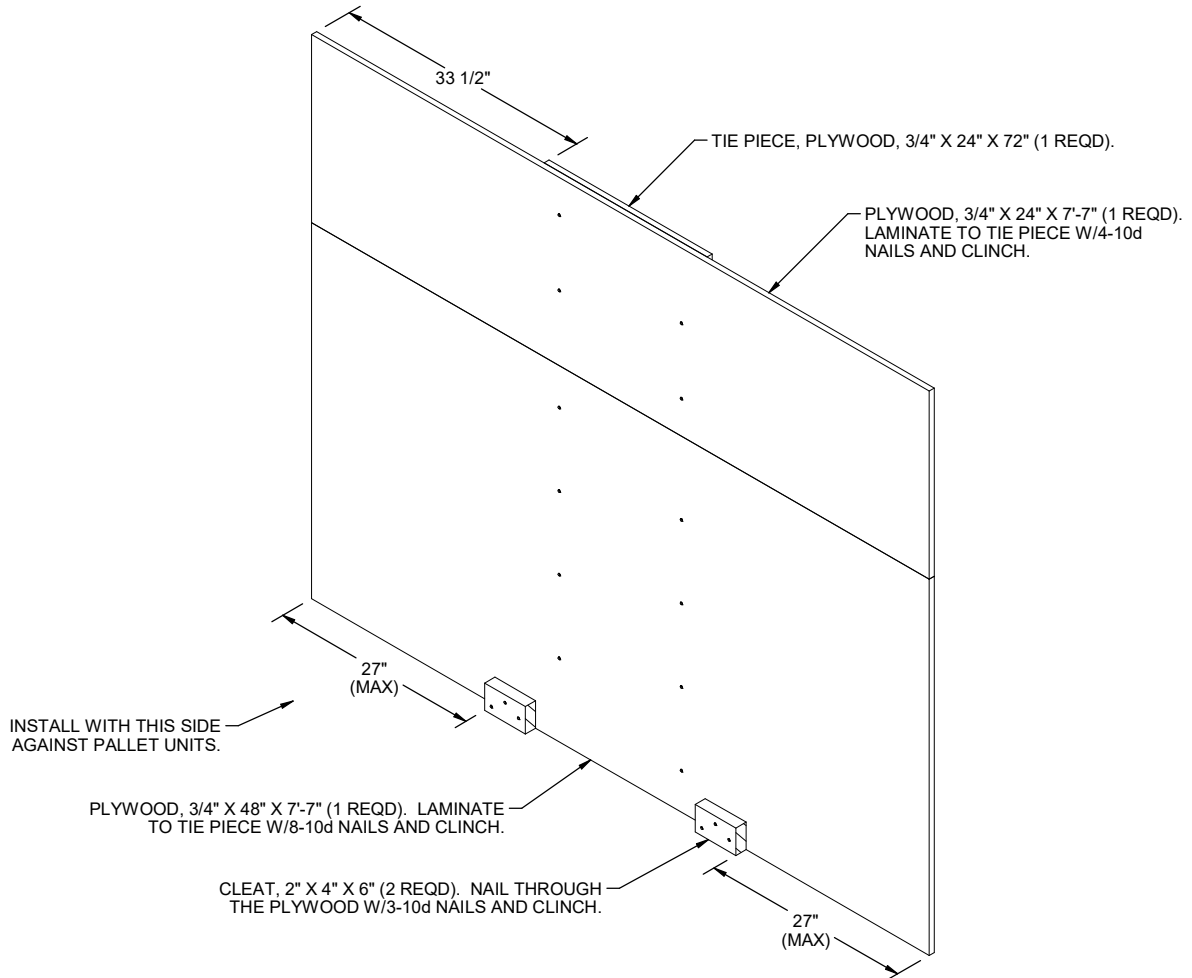
**KEY NUMBERS**

- ① END GATE A (1 REQD). SEE THE DETAIL ON PAGE 5.
- ② TY-GARD DS FLEXIBLE BARRIER, 24" WIDE X 12'-0" LONG (6 REQD). APPLY EACH TY-GARD PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS. PRE-MARK THE CONTAINER SIDEWALL 7'-0" FROM THE EXPECTED REAR-MOST EDGE OF THE LOAD AT THE REQUIRED HEIGHT. INSTALL THE TY-GARD WITH THE 5 FOOT ADHESIVE SECTION FURTHEST FROM THE REAR OF THE LOAD, AT THE PRE-MARKED LOCATION.
- ③ TY-PATCH DS, 24" WIDE X 7'-0" LONG (3 REQD). APPLY EACH TY-PATCH PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS, FORMING A PATCH OVER TWO PIECES OF TY-GARD MATERIAL AFTER CINCHING THEM TIGHT.
- ④ TY-TAPE DS, 72" LONG (2 REQD). APPLY EACH TY-TAPE PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" x 4"	1	1
NAILS	NO. REQD	POUNDS
10d (3")	18	1/4
PLYWOOD, 3/4"	57.5 SQ FT REQD	118.6 LBS
TY-GARD	72 FT REQD	12.1 LBS
TY-PATCH	21 FT REQD	4.7 LBS
TY-TAPE	12 FT REQD	0.8 LBS

