FINAL REPORT
May 2008

REPORT NO. 08-14

ENGINEERING EVALUATION TESTS OF 16 GAUGE VS 14 GAUGE STAPLES IAW MIL-STD-1660, 40MM CARTRIDGE ON WOODEN PALLET

Prepared For:

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VALIDATION ENGINEERING DIVISION
MCALESTER, OKLAHOMA 74501-9053

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REPORT NO. 08-14 **MAY 2008**

ENGINEERING EVALUATION TESTS OF 16 GAUGE VS 14 GAUGE STAPLES IAW MIL-STD-1660, 40MM CARTRIDGE ON WOODEN PALLET

ABSTRACT

The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SJMAC-DEV) conducted Engineering Evaluation Tests IAW MIL-STD-1660, "Design Criteria for Ammunition Unit Loads" on the use of 16 gauge staples vs 14 gauge staples. The unit load tested simulated 40MM cartridges, packed 32 per PA120 metal container, and unitized 48 containers per 40" x 48" pallet. Three test units were tested with a load of 2,290 lbs, 2,295 lbs, and 2,295 lbs. The testing accomplished on the test units was the Stacking, Repetitive Shock, Drop, Incline-Impact, Forklifting, and Disassembly Tests. Test Units #1 and #3 were unitized using 16 gauge staples holding the wooden gates in place, while Test Unit #2 was unitized using the existing requirement of 14 gauge staples holding the gates in place.

Test Unit #1 was tested using the proposed 16 gauge staple in accordance with MIL-STD-1660 at ambient temperature. No damage was noted during the Stacking, Repetitive Shock, Drop, Forklifting, and Disassembly Testing. During all of the Incline-Impact tests, the optional timber was employed which extended approximately 9 inches above the carriage. It was noted that two (2) staples on one side and one (1) staple on the opposite side of the test unit were disengaged. The test unit remained intact and all testing was completed with no further damage noted. Test Unit #2 utilized the existing requirement of 14 gauge staples for the gates. MIL-STD-1660 testing was completed with one (1) staple each on opposite sides being disengaged. Test Unit #3 was tested using the proposed 16 gauge staples as used for Test Unit #1 and had similar results during Incline-Impact tests as seen in the previous test units.

The result of the staples being disengaged did not differ significantly between the use of the 14 gauge or 16 gauge staples. The use of 16 gauge staples on the 40MM cartridges packed 32 per PA120 metal container and unitized 48 containers per 40" x 48" pallet, as simulated for testing, meets the requirements of MIL-STD-1660 and can be utilized by the United States Army.

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VALIDATION ENGINEERING DIVISION
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ENGINEERING EVALUATION TESTS FOR 16 GAUGE VS 14 GAUGE STAPLES IAW MIL-STD-1660, 40MM CARTRIDGE ON WOODEN PALLET

TABLE OF CONTENTS

PART 1 – INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SJMAC-DEV) conducted Engineering Evaluation Tests IAW MIL-STD-1660, "Design Criteria for Ammunition Unit Loads" on the use of 16 gauge staples vs 14 gauge staples. The unit load tested simulated 40MM cartridges, packed 32 per PA120 metal container, and unitized 48 containers per 40" x 48" pallet. Three test units were tested with a load of 2,290 lbs, 2,295 lbs, and 2,295 lbs. The testing accomplished on the test units was the Stacking, Repetitive Shock, Drop, Incline-Impact, Forklifting, and Disassembly Tests. Test Units #1 and #3 were unitized using 16 gauge staples holding the wooden gates in place, while Test Unit #2 was unitized using the existing requirement of 14 gauge staples holding the gates in place. The unitization procedures were provided by DAC, Transportation Engineering Division (SJMAC-DET).

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by the U.S. Army Joint Munitions Command (JMC), Rock Island, IL. Reference is made to the following:

1. AR 740-1, 9 September 2002, Storage and Supply Activity Operation.

2. JMC-R, 10-23, Mission and Major Functions of U.S. Army Defense Ammunition Center (DAC) 12 April, 2007.

C. OBJECTIVE. The objective of the tests was to determine if the 16 gauge staples could be utilized in lieu of the required 14 gauge staples on the 40MM cartridge packed 32 per PA120 metal container, and unitized containers 48 containers per 40" x 48" pallet, by meeting MIL-STD-1660 test requirements prior to the acceptance of the unitization procedures by the U.S. Army.

D. CONCLUSION. The result of the staples being disengaged did not differ significantly between the use of the 14 gauge or 16 gauge staples. The use of 16 gauge staples on the 40MM cartridge packed 32 per PA120 metal container, and unitized 48 containers per 40" x 48" pallet, as simulated for testing, meets the requirements of MIL-STD-1660 and can be utilized by the United States Army.

