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SUPERSEDING
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MILITARY SPECIFICATION

PITCH, COAL TAR

This specification is approved for use by the Air Force Materials Laboratory, Department of the Air Force, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification establishes the requirements and quality assurance provisions for vacuum coal-tar pitch for the densification of graphite fiber preforms.

2. APPLICABLE DOCUMENTS

2.1 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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 36 - Softening Point of Asphalt and Tar Pitches
ASTM D 71 - Specific Gravity of Solid Pitch and Asphalt
ASTM D 129 - Sulfur in Petroleum Products
ASTM D 189 - Conradson Carbon Residue of Petroleum Products
ASTM D 2317 - Benzene-Insoluble (BI) Content of Tar and Pitch
ASTM D 2318 - Quinoline-Insoluble (QI) Content of Tar and Pitch
ASTM D 2415 - Ash in Coal Tars and Pitch
ASTM E 29 - Indicating which Places of Figures are to be Considered Significant in Specified Limiting Values
ASTM E 102 - Saybolt Fural Viscosity of Bituminous Materials at High Temperatures

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: AFML/MXA, WPAFB, O. 45433, 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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(Copies of ASTM publications may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

3. REQUIREMENTS

3.1 Material. The material shall be a vacuum coal-tar pitch.

3.1.1 Chemical and physical properties. The material supplied under this specification shall exhibit the following properties when tested in accordance with the methods specified in Section 4.

Properties	Limits	Test Method
Softening point, °C	95 maximum	4.3.1
Benzene insolubles, percent	22 maximum	4.3.2
Quinoline insolubles, percent	6 maximum	4.3.3
Coking value, percent	35 minimum	4.3.4
Ash, percent	0.25 maximum	4.3.5
Sulfur, percent	0.70 maximum	4.3.6
Specific gravity, g/cc	1.24 - 1.32	4.3.7
Viscosity, sec	23 maximum	4.3.8

3.1.2 Stability. The properties of the material shall remain within the limits specified during the entire shelf life.

3.1.3 Storage. The material shall be stored at a temperature below its softening point.

3.1.4 Toxic products and safety.

3.1.4.1 Vapor. The vapors given off by pitches during melting are toxic and possibly carcinogenic. If a hood or other adequate ventilation equipment is not available a half-face respirator with chemical vapor cartridges shall be worn by all personnel in the area.

3.1.4.2 Skin contact. Direct contact with the skin should be avoided, especially when the pitch is dissolved in a solvent. Skin contact with most solvents capable of dissolving pitch has been shown to be a health hazard.

3.1.4.3 Dusts. In all areas where pitch is being ground or where ground pitch is being handled, half-face repsirators fitted with dust cartridges are necessary unless the material is kept in an exhausted area, such as a hood, during the operation.

4. QUALITY ASSURANCE PROVISIONS

4.1 Vendor warrant. The vendor shall submit the following with each lot of material supplied.

4.1.1 Conformance. Actual test data which shows conformance of the lot to the requirements of 3.1.1.

4.1.2 Certification. Certification that the material supplied meets the requirements of this specification shall include lot numbers and date of manufacture.

4.2 Quality conformance inspection. Samples shall be taken from pitch packaged at the beginning, middle, and end of the pouring operation to obtain an indication of the variability within the lot. The samples shall be evaluated using the tests defined in 4.3.

4.2.1 Evaluation of supplier data. The purchaser shall review and evaluate supplier data, and determine the extent of, and perform any further testing required to adequately assure compliance and acceptability.

4.2.2 Failure of material. Failure of any portion of the material tested or inspected to conform to any of the requirements shall be cause for total rejection of the entire lot.

4.2.3 Disputes. In cases of dispute the purchaser shall have the option of performing referee testing at the purchaser's test facility with the supplier present.

4.3 Test methods.

4.3.1 Softening point. The softening point of the pitch shall be conducted in accordance with ASTM D 36. Verify conformance with 3.1.1.

4.3.2 Benzene insolubles. The benzene insolubles determination shall be conducted in accordance with ASTM D 2317. (Xylene may be used in place of benzene.) Verify conformance with 3.1.1.

4.3.3 Quinoline insolubles. The quinoline insolubles determination shall be conducted in accordance with ASTM D 2318. Verify conformance with 3.1.1.

4.3.4 Coking value. The coking value (Conradson) shall be conducted in accordance with ASTM D 189. Verify conformance with 3.1.1.

4.3.5 Ash content. The ash content test shall be determined in accordance with ASTM D 2415. Verify conformance with 3.1.1.

4.3.6 Sulfur content. The sulfur content test shall be conducted in accordance with ASTM D 129. Verify conformance with 3.1.1.

4.3.7 Specific gravity. The specific gravity determination shall be conducted in accordance with ASTM D 71. Verify conformance with 3.1.1.

4.3.8 Viscosity. The viscosity at 200°C shall be determined in accordance with ASTM E 102. Verify conformance with 3.1.1.

5. PACKAGING

5.1 Packing. Packaging shall be in accordance with the supplier's standard practices. If steel drums are used, all closures shall be water tight to prevent entry of contaminants. The drums shall be shipped and stored under cover and not directly exposed to weather.

5.2 Identification. Each container shall have the following information clearly and indelibly marked on its exterior: (a) drawing designation of this specification; (b) manufacturer's designation; (c) lot number; (d) date of manufacture; and (e) purchase order number.

6. NOTES

6.1 Intended use. This coal tar pitch will be used for densification of graphite fiber preforms.

6.2 Significant figures. When the data reported are based on an average value derived from two (2) or more determinations, for purposes of determining conformance with this specification, values shall be rounded off in accordance with ASTM E 29 to the nearest unit in the last right-hand place of the figures expresisng limits of acceptability for each measured property.

6.3 Definitions.

6.3.1 Lot. A lot shall consist of that amount of material produced at one time and offered for inspection.

6.4 Source of supply.

Vendor	Vendor's Designation
Allied Chemical Company Semet Solvay Division Post Office Box 1013 R Morristown, N.J. 07960	CP 277-15 Vacuum Coal-Tar Pitch.

6.4.1 Alternate suppliers. Other suppliers may be considered provided satisfactory compliance to the requirements of this specification is demonstrated.

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