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24 November 1987
SUPERSEDING
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10 June 1971

MILITARY SPECIFICATION

CARTRIDGE, 7.62mm: NATO, TRACER, M62

This specification is approved for use within the U.S. Army Armament, Munitions and Chemical Command and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 This specification covers the Cartridge, 7.62mm: NATO, Tracer, M62 for use in 7.62mm weapons

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, listed in the solicitation.

SPECIFICATIONS

MILITARY

MIL-A-48078 - Ammunition, Standard Quality Assurance Provisions, General Specifications for

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-109 - Quality Assurance Terms and Definitions

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, U.S. Army Armament Munitions and Chemical Command, Attn. AMSMC-QA, Picatinny Arsenal, New Jersey 07806-5000 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 1305

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- Lot Numbering of Ammunition
MIL-STD-1170- Visual Standards and Comparison Methods for Evaluating Grain Configuration in 7.62mm Cartridge Cases

2.1.2 Other Government documents, drawings and publications. The following other Government documents, drawings and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of solicitation.

DRAWINGS

US ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (ARDEC)

PRODUCT AND PACKAGING DRAWINGS

7553708 - Packing and Marking, Cartridges 7.62mm, NATO; Cartons, Box, Ammunition, M19A1; Box Wirebound
7553747 - Packing and Marking, Cartridges 7.62mm, NATO; Cartons, Box, Ammunition, M2A1; Box Wirebound
7643674 - Classification of Cartridge Case Defects
8594726 - Packing and Marking, Cartridges 7.62mm, NATO; 5 Round Clips; Cartons; Bandoleers; Boxs, Ammunition, M2A1; Box, Wirebound
10521856 - Symbols, Identification Marking; NATO; Boxes, Wirebound, Boxes Ammunition, M19A1 and M2A1
10521857 - Symbols, Interchangeability
10521861 - Packing and Marking, Cartridges, 7.62mm, NATO; Linked; Cartons, Bandoleers; Box, Ammunition, M19A1; Box, Wirebound
10522000 - Cartridge, 7.62mm, NATO, Tracer, M62

INSPECTION EQUIPMENT DRAWINGS

LI10522000- Index of Inspection Equipment List for: Cartridge, 7.62mm, NATO, Tracer, M62

PUBLICATIONS

DEPARTMENT OF DEFENSE

SCATP-7.62 - Ammunition Ballistic Acceptance Test Methods, Test Procedures for 7.62mm Cartridges

AMERICAN SOCIETY OF TESTING AND MATERIALS

E92 - Metallic Materials, Vicker Hardness of

(Copies of specifications, standards, handbooks, drawings and publications required by manufacturers in connection with specific aquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.1.3 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DOD adopted shall be the issue listed in the current DoDISS specified in the solicitation.

CODE OF FEDERAL REGULATIONS

49 CFR-100-199 - Interstate Commerce Commision Rules Regulations for the Transportation of Explosives and Other Dangerous Article

(The Interstate Commerce Commision regulations are now part of the Code of Federal Regulations (1967 editions and revisions) available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Orders for the above publications, cite "49 CFR 110-199, Latest revision.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Cartridges. The cartridge shall comply with all requirements specified on Drawing 10522000, all associated drawings and with all requirements specified in applicable specifications and standards.

3.1.1 Material. All materials shall be in accordance with the applicable drawings, specifications and standards.

3.1.2 Parts. All parts shall comply with the applicable drawings, specifications and standards.

3.2 Bullet extraction. The force required to extract the bullet from the cartridge case shall be not less than 60 pounds.

3.3 Residual stress. The cartridge case shall not split when subjected to a one percent mercurous nitrate solution for 15 minutes.

3.4 Waterproof. The cartridge shall not release more than one bubble of air when subjected to a pressure differential of 7 1/2 psi for 30 seconds.

3.5 Accuracy. The average of the mean radii of all targets of the sample cartridges, fired in standard accuracy test weapons over a range of 600 yards, shall not exceed 15.0 inches.

3.6 Trace. When viewed at night from a line parallel to the plane of the trajectory, with the line of sight perpendicular to the plane of the trajectory at each point of observation, the bullet of the tracer cartridge shall exhibit a visible trace of full luminosity from a point not greater than 125 yards from the muzzle of the weapon to a point not less than 850 yards from the muzzle. The trace shall be blind from the muzzle of the weapon to a point at least 15 yards from the muzzle.

3.7 Action time. The action time (overall primer ignition, propellant burning and bullet-barrel time) of the sample cartridges when conditioned for not less than 2 hours at 68° to 72° F, shall not exceed 4 milliseconds.

3.8 Temperature tests. The chamber pressure, velocity and function and casualty requirements of the sample cartridges subjected to each of the following storage conditions shall be as noted in the applicable sub-paragraphs:

a. Conditioned at 70° F for not less than 2 hours and fired at that temperature.

b. Conditioned at 125°F for 4 to 12 hours and fired at that temperature.

c. Conditioned at -65°F for not less than 6 hours and fired at that temperature.

3.8.1 Chamber pressure. The chamber pressure measurement shall be performed by either the copper-crush cylinder or EPVAT test method. However, the test method employed shall be recorded on the test results.

3.8.1.1 Chamber pressure measurement at 70°F by copper-crush cylinder test method. The average chamber pressure of the sample cartridges conditioned at 70°F shall not exceed 50,000 pounds per square inch (psi). The average chamber pressure plus three standard deviations of chamber pressure shall not exceed 55,000 psi. The chamber pressure of an individual sample cartridge shall not exceed 55,000 psi.

