LOADING AND BRACING® IN END OPENING ISO CONTAINERS OF SMALL DIAMETER BOMB SINGLE WEAPON PACKED ONE PER CNU-659 CONTAINER, PALLETIZED

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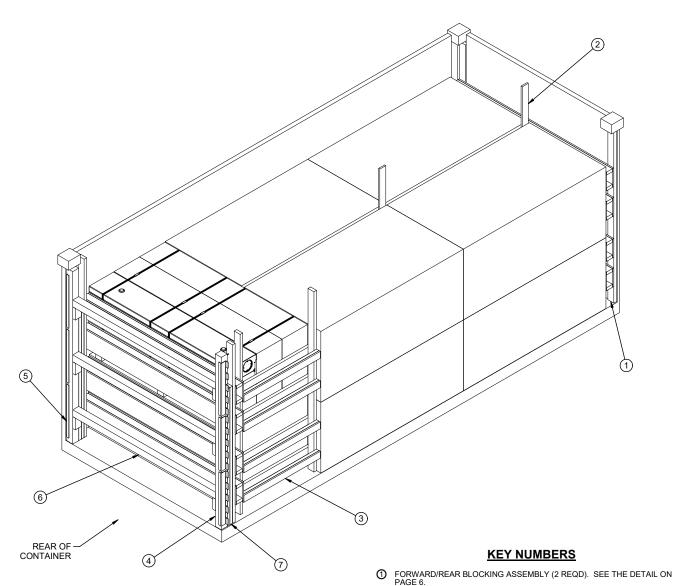
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* THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL, MOTOR, OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED U.S. ARMY JOINT MUNITIONS COMMAND CAUTION: VERIFY PRIOR TO USE AT https://www.dau.mil/cop/ammo/Pages/Default.aspx THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 8. RUS.ALLEN.J Digitally signed by RUS.ALLEN.J.1230354282 DO NOT SCALE **AUGUST 2005** .1230354282 Date: 2019.04.04 15:40:26 BASIC LAURA A. FIEFFER DESIGN **ENGINEER** RFV **QUYEN TRAN REVISION NO. 1 APRIL 2019** APPROVED BY ORDER OF COMMANDING FIEFFER.LAUR Digitally signed by FIEFFER.LAURA.A.1230375727 Date: 2019.03.25 08:01:51-05'00' **ENGINEERING** GENERAL, U.S. ARMY MATERIEL COMMAND SEE THE REVISION LISTING ON PAGE 4 DIVISON THOMAS.CARL.AN Digitally signed by THOMAS.CARL.ANTHONY.1104 CLASS DIVISION DRAWING TEST ENGINEER FELICIANO.ADI Digitally signed by FELICIANO.ADIN.1259200373 TEST N.1259200373 Date: 2019.03.27 13:24:14 THONY.110462137 THOMA 621372 NA REPORT Date: 2019.04.05 07:39:41 -05'00' 8829 **EXPLOSIVE** FAIRHURST.ROBE 19 48 SP15PM8 Digitally signed by FAIRHURST.ROBERT.JOHN.101 5766880 Date: 2019.04.01 09:36:55 -05'00' SAFETY RT.JOHN.10157668 DIRECTORATE U.S. ARMY DEFENSE AMMUNITION CENTER



BILL OF MATERIAL				
LUMBER	LINEAR FEET	BOARD FEET		
1" X 4" 2" X 4" 4" X 4"	52 223 36	17 149 48		
NAI LS	NO. REQD	POUNDS		
6d (2") 10d (3") 12d(3-1/4")	448 120 12	2-3/4 2 1/4		

ISOMETRIC VIEW

PLYWOOD, 1/2" - - 56.00 SQ FT REQD - - 77.00 LBS PLYWOOD, 3/4" - - 96.06 SQ FT REQD - - 198.11 LBS UNI VERSAL LOAD RETAI NER - - 6 REQD - - 39.00 LBS

- ② CENTER FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.
- 3 CRIB FILL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 8.
- 4 DOOR POST VERTICAL (2 REQD). SEE THE DETAIL AND "DETAIL A" ON PAGE 7, AND GENERAL NOTE "P" ON PAGE 3.
- (5) UNIVERSAL LOAD RETAINER (6 REQD, 3 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPART-MENT OF ARMY DRAWING DA-116, "DETAIL A" ON PAGE 7, AND GENERAL NOTE "P" ON PAGE 3.
- (6) DOOR SPANNER, 4" X 4" MATERIAL CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF: 7'-1-1/4") (3 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON
- FILL MATERIAL, 4" WIDE BY 70" LONG MATERIAL (AS REQD). NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/6 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 "DETAIL A" ON PAGE 7.

