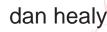
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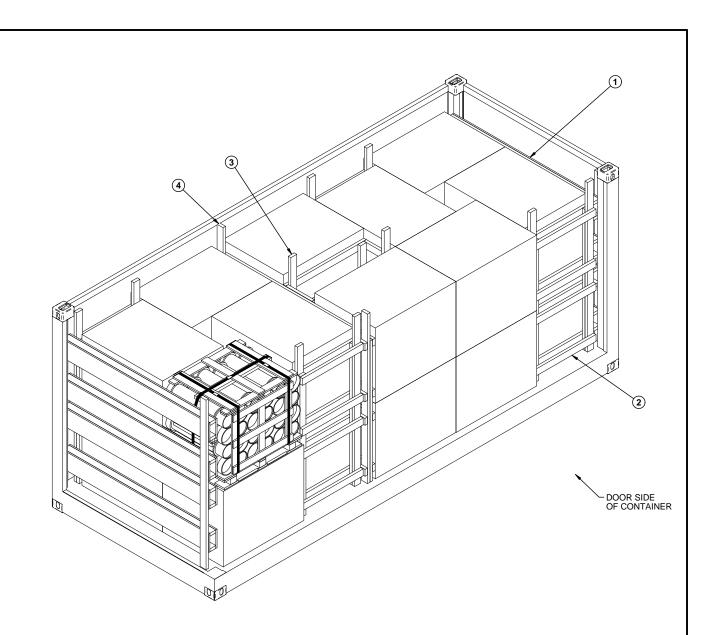
dan healy Digitally signed by dan healy DN: cn-dan healy, o, ou, email=dan_healy@aar.com, c=US Date: 2011.03.01 16:42:18 -06'00'

LOADING AND BRACING® IN SIDE OPENING ISO CONTAINERS OF 155MM M119 SERIES PROPELLING **CHARGES, PACKED IN PA37 CY-**LINDRICAL METAL CONTAINERS, ON WOODEN PALLETS

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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.J.1230354282 Disc.215, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, on=DoS, ou=PKI, ou=USA, on=DoS, ou=PKI, ou=USA, on=PKI, ou=USA, on=PKI, ou=USA, on=DoS, ou=PKI, ou=USA, on=PKI, ou=USA, on=PKI, ou=USA, on=PKI, ou=USA, on=PKI, ou=USA, ou=PKI, ou=USA, ou DO NOT SCALE **MARCH 2011 ENGINEER** BASIC MADELINE BANKS TECHNICIAN RF\/ FIEFFER.LAUR Digitally signed by FIEFFER.LAURA.1230375727 DN: c=US, o=US. Government, TRANSPORTATION APPROVED BY ORDER OF COMMANDING **ENGINEERING** GENERAL, U.S ARMY MATERIEL COMMAND A.A.1230375727 ou=DoD, ou=PKI, ou=USA, on=FIEFFER.LAURA.123037572; DIVISON BARICKMAN. CLASS DIVISION DRAWING FII F TESTED VALIDATION PHILIP.W.123 CARNEY.GARY.BU CARRY.GARY.BU CARRY-GARY SURTON 1038708038 No. c-1/3, o-1/3, o-1 **ENGINEERING** DIVISON 0202202 BEAVER.JERRY Digitally signed by BEAVER.JERRY Digitally signed by BEAVER.JERRY W. 12300 DN: cuUS, o-U.S. Govern Doubloo, cusPKI, ousuLSA cousPAV. OusuPSAV. OusuPSAV. OusuPSAV. 4264/9 15PM1003 19 48 **ENGINEERING** DIRECTORATE U.S. ARMY DEFENSE AMMUNITION CENTER



ISOMETRIC VIEW

KEY NUMBERS

- $\textcircled{1}\ \ \ \mathsf{END}\ \mathsf{BLOCKING}\ \mathsf{ASSEMBLY}\ (2\ \mathsf{REQD}).\ \ \mathsf{SEETHE}\ \mathsf{DETAIL}\ \mathsf{ON}\ \mathsf{PAGE}\ 5.$
- $\ensuremath{\bigcirc}$ SIDE FILL (4 REQD). SEE THE DETAIL ON PAGE 6.
- 3 CRIB FILL A (1 REQD). SEE THE DETAIL ON PAGE 8.
- 4 CENTER FILL (1 REQD). SEE THE DETAIL ON PAGE 6.

