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DETAIL SPECIFICATION
CARTRIDGE, CALIBER 5.56MM,
USMC SPECIAL MATCH, MOLY COATED
MK 294 MOD 0

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Crane, Indiana 47522-5001

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DETAIL SPECIFICATION CARTRIDGE, CALIBER 5.56MM USMC SPECIAL MATCH, MOLY COATED MK 294 MOD 0

TABLE OF CONTENTS

TABLES

APPENDIX

DETAIL SPECIFICATION
CARTRIDGE, CALIBER 5.56MM,
USMC SPECIAL MATCH, MOLY COATED
MK 294 MOD 0

1. SCOPE

1.1 Scope. This specification establishes the requirements for the 5.56mm USMC Special Match, Moly Coated, MK 294 MOD 0 Cartridge (hereafter referred to as "test cartridge" or "cartridge"). The cartridge is intended for use in the National Match M16A2 Weapon System, however this cartridge may be used in any magazine fed 5.56mm weapon system. The Marine Corps Marksmanship Training Unit uses the cartridge as a match round.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2 b).

SPECIFICATIONS

MILITARY

MIL-I-45607.....Inspection Equipment, Acquisition, Maintenance and Disposition of

MIL-L-63460.....Lubricant, Cleaner and Preservative

MIL-P-15011.....Pallets, Material Handling, Wood Post Construction, 4-Way Entry

MIL-P-46610.....Primers, Percussion, Styphnate and Chlorate

Types for Small Arms Ammunition

STANDARDS

MILITARY

MIL-STD-636.....Visual Inspection Standards for Small Arms Ammunition Through Caliber .50

MIL-STD-644.....Visual Inspection Standards and Inspection Procedures for Inspection of Packaging Packing and Marking of Small Arms Ammunition

MIL-STD-1168....Ammunition Lot Numbering

DEPARTMENT OF DEFENSE (DOD)

DOD-STD-2101....Classification of Characteristics

DOD 4145.26M....Contractor's Safety Manual for Ammunition, Explosives and Related Dangerous Material

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWINGS

U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DRAWINGS

19200-7643674...Classification of Cartridge Case Defects

19200-11820451..Case

19200-8649409...Barrel, Test, Accuracy, 5.56 MM

19200-8649410...Barrel, Test, Electronic Pressure, 5.56 MM

19200-8649417...Rifle, Test, Accuracy, 5.56 MM

19200-8649418...Fixture, Test, Accuracy, 5.56 MM

19200-10520043..Receiver, Universal, M2, Assembly, Action Time

19200-10534279..Primer No. 41

NAVAL SEA SYSTEMS COMMAND DRAWINGS

53711-7546726...CARTRIDGE, 5.56 MM, USMC SPECIAL MATCH, MOLY COATED, MK 294 MOD 0
53711-7520779...CARTON
53711-7614523...PACKING AND MARKING FOR CARTON, PAPERBOARD FOR CARTRIDGE, 5.56 MM
53711-7614524...PACKING AND MARKING FOR CARTRIDGES, 5.56 MM, CARTONS, BOX, AMMUNITION, M2A1
53711-7614525...PACKING, AND MARKING FOR BOX, WIREBOUND FOR CARTRIDGE, 5.56 MM
53711-7520785...SEPARATOR
53711-7614522...BULLET, 5.56 MM, USMC SPECIAL MATCH, MOLY COATED

PUBLICATIONS

U.S. ARMY PUBLICATIONS

SCATP-5.56MM....Small Caliber Ammunition Test Procedures For 5.56mm Cartridges

NAVAL SEA SYSTEMS COMMAND PUBLICATIONS

OP 5 Volume 1...Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation and Shipping

(Unless otherwise indicated, copies of the above other Government documents, drawings, and publications are available from the Commanding Officer, Naval Publications and Forms Center (Code 105), 5801 Tabor Ave., Philadelphia, PA 19120. If not available, advise contracting activity.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents that are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2 b).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASQC-A8402.....Quality Management and Quality Assurance – Vocabulay

ANSI/ASQC Z1.4.....Sampling Procedures and Tables for Inspection by Attribute

(Application for copies should be addressed to the American National Standards Institute, Headquarters, 11 West 42nd Street, 13th Floor, New York NY 10036. ANSI may also be contacted via their web site at "http://www.ansi.org/home.html".)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. **REQUIREMENTS**

3.1 First article. When specified in the solicitation (see 6.2.g), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Government-loaned property. Government-loaned property (see 6.2.e and 6.5) shall be used for performing tests as specified in section 4 and appendices A, B and C of this specification. Government-loaned properties are National Match M16A2 Rifle(s) for Function and Casualty testing, 30 round magazines and reference cartridges for Pressure and Velocity testing.

3.3 Components. Caliber, 5.56mm USMC Special Match, Moly Coated MK 294 MOD 0 cartridge components are the projectile, the cartridge case, the propellant and the primer.

3.3.1 Bullet. The bullet (projectile) for the MK 294 MOD 0 shall be in accordance with drawing 53711-7614522. The bullet shall be coated with molybdenum disulfide using the patented NECO-COAT process prior to assembly of the cartridge.

3.3.2 Cartridge case. The cartridge case shall be in accordance with drawing 19200-11820451.

3.3.2.1 Vent hole. (C1) [A vent hole shall be present in the primer pocket of the cartridge case.]

3.3.2.2 Head Stamp. The cartridge case head stamp marking shall be in accordance with drawing 19200-11820451 with the exception of Note 13. The NATO Identification Mark referred to by note 13 does not apply to this item.

3.3.3 Propellant.

3.3.3.1 Presence of propellant. (C2) [Each cartridge shall contain a minimum of 13 grains of propellant.]

3.3.3.2 Charge weight. The manufacturer shall establish the charge weight to meet performance requirements.

3.3.3.3 Energetic Qualification. The propellant shall be a Final Type Qualified (FTQ) Explosive for use in Navy munitions. If the contractor wants to use a propellant that is not a FTQ explosive the contractor shall pay NSWC Crane Division for the cost of obtaining an FTQ prior to using the propellant in the cartridge.

3.3.4 Primer.

3.3.4.1 Type. The primer shall be a No. 41 primer manufactured in accordance with drawing 19200-10534279 and MIL-P-46610.

