

HELLFIRE

UNITIZATION PROCEDURES FOR GUIDED MISSILES, PACKED ONE PER METAL CONTAINER, UNITIZED 9 CONTAINERS PER 4-WAY ENTRY PALLET

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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 style="font-size: small;">Digitally signed by OCONNOR.DOUGLAS.LEO.1140582251 DN: cn=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, c=OCONNOR.DOUGLAS.LEO.1140582251 Date: 2016.02.18 12:58:31 -06'00'</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 6.</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 style="font-size: small;">Digitally signed by SHIMP.UPTON.R.1231257183 DN: cn=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, c=SHIMP.UPTON.R.1231257183 Date: 2016.02.25 07:20:53 -06'00'</p> <p style="text-align: center;">U.S. ARMY DEFENSE AMMUNITION CENTER</p>	<p>DO NOT SCALE</p>		<p>JULY 1981</p>		
	<p>DESIGN ENGINEER</p>	<p>BASIC REV.</p>	<p>WILLIAM R. FRERICHS</p> <p>QUYEN TRAN</p>		<p>REVISION NO. 6</p>
<p style="text-align: center;">TEST ENGINEER</p> <p>TEST REPORT</p> <p style="text-align: center;">14-05</p> <p style="text-align: center;">EXPLOSIVE SAFETY DIRECTORATE</p>	<p>ENGINEERING DIVISION</p>	<p>FIEFFER.LAUR A.A.1230375727</p> <p style="font-size: small;">Digitally signed by FIEFFER.LAURA.A.1230375727 DN: cn=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, c=FIEFFER.LAURA.A.1230375727 Date: 2016.10.28 10:24:18 -05'00'</p>		<p>SEE THE REVISION LISTING ON PAGE 2</p>	
	<p>TEST ENGINEER</p>	<p>FELICIANO.AD IN.1259200373</p> <p style="font-size: small;">Digitally signed by FELICIANO.ADJN.1259200373 DN: cn=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, c=FELICIANO.ADJN.1259200373 Date: 2015.11.06 09:41:44 -06'00'</p>		<p>CLASS</p>	<p>DIVISION</p>
	<p>TEST ENGINEER</p>	<p>TIRONE.JOSEPH. ANDREW.1026683 749</p> <p style="font-size: small;">Digitally signed by TIRONE.JOSEPH.ANDREW.1026683749 DN: cn=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, c=TIRONE.JOSEPH.ANDREW.1026683749 Date: 2016.01.19 08:39:38 -06'00'</p>		<p>DRAWING</p>	<p>FILE</p>
		<p>19</p>	<p>48</p>	<p>5250</p>	<p>GM20HF1</p>

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. FOR DETAILS OF THE UNSEALED TYPE HELLFIRE SHIPPING AND STORAGE CONTAINER, SEE APN 13012182.

CONTAINER DIMENSIONS ----- 76-1/4" L X 15-1/2" W X 16" H*
CONTAINER GROSS WEIGHT ----- 175 LBS (APPROX)
CONTAINER CUBE ----- 10.94 CU FT (APPROX)

FOR DETAILS OF THE SEALED TYPE HELLFIRE SHIPPING AND STORAGE CONTAINER, SEE APN 13155079.

CONTAINER DIMENSIONS ----- 76" L X 14-5/8" W X 16" H*
CONTAINER GROSS WEIGHT ----- 185 LBS (APPROX)
CONTAINER CUBE ----- 10.29 CU FT (APPROX)

FOR DETAILS OF THE STRETCHED TYPE HELLFIRE SHIPPING AND STORAGE CONTAINER, SEE U.S. ARMY MISSILE COMMAND DRAWING NO. 13349586.

CONTAINER DIMENSIONS ----- 84" L X 14-5/8" W X 16" H*
CONTAINER GROSS WEIGHT ----- 203 LBS (APPROX)
CONTAINER CUBE ----- 11.38 CU FT (APPROX)

*THE 16" HEIGHT DIMENSION DOES NOT INCLUDE THE HEIGHT OF THE INTER-LOCK PIN.

C. **CAUTION:** THIS ITEM IS IN A "PROPULSIVE STATE" AND MUST BE LOADED ON THE PALLET WITH THE FORWARD END OF ALL CONTAINERS FACING IN ONE DIRECTION.

