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# LOADING AND BRACING® IN SIDE **OPENING ISO CONTAINERS OF 8" M2 PROPELLING CHARGES PACK-ED IN M10 CYLINDRICAL METAL CONTAINERS, PALLETIZED**

#### **I NDEX**

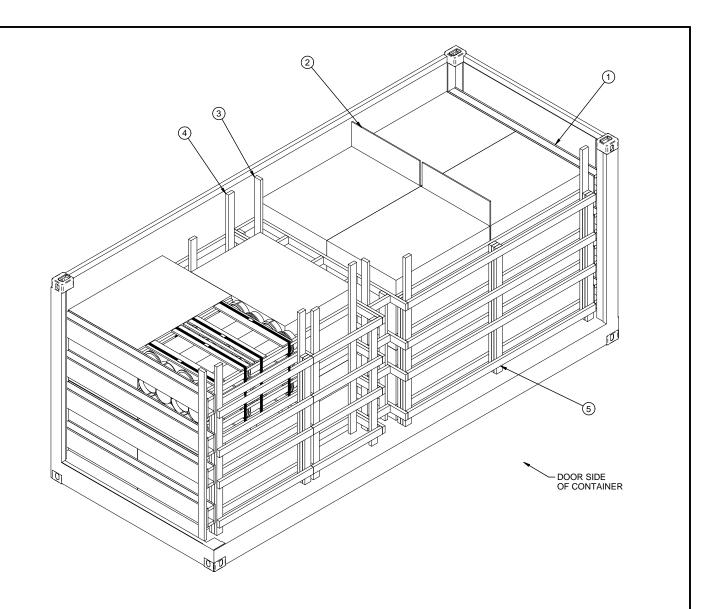
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DISTRIBUTION STATEMENT A

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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 APPROVED U.S. ARMY CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL THAT THIS IS JONE MUNITIONS COMMAND THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 10. RUS.ALLEN.J Digitally signed by RUS.ALLEN.J1230354282 Disc.215, o=U.S. Government, ou=DoD, ou=PKJ, ou=USA, on=RUS.ALLEN.J1230354282 Disc.2011.09.16 12:49:43 -0500′ DO NOT SCALE SEPTEMBER 2011 **ENGINEER** BASIC MADELINE BANKS TECHNICIAN RF\/ TRANSPORTATION FIEFFER.LAUR Digitally signed by FIEFFER.LAURA.1230375727 APPROVED BY ORDER OF COMMANDING **ENGINEERING** GENERAL, U.S ARMY MATERIEL COMMAND A.A.1230375727 ou=DoD, ou=PKI, ou=USA on=FIEFFER.LAURA.A.12 DIVISON BARICKMAN. black/cholad PHLP W 123000 PHLIP W 12300 DIVISION DRAWING FII F TESTED CLASS VALIDATION CARNEY.GARY.BU Digitally signed by CARNEY.GARY.BUTON.1038708038 DN: C=US, O=U.S. Government, ou=DoD. **ENGINEERING** DIVISON RTON.1038708038 ou=PKI, ou=USA, cn=CARNEY.GARY.BURTON.1038708038 Date: 2011.09.29 14:38:20 - 0500' BEAVER.JERRY BEAVER.JERRY.W.1230949952 DN: c=US, c=U.S. Government. 19 48 4264/1 15PM1003 **ENGINEERING** DIRECTORATE W.1230949952 U.S. ARMY DEFENSE AMMUNITION CENTER



# **ISOMETRIC VIEW**

# **KEY NUMBERS**

- 1 END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.
- ② SEPARATOR GATE (2 REQD). SEE THE DETAIL ON PAGE 7.
- $\ensuremath{\mathfrak{J}}$  CENTER FILL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 6.
- 4 CRIB FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6
- $\begin{tabular}{ll} \hline \end{tabular} SIDE FILL ASSEMBLY (2 REQD: 1 AT TWO-LONG, AND 1 AT ONE-LONG SHOWN). SEE THE DETAIL ON PAGE 7.$

BILL OF MATERIAL					
LUMBER	LI NEAR FEET	BOARD FEET			
2" X 4"	517	344			
NAI LS	NO. REQD	POUNDS			
6d (2")	358	2-1/4			
10d (3")	416	6-1/2			
PLYW00D 1/2" - 64 PLYW00D 3/4" - 90					

# LOAD AS SHOWN\*

<u>I TEM</u>	QUANTI TY	<u>WEI GHT</u>	(APPROX)
DUNNAGE	14	29, 736 LBS 973 LBS 6, 050 LBS	
	TOTAL WEIGHT	36, 759 LBS	(APPROX)

<sup>\*</sup>LOAD DEPICTS ALTERNATED PALLET UNIT.

