

MIL-P-48335 (PA)
30 April 1975

MILITARY SPECIFICATION

PROPELLANT, SPHEROIDAL BALL POWDER

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

1. SCOPE

1.1 This specification covers spheroidal propellant for use in ammunition (see 6.3).

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 this specification to the extent specified herein.

SPECIFICATION

MILITARY

MIL-D-98	- Diphenylamine
MIL-G-155	- Graphite
MIL-P-156	- Potassium Nitrate
MIL-P-193	- Potassium Sulfate
MIL-D-204	- Dinitrotoluene (For Use in Explosive)
MIL-D-218	- Dibutylphthalate (For Use in Explosive)
MIL-N-244	- Nitrocellulose (For Use in Explosive)
MIL-N-246	- Nitroglycerin
MIL-C-293	- Calcium Carbonate
MIL-T-458	- Tin
MIL-A-48078	- Ammunition Standard Quality Assurance Provisions, General Specification for
MIL-S-50004	- Sodium Sulfate
MIL-T-50005	- Tin Dioxide (Stannic Oxide)

STANDARDS

MILITARY

MIL-STD-286	- Propellant, Solid, Sampling, Examination and Testing
MIL-STD-652	- Propellants, Solid, for Cannons Requirements and Packing

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(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement function should be obtained from the procuring activity or as directed by the contracting officer).

2.2 Other publications. - The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

CODE OF FEDERAL REGULATIONS

Title 49 - Transportation, Parts 100-199

(The Interstate Commerce Commission Regulations are now a part of the Code of Federal Regulations, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Orders for the above publications should cite, "49 CFR 100-199 (latest revision)").

3. REQUIREMENTS

3.1 Constituent Material. - The constituent materials shall comply with the requirements of the following applicable specification:

Constituent Material	Conforming to Specification
Diphenylamine	MIL-D-98
Graphite	MIL-G-155 Grade III or IV
Potassium Nitrate	MIL-P-156 Class 2 or 3
Dinitrotoluene	MIL-D-204
Dibutylphthalate	MIL-D-218 (see 6.2)
Nitrocellulose	MIL-N-244 Except Nitrogen Content 13.05 to 13.20%
Nitroglycerin	MIL-N-246 Type I
Calcium Carbonate	MIL-C-293
Sodium Sulfate	MIL-S-50004
Potassium Sulfate	MIL-P-193
Tin Dioxide	MIL-T-50005
Tin	MIL-T-458

3.2 Composition and Physical Properties.

3.2.1 Composition. - The propellant composition shall comply with the requirements given in Table I on a Volatiles - Free Basis (see 6.2) when tested as specified in 4.5.1.

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Table I

<u>Constituents</u>	<u>Percent</u>
Nitrocellulose, Min	94.5
Dinitrotoluene, Max (see 6.2)	2.0
Potassium Nitrate, Max (see 6.2)	0.4
Potassium Sulfate, Max	0.5
Sodium Sulfate, Max	0.5
Calcium Carbonate, Max	1.0
Nitroglycerin, Max	1.0
Diphenylamine	0.75 to 1.50
Dibutylphthalate, Max	2.0
Tin Dioxide, Max (see 6.2)	0.1
Graphite, Added, Max	0.4
Total Volatiles, Max	2.0
Moisture	0.85 to 1.45
Tin, Max, (see 6.2)	0.1

3.2.2 Physical Properties. - The propellant shall comply with the requirements given in Table II when tested as specified in 4.5.1.

Table II

<u>Test</u>	<u>Value</u>
Heat Test - 134.5°C	
Methyl violet test paper shall not change to salmon pink color in less than 50 minutes.	
Explosion shall not occur in less than 5 hours.	
Dust and Foreign Matter, Max %.....	0.25
Bulk Density, gm/cc.....	0.89 to 0.97

3.3 Granulation. - The propellant shall comply with the requirements of Table III when tested as specified in 4.5.3.

Table III

<u>U.S. Standard Sieve, Size</u>	<u>Percent</u>
25	95 Min. through
30	90 Min. retained
60	5 Max. through
70	3 Max. through

3.4 Closed Bomb. - The propellant shall have a relative quickness of 100 + 12 percent when tested as specified in 4.5.2.

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3.5 Workmanship. - The best commercial practices shall be used in the formulation of propellant furnished under this specification, and all other applicable documents. The propellant and its standard ingredients shall be protected from the action of direct sunlight and acid fumes (see 6.2).

3.6 First Article Inspection. - This specification contains technical provisions for first article inspection. Requirements for Submission of first article samples by the contractor shall be as specified in the contract (see 6.1).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection and Standard Quality Assurance Provisions. - Unless otherwise specified herein or in the contract, the provisions of MIL-A-48078 shall apply and are hereby made a part of this detail specification.

4.2 Classification of Inspections. - The following types of inspection shall be conducted on this item:

- a. First Article Inspection (see 4.3).
- b. Quality Conformance Inspection (see 4.4).
- c. Packing (see 5).

4.3 First Article Inspection.

4.3.1 Submission. - The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with provisions of 4.3.2. The first article shall consist of 5 pounds of propellant obtained by sampling as described in 4.4.2. The samples shall be obtained from a production batch which has been produced by the contractor using the same production processes, procedures and equipment as will be used in fulfilling the contract. All materials shall be obtained from the same sources of supply as will be used in regular production.