D. THE FOLLOWING AMC DRAWINGS ARE APPLICABLE FOR OUTLOADING AND STORAGE OF THE ITEMS COVERED BY THIS DRAWING.

BOXCAR ----- 19-48-5525-GM5HF1
VAN TRAILER ----- 19-48-5975-GM11HF1
STORAGE ----- 19-48-5251-GM1-3-4-14-22HF1
END OPENING ISO CONTAINER ----- 19-48-8150-GM15HF2
MILVAN ----- 19-48-5979-GM15HF1
SIDE OPENING ISO CONTAINER ----- 19-48-8229-GM15HF3
TACTICAL VEHICLE ----- 19-48-8151-GM17HF1

E. DIMENSIONS, CUBE AND WEIGHT OF A PALLET UNIT WILL VARY SLIGHTLY DEPENDING UPON THE ACTUAL DIMENSIONS OF THE CONTAINERS AND THE WEIGHT OF THE SPECIFIC ITEM BEING UNITIZED.

F. DIMENSIONAL LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF A NOMINAL SIZE, UNLESS OTHERWISE SPECIFIED. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.

G. 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.

H. UNLESS OTHERWISE SPECIFIED, A PLUS OR MINUS 1/4" IS ALLOWED ON OVERALL DIMENSIONS OF ANY DUNNAGE ASSEMBLY. HOWEVER, SIMILAR PIECES IN AN ASSEMBLY MUST BE WITHIN 1/8" OF THE SAME DIMENSION.

J. WHEN ASSEMBLING A COMPLETE PALLET UNIT, CARE SHALL BE TAKEN TO INSURE THAT THE CONTAINERS AND ASSEMBLIES ARE EVENLY ALIGNED HORIZONTALLY AND VERTICALLY SO THAT THE SIDES AND ENDS OF THE PALLET UNIT DO NOT EXCEED A 1/2" TOLERANCE, AND THAT THE CONTAINER INTERLOCKS PROPERLY ENGAGE.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

PALLET, SPECIAL - - - : SPECIAL 4-WAY ENTRY, PRESERVATIVE AND HEAT TREATED, PART NUMBERS ACV00818, ACV00820 AND ACV00821. SEE GENERAL NOTES "P" AND "Q" ABOVE.

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

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

STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH B (GRADE 2).

SEAL, STRAP - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, III, OR IV.

CUSHIONING MATERIAL - : FED SPEC PP-C-1797, TYPE I.

FIBERBOARD - - - - : ASTM D4727; TYPE SF, CLASS WEATHER RESISTANT, GRADE W55.

(GENERAL NOTES CONTINUED)

K. IN ORDER TO OBTAIN COMPACT (SOUND) UNITS, ALL STRAPS SHALL BE LOCATED IN PROPER ALIGNMENT AND TENSIONED UNTIL THEY CUT INTO THE PALLET DECK. AFTER TENSIONING, EACH STRAP WILL BE SECURED USING ONE SEAL AND TWO PAIR OF NOTCHES PER SEAL. ALL STRAPPING MUST BE STRAIGHT WITHIN 2" ON ANY SURFACE OF THE UNITIZED LOAD; I.E., TOP, BOTTOM, SIDES OR END THAT IT ENCOMPASSES.

L. WHEN APPLYING ANY STRAP, CARE MUST BE EXERCISED TO ASSURE THAT THE END OF THE STRAP ON THE UNDERSIDE OF THE JOINT EXTENDS AT LEAST 6" BEYOND THE SEAL. THIS EXTRA MINIMUM LENGTH OF STRAP IS REQUIRED TO PERMIT SUBSEQUENT TIGHTENING OF LOOSENED STRAPPING. RETENSIONING CAN BE ACCOMPLISHED WITHOUT REPLACING STRAPPING OR SPLICING STRAPPING THROUGH THE USE OF A MANUAL OR PNEUMATIC FEEDWHEEL TYPE TENSIONING TOOL AND THE APPLICATION OF ONE ADDITIONAL SEAL.

M. IF STRAP CUTTERS ARE SPECIFICALLY REQUIRED BY THE PROCURING ACTIVITY, REFER TO DARCOM DRAWING 19-48-4127-20P1000 FOR APPROPRIATE MEANS OF SECUREMENT TO THE PALLET UNIT.

N. IF LESS THAN NINE CONTAINERS ARE TO BE LOADED ON A PALLET, IT MAY BE ACCOMPLISHED BY SUBSTITUTING FILLER ASSEMBLIES, AS DEPICTED ON PAGE6 FOR ONE OR TWO OMITTED CONTAINERS. HOWEVER, IF MORE THAN TWO CONTAINERS ARE TO BE OMITTED, A COMPLETE LAYER OF CONTAINERS MUST BE OMITTED. ALL FILLER ASSEMBLIES WILL BE POSITIONED IN THE TOP LAYER OR LAYERS OF THE CENTER STACK OF A UNIT LOAD. **NOTE:** EMPTY OR REJECT CONTAINERS MAY BE USED IN PLACE OF FILLER ASSEMBLIES AS NECESSARY. WHEN (EMPTY) FILLER CONTAINERS ARE USED IN PLACE OF OMITTED CONTAINERS TO COMPLETELY FILL OUT A LAYER ON A PALLET, THEY WILL BE MARKED AS SPECIFIED IN ARDEC DRAWING NO. 12982865.

