

MIL-C-46934B (MU)
29 June 1965

SUPERSEDING
MIL-C-46934A (MU)
22 November 1963

MILITARY SPECIFICATION
CARTRIDGE, 7.62MM, NATO, MATCH, M118

1. SCOPE

1.1 This specification covers Cartridge, 7.62mm, NATO, Match, M118 intended for competitive firing in 7.62mm National Match rifles.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

STANDARDS

Federal

Federal Test Method Standard No. 151 - Metals; Test Methods

Military

- MIL-STD105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-109 - Quality Assurance Terms and Definitions
- 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-1170 - Visual Standards and Comparison Methods for Evaluating Grain Configuration in 7.62mm Cartridge Cases

DRAWINGS

U.S. Army Munitions Command

- C7643674 - Classification of Cartridge Defects
- F8596109 - Packing and Marking, Cartridges, 7.62mm, NATO, Match, M118; Cartons; Box, Ammunition, M19A1; Box, Wirebound
- F8596112 - Packing and Marking, Cartridges, 7.62mm, NATO, Match, M118; Cartons; Box, Ammunition, M2A1; Box, Wirebound
- C8597555 - Cartridge, 7.62mm, NATO, Match, M118
- IEL-8597555 - Inspection Equipment List for Cartridge, 7.62mm, NATO, Match, M118

FSC 1305

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PUBLICATION

AMCR 715-505

Volume 3

- Ammunition Ballistic Acceptance Test Methods, Volume 3,
Test Procedures for 7.62mm Cartridges

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

3. REQUIREMENTS

3.1 General. - The cartridge shall comply with the requirements specified on Drawing C8597555, referenced specifications and the following:

3.2 Initial production sample. - Unless otherwise directed by the contracting officer, an initial production sample shall be required.

3.3 Bullet extraction. - The force necessary to extract the bullet from the cartridge case shall be not less than 20 pounds.

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

3.5 Accuracy. - The average of the mean radii of all targets of the sample cartridges, fired at 600 yards, shall not exceed 3.5 inches.

3.6 Velocity. - The average velocity of the sample cartridges, conditioned at $70^{\circ} \pm 2^{\circ}$ Fahrenheit (F), shall be 2,550 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 not exceed 28 ft/sec .

3.7 Chamber pressure. - The average chamber pressure of the sample cartridges, conditioned at $70^{\circ}\text{F} \pm 2^{\circ}\text{F}$, shall not exceed 50,000 pounds per square inch (psi). Neither the chamber pressure of an individual sample cartridge, nor the average chamber pressure of the sample cartridges plus three standard deviations of chamber pressure, shall exceed 55,000 psi.

3.8 Port pressure. - The average port pressure of the sample cartridges, conditioned at $70^{\circ}\text{F} \pm 2^{\circ}\text{F}$, shall be $12,500 \text{ psi} \pm 2,000 \text{ psi}$.

3.9 Function and casualty. - The cartridge shall function without casualty.

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3.10 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.

3.11 Workmanship. - The requirements for workmanship are as specified on the applicable drawings, referenced specifications and the following:

3.11.1 Metal defects. - The cartridge shall be free of folds, wrinkles, deep draw scratches, scaly metal, dents and other defects.

3.11.2 Foreign matter. - The cartridge shall be free of corrosion, stains, discolorations, dirt, oil and smears of lacquer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - Unless otherwise specified in the contractor purchase order, the supplier is responsible for the performance of all inspection requirements as 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 supplies and services conform to prescribed requirements.

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

4.2 Initial production sample. -At the beginning of regular production, the supplier shall submit an initial production sample to a Government approved facility for evaluation. The sample shall consist of 400 cartridges. The sample shall be manufactured in the same manner, using the same materials, equipment, processes and procedures as will be used in regular production. All parts and materials, including packaging and packing, must be the same as used for regular production and shall be obtained from the same source of supply. After inspection and provisional acceptance at source, the initial production sample shall be inspected at the Government approved facility for all requirements of the drawings and specifications. The Government reserves the right to require new initial production samples until such time as an acceptable sample is submitted.

4.3 Inspection provisions.

4.3.1 Lot.

4.3.1.1 Submission of product. - The product shall be submitted in accordance with MIL-STD-105.

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4.3.1.2 Lot identification. - Each lot of ammunition shall be identified as to type, caliber and model, as well as with a lot number and the manufacturer's identification as assigned by the procuring agency. Each lot shall be further identified by a Federal Stock Number assigned by the procuring agency.

4.3.2 Examination. - One hundred percent examination shall be performed for all critical defects. Examination for major and minor defects shall be performed on a class basis in accordance with the classification of defects, Table 1, using applicable sampling plans and acceptance criteria of MIL-STD-105. The Acceptable Quality Level (AQL) for the major class shall be 0.25 percent and the AQL for the minor class shall be 1.50 percent. All non-conforming cartridges shall be rejected.

4.3.2.1 Classification of defects. - The classification of defects shall be as specified in Table I.

Table I

<u>No.</u>	<u>Defect and Method of Inspection</u>	<u>Critical</u>	<u>Major</u>	<u>Minor</u>	<u>Major or Minor</u>
	Visual <u>1</u> / Cartridge				
1	Discolored, dirty, oily, smeared			X	
2	Corroded or stained, if etched		X		
	Case				
4	Round head		X		
5	Dent				X
6	Split 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		
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		

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Table I (Cont'd)

<u>No.</u>	<u>Defect and Method of Inspection</u>	<u>Critical</u>	<u>Major</u>	<u>Minor</u>	<u>Major or Minor</u>
	visual <u>1/</u>				
	Bullet				
22	Dent			X	
23	Scratch			X	
24	Split bullet jacket		X		
25	Loose bullet		X		
27	Scaly metal (bullet)				X
28	Upset (crooked) point			X	
30	Blunt point			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	
	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 to shoulder datum		X		
46	Depth of primer		X		
	Weighing				
47	Weight, min. <u>2/</u>		X		

1/ Refer to Standard MIL-STD-636 for visual defect standards for defects 1 through 37. In the event of conflict between Table I of this specification and MIL-STD-636 as to defect classification, the classification specified in Table I shall apply.

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

4.3.3 Tests. - The tests listed in Table II shall be conducted in accordance with the methods and procedures specified in 4.4.

4.3.3.1 Test samples. - The quantities for the various tests shall be as specified in Table II. 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 II

<u>Test</u>	<u>Number of Cartridges</u>		<u>Requirement Paragraph</u>
	Ambient		
Bullet extraction <u>1/</u>	20		3.3
Residual stress (Mercurous nitrate) <u>1/</u>	20		3.4
Accuracy <u>2/</u>	90		3.5
Velocity <u>2/</u>	20		3.6
Chamber pressure <u>2/</u>	20		3.7
Port pressure <u>2/</u>	20		3.8
Function and casualty <u>3/</u>			
Rifle, 7. 62mm, M14 (National Match)	100		3.9
Grain configuration <u>1/</u>	10		3.10
Hardness <u>2/</u>	10		Drawing

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 the cartridges 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. Failure of the cartridges in the second sample to comply with the applicable requirement shall be cause for rejection of the lot.

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3/ 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 III. 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 quantity specified under function and casualty test shall be fired in the service weapon specified therefor. If the total number of defects in the combined first and second samples 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 acceptance number for the cumulative sample, the lot shall be rejected.

4.3.3.2 Firing defects. - Firing defects and acceptance numbers shall be as specified in Table III.

Table III

<u>Defects</u>	<u>Acceptance Number</u>	
	<u>First Sample</u>	<u>Cumulative (First and Second Sample)</u>
1. Misfire	0	1
2. Bullet remaining in bore <u>1</u> /	0	
3. Primer leak		
a. Perforation in firing pin indent in primer cup	1	2
b. Escape of gas through primer cup other than 3a	1	2
c. Escape of gas around primer cup <u>2</u> /	3	5
d. Primer remains in pocket, but is physically loose	1	2
e. Blown primer or primer falls out of pocket on retraction of bolt	0	1
4. Case casualties		
a. Longitudinal split <u>3</u> /		
(1) Neck and shoulder (I & S)	5	9
(2) Body (J)	1	2
(3) Body (K)	0	1
(4) To head (L)	0	1
(5) Through head (M)	0	1

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Table III (Cont'd)

Defects	Acceptance Numbers	
	First Sample	Cumulative (First and Second Sample)
b. Circumferential rupture <u>3/</u>		
(1) Partial, shoulder or body (J and S)	1	2
(2) Partial, body (K)	0	1
(3) Partial, head (L)	0	1
(4) Complete	0	1
5. Failure to Extract	0	1

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

2/ Gas escapes around more than 50 percent of periphery of cup.