3.8.1.2 Chamber pressure measurement at 70°F by EPVAT (electronic pressure velocity action time) test method. The average chamber pressure of the sample cartridges conditioned at 70°F shall not exceed 365 MegaPascals (52,940 psi). The average chamber pressure plus three standard deviations of the chamber pressure shall not exceed 400 MPa (58,016 psi). The chamber pressure of an individual sample cartridge shall not exceed 400 MPa (58,016 psi).

3.8.1.3 Chamber pressure measurement at 125°F and -65°F by copper-crush cylinder test. The average chamber pressure of the sample cartridges subjected to 125°F and -65°F storage conditions shall not exceed 55,000 psi nor vary by more than plus (+) 7,500 psi or minus (-)15,000 psi from the average chamber pressure of the sample cartridges of the same lot tested for the requirements of paragraph 3.8.1.1.

3.8.1.4 Chamber pressure measurement at 125°F and -65°F by EPVAT test method. The average chamber pressure of the sample cartridges subjected to 125°F and -65°F storage conditions shall not exceed 400 MPa (58,016 psi) nor vary by more than plus (+)50 MPa (7,252 psi) or minus (-)100 MPa (14,504 psi) from the average chamber pressure of the sample cartridges of the same lot tested for the requirements of paragraph 3.8.1.2.

3.8.1.5 Velocity. The average velocity of the sample cartridges conditioned at 70°F, shall be 2,750 feet per second (ft/sec) plus or minus 30 ft/sec for gilding metal clad steel jacketed bullets or 2,680 ft/sec plus or minus 30 ft/sec for gilding metal jacketed bullets at 78 feet from the muzzle of the weapon. The standard deviation of the velocities shall not exceed 32 ft/sec.

3.8.1.6 Velocity. The average velocity of the sample cartridges subjected to 125°F and -65°F storage conditions shall not vary from the average velocity of the sample cartridges of the same lot conditioned at 70°F by more than plus (+)150 or minus (-)250 ft/sec.

3.8.1.7 Function and casualty. The sample cartridges subjected to 70°F, 125°F and -65°F storage conditions shall function without casualty.

3.9 Bullet integrity. The bullet of the cartridge shall not burst either in its passage through the barrel or in flight; neither shall the jacket of the bullet or any part thereof strip from the slug when the cartridge is fired.

3.10 Port Pressure. The port pressure measurement can be performed by either the copper-crush cylinder or EPVAT test method. The average port pressure of the sample cartridges when conditioned for not less than 2 hours at 68° to 72°F and fired at that temperature shall be as noted in the applicable sub-paragraphs:

3.10.1 Measurement by copper-crush cylinder test method. The average port pressure of the sample cartridges shall be 12,500 psi ± 2,000 psi.

3.10.2 Measurement by EPVAT test method. The average port pressure of the sample cartridges shall not be greater than 85 MPa (12,328 psi) and shall not be less than 60 MPa (8,702 psi).

3.11 Grain configuration. The grain configuration of the sidewall of the finished cartridge case shall fall within the range defined by the grain configuration standards illustrated in MIL-STD-1170, Figures 1 through 6.

3.12. Workmanship. The requirements for workmanship are as specified on the applicable drawings, referenced specifications and the following. The metal parts of the cartridge shall be free of cracks, splits, perforations, burrs and foreign matter. The cleaning method used shall not be injurious to any part, nor shall the parts be contaminated by any cleaning agent. All parts and assemblies shall be fabricated, loaded and assembled in a thorough and workmanlike manner. In addition, the cartridge shall comply with the standards specified in the 7.62mm section of MIL-STD-636. Extreme care should be exercised to avoid contamination of primers or propellant by oil, grease or other foreign matter.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements. In addition, unless specified herein or in the contract the provisions of MIL-A-48078 shall apply and are hereby made a part of this detailed specification.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Quality assurance terms and definitions. Reference shall be made to MIL-STD-109 for definition of quality assurance terms.

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

a. First article inspection (see 4.3).

b. Quality conformance inspection (see 4.4).

4.3 First article inspection.

4.3.1 Submission. The contractor shall submit a first article sample as disignated by the Contracting Officer for evaluation in accordance with the provisions of 4.3.2. The first article sample shall be manufactured using the same materials, equipment, processes and procedures as will be used in regular production. All parts and materials, including packaging and packing shall be the same as used for regular production and shall be obtained from the same source of supply. The first article sample shall consist of the following items in sample quantities as indicated below:

Part Description	Drawing	Quantity
Cartridge, 7.62mm NATO Tracer, M62	10522000	4440
Filler, point	7553760	5/each final station/ each machine
Jacket	7553759	5/each final station/ each machine
Jacket (alternate)	10523993	5/each final station/ each machine
Bullet	7553758	5/each final station/ each machine
Bullet (alternate)	10523994	5/each final station/ each machine
Case	10523997	5/each final station/ each machine

4.3.2 Inspections to be performed. See MIL-A-48078 and Tables I and II specified herein.

4.3.3 Rejection. See MIL-A-48078 and Tables I and II specified herein.

4.3.3.1 Function and casualty. The sample shall be rejected if any defect from function and casualty testing plus firing defects observed in all other firing tests exceeds the acceptance numbers specified in Table II.

