MIL-P-323A
9 MARCH 1959
SUPERSEDING
JAN-P-323
29 MARCH 1946

MILITARY SPECIFICATION

PROPELLANT, M2 AND M5

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 Scope. This specification, together with Specification MIL-P-270 covers two classes of artillery propellant.

1.2 Classification. Propellant covered by this specification shall be of the following two classes as specified:

Class M2 (see 3.3).

Class M5 (see 3.3).

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

MILITARY

JAN-G-155 — Graphite.

MIL-P-156 — Potassium Nitrate.

JAN-N-244 — Nitrocellulose (For use in Explosives).

JAN-N-246 — Nitroglycerin.

JAN-E-255 — Ethyl Centralite (Carbamite).

MIL-P-270 — Propellants, Artillery.

MIL-E-463 — Ethyl Alcohol (For Ordnance Use).

JAN-A-489 — Acetone (For Ordnance Use).

MIL-G-2550 — General Specification for Ammunition. Except Small Arms Ammunition.

STANDARDS

MILITARY

MIL-STD-286 — Propellants: Sampling, Inspection and Testing.

(Copies of specification, 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 Material. The constituent materials

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used in the manufacture of propellant M2 and M5 shall comply with the following requirements:

Constituent material	*Specification conforming to*
Nitrocellulose	JAN–N–244; Grade C, Type II
Nitroglycerin	MIL–N–246
Potassium Nitrate	MIL–P–156, Class 2
Ethyl Centralite	JAN–E–255
Graphite	JAN–G–155, Grades III or IV
Ethyl Alcohol	MIL–E–463, Grade 2
Acetone	JAN–A–489
Barium Nitrate	JAN–B–162, Class 3

3.2 Total volatiles. The total volatiles content shall not exceed the value shown in figure 1 for the appropriate formula and web size, when determined as specified in 4.4.1.

3.3 Composition. The composition of the propellant on a total volatiles-free basis shall be as shown in table I, when determined as specified in 4.4.2.

TABLE I

	Class M2	Class M5
Constituent	Percent	Percent
Nitrocellulose	77.45 ± 2.00	81.95 ± 2.00
Nitroglycerin	19.50 ± 1.00	15.00 ± 1.00
Barium Nitrate	1.40 ± 0.20	1.40 ± 0.20
Potassium Nitrate ..	0.75 ± 0.25	0.75 ± 0.25
Ethyl Centralite	0.60 ± 0.15	0.60 ± 0.15
Graphite[1]	0.30 ± 0.10	0.30 ± 0.10

[1] The maximum graphite content allowed when the M2 or M5 Propellant is graphite-glazed, shall be 0.60.

3.4 Graphite glaze. The propellant may be glazed with graphite in addition to the graphite used in making up the composition (see table I).

3.5 Total moisture. The moisture content shall not exceed 0.70 percent when determined as specified herein.

3.6 Hygroscopicity. The hygroscopicity shall not exceed 1.50 percent, at 90 percent relative humidity and 30 degree Centigrade (°C.), when determined as specified herein.

3.7 120°C. stability test. The propellant shall not cause complete fading of the methyl violet test paper to salmon pink in less than 40 minutes when determined as specified herein.

3.8 Physical requirements. Detail physical requirements as to size and form will be as specified in Specification MIL–P–270, contract or purchase order.

3.9 Ballistic requirements. Ballistic performance requirements shall be as specified in the contract, purchase order, or Specification MIL–P–270.

4. QUALITY ASSURANCE PROVISIONS

4.1 General quality assurance provisions.

4.1.1 *Contractor inspection.* Unless otherwise specified herein, the supplier is responsible for the performance of all inspection requirements prior to submission for Government inspection and acceptance. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. In-

spection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order.

4.1.2 *Contractor quality assurance system.* The contractor shall provide and maintain an effective quality assurance system acceptable to the Government covering the supplies under the contract. A current written description of the system shall be submitted to the contracting officer prior to initiation of production. The written description will be considered acceptable when, as a minimum, it provides the quality assurance required by the detail specification, MIL-G-2550, and other applicable documents referenced in the detail specification. The contractor will not be restricted to the inspection station or to the method of inspection listed provided that an equivalent control is included in the approved quality assurance procedure. In cases of dispute as to whether or not certain procedures of the system provide equal assurance, the comparable procedure of the detail specification shall be used. The contractor shall notify the Government of and obtain approval for any change to the written procedure that might affect the degree of assurance required by the detail specification or other applicable documents referenced therein.