3.4 Complete cartridge.

3.4.1 Cartridge Assembly. The cartridge assembly shall be manufactured and inspected in accordance with the appropriate drawing (53711-7546726) and this specification.

3.4.2 Primer seating depth. (M101) The primer shall be seated flush to 0.008 inch below flush of the face of the cartridge case head. 100% inspection is required to ensure that the seating depth is within the required limits. The primer shall be staked or crimped in place 360 degrees circular.

3.4.3 Case Mouth Diameter. (M102) The case mouth diameter shall not exceed 0.251 inch after assembly.

3.4.4 Cartridge overall length. (M103) The overall length of the assembled cartridge shall not exceed 2.260 inches. 100% inspection is required to ensure that the maximum length is not exceeded. (M104) The overall length of the assembled cartridge shall not be less than 2.235 inches.

3.4.5 Bullet extraction. (M105) The force required to extract the projectile from the MK 294 MOD 0 cartridge case shall be 15 pounds minimum.

3.5 Cartridge ballistic performance.

3.5.1 Velocity. (M106) The average velocity of the cartridge projectile, when conditioned at 70 degrees plus or minus 5 degrees Fahrenheit (F), shall be 2,720 feet per second (ft/sec) plus or minus (±) 30 ft/sec at 78 feet from the muzzle of the weapon. The standard deviation of the velocities shall be 15 ft/sec maximum.

3.5.2 Chamber pressure. (M107) The average chamber pressure of the sample cartridges, conditioned at 70 degrees plus or minus 5 degrees F, shall not exceed 58,700 psi. Neither the chamber pressure of an individual sample test cartridge nor the average chamber pressure plus three standard deviations of chamber pressure shall exceed 64,700 psi.

3.5.3 Port pressure. (M108) The mean port pressure minus three standard deviations shall not be less than 15,300 psi for sample cartridges conditioned to 70 degrees plus or minus 5 degrees F.

3.5.4 Temperature (High and Low). The action time, pressure and velocity of sample cartridges conditioned and fired at the temperature extremes specified below shall be in accordance with 3.5.4.1, 3.5.4.2, and 3.5.4.3.

a. Conditioned at 125°+ 5°F for not less than 1 hour and fired at that temperature.

b. Conditioned at -45°+ 5°F for not less than 1 hour and fired at that temperature.

3.5.4.1 Velocity. (M109) The average velocity shall not decrease by more than 250 fps from the average velocity of the sample cartridges conditioned at 70°± 5°F. Any increase in velocity is acceptable.

3.5.4.2 Chamber Pressure. (M110) The average chamber pressure shall not vary from the average chamber pressure of the sample test cartridges conditioned at 70°± 5°F by more than 7000 psi. The average chamber pressure of the sample cartridges of the same lot conditioned at 125°+ 5°F shall not exceed 63,700 psi. Any decrease in pressure is acceptable.

3.5.4.3 Port Pressure. (M111) The average port pressure shall not vary from the average port pressure of the sample test cartridges conditioned at 70°± 5°F by more than 2000 psi and shall not be less than 14,600 psi.

3.5.5 Accuracy. (M112) The extreme spread of any individual ten-shot (10-shot) group shall not exceed 3.5 inches maximum at 300 yards. The average extreme spread of five 10-shot groups shall not exceed 3.0 inches at 300 yards.

3.5.6 Function and Casualty. The cartridges shall meet all function and safety requirements of Table I. Misfires shall be considered separately in accordance with table I. The cumulative total of all ballistics firing shall be used to determine compliance with the requirements of Table I.

TABLE I. ***Ballistics Function and Safety.*** [1]

Characteristics [2]	Classification	Accept	Reject
1. There shall be no weapon stoppages due to the cartridge. [3]	(M113)	0	2
2. There shall be no failures to extract. [3]	(M114)	0	2
3. Failure to chamber.	(M119)	0	2
4. There shall be no hangfires.	(C3)	0	1
5. There shall be no misfires. [4]			
a. Missing or obstructed vent hole in cartridge case.	(C4)	0	1
b. Other	(M115)	[4]	[4]
6. A projectile or portion thereof shall not remain in the bore.	(C5)	0	1
7. There shall be no gas leakage or primer failures due to:			
a. Perforation in firing pin indent.	Minor	5	6
b. Escape of gas through primer cup other than 5.a.	Minor	5	6
c. Escape of gas around primer cup. [5]	Minor	5	6
d. Loose primer.	(M116)	3	4
e. Blown primer.	(C6)	0	1
8. There shall be no cartridge case casualties due to: [6]			
a. Longitudinal split of the:			
(1) Mouth (I)	Minor	5	6
(2) Body (J)	Minor	5	6
(3) Body (K)	(M117)	3	4
(4) To Head (L)	(C7)	0	1
(5) Through Head (M)	(C8)	0	1
b. Circumferential rupture:			
(1) Partial, Body (J)	Minor	5	6
(2) Partial, Body (K)	(M118)	3	4
(3) Partial, Head (L)	(C9)	0	1
(4) Complete	(C10)	0	1
8. There shall be no premature cartridge functions.	(C11)	0	1

TABLE I. *Ballistics Function and Safety.* [1] **(Continued.)**

NOTES:

[1] The occurrence of one or more critical defect attributable to the cartridge during any test, including warm and foul firings of cartridges from the test lot, shall result in rejection of the lot.

[2] For definition of characteristics, see 6.3.

[3] If weapon stoppages, failures to extract or failures to chamber occur due to the ammunition cartridges, then the criteria for acceptance/rejection for major characteristic (M113), (M114) and (M119) shall be accept on zero (0), reject on two (2) defectives. If one (1) weapon stoppage, one (1) failure to extract or one (1) failure to chamber due to the cartridge occurs, then a second Function and Casualty sample shall be tested in the rifles at the temperature range(s) of the failure in accordance with 4.5.5.6. The occurrence of any additional weapon stoppage, failure to extract or failure to chamber shall result in rejection of the lot and the acceptance criteria for the cumulative total of all firings is accept on one (1), reject on two (2) defectives.