3/ For location of defects indicated by letters in parenthesis, see Drawing C7643674.

4.3.4 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 cartridge shall be classed as a critical defect. Occurrence of any incorrect type other than high pressure test 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.

4.3.5 Inspection equipment. - The examination and tests shall be made using the equipment listed on IEL-8597555, Simulated assessment of reference cartridges shall be made in accordance with AMCR 715-505, Vol. 3.

4.4 Test methods and procedures.

4.4.1 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 AMCR 715-505, Vol. 3.

4.4.2. Residual stress (Mercurous nitrate). - Tests shall be conducted in accordance with AMCR 715-505, Vol. 3.

4.4.3 Accuracy.- The test shall be conducted in accordance with AMCR 715-505, Vol. 3 utilizing the longest range available up to 600 yards. Ranges shorter than 200 yards shall not be used. When accuracy 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	3.25	2.19	1.63	1.31

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4.4.4 Velocity.- The test shall be conducted in accordance with AMCR 715-505, Vol. 3.

4.4.5 Chamber pressure.- The test shall be conducted in accordance with the procedures referenced in IEL-8597555.

4.4.6 Port pressure.- The test shall be conducted in accordance with AMCR 715-505, vol. 3.

4.4.7 Function and casualty.- The test shall be conducted in accordance with AMCR 715- 505, Vol. 3, except that all firings shall be semi-automatic. Two rifles shall be used, and one-half of the cartridges shall be fired in each weapon.

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

4.4.9 Hardness testing. - The bullets shall be extracted, the 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 Federal Test Method Standard No. 151, Method 244.1. The average of the hardness values of the sample cases for each prescribed point shall be computed and charted in accordance with the drawing requirements.

4.4.10 Defect penalty.- In any ballistic test, except function and casualty, in which the occurrence of defect listed in Table III 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 III.

5. PREPARATION FOR DELIVERY.

5.1 Packing.- Level A (World Wide Shipment) The cartridges shall be packed in accordance with Drawing F8596112 or F8596109.

5.2 Marking and labeling.- Packing boxes shall be marked and labeled in accordance with the applicable drawings cited in 5.1.

6. NOTES

6.1 Ordering data.- Invitation for bids and contracts or orders will specify the following:

6.1.1 Title, number and date of this specification.

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6.1.2 Type and level of packing.

6.1.3 Provision for the supply, maintenance and disposition of mandatory ballistic test equipment for acceptance inspection purposes.

6.1.4 Provision for the submission of acceptance inspection reports containing final inspection results for each lot of ammunition presented to the Government.

6.1.5 Provision for the identification and submission of grain configuration photomicrographs prepared in accordance with MIL-STD-1170 where such submission is required.

6.1.6 Head stamp.- Designation "NM" (abbreviation for National Match) will be applied to cartridges in lot(s) specifically manufactured for Camp Perry National Matches.

6.1.7 Requirement for contractor to provide and maintain an inspection system in accordance with MIL-I-45208, Inspection System Requirements.

6.2 Document availability.

6.2.1 Copies of MIL-STD-1170, required for evaluating grain configuration, may be obtained on a need-to-have basis through the Commanding Officer, U. S. Army, Frankford Arsenal, Philadelphia, Pennsylvania 19137.

Custodian:

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Preparing Activity:

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Project No. 1305-A349

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SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
INSTRUCTIONS		
This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.		
SPECIFICATION		
ORGANIZATION	CITY AND STATE	
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
MATERIAL PROCURED UNDER A		\$
<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT		<input type="checkbox"/> SUBCONTRACT
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?		
A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE?		
<input type="checkbox"/> YES <input type="checkbox"/> NO IF "YES", IN WHAT WAY?		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
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