

MIL-STD-1453(MU)
20 July 1971

MILITARY STANDARD

BALLISTIC STANDARDS AND TEST METHOD FOR
EVALUATING AND SELECTING 5.56MM AMMUNITION FOR M16/M16A1 WEAPON
ACCEPTANCE TESTS



FSC 1305

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UNITED STATES ARMY MUNITIONS COMMAND
FRANKFORD ARSENAL, PHILADELPHIA, PA. 19137

Ballistic Standards and Test Method for Evaluating and Selecting 5.56MM Ammunition for M16/M16A1 Weapon Acceptance Tests.

1. This standard has been approved by the Department of the Army to establish standards for selecting 5.56MM ammunition for M16/M16A1 weapon acceptance tests.
2. Recommended corrections, additions, or deletions should be addressed to: Commanding Officer, Frankford Arsenal, ATTN: SMUFA-Q3200, Philadelphia, Pennsylvania 19137.

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BALLISTIC STANDARDS AND TEST METHOD FOR
EVALUATING AND SELECTING 5.56MM AMMUNITION FOR M16/M16A1
WEAPON ACCEPTANCE TESTS

1. SCOPE

1.1 This standard establishes a method for selecting and qualifying Cartridge, 5.56MM, Ball, M193 ammunition production lots for special carton packing to be used for M16/M16A1 weapon acceptance tests.

2. REFERENCED DOCUMENTS

2.1 The issues of the following documents in effect on the date of invitation for bids, form a part of this standard to the extent specified.

SPECIFICATIONS

Military

MIL-C-9963 - Cartridge, 5.56MM: Ball, M193

DRAWINGS

F10542651 - Packing and marking, Cartridge, 5.56MM, Ball, M193, Cartons, Box Shipping.

OTHER GOVERNMENT PUBLICATIONS

TM 9-1005-249-12 - Operator and Organizational Maintenance Manual-Rifle 5.56-MM, M16, Rifle 5.56-MM, M16A1 and Bipod, Rifle, M3.

3. DEFINITIONS

3.1 Ammunition referred to in this Standard is 5.56MM, Ball, M193 ammunition conforming to the requirement as specified herein and packed in a special commercial carton pack for use by weapon manufacturers for the acceptance testing of M16/M16A1 weapons.

4. GENERAL REQUIREMENTS

4.1 General - The lot being qualified shall conform to all requirements of MIL-C-9963 and the following:

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4.1.1 Accuracy - The average of the mean radii of all targets of the sample cartridges, fired in accordance with MIL-C-9963 during normal lot acceptance testing, over a 200 yard range, shall be not less than 1.2 inch nor greater than 1.4 inch.

4.1.2 Cyclic Rate - The average of the cyclic rates, determined in accordance with paragraph 5.6 of this standard, shall be not less than 770, nor exceed 870 shots per minute. The extreme spread shall not exceed 100 shots per minute.

5. DETAIL REQUIREMENTS

5.1 General - In order for an ammunition lot to be qualified for M16/M16A1 Weapon Acceptance Test Ammunition, it must meet all requirements of MIL-C-9963, except that the "Accuracy" shall be in accordance with paragraph 4.1.1 of this standard, and the lot shall be free of malfunctions during all ballistic testing. In addition, it must function within the limits of the "Cyclic Rate" Requirement defined in paragraph 4.1.2 of this standard.

5.1.1 Each ammunition lot will be judged on its own. It will not be required that any previous lots assembled with the same propellant lot also meet cyclic rate requirements. However, only one ammunition lot from a given propellant lot may be packed for M16/M16A1 weapon acceptance tests.

5.2 Test Procedure

5.2.1 Selection and Qualification of Test Weapon

5.2.2 Obtain seven (7) new M16A1 rifles (chrome chamber) from stock.

5.2.3 Record rifle measurements: lands and grooves, firing pin indent and diameter and headspace.

5.2.4 Clean and lubricate each rifle in accordance with TM-9-1005-249-12. Lubrication Must Be Applied Sparingly.

5.2.5 Select an ammunition lot previously qualified for M16/M16A1 weapon acceptance tests and pack a total of 1260 cartridges in 20 - round magazines (63 magazines).

5.2.6 Condition the cartridges in magazines to 70 degrees F. \pm 2 degrees for a period of 2 hours, minimum.

5.2.7 Fire the following test program for each rifle from a standard F & C mount. A total of 9 magazines (180 rounds) shall be fired in each weapon as follows:

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5.2.7 (Cont'd)

<u>Magazine</u>	<u>Mode</u>	<u>Note</u>
1.	Automatic (5 - rd bursts)	
2.	Full automatic	Record cyclic rate
3.	Semi automatic (max. rate=60 shots/min)	

Cool weapon (do not clean or lubricate.) Cooling should be accomplished by forced air applied thru a hand guard hole for a period of not less than five (5) minutes.