[4] Each cartridge that misfires shall be disassembled and examined to determine the cause of the misfire:

a. If the misfire is attributed to a defective cartridge (for other than a critical defect) due to improper assembly, missing components, then the criteria for acceptance/rejection for major characteristic (M115) shall be accept on 0, reject on 2 defective. If one misfire occurs, then a second function and casualty sample shall be tested in accordance with table II and appendix C. The second function and casualty sample size shall be 720 cartridges, or the same as the first sample size. The occurrence of any additional misfires shall result in rejection of the lot (accept on 1, reject on 2 defective for the cumulative total of all firings). Additionally, the occurrence of one or more critical defects during the firing of any test, including the second Function and Casualty sample, shall result in rejection of the lot.

b. The lot shall be rejected if the cartridge does not meet the critical requirements of 3.3.2.1 (presence of primer pocket vent hole) or 3.3.3.1 (presence of propellant charge).

c. If the misfire is attributed to the test weapon, then the weapon shall be repaired or replaced and another cartridge fired in place of the misfire.

[5] Gas escape around more than 50 percent of periphery of the primer cup.

[6] For location of characteristics indicated by letters in parenthesis, see 19200-7643674.

3.6 Workmanship.

3.6.1 Defects. Metallic components and the completed cartridge shall be free from folds, wrinkles, deep draw scratches, scaly metal, dents, burrs and other defects.

3.6.2 Foreign material. All components and the completed cartridge shall be free of foreign material including, but not limited to, corrosion, stains, dirt, oil, grease, smears of lacquer and metal chips.

3.6.3 MIL-STD-636. The cartridge and components shall meet the visual standards requirements of MIL-STD-636 for caliber .30 cartridges. Classification of individual visual and workmanship characteristics shall be as defined by MIL-STD-636.

3.6.4 Mixed ammunition types. For mixed ammunition types, the occurrence of a high pressure test, dummy or blank cartridge shall be classed as a critical defect. Occurrence of any other type shall be classed as a major defect.

3.7 Lot formation.

3.7.1 Cartridges. The cartridges shall be assembled into identifiable lots. Each lot shall consist of units of product of a single type, grade, class, size and composition, manufactured under the same conditions, by the same manufacturer, and at the same time (continuous production run). Each cartridge lot shall contain no more than one lot of primers, one lot of propellant, one lot of cartridge cases and one lot of projectiles. Unless otherwise specified in the solicitation, the lot size shall be no more than 1,500,000 cartridges. Lot numbers shall be assigned in accordance with MIL-STD-1168. Each lot shall be identified as to type, caliber, model and lot number.

3.7.2 Primers. The size of any lot of primers used in the cartridges shall be 200,000 units minimum and 1,500,000 units maximum. A primer lot shall consist of a specific product, made on consecutive work shifts, with no break in the production of that specific product.

3.8 Safety precautions.

3.8.1 Contractor. Work performed in support of this specification and solicitation, when performed by contractors, shall comply with the safety precaution requirements of DOD 4145.26M.

3.8.2 Government activity. Work performed in support of this specification and solicitation, when performed by a Government activity, shall comply with the safety precaution requirements of NAVSEA OP 5 Volume 1.

TABLE II. ***Test requirements - temperature conditioning ranges, sample sizes and paragraph references.***

Tests	Temperature Ranges			Paragraph References	
	-45°F to -40°F	65°F to 75°F	125°F to 130°F	Requirement	Verification
CARTRIDGE: 1. Bullet Extraction		40		3.4.5	4.5.5.2
CARTRIDGE BALLISTICS TESTS:					
Cumulative Sample Size		920 to 1640		(1)	(2)
2. Velocity/ Chamber & Port Pressure(3) (4)	20	20	20	3.5.1 through 3.5.4.3	4.5.5.3 through 4.5.5.5
3. Accuracy		100		3.5.5	4.5.5.6
4. Function and Casualty	240	240	240	3.5.6	4.5.5.7

(1) The results of all ballistics tests, including examination of misfired cartridges, fired cartridge cases and primers, shall be used to determine compliance with the requirements of Table I. The occurrence of any critical defects attributable to the cartridges (including firings of warm and foul cartridges from the test lot) shall result in rejection of the lot and no further testing shall be conducted.

(2) If the firing of a second Function and Casualty sample is required due to the occurrence of a misfire as specified by Table I, the second sample shall be a single sample and shall be fired in accordance with the Function and Casualty test procedure. This second sample shall be tested only for misfires and critical defects in determining acceptance/rejection.

(3) Unless otherwise substantiated that the applicable chamber pressure requirements are met, chamber pressure testing shall be completed and the applicable requirements shall be met prior to conducting any other ballistics tests. Acceptable methods of substantiating that the chamber pressure requirements have been met are in-process chamber pressure checks, or propellant checks, or propellant acceptance tests. These acceptable methods do not eliminate the requirement to perform chamber pressure testing as part of the first article sample or final lot acceptance testing. The contractor shall submit substantiating documentation to and receive approval from the Contracting Officer for each lot that will not be subjected to chamber pressure testing prior to other ballistic tests.

(4) For production lot acceptance and First Article acceptance, 20 samples shall be fired with the propellant positioned at the primer end of the cartridge per SCATP-5.56mm (Heavy Bullet). Reference cartridges and all other EPVAT test samples shall be fired with the propellant at the primer end of the cartridge per SCATP-5.56mm (Heavy Bullet). Each 20 round sample shall meet the requirements of 3.5.1 through 3.5.4.3.

4. **VERIFICATION**

4.1 Responsibility for Inspection. Unless otherwise specified herein, in the contract or purchase order, the supplier is responsible for the performance of all inspection and test requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial facility acceptable to the Government. The Government reserves the right to perform any of the inspections and tests set forth in this specification where such inspections and tests are deemed necessary to ensure that supplies and services conform to prescribed requirements. Unless otherwise specified herein, in the contract or in the purchase order, all test and inspection equipment (including test barrels) shall be supplied and maintained by the contractor in accordance with MIL-I-45607.

4.1.1 Quality Assurance Terms and Definitions. Reference shall be made to ANSI/ASQC-A8402 for definitions of quality assurance terms.

4.1.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2).

b. Conformance inspection (see 4.3).

