

Coating, Black Oxide

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:

This coating has been used typically to improve the anti-chafing and anti-friction properties of carbon and low-alloy steel parts, particularly for sliding or bearing surfaces, by providing a finish coating which will retain an oil film, but usage is not limited to such applications.

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.

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2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or <http://www.astm.org>.

ASTM G 46 Examination and Evaluation of Pitting Corrosion

3. TECHNICAL REQUIREMENTS:

3.1 Preparation:

3.1.1 The parts to be coated shall have clean surfaces, free from water-breaks.

3.2 Procedure:

3.2.1 The cleaned parts, while still wet, shall be immersed in one or more boiling aqueous alkali oxidizing baths for times and at temperatures (See 8.3) which will produce coatings meeting the requirements of 3.3 and 3.4.

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

3.2.3 Parts shall be thoroughly dried unless a water-displacing oil is used in 3.2.4, in which case complete drying may be omitted.

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

3.3 Properties:

Coated parts shall conform to the following requirements:

3.3.1 Smut Test: Coatings on parts before oiling as in 3.2.4, or on oiled parts after degreasing, shall show no indications of reddish-brown or green smut when wiped with a clean, white cloth.

3.3.2 Dimensional Change: When determined using a micrometer accurate to 0.0001 inch (2.5 mm), no dimensional change shall result from processing.

3.3.3 Oxalic Acid Spot Test: The coating, prior to application of corrosion preventative oil, shall be tested as follows. Clean, dry coated parts or specimens of the same composition and heat treat condition as the parts and processed with the parts represented shall be handled with clean cotton gloves. Each sample shall have deposited three drops of a 5% solution of oxalic acid on a flat surface. Permit the accompanying reaction to continue for eight minutes, followed by rinsing in cool water and drying. When examined, the area which was directly under the acid test solution drops shall exhibit a black or dark brown center with a light border. Areas under the drop, which exhibit a gray center and lighter border are marginal coatings and are not acceptable.