



Standard Specification for Passivation of Stainless Steels Using Electropolishing¹

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1. Scope

1.1 This specification covers the passivation of stainless steel alloys in the 200 (UNS2XXXX), 300 (UNS3XXXX), and 400 (UNS4XXXX) series, and the precipitation-hardened alloys, using electropolishing procedures.

NOTE 1—Surface passivation occurs simultaneously with electropolishing under proper operating conditions. The quality of passivation will depend on the type of stainless steel, the formulation of the electropolishing solution, and the conditions of operation. Free iron on the surface of the stainless steel is removed resulting in improved corrosion resistance. Surface smoothing obtained by electropolishing will also improve corrosion resistance. Electropolishing will also remove heat tint and oxide scale.

1.2 *This specification may involve hazardous materials, operations, and equipment. This specification does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- A 380 Practice for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems²
- A 967 Specification for Chemical Passivation Treatments for Stainless Steel Parts²
- B 117 Practice for Operating Salt Spray (Fog) Apparatus³
- B 322 Practice for Cleaning Metals Prior to Electroplating⁴
- B 374 Terminology Relating to Electroplating⁴
- B 602 Test Method for Attribute Sampling of Metallic and Inorganic Coatings⁴
- D 3951 Practice for Commercial Packaging⁵

2.2 ISO Standards:

- ISO 2080 Electroplating and Related Processes—Vocabulary⁶
- ISO 4519 Electrodeposited Metallic Coatings and Related

- Finishes—Sampling Procedures for Inspection by Attributes⁶
- ISO 9227 Corrosion Tests in Artificial Atmospheres—Salt Spray Tests⁶
- ISO/DIS 15730 Metallic and Other Inorganic Coatings—Electropolishing as a Means of Smoothing and Passivating Stainless Steels^{6,7}
- ISO/DIS 16348 Metallic and Other Inorganic Coatings—Definitions and Conventions Concerning Appearance⁶

3. Terminology

3.1 Definition of terms in this specification can be found in Terminology B 374 and ISO 2080.

3.2 Definitions:

3.2.1 *passivation, n*—The rendering of a stainless steel surface into a lower state of chemical reactivity.

3.2.1.1 *Discussion*—Passivated surfaces are characterized by the absence of free iron, as defined by Practice A 380.

3.2.2 *electropolishing, n*—the electrochemical process in which the article(s) to be passivated are treated anodically in a suitable acid medium.

4. Ordering Information

4.1 When ordering articles to be electropolished in conformance with this standard, the purchaser shall state the following:

4.1.1 *Alloy Designation*—When ordering articles passivated in accordance with this specification, the purchaser shall state, in addition to the ASTM designation number, the date of issue, the alloy designation number, and the testing method(s) by which the article will be evaluated (see 5.3).

4.1.2 *Appearance*—The purchaser shall specify the appearance required, for example, bright or dull. Unless otherwise specified by the purchaser, a bright luster shall be acceptable. Alternatively, samples showing the required finish, or range of finish, shall be supplied or approved by the purchaser. When required, the basis material may be subjected, before electropolishing, to such mechanical polishing as may be required to yield the desired final surface characteristics.

4.1.3 *Contact Marks*—Visible contact marks may occur. The location of electrical contact marks shall be agreed upon between purchaser and supplier.

¹ This specification is under the jurisdiction of ASTM Committee B08 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B.08.07 on Chromate Conversion Coatings.

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² Annual Book of ASTM Standards, Vol 01.03.

³ Annual Book of ASTM Standards, Vol 03.02.

⁴ Annual Book of ASTM Standards, Vol 02.05.

⁵ Annual Book of ASTM Standards, Vol 15.09.

⁶ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁷ This standard is not a requirement but can be referenced for additional information.