4.1.3 *Government verification.* All quality assurance operations performed by the contractor will be subject to Government verification at unscheduled intervals. Verification will consist of (a) surveillance of the operations to determine that practices, methods, and procedures of the written inspection plan are being properly applied, and (b) Government product inspection to measure quality of product offered for acceptance. Deviation from the prescribed or agreed-upon procedures, or instances of poor practices which might have an effect upon the quality of the product, will be immediately called to the attention of the contractor. Failure of the contractor to promptly correct deficiencies discovered shall be cause of suspension of acceptance until correction has been made or until conformance of product to prescribed criteria has been demonstrated. To avoid interference with operations, the contractor shall designate a responsible official or officials to whom the Government inspector will report such instances. At the time the completed lot of product is submitted to the Government for acceptance the contractor shall supply the following information accompanied by a certificate which attests that the information is correct and applicable to the product being submitted:

(a) A statement that the lot complies with all quality assurance provisions of the approved current written description of the system.

(b) Results obtained for all inspection performed.

(c) Drawings, specification number and date, together with an identification and date of changes.

(d) Certificates of material analysis.

(e) Quantity, in pounds, of product in lot.

(f) Date submitted.

The certificate shall be signed by a responsible agent of the certifying organization and shall be accompanied by evidence of the agent's authority to bind his principal.

4.2 Lot. A lot shall consist of one class and type of propellant manufactured from one grade and type of nitrocellulose, manufactured from one class (cotton linters, sulfate, or sulfite woodpulp) of cellulose under the same processing operations and conditions. The lot size shall be as specified in Specification MIL-P-270, the contract or purchase order, as applicable.

4.3 Sampling. Sampling shall be conducted

as specified in Specification MIL–P–270.

4.4 **Test procedures.** Test methods specified below are outlined in MIL–STD–286.

4.4.1 *Total volatiles.* The total volatiles content shall be determined as specified in method 103.3.

4.4.2 *Determination of composition.*

4.4.2.1 *Nitrocellulose.* The percentage of nitrocellulose shall be determined as specified in method 209.2.

4.4.2.2 *Nitroglycerin.* The percentage of nitroglycerin shall be determined as specified in method 208.1, using absolute ether or methylene chloride as the solvent for extraction.

4.4.2.3 *Barium nitrate.* The percentage of barium nitrate shall be determined as specified in method 304.1.1.

4.4.2.4 *Potassium nitrate.* The percentage of potassium nitrate shall be determined as specified in method 310.4.

4.4.2.5 *Ethyl centralite.* The percentage of ethyl centralite shall be determined as specified in method 202.2, using absolute ether or methylene chloride as the solvent for extraction.

4.4.2.6 *Graphite.* The percentage of graphite shall be determined as specified in method 308.1.

4.4.3 *Total moisture.* The total moisture content shall be determined as specified in method 102.1.

4.4.4 *Hygroscopicity.* The hygroscopicity of the propellant shall be determined as specified in method 503.2.

4.4.5 *120°C. stability test.* The 120°C. heat stability test shall be conducted as specified in method 404.1.

5. PREPARATION FOR DELIVERY

5.1 **Packing and marking.** Packing and marking shall be as specified in Specification MIL–P–270, unless otherwise specified in the contract or purchase order.

6. NOTES

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

(a) Title, number, and date of this specification.

(b) Class and type of propellant required.

(c) Lot size required, if other than as specified in Specification MIL–P–270.

(d) The following statement:
Process. Details of the manufacturing process and the equipment used by the contractor shall be submitted to the procurement activity in writing prior to commencement of manufacture. Any deviation from this manufacturing process must be submitted in writing to the procurement activity prior to being put into effect.

6.2 Provisions of this specification are the subject of international standardization agreements. When amendment, revision, or cancellation of this specification is proposed, the departmental custodians will inform their respective Departmental Standardization Office (DepSO) so that appropriate action may be taken respecting the international agreement concerned.

ment thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may be related thereto.

