

# AEROSPACE MATERIAL SPECIFICATION



AMS 3755B

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Superseding AMS 3755A

## Powder, Fumed Silicon Dioxide

### 1. SCOPE:

#### 1.1 Form:

This specification and its supplementary detail specifications cover silicon dioxide in the form of a white, amorphous powder.

#### 1.2 Application:

This powder has been used typically as a thickening (thixotropic) agent for resin systems, but usage is not limited to such applications.

#### 1.3 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

### 2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order form a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

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## 2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or URL <http://www.astm.org/cgi-bin/softcart-exe/store/store/htm?e+mystore>.

ASTM D 1514 Carbon Black - Sieve Residue  
ASTM D 2773 Loss on Ignition of Electrical Grade Magnesium Oxide  
ASTM D 3037 Carbon Black - Surface Area by Nitrogen Adsorption  
ASTM D 4820 Carbon Black - Surface Area by Multipoint B.E.T. Adsorption Nitrogen  
ASTM E 300 Sampling Industrial Chemicals

## 3. TECHNICAL REQUIREMENTS:

### 3.1 Material:

Shall be a fumed, white, amorphous silica.

### 3.2 Properties:

Powder shall conform to the requirements shown in Table 1; tests shall be performed on the powder supplied and in accordance with test methods specified in 4.5.

TABLE 1 - Properties

| Properties                                                                  | Requirements                |
|-----------------------------------------------------------------------------|-----------------------------|
| Surface Area                                                                | 175 - 225 m <sup>2</sup> /g |
| Grit Content retained<br>on No. 325 mesh (45 µm) screen,<br>maximum         | 0.02%                       |
| pH, 4% Aqueous Dispersion                                                   | 3.8 - 4.3                   |
| Loss on Ignition by weight,<br>maximum, 1000 °C (1832 °F),<br>Moisture Free | 2.0%                        |

### 3.3 Quality:

The powder, as received by purchaser, shall be uniform in quality and condition, smooth, as free from foreign material as commercially practicable, and free from imperfections detrimental to usage of the powder.

#### 4. QUALITY ASSURANCE PROVISIONS:

##### 4.1 Responsibility for Inspection:

The vendor of powder shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the powder conforms to specified requirements.

##### 4.2 Classification of Tests:

4.2.1 Acceptance Tests: Surface area, grit content, pH (see Table 2), and quality (3.3) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of powder to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.1, and when purchaser deems confirmatory testing to be required.

##### 4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Each lot of powder shall be sampled in accordance with ASTM E 300 at random to provide sufficient powder to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1.1 A lot shall be all powder produced in a continuous production run from the same batch of raw material under the same fixed conditions and presented for vendor's inspection at one time.

4.3.1.2 When a statistical sampling plan has been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6 shall state that such plan was used.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

##### 4.4 Approval:

4.4.1 Sample powder shall be approved by purchaser before powder for production use is supplied, unless such approval is waived by purchaser. Results of tests on production powder shall be essentially equivalent to those on the approved sample. Production powder made by a revised procedure shall not be shipped prior to receipt of reapproval. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample product. Production powder made by the revised procedure shall not be shipped prior to receipt of reapproval.

- 4.4.2 Manufacturer of the powder shall make no significant change in material, processes, or methods of inspection from those on which the approval was based, unless the change is approved by the cognizant engineering organization. A significant change is one which, in the judgment of the cognizant engineering organization, could affect the properties or performance of the product.

4.5 Test Methods:

Shall be as shown in Table 2:

TABLE 2 - Test Methods

| Property                  | Test Method                |
|---------------------------|----------------------------|
| Surface Area              | ASTM D 3037 or ASTM D 4820 |
| Grit Content              | ASTM D 1514                |
| pH, 4% Aqueous Dispersion | 4.5.1                      |
| Loss on Ignition          | ASTM D 2773                |

4.5.1 pH, 4% Aqueous Dispersion:

- 4.5.1.1 Weigh 4.000 grams  $\pm$  0.010 of powder into a 250-mL beaker and add 100 mL  $\pm$  10 of distilled water with pH of not lower than 5.5. Boiling may be necessary to remove carbon dioxide to give a minimum pH of 5.5. (Do not adjust the pH of the water with caustic.)
- 4.5.1.2 Stir the mixture vigorously for not less than five minutes. When liquid agitation ceases, measure pH.

4.6 Reports:

The supplier of powder shall furnish with each shipment a report from the manufacturer showing the results of tests to determine conformance to the acceptance test requirements and stating that the powder conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3755B, manufacturer's product designation, date of manufacture, and quantity.

4.7 Resampling and Retesting:

If any sample used in the above test fails to meet the specified requirements, disposition of the powder may be based on the results of testing three additional samples for each original nonconforming sample. Failure of any retest sample to meet the specified requirements shall be cause for rejection of the powder represented. Results of all tests shall be reported.