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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3041D

Issued MAR 1974
Revised FEB 2002

Superseding AMS 3041C

Magnetic Particles, Nonfluorescent Wet Method, Oil Vehicle, Ready-to-Use

1. SCOPE:

1.1 Form:

This specification covers nonfluorescent magnetic particles in the form of a mixed, ready-to-use suspension in an odorless inspection oil vehicle.

1.2 Application:

These products have been used typically as the inspection medium in a wet magnetic particle inspection system in accordance with ASTM E 1444, but usage is not limited to such application.

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 forms 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.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2641 Vehicle, Magnetic Particle Inspection, Petroleum Base

AS5282 Tool Steel Ring for Magnetic Particle Inspection

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM D 1966 Test Method for Foots in Raw Linseed Oil
ASTM E 11 Wire-Cloth Sieves for Testing Purposes
ASTM E 1444 Magnetic Particle Examination

3. TECHNICAL REQUIREMENTS:

3.1 Material:

The product shall be composed of durable magnetic particles, suitable for long-time use, which may have been treated to attain the color specified. Particles shall be supplied ready-to-use, mixed in the proper proportion with odorless inspection oil conforming to AMS 2641, or equivalent.

3.2 Storage Life:

The product shall meet the requirements specified in 3.3 when tested at any time up to twelve months from date of manufacture.

3.3 Properties:

The product shall conform to the following requirements; tests shall be performed on the product supplied and in accordance with specified test procedures.

3.3.1 Contamination: The product shall show no evidence of foreign material, agglomeration, or scum, determined by visual examination of the test suspension at the following times:

3.3.1.1 Immediately after mixing the test suspension.

3.3.1.2 After mixing the test suspension, allowing it to stand for not less than 30 minutes, and agitating it slightly.

3.3.1.3 During tests to determine other characteristics of the product.

3.3.2 Concentration: The concentration of magnetic particles in the vehicle shall be 1.0 to 2.4 mL of magnetic particles in 100 mL of suspension, determined by mixing the suspension thoroughly, filling a 100 mL calibrated centrifuge tube as specified in ASTM D 1966, demagnetizing, allowing to stand undisturbed for at least 60 minutes, and reading, on the calibrated tube, the volume of particles settled from the suspension.

3.3.3 Sensitivity: The product shall provide indications of at least the first six holes of the test ring specimen of 4.4 when tested as follows:

3.3.3.1 Place the ring on a 1-inch (25-mm) diameter copper bar and circularly magnetize in a standard magnetic particle inspection unit by passing 2500 amperes of direct current through the bar immediately before flushing the ring with the agitated test suspension which has passed the concentration, and contamination tests. Examine the ring under a white light of not less than 100 foot-candles (1075 lx) at the examining surface.

3.4 Color:

The color of the magnetic particles in suspension shall be black, red, gray, or as specified by purchaser, determined by observing a well-dispersed sample of the test suspension in a glass container under a white light of not less than 100 foot-candles (1075 lx) at the examining surface.

3.5 Particle Size:

The magnetic particles shall be of such size that not less than 98% by weight shall pass through a 3-inch (76-mm) diameter U.S. Standard No. 325 (45 µm) sieve, as defined in ASTM E 11, determined by passing a 1-quart (1-L) sample of agitated test suspension through the sieve. After the test suspension vehicle has completely passed through the sieve, rinse with 1 quart (1 L) of the original AMS 2641 vehicle. Dry the sieve to remove all liquid and determine the weight of the residual particulate material not passing through the sieve. A comparison sample shall be obtained by passing 1 quart (1 L) of agitated suspension through a preweighed #2 Whatman filter paper, or equivalent. Dry the filter and retained particles to remove all liquid and re-weigh. The weight of the particles retained on the sieve shall not be greater than 2% of the weight of particles retained on the filter paper.

3.6 Mechanical Durability:

Magnetic particles shall retain their initial sensitivity, color, and brightness of indication after placing not less than 400 mL of agitated suspension in a 1 quart (1 L) capacity, constant speed blender, operating the blender at approximately 10,000 to 12,000 rpm for a total of 10 minutes in 2-minute intervals, allowing the suspension to cool for 5 minutes during each period between stirring cycles and, at the end of the cumulative 10 minutes blending, conducting the sensitivity tests (See 3.3.3).

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of the product shall supply all samples for manufacturer'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 product conforms to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Contamination (3.3.1), concentration (3.3.2), sensitivity (3.3.3), color (3.4), and particle size (3.5) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Mechanical durability (3.6) is a periodic test and shall be performed at a frequency selected by the manufacturer unless frequency of testing is specified by purchaser.

4.2.3 Preproduction Tests: All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of a product to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.5.2, and when purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient product shall be taken at random from each lot to perform all required tests. The number of determinations for each requirement shall as specified in the applicable test procedures or, if not specified therein, not less than three.

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

4.3.1.2 A statistical sampling plan, acceptable to purchaser, may be used in lieu of sampling as in 4.3.1.

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

4.4 Tool Steel Test Ring:

Shall be in accordance with AS5282.

4.5 Approval:

4.5.1 Sample product shall be approved by purchaser before product for production use is supplied, unless such approval be waived by purchaser. Results of tests on production product shall be essentially equivalent to those on the approved sample.