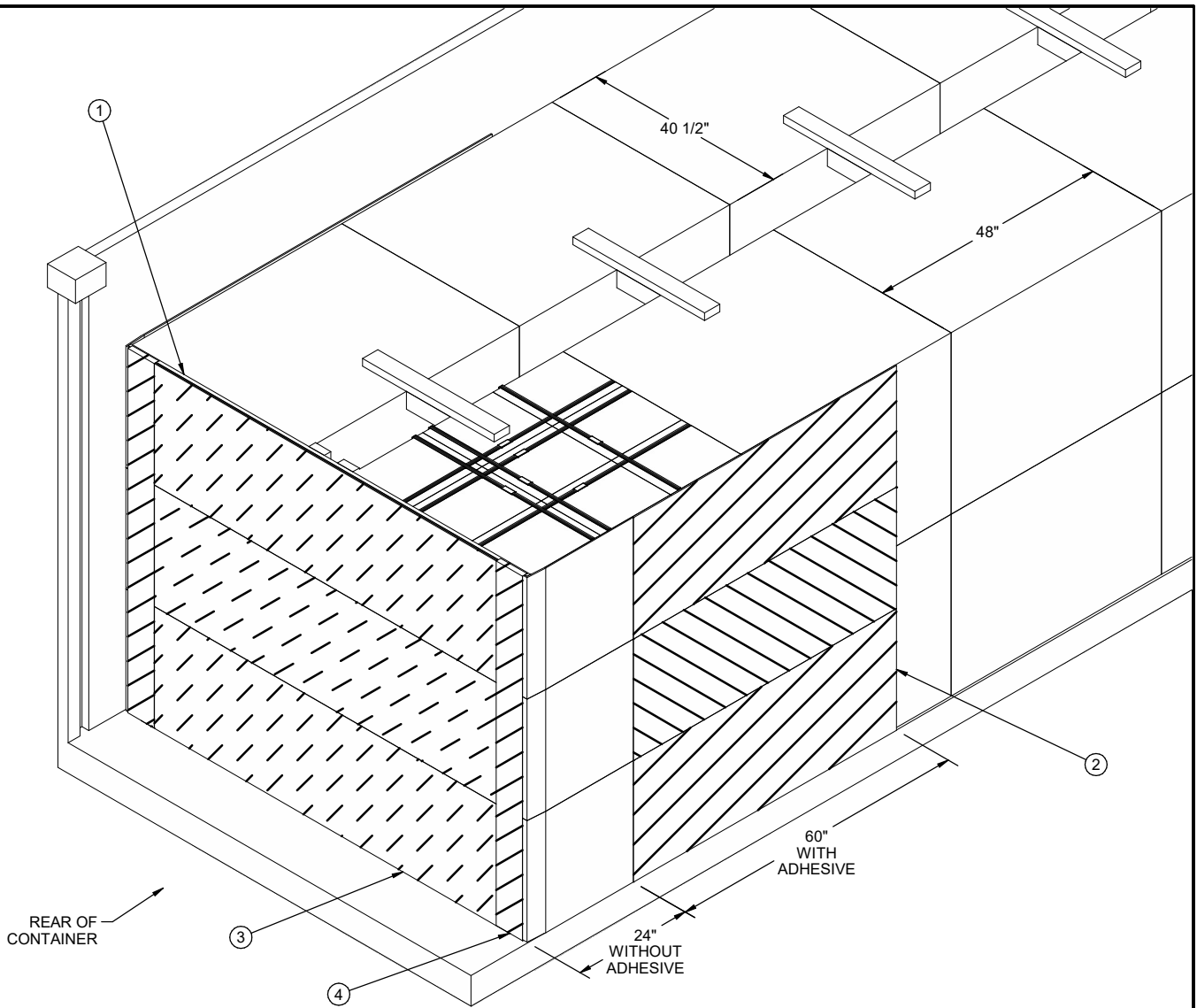
**SPECIAL NOTES:**

1. THE LOAD SHOWN ON PAGE 4 IS BASED ON "PALLET UNIT A", SHOWN ON PAGE 3. THE DIMENSIONS AND ORIENTATION OF THIS PALLET UNIT ARE SUCH THAT THERE IS NO LATERAL VOID TO FILL. THE GATE DEPICTED BELOW IS DESIGNED FOR A LOAD WITHOUT LATERAL VOID, OR WITH SIDE VOID FILLERS. THE LOAD WEIGHT IS MAXIMIZED TO 39,600 POUNDS TO DEPICT THE USE OF THREE SETS OF TY-GARD RESTRAINTS. THE CONFIGURATION DEPICTED ON PAGE 4 MAY ALSO BE USED FOR LOADS WEIGHING LESS THAN 39,600 POUNDS. NOTE THAT LIGHTER LOADS MAY NOT REQUIRE THREE SETS OF TY-GARD. REFER TO THE CHART ON PAGE 2 FOR DETAILS.
2. U. S. ARMY MATERIEL COMMAND DRAWING 19-48-4153-15PA1002 (REFERENCE PAGE 14) MUST BE USED AS GUIDANCE FOR BUILDING THE LOAD. THE DUNNAGE REQUIRED TO UTILIZE THE TY-GARD METHOD OF RESTRAINT LISTED IN THE KEY NUMBERS ON PAGE 4 REPLACES THE REAR BLOCKING ASSEMBLY, FILL MATERIAL, DOOR SPANNERS, AND WHEN REQUIRED DUE TO ISO CONTAINER CONFIGURATION, UNIVERSAL LOAD RETAINERS AND DOOR POST VERTICALS. ALL OTHER DUNNAGE LISTED IN DRAWING 19-48-4153-15PA1002 IS STILL REQUIRED TO COMPLETE THIS LOAD. THE BILL OF MATERIAL ON PAGE 4 ONLY COVERS THE KEY NUMBERED MATERIAL ON PAGE 4. THE FULL LADING WEIGHTS AND MATERIAL QUANTITIES MUST BE COMPUTED SEPARATELY.



