

MIL-P-3984G
~~10 December 1976~~
SUPERSEDING
MIL-P-3984F
10 December 1971

**MILITARY SPECIFICATION
PROPELLANTS FOR SMALL ARMS AMMUNITION**

This specification is approved for use by all Department and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. - This specification covers propellant for use in small arms ammunition (see 6.1).

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.

SPECIFICATIONS

Military
MIL-N-244 - Nitrocellulose

STANDARDS

Military
MIL-STD-105 - Sampling Procedures and Tables for Inspection
by Attributes
MIL-STD-109 - Quality Assurance Terms and Definitions
MIL-STD-286 - Propellants, Solid: Sampling, Examination and
Testing
MIL-STD-1168 - Lot Numbering of Ammunition

DRAWINGS

Armament Command - Drawings as designated in the contract or order
for the propellant being procured (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Frankford Arsenal, Attn: SARFA-MDM, Phila., PA 19137 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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DRAWINGS (Cont'd)

- 76-4-46 - Box, Packing, Metal Liner (Copper), M24, for Smokeless Powders
- 76-4-56 - Box, Packing, Metal-Wood, M17 for Smokeless Powders
- 20-4-77 - Packing and Marking of Box, Packing, for Smokeless Powders
- F7549033 - Container, Metal, Universal, M25 for Propellant and Explosives, Assembly and Details
- 8858577 - Marking Diagram and Sealing of Container, Metal, Universal, M25 for Shipping of Propellant
- 8858848 - Marking Diagram and Sealing of Metal Lined Wooden Packing Boxes for Shipment of Propellant
- C9256486 - Container, Packing PA 54, Wood with Metal Liner (Modified M24 Box for Smokeless Powder)

PUBLICATIONS

- TECP 700-700, Vol. III - Manual of Test Methods for Small Arms Ammunition
- "AMCR 715-505 - Ammunition Ballistic Acceptance Test Methods Vol-8 Test Procedures for 20MM Cartridges
- SCATP-5.56 - Ammunition Ballistic Acceptance Test Methods Test Procedures for 5.56MM Cartridges
- SCATE-7.62 - Ammunition Ballistic Acceptance Test Methods Test Procedures for 7.62MM Cartridges
- SCATP-45 - Ammunition Ballistic Acceptance Test Methods Test Procedures for Caliber .45 Cartridges"

(Copies of specifications, standards, pamphlets, and drawings 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 Chemical composition and physical properties.-The finished propellant shall comply with the requirements specified on the applicable propellant drawing.

3.1.1 Nitrocellulose.-Nitrocellulose recovered from the rework of propellants or new nitrocellulose with the nitrogen content not fully meeting the requirements of MIL-N-244 may be used in lieu of, or in combination with complying nitrocellulose. Propellant so manufactured shall comply with all chemical, physical and ballistic requirements.

3.2 Ballistics.-The propellant, when loaded into appropriate test cartridges (see 6.3), shall comply with the ballistic requirements for the

3.2 (Cont'd)

cartridge by caliber, type and model for which it is intended as specified in Tables I and III, referenced publications and the following:

3.2.1 Velocity.-The velocity in feet per second (fps) obtained with test cartridges shall be within the limits specified in Table I.

3.2.2 Pressure.

3.2.2.1 Chamber.-The chamber pressure in pounds per square inch (psi) obtained with test cartridges shall be within the limits specified in Table I.

3.2.2.2 Port.-The port pressure (psi) obtained with test cartridges shall be within the limits specified in Table I.

3.2.3 Action time.-The action time (overall primer ignition, propellant burning and bullet-barrel time) in milliseconds (ms) obtained with test cartridges shall not exceed the limits specified in Table I.

3.2.4 Trace.-Test cartridges, when tested for initiation of igniter and tracer mixtures, shall initiate a trace equivalent to at least 96% of the value obtained from the tracer bullets supplied. The tracer bullets supplied shall be from a lot having a minimum trace initiation performance of 96%.