TABLE I. First article inspection

CLASSIFICATION OF DEFECTS & TESTS MIL-C-46281F(AR)

PARAGRAPH	TITLE		SHEET 1 OF 4		DRAWING NUMBER
4.3	Cartridge, 7.62mm, NATO, Tracer, M62 and Components				See below
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Filler, point (Dwg. 7553760)				
	Examination for defects	5 1/	Acc-0 Rej-1	3.1	2/
	Jacket (Dwg. 7553759)				
	Examination for defects	5 1/	Acc-0 Rej-1	3.1	2/
	Jacket alternate (Dwg. 10523993)				
	Examination for defects	5 1/	Acc-0 Rej-1	3.1	2/
	Bullet (Dwg. 7553758)				
	Examination for defects	5 1/	Acc-0 Rej-1	3.1	2/
	Bullet alternate (Dwg. 10523994)				
	Examination for defects	5 1/	Acc-0 Rej-1	3.1	2/
	Case (Dwg. 10521997)				
	Examination for defects	5 1/	Acc-0 Rej-1	3.1	2/
	Cartridge, 7.62mm, NATO, Tracer, M62				
	Examination for defects:		Acc-Rej	3.1, 3.12	Table III
	Critical defect	4440	0 1		
	Major defect	500	2 3		3/
	Minor defect	500	8 9		3/

NOTES: 1/ Each final station/each machine

2/ The sample units shall be inspected with standard measuring and test equipment for all mandatory requirements specified on the applicable drawing.

AMSMC Form 1570, 1 Feb 85 Replaces DRSMC-QA (D) Form 160, 1 Aug 83, which may not be used.

TABLE I. First article inspection

CLASSIFICATION OF DEFECTS & TESTS MIL-C-46281F(AR)

PARAGRAPH	TITLE		SHEET 2 OF 4		DRAWING NUMBER See below
4.3	Cartridge, 7.62mm, NATO, Tracer, M62 and Components				NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Bullet extraction	80	Acc-1 Rej-2	3.2	4.5.1
	Residual stress	80	Acc-0 Rej-1	3.3	4.5.2
	Action time at 70°F	80	Acc-0 Rej-1	3.7	4.5.6
	Velocity				
	70°F	40	4/	3.8.1.5	4.5.7, 4.5.9.1
	High temperature	40	4/	3.8.1.6	4.5.7, 4.5.9.3
	Low temperature	40	4/	3.8.1.6	4.5.7, 4.5.9.2
	Chamber pressure				
	70°F	40	4/	3.8.1.1	
				3.8.1.2	4.5.8, 4.5.9.1
	High temperature	40	4/	3.8.1.3	
				3.8.1.4	4.5.8, 4.5.9.3
	Low temperature	40	4/	3.8.1.3	
				3.8.1.4	4.5.8, 4.5.9.2
	Port Pressure				
	70°F	40	4/	3.10	4.5.12, 4.5.9.1

NOTES: 3/ One random sample of 500 cartridges for major and minor defects inspection taken from 4440 cartridges.

AMSMC Form 1570, 1 Feb 85 Replaces DRSMC-QA (D) Form 160, 1 Aug 83, which may not be used.

TABLE I. First article inspection

CLASSIFICATION OF DEFECTS & TESTS

MIL-C-46281F(AR)

PARAGRAPH	TITLE		SHEET 3 OF 4		DRAWING NUMBER
4.3	Cartridge, 7.62mm, NATO, Tracer, M62 and Components				See below
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Function and Casualty-Gun machine M60				
	70°F	200	5/	3.8.1.7	4.5.10, 4.5.9.1
	High temperature	200	5/	3.8.1.7	4.5.10, 4.5.9.3
	Low temperature	200	5/	3.8.1.7	4.5.10, 4.5.9.2
	Function and Casualty-Gun Machine, M134				
	70°F	200	5/	3.8.1.7	4.5.10, 4.5.9.1
	High temperature	200	5/	3.8.1.7	4.5.10, 4.5.9.3
	Low temperature	200	5/	3.8.1.7	4.5.10, 4.5.9.2
	Function and Casualty-Gun Machine, M240				
	70°F	200	5/	3.8.1.7	4.5.10, 4.5.9.1
	High temperature	200	5/	3.8.1.7	4.5.10, 4.5.9.3
	Low temperature	200	5/	3.8.1.7	4.5.10, 4.5.9.2
	Function and Casualty-Gun Machine, NF1				
	70°F	100	5/	3.8.1.7	4.5.10, 4.5.9.1
	High temperature	100	5/	3.8.1.7	4.5.10, 4.5.9.3
	Low temperature	100	5/	3.8.1.7	4.5.10, 4.5.9.2
	Function and Casualty-Rifle, M14				
	70°F	160	5/	3.8.1.7	4.5.10, 4.5.9.1
	High temperature	120	5/	3.8.1.7	4.5.10, 4.5.9.3
	Low temperature	120	5/	3.8.1.7	4.5.10, 4.5.9.2

NOTES: 4/ The first article sample shall be rejected if the sample fails to comply with the applicable requirement.
5/ The first article sample shall be rejected when function and casualty defects plus firing defects observed on all other firing tests exceed any acceptance numbers listed in Table II.

TABLE I. First article inspection

CLASSIFICATION OF DEFECTS & TESTS

MIL-C-46281F(AR)

PARAGRAPH	TITLE		SHEET 4 OF 4		DRAWING NUMBER
4.3	Cartridge, 7.62mm, NATO, Tracer, M62 and Components				See below
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Function and Casualty-Rifle (LAR), FN				
	70°F	160	5/	3.8.1.7	4.5.10, 4.5.9.1
	High temperature	120	5/	3.8.1.7	4.5.10, 4.5.9.3
	Low temperature	120	5/	3.8.1.7	4.5.10, 4.5.9.2
	Function and Casualty-Rifle, G3A2				
	70°F	160	5/	3.8.1.7	4.5.10, 4.5.9.1
	High temperature	120	5/	3.8.1.7	4.5.10, 4.5.9.3
	Low temperature	120	5/	3.8.1.7	4.5.10, 4.5.9.2
	Waterproof	80	Acc-5 Rej-6	3.4	4.5.3
	Accuracy	180	4/	3.5	4.5.4
	Trace				
	Machine gun, M60	150	Acc-20 Rej-21	3.6	4.5.5
	Machine gun, Test, T65E1	150	Acc-20 Rej-21	3.6	4.5.5
	Bullet integrity	6/	Acc-0 Rej-1	3.9	4.5.11
	Grain configuration	20	Acc-0 Rej-1	3.11	4.5.13
	Hardness				
	Case Head	20	Acc-0 Rej-1	3.1	4.5.14.2
	Case Sidewall	20	4/	3.1	4.5.14.1

NOTES: 6/ This shall be performed concurrently with trace testing.