LOAD AS SHOWN

<u>I TEM</u>	QUANTI TY	WEIGHT (APPROX)
DUNNAGE	10	747 LBS

TOTAL WEIGHT - - - - 30, 337 LBS (APPROX)

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 PALLETIZED SMALL DIAMETER BOMB SINGLE WEAPONS PACKED ONE GBU-39/B BOMB PER CNU-659 CONTAINER. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 5, AMC DRAWING 19-48-8826-SP20J1, AND BOEING DRAWING 70P993152-1001 FOR DETAILS OF THE PALLET UNIT 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 4,700 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. MOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.
- D. WHEN LOADING PALLET 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 FILL PIECES ON THE CRIB FILL ASSEMBLIES OR THE VERTICAL PIECES ON THE CENTER FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND/OR QUANTITY OF THE PIECES IN THE CRIB FILL OR CENTER 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. EXCESSIVE SLACK CAN BE ELIMINATED BY INCREASING THE THICKNESS OF THE FILL MATERIALS.
- 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 WALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE FORWARD BLOCKING ASSEMBLY OR 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". 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 FORWARD WALL, ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR FORWARD LONGITUDINAL BLOCKING.
- 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. <u>CAUTION</u>: 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.

- 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 BO-GIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
 - 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.

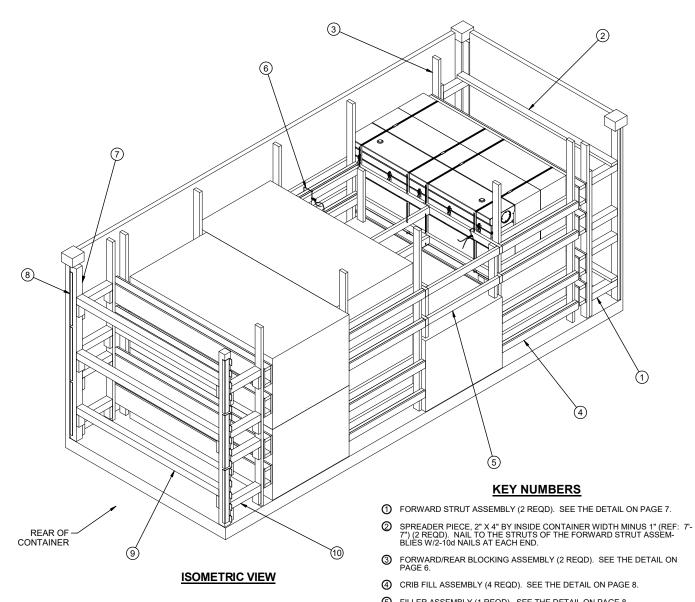
(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