O. UNIT LOADS MUST ONLY BE MADE UP WITH FULL LAYERS. HOWEVER, FOR REDUCED QUANTITIES IN A UNIT LOAD, ONE OR TWO FULL LAYERS MAY BE OMITTED, AND/OR A FULL LAYER MAY CONSIST OF TWO CONTAINERS AND A FILLER ASSEMBLY. ONLY ONE UNIT LOAD HAVING A REDUCED QUANTITY OF ITEMS SHOULD BE PERMITTED PER LOT OF THAT ITEM. CARE SHALL BE TAKEN TO INSURE THAT "REDUCED-QUANTITY" UNITS ARE EVENLY ALIGNED HORIZONTALLY AND VERTICALLY AS SPECIFIED IN GENERAL NOTE "J" AT LEFT.

P. THE PALLET AND ALL WOODEN DUNNAGE USED IN UNIT LOADS SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN MIL-DTL-2427 FOR CLEATED WOODEN BOXES. IF THE DUNNAGE CONSISTS OF MORE THAN ONE COMPONENT, IT MUST BE ASSEMBLED PRIOR TO TREATMENT. THE LETTERS "PA" DENOTING PQ56 (COPPER-8 QUINOLINOLATE), "PB" DENOTING M-GARD W550 (ZINC NAPHTHANATE EMULSIFIABLE), OR "PC" DENOTING M-GARD W510 OR CUNAPSOL 5 (COPPER NAPHTHANATE) MUST BE APPLIED TO THE WOOD DUNNAGE IN LETTERS AT LEAST ONE-INCH HIGH, AND WILL BE APPLIED ON THE OUTER FACE OF A CENTER POST ON THE 76-1/4", 76", OR 84" SIDES OF THE PALLET.

Q. ALL NON-MANUFACTURED WOOD USED IN THE UNIT LOAD WILL BE HEAT TREATED AND MARKED TO SHOW CONFORMANCE TO THE INTERNATIONAL PLANT PROTECTION CONVENTION STANDARD (IPPC), ISPM-15. SEE DAC DRAWING ACV00831 FOR ISPM-15 CERTIFICATION MARKING AND PLACEMENT DETAILS.

REVISIONS

REVISION NO. 1, DATED SEPTEMBER 1982, CONSISTS OF:

1. ADDING PROCEDURES FOR SEALED CONTAINER.
2. CHANGING PROCEDURES FOR UNSEALED CONTAINERS TO DEPICT THE USE OF A SPECIAL 4-WAY ENTRY PALLET.

REVISION NO. 2, DATED MAY 1985, CONSIST OF:

1. CHANGING WIDTH DIMENSION OF SEALED CONTAINER.
2. CHANGING LENGTH OF SPECIAL PALLET.

REVISION NO. 3, DATED NOVEMBER 1985, CONSIST OF:

1. CHANGING WIDTH DIMENSION OF SEALED CONTAINER.
2. CHANGING LENGTH OF SPECIAL PALLET.

REVISION NO. 4, DATED NOVEMBER 1987, CONSIST OF:

CHANGING BILL OF MATERIAL.

REVISION NO. 5, DATED NOVEMBER 1990, CONSIST OF:

ADDING PROCEDURES FOR STRETCHED CONTAINER.

REVISION NO. 6, DATED MARCH 2016, CONSIST OF:

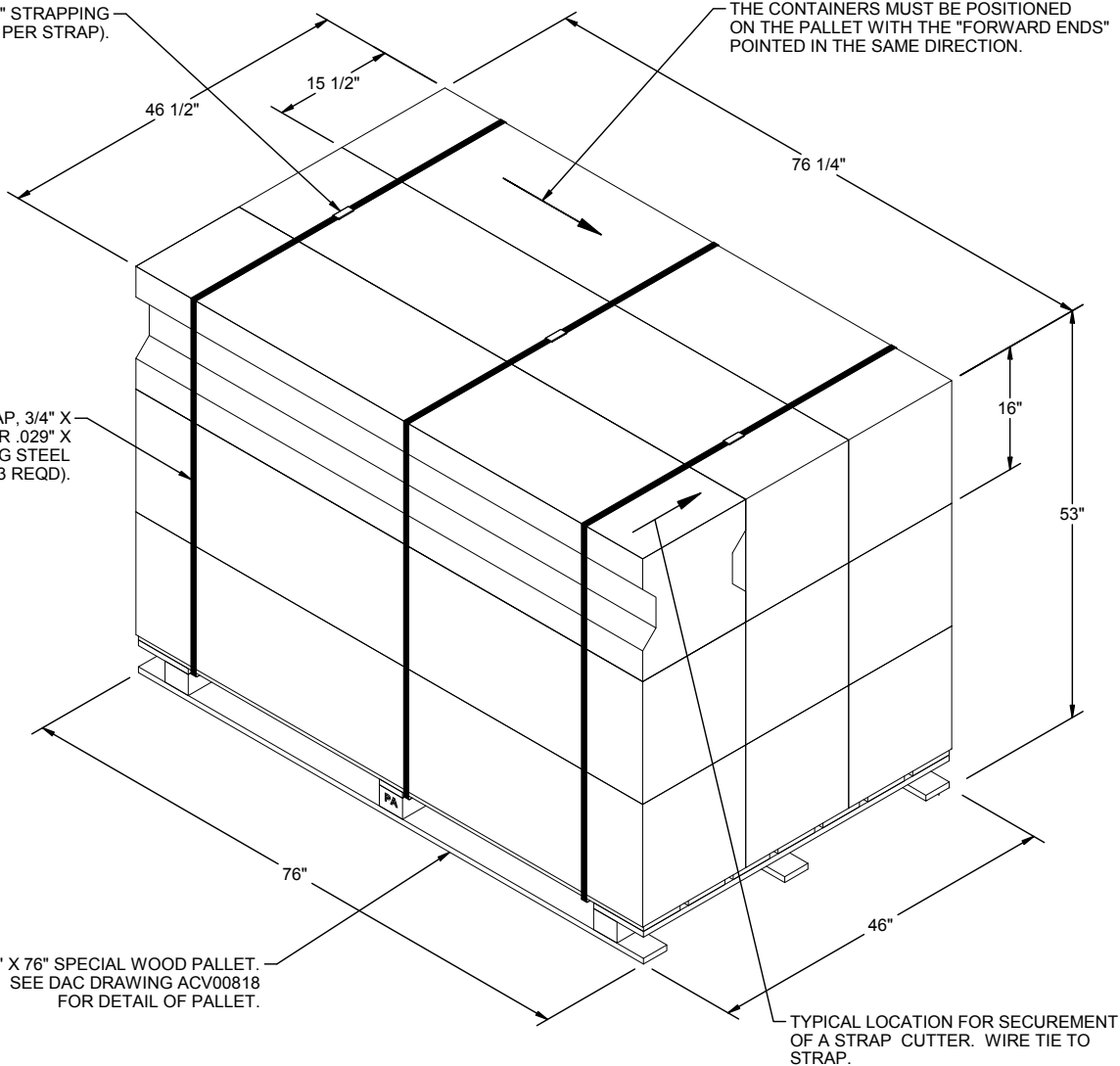
1. UPDATING DRAWING FORMAT, GENERAL NOTES, MATERIAL SPECIFICATIONS.
2. ADDING .029" THICK STRAPPING.
3. DELETING PALLET CONSTRUCTION DETAILS.
4. ADDING REFERENCE TO ACV DRAWINGS FOR PALLET.

SEAL FOR 3/4" STRAPPING
(3 REQD, 1 PER STRAP).

THE CONTAINERS MUST BE POSITIONED
ON THE PALLET WITH THE "FORWARD ENDS"
POINTED IN THE SAME DIRECTION.

TIEDOWN STRAP, 3/4" X
.035 OR .031" OR .029" X
16'-10" LONG STEEL
STRAPPING (3 REQD).

46" X 76" SPECIAL WOOD PALLET.
SEE DAC DRAWING ACV00818
FOR DETAIL OF PALLET.



TYPICAL LOCATION FOR SECUREMENT
OF A STRAP CUTTER. WIRE TIE TO
STRAP.

PALLET UNIT
(UNSEALED CONTAINER)

