MIL-S-47129A(MI)
16 December 1988
SUPERSEDING
MIL-S-47129(MI)
24 May 1974

MILITARY SPECIFICATION

SILICON DIOXIDE, MICROFINE

This specification is approved for use by the U.S. Army Missile Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers microfine silicon dioxide.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

QQ-S-781	-	Strapping, Steel, and Seals
RR-S-366	-	Sieve, Test
PPP-B-585	-	Boxes, Wood, Wirebound
PPP-B-601	-	Boxes, Wood, Cleated-Plywood
PPP-B-621	-	Boxes, Wood, Nailed and Lock-Corner
PPP-B-636	-	Boxes, Shipping, Fiberboard

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, U.S. Army Missile Command, ATTN: AMSMI-RD-SE-TD-ST, Redstone Arsenal, AL 35898-5270, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) at the end of this document or by letter.

AMSC N/A FSC 9620

MILITARY

MIL-P-116 - Preservation, Methods of

STANDARDS

MILITARY

MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	-	Marking for Shipment and Storage
MIL-STD-147	-	Pallitized Unit Loads
MIL-STD-1190	-	Minimum Guidelines for Level C, Preservation, Packing, and Mailing
MIL-STD-2073-1	-	DOD Materiel, Procedures for Development and Application of Packaging Requirements

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. Unless otherwise specified (see 6.2), a first article shall meet the requirements of this specification.

3.2 Chemical and physical properties. The chemical and physical properties of silicon dioxide shall conform to Table I.

Table I

Chemical and Physical Properties

Properties	Min	Max
Moisture, %	--	2.0
Particle size, retained in 325 mesh %	--	0.02
PH	3.5	4.2
Bulk density, g/cc	--	0.04

3.3 Form and color. The silicon dioxide shall be a fluffy, fine white powder.

3.4 Workmanship. The silicon dioxide shall be uniform in quality and free from dirt, metallic particles, and other foreign material.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor 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 ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.4).

b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Unless otherwise specified, all inspection shall be performed in accordance with the test conditions specified in RR-S-366 and paragraph 4.6 of this specification.

4.4 First article inspection. First article inspection shall be representative of production lots of silicon dioxide. The first article shall be subject to all examinations and tests specified herein. Unless otherwise specified, the Government will perform the examinations and tests for first article sample acceptance at the contractor's plant. First article samples which do not meet all the requirements of this specification will be rejected and returned to the contractor. Subsequent quantities will not be considered for acceptance until approval of the first article sample has been obtained.

4.5 Quality conformance inspection.

4.5.1 Lot size. A lot shall consist of material from the same batch or blending operation from one manufacturer and one unchanged process. In the event of a continuous process, a lot shall consist of material subjected to the same processing operations and conditions.

4.5.2 Sampling. Unless otherwise specified (see 6.2) sampling shall be in accordance with MIL-STD-105.

4.5.3 Examination.

4.5.3.1 Visual examination. Visual examination of the samples specified in 4.5.2 shall be conducted for the purpose of determining compliance with the requirements in 3.3 and 3.4 as well as the preservation, packaging, packing, and marking of Section 5.

4.5.3.2 Examination testing. Examination testing of the sample specified in 4.5.2 to determine compliance with the following characteristics shall be conducted in accordance with their corresponding test paragraphs.

a. Moisture (see 3.2), test 4.6.1.1.

b. Particle size, retained on 325 mesh, percent (see 3.2), test 4.6.1.2.

c. PH (see 3.2), test 4.6.1.3.

d. Bulk density, graphs per cubic centimeter (g/cc) (see 3.2), test 4.6.1.4.

4.5.4 Inspection equipment. In examining the contractor's inspection equipment, the Government inspector will determine whether the contractor has available, and utilizes correctly, gaging, measuring, and test equipment of required accuracy and precision, and that the instruments are of a proper type and range to make measurements within the required accuracy. The contractor shall have available a set of master gages, standards, and appropriate instruments to conduct regularly scheduled calibrations of his inspection equipment. Records of such calibrations shall be maintained by the contractor and made available for Government review. The calibration of gages, standards, and instruments will be checked periodically by authorized Government personnel.

4.6 Test methods and procedures.

4.6.1 Tests.

4.6.1.1 Moisture.

Apparatus:

a. Crucible and cover, 100 milliliter (ml) capable of being heated to 1000 degrees celsius (C).

b. Drying oven, non-circulating type. Weigh accurately 2.0 to 3.0 grams (g) of sample into a tared 100-ml crucible. Place the crucible and sample into a 105 degrees C oven for one (1) hour with the cover off the crucible. Replace the cover, cool in a desiccator and reweigh.

Calculation:

$$\text{Moisture, percent} = \frac{(A-B) \times 100}{A-C}$$

A = weight of crucible, cover and sample, g

B = weight of crucible, cover and dired sample, g

C = weight of crucible and cover, g

Report the moisture to the nearest 0.1 percent.

4.6.1.2 Particle size.

Apparatus: Sieve No. 325 in accordance with RR-S-366.

Method: Sieve should be weighed before adding the sample. Transfer 10.0 grams of sample to a thoroughly wet No. 325 sieve. Wash all the fines through the sieve with a flow of water. Dry the sieve at 105°C and weight sieve containing dried residual silicon dioxide.

Calculation:

Weight of residue = weight of dry sieve containing dried residual silicon dioxide
minus
weight of dry empty sieve

$$\text{Retained, percent} = \frac{\text{weight of residue} \times 100}{\text{weight of sample}}$$

Report the material retained to the nearest 0.01 percent

4.6.1.3 PH:

Reagents: distilled water, PH 7.0.