- M. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRE-CLUDE 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 PALLET UNITS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FILLER ASSEMBLY ON PAGE 8 AND THE "SEVEN PALLET UNIT LOAD" ON PAGE 4.
 - 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 LAD-ING UNITS), LADING UNITS SHOULD BE ELIMINATED AS REQURED AND THE TOTAL LOAD 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 ACCOM-MODATE THE NUMBER OF UNITS TO BE SHIPPED.
- P. SIX UNIVERSAL LOAD RETAINERS, AS DEPICTED IN THE LOADS ON PAGES 2 AND 4, ARE REQUIRED WHEN LOADING TWO LAYERS OF PALLET UNITS, AND FOUR ARE REQUIRED WHEN LOADING ONE LAYER OF PALLET UNITS. REFER TO DAC DRAWING ACVO0682 FOR DETAILS OF THE UNIVERSAL LOAD RETAINER CONSTRUCTION, AND TO DEPARTMENT OF THE ARMY DRAWING DA-116 FOR DETAILS FOR INSTALLATION TO THE DOOR POST VERTICAL, PLACEMENT INTO THE CONTAINER, AND FOR OTHER METHODS OF REAR-OF-LOAD RESTRAINT.
- Q. 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.
- R. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN PALLET UNITS OR BETWEEN PALLET UNITS AND THE END OPENING CONTAINER, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.
- S. RECOMMENDED SEQUENTIAL LOADING PROCEDURES FOR THE LOAD ON PAGE 2:
 - PREFABRICATE FORWARD AND REAR BLOCKING ASSEMBLIES, TWO CENTER FILL ASSEMBLIES, CRIB FILL ASSEMBLY, AND TWO DOOR POST VERTICALS WITH UNIVERSAL LOAD RETAINERS.
 - 2. INSTALL THE FORWARD BLOCKING ASSEMBLY.
 - 3. LOAD FOUR PALLET UNITS.
 - 4. INSTALL ONE CENTER FILL ASSEMBLY.
 - 5. LOAD FOUR MORE PALLET UNITS.
 - 6. INSTALL ANOTHER CENTER FILL ASSEMBLY.
 - 7. LOAD LAST TWO PALLET UNITS.
 - 8. INSTALL THE CRIB FILL ASSEMBLY.
 - 9. INSTALL THE REAR BLOCKING ASSEMBLY.
 - 10. INSTALL TWO DOOR POST VERTICALS WITH UNIVERSAL LOAD RETAINERS.
 - 11. INSTALL THE LOWER TWO DOOR SPANNER PIECES.
 - 12. INSTALL THE FILL MATERIAL.
 - 13. INSTALL THE REMAINING DOOR SPANNER PIECE.

MATERIAL SPECIFICATIONS

<u>LUMBER</u> :	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOL- UNTARY PRODUCT STANDARD PS 20.
<u>NAI LS</u> :	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
<u>PLYWOOD</u> :	COMMERCIAL ITEM DESCRIPTION A-A-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.
STEEL, STRUCTURAL:	ASTM A36; 36,000 PSI MINIMUM YIELD OR BETTER.
WIRE, CARBON STEEL -:	ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.
ANTI-CHAFING MATERIAL:	MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER



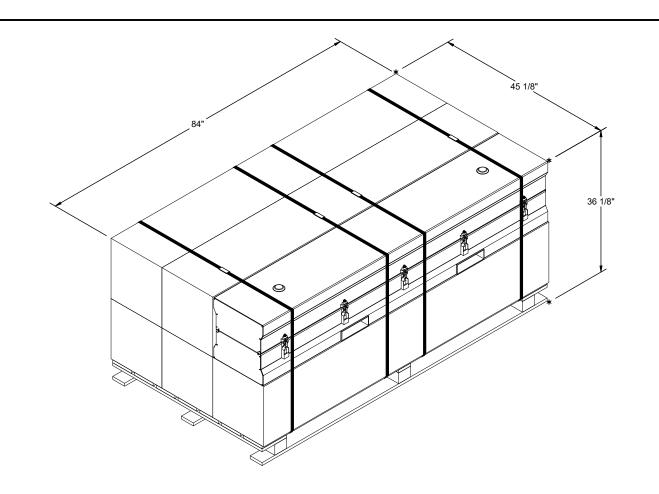
BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
1" X 4" 2" X 4" 4" X 4"	60 444 58	20 296 77	
NAI LS	NO. REQD	POUNDS	
6d (2") 10d (3") 12d(3-1/4")	448 316 44	2-3/4 5 3/4	
DLVWOOD 2/4#	04 04 CO ET DEOL	100 11 LDC	

PLYWOOD, 3/4" - - 96.06 SQ FT REQD - - 198.11 LBS WIRE, .0800" DIA - - - - 4" REQD - - 0.07 LBS UNIVERSAL LOAD RETAINER - - 6 REQD - - 39.00 LBS