AMSMC Form 1570, 1 Feb 85 Replaces DRSMC-QA (D) Form 160, 1 Aug 83, which may not be used.

TABLE II
First Article Acceptance and Rejection Numbers for Firing Defects

Defects	Accept	Reject
1. Misfire 1/		
a. No vent hole, or obstruction in vent area	0	1
b. Other	0	1
2. Bullet remaining in bore	0	1
3. Hangfire 2/	0	1
4. Primer leak		
a. Perforation in firing pin indent in primer cup		
(1) Machine guns (other than M60, M240, M134)	5	6
(2) Rifles (other than M14)	1	2
(3) Machine gun M60, M240, M134	0	1
(4) Rifle, M14	0	1
b. Escape of gas through primer cup other than 4a.	1	2
c. Escape of gas around primer cup	76	77
d. Blown primer	0	1
e. Primer falls out of pocket on retraction of bolt	0	1
f. Primer remains in pocket but is physically loose	1	2
5. Case casualties		
a. Longitudinal split 3/		
(1) Neck & Shoulder (I or S)	51	52

TABLE II
First Article Acceptance and Rejection Numbers for Firing Defects

Defects	Accept	Reject
(2) Body (J)	3	4
(3) Body (K)	1	2
(4) To head (L)	0	1
(5) Through head (M)	0	1
b. Circumferential rupture 3/		
(1) Partial, shoulder of body (J & S)	0	1
(2) Partial, body (K)	0	1
(3) Partial, Head (L)	0	1
(4) Complete	0	1
6. Failure to extract	0	1
7. Weapon stoppage 4/		
Total of defects 4a.(1), 4a.(2), 4c., & 5a(1)	77	78
Total of all other listed defects	7	8

1/ Each cartridge that misfires shall be disassembled and examined for the presence of the vent hole in the primer pocket or any obstruction in the vent hole area of the primer pocket that can be assignable as the cause for the misfire. If the vent hole is missing or obstructed, the first article quantity shall be rejected.

2/ For the definition of hangfire, see SCATP-7.62 paragraph 10.6.2.

3/ For location of defects indicated by letters in parentheses, see, Dwg. 7643674.

4/ All stoppages attributable to the ammunition, with the exception of misfire, complete rupture and failure to extract, observed in all tests shall be included.

4.4 Quality conformance inspection.

4.4.1 Lot formation. In accordance with MIL-A-48078.

4.4.1.1 Lot submission. The cartridge shall be submitted in accordance with MIL-STD-105, Inspection Level II,

4.4.1.2 Component parts. Unless otherwise specified, component parts shall be homogeneous and of a size convenient to the contractor and inspected, tested and accepted by the contractor. The cartridge lot shall contain:

a. Cartridge cases from one unchanged process and from one manufacturer.

b. Bullets from one unchanged process and from one manufacturer.

c. Primers from one lot interfix number and from one manufacturer.

d. Propellant from no more than two lot numbers and from one manufacturer.

4.4.1.3 Lot identification. Each lot of ammunition shall be identified as to type, caliber and model, lot number in accordance with MIL-STD-1168 and the supplier's identification as assigned by the procuring activity.

4.4.2 Examination for defects.

a. Major and minor defects. Examination for major and minor defects shall be performed on a class basis in accordance with the quality conformance classification of defects, (see Table III) using applicable sampling plans and acceptance criteria of MIL-STD-105. The acceptable quality level (AQL) for the major class shall be 0.25% and the minor class shall be 1.50% except for workmanship which shall be 2.5%. All nonconforming cartridges shall be rejected.

b. Critical defects. Unless otherwise specified, one hundred percent examination shall be performed for all critical defects (see Table III). If a visual critical defect is found in a sample either just prior to a firing test or after a firing test (and the defect is not due to the firing), the lot shall be rejected. The lot shall then be rescreened and resubmitted for visual inspection of critical defects. If a critical defect is found during packing, the portion of the lot that has been packed or is in the process of being packed shall be rejected. In addition, the portion of the lot remaining to be packed shall be rejected. The lot shall then be rescreened and resubmitted for visual inspection of critical defects.