4.2 First article inspection. When specified in the solicitation (see 6.2 g), first article inspection of cartridges and cartridge components shall be performed on a first article sample (see 3.1). The first article inspection shall include the non-destructive inspections in 4.4 through 4.4.8 and the tests in 4.5 through 4.5.5.7 and appendices A, B and C. The first article quantity (sample size) of cartridges and cartridge components shall be as specified in the solicitation (see 6.2 g).

4.3 Conformance inspection. Conformance inspection of production cartridges and cartridge components shall include the non-destructive inspections in 4.4 through 4.4.7 and the tests in 4.5 through 4.5.5.7 and appendices A, B and C.

4.4 Non-destructive inspections.

4.4.1 Inspection provisions. Unless otherwise specified herein or in the solicitation, Tables III and IV shall be used for nondestructive acceptance inspection. Inspection shall be by characteristic. Acceptance criteria shall be accept on zero defects and reject on one or more defects for all inspection levels. In table IV, the number under each inspection level indicates sample size. An asterisk under the inspection level in table IV indicates one hundred percent inspection. If the sample size exceeds lot size, the lot shall be one hundred percent

inspected. One hundred percent inspection shall be used for all critical characteristics. Unless otherwise specified, inspection level V shall be used for major characteristics and inspection level VII for minor characteristics. Section 3 requirements that are not annotated as critical or major shall be classified as minor. Classification of characteristics shall be defined in accordance with DOD-STD-2101.

4.4.2 Material requirements. The contractor shall maintain certificates and test results showing compliance with all material requirements of section 3. Certifications and test results shall be included in each first article test report and shall be available upon request for each production lot.

TABLE III. *Inspection level.*

Referenced AQL	Inspection Level
0.040	I
0.065	II
0.100	III
0.150	IV
0.250	V
0.400	VI
0.650	VII
1.000	VIII
1.500	IX
2.500	X
4.000	XI
6.500	XII

4.4.3 Workmanship. Cartridges and components shall be visually inspected to determine compliance with the requirements of 3.3.2.2, and 3.6.1 through 3.6.4.

4.4.4 Dimensional and weight requirement. All dimensional and weight requirements in section 3 shall be verified by contractor gages or by Standard Measuring Instruments (SMI).

4.4.5 Vent hole and propellant presence. The contractor shall verify the presence of primer pocket vent hole (see 3.3.2.1) and the presence of a propellant charge (see 3.3.3.1) by visual inspection or by automated equipment using probes or other sensing devices.

4.4.6 Lot formation. The contractor shall maintain records on lot formation. Lot formation records shall be available upon request for review to verify that lot formation complies with 3.7.1 and 3.7.2 and that lot numbering is in accordance with MIL-STD-1168.

TABLE IV. *Sample size*

Lot Size	Inspection Levels											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2 – 8	*	*	*	*	*	*	*	*	*	5	3	2
9 – 15	*	*	*	*	*	*	*	13	8	5	3	2
18 –25	*	*	*	*	*	*	20	13	8	5	3	2
26 – 50	*	*	*	*	*	32	20	13	8	5	4	3
51 – 90	*	*	*	80	50	32	20	20	20	13	8	6
91 – 150	*	*	125	80	50	32	20	20	20	13	10	8
151 – 280	*	200	125	80	50	32	32	32	20	15	13	9
281 – 500	315	200	125	80	50	50	49	33	24	19	14	11
501 – 1200	315	299	200	125	80	74	49	39	31	23	18	14
1201 – 3200	315	299	200	169	129	96	59	49	36	28	22	17
3201 – 10000	315	299	200	169	149	124	74	56	45	35	27	19
10001 – 35000	498	315	299	229	199	142	99	72	56	43	31	19
35001 – 150000	748	498	373	299	213	175	99	87	69	49	31	19
150001 – 500000	748	598	498	332	271	213	142	110	74	49	31	19
500000 – OVER	998	748	598	427	332	299	149	124	74	49	31	19

4.4.7 100% Examination of Cartridges. During or immediately prior to the packaging operation, 100% examination of the cartridges shall be performed to ascertain that the cartridge type conforms to the requirements of 3.6.1 through 3.6.4. All non-conforming cartridges shall be rejected.

4.4.8 Packaging, Packing and Marking Inspection. Inspection for packaging, packing and marking shall be in accordance with MIL-STD-644. The requirements of Section 5.0 shall be met.

4.5 Tests.

4.5.1 Test conditions. Unless otherwise specified herein or in the solicitation, all testing shall be conducted with samples conditioned at 70°F plus or minus (±) 5°F for a minimum of two hours.

4.5.2 Test provisions. Unless otherwise specified herein or in the solicitation, each lot of components and each lot of cartridges shall be tested in accordance with the requirements stated in the specification, drawings and contract documents. Cartridges shall be randomly selected in such a manner that the sample is representative of the lot. The cartridges shall be thoroughly mixed before being divided into sample groups for each test.

4.5.3 Equipment/weapon failure. If an equipment/weapon failure occurs which prevents the obtaining of a reliable test result, then the equipment/weapon shall be replaced or repaired, the individual test cartridge result shall be disregarded and another sample cartridge shall be fired for the record. If the equipment/weapon failure prevented the obtaining of reliable results for the entire test series, then the entire test result shall be disregarded and a complete sample shall be fired for record. If a firing defect occurs which is not attributable to the test conditions, and which prevents obtaining a reliable result for the test, an additional cartridge shall be fired in its place. The test shall not be penalized, but the defect shall be counted in the cumulative ballistics sample for table I.

4.5.4 Reference cartridges. Unless otherwise specified in the solicitation (6.2.e), reference cartridges shall be supplied by the government. Government furnished reference cartridges shall be used only for calibrating test equipment, verifying test equipment calibration during testing, and determining correction factors to be applied to test results. Government furnished reference cartridges shall be used only for chamber pressure and muzzle velocity tests during first article inspections and conformance inspections. Reference cartridges furnished by the Government under this solicitation shall not be used for any other purpose. The contractor shall be responsible for furnishing secondary reference cartridges needed for in-process and in-house testing. Unused reference cartridges shall be returned to the Government upon completion of the contract.