PART 2 - ATTENDEES

DATE PERFORMED:

Test Unit #1- March 18-19, 2008

Test Unit #2- March 19-20, 2008

ATTENDEE	MAILING ADDRESS
Jeff L. Dugan General Engineer DSN 956-8090 (918) 420-8090	Director U.S. Army Defense Ammunition Center ATTN: SJMAC-DEV 1 C Tree Road, Bldg. 35 McAlester, OK 74501-9053
Daryl Sieczkowski Electronics Technician DSN 956-8988 (918) 420-8988	Director U.S. Army Defense Ammunition Center ATTN: SJMAC-DEV 1 C Tree Road, Bldg. 35 McAlester, OK 74501-9053

PART 3 - TEST PROCEDURES

A. MIL-STD-1660 TEST. The test procedures outlined in this section from were extracted from the MIL-STD-1660. The tests are conducted on ammunition pallet units or unit loads and are summarized as follows:

1. STACKING TEST. The test unit will be tested to simulate a stack of identical items stacked 16 feet high, for a period of one hour. This stacking load will be simulated by subjecting the specimen to a compression weight equal to an equivalent 16-foot stacking height. Photo 1 below shows an example of a unit load in the compression tester.

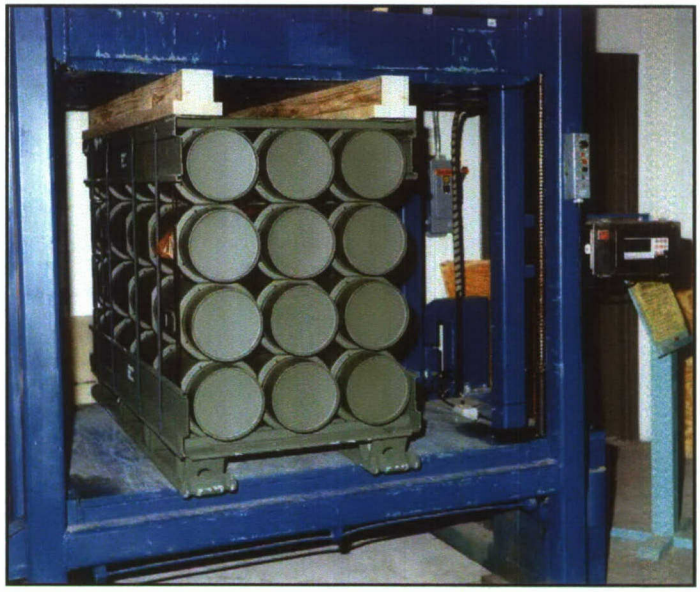

Photo 1. Example of Stacking Test.
(2.75-inch Hydra 70, PA151 Rocket Pallet in the Stacking Test.)

2. REPETITIVE SHOCK TEST. The Repetitive Shock Test is conducted IAW Method 5019, Federal Standard 101. The test procedure is as follows: The test unit will be placed on (not fastened to) the platform. With the test unit in one position, the platform will be vibrated at ½-inch amplitude

(1-inch double amplitude) starting at a frequency of approximately 3 cycles-per-second. The frequency will be steadily increased until the specimen leaves the platform. The resonant frequency is achieved when a 1/16-inch-thick feeler gage momentarily slides freely between every point on the specimen in contact with the platform at some instance during the cycle. Midway into the testing period, the specimen will be rotated 90 degrees, and the test continued for the duration. Unless failure occurs, the total time of vibration will be three (3) hours. Photo 2 shows an example of the Repetitive Shock Test.

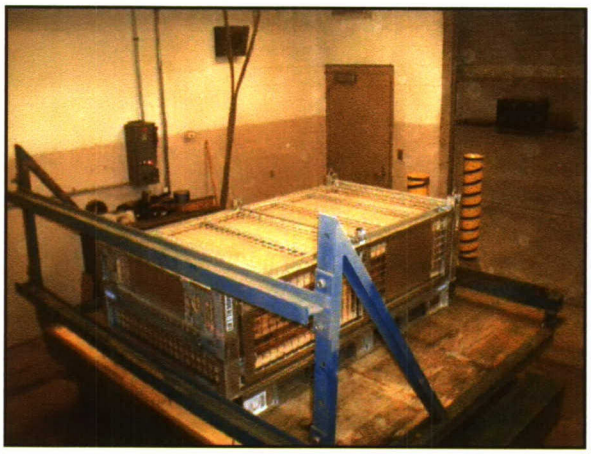

Photo 2. Example of the Repetitive Shock Test.
(MSTF Low)

3. <u>EDGEWISE-ROTATIONAL DROP TEST</u>. This test is conducted using the procedures of Method 5008, Federal Standard 101. The procedure for the Edgewise-Rotational Drop Test is as follows: The test unit will be placed on its skids with one end of the pallet supported on a beam 6 inches high. The height of the beam will be increased as necessary to ensure that there is no support for the skids between the ends of the specimen when the dropping takes place, but should not be high enough to cause the specimen to slide on the supports when the dropped end is raised for the drop. The unsupported end of the specimen is then raised and allowed to fall freely to the concrete, pavement, or similar unyielding surface from a prescribed height. Unless otherwise specified, the height of drop for Level A protection will conform to the following tabulation:

GROSS WEIGHT (WITHIN RANGE LIMITS) (Pounds)	DIMENSIONS OF ANY EDGE, HEIGHT OR WIDTH (WITHIN RANGE LIMITS) (Inches)	HEIGHT OF DROPS ON EDGES	
		Level A (Inches)	Level B (Inches)
150-250	60-66	36	27
250-400	66-72	32	24
400-600	72-80	28	21
600-1,000	80-95	24	18
1,000-1,500	95-114	20	16
1,500-2,000	114-144	17	14
2,000-3,000	Above 145- No limited	15	12
Above – 3,000		12	9

Figure 1.