**END GATE A**

CLEAT SIZE AND LOCATION IS DEPENDENT ON UNIT CONFIGURATION, VERIFY PRIOR TO USE THAT CLEATS ARE PROPERLY POSITIONED TO VERTICALLY RESTRAIN GATE.



**ISOMETRIC VIEW**

**KEY NUMBERS**

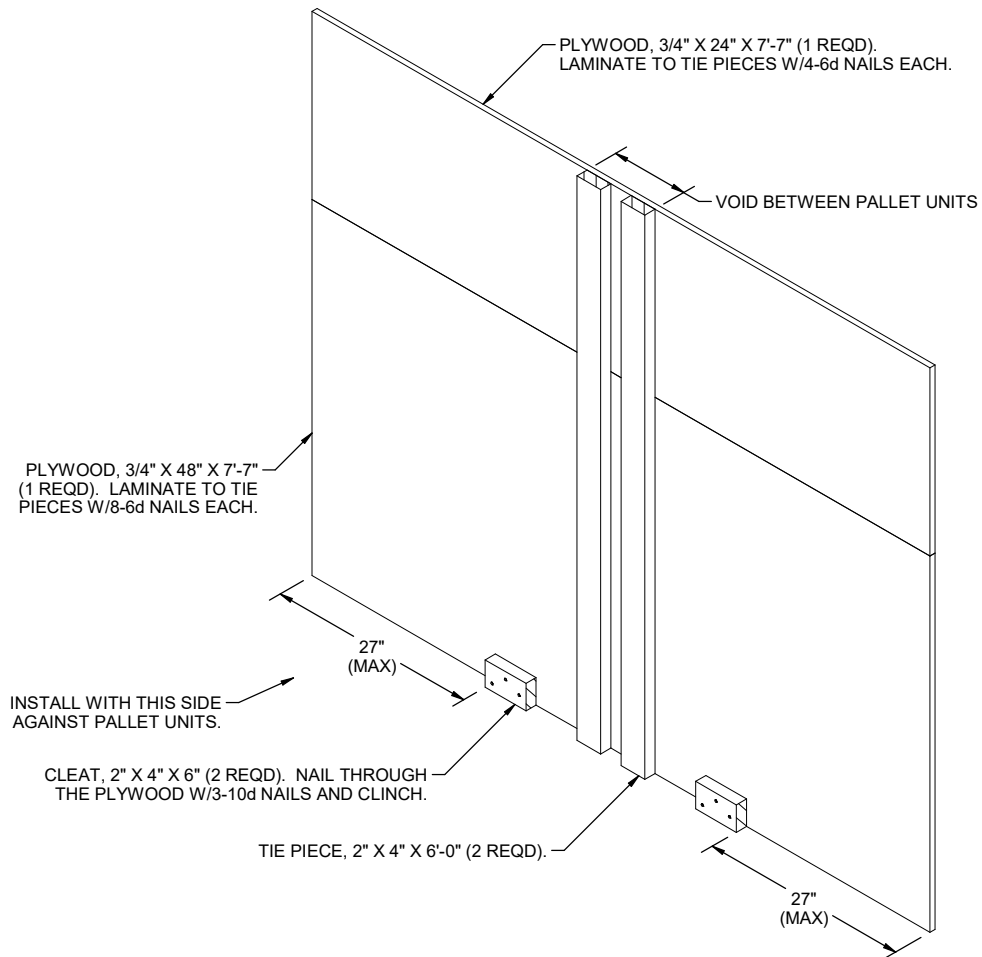
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- ③ TY-PATCH DS, 24" WIDE X 7'-0" LONG (3 REQD). APPLY EACH TY-PATCH PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS, FORMING A PATCH OVER TWO PIECES OF TY-GARD MATERIAL AFTER CINCHING THEM TIGHT.
- ④ TY-TAPE DS, 72" LONG (2 REQD). APPLY EACH TY-TAPE PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
2" x 4"	13	9
NAILS	NO. REQD	POUNDS
10d (3")	30	1/2
PLYWOOD, 3/4" -	45.5 SQ FT REQD	93.8 LBS
TY-GARD - - - - -	72 FT REQD	12.1 LBS
TY-PATCH - - - - -	21 FT REQD	4.7 LBS
TY-TAPE - - - - -	12 FT REQD	0.8 LBS