PAGE 2

#### **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 8" M2 PROPELLING CHARGES IN M10 CYLINDRICAL METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4 AND AMC DRAWING 19-48-4042A/1-20PM1001 FOR DETAILS OF THE PALLET UNIT. CAUTION: REGARDLESS OF THE QUANTITY OF PALLET UNITS 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'-5-1/4" LONG BY 89-3/4" WIDE BY 88" 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 BE USED.
- D. WHEN LOADING PALLETS, 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 LONGITUDINAL PIECES ON THE CRIB FILL ASSEMBLIES OR THE HORIZONTAL PIECES ON THE SIDE FILL ASSEMBLIES OR THE HORIZONTAL PIECES ON THE SIDE FILL ASSEMBLY. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE LATERAL PIECES OR STRUTS IN THE CRIB FILL ASSEMBLIES OR SIDE FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE PALLET UNIT. THE LOADS MUST BE AS TIGHT AS POSSIBLE LONGITUDINALLY, BUT THE VOID MUST NOT EXCEED 3/4" OVERALL.
- 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 ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- G. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE ENDWALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE END BLOCKING ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THE BUFFER PIECES. A PIECE OF 2" X 4", 2" X 3" OR A SPECIAL WIDTH PIECE CUTTO-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 FORWARD WALL ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER ENDWALLS, ONLY THE CORNER PORTS OF THE CONTAINER SHOULD BE USED FOR FORWARD 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. <u>CAUTION</u>: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- K. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

#### L. 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.

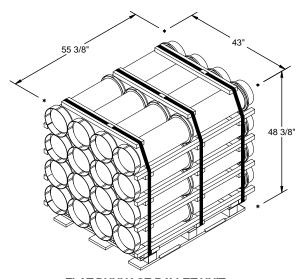
(CONTINUED AT RIGHT)

#### (GENERAL NOTES CONTINUED)

- 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:
  - A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BO-GIE 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 PALLETS SHOWN IN THE LOAD ON PAGE 2 MAY BE RE-DUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL-LOAD PROCEDURE" ON PAGE 9
  - IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT (ONE OR TWO LAD-ING UNITS), LADING UNITS NORMALLY MAY BE ELIMINATED FROM THE CENTER OF THE LOAD.
  - 2. IF A LOAD IS REDUCED BY A LARGE AMOUNT (MORE THAN TWO LADING UNITS), LADING UNITS SHOULD BE ELIMINATED AS REQUIRED AND THE VOID IN THE LONGITUDINAL CENTER OF THE CONTAINER SHIFTED FORE OR AFT, AS NECESSARY, TO ACHIEVE A SYMMETRICAL WEIGHT DISTRIBUTION. THE DEPICTED PROCEDURES WILL BE FOLLOWED AS CLOSELY AS POSSIBLE, MAKING ONLY THOSE ADJUSTMENTS TO THE DUNNAGE WHICH ARE REQUIRED TO ACCOMMODATE THE NUMBER OF UNITS TO BE SHIPPED.
- Q. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN ON PAGE 9. 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.
- R. ANTI-CHAFING MATERIAL MUST BE INSTALLED AT POINTS OF METAL CONTACT BETWEEN PALLET UNITS, AND BETWEEN PALLET UNITS AND THE SIDE OPENING CONTAINER.

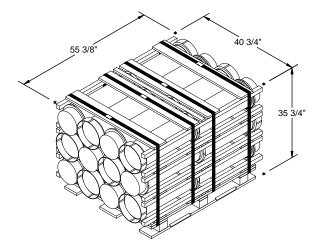
#### **MATERIAL SPECIFICATIONS**

WATERIAL SPECIFICATIONS					
<u>LUMBER</u> :	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VO- LUNTARY PRODUCT STANDARD PS 20.				
<u>NAILS</u> :	ASTM F1667; COMMON STEEL NAIL NLCMS OR NLCMMS).				
<u>PLYWOOD</u> :	COMMERCIAL ITEM DESCRIPTION 1-1-55057, IN- DUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EX- TERIOR GRADE MAY BE SUBSTITUTED.				
WIRE, CARBON STEEL -:	ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, O. 0800" DIA, GRADE 1006 OR BETTER.				
ANTI - CHAFING MATERIAL:	MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.				