BILL OF MATERIAL					
LUMBER	LINEAR FEET	BOARD FEET			
2" X 4"	519	346			
NAI LS	NO. REQD	POUNDS			
6d (2") 10d (3")	352 360	2-1/4 5-1/2			
PLYWOOD, 3/4" 90.78 SQ FT REQD - 187.23 LBS					

LOAD AS SHOWN

<u>I TEM</u>	QUANTI TY	WEIGHT (APPROX)
DUNNAGE	2 20	
Т	OTAL WEIGHT	30. 137 LBS (APPROX)

20 PALLET UNIT LOAD (ALTERNATED PALLET UNIT)

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 PROPELLING CHARGES PACKED IN PA37 SERIES METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4 AND AMC DRAWING 19-48-4042A/9-20PM1001 FOR DETAILS OF THE PALLET UNIT. **CAUTION**: REGARDLESS OF THE QUANTITY OF CONTAINERS 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 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 HORIZONTAL PIECES ON THE CRIB FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS, LENGTH AND/OR QUANTITY OF THE VERTICAL OR HORIZONTAL PIECES IN THE SIDE FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE PALLET UNIT. IN THE EVENT OF A VARIATION IN THE ISO CONTAINER DIMENSIONS, PLYWOOD FILL MAY BE ADDED AT THE DOOR SIDE OF THE LOAD SHOWN ON PAGE 7.
- 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 POSTS 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.

- 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.

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

- 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 PALLET UNITS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FILLER ASSEMBLY ON PAGE 8.
 - 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 DEPICTED ON PAGE 10. 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 MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN PALLET UNITS, AND BETWEEN PALLET UNITS AND THE SIDE OPENING CONTAINER, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.

MATERIAL SPECIFICATIONS

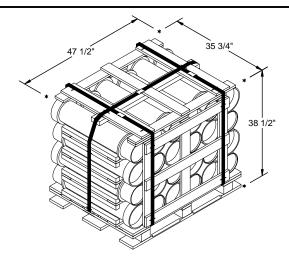
LUMBER - - - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VO-LUNTARY PRODUCT STANDARD PS 20.

NAILS - - - - - - - : ASTM F1667; COMMON STEEL NAIL NLCMS OR NLCMMS).

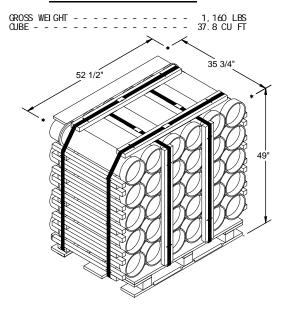
PLYWOOD - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.