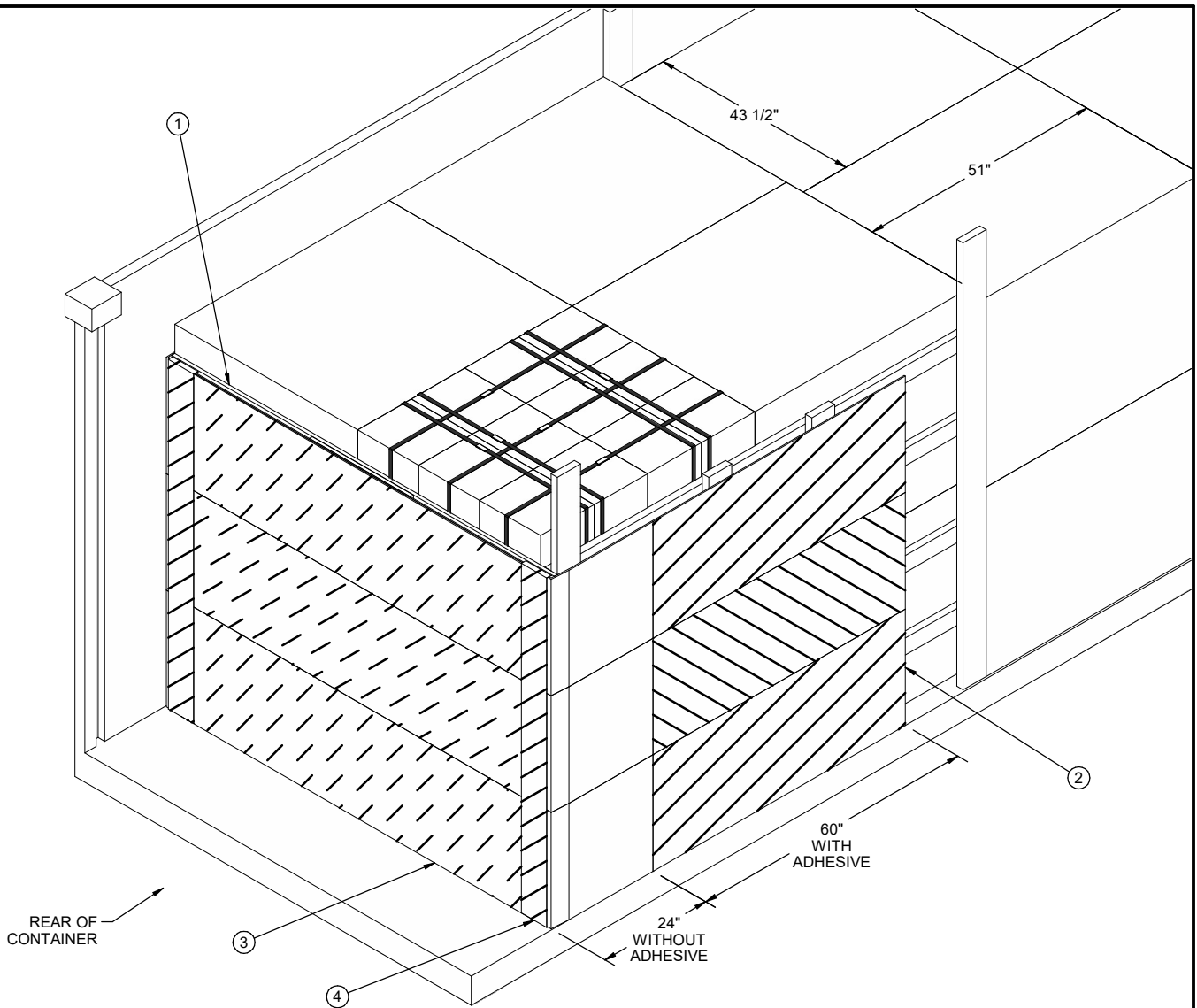
**SPECIAL NOTES:**

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**END GATE B**

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**ISOMETRIC VIEW**

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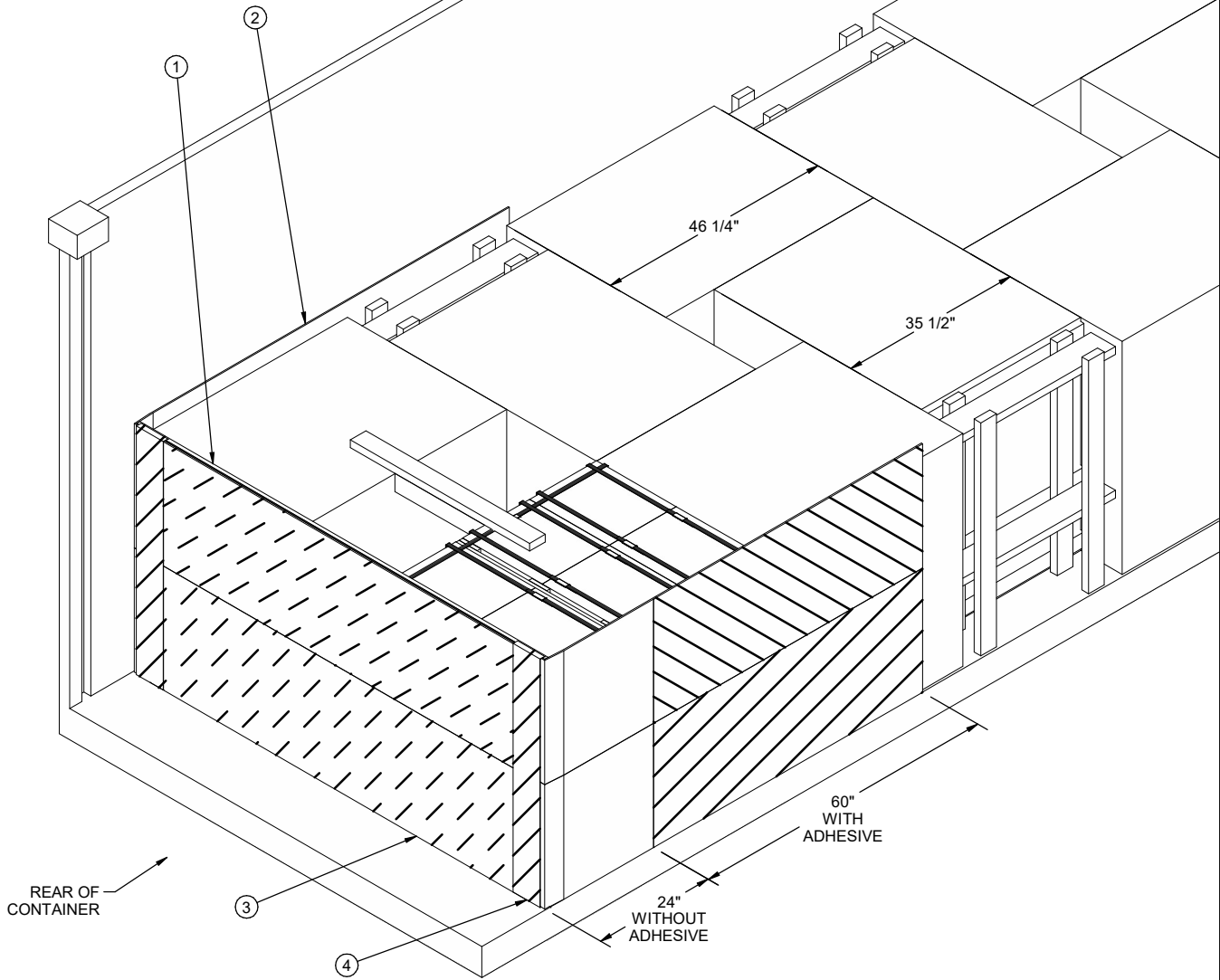
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- ③ TY-PATCH DS, 24" WIDE X 7'-0" LONG (3 REQD). APPLY EACH TY-PATCH PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS, FORMING A PATCH OVER TWO PIECES OF TY-GARD MATERIAL AFTER CINCHING THEM TIGHT.
- ④ TY-TAPE DS, 72" LONG (2 REQD). APPLY EACH TY-TAPE PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS.

