AEROSPACE STANDARD

AS4792™ REV. C

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Superseding AS4792B

Water Conditioning Agents for Aqueous Magnetic Particle Inspection

RATIONALE

AS4792C is the result of a Five-Year Review and update of the specification. The revision deletes tap water as a water requirement (see 3.2), removes water dispersible as type option (see 3.5.1), limits corrosion inhibitor additions (see 3.6.2.1.1) and updates formatting consistent with an AS document (removes Sections 5 and 6 as in AS5792B).

1. SCOPE

1.1 This SAE Aerospace Standard (AS) covers water conditioning agents used to facilitate aqueous wet-method magnetic particle inspection.

1.2 Such conditioning agents, in powder or liquid form, provide suitable corrosion protection, wetting, and particle dispensability properties when mixed in water for application of magnetic particles on the surface of an object for magnetic particle inspection, as described in AMS3042, AMS3044, ASTM E1444/E1444M, and others.

1.3 Water conditioning agents can consist of varying combinations of such components as dispersants, surfactants, corrosion inhibitors, and anti-foaming agents. Individual components may be added to the bath of a system to develop specific properties. The user is referred to the manufacturer of the conditioning agent to develop the most suitable combination of ingredients for the user's requirements.

1.4 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this aerospace standard may involve the use of hazardous materials, this aerospace standard practice 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 following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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For more information on this standard, visit
https://www.sae.org/standards/content/AS4792C

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS3042 Magnetic Particles, Nonfluorescent, Wet Method, Dry Powder

AMS3044 Magnetic Particles, Fluorescent, Wet Method, Dry Powder

AS7766 Terms Used in Aerospace Metals Specifications

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 E709 Guide for Magnetic Particle Testing

ASTM E1444/E1444M Magnetic Particle Testing

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. REQUIREMENTS

3.1 Bath Preparation

The conditioning agent shall be first added to the water bath, followed by the dispersion of the magnetic particles in accordance with manufacturer's instructions.

3.2 Premixed Particles

When using a product containing a premixture of water conditioner and magnetic particles, the premixed product shall be mixed with water in accordance with manufacturer's instructions.

3.3 Equipment

Equipment used for evaluation of an aqueous magnetic particle suspension shall be clean and free from contaminants including dirt, oil, and other foreign substances.

3.4 Storage

Conditioning agents shall be stored at room temperature in a sealed container away from heat, cold, and moisture. An acceptable shelf life shall be as recommended by manufacturer. Expiration date of the product, when applicable, shall be plainly marked on the package label by the manufacturer. Improperly stored or otherwise spoiled agents shall be disposed of in accordance with appropriate regulations.

3.5 Properties

3.5.1 Material

The conditioning agent shall be a water-soluble compound conforming to the following requirements when tested in properly diluted form.

3.5.1.1 Fluorescence

The fluorescence of the conditioning water shall be not greater than that of a 10 ppm (1.27×10^{-5} molar) solution of quinine sulfate dehydrate in 0.1 N sulfuric acid (H_2SO_4), determined by visual comparison of the two solutions in 10 x 75 mm glass tubes. Minimum blacklight intensity shall be 1200 microwatts per cm^2 (7742 microwatts/in^2) at the surface.

3.5.1.1.1 Determinations shall be made by visual comparison of the two tubes under blacklight of 365 nm wavelength.

3.5.1.2 Particulate Matter

The conditioning agent shall be readily and fully soluble in water. A solution of conditioning agent and water shall not display any particulate matter.

3.5.1.3 pH

Solution shall exhibit a pH of 7.0 to 10.0.

3.5.1.4 Odor

Shall not be offensive, objectionable, or disagreeable.

3.5.1.5 Toxicity

The toxicological properties of the water conditioning agent shall be reported, and users shall review them to ensure conformance to any applicable hazard standards.

3.5.1.6 Surface Wetting/Adherence

An unbroken film shall be observed over the entire part when tested in accordance with 3.6.1.

3.6 Performance Testing

3.6.1 Water Break Test

A clean part with a surface finish the same as parts to be tested shall be flooded with the conditioned water. Note the appearance of the surface during flooding. Sufficient wetting agent is deemed to be present if a continuous film forms over the entire part. If the part shows a break in the suspension film during flooding exposing bare surface, insufficient water conditioner may be present, or the part may not be adequately cleaned. Additional agents, such as anti-foaming agents, may be added to the bath, so long as bath performance is not affected.

3.6.2 Preliminary Processing Evaluations

An aqueous magnetic particle bath suspension shall be prepared by dispersing the recommended levels of magnetic particles and conditioning agent in water (preferably at room temperature).

3.6.2.1 Preparation

Identify the part of component to be inspected and ensure that it is free of oil, dirt, or any other foreign substance. Immerse, spray, or otherwise expose the object to the aqueous bath solution. Excess solution should be allowed to drain, and the part shall then be placed in an environment representative of its usual processing and left undisturbed for sufficient time to allow complete drying of the surface.

3.6.2.1.1 Inspect the surface for any indication of corrosion. If an indication is observed that is deemed objectionable, the test may be repeated with an increased concentration of corrosion inhibitor in the solution. The tests may be continually repeated until a suitable concentration level is established, as long as bath performance is not affected. That level shall be considered the standard concentration of corrosion inhibitor for that object or part of material.