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

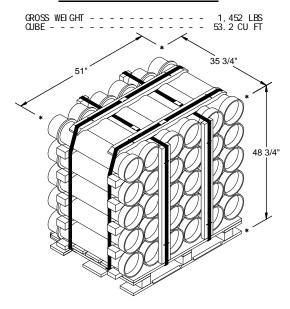
PAGE 3

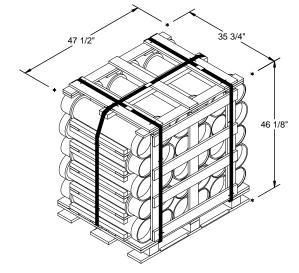


ALTERNATED PALLET UNIT

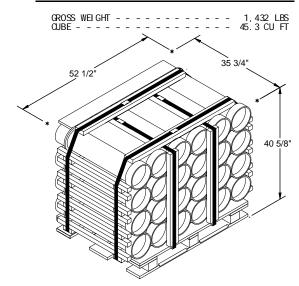


FLAT DUNNAGE PALLET UNIT



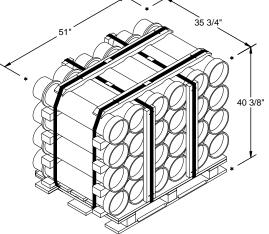


ALTERNATED INCREASED HEIGHT PALLET UNIT



FLAT DUNNAGE REDUCED HEIGHT PALLET UNIT

GROSS WEI GHT - - - - - - - - - 1, 195 LBS CUBE - - - - - 44. 1 CU FT



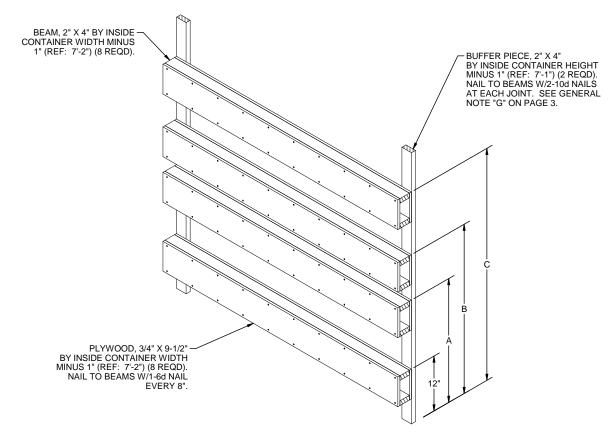
ROUTED DUNNAGE REDUCED HEIGHT

PALLET UNIT

ROUTED DUNNAGE PALLET UNIT

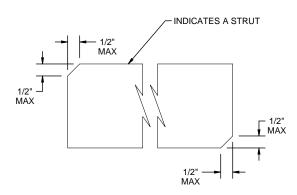
GROSS WEI GHT - - - - - - - - - 1,429 LBS CUBE - - - - - - 51.4 CU FT

DIMENSION CHART								
	DIMENSION							
PALLET UNIT	Α	В	С	D	E	F	G	Н
ALTERNATED BASIC PALLET	34"	46"	68"	30"	46"	70"	27"	62"
ALTERNATED INCREASED PALLET	42"			38"				
FLAT BASIC PALLET	46"			42"				
FLAT REDUCED PALLET	36"	48"	6'-4"	34"	58"	6'-10"	30"	70"
ROUTED BASIC PALLET	46"			40"				
ROUTED REDUCED PALLET	36"	48"	6'-4"	32"	56"	6'-8"	30"	70"



END BLOCKING ASSEMBLY

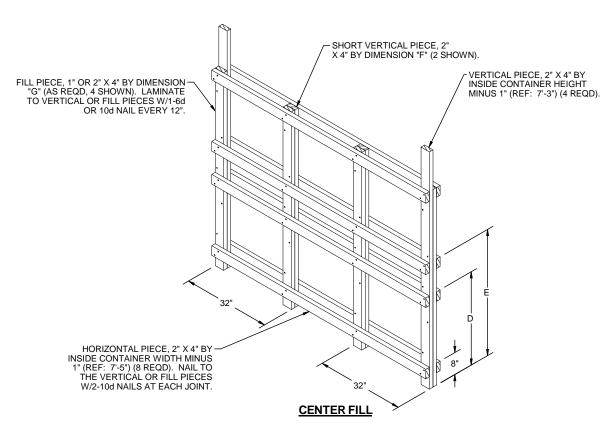
FOR SINGLE LAYER LOAD, ELIMINATE THE TOP TWO BEAM ASSEMBLIES.



