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MIL-C-1217B(Ord)
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~~SUPERSEDING~~
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20 September 1950

MILITARY SPECIFICATION
CARTRIDGE, ARMOR-PIERCING, CALIBER .30, M2

- 1. SCOPE
 - 1.1 Scope.- This specification covers cartridges for firing in caliber .30 weapons against light armored vehicles.
- 2. APPLICABLE DOCUMENTS
 - 2.1 Applicable specifications, standards, drawings and publications, unless otherwise specified, of the issue in effect on date of invitation for bids form a part of this specification.

SPECIFICATIONS

MILITARY
MIL-A-625 - Ammunition, Small Arms, General Specification for

STANDARDS

MILITARY
MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

MIL-STD-129 - Marking for Shipment and Storage.

DRAWINGS

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ORDNANCE CORPS

- 27-79-41 Cartridge, Armor Piercing, Caliber .30, M2, List of Drawings, Specifications, and Inspection for Acceptance
- B7643674 - Classification of Cartridge Case Defects
- B6138194 - Cartridge, Armor Piercing, Caliber .30, M2
- D7692874 - Barrel, Caliber .30, Assembled with Receiver, Universal, M2, for Velocity Firing
- 49-6-42A - Rest, Recoil, Receiver, Universal, Caliber .30 and .50, List of Drawings and List of Parts
- D7692873 - Barrel, Caliber .30, Assembled with Receiver, Universal, M2, for Pressure Firing
- D7692088 - Rifle, Accuracy, Caliber .30, Assembly and List of Drawings
- 49-6-40A - Rest, Recoil, Caliber .30, List of Drawings and List of Parts
- D7142391 - Gun, Machine, Browning, Caliber .30, M1917A1 - List of Drawings
- D7142393 - Gun, Machine, Browning, Caliber .30, M1919A4 - List of Drawings
- D7142395 - Gun, Machine, Browning, Caliber .30, M1919A6 - List of Drawings
- 42-42-4 - Rifle, U. S., Caliber .30, M1903A3, Longitudinal Section
- 51-102-4 - Rifle, Automatic, Browning, Caliber .30, M1918A2, Longitudinal Section
- 42-24-2 - Rifle, U. S., Caliber .30, M1, Longitudinal Section
- FD14884 - Rest, Recoil (wood) for Rifle Function Test Assembly, Base, Bed and Legs

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- FD14711 - Slide for Ammunition Function Test in Caliber
.30 and .50 Machine Gun Assembly
- D7690962 - Rest, Gun, Assembly
- 49-6-6 - Rest for Rifle, Caliber .30, M1903, List of
Drawings and List of Parts

PUBLICATIONS

U. S. ARMY ORDNANCE CORPS

ORD-M608-PM Vol. III - Manual of Test Methods for Small Arms
Ammunition

ORD-SIP-S315 - Visual Inspection Standards for Small
Arms Ammunition

ORD-SIP-S324 - Standard Inspection Procedures for Pack-
ing of Small Arms Ammunition

(Copies of Specifications, standards, drawings and publications re-
quired by contractors in connection with specific procurement functions
should be obtained from the procuring agency or as directed by the con-
tracting officer).

3. REQUIREMENTS

3.1 Design and construction

3.1.1 General.- General requirements shall conform to Specification
MIL-A-625.

3.1.2 Material.- Material shall conform to material requirements of
applicable specifications and drawings.

3.1.3 Components.- All components, (propellant, specification MIL-
P-733; primer, MIL-P-1394) procured from a vendor shall have been in-
spected, tested and accepted in accordance with their respective spec-
ifications or drawings.

3.1.4 Processing.- The contractor shall maintain a system of process-
ing which will insure that the process average quality with respect to
all requirements is equal to or better than the acceptable quality levels
specified herein.

3.1.5 Physical Requirements.- The physical requirements of the car-
tridge shall conform to applicable specifications and to Drawing B6138194,
Cartridge, Armor Piercing, Caliber .30, M2.

3.2 Bullet extraction.- The force necessary to extract the bullet
from the case shall be not less than 45 pounds.

3.3 Mercurous nitrate.- No cartridge case subjected to the mercurous
nitrate test shall show splits in any part.

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3.4 Velocity.- The basic velocity shall be 2715 feet per second at 78 feet from the muzzle. The average velocity shall not vary from the basic velocity by more than 30 feet per second. The standard deviation of the individual velocities shall not exceed 32 feet per second.