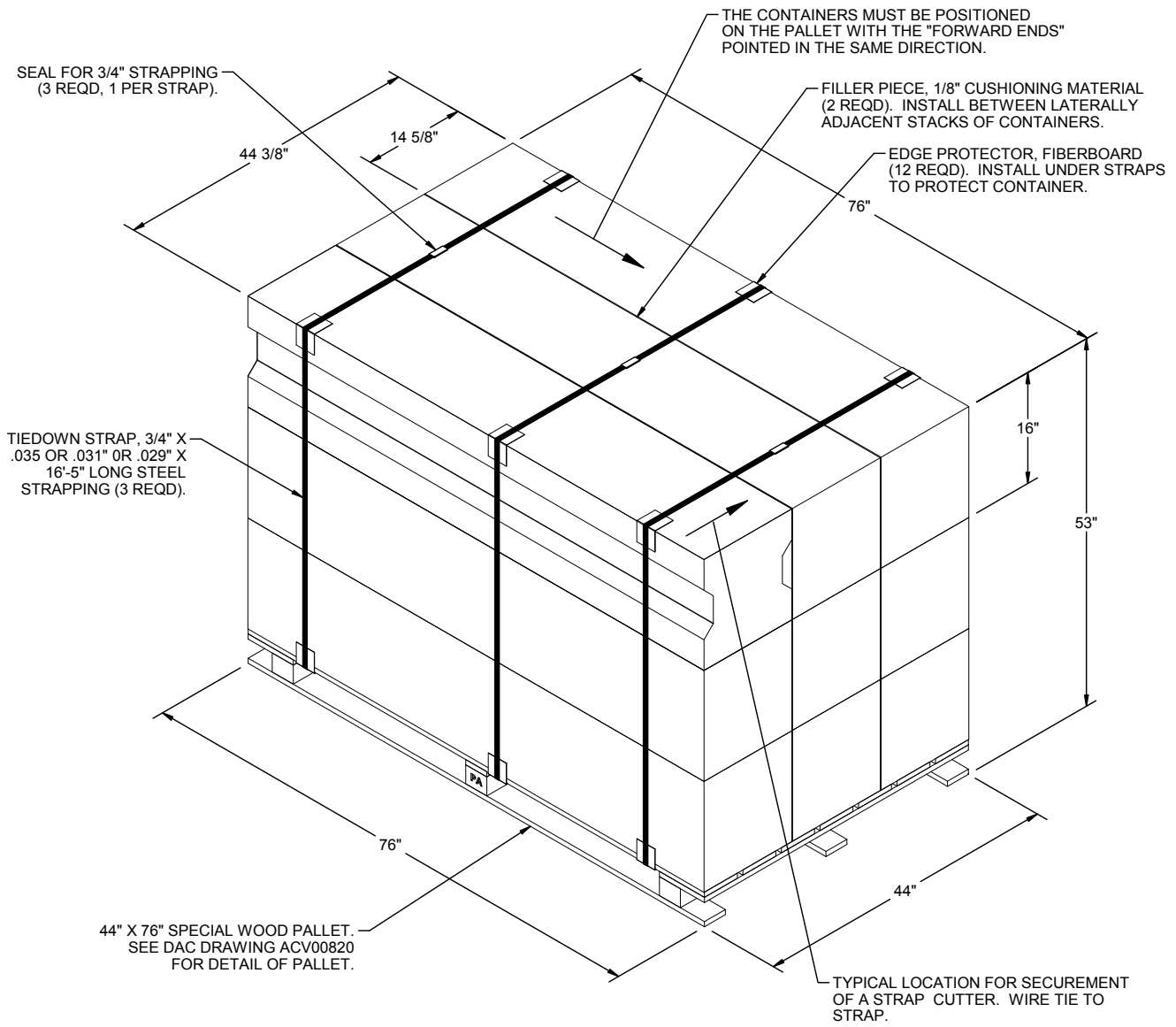
9 EACH HELLFIRE MISSILES IN CONTAINERS @ 175 LBS	---	1,575 LBS (APPROX)
DUNNAGE	-----	5 LBS
PALLET	-----	82 LBS
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TOTAL WEIGHT	-----	1,662 LBS (APPROX)
CUBE	-----	108.7 CU FT (APPROX)

BILL OF MATERIAL

PALLET, 46" X 76"	-----	1 REQD	-----	82 LBS
STEEL STRAPPING, 3/4"	-----	50.50' REQD	-----	4.51 LBS
SEAL FOR 3/4" STRAPPING	-----	3 REQD	-----	NIL

SPECIAL NOTES:

THE UNITIZATION PROCEDURES DELINEATED ON THIS PAGE ARE FOR
THE UNSEALED TYPE CONTAINER UNITIZED 9 CONTAINERS PER 46" X
76" SPECIAL PALLET AS DETAILED IN THE DAC DRAWING ACV00818.