3.2.5 Smoke and flash.-The smoke and flash produced by test cartridges shall not exceed the smoke and flash produced by reference cartridges or by production components loaded with propellant from an accepted lot fired at the same time and under the same conditions (see 6.2).

3.2.6 Fouling.-The test cartridges shall not produce fouling of the barrel, barrel bearings, muzzle attachments, ports or gas cylinders of automatic or semi-automatic weapons to the extent that it will impair or prevent the normal functioning of the weapon.

3.2.7 Barrel erosion.-The test cartridges shall not cause the average life per barrel of three barrels to be less than 5000 rounds. The barrel life shall be considered as having ended when the average velocity of an individual burst in the test drops 200 (fps) or more with respect to that of the initial burst or when the bullets from 20 per cent or more of the cartridges in any burst shows key-holing which is defined as yaw exceeding 15 degrees at 1000 inch range, whichever occurs first.

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3.2.8 Screen perforation.-Blank test cartridges shall not cause any perforations, due to unburnt propellant, in a paper screen placed 15 feet from the muzzle of the weapon.

3.2.9 Cyclic rate.-The cyclic rate per minute produced by blank test cartridges, when fired fully automatic, shall comply with the following:

<u>Weapon</u>	<u>Cyclic Rate</u>
5.56mm (rifle)	550 to 800
7.62mm (rifle)	700 minimum
7.62mm (MG)	500 minimum
Caliber .30 (MG)	450 to 650

3.2.10 Noise level.-The noise level produced by blank test cartridges shall not be less than that shown below when the noise level of ball production cartridges of the same caliber fired under identical conditions and using the same equipment except for the use of a blank firing attachment is 120-130 decibels:

5.56mm Blank, M200	- 100 decibels
7.62mm Blank, MB2	- 105 decibels

3.2.11 Extreme temperature.-Test cartridges conditioned for a minimum of 4 hours and fired at the temperatures specified in Table III shall not exceed the ballistic limits specified in Table I and shall comply with the applicable requirements of 3.2.4 thru 3.2.10 and the following:

3.2.11.1 Cartridges 7.62mm.-The average velocity and chamber pressure of test cartridges subjected to the following storage conditions shall not vary from the average velocity and chamber pressure of similar test cartridges conditioned and fired at $70 \pm 2^{\circ}\text{F}$ by more than the following indicated amounts:

<u>Condition</u>	<u>Variation in Average Velocity (FPS)</u>	<u>Variation in Average Chamber Pressure (PSI)</u>
Stored at $125^{\circ} \pm 2^{\circ}\text{F}$ for 4 hours and fired at that temperature	± 150	± 5000
Stored at $-65^{\circ} \pm 5^{\circ}\text{F}$ for not less than 6 hours and fired at that temperature	+ 150 - 250	+ 5000 -10000

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3.2.11.2 Cartridge 5.56mm.-The average velocity and average chamber and port pressure of test cartridges subjected to the following storage conditions shall not vary from the average velocity and average chamber and port pressure of similar test cartridges conditioned and fired at $70^{\circ} \pm 2^{\circ}\text{F}$ by more than the following indicated amounts:

<u>Condition</u>	<u>Variation in Average Velocity 1/</u>	<u>Variation in Average Pressure Chamber 1/ Pressure</u>	
Stored at $125^{\circ} \pm 2^{\circ}\text{F}$ for 4 hours and fired at that temperature	-250	+5000	<u>+2000</u>
Stored at $-65^{\circ} \pm 5^{\circ}\text{F}$ for not less than 6 hours and fired at that temperature	-250	+5000	<u>+2000</u>

1/ Any increase in velocity and decrease in chamber pressure of the test cartridges obtained under the above storage conditions are acceptable.

3.2.12 Climatic storage.-7.62mm test cartridges subjected to the following storage conditions shall comply with the requirements of 3.2.12.1 thru 3.2.12.4.