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**SPECIAL NOTES:**

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**ISOMETRIC VIEW**

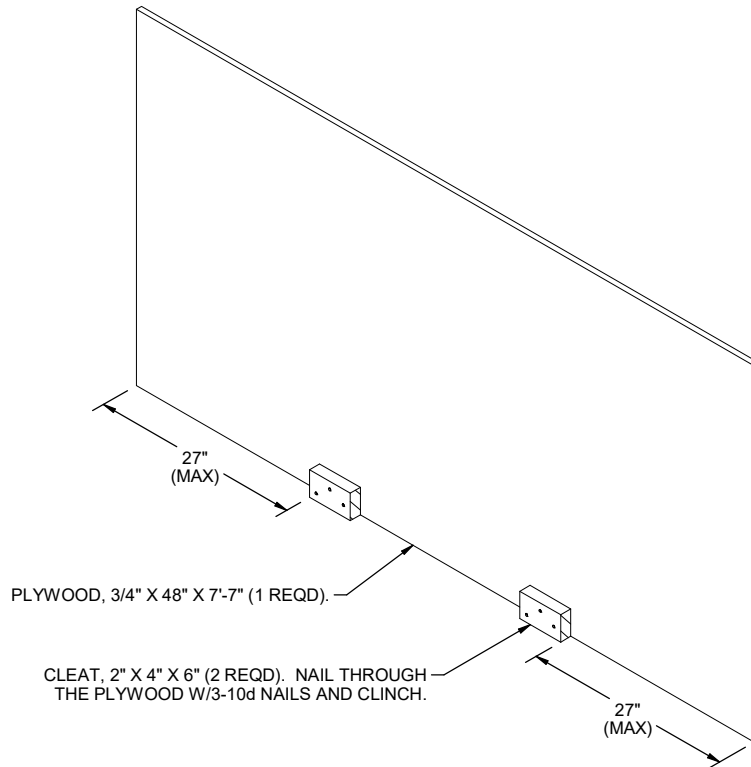
**KEY NUMBERS**

- ① END GATE C (1 REQD). SEE THE DETAIL ON PAGE 11.
- ② TY-GARD DS FLEXIBLE BARRIER, 24" WIDE X 12'-0" LONG (4 REQD). APPLY EACH TY-GARD PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS. PRE-MARK THE CONTAINER SIDEWALL 7'-0" FROM THE EXPECTED REAR-MOST EDGE OF THE LOAD AT THE REQUIRED HEIGHT. INSTALL THE TY-GARD WITH THE 5 FOOT ADHESIVE SECTION FURTHEST FROM THE REAR OF THE LOAD, AT THE PRE-MARKED LOCATION.
- ③ TY-PATCH DS, 24" WIDE X 7'-0" LONG (2 REQD). APPLY EACH TY-PATCH PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS, FORMING A PATCH OVER TWO PIECES OF TY-GARD MATERIAL AFTER CINCHING THEM TIGHT.
- ④ TY-TAPE DS, 48" LONG (2 REQD). APPLY EACH TY-TAPE PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" x 4"	1	1
NAILS	NO. REQD	POUNDS
10d (3")	6	NIL
PLYWOOD, 3/4"	30.3 SQ FT REQD	62.6 LBS
TY-GARD	48 FT REQD	8.1 LBS
TY-PATCH	14 FT REQD	3.1 LBS
TY-TAPE	8 FT REQD	0.5 LBS

