



Standard Test Method for Evaluating Stress-Corrosion Cracking of Stainless Alloys with Different Nickel Content in Boiling Acidified Sodium Chloride Solution¹

This standard is issued under the fixed designation G123; 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 a procedure for conducting stress-corrosion cracking tests in an acidified boiling sodium chloride solution. This test method is performed in 25 % (by mass) sodium chloride acidified to pH 1.5 with phosphoric acid. This test method is concerned primarily with the test solution and glassware, although a specific style of U-bend test specimen is suggested.

1.2 This test method is designed to provide better correlation with chemical process industry experience for stainless steels than the more severe boiling magnesium chloride test of Practice G36. Some stainless steels which have provided satisfactory service in many environments readily crack in Practice G36, but have not cracked during interlaboratory testing (see Section 12) using this sodium chloride test method.

1.3 This boiling sodium chloride test method was used in an interlaboratory test program to evaluate wrought stainless steels, including duplex (ferrite-austenite) stainless and an alloy with up to about 33 % nickel. It may also be employed to evaluate these types of materials in the cast or welded conditions.

1.4 This test method detects major effects of composition, heat treatment, microstructure, and stress on the susceptibility of materials to chloride stress-corrosion cracking. Small differences between samples such as heat-to-heat variations of the same grade are not likely to be detected.

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

1.6 *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 applica-*

bility of regulatory limitations prior to use. For specific hazard statements, see Section 8.

2. Referenced Documents

2.1 ASTM Standards:²

- D1193 Specification for Reagent Water
- E8 Test Methods for Tension Testing of Metallic Materials
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
- G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)³
- G16 Guide for Applying Statistics to Analysis of Corrosion Data
- G30 Practice for Making and Using U-Bend Stress-Corrosion Test Specimens
- G36 Practice for Evaluating Stress-Corrosion-Cracking Resistance of Metals and Alloys in a Boiling Magnesium Chloride Solution
- G49 Practice for Preparation and Use of Direct Tension Stress-Corrosion Test Specimens
- G107 Guide for Formats for Collection and Compilation of Corrosion Data for Metals for Computerized Database Input

3. Terminology

3.1 *Definitions*—For definitions of corrosion-related terms used in this test method, see Terminology G15.

4. Summary of Test Method

4.1 A solution of 25 % sodium chloride (by mass) in reagent water is mixed, and the pH is adjusted to 1.5 with phosphoric acid. The solution is boiled and U-bends (or other stressed specimens) are exposed in fresh solution for successive one-week periods.

¹ This test method is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.06 on Environmentally Assisted Cracking.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.