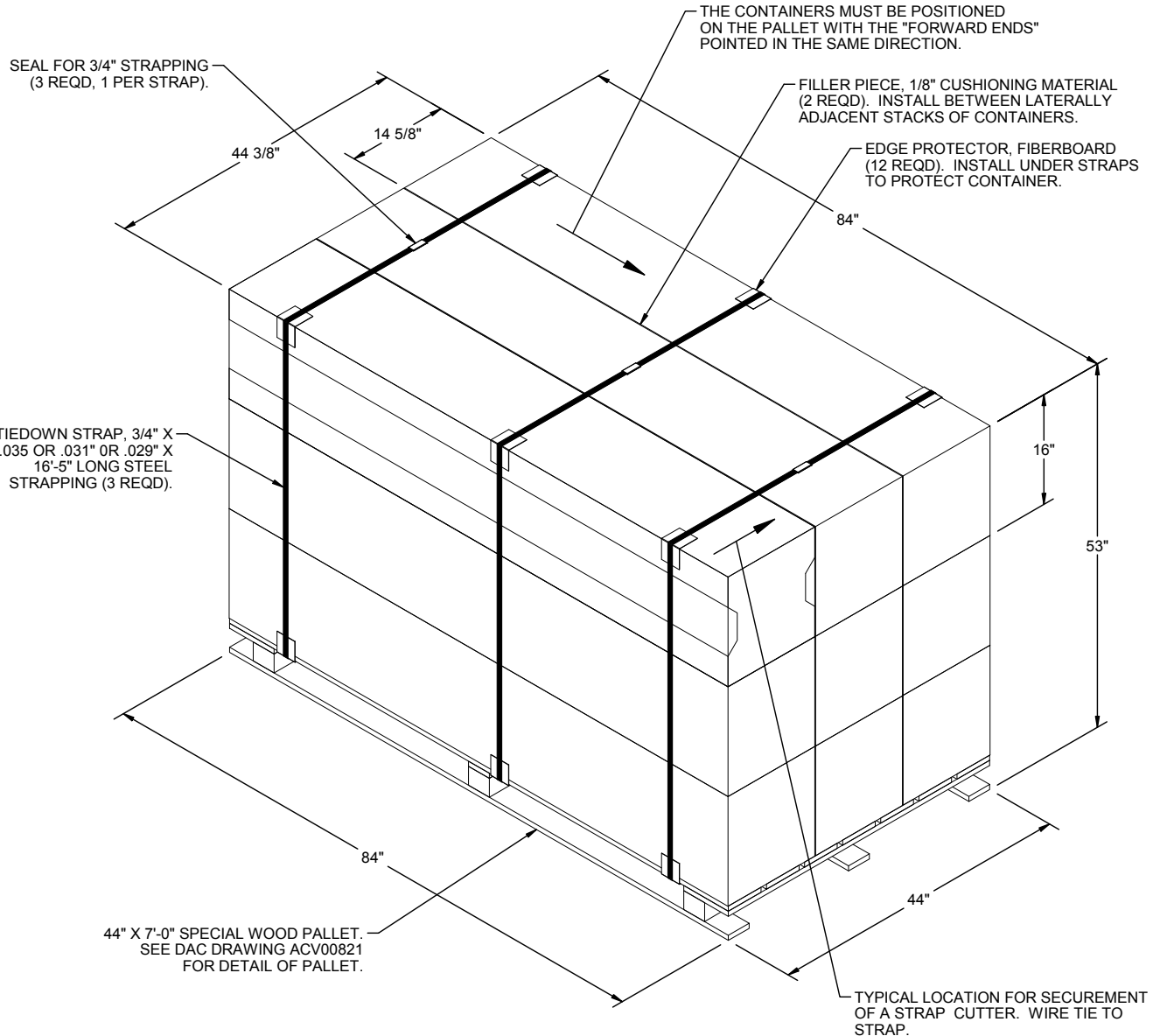
PALLET UNIT
(SEALED CONTAINER)

9 EACH HELLFIRE MISSILES IN CONTAINERS @ 185 LBS	- - -	1,665 LBS (APPROX)
DUNNAGE	- - -	5 LBS
PALLET	- - -	80 LBS
TOTAL WEIGHT		1,750 LBS (APPROX)
CUBE		103.4 CU FT (APPROX)

BILL OF MATERIAL	
PALLET, 44" X 76"	1 REQD - - - - 80 LBS
STEEL STRAPPING, 3/4"	49.25' REQD - - - 4.51 LBS
SEAL FOR 3/4" STRAPPING	3 REQD - - - - - NIL
CUSHIONING MATERIAL	2 REQD - - - - - NIL
FIBERBOARD, EDGE PROTECTOR	12 REQD - - - - - NIL

SPECIAL NOTES:

1. THE UNITIZATION PROCEDURES DELINEATED ON THIS PAGE ARE FOR THE SEALED TYPE CONTAINER UNITIZED 9 CONTAINERS PER 44" X 76" SPECIAL PALLET AS DETAILED IN THE DRAWING ACV00820.
2. ONLY THE UNITIZATION PROCEDURES DELINEATED ABOVE ARE TO BE USED FOR THE SEALED HELLFIRE CONTAINERS.



