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

AEROSPACE MATERIAL SPECIFICATION

AMS 2485E
Superseding AMS 2485D

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BLACK OXIDE TREATMENT

1. SCOPE:

1.1 Purpose: This specification covers the engineering requirements for producing black oxide coatings on parts and the properties of such coatings.

1.2 Application: Primarily to increase the anti-chafing and anti-friction properties of carbon and low-alloy steel parts, particularly sliding or bearing surfaces, by providing a finish coating which will retain an oil film.

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

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

ASTM D2247 - Testing Coated Metal Specimens at 100 Percent Relative Humidity

3. TECHNICAL REQUIREMENTS:

3.1 Procedure:

3.1.1 Parts should be finish machined, inspected, and deemed acceptable by the parts manufacturer before being treated.

3.1.2 The parts to be coated shall have chemically clean surfaces free from water-breaks, prepared with minimum abrasion, erosion, and pitting. Parts showing a water-break shall be recleaned before being coated.

3.1.3 The properly cleaned parts, while still wet, shall be immersed in one or more boiling aqueous alkali oxidizing baths for such times and at such temperatures (See 8.1) as will produce coatings meeting the requirements of 3.2 and 3.3.

3.1.4 Coated parts shall be washed thoroughly in running tap water to remove all traces of processing solution and deposited salts. Parts shall not be allowed to dry during the entire sequence of operations until completion of this rinse.

3.1.5 Parts shall be thoroughly dried unless a water-displacing oil is used for corrosion prevention as in 3.1.6, in which case drying may be omitted.

3.1.6 Parts shall then be dipped in a suitable corrosion-preventive oil.

3.2 Properties:

3.2.1 Smut Test: Coatings on parts before oiling as in 3.1.6, or on oiled parts after vapor degreasing, shall show no indications of reddish-brown or green smut when wiped with a clean white cloth.

3.2.2 Humidity Resistance: Completely processed parts, or panels processed with parts, shall withstand exposure for not less than 120 hr to humidity test conducted in accordance with ASTM D2247 except that the temperature in the humidity cabinet shall be 120 F ± 5 (48.9 C ± 2.8).

3.3 Quality:

3.3.1 Except as otherwise specified herein, the coating on polished surfaces shall be a lustrous black color, uniform in color and luster; coating on other surfaces shall be black or dark gray in color, uniform on areas of equivalent surface roughness. Coating on all types of surfaces shall be free of spots of red oxide or an overall reddish-brown color but an overall reddish-brown cast on a basically black color will not be cause for rejection. Standards for acceptance shall be as agreed upon by purchaser and vendor taking into consideration the factors mentioned in 8.2. Coating shall be continuous, smooth, dense, and adherent and shall not chip, peel, crack, or rub off under any conditions incident to normal handling or storage.

3.3.2 No measurable dimensional changes shall result from processing.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor 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 processing 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: Each lot of parts shall be sampled as follows; a lot shall be all parts made of the same material, heat treated to the same hardness or tensile strength level, processed in the same solution(s) in a period not longer than eight consecutive hours, and presented for inspection at one time.

4.3.1 Smut Test: Three pieces from each lot.

4.3.2 Humidity Resistance: One piece or one panel from each lot.

4.4 Approval:

4.4.1 Coated parts shall be approved by purchaser before parts for production use are supplied.

4.4.2 Vendor shall use manufacturing procedures, processes, and methods of inspection on production parts to determine conformance to this specification which are essentially the same as those used on the approved sample parts. If any change is necessary in type of equipment or in established composition limits and operating conditions of process solutions, vendor shall submit for reapproval of the process a detailed statement of the revised operations and, when requested, sample coated parts. No production parts coated by the revised procedure shall be shipped prior to receipt of reapproval.

4.5 Reports: The vendor of coated parts shall furnish with each shipment three copies of a report showing the purchase order number, this specification number and its revision letter, material specification number and its revision letter if any, contractor or other direct supplier of uncoated parts, part number, and quantity. When uncoated parts are produced or purchased by the coated parts vendor, that vendor shall inspect each lot of parts to determine conformance to the requirements of the material specification, and shall include in the report a statement that the parts conform, or shall include copies of laboratory reports showing the results of tests to determine conformance.