3.5 Waterproof.- The average velocity of cartridges submerged in water shall not vary from the average velocity of the same lot by more than 100 feet per second.

3.6 Pressure.- The average pressure shall not exceed 54,000 pounds per square inch.

3.7 Penetration.- The average depth of penetration of cores fired at a range of 100 yards shall be not less than 0.42 inch in homogeneous 7/8 inch thick armor plate.

3.8 Accuracy.- The average of the mean radii of all targets obtained at 600 yards shall be not greater than 10 inches.

3.9 Function and casualty.- Function and casualty firing defects plus firing defects discovered in other tests shall not exceed the percentages shown in Table III.

3.10 Hangfire.- The hangfire time of each group of cartridges fired shall not exceed 2.0 milliseconds.

3.11 Stripping.- The results obtained from this test shall not exceed percentages specified in Table III.

3.12 Case Extraction.- The average net extraction force necessary to extract a fired case from the rifle shall not exceed 15 pounds.

3.13 Workmanship.- Workmanship shall be in accordance with Specification MIL-A-625.

4. QUALITY ASSURANCE PROVISIONS

4.1 Lot

4.1.1 Ammunition lot.- Unless otherwise specified by the procuring agency an ammunition lot shall consist of the number of cartridges produced in one day at the particular plant or unit concerned. However, where a day's production is relatively small, an ammunition lot may include the production of two or more consecutive days but not more than 2,000,000 cartridges. The number of cartridges in a probational lot shall not exceed 500,000.

4.1.2 Inspection lot.- The contractor shall submit a lot for visual inspection, gaging and weighing by inspection lots.

4.2 Sampling.- Sampling of such inspection lots with respect to visual inspection, gaging and weighing shall be in accordance with inspection level II of Standard MIL-STD-105. The quantity for the various acceptance tests, other than inspection, gaging and weighing, shall be as specified in Table I.

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TABLE I.- Test Samples

Test	Number of Cartridges
Bullet extraction	50
Mercurous Nitrate	50
Velocity firing test	20
Waterproof firing test	20
Pressure firing test	20
Accuracy firing test	90
Penetration firing test	20
Function and casualty:	
Gun, machine, Browning, caliber .30, M1917A1	500
Gun, machine, Browning, caliber .30, M1919A4	300
Gun, machine, Browning, caliber .30, M1919A6	300
Rifle, U.S., caliber .30, M1903A3	100
Rifle, automatic, Browning, caliber .30, M1918A2 ...	200
Rifle, U.S., caliber .30, M1	104
Hangfire test	600
Stripping test	100
Case extraction test	50

Note.- Retest shall be made with double the number of cartridges specified in Table I.

4.3 Inspection

4.3.1 Place.- Unless otherwise specified, the visual inspection, gaging, weighing and tests for acceptance shall be made at the place of manufacture.

4.3.2 Contractor inspection.- The contractor shall inspect by 100 percent inspection each lot of cartridges for the visual, gaging and weighing defects listed in Table II.

4.3.3 Government acceptance inspection.- Each cartridge of the acceptance sample shall be inspected, gaged and weighed for all defects listed in Table II. Any defects discovered by the government inspector not listed in Table II shall be recorded on the acceptance report and brought to the attention of the contracting officer in accordance with specification MIL-A-625.

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4.3.4 Acceptable quality levels.- The acceptable quality levels with respect to visual, dimensional and weighing defects shall be as follows:

<u>Defects</u>	<u>Percent</u>
Critical	0
Major	.25
Minor	1.5

4.3.5 Classification of defects.

4.3.5.1 Visual, gaging and weighing defects.- The visual, gaging and weighing defects shall be classified as specified in Table II.