TABLE III

Qualtiy Conformance Classification of Defects

No.	Defect and Method of Inspection Visual 1/	Critical	Major	Minor	Major or Minor
	CARTRIDGE				
1	Discolored, dirty, oil, smeared			X	
2	Corroded or stained, if etched		X		
3	Mixed ammunition types (see 4.4.4)	X	X		
3a	Missing or partially missing paint identification (see MIL-STD-636)				X
	CASE				
4	Round head		X		
5	Dent				X
6	Spilt case				
	in K, L or M location	X			
	in I, S or J location	X			
7	Perforated case	X			
8	Draw scratch				X
9	Scratch			X	
10	Beveled underside of head		X		
11	Case mouth not crimped in cannelure		X		
12	Scaly metal				X
13	No chamfer on head (rim)		X		
14	Fold			X	
15	Wrinkle			X	
16	Buckle			X	
17	Bulge			X	
18	Illegible or missing head stamp			X	
19	Defective head			X	
20	Defective mouth			X	
21	No visible evidence of mouth anneal		X		
	BULLET				
22	Dent			X	
23	Scratch			X	
24	Split bullet jacket		X		
25	Loose Bullet		X		
26	Missing cannelure		X		
27	Scaly metal (bullet)				X

TABLE III
(continued)

No.	Defect and Method of Inspection Visual 1/	Critical	Major	Minor	Major or Minor
28	Upset (crooked) point			X	
29	Exposed steel (clad jacket)			X	
30	Blunt point			X	
31	Defective cannelure			X	
	PRIMER				
32	No primer	X			
33	Cocked primer	X			
34	Inverted primer	X			
35	Loose primer		X		
36	Nicked or dented primer			X	
37	No waterproofing material (primer pocket joint)			X	
38	Defective crimp			X	
	CARTRIDGE-GAGING				
39	Total length		X		
40	Cartridge profile failure (requiring more than 20 lbs dead weight to insert in profile and alignment gage)		X		
41	Diameter of extractor groove, max.		X		
42	Diameter of extractor groove, min.			X	
43	Diameter of head		X		
44	Thickness of head		X		
45	Length of shoulder datum		X		
46	Depth of primer		X		
	CARTRIDGE-WEIGHING				
47	Weight, min 2/	X			
	CARTRIDGE-OTHER				
48	Workmanship (see 3.12 and 4.4.2.a)			X	

1/ Refer to MIL-STD-636 for visual defect standards for defects 1 through 38.

2/ Each lightweight cartridge shall be disassembled and the propellant weighed. Each such cartridge found to contain 25 grains or more of propellant shall be classed as a major defect. Any cartridge containing less than 25 grains of propellant shall be classed as a critical defect.

4.4.3 Tests. The tests listed in Table IV shall be conducted in accordance with the methods and procedures specified in 4.5.

4.4.3.1 Test samples. The quantities for the various tests shall be as specified in Table IV. Only cartridges having met the visual, dimensional and weight requirements shall be used in the ballistic tests and shall have been selected in such a manner that the sample is representative of the entire lot. The cartridges shall be thoroughly mixed before being divided into samples for the various tests.

TABLE IV

Quality Conformance Tests

	Ambient Temperature	70 +2 °F 4.5.10.1	Low temperature (see 4.5.10.2)	High temperature (see 4.5.10.3)	Requirement paragraph
Bullet extraction 1/	25				3.2
Residual stress (mercurous nitrate) 1/	50				3.3
Waterproof 2/	50				3.4
Accuracy 3/	90				3.5
Trace 4/					3.6
Gun, machine, 7.62mm, M60	100				
Gun, machine, 7.62mm, T65E1	100				
Bullet integrity 5/	--	--		--	3.9
Grain configuration 1/	10				3.11
Hardness:					3.1
Head 6/	10				3.1
Sidewall 3/	10				
Function & Casualty 7/:					3.8.1.7
Gun, machine M60		150	150	150	
Gun, machine, M240		150	150	150	
Gun, automatic, M134		200	200	200	
Rifle, M14		120	80	80	
Rifle, (LAR), FN		120	80	80	
Rifle, G3A2		120	80	80	
Gun, machine, NF1		100	100	100	

TABLE IV
(continued)

	.70 +2 σ_F 4.5.10.1	Low temperature (see 4.5.10.2)	High temperature (see 4.5.10.3)	Requirement paragraph
Measurement by copper-crush cylinder:				
Action time 1/	50			3.7
Velocity 8/	20	20	20	3.8.1.5, 3.8.1.6
Chamber pressure 8/	20	20	20	3.8.1.1, 3.8.1.3
Port pressure 3/	20			3.10.1
Measurement by EPVAT 9/	30	30	30	
Action time 1/	--			3.7
Velocity 8/	--	--	--	3.8.1.5, 3.8.1.6
Chamber pressure 8/	--	--	--	3.8.1.2, 3.8.1.4
Port pressure 3/	--			3.10.2

1/ Failure of two or more cartridges to comply with the applicable requirement shall be cause for rejection of the lot. If one cartridge fails in the first test, a second sample consisting of double the number of cartridges in the first sample shall be tested. If any failing cartridges are found in the second sample, the lot shall be rejected.

2/ Failure of ten or more cartridges to comply with the applicable requirement shall be cause for rejection of the lot. If more than three but less than ten cartridges fail in the first test, a second sample consisting of double the number of cartridges in the first sample shall be tested. The lot shall be rejected if in the combined first and second sample, ten or more cartridges fail to comply with the applicable requirements.

3/ Failure of the cartridges to comply with the applicable requirement shall be cause for rejection ot the lot subject to testing a second sample consisting of double the quantity of cartridges used in the first test. Failure of the cartridges in the second sample to comply with the applicable requirement shall be cause for rejection of the the lot.

4/ The lot shall be rejected if more than twenty shots in either weapon fail to comply with the applicable requirement. No second sample permitted.

5/ This test shall be performed in conjunction with the "Trace test". Failure of any cartridge to comply with the applicable requirement shall be cause for rejection of the lot. No second sample permitted.

6/ Failure of one or more cartridges to comply with the applicable requirements shall be cause for rejection of the lot. No second sample permitted.

7/ The lot shall be rejected when function and casualty defects plus firing defects observed in all other firing tests exceed the acceptance number for the cumulative sample in Table V. If the number of defects found in the first test exceeds the acceptance number for the first sample, but is equal to or less than the acceptance number for the cumulative sample, a second sample, consisting of double the quantities specified under function and casualty test, shall be fired in all the service weapons specified therefor. This procedure shall apply regardless of the weapon or weapons in which the firing defects occurred in the first test. If the total number of defects in the combined first and second sample exceeds the acceptance number for the cumulative sample, the lot shall be rejected. If, in testing a second sample, defects other than those for which the second sample is being tested should occur to the extent that they exceed the accpetance number for the cumulative sample, the lot shall be rejected.

8/ Failure of the cartridges in any sample to comply with the applicable requirement shall be cause for rejection of the lot subject to testing of a second sample consisting of double the quantity of cartridges used in the first test for the temperature or temperatures at which the failure occurred. Failure of the cartridges of the second sample to comply with the applicable requirement shall be cause for rejection of the lot.

9/ EPVAT test method for chamber pressure, port pressure, velocity and action time shall be performed simultaneously at all temperatures except for action time and port pressure which are performed only at 70° ± 2°F.

4.4.3.2 Firing defects. Firing defects and acceptance numbers shall be as specified in Table V.

TABLE V

Quality Conformance Acceptance Numbers for Firing Defects

Defects	ACCEPTANCE NUMBER COPPER-CRUSH CYL. First Sample 1/	ACCEPTANCE NUMBER COPPER-CRUSH CYL. Cumulative (1st & 2nd Sample) 1/	ACCEPTANCE NUMBER EPVAT First Sample 1/	ACCEPTANCE NUMBER EPVAT Cumulative (1st & 2nd Sample 1/
1. Misfire 2/				
a. No vent hole, or obstruction in vent area 3/	0	-	0	-
b. Other	1	2	1	2
2. Bullet remaining in bore 3/	0	-	0	-
3. Hangfire 4/ 3/	0	-	0	-
4. Primer leak				
a. Perforation in firing pin indent in primer cup				
(1) Machine guns (other than M60, M240 and M134)	6	14	6	14
(2) Rifles (other than M14)	2	4	2	4
(3) Machine gun M60, M240 and M134 5/	0	-	0	-
(4) Rifle, M14 5/	0	-	0	-
b. Escape of gas through primer cup other than 4a.	1	2	1	2
c. Escape of gas around primer cup 6/	80(64)	189(142)	77(61)	186(139)
d. Blown primer	0	1	0	1
e. Primer falls out of pocket on retraction of bolt	0	1	0	1

TABLE V
(continued)

Defects	ACCEPTANCE NUMBER COPPER-CRUSH CYL. First Sample 1/	Cumulative (1st & 2nd Sample) 1/	ACCEPTANCE NUMBER EPVAT First Sample 1/	Cumulative (1st & 2nd Sample 1/
f. Primer remains in pocket but is physically loose	2 (1)	5 (2)	2 (1)	5 (2)
5. Case casualties				
a. Longitudinal split 7/				
(1) Neck & Shoulder (I or S)	54(43)	132(99)	52(41)	130(97)
(2) Body (J)	4(3)	8(6)	4(3)	8(6)
(3) Body (K)	1	2	1	2
(4) To head(L)	0	1	0	1
(5) Through head (M)	0	1	0	1
b. Circumferential rupture 7/				
(1) Partial, shoulder of body (J & S)	1	2	1	2
(2) Partial, body (K)	0	1	0	1
(3) Partial, Head (L)	0	1	0	1
(4) Complete	0	1	0	1
6. Failure to extract	0	1	0	1
7. Weapon stoppage 8/	0	1	0	1
Total of defects 4a.(1), 4a.(2), 4c., & 5a(1)	81(64)	190(146)	78(61)	187(143)
Total of all other listed defects	8(6)	17(13)	8(6)	17(13)

1/ Numbers in parentheses indicate acceptance numbers to be applied during reduced testing when function and casualty testing is conducted only in the M60 Machine Gun, M240 Machine Gun, M134 Automatic Gun and M14 Rifle.

2/ Each cartridge that misfires shall be disassembled and examined for presence of vent hole in primer pocket or any

obstruction in the vent hole area of the primer pocket that can be assignable as the cause for misfire. If the vent hole is missing or obstructed, the lot shall be rejected with no second sample permitted.

3/ No second sample permitted. Lot shall be rejected.

4/ For the definition of a hangfire, see SCATP-7.62 paragraph 10.6.2.

5/ If one or more defects are found in the first sample, a second sample shall be fired in the weapon(s) in which the defect occurred. The second sample shall consist of double the quantity of cartridges specified under function and casualty of Table IV for such weapon(s). Prior to the testing of the second sample, the firing pin of the specified weapon(s) in which the defect originally occurred shall be replaced by a new firing pin. If an additional primer perforation is found in the second sample, the lot shall be rejected.

6/ The total number of cases in which the escape of gas is 50% or more around the periphery of the primer cup shall not exceed 25 for the first sample nor more than 57 for the cumulative sample. When Note 1/ applies, the total number of cases in which the escape of gas is 50% or more around the primer cup periphery shall not exceed 20 for the first sample nor more than 43 for the cumulative sample.

7/ For location of defects indicated by letters in parentheses, see Dwg. 7643674.

8/ All stoppages attributable to the ammunition, with the exception of misfire, complete rupture or failure to extract, observed in all tests shall be included.

