

MIL-C-46932A (MU)

24 August 1966

SUPERSEDING

MIL-C-46932 (ORD)

5 September 1962

AMENDMENT 1

26 December 1962

MILITARY SPECIFICATION
CARTRIDGE, 7.62MM, NATO, BALL, FRANGIBLE, M160

1. SCOPE

1.1 This specification covers Cartridge, 7.62mm, NATO, Ball, Frangible, M160 for training purposes.

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 the specification to the extent specified herein:

STANDARDS

Federal

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

Military

- MIL-STD-105 - 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 Case

DRAWINGS

U.S. Army Munitions Command

- C7643674 - Classification of Cartridge Case Defects
- C10522476 - Cartridge, 7.62mm, NATO, Ball, Frangible, M160
- F10522478 - Packing and Marking; Cartridges, 7.62mm, NATO, Ball, Frangible, M160, Linked; Box, Ammunition, M19A1; Box, Wirebound

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DRAWINGS (Cont'd)

- F10522480 - Packing and Marking; Cartridges, 7.62MM; NATO, Ball, Frangible, M160; Linked; Cartons; Bandoleers, Box, Ammunition, M19A1; Box, Wirebound
- IEL-10522476 - List of Inspection Equipment for Cartridge, 7.62MM, NATO, Ball, Frangible, M160

PUBLICATIONS

U. S. Army Munitions Command

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 contractors 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 C10522476, referenced specifications and the following:

3.2 First article sample.- Requirements for the submission of first article samples by the contractor shall be as specified in the contract.

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

3.4 Velocity.- The average velocity of the sample cartridges at 53 feet from the muzzle shall be 1320 feet per second (ft/sec) plus or minus 50 ft/sec. No individual velocity shall exceed 1500 ft/sec.

3.5 Waterproof.- The cartridge shall not release more than one bubble of air when subjected to a pressure differential of 5 pounds per square inch for 15 seconds.

3.6 Accuracy.- The average of the mean radii of all targets of the sample cartridges fired at 100 yards shall not exceed 4.0 inches.

3.7 Perforation.- The bullet of the cartridge shall not perforate a 3/16 inch thick plate of Dural 2024 T4 (or equivalent) with a Brinell hardness of 105 to 125 under a 500 kilogram load at a range of 25 yards.

3.8 Function and casualty.- The cartridges shall function without casualty.

3.9 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.

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

3.10.1 Metal defects (Case).- The cartridge case shall be free of folds, wrinkles, deep draw scratches, scaly metal, dents and other defects.

3.10.2 Material defects (Bullet).- The bullet shall not be chipped and shall be free of dents, scratches, voids and seams, broken points and other defects.

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

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 supplies and services conform to prescribed requirements.

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

4.2 First article sample.

4.2.1 Initial production sample.- At the beginning of regular production, a sample shall be submitted in accordance with contract requirements and shall consist of 500 cartridges. The 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.

4.2.1.1 Examination and test.- After inspection and provisional acceptance at source, the sample shall be inspected for all requirements of the drawings and specifications at a Government laboratory or such other facility specified in the contract.

4.2.1.2 Initial production sample failure.- Failure of the sample to comply with requirements of the drawings and specifications shall result in sample disapproval.

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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.

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 I, using applicable sampling plans and acceptance criteria of Standard 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 shall be as specified in Table I.

TABLE I

<u>No.</u>	<u>Defect and Method 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		X		
7	Perforated case	X			
8	Draw scratch				X
9	Scratch			X	
10	Beveled underside of head		X		
11	Case mouth not crimped		X		
12	Scaly metal				X
13	No chamfer on head (rim)		X		
14	Fold			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>
Case (cont'd)					
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	
25	Loose bullet		X		
27	Voids and seams		X		
28	Chipped			X	
29	Broken 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	
38	Defective crimp			X	
Gaging					
39	Total length		X		
40	Cartridges 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, min.		X		
46	Depth of primer		X		
47	Weight <u>2/</u>		X		

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- 1/ Refer to 7.62MM section of MIL-STD-636 for visual standards for defects Nos. 1 through 38 except defects 27, 28 and 29. In the event of conflict between I of this specification and MIL-STD-636 as to defect classification the classification specified in Table I shall apply.
- 2/ Each light or heavy weight cartridge shall be broken down and the propellant charge weighed. Each such cartridge found to contain less than 6 or more than 18 grains of propellant shall be counted as a critical defective.

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 selected shall be thoroughly mixed before being divided into test samples.