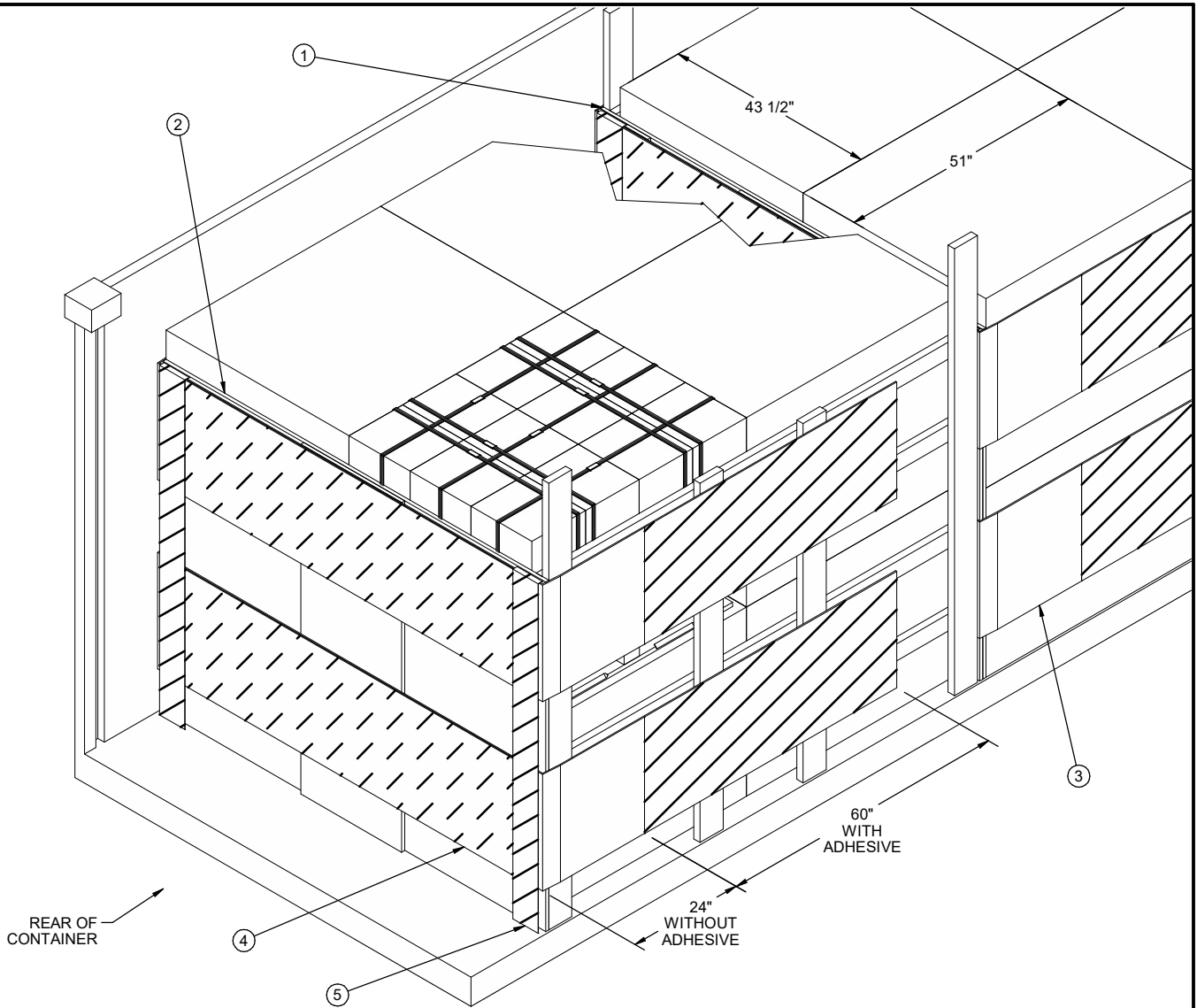
**SPECIAL NOTES:**

1. THE LOAD SHOWN ON PAGE 10 IS BASED ON "PALLET UNIT D", SHOWN ON PAGE 3. THE GATE DEPICTED BELOW IS DESIGNED FOR A LOAD REQUIRING ONE OR TWO SETS OF TY-GARD. THE LOAD WEIGHT IS MAXIMIZED TO 26,400 POUNDS TO DEPICT THE USE OF TWO SETS OF TY-GARD RESTRAINTS. THE CONFIGURATION DEPICTED ON PAGE 10 MAY ALSO BE USED FOR LOADS WEIGHING LESS THAN 26,400 POUNDS. NOTE THAT LIGHTER LOADS MAY NOT REQUIRE TWO SETS OF TY-GARD. REFER TO THE CHART ON PAGE 2 FOR DETAILS.
2. U. S. ARMY MATERIEL COMMAND DRAWING 19-48-4153-15PA1002 (REFERENCE PAGE 36) MUST BE USED AS GUIDANCE FOR BUILDING THE LOAD. THE DUNNAGE REQUIRED TO UTILIZE THE TY-GARD METHOD OF RESTRAINT LISTED IN THE KEY NUMBERS ON PAGE 10 REPLACES THE REAR BLOCKING ASSEMBLY, FILL MATERIAL, DOOR SPANNERS, AND WHEN REQUIRED DUE TO ISO CONTAINER CONFIGURATION, UNIVERSAL LOAD RETAINERS AND DOOR POST VERTICALS. ALL OTHER DUNNAGE LISTED IN DRAWING 19-48-4153-15PA1002 IS STILL REQUIRED TO COMPLETE THIS LOAD. THE BILL OF MATERIAL ON PAGE 10 ONLY COVERS THE KEY NUMBERED MATERIAL ON PAGE 10. THE FULL LADING WEIGHTS AND MATERIAL QUANTITIES MUST BE COMPUTED SEPARATELY.