4.4.4 Packaging, packing and marking inspection. During or immediately prior to the packaging operation, 100 percent examination of the cartridges shall be performed to ascertain that the cartridge type conforms to the drawing. Occurrence of a high pressure test, dummy, blank or grenade cartridge shall be classed as a critical defect. Occurrence of any incorrect type other than those listed shall be classed as a major defect. All non-conforming cartridges shall be rejected. Inspection for packaging, packing and marking shall be in accordance with MIL-STD-644 as applicable to the drawing. In addition, after linking, clipping or prior to insertion into cartons, the cartridges shall be inspected for paint identification missing in excess of 40% of original coverage (Major or Minor defect). This inspection shall be in accordance with MIL-STD-105, Inspection Level II with an AQL of 0.25 percent for Major defects and 1.50 percent for Minor defects.

4.4.5 Inspection equipment. The inspection equipment required to perform the inspections and test prescribed herein is described in the Index of Inspection Equipment List LI-10522000. The contractor shall submit for approval inspection equipment designs in accordance with the terms of the contract. See Section 6 of MIL-A-48078 and 6.2 herein.

4.5 Test methods and procedures.

4.5.1 Bullet extraction. The cartridges shall be tested in an approved bullet extractor machine. The rate of travel of the test head shall be not less than three nor more than six inches per minute. The test shall be conducted in accordance with SCATP-7.62.

4.5.2 Residual stress (mercurous nitrate). The test shall be conducted in accordance with SCATP-7.62.

4.5.3 Waterproof. The test shall be conducted in accordance with SCATP-7.62. The container shall be evacuated to a pressure of 7 1/2 pounds per square inch (15 inches of mercury) below atmospheric pressure, and held at that pressure for 30 seconds.

4.5.4 Accuracy. The test shall be conducted in accordance with SCATP-7.62, utilizing the longest range available up to 600 yards. Ranges shorter than 200 yards shall not be used. When accuacy testing is conducted on ranges shorter than 600 yards, the average of the mean radii of the targets shall be multiplied by the applicable conversion factor given below:

Range (yards)	200	300	400	500
Factor	3.15	2.08	1.57	1.25

4.5.5 Trace. The test shall be conducted in accordance with SCATP-7.62. The cartridges shall be fired in Guns, Machine, 7.62mm, M60, and T65E1. One hundred rounds shall be fired in each gun.

4.5.6 Action time. The test shall be conducted in accordance with SCATP-7.62.

4.5.7 Velocity. The test shall be conducted in accordance with SCATP-7.62.

4.5.8 Chamber pressure. The test shall be conducted in accordance with SCATP-7.62.

4.5.9 Temperature tests. The tests shall be conducted in accordance with SCATP-7.62. The weapon or weapons in which these tests are fired shall be at room temperature. Prior to firing, reference cartridges shall be conditioned at 68°F to 72°F, for not less than two hours and fired at that temperature.

4.5.9.1 70° Fahrenheit test. The test sample shall be conditioned at 70°F, plus or minus 2°F for not less than two hours and shall be fired at that temperature.

4.5.9.2 -65° Fahrenheit test. The test samples shall be conditioned at minus 65 degrees F., plus or minus 5 degrees F., for not less than 6 hours and shall be fired at that temperature.

4.5.9.3 +125° Fahrenheit test. The test sample shall be conditioned at 125 degrees F., plus or minus 2 degrees F., for 4 to 12 hours and shall be fired at that temperature.

4.5.10 Function and casualty test. The test shall be conducted in accordance with SCATP-7.62 and 4.5.11.1. One weapon of each type shall be used.

4.5.10.1 Gun automatic, M134. The gun automatic, M134 shall maintain a cyclic rate of 6000 rounds per minute. Barrels shall be replaced after firing 60,000 cartridges (10,000 cartridges per barrel). Firing shall be in 200 round bursts, with cooling to ambient temperature between bursts.

4.5.10.2 Reduced testing for function and casualty. When five consecutive production lots have successfully met the criteria of Table V, testing for function and casualty shall be reduced. The reduced plan shall consist of testing one out of every ten lots in all the weapons prescribed in Table IV, using the sample quantities specified herein. The lots to be tested in this manner shall be selected randomly. The remaining nine lots shall be tested only in the M60 Machine Gun, M240 Machine Gun, M134 Automatic Gun and M14 Rifle using sample quantities specified therefore in Table IV. Failure of any lot to meet acceptance criteria of Table V during reduced testing shall be cause for reinstatement of lot-by-lot testing in all prescribed weapons. When five consecutive lots thereafter have met the criteria of Table V, the reduced testing described above shall be resumed.

4.5.11 Bullet integrity. The test shall be conducted in accordance with Appendix A. Any bullet recorded as a "Blind" by down range observers either by absence of trace or absence of noise of passing bullet and accompanied by either detection of an abnormally loud report and bright flash by the observer at the gun position or by the presence of any irregularly shaped hole in the screen, shall be considered as a bursting or stripped bullet.

4.5.12 Port pressure. The test shall be conducted in accordance with SCATP-7.62.

4.5.13 Grain configuration. The test samples shall be prepared and evaluated in accordance with MIL-STD-1170.

4.5.14 Hardness testing. The bullets shall be extracted, propellant removed and the primers extracted. Each cartridge case of the sample shall be prepared and placed on the appropriate test fixture for testing in accordance with ASTM-E92.

4.5.14.1 Case sidewall. The average of the hardness values of the sample cases for each prescribed point along the sidewall exterior surface shall be computed and charted in accordance with the drawing requirements.

4.5.14.2 Case head. The individual hardness value for each prescribed point on the head section of each sample case shall be recorded. Any value failing to meet the drawing requirement at a prescribed point(s) shall be cause for remeasurement of hardness at the corresponding point(s) on the opposite side of the primer pocket of the same head section from which the initial value was obtained. The higher of the two measurements shall be recorded as the value of record for determination of conformance to drawing requirements.