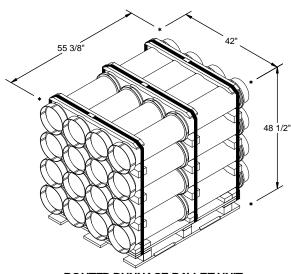


# FLAT DUNNAGE PALLET UNIT

GROSS WEIGHT - CUBE - - - - -

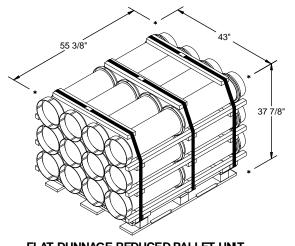


# ALTERNATED PALLET UNIT



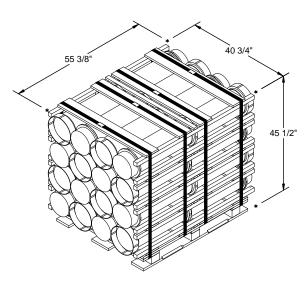
#### **ROUTED DUNNAGE PALLET UNIT**

PAGE 4



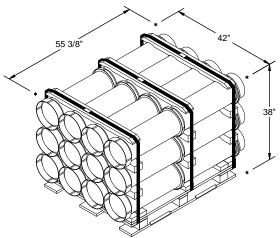
# FLAT DUNNAGE REDUCED PALLET UNIT

GROSS WEI GHT - - - - - - - - - 1,634 LBS CUBE - - - - - - 53.0 CU FT



#### **ALTERNATED INCREASED PALLET UNIT**

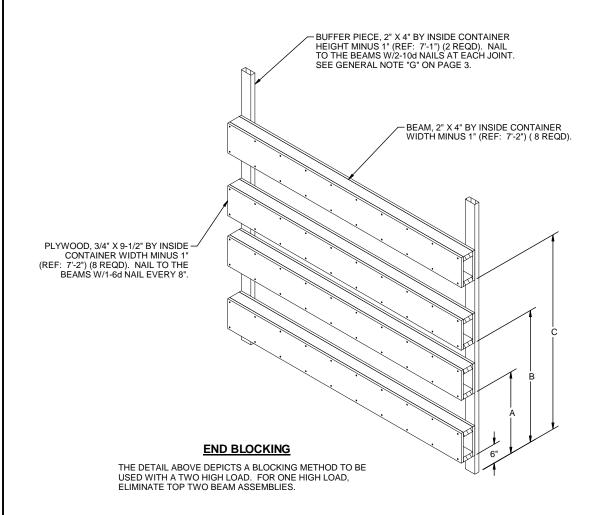
GROSS WEI GHT - - - - - - - - - - 2, 124 LBS CUBE - - - - - - 59. 1 CU FT

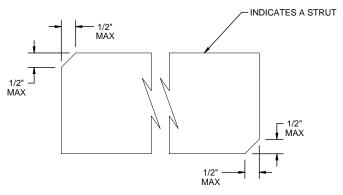


# ROUTED DUNNAGE REDUCED PALLET UNIT

GROSS WEI GHT - - - - - - - - - 1, 614 LBS CUBE - - - - - - 51.1 CU FT

DIMENSION CHART									
	DIMENSION								
PALLET UNIT	Α	В	С	D	E	F	G	Н	J
ALTERNATED	27"	42"	60"	28"	44"	62"	24-1/2"	40-1/2"	58-1/2"
ALTERNATED INCREASED	37"			38"			34-1/2"		
FLAT DUNNAGE	38"			40"			36-1/2"		
FLAT DUNNAGE REDUCED	28"	44"	66"	30"	46"	68"	26-1/2"	42-1/2"	64-1/2"
ROUTED DUNNAGE	38"			40"			36-1/2"		
ROUTED DUNNAGE REDUCED	28"	44"	66"	30"	46"	68"	26-1/2"	42-1/2"	64-1/2"