4.	Automatic (5 - Rd bursts)	
5.	Full automatic	Record cyclic rate
6.	Semi automatic (max rate=60 shots Min)	

Cool weapon as above.

7.	Automatic (5 - Rd bursts)	
8.	Full automatic	Record cyclic rate
9.	Semi automatic (max rate=60 shots Min)	

5.2.8 Compute the average cyclic rate for each weapon.

5.2.9 Eliminate the two rifles which produced the highest average cyclic rate and the two rifles which produced the lowest average cyclic rate. The three remaining rifles shall be set aside for use in qualifying future ammunition lots for M16/M16A1 weapon acceptance tests so long as the 3 rifles all produce cyclic rates within an extreme spread of 100 shots per minute and an average cyclic rate between 770 and 870 shots per minute. The three selected rifles will be used on an alternating basis. Only one rifle being required for each ammunition lot to be qualified. The rifles will be used regardless of changes in propellant lots until there is evidence of excessive weapon malfunctioning or until there is a drastic change in cyclic rate attributable to the weapon. When a drastic change in cyclic rate does occur in the firing of a test for cyclic rate in any given rifle, the test may be repeated in a second rifle using the same ammunition lot. If the results of the retest indicate that the initial rifle is at fault, the initial rifle shall be disqualified. The data leading to the disqualification shall be included in the acceptance report. A sufficient number of additional qualified weapons shall be made available for replacing disqualified weapons. These weapons shall be qualified in an identical manner.

5.3 Preparation of Test Weapons for Testing

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5.3.1 Select one qualified rifle. Clean and lubricate in accordance with TM-9-1005-249-12. Apply lubricant sparingly.

5.3.2 Mount rifle in a standard F&C mount.

5.4 Preparation of Ammunition Lot for Testing

5.4.1 For each lot which is to be considered for M16/M16A1 weapon acceptance tests, load 300 rounds into magazines (maximum usage of each magazine shall be limited to a total of 500 rounds).

5.4.2 Condition the loaded magazines to 70 degrees F. \pm 2 degrees for a minimum of two (2) hours. Conduct all firing with ammunition at that temperature.

5.5 Instrumentation

While it is essential that the cyclic rate timer be properly calibrated, it is also a requirement that the timer has reached its proper speed before firing automatic bursts for recording cyclic rates. Prior to measuring the tape for cyclic rate, the technician shall count the number of shots on the tape to insure proper calculations.

5.6 Firing Procedure

Magazine (20 RDS)	Mode	Note
1.	Automatic (5 - rd bursts)	
2.	Full automatic	Record cyclic rate
3.	Semi automatic (max rate= 60 shots/min)	

Cool weapon (do not clean or lubricate). Cooling should be accomplished by forced air applied thru a hand guard hole for a period of not less than five (5) minutes.

4.	Same as magazine 1	
5.	Same as magazine 2	Record cyclic rate
6.	Same as magazine 3	

Cool weapon in same manner as above

7.	Same as magazine 1	
8.	Same as magazine 2	Record cyclic rate
9.	Same as magazine 3	

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5.6 (Cont'd)

<u>Magazine</u> (20 RDS)	<u>Mode</u>	<u>Note</u>
Cool weapon in same manner as above		
10.	Same as magazine 1	
11.	Same as magazine 2	Record cyclic rate
12.	Same as magazine 3	
Cool weapon in same manner as above		
13.	Same as magazine 1	
14.	Same as magazine 2	Record cyclic rate
15.	Same as magazine 3	

Note: If a malfunction occurs which prevents the recording of cyclic rate during the firing of a full automatic mode (magazines 2, 5, 8, 11 or 14), the next magazine shall be fired in full automatic instead of semi automatic to obtain a cyclic rate recording (magazines 3, 6, 9, 12 or 15). The total number of rounds fired shall not be affected. In all events, magazines 1, 4, 7, 10 and 13 shall be fired in the automatic mode in 5 rd bursts.

5.7 Reporting of Data

5.7.1 All pertinent data pertaining to the described test, including the following, shall be reported to: Commanding Officer, Frankford Arsenal, ATTN: SMUFA-Q3200, Philadelphia, Pa. 19137.

5.7.1.1 Cyclic Rate

- a. Individual cyclic rates, in sequence.
- b. Average cyclic rate
- c. Extreme spread

5.7.1.2 Accuracy (Recorded from Acceptance Sheet)

- a. Mean radius.
- b. Extreme horizontal spread.