TABLE II.- Visual, gaging and weighing defect classification

No.	Defect	Crit.	Major	Minor	Major or Minor
	Visual				
	Cartridge:				
1	Discolored, dirty, oily, smeared(waterproofing).....			X	
2	Corroded		X		
3	Mixed ammunition types				
	a. HPT, Dummy, Blank, Grenade	X			
	b. All other types not in a.			X	
	Case:				
4	Round head		X		
5	Dent				X
6	Split case ¹		X		
7	Perforated case	X			
8	Draw scratch				X
9	Scratch			X	
10	Beveled underside of head		X		
11	Case mouth not crimped in cannellure		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 oxide film (mouth anneal)		X		

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TABLE II.- Visual, gaging and weighing defect classification (cont'd)

No.	Defect	Crit.	Major	Minor	Major or Minor
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
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 ^{1/}	X			
34	Inverted primer	X			
35	Loose primer		X		
36	Nicked or dented primer			X	
37	No waterproofing (primer pocket joint)			X	
38	Defective crimp			X	
Gaging					
Cartridge:					
Overall length					
	Over max.		X		
	Under min.		X		
	Cartridge profile failure (requiring more than 20 lbs. dead weight to in- sert in profile and alignment gage) ^{2/}		X		
Case:					
Extractor groove diameter					
	Over max.		X		
	Under min.			X	
Head diameter					
	Over max.		X		
	Under min.		X		
Rim thickness					
	Over max.		X		
	Under min.		X		
Length to shoulder					
	Over max.		X		
	Under min.		X		
Primer:					
Primer depth					
	Over max.		X		
	Under min.		X		
Weight					
	Cartridge weighing less than minimum weight of components shown on drawing plus weight of propellant ^{3/}			X	

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1/ Refer to ORD-SIP-S315 for definite classification

2/ Each failing cartridge shall be loaded in an eight round clip with seven cartridges being free of all defects listed in Table II. The loaded clip shall then be inserted into a rifle, U.S., caliber .30, M1, with minimum chamber and a headspace of 1.942 inches, in such a manner that the failing cartridge will be the initial one chambered. If the test cartridge (failing cartridge) fails to chamber completely, it shall be counted as a critical defect.

3/ Each light weight cartridge shall be broken down and the powder charge weighed. Each such cartridge found to contain less than 25 grains of powder shall be counted as a critical defect.

4.3.5.2 Firing defects.- Function and casualty defects plus all other firing defects shall not exceed the limits specified in Table III.

TABLE III.- Firing defects and limits permitted in a sample

Defects	Percent ^{1/}
Misfire ^{2/}	∞
Bullet remaining in bore	0.0
Hangfire ^{3/}	0.0
Primer leak	
a. Perforation in firing pin indent in primer cup	
Machine guns	2.5
Rifles (not including Browning M1918A2)	1.5
Rifle, Browning, M1918A2 ^{4/}	∞
b. Escape of gas through primer cup other than a.	1.0
c. Escape of gas around primer cup ^{5/}	5.0
d. Loose primer	
(1) Primer falls out of pocket on retraction of bolt	0.0
(2) Primer remains in pocket but is visually loose	1.0
e. Blown primer ^{6/}	0.0
Case casualty	
a. Longitudinal split ^{7/}	
(1) Neck and shoulder (i and s)	2.5
(2) Body (j)	0.5
(3) Body (k) ^{8/}	∞
(4) To head (l)	0.0
(5) Through head (m)	0.0
b. Circumferential rupture ^{7/}	
(1) Partial, shoulder or body (s or j)	0.4
(2) Partial body (k)	0.0
(3) Partial head (l)	0.0
(4) Complete	0.0
Failure to extract	0.0
Breech sparks, flashes or flames ^{4/}	∞
Gun stoppage ^{9/}	0.0
Bullet stripping before striking terminal or target	0.5

Note: ^{1/}The number of defects permitted is calculated as specified in Specification MIL-A-625.

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- 2/ This limit shall remain at one misfire.
- 3/ If an audible delay occurs in any ballistic test repeat hangfire test with four times sample size. Final penalty will rest solely with results of the hangfire test.
- 4/ No limits specified. Results to be reported.
- 5/ Gas escapes around more than 50 percent of periphery of cup.
- 6/ Primer not in pocket after firing and both head of cartridge case and pocket enlarged and distorted (determined visually).
- 7/ For location of defects indicated by small letters in parentheses. See Drawing B7643674.
- 8/ This allowance shall remain at one and shall not be proportionate to the number of cartridges in the ballistic firing test.
- 9/ Gun stoppages, with the exception of misfire, observed in all test phases where the percentage is 0.1 percent or higher, shall be included.