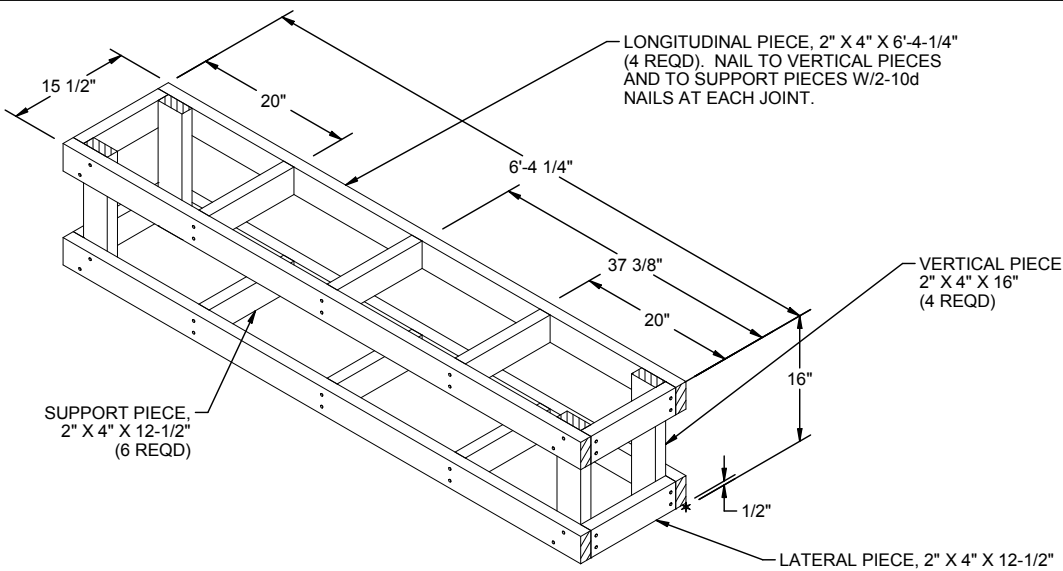
PALLET UNIT
(STRETCHED CONTAINER)

9 EACH HELLFIRE MISSILES IN CONTAINERS @ 203 LBS	---	1,827 LBS (APPROX)
DUNNAGE	---	5 LBS
PALLET	---	90 LBS
<hr/>		
TOTAL WEIGHT	---	1,922 LBS (APPROX)
CUBE	---	114.3 CU FT (APPROX)

BILL OF MATERIAL				
PALLET, 44" X 7'-0"	---	1 REQD	---	90 LBS
STEEL STRAPPING, 3/4"	---	49.25' REQD	---	4.51 LBS
SEAL FOR 3/4" STRAPPING	---	3 REQD	---	NIL
CUSHIONING MATERIAL	---	2 REQD	---	NIL
FIBERBOARD, EDGE PROTECTOR	---	12 REQD	---	NIL

SPECIAL NOTES:

1. THE UNITIZATION PROCEDURES DELINEATED ON THIS PAGE ARE FOR THE STRETCHED TYPE CONTAINER UNITIZED 9 CONTAINERS PER 44" X 7'-0" SPECIAL PALLET AS DETAILED IN THE DRAWING ACV00821.
2. ONLY THE UNITIZATION PROCEDURES DELINEATED ABOVE ARE TO BE USED FOR THE STRETCHED HELLFIRE CONTAINERS.



SUPPORT PIECE,
2" X 4" X 12-1/2"
(6 REQD)

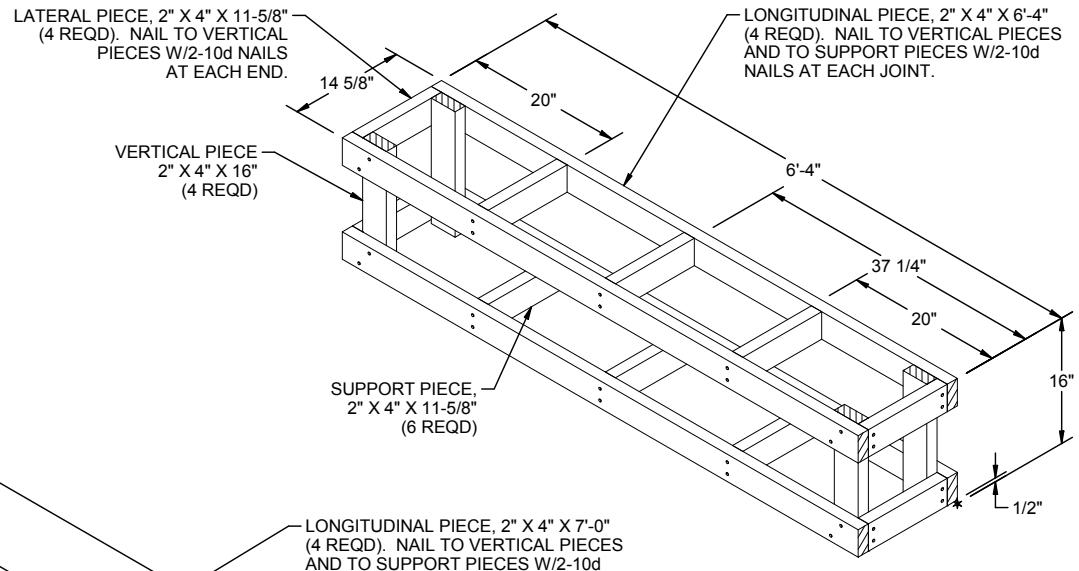
LONGITUDINAL PIECE, 2" X 4" X 6'-4-1/4"
(4 REQD). NAIL TO VERTICAL PIECES
AND TO SUPPORT PIECES W/2-10d
NAILS AT EACH JOINT.