4.5.15 Defect penalty. In any ballistic test except function and casualty, in which the occurrence of a firing defect listed in Table V prevents the obtaining of a reliable result for the characteristic being tested, an additional shot shall be fired. That particular test shall not be penalized, but the total ballistic sample shall be penalized for such defects in accordance with Table V.

5. PRESERVATION AND PACKING

5.1 Level A

5.1.2 Packing. The cartridges shall be packed in accordance with drawings 7553708, 7553747, 8594726, or 10521861.

5.3 Marking. Marking shall be in accordance with applicable drawings (see 5.1.2) and MIL-STD-129.

6. NOTES

6.1 Intended use. The cartridges covered by this specification are intended for use in 7.62mm weapons.

6.2. Ordering data. Ordering data should include:

a. Title, number and date of this specification.

b. Type and level of packing for the cartridge.

c. Provisions for the submission of Inspection Equipment Designs, See 6.3.

6.3. Submission of inspection equipment designs for approval. Submit equipment designs as required to Commander, U.S. Army ARDEC, ATTN: AMSMC-QAF-I(D), Picatinny Arsenal NJ, 07806-5000. Request letter of submittal shall state the contractor, contract number, specification number, item nomenclature and classification of defects or tests.

6.4 Hazard notice. The cartridge described herein and certain of its components are flammable and explosive and consequently present hazards in manufacture, handling, storage and shipment. The contractor should recognize these hazards and take appropriate measures to guard and protect against fire, explosion, adverse environment, corrosive atmosphere, rough handling and electrically induced incidents.

6.5 Drawings. Drawings listed in Section 2 of this specification under the heading US Army Armament Research, Development and Engineering Center (ARDEC) may also include drawings prepared by, and identified as Edgewood Arsenal, Frankford Arsenal, Rock Island Arsenal, ARDC, ARRADCOM, Picatinny Arsenal drawings. Technical data originally prepared by these activities are now under the cognizance of ARDEC.

6.6 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issues due to the extensiveness of the changes.

6.7 Shipping. When cartridges from more than one lot are shipped at one time, each lot shall be kept separate and the division between lots clearly indicated to prevent mixing of the lots in transit.

6.8 International agreements. Certain provisions of this specification are the subject of international standardization agreements listed below. When amendment, revision or cancellation of this specification is proposed which will affect or violate the International Agreement concerned, the preparing activity will take appropriate reconcilliation action through international standardization channels including Departmental Standardization Offices to change the agreement or make other appropriate accomodations.

NATO STANAG	ABCA-ARMY-STD
2310	123
2315	
2316	
2320	

Custodian:
Army-AR

Preparing activity:
Army-AR

(Project 1305-AB74)

APPENDIX A

BULLET INTEGRITY TEST PROCEDURE

10. SCOPE

10.1 Scope. This appendix details the procedure for conducting the bullet integrity test which is performed concurrently with trace testing. This appendix is a mandatory part of this specification. The information contained herein is intended for compliance.

20. APPLICABLE DOCUMENTS

PUBLICATIONS

Department of Defense

SCATP-7.62- Ammunition Ballistic Acceptance Test Methods, Test Procedures for 7.62mm Cartridges

30. EQUIPMENT

30.1 Equipment listed in the Trace section of the Inspection Equipment List shall be used.

30.2 Target screen, 6' x 6' shall be placed 50 feet from the muzzle of the gun, in the line of fire.

40.0 OBSERVATION POINTS

40.1 The three observers used for the Trace test shall also observe the Bullet Integrity test.

50. TEST PROCEDURES

50.1 Preparation for firing.

50.1.1 Preparation for firing shall be in accordance with SCATP-7.62, Chapter 1, Section 17.

50.1.2 Prior to each test, the gun to be used for the test shall be inspected. Gun shall be clean, chamber and bore of the barrel shall also be clean.

50.1.3 Target screen, referenced in paragraph 30.2, shall be placed in specified position, so that the bullets pass through the screen at its center.

APPENDIX A (continued)

BULLET INTEGRITY TEST PROCEDURE

60. FIRING THE TEST

60.1 This test shall be performed in accordance with SCATP-7.62, Chapter 1 Section 17.

60.2 Each observer shall keep a shot-by-shot record. In addition to recording trace performance of each bullet, observers shall also record any abnormalties observed, e.g., large flash, loud report, erratic flight, absence of noise of passing bullet in order to compare records upon completion of the test.

60.3 The target screen shall be examined after each series of 20 rounds or anytime a suspect bursting or stripped bullet is encountered. Screen shall be renewed as often as is necessary to assure positive identification of bursting or stripped bullets.

70. RECORDING OF DATA

70.1 Upon completion of the test, the observers shall check their respective observations together, shot by shot. All observations shall be recorded.

70.1.1 Suspect shots shall be recorded by each observer, as follows:

a. Loud report.

b. Large flash.

c. Lack of trace.

d. Erratic flight.

e. Shot number.

70.1.2 Target screen observations shall be reported as follows:

a. Number of holes.

b. Location of holes.

c. Type of holes.

APPENDIX A (continued)

BULLET INTEGRITY TEST PROCEDURE

70.1.3 The test results are reported as follows:

a. Number of cartridges fired.

b. Number and type of defects.

c. Number and type of case casualties.

70.1.4 The following test weapon data shall be recorded on the test sheet.

a. Receiver number.

b. Barrel number.

c. Total number of cartridges fired in barrel prior to test.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-C-46281F	CARTRIDGE, 7.62MM: NATO, TRACER, M62

3a. NAME OF SUBMITTING ORGANIZATION

b. ADDRESS *(Street, City, State, ZIP Code)*

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* — Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* — Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* — Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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