Photo 3. Example of Edgewise-Rotational Drop Test (MSTF Low)

4. **INCLINE-IMPACT TEST**. This test is conducted by using the procedure of Method 5023, Incline-Impact Test of Federal Standard 101. The procedure for the Incline-Impact Test is as follows: The test unit will be placed on the carriage

with the surface or edge to be impacted projecting at least 2 inches beyond the front end of the carriage. The carriage will be brought to a predetermined position on the incline and released. If it were desired to concentrate the impact on any particular position on the container, a 4- x 4-inch timber may be attached to the bumper in the desired position before the test. The carriage will not strike any part of the timber. The position of the specimen on the carriage and the sequence in which surfaces and edges are subjected to impacts may be at the option of the testing activity and dependent upon the objective of the test. When the test is to determine satisfactory requirements for a container or pack, and, unless otherwise specified, the specimen will be subjected to one impact on each surface that has each dimension less than 9.5 feet. Unless otherwise specified, the velocity at the time of the impact will be 7 feet-per-second. Photo 4 shows an example of this test.

Photo 4. Example of the Incline-Impact Test.
(2.75-Inch, Hydra 70, PA151 Rocket Pallet on incline-impact tester.)

5. <u>SLING COMPATIBILITY TEST</u>. The test unit utilizing special design or non-standard pallets will be lifted, swung, lowered and otherwise handled as necessary, using slings of the types normally used for handling the unit loads

under consideration. Slings will be easily attached and removed. Danger of slippage or disengagement when load is suspended will be cause for rejection of the specimen.

6. **FORKLIFTING TESTS.** The test unit will be lifted clear of the ground by a forklift from the end of the test unit and transported on the forks in the level or back-tilt position. The forklift will pass over the Optional Rough Handling Course for Forklift Trucks as outlined in MIL-STD-1660. The course will consist of parallel pairs of 1-inch boards spaced 54 inches apart and will be laid flat wise on the pavement across the path of the forklift. One pair will be laid at an angle of approximately 60 degrees to the path so that the left wheel strikes first. Another pair will be laid securely across the path of the forklift so that the wheels strike simultaneously. Another pair will be laid at an angle of approximately 75 degrees to the path so that the right wheel strikes first. The test unit will be transported over the Optional Rough Handling Course. The test unit shall be observed for deflection and damage. The test unit will be rotated 90 degrees and the test unit lifted from the side and the above steps repeated.

7. **DISASSEMBLY TEST.** Following all rough handling tests the test unit may be squared up within 2 inches of its original shape and on a flat level surface. The strapping will then be cut and removed from the palletized load. Assembly of the test unit will be such that it retains its unity upon removal of the strapping.

PART 4 - TEST EQUIPMENT

A. COMPRESSION TESTER.

1. Manufacturer:	Ormond Manufacturing
2. Platform:	60- x 60-inches
3. Compression Limit:	50,000 pounds
4. Tension Limit:	50,000 pounds

B. TRANSPORTATION SIMULATOR.

1. Manufacturer:	Gaynes Laboratory
2. Capacity:	6,000-pound payload
3. Displacement:	1/2-inch amplitude
4. Speed:	50 to 400 RPM
5. Platform:	5- x 8-foot

C. INCLINED PLANE.

1. Manufacturer:	Conbur Incline
2. Type:	Impact Tester
3. Grade:	10 percent incline
4. Length:	12-foot

PART 5 - TEST RESULTS

5.1. TEST UNIT DATA. The test unit was inertly loaded to the specified design weight using inert materials. The test unit was prepared using the unitization procedures specified in Part 6 – Drawings. Special care was taken to ensure that each PA120 Metal Containers had the proper amount of weight in order to achieve a realistic pallet center of gravity (CG). Once properly prepared, Test Units #1, #2, and #3 were tested using MIL-STD-1660 requirements. Photo 5 shows a typical test unit. Photo 6 shows the 16 gauge staple versus the 14 gauge staple.

TEST UNIT #1:

Test Date:	24-25 March 2008	Pallet inertly loaded with:
Weight:	2,290 pounds	48 PA120 metal containers
Length:	51 inches	loaded to 40 pounds each
Width:	40 inches	with inert material
Height:	36 1/8 inches	16 gauge staples in gates

TEST UNIT #2:

Test Date:	25-26 March 2008	Pallet inertly loaded with:
Weight:	2,295 pounds	48 PA120 metal containers
Length:	51 inches	loaded to 40 pounds each
Width:	40 inches	with inert material
Height:	36 1/8 inches	14 gauge staples in gates

TEST UNIT #3:

Test Date:	26 March 2008	Pallet inertly loaded with:
Weight:	2,295 pounds	48 PA120 metal containers
Length:	51 inches	loaded to 40 pounds each
Width:	40 inches	with inert material
Height:	36 1/8 inches	16 gauge staples in gates

Photo 5. Photo of Test Unit #1.