VERTICAL PIECE
2" X 4" X 16"
(4 REQD)

LATERAL PIECE, 2" X 4" X 12-1/2"
(4 REQD). NAIL TO VERTICAL
PIECES W/2-10d NAILS
AT EACH END.

FILLER ASSEMBLY

(FOR MINUS ONE UNSEALED CONTAINER)



LATERAL PIECE, 2" X 4" X 11-5/8"
(4 REQD). NAIL TO VERTICAL
PIECES W/2-10d NAILS
AT EACH END.

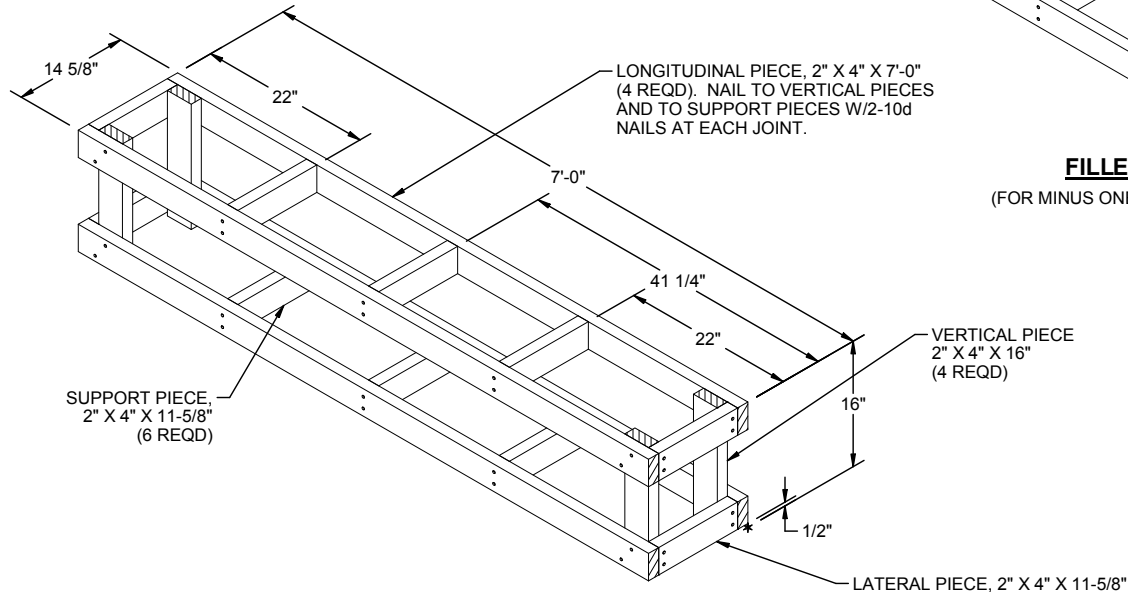
LONGITUDINAL PIECE, 2" X 4" X 6'-4"
(4 REQD). NAIL TO VERTICAL PIECES
AND TO SUPPORT PIECES W/2-10d
NAILS AT EACH JOINT.

VERTICAL PIECE
2" X 4" X 16"
(4 REQD)

SUPPORT PIECE,
2" X 4" X 11-5/8"
(6 REQD)

FILLER ASSEMBLY

(FOR MINUS ONE UNSEALED CONTAINER)



SUPPORT PIECE,
2" X 4" X 11-5/8"
(6 REQD)

LONGITUDINAL PIECE, 2" X 4" X 7'-0"
(4 REQD). NAIL TO VERTICAL PIECES
AND TO SUPPORT PIECES W/2-10d
NAILS AT EACH JOINT.

VERTICAL PIECE
2" X 4" X 16"
(4 REQD)

LATERAL PIECE, 2" X 4" X 11-5/8"
(4 REQD). NAIL TO VERTICAL
PIECES W/2-10d NAILS
AT EACH END.

FILLER ASSEMBLY

(FOR MINUS ONE STRETCHED CONTAINER)