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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 2450E
Superseding AMS 2450D

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SPRAYED METAL FINISH
Aluminum

1. SCOPE:

1.1 Purpose: This specification covers the procedure to be used for spraying metallic parts with aluminum and the properties of the coating.

1.2 Application: Primarily to provide thermal radiation and protection against corrosion of air-cooled cylinder assemblies and for building up surfaces of other parts where applicable.

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 SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 4180 - Aluminum Wire, 99.0 Min Al (1100-H18)

2.1.2 SAE Standards and Recommended Practices:

J444 - Cast Shot and Grit Size Specifications for Peening and Cleaning

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

ASTM B117 - Salt Spray (Fog) Testing
ASTM E11 - Wire-Cloth Sieves for Testing Purposes

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

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Metal Spray Gun: The metal spray gun shall be provided with two-stage oxygen and acetylene regulators capable of maintaining uniform delivery pressures at any desired setting in the pressure range of 5 to 50 psig (105 to 445 kPa), and shall be equipped with accurate indicating pressure gages.

3.1.2 Air Cleaner: An oil or water extractor shall be used in the air line to the metal spray gun in order to ensure clean, dry air.

3.2 Preparation:

3.2.1 Completely remove oil and grease by vapor degreasing or other methods of equal cleaning power.

3.2.2 Ø Blast clean with No. 18, No. 20, or No. 25 refractory grit, or with No. 30, No. 35, or No. 40 hard, angular, silica or flint sand, free from oil, grease, dust, moisture, and other foreign substances. The above designations are standard sieve numbers in accordance with ASTM E11.

3.2.3 Ø No. 35 steel grit conforming to SAE J444 or equivalent may be used for blasting steel but shall not be used on aluminum alloy.

3.2.4 If compressed air is used as the blasting force, it shall be essentially free from oil and water.

3.2.5 Extreme care shall be exercised that products of corrosion and foreign materials are thoroughly removed by the blasting and the surfaces roughened to attain a good bond for the sprayed aluminum. Remove all dust and particles after blasting by blowing with high-pressure, clean, dry air.

3.2.6 Blasted surfaces shall be kept clean and handled only with protected hands until spraying operations can proceed.

3.3 Procedure:

3.3.1 Ø Sprayed metal coating shall be applied as soon as practicable after the surfaces have been cleaned.

3.3.2 Ø Parts shall be preheated as specified on the drawing or as agreed upon by purchaser and vendor; the temperature to which parts are preheated shall not be high enough to affect properties or usage of the basis metal.

3.3.3 The aluminum shall be applied in such a manner as to ensure complete Ø coverage of the required surfaces without depositing an unnecessarily heavy coating.

3.3.4 All surfaces exposed after the parts are assembled shall be sprayed, unless Ø otherwise noted, with metallic aluminum conforming to AMS 4180.

3.4 Properties: The aluminum coating shall conform to the following requirements:

3.4.1 Thickness: The thickness of the sprayed metal coating shall be as specified on the drawing. When not so specified, the thickness shall be 0.004 - 0.010 in. (0.10 - 0.25 mm).

3.4.2 Corrosion Resistance:

3.4.2.1 The effectiveness of the sprayed metal coating shall be determined by periodically subjecting representative parts to the salt spray corrosion test conducted in accordance with ASTM B117.

3.4.2.2 If the metallized steel parts selected for test are oily or greasy, they shall be degreased with trichloroethylene vapor or other suitable volatile solvent. Exposed, unsprayed surfaces of the steel shall be protected with a suitable coating to prevent corrosion. The prepared parts shall be exposed in such a position as to prevent or minimize accumulation of condensate in recesses and shall be spaced to allow free circulation of the fog within the spray chamber.

3.4.2.3 The exposed parts shall be visually examined daily during the duration of the test. They shall be carefully removed from the spray chamber, thoroughly washed in running tap water, scrubbing only with a bristle brush if necessary to completely remove persistent salt encrustation, and inspected closely for evidence of rust. If rusted areas appear on the metallized portion of the parts at any time during the test and remain at the finish, it is proof that the sprayed coating has failed to afford full protection for the basis metal. Slight discoloration, which shows little or no tendency to spread or deepen as the test progresses to completion is permissible.

3.4.2.4 Finned areas of steel cylinder barrels, and areas of other parts having deep fins, grooves, or recesses where it is impracticable to apply full thickness of metal coating to the bottoms without depositing an excessively heavy coating on the outer edges, shall withstand not less than 250 hr continuous exposure to the salt spray without rusting.

3.4.2.5 Other steel areas where the surfaces are readily accessible and permit controlled application of the metal coating shall withstand not less than 500 hr continuous exposure to the salt spray without rusting.

3.4.2.6 The exposure time for parts, other than given in 3.4.2.4 and 3.4.2.5, Ø shall be as agreed upon by purchaser and vendor.

3.5 Quality: Sprayed coating shall be of fine texture, close grained, as dense Ø as possible, and free from unatomized particles of metal. Standards for acceptance shall be as established by purchaser, based on evaluation of samples as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of coated parts shall supply all Ø samples for vendor's tests 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 sample and to perform any confirmatory testing deemed necessary to ensure that the coating conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for thickness (3.4.1) and visual appearance (3.5) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for corrosion resistance (3.4.2) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.2.3 Preproduction Tests: Tests to determine conformance to all technical Ø requirements of this specification are classified as preproduction tests and shall be performed on the first-article shipment of a spray-coated part to a purchaser, when a change in material and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.3.1 For direct U.S. Military procurement, substantiating test data and, when Ø requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be not less than the following; a lot shall be all parts of Ø the same part number sprayed in a continuous operation of not more than 8 hr and presented for vendor's inspection at one time:

4.3.1 Thickness and Visual Examination: Three parts per lot, or as agreed upon Ø by purchaser and vendor.

4.3.2 Corrosion Resistance: As agreed upon by purchaser and vendor.

4.4 Approval: