Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

AEROSPACE MATERIAL SPECIFICATION

AMS 3040

Issued March 1, 1974
Revised

MAGNETIC PARTICLE INSPECTION MATERIAL
Dry Method

1. SCOPE:

1.1 Form: This specification covers magnetic particles having black, red, or other color, as ordered, supplied in the form of dry, packaged powders.

1.2 Application: Primarily as the inspection medium in a dry magnetic particle inspection system as defined in AMS 2640 or MIL-I-6868.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York 10001.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2640 - Magnetic Particle Inspection

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

ASTM B214 - Sieve Analysis of Granular Metal Powders

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

2.3.1 Military Specifications:

MIL-I-6868 - Inspection Process, Magnetic Particle

3. TECHNICAL REQUIREMENTS:

3.1 Material: The product shall be composed of magnetic particles which may have been dyed or otherwise treated to attain the color specified.

3.2 Properties: The product shall conform to the following requirements; tests shall be performed on the product supplied and in accordance with the test procedures of this specification.

3.2.1 Contamination: The dry powder shall show no evidence of foreign material or agglomeration, determined by visual examination during the tests to determine other characteristics of the product.

3.2.2 Color: The product shall be black, red, or as ordered, determined by applying the dry powder on a white paper at least 8-1/2 x 11 in. (216 x 279 mm), completely covering an area not less than 4 in. (102 mm) in diameter. The color shall be observed under a white light of not less than 100 ft-candles (1076 lm/m^2) at the examining surface.

Printed in U.S.A.

3.2.3 Particle Size: The magnetic particles shall be of such size that not less than 98% by weight shall pass through a U.S. Standard No. 80 screen/sieve, determined in accordance with ASTM B214. Determine the dry weight of the residual particulate material not passing through the screen/sieve as related to the original weight of the sample, expressed in percent.

3.2.4 Magnetic Properties: The magnetic particles shall be attracted and removed from a white surface with no more than a trace of color or nonmagnetic particles remaining, determined as follows:

3.2.4.1 Prepare an electromagnet consisting of an armco iron core, 0.312 in. ± 0.031 (7.92 mm ± 0.79) in diameter and 3.00 in. ± 0.13 (76.2 mm ± 3.3) long, with a 2-in. (51-mm) long nonmagnetic handle attached to one end, the core being wrapped with 25 turns of No. 12 (2.052 mm diameter) enameled copper conductor, or use an equivalent electromagnet.

3.2.4.2 Sprinkle not less than 10 cm^3 of fresh dry powder evenly over a clean white surface not less than 8-1/2 x 11 in. (216 x 279 mm). Lower the electromagnet, energized with 15 A of direct current, over the magnetic particles and carefully remove the particles by attracting the top layer of particles to the magnet in a gentle manner. Progressively extract the particles by carefully removing the probe from the proximity of the sample, shutting off the current, and removing the particles from the electromagnet. Gently repeat the extraction process until all magnetic particles have been removed and examine the surface for remaining particulate material.

3.2.5 Sensitivity: The product shall show a six-hole indication of the test ring specimen defined in MIL-I-6868, determined as follows:

3.2.5.1 Place the ring on a 1-in. (25-mm) diameter copper bar and circularly magnetize in a standard magnetic particle inspection unit by passing 2500 A of direct current through the bar immediately before coating the ring with fresh dry powder that has passed the contamination and magnetic property tests, using a suitable squeeze-bulb applicator. Examine the ring under a white light of not less than 100 ft-candles (1076 lm/m^2) at the examining surface.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that the product conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance or routine control tests.

4.3 Sampling:

4.3.1 Sampling Schedule: Sufficient material shall be taken at random from each lot to perform all required tests in triplicate.

4.3.2 Lot: A lot shall be all material produced in a single production run from the same batch of raw materials under the same fixed conditions and presented for inspection at one time. A lot may be packaged in smaller quantities and delivered separately under the basic lot approval as long as lot identity is maintained.

4.4 Approval:

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

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production material which are essentially the same as those used on the approved sample material. If any change is necessary in ingredients, in type of equipment for processing, or in manufacturing procedures which could affect quality or properties of the material, vendor shall submit samples for reapproval unless purchaser grants written approval after review of a detailed statement of materials and processing used on the approved sample and those proposed. No production material made by the revised procedure shall be shipped prior to receipt of approval of such procedure.

4.5 Reports: The vendor of the product shall furnish with each shipment three copies of a report showing the results of tests made on the product to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, material specification number, vendor's material designation, lot number, date of manufacture, color, and quantity.

4.6 Resampling and Retesting: If any sample used in the above tests fails to meet the specified requirements, disposition of the product 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 product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Dry magnetic particles shall be packaged in suitable packages or containers for the product supplied.

5.1.2 Each container shall be identified by attaching a durable label bearing characters of such size as to be clearly legible and which will not be obliterated by normal handling. Each label shall show the following information:

MAGNETIC PARTICLE INSPECTION MATERIAL, DRY METHOD
COLOR ___*___
AMS 3040
MANUFACTURER'S MATERIAL DESIGNATION _____
DATE OF MANUFACTURE _____
LOT NUMBER _____
QUANTITY _____
MANUFACTURER'S INSTRUCTIONS FOR USE (**) _____

*Enter color, "BLACK", "RED", or as ordered.
**May be on separate sheet.

5.1.3 Individual packages or containers may be packed in an exterior shipping container capable of protecting the materials during shipment and storage against damage from exposure to weather or any normal hazard.

5.1.4 Each exterior shipping container shall be legibly marked with the following information in such a manner that the markings will not smear or be obliterated during normal handling or use:

MAGNETIC PARTICLE INSPECTION MATERIAL, DRY METHOD
COLOR ___*___
AMS 3040
MANUFACTURER'S MATERIAL DESIGNATION _____
PURCHASE ORDER NUMBER _____
DATE OF MANUFACTURE _____
LOT NUMBER _____
QUANTITY _____

*Enter color, "BLACK", "RED", or as ordered.