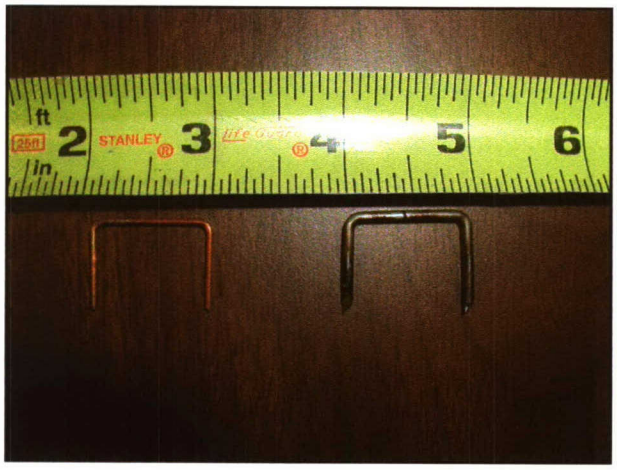

Photo 6. 16 Gauge Staple (left) and 14 Gauge Staple (right).

A. MIL-STD-1660 TEST RESULTS TEST UNIT #1:

1. **STACKING TEST**. The test unit was compressed with a load force of 9,200 pounds for 60 minutes on 24 March 2008. No damage was noted as a result of this test. See Photo 7 of the test unit in the compression unit.

Photo 7. Test Unit in the Stacking Test.

2. **REPETITIVE SHOCK TEST.** The test unit was vibrated 90 minutes at 195 RPM in the longitudinal orientation and 90 minutes at 200 RPM in the lateral orientation on 24 March 2008. No damage was noted as a result of this test. Photo 8 shows the test unit on the vibration platform.

Photo 8. Test Unit During Repetitive Shock Testing.

3. **EDGEWISE-ROTATIONAL DROP TEST**. The test unit was edgewise-rotationally dropped from a height of 15 inches on both longitudinal sides and

both lateral sides. No significant damage was noted as a result of this test. Photo 9 shows the test unit during the Edgewise Drop Test.

Photo 9. Edgewise Drop Test on the Test Unit.

4. **INCLINE-IMPACT TEST.** The test unit was impact tested on both longitudinal sides and both lateral sides. During the Incline-Impact Tests, the optional timber was employed which extended approximately 9 inches above the carriage. It was noted that two (2) staples on one side and one (1) staple on the opposite side of the test unit were disengaged. The test unit remained intact and all testing was completed with no further damage noted. See Photo 10 for the test unit during the lateral Incline-Impact Test and Photo 11 for the disengaged staple.

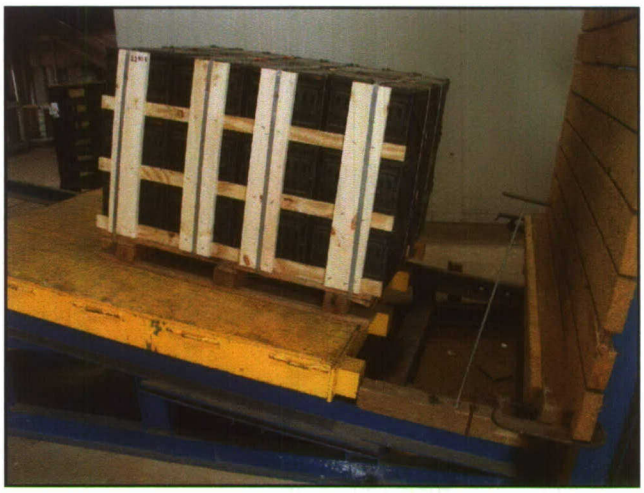

Photo 10. Incline-Impact Testing of Test Unit #1.

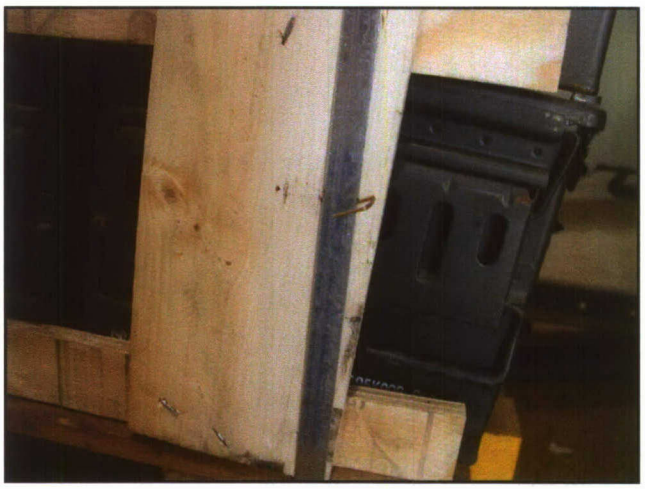

Photo 11. Disengaged Staple During Incline-Impact Testing of Test Unit #1.

5. **SLING COMPATIBILITY TEST**. N/A.

6. **FORKLIFTING TEST**. On 25 March 2008, Test Unit #1 was lifted from the end of the pallet on the forks of the forklift truck and carried over the hazard course three times with no damage or instability noted. The test unit was lifted from the adjacent side of the pallet and the above steps accomplished with no

problems encountered. See Photo 12 for the test setup during the Forklifting Test.

Photo 12. Forklift Testing of the Test Unit.

7. **DISASSEMBLY TEST**. Inspection revealed no damage.