<u>Condition</u>	<u>Description</u>
Exposed Desert	Stored for 30 days; performing a cyclic procedure each 24 hours as follows: 3 hours slow heating to $150^{\circ} \pm 2^{\circ}\text{F}$ and $15\% \pm 5\% \text{RH}$ 9 hours at $150^{\circ} \pm 2^{\circ}\text{F}$ and $15\% \pm 5\% \text{RH}$ 3 hours slow cooling to $60^{\circ} \pm 2^{\circ}\text{F}$ and $90\% \pm 5\% \text{RH}$ 9 hours at $60^{\circ} \pm 2^{\circ}\text{F}$ and $90\% \pm 5\% \text{RH}$
Continuous Heating	Stored for 30 days at $150^{\circ} \pm 2^{\circ}\text{F}$ and $15\% \pm 5\% \text{RH}$ or 120 days at $125^{\circ} \pm 2^{\circ}\text{F}$ and $30\% \pm 5\% \text{RH}$
Continuous Arctic	Stored for 30 days at $-40^{\circ} \pm 5^{\circ}\text{F}$

3.2.12.1 Chamber pressure.-The difference in the average chamber pressure between the cartridges stored at each of the specified conditions and cartridges conditioned at $70^{\circ} \pm 2^{\circ}\text{F}$ for 30 days or 120 days shall not exceed +5000 psi.

3.2.12.2 Velocity.-The difference in the average velocity between the

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3.2.12.2 (Cont'd)

cartridges stored at each of the specified conditions and cartridges conditioned at $70^{\circ} \pm 2^{\circ}\text{F}$ for 30 days or 120 days shall not exceed ± 60 FPS.

3.2.12.3 Action time. -The action time (overall primer ignition, propellant burning and bullet-barrel time) of the cartridge stored at each of the three specified condition for 30 days or 120 days shall not exceed 2.5 milliseconds.

3.2.12.4 Trace. -When tested for initiation of igniter and tracer mixtures after storage at each of the specified conditions for 30 days or 120 days, the propellant under test shall initiate trace in a minimum of 70% of the cartridges fired.

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 as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by 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 to define quality assurance terms used.

4.2 First article sample. -After inspection at source, in accordance with the production lot acceptance tests for the first lot as cited in Table III, (acceptability shall be based on results of initial tests only, second tests are not permitted) a quantity of the first acceptable production lot, as prescribed by the procuring activity, shall be submitted to a Government approved facility for first article testing. The first production lot shall have been manufactured in the same manner, with the same materials, equipment, processes and procedures as will be used in subsequent production lots and packed in accordance with the contract or order. The first article sample shall be inspected at a Government approved facility for all the applicable requirements of the drawings and specifications.

4.2.1 First article sample failure. -Failure of the sample to comply with requirements of the drawings and specifications shall result in sample disapproval. Determination as to acceptability of any first article sample shall be based upon results of initial test only, and no second test shall

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4.2.1 (Cont'd)

be permitted on that first article sample. In the event of first article failure, disposition of the first production lot shall be determined by the contracting officer.

4.3 Inspection provisions.-In all chemical, physical and ballistic testing, the use of the equipment specified and the methods of test prescribed in this specification and other documents referenced therein shall be mandatory.

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 Size of lot.-The propellant lot size shall be as agreed upon between the supplier and the contracting officer, provided the formation of the lot is in accordance with MIL-STD-105.

4.3.1.3 Lot identification.-Each lot of propellant shall be identified with a lot number in accordance with MIL-STD-1168.