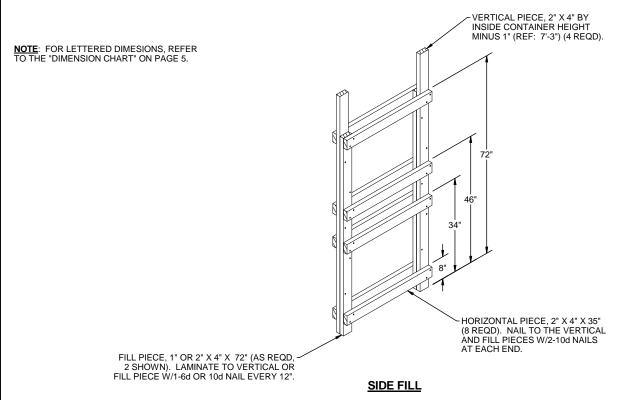
BEVEL CUT

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

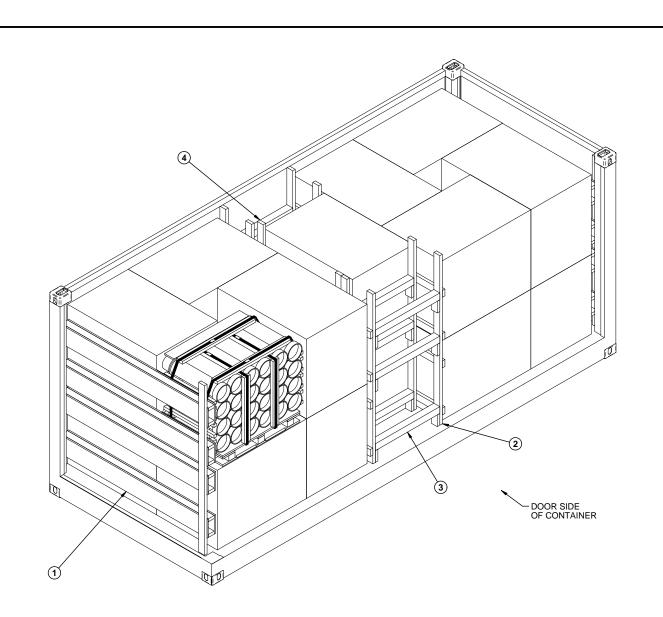
PAGE 5



THE DETAIL ABOVE DEPICTS A CENTER FILL ASSEMBLY TO BE USED IN THE 20 PALLET UNIT LOAD AS SHOWN ON PAGE 2. FOR A SINGLE LAYER LOAD, ELIMINATE THE UPPER FOUR HORIZONTAL PIECES AND REDUCE THE HEIGHT OF THE FILL PIECE TO DIMENSION "D". NOTE: FOR THE 18 PALLET UNIT LOAD SHOWN ON PAGE 7, ELIMINATE THE TWO SHORT VERTICALS AND THE CENTER FILL PIECES AND REDUCE THE LENGTH OF THE HORIZONTAL TO PALLET UNIT LENGTH.



THE DETAIL ABOVE DEPICTS A SIDE FILL ASSEMBLY TO BE USED IN THE 20 PALLET UNIT LOAD AS SHOWN ON PAGE 2. FOR A SINGLE LAYER LOAD, ELIMINATE THE UPPER FOUR HORIZONTAL PIECES AND REDUCE THE HEIGHT OF THE FILL PIECES TO 34".



ISOMETRIC VIEW

KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 5.
- ② CENTER GATE A (4 REQD). SEE THE DETAIL ON PAGE 9.
- (3) STRUT, 4" X 4" BY CUT-TO-FIT (REF: 38") (12 REQD). TOENAIL TO THE CENTER GATES W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 5.
- 4 CENTER FILL (1 REQD). SEE THE DETAIL ON PAGE 6.

BILL OF MATERIAL						
LUMBER	LINEAR FEET	BOARD FEET				
2" X 4"	286	190				
4" X 4"	38	51				
NAI LS	NO. REQD	POUNDS				
6d (2")	6d (2") 352					
10d (3")	256	4				
12d (3-1/4")	48	1				
PLYWOOD, 3/4" 88.67 SQ FT REQD - 182.88 LBS						

LOAD AS SHOWN

<u>I TEM</u>	QUANTI TY	<u>WEIGHT</u> (APPROX)
DUNNAGE	18	672 LBS
	TOTAL WEIGHT	27 008 LBS (ADDDOX)

18 PALLET UNIT LOAD (FLAT DUNNAGE - REDUCED HEIGHT)

PAGE 7