8. **CONCLUSION.** No additional problems were encountered during the completion of the required testing. The test unit passed the requirements of MIL-STD-1660.

B. MIL-STD-1660 TEST RESULTS TEST UNIT #2:

1. **STACKING TEST**. The test unit was compressed with a load force of 9,200 pounds for 60 minutes on 25 March 2008. No damage was noted as a result of this test.

2. **REPETITIVE SHOCK TEST.** The test unit was vibrated 90 minutes at 195 RPM in the longitudinal orientation and 90 minutes at 200 RPM in the lateral orientation on 25 March 2008. No damage was noted as a result of this test.

3. **EDGEWISE-ROTATIONAL DROP TEST**. The test unit was edgewise rotationally dropped from a height of 15 inches on both longitudinal sides and both lateral sides. No significant damage was noted as a result of this test,

4. **INCLINE-IMPACT TEST.** The test unit was impact tested on both longitudinal sides and both lateral sides. During the incline-impact tests, the optional timber was employed which extended approximately 9 inches above the carriage. It was noted that one (1) staple each on opposite sides became disengaged. The results were similar to those seen during incline-impact of Test Unit #1. The test unit remained intact and all testing was completed with no further damage noted. See Photo 13 for the disengaged staple.

Photo 13. Disengaged Staple During Incline-Impact Testing.

5. **SLING COMPATIBILITY TEST**. N/A.

6. **FORKLIFTING TEST**. On 26 March 2008, Test Unit #2 was lifted from the end of the pallet on the forks of the forklift truck and carried over the hazard course three times with no damage or instability noted. The test unit was lifted from the adjacent side of the pallet and the above steps accomplished with no problems encountered.

7. **DISASSEMBLY TEST**. Inspection revealed no damage.

8. **CONCLUSION**. No additional problems were encountered during the completion of the required testing. The test unit passed the requirements of the MIL-STD-1660. Test Units #1 and #2 has similar results during testing.

C. MIL-STD-1660 TEST RESULTS TEST UNIT #3.

1. **STACKING TEST**. The test unit was compressed with a load force of 9,200 pounds for 60 minutes on 26 March 2008. No damage was noted as a result of this test.

2. **REPETITIVE SHOCK TEST**. The test unit was vibrated 90 minutes at 195 RPM in the longitudinal orientation and 90 minutes at 200 RPM in the lateral orientation on 26 March 2008. No damage was noted as a result of this test.

3. **EDGEWISE-ROTATIONAL DROP TEST**. The test unit was edgewise-rotationally dropped from a height of 15 inches on both longitudinal sides and both lateral sides. No significant damage was noted as a result of this test,

4. **INCLINE-IMPACT TEST**. The test unit was impact tested on both longitudinal sides and both lateral sides. During the Incline-Impact Tests, the optional timber was employed which extended approximately 9 inches above the carriage. It was noted that two (2) staples on one side and one (1) staple on the opposite side of the test unit were disengaged, which is similar to the results of the first two test units. The test unit remained intact and all testing was completed with no further damage noted. See Photo 14 for the disengaged staple.

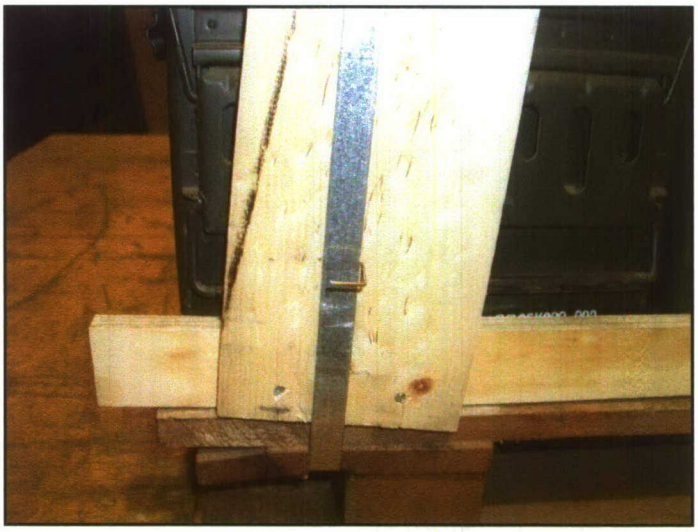

Photo 14. Disengaged Staple During Incline-Impact Testing.

5. **SLING COMPATIBILITY TEST**. N/A.

6. **FORKLIFTING TEST**. On 26 March 2008, Test Unit #3 was lifted from the end of the pallet on the forks of the forklift truck and carried over the hazard course three times with no damage or instability noted. The test unit was lifted from the adjacent side of the pallet and the above steps accomplished with no problems encountered.

7. **DISASSEMBLY TEST**. Inspection revealed no damage.

8. **CONCLUSION**. No additional problems were encountered during the completion of the required testing. The test unit passed the requirements of the MIL-STD-1660. Test Units #1, #2, and #3 had similar results during testing. The result of the staples being disengaged did not differ significantly between the use of the 14 gauge or 16 gauge staples. The use of 16 gauge staples on the 40MM cartridge packed 32 per PA120 metal container, and unitized 48 containers per 40" x 48" pallet, as simulated for testing, meets the requirements of MIL-STD-1660 and can be utilized by the United States Army.