- 5 FILLER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 8.
- TIE WIRE, .0800 BY 24" LONG (2 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND THE FILLER ASSEMBLY AND THE STRAP OF THE PALLET UNIT OR THE CRIB FILL ASSEMBLY. BRING ENDS TOGETHER AND TWIST
- O DOOR POST VERTICAL (2 REQD, ONE LEFT HAND AND ONE RIGHT HAND). SEE THE DETAIL AND "DETAIL A" ON PAGE 7, AND GENERAL NOTE "P" ON PAGE 3.
- UNIVERSAL LOAD RETAINER (6 REQD, 3 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPART-MENT OF ARMY DRAWING DA-116, "DETAIL A" ON PAGE 7, AND GENERAL NOTE "IT!" ON PAGE 7, AND GENERAL
- (9) DOOR SPANNER, 4" X 4" MATERIAL CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF: 7'-1-1/4") (3 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 5.
- STRUT, 4" X 4" BY CUT-TO-FIT (REF: 17-3/4") (8 REQD). TOENAIL TO THE BUFFER PIECES OF THE REAR BLOCKING ASSEMBLY AND TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 5.

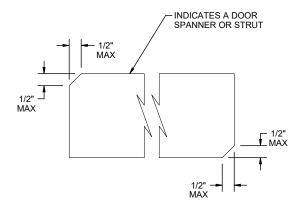
LOAD AS SHOWN

<u>I TEM</u>	QUANTI TY	WEIGHT (APPROX)
DUNNAGE	7	1, 032 LBS
	TOTAL WEIGHT	23, 155 LBS (APPROX)