4.3.2 Sampling.-Random representative samples shall be taken by random selection of one container from each identifiable increment of the lot. A random sample of five containers shall be selected from these representative samples. From each container selected, a sample shall be taken such that the aggregate quantity shall be sufficient for the required chemical, physical, ballistic, and ballistic uniformity tests. These samples shall be poured into clean containers, immediately closed with a hermetically tight seal and identified as "Representative Sample" with a label showing the container number from which the sample was taken, the Army lot number, propellant nomenclature, packing date manufacturer, manufacturing plant, and total weight of the lot as packed. Prior to conducting lot acceptance tests, these samples shall be permitted to attain room temperature, then equal portions sufficient to make the required quantity of a composite sample shall be taken from each "Representative Sample" and blended. This composite sample shall be placed in two separate containers, immediately closed with a hermetically tight seal and identified respectively as "Chemical Sample" and "Ballistic Sample." These containers shall be further identified by the container numbers from which the composite sample was taken, the Army lot number, propellant nomenclature, packing date, manufacturer, manufacturing plant, and total weight of the lot as packed. The balance of the propellant remaining in each of the Representative Samples shall be used to perform the ballistic uniformity test.

4.3.3 Tests.-The following tests shall be performed in accordance with the provisions of 4.4.

4.3.3.1 Chemical composition and physical properties.-The sample quantity of propellant to be tested for the chemical composition and physical properties

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4.3.3.1 (Cont'd)

requirements specified in the applicable propellant drawing shall be as prescribed in MIL-STD-286. In the event of failure of the sample to comply with the requirements of 3.1, the procedure of Note 1/ under 4.3.3.2 shall apply.

4.3.3.2. Ballistics.--The following ballistic tests shall be made in accordance with Tables II and III to determine compliance with the requirements of the caliber, type and model of the cartridge for which the propellant is intended. The "Ballistic Sample" shall be subjected to all of the tests prescribed below:

<u>TEST 1/</u>	<u>REQUIREMENT PARAGRAPH</u>
Velocity <u>2/</u>	3.2.1
Pressure <u>2/</u>	3.2.2
Action Time	3.2.3
Smoke & Flash	3.2.5
Fouling	3.2.6
Barrel Erosion <u>3/</u>	3.2.7
Screen Peforation	3.2.8
Cyclic Rate	3.2.9
Noise Level	3.2.10
Extreme Temperature	3.2.11
Climatic Storage <u>3/</u>	3.2.12

1/ Failure of the propellant to comply with the requirements of 3.1 or 3.2 shall be cause for rejection of the lot subject to testing of a second sample for the characteristic(s) in which the failure occurred. The second test shall be made using the original sample, provided sufficient propellant remains. If additional propellant should be required, it shall be taken from the same boxes of propellant from which the initial "Representative Samples" were obtained. Failure of the second sample to comply with the requirements of the characteristic(s) under test shall be cause for rejection of the lot. The above provisions for testing of a second sample shall apply to the second and subsequent production lots. "Accept/Reject" decision for first production lot and first article sample shall be based upon results of initial test only, and no second tests shall be permitted.

2/ Velocity and pressure may be fired either separately or simultaneously, as prescribed in the appropriate inspection equipment list.

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y Performed by the Government only.

4.3.3.2.1 Velocity uniformity.-Cartridges loaded with each of the "Representative Samples" shall be tested for velocity uniformity. These tests shall be conducted only at ambient conditions. Ten rounds using each of the "Representative Samples" shall be loaded at the same charge weight established for the "Ballistic Sample." The velocity shall be averaged for each ten-round test. Criteria for "Ballistic Sample" charge establishment velocity, variation of "Representative Sample" velocity from that of "Ballistic Sample" and standard deviations for "Representative Sample" velocities follow:

	"Ballistic Sample" Velocity	"Representative Sample" Vel. Variation	"Representative Sample" Vel. Std. Dev. (Max)	
			Initial Test	Retest
5.56mm Ball, M193	3250 \pm 10	+25	30	25
5.56mm Tracer, M196	3200 \pm 10	+25	30	25
7.62mm Ball, M80	2750 \pm 5	+20	24	20
7.62mm Tracer, M62	2750 \pm 5	+20	24	20
Caliber .30 Ball, M2	2740 \pm 5	+20	24	20
Caliber .30 Tracer, M25	2665 \pm 5	+20	24	20
Caliber .45 Ball, M1911	855 \pm 5	+20	21	18
Caliber .45 Tracer, M26	885 \pm 5	+20	21	18
Caliber .50 Ball, M33	2910 \pm 10	+20	36	30
Caliber .50 Tracer, M17	2860 \pm 10	+25	48	40
20mm, HEI, M56	3380 \pm 15	+30	36	30
20mm, TP, M99	2680 \pm 15	+30	36	30