PART 6– DRAWINGS

The following test sketches represent the load configuration that was subjected to the test criteria.

Note: A weight of 40 lbs per container was used instead of the 45 lbs depicted in the drawing.

APPENDIX 26S

UNITIZATION PROCEDURES FOR BOXED AMMUNITION AND COMPONENTS ON 4-WAY ENTRY PALLETS

CARTRIDGE, 40MM, PACKED 32 PER PA120 METAL CONTAINER, UNITIZED 48 CONTAINERS PER 40" X 48" PALLET; APPROX BOX SIZE 18-3/4" L X 6-3/8" W X 10-3/8" H

NOTICE: THIS APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH THE BASIC UNITIZATION PROCEDURES DRAWING 19-48-4116-20PA1002.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY FIELD SUPPORT COMMAND TPR
David A. Pistorik
AMSRD-AAR-AIL-TP

AMSFS-ST

APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND

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VALIDATION ENGINEERING DIVISION		TESTED
ENGINEERING DIRECTORATE		

DECEMBER 1992

REVISION NO. 3 — **DECEMBER 2004**

SEE THE REVISION LISTING ON PAGE 2

CLASS	DIVISION	DRAWING	FILE
19	48	4116/ 26S	20PA1002

PROJECT FSA 146/26S-75

PALLET UNIT DATA				
ITEMS INCLUDED		● HAZARD CLASS AND DIVISION		APPROX WEIGHT LBS
NSN	DODIC	QD CLASS	COMP GROUP	
1310-				
01-362-5295	B542	1.1	E	2,148
01-362-5296	B542	1.1	E	2,148
01-419-9285	B542	1.1	E	2,148
01-361-9039	B576	1.4	C	2,292
01-362-5294	B584	1.4	C	2,292
01-464-4121	BA11			2,148
01-472-9871	BA12	1.4	C	2,148

● HAZARD CLASSIFICATION DATA CONTAINED IN THE ABOVE CHART IS FOR GUIDANCE AND INFORMATIONAL PURPOSES ONLY. VERIFICATION OF THE SPECIFIED DATA SHOULD BE MADE BY CONSULTING THE MOST RECENT JOINT HAZARD CLASSIFICATION SYSTEM LISTING OR OTHER APPROVED LISTING(S).

REVISION

REVISION NO. 1, DATED AUGUST 1995, CONSISTS OF:

1. CHANGING DIMENSIONS ON END AND SPACER ASSEMBLIES.

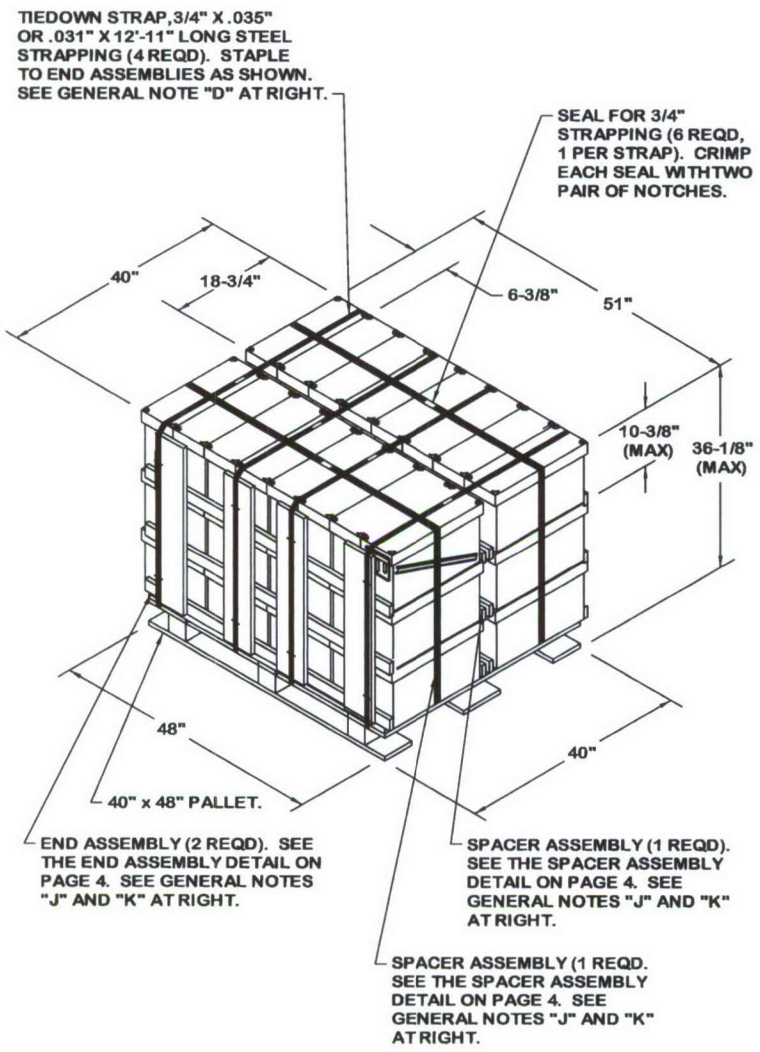
2. ADDING GENERAL NOTES "J", "K", "L", AND "M" ON PAGE 3.