4.5.5 Cartridge tests. Each lot of cartridges shall be subjected to the bullet extraction test in 4.5.5.2, ballistics tests in 4.5.5.3 through 4.5.5.7.

4.5.5.1 Appendices A, B and C. Appendices A, B and C provide more detailed ballistics test requirements. The following document shall be used as stated in these appendices: Small Caliber Ammunition Test Procedures (SCATP)-5.56mm Heavy Bullet) Cartridges.

4.5.5.2 Bullet extraction. The cartridge shall be secured in the test machine so that the extraction force is collinear with the cartridge central axis. The cartridge case shall be held in such a manner that the projectile is not pinched. The extraction force shall be applied by using a test machine crosshead travel rate (pulling rate) of 0.20 to 0.30 inches per minute. Each sample shall be tested to failure and the maximum load occurring during projectile separation from the cartridge case shall be recorded. (If the projectile pulling collet or jaws slips off the projectile, and the force exceeded the extraction force requirement of 3.4.5, then it shall be considered a valid test. If the force did not exceed the requirement of 3.4.5, then it shall be considered a non-test.) The lot shall be rejected if two or more cartridges fail to meet the requirements of 3.4.5.

4.5.5.3 Velocity. The velocity test shall be conducted in accordance with appendix A. The lot shall be rejected if the average velocity (corrected) of the projectiles does not meet the requirements of 3.5.1 or if the standard deviation of the velocities does not meet the requirements of 3.5.1 when temperature conditioned at 70°F. The lot shall also be rejected if one or more of the samples conditioned at -45°F or 125°F fail to meet the requirements of 3.5.4.1.

4.5.5.4 Chamber pressure. The test shall be performed in accordance with appendix A. Unless otherwise specified in the solicitation, the contractor shall provide the test barrel for pressure testing. The lot shall be rejected if the average peak chamber pressure of any test sample (corrected) at the 70°F temperature range fails the requirements of 3.5.2 or if one or more cartridges fail the individual sample requirements (corrected) of 3.5.2. The lot shall also be rejected if one or more of the samples temperature conditioned at -45°F or 125°F fails to meet the requirements of 3.5.4.2.

4.5.5.5 Port Pressure. The test shall be performed in accordance with appendix A. Unless otherwise specified in the solicitation, the contractor shall provide the test barrel for pressure testing. The lot shall be rejected if the average peak chamber pressure of any test sample (corrected) at the 70°F temperature range fails the requirements of 3.5.3 or if one or more cartridges fail the individual sample requirements (corrected) of 3.5.3. The lot shall also be rejected if one or more of the samples conditioned at -45°F or 125°F fail to meet the requirements of 3.5.4.3.

4.5.5.6 Accuracy. The accuracy test shall be conducted in accordance with appendix B. The requirements of 3.5.5 shall be met. The lot shall be rejected if the average extreme spread of all 10-shot groups exceeds the specified requirement or if two or more 10-shot groups exceed the individual group requirement.

4.5.5.7 Function and casualty. The function and casualty test shall be conducted in accordance with appendix C. The misfire requirement of 3.5.6 shall be met. The desired acceptance/ rejection shall be as shown in table I.

4.6 Safety Precautions. Compliance with the safety precautions of 3.8.1 (contractor) or 3.8.2 (government activity) shall be verified as part of the safety survey conducted during solicitation pre-award.

5. **PACKAGING**

5.1 Packaging. For acquisition purposes, packaging requirements shall be as specified in the solicitation (see 6.2.c.). When actual packaging of material is to be performed by DOD personnel, DOD personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department’s or Defense Agency's automated packaging files, CD-ROM products, or by contracting the responsible packaging activity.

6. **NOTES**

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The caliber 5.56mm cartridges covered by this specification are for use in the M16 family of weapons chambered for caliber 5.56mm cartridges. These cartridges are intended for use in magazine feed weapon systems only.

6.2 Acquisition requirements. Acquisition documents include the solicitation, quotation, contract and/or purchase order and are herein referred to as "solicitation". Acquisition documents must specify the following:

a. Title, number and date of the specification.

b. The issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.2 through 2.3).

c. Packaging, packing, palletizing, marking and labeling requirements: See 5. Solicitation must specify that packaging, packing, palletizing, marking and labeling shall be in accordance with MIL-P-15011, MIL-STD-644, drawings 19-48-4116, 19-48-4116/5A, 53711-7520779, 53711-7614523, 53711-7614524, and 53711-7614525.

d. Item designators (Department of Defense Identification Code/Naval Ammunition Logistic Code (DODIC/NALC) Index, Navy Item Identification Number, National Stock Number (NSN), and nomenclature).

e. Government-loaned property:

(1) Identification of Government-owned property to be loaned to the contractor for use under this specification only, to include quantities and test weapon serial numbers.

(2) Method by which contractor shall receive, account for during use, and return Government-loaned property to the Government upon termination or completion of the solicitation.

(3) All unexpended reference cartridges shall be returned to the Government with the test weapons (s). Record of test rifles used and the number of

cartridges expended in each weapon used shall be included as data in the test report(s).

f. Data Item Descriptions (DIDs) that are to be substituted for canceled and superseded DIDs, with reference to the appropriate Contract Data Requirements List (CDRL) (DD Form 1423).

g. First article: The solicitation must specify if first article inspection is required. If first article inspection is required, the solicitation must specify the quantity (sample size) of cartridges and the component name and quantity of each cartridge component to be subjected to first article inspection. The solicitation must also include clauses that require the following: First article sample shall be representative of the manufacturing methods and processes to be used for quantity production. First article sample shall be tested and the first article report submitted prior to the beginning of production. Further production of cartridges prior to acceptance of first article sample and written approval by the contracting officer shall be at the risk of the contractor. Additionally, any change in a component type or manufacturer after approval of the first article sample shall require an additional first article sample to be submitted and accepted prior to further production (including certification of propellant reactivity stability). The government may require sample cartridges delivered to the government and may subject sample cartridges to any or all of the inspections and tests specified in this specification, the applicable documents referenced herein or in the solicitation. The increased quantity shall be for informational purposes and will not effect the accept/reject criteria. Rejection criteria: if any cartridge in the first article sample fails to comply with any of the applicable requirements, the first article sample shall be rejected.

