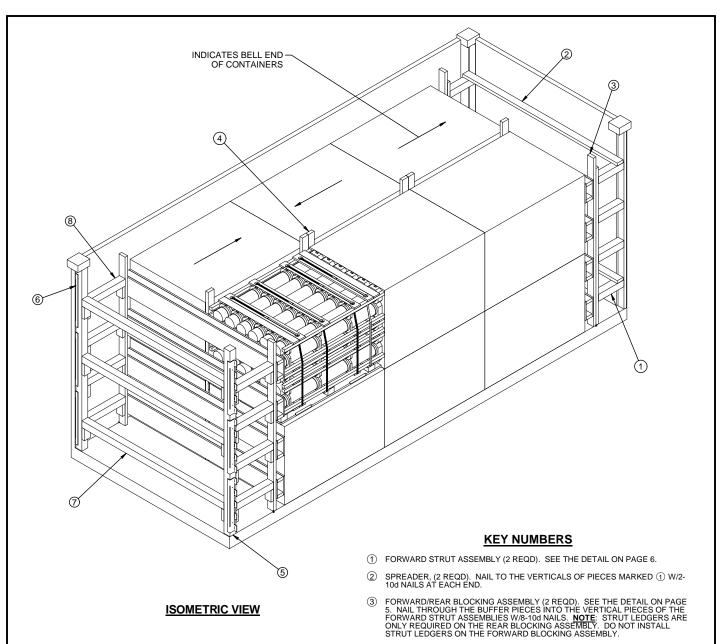
LOADING AND BRACING[®] IN END OPENING ISO CONTAINERS OF VOLCANO MINE CANISTERS, M87, M87A1, M88, AND M89, PACKED IN PA113 CYLINDRICAL METAL CON-TAINERS, ON WOODEN PALLETS

INDEX

<u>I TEM</u>							PA	GE (<u>S)</u>
TYPICAL LOADING PROCEDU GENERAL NOTES AND MATEF PALLET UNIT DETAIL DETAILS LESS-THAN-FULL-LOAD PRO	RIAL SPEC		ATI ONS					5-	2 3 4 7 8
DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE DISTRIBUTION IS UNLIMITED.	BI W	e shi 'Ater	PROCEDURES SHOWN I PPED BY TRAILER/COI CARRIERS.	NTAINI	ER-ON-	FLATCAR	(T/COFC)	-	-
U.S. A	RMY M	ATE	ERIEL COMMA	٩ND	DR/	AWING	Ì		
APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND			ON: VERIFY PRIOR TO			-			
RUS.ALLEN.J	DO NOT SCALE		APRIL 1989						
.1230354282 0n-RUS ALLEN.J.1230354282 Date: 2012.11.26 12:16:27 -06'00'	ENGINEER OR	BASIC	LAURA FIEFFER	2					05
	TECHNICIAN	REV.	MADELINE BANK	S	RE	VISION NO	.1	A	PRIL 2012
APPROVED BY ORDER OF COMMANDING GENERAL, U.S ARMY MATERIEL COMMAND	TRANSPORTA ENGINEERII DIVISON	NG	FIEFFER.LAURA FIEFFER.LAURA 12 N: c=US, o=U.S. Gov A.A.1230375727	vernment,	SEE	THE REV	ISION LIS	TIN	G ON PAGE 4
Digitally signed by	VALIDATIO		Date: 2012.04.09 1 BARICKMAN. Digitally signed by BARICKMAN.PHILIP W.120002202		CLASS	DIVISION DRAWING		FILE	
SHIMP.UPTON, SHIMP.UPTON, 1231257183 DN: C=US, C=US, Government, ou=DoD, ou=PKI, ou=USA, on=SHIMP.UPTON.R.1231257183	31257183 overnment, ou=DoD, DIVISON		PHILIP.W.123 0202202 Date: 2012.04.18.09.59.16.05.00 Date: 2012.00 Date: 2012.04.18.09.59.16.00 Date: 2012.04.18.09.59.16.00 Date: 2012.04.18.09.59.16.00 Date: 2012.04.18.09.59.16.00 Date: 2012.04.18.00 Date: 2012.04.18.00						
U.S. ARMY DEFENSE AMMUNITION CENTER	ENGINEERII DIRECTORA		BEAVER.JERRY N.1230949952	vernment, USA, N.1230949952	19	48	4215/1	13	15PM1013



	(4)	CENTER FILL ASSEMBLY (3 REQD).	SEE THE DETAIL ON PAGE 6
--	-----	--------------------------------	--------------------------

- (5) DOOR POST VERTICAL (2 REQD) (ONE LEFT AND ONE RIGHT HAND). SEE THE "DOOR POST VERTICAL" DETAIL AND "DETAIL A" ON PAGE 7 AND GEN-ERAL NOTE "P" ON PAGE 3.
- (6) UNIVERSAL LOAD RETAINER (6 REQD, 3 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPARTMENT OF ARMY DRAWING DA-116, "DETAIL A" ON PAGE 7, AND GENERAL NOTE "P" ON PAGE 3.
- ⑦ DOOR SPANNER, 4" X 4" MATERIAL CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF:7'-1-3/8") (3 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 7.
- (8) STRUT, 4" X 4" BY CUT-TO-FIT (REF: 22-1/4") (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 7.