REVISION NO. 2, DATED DECEMBER 1999, CONSISTS OF:

ADDING A NATIONAL STOCK NUMBER AND ASSOCIATED DATA TO PALLET UNIT DATA BLOCK ON PAGE 2.

REVISION NO. 3, DATED DECEMBER 2004, CONSISTS OF:

ADDING A NATIONAL STOCK NUMBER AND ASSOCIATED DATA TO PALLET UNIT DATA BLOCK ON PAGE 2.



PALLET UNIT

SEE GENERAL NOTE "B" AT RIGHT

48 BOXES OF 40MM CTG (32 PER BOX) @ 45 LBS	2,160 LBS (APPROX)
DUNNAGE	52 LBS
PALLET	80 LBS
TOTAL WEIGHT	2,292 LBS (APPROX)
CUBE	42.7 CU FT (APPROX)

load boxes up to 58.25# each to make a total pallet weight of 2928#

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4" 1" X 6"	9.88 19.75	3.29 9.88
NAILS	NO. REQD	POUNDS
6d (2") 10d (3")	72 36	0.42 0.55
PALLET, 40" X 48"	1 REQD	80 LBS
PLYWOOD, 3/4"	8.29 SQ FT REQD	17.10 LBS
STEEL STRAPPING, 3/4"	81.17' REQD	7.25 LBS
SEAL FOR 3/4" STRAPPING	6 REQD	NIL
STAPLE, 15/16" X 3/4"	16 REQD	NIL

GENERAL NOTES

A. THIS APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH THE BASIC UNITIZATION PROCEDURES DRAWING 19-48-4116-20PA1002. TO PRODUCE AN APPROVED UNIT LOAD, ALL PERTINENT PROCEDURES, SPECIFICATIONS AND CRITERIA SET FORTH WITHIN THE BASIC DRAWING WILL APPLY TO THE PROCEDURES DELINEATED IN THIS APPENDIX. ANY EXCEPTIONS TO THE BASIC PROCEDURES ARE SPECIFIED IN THIS APPENDIX.

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

C. THE LOAD STRAPS MUST BE PRE-POSITIONED ON THE PALLET DECK PRIOR TO PLACING BOXES ON THE PALLET. NOTE THAT THE LOAD STRAPS WILL BE LOCATED AS SHOWN. LOAD STRAPS MUST BE TENSIONED AND SEALED PRIOR TO APPLICATION OF TIEDOWN STRAPS.

D. INSTALL EACH TIEDOWN STRAP TO PASS UNDER THE DECK/STRINGER BOARDS OF THE PALLET AND TO BE LOCATED AS SHOWN.

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

CARLOADING - - - - 19-48-4115-5PA1002
TRUCKLOADING - - - 19-48-4117-11PA1003
STORAGE - - - - - - 19-48-4118-1-2-3-4-14-22PA1002
END OPENING ISO
CONTAINER - - - - - 19-48-4153-15PA1002
MILVAN - - - - - - - 19-48-4166-15PA1003
SIDE OPENING ISO
CONTAINER - - - - - 19-48-4267-15PA1009

F. IF ITEMS COVERED HEREIN ARE UNITIZED PRIOR TO ISSUANCE OF THIS REVISION TO THIS APPENDIX, THE BOXES NEED NOT BE REUNITIZED SOLELY TO CONFORM TO THIS REVISION.

G. THE UNITIZATION PROCEDURES DEPICTED HEREIN MAY ALSO BE USED FOR UNITIZING 40MM CARTRIDGES WHEN IDENTIFIED BY DIFFERENT NATIONAL STOCK NUMBERS (NSN) THAN WHAT IS SHOWN ON PAGE 2, PROVIDED THE CONTAINER DOES NOT VARY FROM WHAT IS DELINEATED HEREIN. THE EXPLOSIVE CLASSIFICATION OF OTHER ITEMS MAY BE DIFFERENT THAN WHAT IS SHOWN.

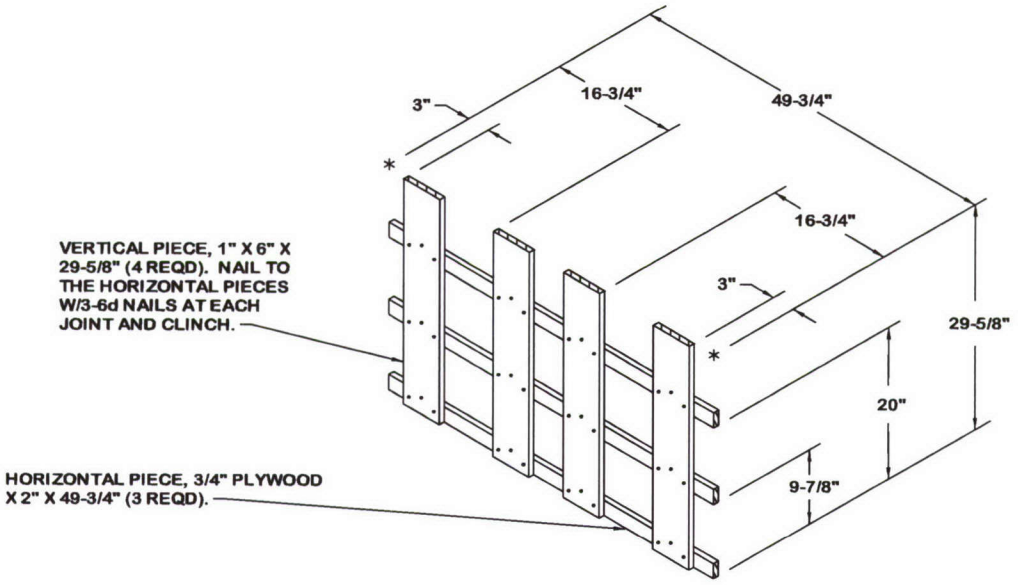
H. THE STYLE 1 PALLET DELINEATED IN THE DETAIL AT LEFT NEED NOT HAVE CHAMFERS OR STRAP SLOTS AS SPECIFIED WITHIN MILITARY SPECIFICATION MIL-P-15011 WHEN USED FOR THE UNITIZATION OF ITEMS COVERED BY THIS APPENDIX.