Failure of the propellant to comply with the criteria of the uniformity test shall be cause for rejection of the lot subject to testing of a second sample. The second test shall be made using propellant from the original container in which sample failure occurred in the initial test. The second sample shall consist of twenty rounds. The criteria shall remain the same except for velocity standard deviation which shall not exceed the value indicated above under "Retest." Failure of the second sample to comply with the criteria of the uniformity test shall be cause for rejection of the lot. The velocity uniformity test is not required for cartridges not listed in the above table of cartridges.

4.3.3.3 Packing and marking inspection.-Inspection of packing and marking to determine compliance with the requirements of 5.1 shall be as prescribed by the procuring activity.

4.3.4 Inspection equipment.-All tests shall be made using equipment listed on the applicable inspection list.

4.4 Test methods and procedure.

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TABLE I
BALLISTIC REQUIREMENTS FOR PROPELLANTS

CARTRIDGE CALIBER, TYPE & MODEL	INSTRUMENT VELOCITY (FPS)					STANDARD DEVIATION (MAX)	CHAMBER PRESSURE (PSI)		Indv max action time (ms)	EXTREME TEMPERATURE INDIVIDUAL MAX. CHAMBER PRESSURE (PSI)	Indv max action time (ms)
	AVERAGE AT						MAXIMUM AVERAGE	STANDARD DEVIATION (MAX)			
	5.5 -Y-	18.0 Ft.	33.5 Ft.	53.0 Ft.	78.0 Ft.						
5.56MM											
Ball M193		2550 ± 20				25	50,000 ¹⁰⁾	56,000 ¹³⁾	2.5	58,000	
Tracer M198		3200 ± 30									
HPT M197							70,000 ± 2000	3000			
Greenade M196		180 ± 5				2					
Blank M200											
7.62MM											
Ball M59											
Ball M80					2750 ± 15	20	48,000	53,000 ¹³⁾	2.5	65,000	
AP M81											
Tracer M82											
Greenade M84		180 ± 5				2					
HPT M80							67,000 ± 2500	3000			
Frangible M100			1320 ± 30								
Blank M110					2550 ± 15	20	48,000 ⁹⁾	53,000 ¹³⁾			
Blank M83											
Duplex M198					2750 ± 15	20 ⁸⁾	50,000 ¹²⁾		2.5 ⁹⁾	60,000	
CALIBER .30											
Ball M3					2740 ± 15						
API M14					2780 ± 15	20	48,000		2.5	60,000	
Tracer M38					2665 ± 15						
Greenade M3		180 ± 15				12					
HPT M1 & M1 alt							67,500 ± 2500	3000			
Blank M72					2440 ± 15	20	48,000				
Blank M1900											
CALIBER .45											
Ball M1911			835 ± 15 ⁷⁾			18	18,500	400		19,500	
Ball, Match Grade M1911											
Tracer M206			885 ± 15 ⁷⁾								
Blank M9											
HPT M1							22,000 ± 1000	1000			
CALIBER .50											
Ball M33					2910 ± 15	30	53,000		2.5	65,500	
API M2											
APIT M20					2880 ± 20	40	53,000			61,000	
Tracer M17					1745 ± 10	9	36,000		3.5	48,000	
Spotter-Tracer M48A2							62,500 ± 2500	3000			
HPT M1							53,000 ± 2000				
HPT T251											
30MM											
Target Practice M99					2880 ± 25	30	45,000	2000	3.5		
HE1 M56					3380 ± 25		55,000			3.5	
HPT M54							67,500 ± 1500	2500			
TPT M206					3430 ± 25	30	47,500		5.5	52,000 ¹⁴⁾	