Apparatus: PH Indicator, Leeds, and Northrup, No. 7664, or equivalent, equipped with calomel electrode Std. 1199-31 and glass electrode Std. 1199-30 or their equivalent.

Weigh 0.4 gram of sample into a beaker, add 10 ml of PH 7.0 distilled water and stir the suspension for five (5) minutes. Determine the PH of the suspended mixture using the PH meter.

Report the PH to the nearest 0.1 PH units.

4.6.1.4 Bulk density.

Apparatus:

a. Calibrated glass cylinder, 100 cubic centimeter (cc)

b. Powder funnel, 7.5 centimeter (cm).

c. Sieve No. 10, RR-S-366.

Weigh the clean, dry, calibrated cylinder. Support the funnel, with the discharged opening centered over the cylinder and 3 cm above the top. Pass approximately 120 ml of the sample through a No. 10 sieve onto glazed paper. Shake the sifted sample from the paper into the funnel slowly. Strike off the excess sample above the top of the cylinder, wipe the exterior of the cylinder until clean and reweigh.

Calculation:

$$\text{Bulk Density, g/cc} = \frac{(A-B)}{V}$$

Where A = weight of cylinder and sample, g

B = weight of cylinder, g

V = volume of calibrated cylinder, ml

Report the bulk density to the nearest 0.01 g/cc.

5. PACKAGING

5.1 Preservation. Preservation shall be level A, B, or C as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Unit packs. Unless otherwise specified (see 6.2), each item shall be individually unit packed in accordance with the method III of MIL-P-116.

5.1.1.2 Intermediate packs. Items, unit packed as specified in 5.1.1.1 shall be placed in intermediate containers conforming to PPP-B-636, Class weather resistant. Intermediate containers shall be uniform in size, shape, and

quantities, shall be of minimum tare and cube and shall contain multiples of five unit packs, not to exceed 100 unit packs. No intermediate packs are required when the total quantity shipped to a single destination is less than 100 unit packs.

5.1.2 Level B. Level B preservation shall conform to MIL-STD-2073-1, Appendix F.

5.1.3 Level C. Preservation shall be in accordance with the requirements of MIL-STD-1190.

5.2 Packing. Packing shall be Level A, B, or C as specified (see 6.2).

5.2.1 Level A. The packaged items shall be packed in containers conforming to PPP-B-601, overseas type; PPP-B-621, Class 2, style 4, or PPP-B-585, Class 3, style 2 or 3. Closure and strapping shall be in accordance with applicable container specifications except the strapping shall conform to QQ-S-781, type I or IV, finish A. When the gross weight exceeds 200 pounds or the container length and width is 48" X 24" or more and the weight exceeds 100 pounds, 3 X 4 inch skids (laid flat) shall be applied in accordance with the requirements of the container specification.

5.2.2 Level B. The packaged items shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant. Closures shall be in accordance with the appendix thereto.

5.2.3 Level C. The packaged items shall be packed in accordance with requirements of MIL-STD-1190.

5.2.4 Unitized loads. Unitized loads, commensurate with the level of packing specified in the contract or order, shall be used whenever total quantities for shipment to one destination equal 40 cubic feet or more. Quantities less than 40 cubic feet need not be unitized. Unitized loads shall be uniform in size and quantities to the greatest extent practicable.

5.2.4.1 Level A. Items, packed as specified in 5.2.1, shall be unitized on pallets in conformance with MIL-STD-147, load type I, with a fiberboard cap (storage aid 4) positioned over the load.

5.2.4.2 Level B. Items packed as specified in 5.2.2 shall be unitized as specified in 5.2.4.1 except that the fiberboard caps shall be class domestic.

5.3 Marking.

5.3.1 Levels A and B. In addition to any special or other identification marking required by he contract (see 6.2), each unit pack, intermediate and exterior container and unitized load shall be marked in accordance with MIL-STD-129.

5.3.2 Level C. Marking shall be in accordance with the requirements of MIL-STD-1190.

5.4 General.

5.4.1 Exterior container. Exterior containers (see 5.2.1, 5.2.2, and 5.2.3) shall be of a minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered items to the greatest extent practicable.

5.4.2 Hazardous materials. Packaging, marking, and labeling of hazardous materials shall conform to the requirements of the Code of Federal Regulations (CFR) and with the United Nations Recommendations on the Transport of Dangerous Goods.

6. NOTES

6.1 Intended use. The material covered by this specification is intended for use as a filler in adhesive bonding compounds for bonding components in rocket motor nozzles.

6.2 Acquisition requirements. Acquisition documents should specify the following:

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

b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1).

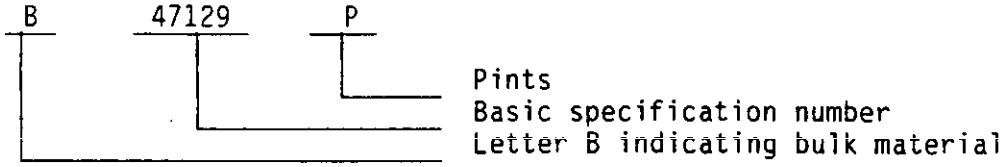
c. Maximum lot size, if applicable.

d. Whether a first article is required (see 3.1).

e. Method of sampling and inspection, if other than as specified herein.

f. Applicable level of preservation, packaging, and packing.

6.3 Part or Identifying Number (PIN). The PIN shall consist of the letter B, plus the basic number of this specification, followed by the letter P indicating container size.



6.4 Subject term (key word) listing.

Silicon
Silicon, Dioxide
Silicon, Dioxide Microfine

6.5 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

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(Project No. 9620-A013)

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MIL-S-47129A	

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
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5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
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