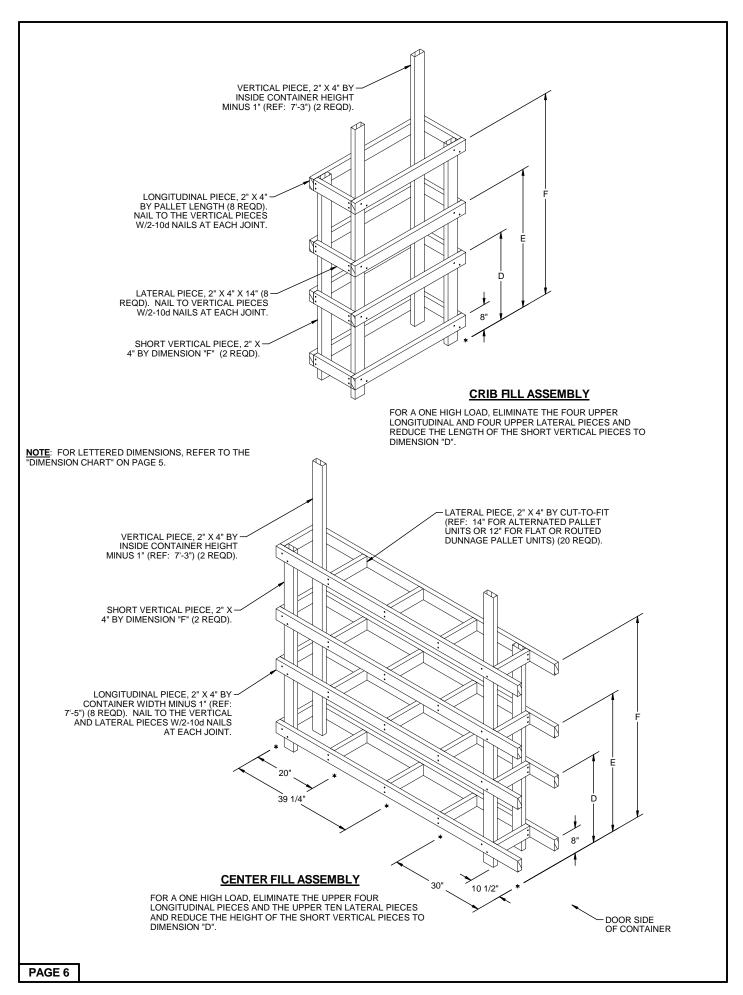


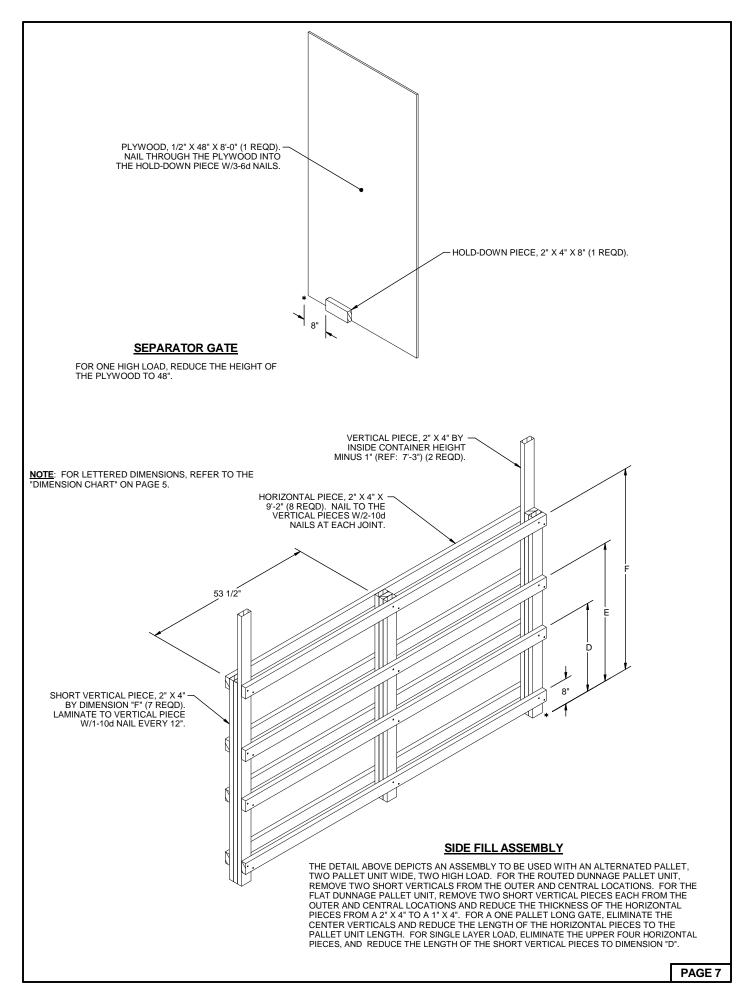


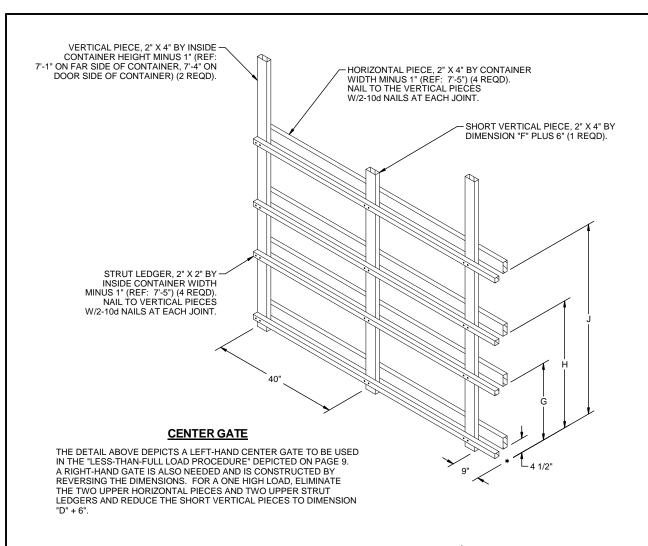
# **BEVEL CUT**

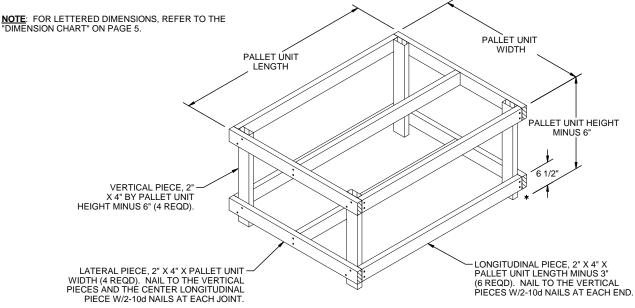
IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE INSTALLING THE STRUTS WITH A "DRIVE" FIT.

PAGE 5



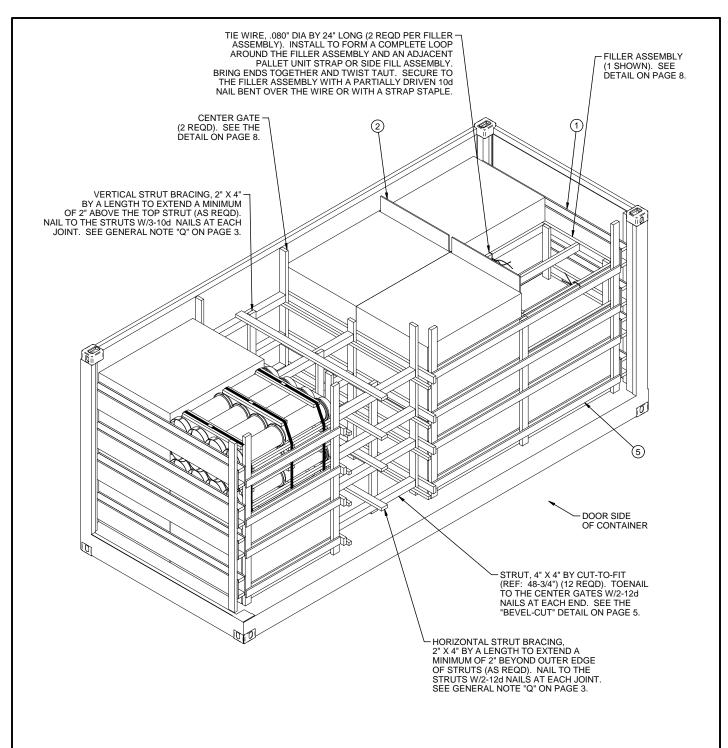






#### FILLER ASSEMBLY

FOR MINUS ONE PALLET UNIT. NO MORE THAN THREE FILLER ASSEMBLIES MAY BE USED PER TWO HIGH LOAD, AND NO MORE THAN ONE FILLER ASSEMBLY MAY BE USED PER ONE HIGH LOAD. DO NOT INSTALL FILLER ASSEMBLY IMMEDIATELY ADJACENT TO CENTER FILL ASSEMBLY OR GATE.



#### LESS-THAN-FULL-LOADPROCEDURE

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (LESS THAN 14 UNITS) AND DEPICTS THE FLAT DUNNAGE REDUCED PALLET UNIT. KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. SEE GENERAL NOTES "H" AND "P" ON PAGE 3.

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