- Cases to be drilled: except caliber 45; 5.56MM and 7.62MM Duplex, M198.
- Average velocity shall be 2680 ± 15 ft/sec if bullet is assembled with gilding metal bullet jacket.
- When tested with prov. slug - Drawing B10522589.
- The average port pressure shall be 12,500 ± 2000 (psi).
- For permissible variation in 7.62MM average velocity and chamber pressure, see paragraph 3.2.11.1 and for 5.56MM, see paragraph 3.2.11.2.
- HPT shows permissible limits for average pressure in lieu of maximum average.
- In universal page.

- Inert projectile.
- Requirement applies to front bullet only.
- The average port pressure shall be 15,000 ± 2000 (psi).
- The M99, M56 and M206 components are used as test vehicles for the acceptance of propellant for the entire family of M99, M56 and M206 series of cartridges respectively.
- The average port pressure shall be 8000 psi minimum.
- Mean chamber pressure plus three (3) standard deviations.
- Individual Max applies at 70±2° only.

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**TABLE II
SAMPLE SIZE OF TEST CARTRIDGES FOR BALLISTIC TESTS**

CARTRIDGE CALIBER, PIPE & MODEL	VELOCITY	CHAMBER PRESSURE	ACTION TIME	TRACE	SMOKE	FLASH	FOULING	BARREL EROSION	SCREEN PERFO- RATION	CLIMATIC STORAGE	CYCLIC RATE				EXTREME TEMPER- TURE	TOTALS BY LOT
											RIFLE	MG	RIFLE	MG		
5.56MM																
GRENADE M195	20														50	175
BLANK M200					100	100	500		200		100		20		0	1020
BALL M193															100	1500
TRACER M196	20	20	20	100	100	1000									320	1000
HPT M197		20														100
7.62MM																
DUPLEX BALL M198															100	620
BALL M59	20	20	20		100	100	100	9		9					120	600
BALL M80																
AP M61																
TRACER M62				100											320	900
GRENADE M64		0													40	100
HPT M69	0	20														100
FRANGIBLE M159		0														
BATCH M116	20	0													0	400
BLANK M62		20			100	0	100		100		100	100	20	100	0	1120
CALIBER .38																
BALL M2															40	500
API M14	20	20	20		100	100	100								200	800
TRACER M25				100												
GRENADE M3		0														100
HPT M1	0															
BATCH M72	20	20														400
BLANK M1909					100	100	100		100		100				0	500
CALIBER .45																
BALL M1911															40	520
BALL, BATCH GRADE M1911	20														0	100
TRACER M26				100	100	0	100								200	320
BLANK M5									100						0	100
HPT M1		20														100
CALIBER .50																
BALL M33															40	500
API M8																
BALL M20	20	20	20		100	100	100								200	600
TRACER M17				100											200	800
SPOTTER-TRACER M48A2															200	800
HPT M1																100
HPT T251																
20MM																
TARGET PRACTICE M99	20		20		100	100									20	300
HEI M56																100
HPT M54																
TPT M206	20		20	50	100	100										670

1) SAME QUANTITY REQUIRED FOR PORT PRESSURE.
 2) EXAMINATION OF WEAPON IN THE SMOKE TEST MAY CONSTITUTE THE FOULING TEST OR VICE VERSA EXCEPT FOR 5.56MM CARTRIDGES.
 3) APPROPRIATE BLANK ATTACHMENT TO BE USED FOR EACH WEAPON.
 4) SEE TABLE III FOR EXTREME TEMPERATURE CONDITIONS.
 5) INERT PROJECTILE.
 6) BARREL EROSION AND CLIMATIC STORAGE TESTS WILL BE PERFORMED BY THE GOVERNMENT ONLY.
 7) VELOCITY AND PRESSURE FIRED SIMULTANEOUSLY. FOR 20MM, FIXED REFERENCE CARTRIDGES ARE TO BE USED FOR OBTAINING BARREL CORRECTIONS.
 8) CHAMBER PRESSURE AND PORT PRESSURE FIRED SIMULTANEOUSLY.
 9) TEST NOT REQUIRED FOR REFERENCE PROPELLANT.