6.3 Definitions.

a. Misfire: Failure of a cartridge to fire after the initiating impulse has been applied to the primer, normally due to:

(1) Primer fails to fire when struck by firing pin.

(2) Propellant does not ignite when primer fires.

b. Hangfire: Any perceptible delay in the functioning of a cartridge after the initiating impulse has been applied to the primer.

c. Blown primer: A blown primer is a primer which, when the cartridge is fired, is separated completely from the head of the cartridge case and both the head of the case and the primer pocket are enlarged and deformed.

d. Longitudinal split: A longitudinal separation of the metal in the cartridge case wall produced by firing.

e. Circumferential rupture: A circumferential separation of the cartridge case wall produced by firing. A partial rupture is one that extends less than 360 degrees around the case. A complete rupture is one that extends entirely around the case, separating the case into two parts.

f. Premature cartridge function: A premature function of the cartridge prior to intentional initiation of the firing mechanism of the weapon. Such failures usually occur during cycling of the weapon mechanism and prior to complete locking of the weapon's bolt.

g. Loose primer: Independent movement of primer in the cartridge case primer pocket or the primer falls out of the cartridge case primer pocket.

6.4 Government-loaned property: Government-loaned property is defined as property "that the Government loans to the contractor for testing or any other purpose and which does not lose its identity by becoming part of the commodity" (5.3.3.13 of MIL-STD-961D). The contracting officer should arrange to loan the property listed in 3.2 to the contractor awarded the contract or purchase order (see 6.2.e.).

6.5 Part or identifying number (PIN) structure. See 6.2.d.

APPENDIX A

PROCEDURE FOR ELECTRONIC PRESSURE AND VELOCITY TEST

A.1 SCOPE

A.1.1 Scope. The electronic pressure and velocity test shall be performed to determine the chamber pressure level, port pressure level, velocity level and the uniformity of the cartridges. This test shall be performed prior to the conduct of other ballistic tests.

A.2 EQUIPMENT

A.2.1 Mount. A pier or mount of solid construction shall be utilized to mount the universal receiver and barrel assembly.

A.2.2 Barrel. The test barrel shall be 20.000 ± 0.010 inches in length and shall be in accordance with the requirements of SCATP-5.56mm (Heavy Bullet) Cartridges and drawing 19200-8649410. The barrel and universal receiver assembly shall be headspaced in accordance with the requirements of SCATP-5.56mm (Heavy Bullet) Cartridges. The barrel assembly shall be acceptable provided the values obtained with the reference cartridges during the test are as described: the peak average chamber pressure is within plus or minus 3500 psi of the assessed value of the reference lot, the peak port pressure is within plus or minus 2000 psi of the assessed value of the reference lot and the average velocity is within plus or minus 35 feet per second of the assessed value of the reference lot.

A.2.3 Transducer. A piezoelectric transducer shall be used in accordance with the requirements of SCATP-5.56MM (Heavy Bullet) for EPVAT testing. The transducer shall be calibrated in accordance with SCATP-5.56MM (Heavy Bullet). If Kistler type transducers are used, calibration is not required.

A.2.4 Measuring equipment. Equipment shall be in accordance with the requirements of SCATP-5.56MM (Heavy Bullet) for EPVAT testing, less the equipment required to measure action time.

A.3 USE OF REFERENCE CARTRIDGES

A.3.1 Reference cartridges shall be used to establish range and equipment corrections prior to firing an ammunition lot for acceptance. A minimum of twenty (20) reference cartridges shall be fired for each test sample of forty (40) cartridges. If several Electronic pressure and velocity tests are grouped such that they

may be fired in a common test barrel and within a period of time of 4 hours maximum, then a single twenty (20) cartridge reference

APPENDIX A (cont.)

firing may be performed. Reference cartridges shall be temperature conditioned at 65˚F to 75˚F only.

A.3.2 After the required number of reference cartridges has been fired, the actual average chamber pressure, the actual average port pressure and the actual average velocity of the reference cartridges shall be compared with the assessed value. If the assessed value is higher than the actual average chamber/port pressure of the reference cartridges, the difference is a plus correction and shall be added to the average chamber pressure of the test cartridges. If the assessed value is lower than the actual average chamber/port pressure of the reference cartridges, the difference is a minus correction and shall be subtracted from the average chamber pressure of the test cartridges. If the assessed value and the actual average chamber/port pressure of the reference cartridges are identical, then no correction is applied. If the assessed value is higher than the actual average velocity of the reference cartridges, the difference is a plus correction and shall be added to the average velocity of the test cartridges. If the assessed value is lower than the actual average velocity of the reference cartridges, the difference is a minus correction and shall be subtracted from the average velocity of the test cartridges. If the assessed value and the actual average velocity of the reference cartridges are identical, then no correction is applied.

A.4 **ELECTRONIC PRESSURE AND VELOCITY TEST PROCEDURE**

A.4.1 Cartridge conditioning. The required number of test cartridges shall be placed in a vertical position, primer-end down, in recessed holding blocks. The cartridges shall be permitted to come to a temperature of 60˚F to 80˚F prior to being placed in the controlled temperature room or container. The recessed holding blocks containing the cartridges shall be placed in a controlled temperature room or container in such a manner that all the cartridges are subjected to a uniform temperature for a minimum of two hours, prior to firing. The container or room shall be maintained at the temperature range for each test specified in Table II. Reference cartridges shall be temperature conditioned at 70˚± 5˚F only for each temperature range of firing.

A.4.2 Barrel preparation The chamber and bore of the test barrel shall be thoroughly cleaned and wiped dry prior to firing, and shall be cleaned after firing each group of rounds for record.

APPENDIX A (CONT)

A.4.3 Firing.

A.4.3.1 Two (2) warmer (fouling) shots shall be fired after each cleaning of the test barrel. During warm and foul, chamber pressure shall be measured using transducer in accordance with paragraphs A.4.3.3 through A.4.3.6 below, but the readings shall not be included in the record of the sample.

A.4.3.2 The cartridges shall be placed in an insulated box (five cartridges at a time) and the box placed at a point convenient to the technician. The cartridges are then removed singly from the insulated box immediately before firing. If an insulated box is not available, then the cartridges shall be removed singly from the controlled temperature room or container immediately before firing.

