Designation: F1089 – 02

Standard Test Method for Corrosion of Surgical Instruments[1]

This standard is issued under the fixed designation F1089; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers general test procedures and evaluation criteria for the corrosion resistance of surgical instruments intended for reuse in surgery and fabricated from stainless steel such as, but not limited to, those listed in Specification F899.

1.2 Austenitic (Class 3), martensitic (Class 4), and precipitation hardening (Class 5) materials shall use the boil test and the copper sulfate test.

1.3 Ferritic (Class 6) materials shall use the copper sulfate test.

1.4 The copper sulfate test is used to detect chromium depletion at the grain boundaries caused by improper heat treatment or improper cold working of austenitic materials.

1.5 The copper sulfate test is used to detect improper heat treatment of martensitic materials.

1.6 The boil test is applicable to martensitic, austenitic, and precipitation hardened materials to detect surface imperfections.

1.7 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.8 *This standard 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:*[2]

A380 Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems

F899 Specification for Wrought Stainless Steels for Surgical Instruments

3. Significance and Use

3.1 This test method provides a test methodology and means of evaluation consistent to both producers and users alike. The corrosion tests serve as an indicator of proper material processing selection by the manufacturers and proper care by the user.

4. Reagents and Materials

4.1 *Cupric Sulfate*—Cupric sulfate crystals ($CuSO_4 \cdot 5H_2O$), 1 g.

4.2 *Sulfuric Acid*—Sulfuric acid AR (H_2SO_4), sp gr 1.84, 2.5 g.

4.3 *Distilled Water*.

4.4 *Isopropyl Alcohol or 95 % Ethyl Alcohol*.

4.5 *Nonreactive Vessel*, such as a glass or ceramic container.

5. Specimen Preparation

5.1 *Boil Test*:

5.1.1 Wash the instrument(s) with mild soap using a nonmetallic hard bristle brush and warm tap water, 26 to 51°C (80 to 125 °F).

5.1.2 Rinse the instruments thoroughly at room temperature in distilled water, 95 % ethyl alcohol, or isopropyl alcohol.

5.1.3 Dry using paper towel or soft cloth.

5.2 *Copper Sulfate Corrosion Test*:

5.2.1 Wash the instrument(s) with mild soap using a nonmetallic hard bristle brush and warm, 26 to 51°C (80 to 125 °F) tap water.

5.2.2 Rinse the instruments thoroughly at room temperature in distilled water followed by rinsing in 95 % ethyl alcohol or isopropyl alcohol.

5.2.3 Air dry (ambient air).

6. Procedure

6.1 *Boil Test*:

6.1.1 Immerse the instrument(s) into a nonreactive container of distilled water.

6.1.2 Bring the water to a boil.

6.1.3 Maintain boiling temperature for 30 ± 1 min.

[1] This test method is under the jurisdiction of ASTM Committee F04 on Medical and Surgical Materials and Devices and is the direct responsibility of Subcommittee F04.15 on Material Test Methods.

Current edition approved Dec. 10, 2002. Published February 2003. Originally approved in 1987. Last previous edition approved in 1987 as F1089 – 87 (1994)$^{\varepsilon 1}$. DOI: 10.1520/F1089-02.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.