4.4 Tests.

4.4.1 Mercurous nitrate test.- Each cartridge of the test sample shall be given a mercurous nitrate test in accordance with Publication ORD-M608-PM, Vol. III, Subsection 7-24.

4.4.2 Bullet extraction test.- Each cartridge of the test sample shall be tested in a tensile test machine of suitable capacity which will register the force required to extract the bullet from the cartridge case when the rate of travel of the test head is controlled within 0.05 to 0.10 inch per second, inclusive. The extractive force required to separate the bullet from each cartridge shall be recorded.

4.4.3 Velocity firing.

4.4.3.1 Equipment.- Cartridges shall be fired in weapon conforming to Drawing D7692874, held in a rest conforming to Drawing 49-6-42A. The breeching space of the weapon shall be 1.940 to 1.943 inches, inclusive.

4.4.3.2 Method.- The method of test shall be in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-13.

4.4.4 Waterproof firing.- Cartridges shall be handled and fired in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-13.

4.4.5 Pressure firing.

4.4.5.1 Equipment.- Cartridges shall be fired in a weapon conforming to Drawing D7692873 held in a rest conforming to Drawing 49-6-42A. The breeching space of the weapon shall be 1.940 to 1.943 inches, inclusive.

4.4.5.2 Method.- The method of test shall be in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-13.

4.4.6 Accuracy firing test.

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4.4.6.1 Equipment.- Ten shots shall be fired at each target from rifle, accuracy, caliber .30, conforming to Drawing D7692088, held in rest, recoil, accuracy, caliber .30, conforming to Drawing 49-6-40A. The headspace of the weapon shall be from 1.940 to 1.943 inches, inclusive.

4.4.6.2 Method.- Testing shall be in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-14.

4.4.7 Penetration.-

4.4.7.1 Equipment.- Cartridges shall be fired in a weapon conforming to Drawing D7692088 held in rest conforming to Drawing 49-6-40A. The headspace of the weapon shall be 1.940 to 1.943 inches, inclusive.

4.4.7.2 Method.- The method of test shall be in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-17. The velocity of each shot shall be recorded. The weapon used shall be such that the average velocity shall not vary from the corrected velocity obtained under paragraph 4.4.3 by more than 35 feet per second. At the discretion of the contracting officer, penetration test may be reduced to one lot in every ten, provided that the penetration tests of the previous three lots tested consecutively were satisfactory.

4.4.8 Function and casualty firing.-

4.4.8.1 Equipment.- Cartridges shall be fired from the weapons listed below. In these firings, the gun shall be at room temperature at beginning of test and the machine gun cooled between bursts.

- a. Gun, machine, Browning, caliber .30, M1917A1, conforming to Drawing D7142391, with headspace of 1.946 to 1.950 inches, inclusive, fired in bursts of 250 cartridges. Gun shall be held in rest conforming to Drawing D769062 or in slide conforming to Drawing FD14711.
- b. Gun, machine, Browning, caliber .30, M1919A4, conforming to Drawing D7142393, with headspace of 1.946 to 1.950 inches, inclusive, fired in bursts of 100 cartridges. Gun shall be held in rest conforming to Drawing D769062 or in slide conforming to Drawing FD14711.
- c. Gun, machine, Browning, caliber .30, M1919A6, conforming to Drawing D7142395, with headspace of 1.946 to 1.950 inches, inclusive, fired in bursts of 100 cartridges. Gun shall be held in rest conforming to Drawing D769062 or in slide conforming to Drawing FD14711.
- d. Rifle, U. S., caliber .30, M1903A3, conforming to Drawing 42-42-4, with headspace of 1.940 to 1.946 inches, inclusive, firing five cartridges (one clip), rapid fire with intervals of not more than one-half minute between clips. Gun shall be completely cooled after firing 50 rounds. The rifles may be held in rest conforming to Drawing FD14884, or may be fired from shoulder or hip.
- e. Rifle, automatic, Browning, caliber .30, M1918A2, conforming to Drawing 51-102-4, with headspace of 1.940 to 1.950 inches, inclusive, fired in bursts of 20 cartridges (one magazine) with intervals of not more than one-half minute between magazines. The rifles may be held in rest conforming to Drawing FD14884, or may be fired from shoulder or hip.
- f. Rifle, U. S., caliber .30, M1, conforming to Drawing 42-24-2, with headspace of 1.942 to 1.946 inches, inclusive, firing eight cartridges (one clip), rapid fire, with intervals of one-half minute between clips. Gun shall be completely cooled after firing 48 rounds. The rifles may be held in rest conforming to Drawing FD14884, or may be fired from shoulder or hip.