4.3.2 Inspections to be Performed. - The sample will be subjected by the Government to any or all of the examinations or tests specified in 4.5 of this specification.

4.3.3 Rejection. - See MIL-A-48078.

4.4 Quality Conformance Inspection.

4.4.1 Lot formation. The term "lot" as used throughout this specification, refers to an inspection lot, which is defined as an essentially homogeneous quantity of propellant from which the sample was drawn and shall not be construed to represent any prior or subsequent quantities presented for

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inspection. A lot shall consist of ball powder produced by one manufacturer, in accordance with the same specification and the same specification revision, under one continuous set of operating conditions. Each lot shall consist of that quantity of ball powder which has been subjected to the same unit chemical or physical process intended to make the final product homogeneous.

4.4.2 Sampling. - The sampling shall be in accordance with MIL-STD-652, except that a five pound sample shall be randomly collected for chemical and physical tests. If the sample fails to meet any of the requirements of paragraph 3, the lot shall be rejected.

4.4.2.1 Classification of Defects.

<u>Test</u>	<u>Defects Classification</u>
Nitrocellulose	Major B
Solvent extractible	
Material	Major B
Diphenylamine	Major B
Total Volatiles	Major B
Moisture	Major B
Bulk Density	Major B
Dust and foreign	
material	Major B
Heat Test	Major B
Closed Bomb	Major B
Granulation	Major B
Dinitrotoluene	Minor
Graphite	Minor
Potassium Nitrate	Minor
Sodium Sulfate	Minor
Calcium Carbonate	Minor
Dibutylphthalate	Minor
Tin Dioxide	Minor
Workmanship	Minor
Nitroglycerin	Minor
Potassium Sulfate	Minor
Tin	Minor

4.4.3 Inspection Equipment. - The government reserves the right to inspect the contractor's equipment and determine that he has available and utilizes correctly, measuring and test equipment of the required accuracy and precision and that the instruments are of the proper type and range to make measurements of the required accuracy. Commercial inspection equipment, shall be employed where applicable for all tests and examinations specified in 4.4 and 4.5. The contractor is responsible for assuring proper calibration procedures are followed. Government approval of all inspection equipment is required prior to its use for acceptance purpose.

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4.5 Test Methods and Procedures. - The tests in 4.5.1 through 4.5.3 shall be performed using prescribed analytical procedures for duplicate determinations given in standard analytical textbooks (see 6.4).

4.5.1 Chemical and physical properties. - The chemical and physical properties shall be determined utilizing the MIL-STD-286 method shown in Table IV.

Table IV

<u>Properties</u>	<u>Methods</u>
Nitrocellulose	209.2
Dinitrotoluene	T226.1
Graphite	308.1
Potassium Nitrate	T317.1
Sodium Sulfate	T317.1
Calcium Carbonate	T317.1
Nitroglycerin	T226.1
Diphenylamine	T226.1
Dibutylphthalate	T226.1
Tin Dioxide	306.2
Total Volatiles	103.3
Moisture	102.1
Solvent Extractive Matter (Use methylene chloride, as solvent)	104.1
Heat Test	404.1
Dust and Foreign Matter	501.1
Bulk Density	502.1
Potassium Sulfate	T317.1
Tin	306.2

4.5.2 Closed bomb test. - The closed bomb test shall be conducted in accordance with method 801.1 of MIL-STD-286. A 200 cc nominal closed bomb loaded with 14.17 grams (loading density 0.075 gm/cc) shall be used.

4.5.3 Granulation. - The granulation shall be determined in accordance with Method 506.1 of MIL-STD-286.

5. PREPARATION FOR DELIVERY

5.1 Packing Level A. - The packing shall be in accordance with MIL-STD-652.

5.2 Alternate Packing. - Unless otherwise specified by the Contracting Officer, the propellant shall be packed in standard commercial containers acceptable by common or other carrier for safe transportation to the point of delivery.

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6. NOTES

6.1 Ordering Data

- a. See MIL-A-48078.
- b. Packing required (see 5).
- c. First Article.

6.2 Process. - Details of the manufacturing process and the equipment used by the contractor will be submitted to the procuring activity in writing prior to commencement of the manufacture. The presence of dinitrotoluene, tin dioxide, tin, potassium sulfate, and potassium nitrate is permissible when reworked propellant is one of the basic materials of the process used. A minimum nitrogen content of 13.00 percent is permissible when reworked propellant is one of the basic materials of the process.

6.3 Intended use. - The propellant (WC-140) of this specification is intended for use as a propelling charge in the ADAM program.

6.4 Prior approval of the Contracting Officer is required for use of equivalent test methods. A description of the proposed method should be submitted thru the Contracting Officer to: Commander, ATTN: SARPA-QA-A-P, Picatinny Arsenal, Dover, N.J., 07801. This description should include but not be limited to the procedures used, the accuracy and precision of the method, test data to demonstrate the accuracy and precision and drawings of any special equipment required.

Custodian:
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Preparing Activity:
Army - PA

Project Number: 1376-A022

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