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TABLE III ¹⁾													
CONDITIONING REQUIREMENTS BY CHARACTERISTICS & CALIBER							TESTING REQ. BY LOTS						
CHARACTERISTICS	TEMPERATURE CONDITIONS ²⁾ ³⁾												
	5.56mm and 7.62mm			CALIBERS .30, .45, .50			20mm						
TEST CARTRIDGES										First Article Sample Tests By Govt Only	PRODUCTION LOT ACCEPTANCE TESTS		
Conditioned At	+125	-65	+70	-40	+125	+70	-65	+70	First Lot		Second to Fifth Lot	Sixth Lot on	
Fired At	+125	-65	+70	-40	+125	+70	-65	+70					
Chemical Composition													
Physical Properties													
Velocity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Pressure ⁶⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Action Time			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Trace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Smoke			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Flash			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Fouling			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Screen Perforation			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Cyclic Rate			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Noise Level			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Barrel Erosion			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Climatic Storage			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

1) Table II denotes when tests are applicable by specific cartridge and sample size of test cartridges required.

2) Cartridge cases for pressure test to be drilled prior to being stored at specified temperature, except Cal. .45; 5.56MM and 7.62MM Duplex, M198.

3) Test cartridges to be loaded in links, belts magazines or chargers prior to being stored at specified temperature. ($\pm 2^\circ$ For hot & ambient & $\pm 5^\circ$ For cold temperature)

4) For 7.62MM Cartridges port pressure test is also required.

5) Except hygroscopicity.

6) The 5.56MM Cartridges require port pressure as well as chamber pressure tests at all temperature conditions.

7) This requirement applies to 7.62MM Cartridges only. Evaluation will be made by the Government independently of all other tests.

8) This requirement applies to 20mm TPT M206 only.

9) Test conducted at 70°F only.

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4.4.1 Chemical composition and physical properties.-The applicable tests shall be performed in accordance with the procedures set forth in MIL-STD-286.

4.4.2 Ballistics.-Ballistic test listed in 4.3.3.2 shall be performed in accordance with TECP 700-700 (Vol III), AMCR 715-505 (Vol 8), SCATP-5.56, SCATP-7.62 or SCATP-45 as applicable, and the following:

4.4.2.1 Loading of test cartridges.-Except as provided in 4.4.2.2., the propellant sample selected in accordance with 4.3.2 shall be used to load test cartridges with the charge weight established to obtain the specified average corrected velocity. When once established for a particular propellant lot, this charge weight may not be varied while the same lot is being tested. The test cartridges to be used for any velocity and pressure test shall be loaded by a method capable of maintaining propellant charge weight uniformity of ± 0.1 grain.

4.4.2.2 Cyclic rate.-The charge weight of the propellant under test shall be established by trial and error to obtain proper functioning of the weapon fitted with the appropriate blank firing attachment at the prescribed cyclic rate (3.2.9). Prior to establishment of the charge weight of the propellant undergoing test, the weapon shall be qualified for use by firing the appropriate blank cartridges from an accepted lot, to determine that the cyclic rate of the weapon is within the limits prescribed for that cartridge. In the event the cyclic rate of the weapon is not within these limits, either the appropriate adjustments shall be made to the gun or a properly qualified replacement weapon shall be substituted before proceeding with the test. The cartridge shall be fired fully automatic in bursts of 100 rounds each in the weapon specified in the applicable inspection equipment list.

4.4.2.3 Extreme temperature.-The test cartridges shall be conditioned and fired as indicated in Table III and 3.2.11. Characteristic(s) applicable to the cartridge under test shall be tested in accordance with 4.4.2.