TABLE II

<u>Test</u>	<u>Number of Cartridges Ambient Temperature</u>	<u>Requirement Paragraph</u>
Mercurous Nitrate <u>1/</u>	20	3.3
Velocity <u>2/</u>	20	3.4
Waterproof <u>4/</u>	20	3.5
Accuracy <u>2/</u>	50	3.6
Perforation <u>1/</u>	50	3.7
Function and Casualty <u>3/</u> Gun, Machine, 7.62MM, M73	200	3.6
Hardness <u>2/</u>	10	Drawing
Grain Configuration <u>1/</u>	10	3.9

- 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 initial test, a second sample consisting of double the number of cartridges in the first sample may 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 in the first test. Failure of the cartridge in the second sample to comply with the applicable requirement shall be cause for rejection of the lot.

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3/ The initial production sample or production lot shall be rejected when function and casualty defects plus all other firing defects exceed the acceptance number for the cumulative sample of Table III. If the number of defects found in the first test exceeds the acceptance number of 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 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 the second sample, defects other than those for which the second sample is being tested should occur to the extent that they exceed the acceptance numbers for the cumulative sample, the lot shall be rejected.

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

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

TABLE III
Lot Acceptance Test

<u>Defects</u>	<u>Acceptance Number</u>	
	<u>First Sample</u>	<u>Cumulative (First & Second Samples)</u>
1. Misfire	1	2
2. Bullet remaining in bore <u>1/</u>	0	-
3. Primer leak		
a. Perforation in firing pin indent in primer cup Machine guns	4	9
b. Escape of gas through primer cup other than 3a	1	2
c. Escape of gas around primer cup more than 50% of periphery	3	6
d. Blown primer or primer falls out of pocket on retraction of bolt	0	1
e. Primer remains in pocket but is physically loose	2	4

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TABLE III (Cont'd)
Lot Acceptance Test

<u>Defects</u>	<u>Acceptance Number</u>	
	<u>First Sample</u>	<u>Cumulative (First & Second Samples)</u>
4. Case Casualites		
a. Longitudinal split <u>2/</u>		
(1) Neck and shoulder (I & S)	7	13
(2) Body (J)	2	4
(3) Body (K)	1	2
(4) To head (L)	0	1
(5) Through head (M)	0	1
b. Circumferential rupture <u>2/</u>		
(1) Partial, Shoulder or body (S, J or K)	2	4
(2) Partial Head (I)	0	1
(3) Complete	0	1
5. Failure to Extract	0	1
6. Bullet disintegrating before striking target or terminal	1	2

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

2/ For location of defects indicated by numbers in parenthesis, see Drawing C7643674.

4.3.4 Packaging, packing and marking inspection.- During or immediately prior to the packaging operation, 100% examination of the cartridges shall be performed to ascertain that the cartridge type conform to the drawing. Occurrence of a dummy, blank or grenade cartridge shall be classed as a major defect. Occurrence of any type other than those listed shall be classed as a critical defect. All nonconforming 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 equipment listed on IEL-10522476, except as provided in 4.3.

4.4 Test methods and procedures.

4.4.1 Mercurous nitrate.- Test shall be conducted in accordance with AMCR 715-505, Vol. 3.

4.4.2 Velocity.- Test shall be conducted in accordance with AMCR 715-505, Vol. 3.

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

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

4.4.5 Perforation.- This test shall be conducted in accordance with AMCR 715-505, Vol. 3, Chapter 1, Section 12, with the following exceptions:

- a. Velocity is not measured for the test cartridges.
- b. To qualify as a record shot, bullets must strike plate at least 2" apart or 2" from the edge of the plate.
- c. Number of cracks and their extent are reported.

4.4.6 Function and casualty.- This test is to be fired, single shot, 100 rounds in each of two M73 machine guns. The weapons and ammunition shall be at room temperature at the beginning of the test. The test shall be conducted in accordance with AMCR 715-505, Vol. 3.

4.4.7 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.

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

4.4.9 Defect penalty.- In any ballistic test, except function and casualty, in which the occurrence of a firing 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 (Worldwide Shipment).- The cartridges shall be packed in accordance with Drawing F10522478 or F10522480.

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

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6. NOTES

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

6.1.1 Title, number and date of this specification.

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

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

Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodian:

Army - MU

Preparing activity:

Army - MU

Project No. 1305-A460

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)		
SUBMITTED BY (Printed or typed name and activity)		DATE

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