A.4.3.3 The cartridge shall be chambered very carefully.

A.4.3.4 The breech-block shall be closed gently.

A.4.3.5 The trip lever to which the lanyard is attached shall be carefully engaged to the hammer. If the technician encounters any difficulty closing the breech-block or engaging the trip lever, the test shall be discontinued until such difficulty is corrected. If any delay should occur after the cartridge is placed in the chamber, and the duration of the delay is approximately 1 minute or longer, that cartridge shall be extracted and another inserted in its place.

A.4.3.6 The cartridge shall be fired. The breech-block shall be lowered and the cartridge case extracted.

A.4.3.7 The procedure prescribed in A.4.3.3 through A.4.3.6 is repeated until the required number of cartridges have been fired.

A.4.3.8 The average chamber and port pressures of the reference cartridges shall be compared to their respective assessed values for the reference lot to assure that the test barrel meets the requirements of A.2.2. The average velocity of the reference cartridges shall be compared to the assessed value for the reference lot to assure that the test barrel meets the requirements of A.2.2.

A.4.3.9 The chamber and port pressure correction shall be obtained as prescribed in A.3.2. The velocity correction shall then be obtained as prescribed in A.3.2.

A.4.3.10 The chamber pressure correction obtained with the reference cartridges shall be applied to the average chamber

APPENDIX A (CONT)

pressure and to the maximum individual chamber pressure obtained with the test cartridges as prescribed in A.3.2. The port pressure correction obtained with the reference cartridges shall be applied to the average port pressure as prescribed in A.3.2. The velocity correction obtained with the reference cartridges shall be applied to the average velocity obtained with the test cartridges as prescribed in A.3.2.

A.4.3.11 The maximum individual peak pressure and the time of flight over the screens and/or the velocity shall be recorded.

A.4.3.12 The test cartridges shall then be fired in accordance with A.4.3.1 through A.4.3.6 above.

A.4.3.13 Continuous air cooling should be used on the barrel throughout the test. If air cooling is not available, firing should be regulated so that one cartridge is fired every 15 seconds. The barrel shall be allowed to cool to ambient temperature between each series of tests, or after a maximum of sixty (60) cartridges have been fired. At no time shall the exposed metal surface of the test barrel become too hot to grasp with the bare hands (approximately 140°F). After the barrel has cooled to ambient temperature, warming (fouling) shots shall be fired in accordance with A.4.3.1 prior to continuation of the test.

A.5 **EXAMINATIONS**

A.5.1 Examinations. All fired cartridge cases and primers shall be visually examined to determine compliance with the applicable requirements of Table I. In the event that fired case or primer defects are encountered, or if a misfire(s) occurs, then the test weapon shall be examined to determine if the defect(s) is attributable to the weapon. If the weapon is at fault, then the test shall be disregarded and the weapon shall be repaired or replaced prior to performing a retest. If the defect cannot be attributed to the weapon, then the defect shall be attributed to the cartridges. Misfired cartridges shall be disassembled to determine the cause of the misfire.

APPENDIX B

PROCEDURE FOR ACCURACY TEST

B.1 **SCOPE**

B.1.1 Scope. The accuracy test shall be performed to determine the uniformity and dispersion of the bullets at a specified distance from the test weapon.

B.2 **EQUIPMENT**

B.2.1 Range. The firing range shall be arranged such that a horizontal distance of 300 to 301 yards is maintained from the muzzle of the test weapon to the face of the test targets.

B.2.2 Weapon mount. The accuracy test weapon shall be supported during testing by mounting in the accuracy test fixture as described in drawing 19200-8649418 as required by SCATP-5.56mm (Heavy Bullet) Cartridges for operation of the test weapon. The test fixtures shall be constructed and mounted so as to prevent fixture movement during testing.

B.2.3 Targets. All test targets shall be rigidly mounted at a distance of 300 to 301 yards from the muzzle of the test weapon. An automated targeting system may be used in lieu of a rigid target if its accuracy has been verified with rigidly mounted targets.

B.2.4 Weapons. Test weapons shall consist of solid barrels (no piston or transducer port) with barrel dimensions in accordance with the requirements of 19200-8649409. The test weapon shall be in accordance with drawing 19200-8649417. The test weapon shall be headspaced in accordance with Drawing 19200-8649417. A minimum of two test barrels shall be used, with a maximum of five targets being fired upon by each test barrel (ten shots per target).

B.3 **TEST PROCEDURE**

B.3.1 Cartridge conditioning. The required number of test cartridges shall be placed in a temperature-controlled room or container in such a manner that all cartridges are subjected to an uniform temperature for a minimum of two hours prior to firing. The container or room shall be maintained at 70° ± 5°F and be of sufficient capacity to allow free circulation of air.

B.3.2 Barrel preparation. The chamber and the bore of the test barrel shall be thoroughly cleaned and wiped dry prior to firing.

APPENDIX B (CONT)

If the barrel is not conditioned for shooting moly coated rounds, 20 rounds should be fired through the barrel prior to beginning accuracy test.

B.3.2.1 Barrel Cleaning (for multiple tests). If firing multiple accuracy tests or after firing 100 rounds through the barrel, it should be cleaned with a non-abrasive cleaner. Do not use a brush or any abrasive cleaner. If the barrel has previously fired the 20 conditioning rounds or at least 20 other moly coated rounds, fire only 10 additional rounds through the barrel after each cleaning.

B.3.3 Firing.

B.3.3.1 A minimum of three unrecorded cartridges of the type of ammunition under test shall be fired to assure that the test weapon is correctly sighted on the target, to warm and foul the weapon, and to settle the weapon in the test fixtures.

B.3.3.2 After the warming and fouling cartridges have been fired, the target shall be changed so as to present a fresh surface for the succeeding rounds. Thereafter, the target shall be changed after each group of five cartridges has been fired.

B.3.3.3 For accuracy testing, all cartridges shall be singly loaded into the chamber of the test barrel. The required number of cartridges are removed from the controlled-temperature room or container and placed at a point convenient to the technician, provided temperature of the firing room is 70° ± 5°F. Otherwise the cartridges shall be placed in an insulated box (five cartridges at a time) which has been conditioned at 70° ± 5°F, and the box placed at a point convenient to the technician. The cartridges are then removed singly from the insulated box immediately before firing. If an insulated box is not available, then the cartridges shall be removed singly from the controlled-temperature room or container immediately before firing.