4.4.2.4 Climatic storage.-The test cartridges shall be conditioned and fired as indicated in 3.2.12. Characteristics applicable to the cartridge under test shall be tested in accordance with 4.4.2. If a failure should occur in the 30 day continuous heating test, a second test at the 120 day continuous heating conditions indicated in 3.2.12, shall be made.

4.4.2.5 Trace.-Initiation shall be observed from a position behind the gun. The test shall be conducted on a range of sufficient length that the initiation or lack of initiation can be observed. The range length shall be determined by the contractor. Failure of the sample to meet the trace requirements shall be cause for rejection of the propellant lot.

5. PREPARATION FOR DELIVERY

5.1 Packing.

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5.1.1 Level A.-(Worldwide shipment and/or long term storage). Unless otherwise specified by the contracting officer, the propellant shall be packed in clean airtight containers conforming to Drawings 76-4-46, 76-4-56, F7549033 or C9256486.

5.1.1.1 Immediately prior to packing, containers listed in 5.1.1 shall be subjected to an internal pressure of $\frac{1}{2}$ to 1 pound per square inch by a method satisfactory to the contracting officer's representative. A water manometer shall be assembled in the system. A drop of 0.7 inches or more on the manometer in 15 seconds shall be cause for rejection and the container removed from the lot.

5.1.2 Level B.-Packing shall be as specified in 5.1.1.

5.1.3 Level C.-(CONUS shipment and/or short term storage). Unless otherwise specified by the contracting officer, the propellant shall be packed in standard commercial containers having a minimum capacity of approximately 100 pounds and acceptable by common or other carrier for safe transportation to the point of delivery, at the lowest cost.

5.2 Marking.

5.2.1 Levels A & B.-The containers shall be sealed and marked in accordance with Drawings 20-4-77, 8858577 or 8858848. Markings shall also include the date of manufacture of propellant (month and year).

5.2.2 Level C.-Containers shall be marked on the side with the same markings as required for the side of the box shown on Drawing 8858848. Markings shall also include the date of manufacture of the propellant (month and year).

5.2.3 Special Marking.-All packed containers (Level A, B, or C) shall have a printed label affixed to the side with the following information:

NOTICE

AFTER FIVE YEARS FROM DATE OF MANUFACTURE, APPROVAL BY
THE RESPONSIBLE ENGINEERING AGENCY IS REQUIRED PRIOR TO
THE LOADING OF THIS PROPELLANT INTO SMALL ARMS AMMUNITION

5.3 Palletization.-All Level A shipments shall be palletized in accordance with instructions furnished by the procuring activity. Palletization is not required for Level B or C shipments.

6. NOTES

6.1 Intended use.-Propellants procured under this specification are intended to be used in small arms ammunition listed in Table I by caliber, type and model.

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6.2 Ordering data.-Invitation for bids or request for proposal, contract or order should specify the following:

- a. Title, number and date of this specification.
- b. Nomenclature of propellant and the caliber, type and model of cartridge for which it is intended.
- c. Applicable technical data package.
- d. Provisions for the supply of the following, when applicable:
 - 1) test equipment, 2) production cartridges, 3) production components, 4) reference cartridges, 5) reference propellant
 - 6) trace initiation performance data of the tracer bullets (percentage) will be available from the supplying agency.
- e. Applicable packing container. (See 5.1)
- f. Provision for the submission of acceptance inspection reports containing propellant description sheets and ballistic acceptance test results for each lot of propellant presented to the government.

6.3 Definition of appropriate test cartridge.-The appropriate test cartridge for all propellant acceptance tests shall be the same caliber, type and model for which the propellant is intended and shall be assembled from components manufactured under production conditions as follows: 1) Propellant under test, 2) primed case, 3) Bullet or wadding as applicable. The test cartridge shall also be waterproofed and crimped if specified on the appropriate cartridge drawing.

Custodians:

Army - MU

User activities:

Navy - OS, MC

Air Force - 99

Preparing activity:

Army - MU

Project No. 1376-0121

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