Custodians:
Army—Ordnance Corps
Navy—Bureau of Ordnance

Other interest:
International (see section 6)

Preparing activity:
Army—Ordnance Corps

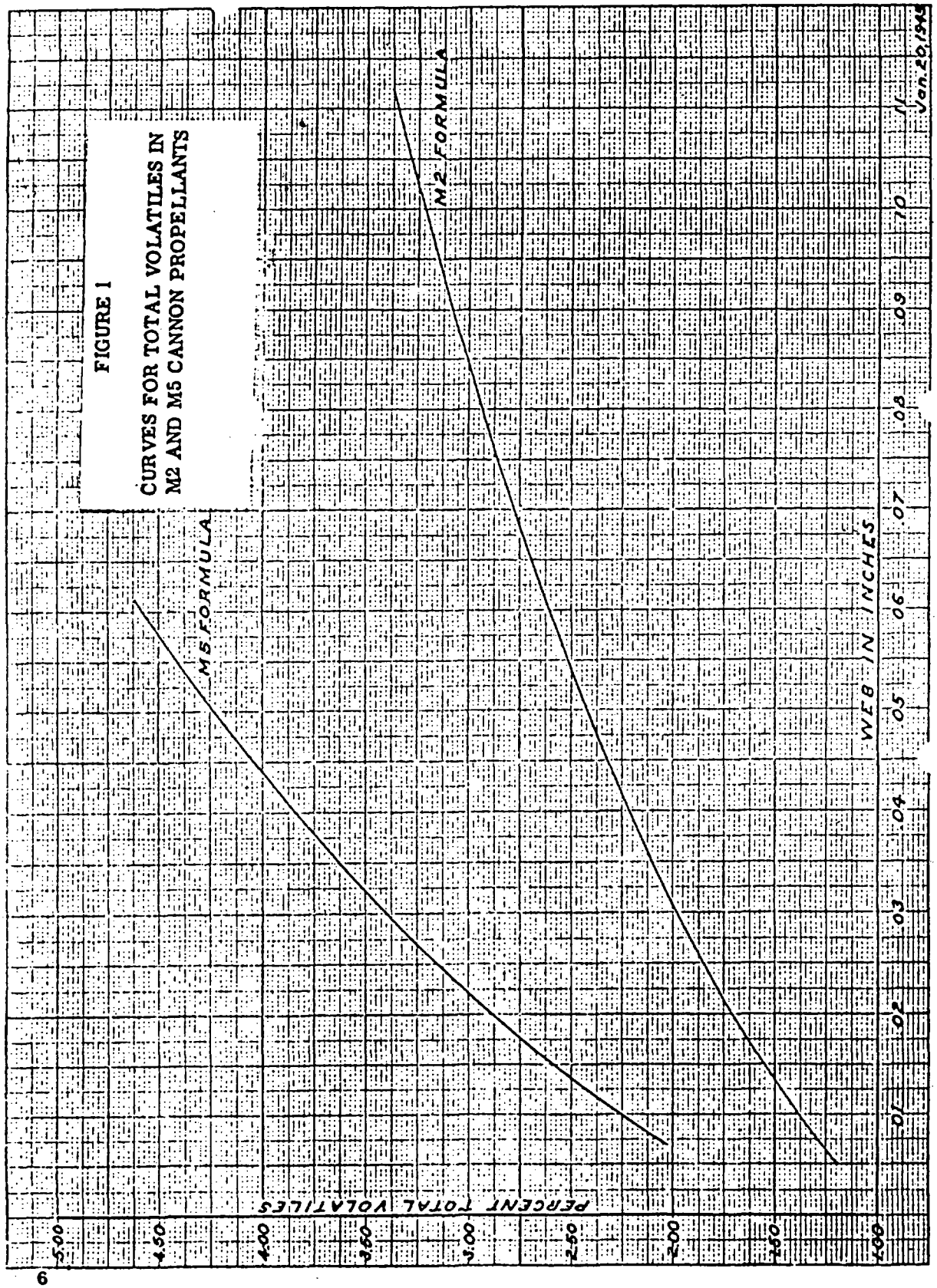

FIGURE 1

CURVES FOR TOTAL VOLATILES IN M2 AND M5 CANNON PROPELLANTS

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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 *(as indicated on reverse hereof)*.

SPECIFICATION

ORGANIZATION *(Of submitter)* | CITY AND STATE

CONTRACT NO. | QUANTITY OF ITEMS PROCURED | DOLLAR AMOUNT $

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ 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?

☐ YES ☐ 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

DD FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE PLATE NO. 15419