LOAD AS SHOWN					
<u>I TEM</u>	QUANTI TY	WEIGHT (APPROX)			
DUNNAGE	12	32, 892 LBS 678 LBS 4, 700 LBS			

TOTAL WEIGHT - - - - - 38,270 LBS (APPROX)

BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
1" X 4" 2" X 4" 4" X 4"	59 205 46	20 137 61	
NALLS	NO. REQD	POUNDS	
6d (2") 10d (3") 12d (3-1/4")	400 128 76	2-1/2 2-1/4 1-1/2	
PLYWOOD, 3/4" 96.06 SQ FT REQD - 198.11 LBS UNI VERSAL LOAD RETAINER 6 REQD 39 LBS			

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 VOLCANO MINE CANISTERS PACKED IN PA113 SERIES METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 4 AND AMC DRAWING 19-48-4079/12-20PM1002 FOR DETAILS OF THE PALLET UNIT. <u>CAUTION</u>: 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 DE-SIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT, HOWEV-ER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. <u>NOTICE</u>: 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 VERTICAL OR HOR-IZONTAL 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 VERTICAL OR HORIZONTAL PIECES ON THE CENTER FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILI-TATE VARIANCE IN THE SIZE OF THE PALLET UNIT.
- 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 LAMI-NATING 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 BE-SIDE A NAIL IN A LOWER PIECE.
- G. 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 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 CORNERS 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 IS 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 ARE SHOUTH DE 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 CON-TAINER.
- 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 IN-TERMODAL 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 FOL-LOW:
 - 1. 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 PRE-CLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.
- O. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCU-MENT 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. SIX UNIVERSAL LOAD RETAINERS, AS DEPICTED IN THE LOADS ON PAGES 2 AND 8, ARE REQUIRED WHEN LOADING SEVEN TO TWELVE PALLETS, AND FOUR ARE REQUIRED WHEN LOADING ONE TO SIX PALLETS. REFER TO DAC DRAWING ACV00682 FOR DETAILS OF THE UNIVERSAL LOAD RETAIN-ER CONSTRUCTION, AND TO DEPARTMENT OF THE ARMY DRAWING DA-116 FOR DETAILS FOR INSTALLATION TO THE DOOR POST VERTICAL, PLACE-MENT INTO THE CONTAINER, AND FOR OTHER METHODS OF REAR-OF-LOAD RESTRAINT.
- Q. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN IN THE "LESS-THAN-FULL-LOAD PROCEDURES" ON PAGE 8. BRAC-ING 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 HORI-ZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES. NOTE THAT HORIZONTAL STRUT BRACING PIECE ES 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 BE-TWEEN PALLET UNITS, IF DESIRED, TO PREVENT CHAFING DAMAGE TO PAINT AND MARKINGS.
- S. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:
 - 1. PREFABRICATE TWO FORWARD STRUT ASSEMBLIES, TWO FOR-WARD/REAR BLOCKING ASSEMBLIES, AND THREE CENTER FILL ASSEM-BLIES.
 - 2. INSTALL FORWARD STRUT ASSEMBLIES, SPREADERS, AND FORWARD BLOCKING ASSEMBLY.
 - 3. LOAD FOUR PALLET UNITS AND ONE CENTER FILL ASSEMBLY.
 - 4. REPEAT STEP 3 TWO TIMES.
 - 5. INSTALL ONE END BLOCKING ASSEMBLY.
 - 6. INSTALL TWO DOOR POST VERTICAL ASSEMBLIES (ONE RIGHT HAND AND ONE LEFT HAND) AND SIX UNIVERSAL LOAD RETAINERS.
 - 7. INSTALL THE STRUTS BETWEEN THE REAR BLOCKING ASSEMBLY AND THE DOOR POST VERTICALS.
 - 8. INSTALL THE DOOR SPANNER PIECES.

MATERIAL SPECIFICATIONS

<u>LUMBER</u> :	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOL- UNTARY PRODUCT STANDARD PS 20.
<u>NAILS</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.
<u>STAPLE</u> :	ASTM F1667; STFCS-189 OR STFCS-207,15/16" OR 1" CROWN WIDTH X 3/4" LEG LENGTH FOR 3/4" STRAPPING, OR STFCS-224, 1-17/32" CROWN WIDTH X 3/4" LEG LENGTH FOR 1-1/4" STRAPPING.
ANTI-CHAFING MATERIAL:	MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
STEEL, <u>STRUCTURAL</u> :	ASTM A36; 36,000 PSI MINIMUM YIELD OR BET- TER.