4.4.8.2 Method.- The method of test shall be in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-15.

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4.4.9 Hangfire firing test.

4.4.9.1 Equipment.- Cartridges shall be fired in bursts of 50 cartridges at a cyclic rate of 225 shots per minute from gun, machine, Browning, caliber .30, M1919A4, conforming to Drawing D7142393 and held in rest, conforming to Drawing D7690962. The headspace of the weapon used shall be from 1.946 to 1.950 inches, inclusive. The weapon shall be at room temperature at the beginning of the test and cooled between bursts.

4.4.9.2 Method.- The method of test shall be in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-16.

4.4.10 Stripping.- If any strips or tumbles, or both, occur, or are suspected of occurring in the accuracy, velocity, or pressure tests, a test for stripping shall be made.

4.4.10.1 Equipment.- Fire cartridges in rifle, U. S., caliber .30, M1903A3, conforming to Drawing 42-42-4, and held in rest conforming to Drawing 49-6-6. The rifle shall have been fired previously between 4,000 and 6,000 times. The headspace shall be from 1.940 to 1.946 inches, inclusive.

4.4.10.2 Method.- Shots of cartridges shall be fired against paper screens placed 10 feet and 50 feet in front of the muzzle of the gun in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-24.

4.4.11 Case extraction.

4.4.11.1 Equipment.- Cartridge shall be fired from rifle, U. S., caliber .30, M1903A3, conforming to Drawing 42-42-4, held in rest, conforming to Drawing 49-6-6. The headspace of the weapon shall be from 1.946 to 1.947 inches, inclusive.

4.4.11.2 Method.- The method of test shall be in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-20.

4.4.12 Headspace.- All headspaces shall be measured in accordance with Publication ORD-M608-PM, Volume III, Subsection 7-11.

4.4.13 Defective equipment.- When any firing defect is found to have been caused by defective equipment, such firing defect shall not be counted against the ammunition but the equipment shall be corrected or replaced and the test repeated. This applies also in any retest of ammunition.

4.4.14 Firing defects.- In any ballistic test, except function and casualty, in which a misfire occurs or a bullet remains in a bore, an additional shot shall be fired. That particular test shall not be penalized but the acceptance sample shall be penalized for such defects in accordance with Table III.

4.4.14.1 Unusual firing defects.- Any defects not covered by this specification that are found by the government inspector during the acceptance test shall be recorded on the acceptance report and brought to the attention of the contracting officer. The contracting officer shall report the defects to the Chief of Ordnance along with comments of the manufacturer when the defects indicate that the ammunition is unsuited for the purpose intended.

4.4.15 Retests.- Retests for ballistic failure shall be made by firing double the sample size specified in Table I in all of the weapons specified for the test and shall be made in accordance with Specification MIL-A-625.

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5. PREPARATION FOR DELIVERY

5.1 Packing.- Cartridges shall be packed in accordance with applicable drawings.

5.2 Loading of Ammunition for Shipment.- The loading of ammunition lots for delivery shall be under the supervision of the government inspector and in accordance with Military Specification MIL-A-625.

5.3 Inspection of pack.- Inspection of pack shall be in accordance with Publication ORD-SIP-S324.

5.4 Acceptance of pack.- Acceptance of pack shall be in accordance with Military Specification MIL-A-625.

5.5 Marking.- In addition to any special marking required by the contract or order, marking shall be in accordance with Standard MIL-STD-129.

6. NOTES.

6.1 Ordering data.- Procurement documents should specify the following:

Title, number and date of this specification.

6.2 Test of components.- When the contractor for the cartridge is also the contractor for one or more of the components thereof, the ballistic tests of the components may be combined, upon agreement between the government inspector and the contractor, with the ballistic tests of the cartridge to save expense.

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