



AEROSPACE MATERIAL SPECIFICATION

AMS3045

REV. E

Issued 1974-03
Revised 2008-11
Reaffirmed 2014-08

Superseding AMS3045D

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

RATIONALE

AMS3045E has been reaffirmed to comply with the SAE five year review policy.

1. SCOPE

1.1 Form

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

1.2 Application

These particles have been used typically as the inspection medium in a wet method, magnetic inspection system as defined in 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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2014 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

SAE values your input. To provide feedback
on this Technical Report, please visit
<http://www.sae.org/technical/standards/AMS3045E>

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2641 Vehicle, Magnetic Particle Inspection, Petroleum Base
AMS3044 Magnetic Particles, Fluorescent, Wet Method, Dry Powder

AS5282 Tool Steel Ring for Magnetic Particle Inspection

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 1966 Test Method for Foots in Raw Linseed Oil, (Gravimetric Method)
ASTM E 1444 Magnetic Particle Examination

3. TECHNICAL REQUIREMENTS

3.1 Material

The product shall be composed of durable fluorescent magnetic particles, suitable for long time use, which have been dyed or otherwise treated to attain the fluorescent color specified. The particles shall be supplied ready-to-use, mixed in the proper proportion with an inspection vehicle.

3.1.1 Fluorescent particles shall conform to AMS3044.

3.1.2 Magnetic particle inspection vehicle shall conform to AMS2641.

3.2 Storage Life

The product shall meet the requirements of 3.3 when tested at any time up to 12 months from date of manufacture.

3.3 Properties

The product shall conform to the following requirements; tests shall be performed, on the product supplied, in accordance with specified test methods:

3.3.1 Contamination

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

3.3.1.1 During preparation of the test suspension as in 4.3.3.

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 conformance with other characteristics of the product.

3.3.2 Concentration

The concentration of magnetic particles in the vehicle shall be 0.10 to 0.40 mL of fluorescent particles in 100 mL of suspension, determined by mixing the test suspension thoroughly, filling a 100 mL calibrated centrifuge tube as specified in ASTM D 1966, allowing it to stand undisturbed for not less than 30 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 seven 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 magnetizing the ring in a standard magnetic particle inspection unit by passing 2500 amperes of direct current through the copper bar immediately before flooding the ring with the agitated test suspension that has passed the contamination (3.3.1) and concentration (3.3.2) tests. Examine the ring in a darkened environment under ultraviolet light with a minimum UV-A intensity of $1000 \mu\text{W}/\text{cm}^2$ at the inspection surface. Visible light shall not exceed 2 foot-candles (20 lx) at the inspection surface.

3.3.3.2 Flaw-to-Background Test

Obtain a test part, or prepare a test specimen, containing flaws of the size expected to be found in production inspection. The surface finish of the test specimen shall be representative of production parts. Magnetize and flood the specimen as specified in 3.3.3.1, using a sample of agitated test suspension that has passed the contamination (3.2.1) and concentration (3.3.2) tests. View the flaw indications in a darkened area under backlight as defined in 3.3.3.1. Indications shall be sharp and distinct. Background fluorescence around the flaws shall be of a level which will neither obscure the flaw indications nor cause difficulty in flaw detection.

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 product conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

All technical requirements, except storage life (3.2), 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 the product to a purchaser, when a change in ingredients and/ or processing requires reapproval as in 4.4.2, and when a purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing

Shall be as follows:

4.3.1 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 be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1.1 Lot

A lot shall be all product produced in a single production run from the same batches of raw materials under the same fixed conditions and presented for manufacturer'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 Preproduction Tests

As agreed upon by purchaser and vendor.

4.3.3 Sample Preparation

The product to be sampled shall be mixed thoroughly for not less than 30 minutes and a sample of at least 1 gallon (3.8 L) of suspension drawn off while being stirred.

4.3.4 Tool Steel Test Ring

Shall be in accordance with AS5282.

4.4 Approval

4.4.1 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 equivalent to those on the approved sample.

4.4.2 Manufacturer shall use ingredients, manufacturing procedures, processes, and methods of inspection on production product that are the same as those used on the approved sample. If necessary to make any changes in ingredients, processing techniques, or manufacturing procedures, manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample product. Production product shall not be shipped prior to receipt of reapproval.

4.5 Reports

The vendor of the product shall furnish with each shipment a report stating that the product conforms to all technical requirements. This report shall include the purchase order number, lot number, AMS3045E, manufacturer's material designation, lot number, and date of manufacture.

4.6 Resampling and Retesting

If any sample used in the above tests fails to meet 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 specified requirements shall be cause for rejection of the product represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Packaging and Identification

5.1.1 The product shall be packaged in containers of a type and size acceptable to purchaser.

5.1.2 A lot of magnetic particles may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.