PALLET UNIT DATA

GROSS WEI GHT - - - - - - - - - - 2, 489 LBS CUBE - - - - - - - - - - 79. 2 CU FT



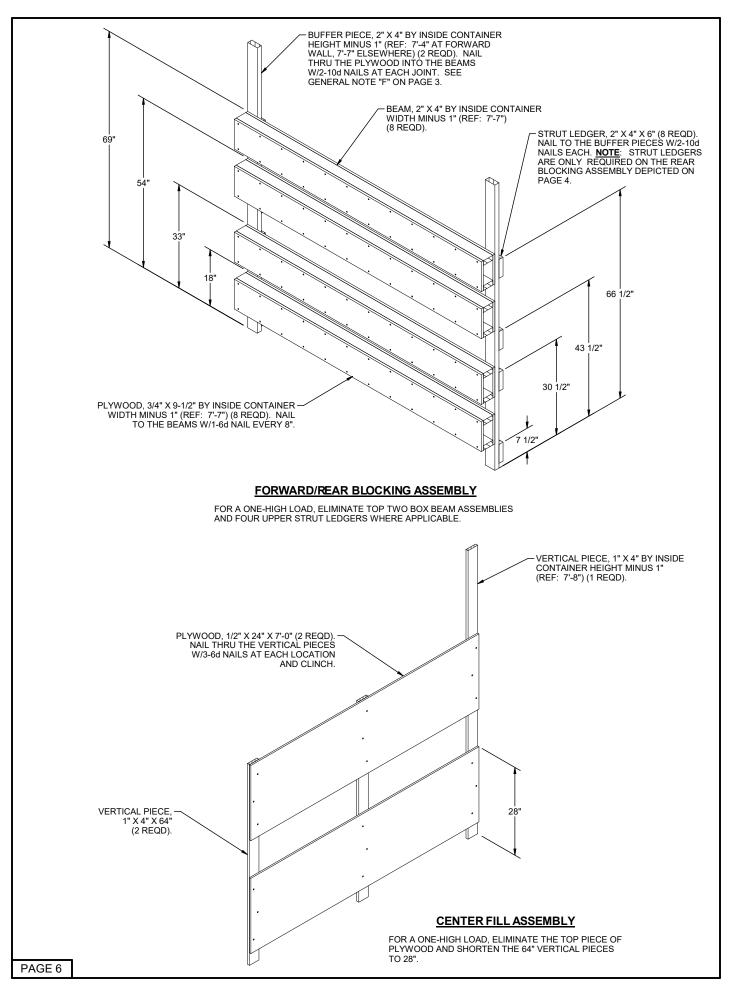
BEVEL CUT

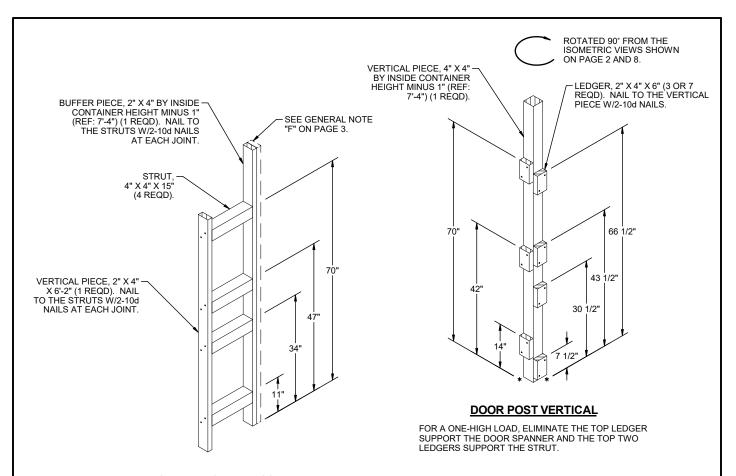
IF DESIRED, EACH END OF A STRUT OR DOOR SPANNER MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE INSTALLING THE STRUTS WITH A "DRIVE" FIT.

REVISION

REVISION NO. 1, DATED APRIL 2019, CONSISTS OF:

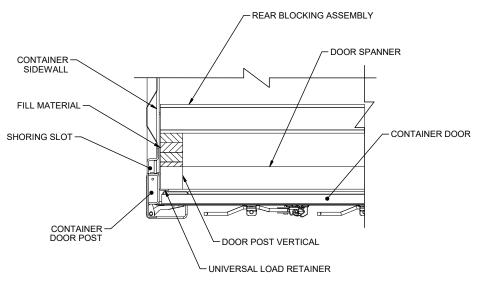
INCREASING PALLET UNIT WEIGHT AND CORRECTING FILE NUMBER.





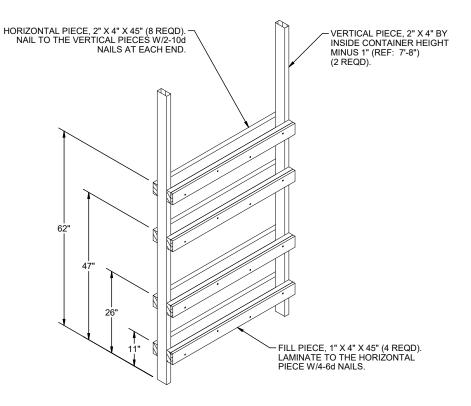
FORWARD STRUT ASSEMBLY

FOR A ONE HIGH LOAD, ELIMINATE TOP TWO STRUTS AND SHORTEN THE VERTICAL PIECE FROM 6'-2" TO 51".



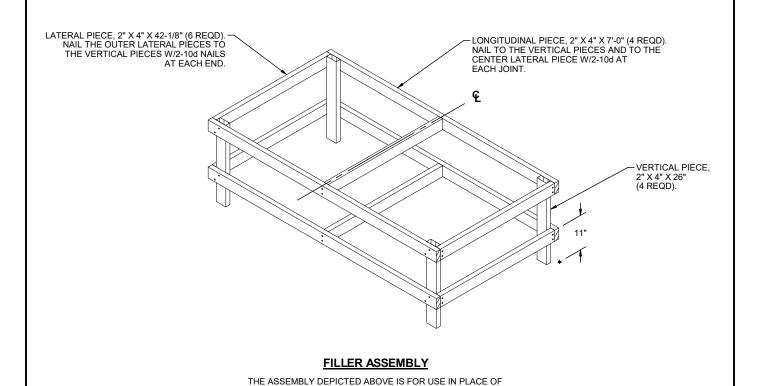
DETAIL A

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE DOOR POST VERTICAL, UNIVERSAL LOAD RETAINER, AND ADJACENT DUNNAGE PIECES.



CRIB FILL ASSEMBLY

FOR A ONE-HIGH LOAD, ELIMINATE THE TOP TWO SET OF HORIZONTAL PIECES AND FILL PIECES.



PAGE 8

AN OMITTED PALLET UNIT.