B.3.3.4 Five cartridges shall be fired for record. The target shall be changed and a second five shot group shall be fired in the same manner. This sequence shall be repeated until the specified number of cartridges has been fired on the first test barrel (50 cartridges maximum, plus warm and foul rounds).

B.3.3.5 The temperature of the test barrel should be controlled so that the exposed metal surface of the barrel does not become too hot to grasp with the bare hands (approximately 140°F). If the barrel becomes too hot to use, it shall be cooled to ambient temperature before the test is continued. The chamber and bore

shall be cleaned and wiped dry and the warming and fouling cartridges shall again be fired prior to continuation of the test.

APPENDIX B (CONT)

B.3.3.6 The second test barrel shall then be placed in the test fixture and the cartridges shall be tested using the procedures of B.3.3.1 through B.3.3.5 above. If more than two test barrels are used, then the number of targets to be fired shall be divided among the number of weapons used.

B.3.3.7 Misfired cartridges and fired cartridge cases and primers shall be retained for further examination.

B.3.3.8 Each target shall be measured to determine the maximum extreme spread of each ten shot group. This shall be accomplished by measuring the distance between the two outermost bullet holes (the two holes which are farthest apart). The measurement shall be taken from the centers of the holes. Measurements shall be accurate within plus or minum 0.1 inch and results shall be recorded to the nearest one-tenth of an inch.

B.3.4 Examinations. All fired cartridge cases and primers shall be visually examined to determine compliance with the applicable requirements of Table I. In the event that fired case or primer defects are encountered, or if a misfire(s) occurs, then the test weapon shall be examined to determine if the defect(s) or misfire(s) is attributable to the weapon. If the weapon is at fault, then the test shall be disregarded and the weapon shall be repaired or replaced prior to performing a retest. If the defect cannot be attributed to the weapon, then the defect shall be attributed to the cartridge. Misfired cartridges shall be disassembled to determine the cause of the misfire.

APPENDIX C

PROCEDURE FOR FUNCTION AND CASUALTY TEST

C.1 **SCOPE**

C.1.1 Scope. The purpose of the function and casualty test is to determine if the ammunition will perform and function satisfactorily in the weapons for which it has been designed.

C.2 **EQUIPMENT**

C.2.1 Test weapons. Test weapons shall be two each National Match M16A2's. No alterations to the test weapons, beyond the requirements and specifications of the original manufacturer or supplier, shall be permitted.

C.3 **TEST PROCEDURE**

C.3.1 Cartridge examination. If visual defects are found in the test cartridges prior to testing, the defective cartridge(s) shall be replaced. Table V below shows the number of rounds to be fired at each temperature range.

TABLE V. *Function and casualty test.*

Test Weapon	Firing Mode	Temperature Ranges		
		-40° ± 5°F	70° + 5°F	+125° ± 5° F
NM M16A2 #1	Semi-Auto	120	120	120
NM M16A2 #2	Semi-Auto	120	120	120
Total Rounds Each Range		240	240	240

C.3.2 Cartridge conditioning. Test cartridges shall be loaded into 30 round magazines and temperature conditioned at the specified temperatures for two hours minimum and shall be fired within two minutes after removal from the controlled temperature-conditioning chamber.

APPENDIX C (Cont)

C.3.3 Weapon preparation. Test weapons shall be thoroughly cleaned prior to the beginning of testing, but shall not be cleaned again until testing at all temperature ranges has been completed. The test weapons shall be lubricated using cleaner, lubricant and preservative (CLP, MIL-L-63460). The weapon shall be wiped with a cloth that was sprayed with CLP prior to assembly. The weapons shall be maintained at room temperature (55°F minimum) for a minimum of two hours prior to start of testing. Test sequence shall be cold temperature condition first, hot temperature condition second, and ambient temperature condition last, for each test weapon. Both weapons shall be tested at a given temperature condition prior to testing at another temperature condition.

C.3.4 Firing.

C.3.4.1 The firing procedure shall be as follows:

a. The test weapon shall be firmly supported by the shoulder and both hands during test firing, with no artificial support for the hands or arms of the tester.

b. The 30 round magazines shall be loaded to full capacity. The weapon shall be fired in semi-auto mode at a rate of approximately 30 shots per minute or about 1 shot every 2 seconds. This sequence shall be repeated until all test cartridges have been fired. The weapon shall be allowed to cool after firing 240 rounds.

C.3.4.2 The firing sequence of C.3.4.1 shall be repeated for each test weapon for each temperature range.

c.3.4.3 In the event of a weapon stoppage during the test, the test weapon shall be examined to determine if the stoppage is attributable to the weapon. If the weapon is at fault, then the test shall be disregarded and the weapon shall be repaired or replaced prior to performing a retest. If the stoppage cannot be attributed to the weapon, then the defect shall be attributed to the cartridges. In addition to weapon stoppages during firing, the following shall also be considered as weapon stoppages attributable to the cartridges.

(1) Failure of the last cartridge to eject from the weapon during any sequence of firing and locking the slide in the rearward position.
(2) Failure of the manually chambered cartridge to fully chamber in the barrel of the weapon.

(3) Failure of any cartridge to completely chamber, fire and completely eject due to residue build-up in the weapon mechanism from previous firings shall be a stoppage that is attributed to the cartridge.

APPENDIX C (CONT)

C.3.4.4 Misfired cartridges and fired cartridges cases and primers shall be retained for further examination.

C.3.5 Examinations. All fired cartridge cases and primers shall be visually examined to determine compliance with the applicable requirements of Table I. In the event that fired case or primer defects are encountered, or if a misfire(s) occurs, then the test weapon shall be examined to determine if the defect(s) or misfire(s) is attributable to the weapon. If the weapon is at fault, then the test shall be disregarded and the weapon shall be repaired or replaced prior to performing a retest. If the defect cannot be attributed to the weapon, then the defect shall be attributed to the cartridges. Misfired cartridges shall be disassembled to determine the cause of the misfire.