



Standard Guide for Crevice Corrosion Testing of Iron-Base and Nickel-Base Stainless Alloys in Seawater and Other Chloride-Containing Aqueous Environments¹

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INTRODUCTION

Crevice corrosion of iron-base and nickel-base stainless alloys can occur when an occlusion or crevice limits access of the bulk environment to a localized area of the metal surface. Localized environmental changes in this stagnant area can result in the formation of acidic/high chloride conditions that may result in initiation and propagation of crevice corrosion of susceptible alloys.

In practice, crevices can generally be classified into two categories: (1) naturally occurring, that is, those created by biofouling, sediment, debris, deposits, etc. and (2) man-made, that is, those created during manufacturing, fabrication, assembly, or service. Crevice formers utilized in laboratory and field studies can represent actual geometric conditions encountered in some service applications. Use of such crevice formers in service-type environments are not considered accelerated test methods.

The geometry of a crevice can be described by the dimensions of crevice gap and crevice depth. Crevice gap is identified as the width or space between the metal surface and the crevice former. Crevice depth is the distance from the mouth to the center or base of the crevice.

1. Scope

1.1 This guide covers information for conducting crevice-corrosion tests and identifies factors that may affect results and influence conclusions.

1.2 These procedures can be used to identify conditions most likely to result in crevice corrosion and provide a basis for assessing the relative resistance of various alloys to crevice corrosion under certain specified conditions.

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

1.4 *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.* For a specific warning statement, see 7.1.

¹ This guide is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.09 on Corrosion in Natural Waters.

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2. Referenced Documents

2.1 *ASTM Standards*:²

G1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens

G4 Guide for Conducting Corrosion Tests in Field Applications

G46 Guide for Examination and Evaluation of Pitting Corrosion

G48 Test Methods for Pitting and Crevice Corrosion Resistance of Stainless Steels and Related Alloys by Use of Ferric Chloride Solution

G193 Terminology and Acronyms Relating to Corrosion

3. Terminology

3.1 Definitions of related terms can be found in Terminology G193.

4. Significance and Use

4.1 This guide covers procedures for crevice-corrosion testing of iron-base and nickel-base stainless alloys in seawater. The guidance provided may also be applicable to crevice

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.