**END GATE C**

CLEAT SIZE AND LOCATION IS DEPENDENT ON UNIT CONFIGURATION, VERIFY PRIOR TO USE THAT CLEATS ARE PROPERLY POSITIONED TO VERTICALLY RESTRAIN GATE.



**ISOMETRIC VIEW**

**KEY NUMBERS**

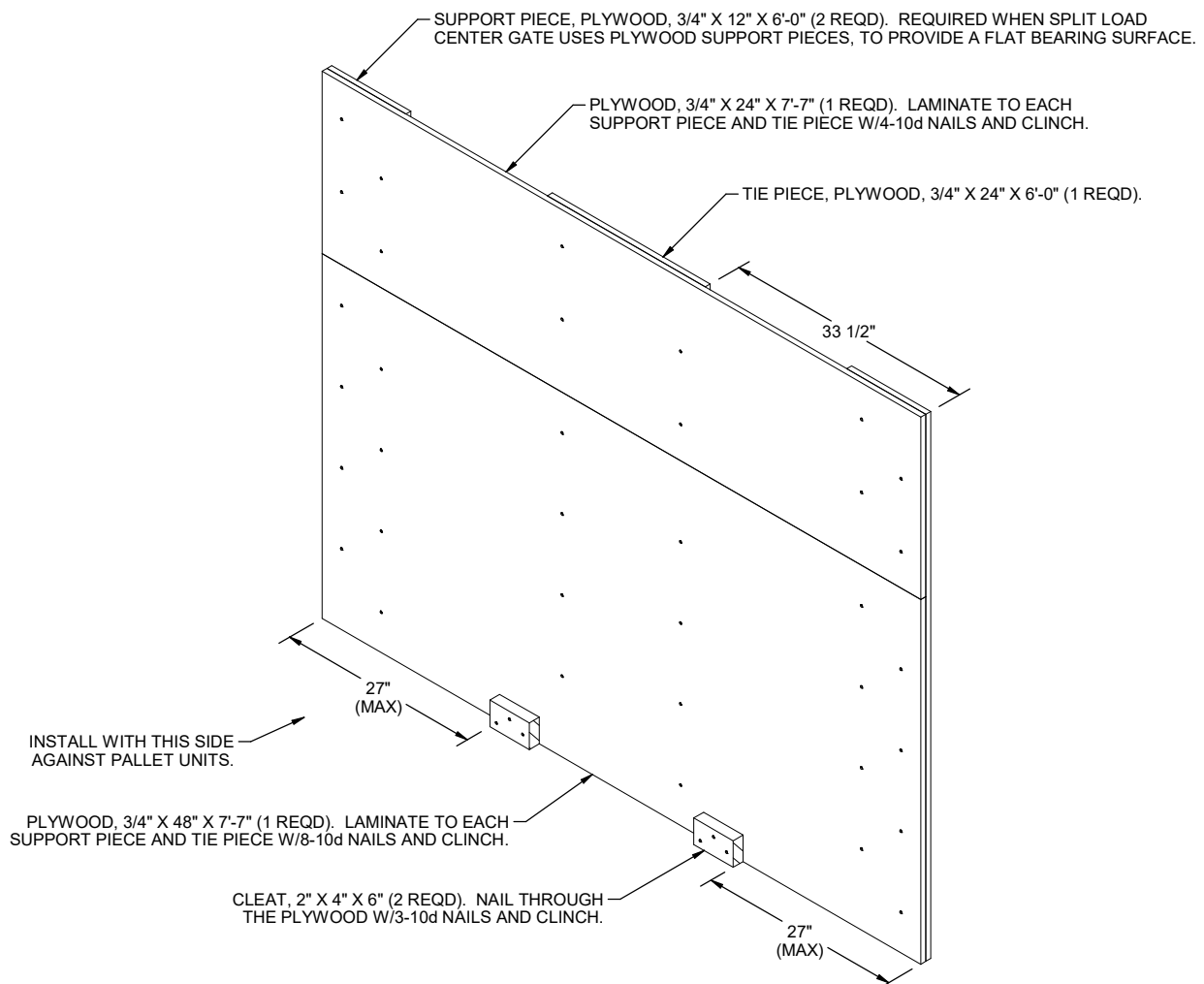
- ① CENTER GATE (1 REQD). SEE THE DETAIL ON PAGE 13.
- ② END GATE A (1 REQD). SEE THE DETAIL ON PAGE 5.
- ③ TY-GARD DS FLEXIBLE BARRIER, 24" WIDE X 12'-0" LONG (8 REQD). APPLY EACH TY-GARD PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS. PRE-MARK THE CONTAINER SIDEWALL 7'-0" FROM THE EXPECTED REAR-MOST EDGE OF THE LOAD AT THE REQUIRED HEIGHT. INSTALL THE TY-GARD WITH THE 5 FOOT ADHESIVE SECTION FURTHEST FROM THE REAR OF THE LOAD, AT THE PRE-MARKED LOCATION.
- ④ TY-PATCH DS, 24" WIDE X 7'-0" LONG (4 REQD). APPLY EACH TY-PATCH PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS, FORMING A PATCH OVER TWO PIECES OF TY-GARD MATERIAL AFTER CINCHING THEM TIGHT.
- ⑤ TY-TAPE DS, 72" LONG (4 REQD). APPLY EACH TY-TAPE PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
2" x 4"	2	1
NAILS	NO. REQD	POUNDS
10d (3")	60	1
PLYWOOD, 3/4"	127 SQ FT REQD	262 LBS
TY-GARD	96 FT REQD	16.1 LBS
TY-PATCH	28 FT REQD	6.3 LBS
TY-TAPE	24 FT REQD	1.6 LBS