J. DIMENSIONS OF THE SPACER AND END ASSEMBLIES ARE APPROXIMATE AND MUST BE VERIFIED IN ACCORDANCE WITH GENERAL NOTE "Z" IN THE BASIC PROCEDURES. THESE ASSEMBLIES MUST NOT PROTRUDE PAST THE TOPS AND/OR SIDES OF THE METAL CONTAINERS. THEY MAY BE SHORTER, PROVIDED THE TIEDOWN STRAPS, ARE PREVENTED FROM DAMAGING THE EDGES OF THE CANS AND ARE NOT IN CONTACT WITH THE STACKING AIDS ON THE CAN LID. THE HORIZONTAL PIECES MUST FIT AGAINST THE BODY OF THE CAN AND MUST NOT BEAR AGAINST THE HANDLE OR LATCH ASSEMBLY.

K. ALL DUNNAGE SHALL BE PRESERVATIVE TREATED IN ACCORDANCE WITH GENERAL NOTE "AA" IN THE BASIC PROCEDURES.

L. FOR DETAILS OF THE METAL CONTAINER SEE DRAWING NUMBER 12564414.

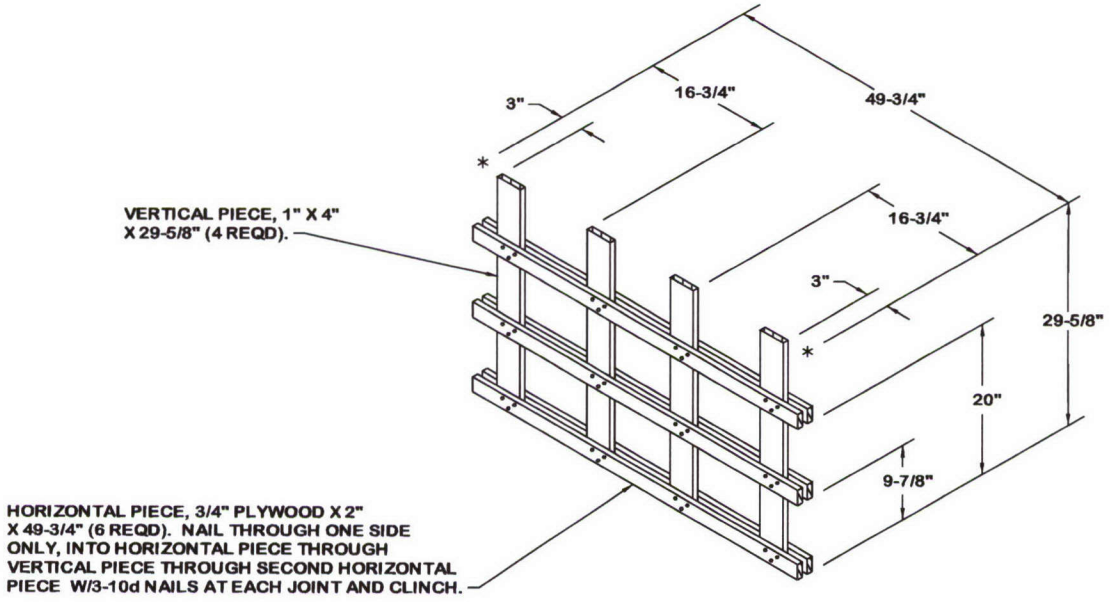
M. EMPTY OR REJECT PA120 CONTAINERS WILL BE USED AS FILLER CONTAINERS AS NECESSARY. FILLER CONTAINERS MUST BE INSTALLED IN THE MIDDLE OF THE TOP LAYER(S) OF CONTAINERS. WHEN (EMPTY) FILLER CONTAINERS ARE USED IN PLACE OF OMITTED CONTAINERS TO COMPLETELY FILL OUT A LAYER ON A PALLET, THEY WILL BE MARKED AS SPECIFIED IN MIL-STD-129-1.



END ASSEMBLY

(2 REQD)

SEE GENERAL NOTES "J" AND"K" ON PAGE 3.



SPACER ASSEMBLY

(1 REQD)

SEE GENERAL NOTES "J" AND "K" ON PAGE 3.

PROJECT FSA 146/26S-75 DRAWING 19-48-4116/26S