**SPECIAL NOTES:**

1. THE LOAD SHOWN ON PAGE 12 IS BASED ON "PALLET UNIT C", SHOWN ON PAGE 3. THE DIMENSIONS AND ORIENTATION OF THIS PALLET UNIT ARE SUCH THAT THE LOAD HAS SIDE LATERAL VOID TO FILL. THE GATE DEPICTED IN THE LOAD ON PAGE 12 IS DESIGNED FOR A LOAD WITHOUT LATERAL VOID, OR WITH SIDE VOID FILLERS. THE LOAD WEIGHT IS MAXIMIZED TO 52,800 POUNDS TO DEPICT THE USE OF TWO SETS OF TY-GARD RESTRAINTS IN TWO LOCATIONS. THE CONFIGURATION DEPICTED ON PAGE 12 MAY ALSO BE USED FOR LOADS WEIGHING LESS THAN 52,800 POUNDS. NOTE THAT LIGHTER LOADS MAY NOT REQUIRE TWO SETS OF TY-GARD. REFER TO THE CHART ON PAGE 2 FOR DETAILS.
2. U. S. ARMY MATERIEL COMMAND DRAWING 19-48-4153-15PA1002 (REFERENCE PAGE 20) MUST BE USED AS GUIDANCE FOR BUILDING THE LOAD. THE DUNNAGE REQUIRED TO UTILIZE THE TY-GARD METHOD OF RESTRAINT LISTED IN THE KEY NUMBERS ON PAGE 12 REPLACES THE REAR BLOCKING ASSEMBLY, FILL MATERIAL, DOOR SPANNERS, AND WHEN REQUIRED DUE TO ISO CONTAINER CONFIGURATION, UNIVERSAL LOAD RETAINERS AND DOOR POST VERTICALS. ALL OTHER DUNNAGE LISTED IN DRAWING 19-48-4153-15PA1002 IS STILL REQUIRED TO COMPLETE THIS LOAD. THE BILL OF MATERIAL ON PAGE 12 ONLY COVERS THE KEY NUMBERED MATERIAL ON PAGE 12. THE FULL LADING WEIGHTS AND MATERIAL QUANTITIES MUST BE COMPUTED SEPARATELY.
3. THE LOAD DEPICTED ON PAGE 12 IS CONFIGURED TO DEMONSTRATE THE USE OF SEPARATE LOAD BAYS TO ACCOMMODATE HIGH WEIGHT UNITS, AS DESCRIBED IN GENERAL NOTE "J" ON PAGE 2. CAUTION MUST BE TAKEN TO ENSURE THAT ONE SET OF TY-GARD MATERIAL DOES NOT OVERLAP ANOTHER SET LONGITUDINALLY. A LOAD BAY MUST BE AT LEAST 60" IN LENGTH TO AVOID THIS OVERLAP.



**CENTER GATE**

CLEAT SIZE AND LOCATION IS DEPENDENT ON UNIT CONFIGURATION, VERIFY PRIOR TO USE THAT CLEATS ARE PROPERLY POSITIONED TO VERTICALLY RESTRAIN GATE. THIS GATE MAY ALSO BE CONSTRUCTED USING A SINGLE PIECE OF PLYWOOD, SIMILAR TO "END GATE C" ON PAGE 11, PROVIDED THE LOAD HEIGHT AND GATE HEIGHT CONFORM TO THE REQUIREMENTS OF GENERAL NOTE "H" ON PAGE 3.

