



Standard Practice for Making and Using U-Bend Stress-Corrosion Test Specimens¹

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1. Scope

1.1 This practice covers procedures for making and using U-bend specimens for the evaluation of stress-corrosion cracking in metals. The U-bend specimen is generally a rectangular strip which is bent 180° around a predetermined radius and maintained in this constant strain condition during the stress-corrosion test. Bends slightly less than or greater than 180° are sometimes used. Typical U-bend configurations showing several different methods of maintaining the applied stress are shown in Fig. 1.

1.2 U-bend specimens usually contain both elastic and plastic strain. In some cases (for example, very thin sheet or small diameter wire) it is possible to form a U-bend and produce only elastic strain. However, bent-beam (Practice G39 or direct tension (Practice G49)) specimens are normally used to study stress-corrosion cracking of strip or sheet under elastic strain only.

1.3 This practice is concerned only with the test specimen and not the environmental aspects of stress-corrosion testing which are discussed elsewhere (1)² and in Practices G35, G36, G37, G41, G44, G103 and Test Method G123.

1.4 The values stated in SI units are to be regarded as standard. The inch-pound units in parentheses are provided for information.

1.5 *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.*

¹ This practice 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 The boldface numbers in parentheses refer to a list of references at the end of this standard.

2. Referenced Documents

2.1 ASTM Standards:³

E3 Guide for Preparation of Metallographic Specimens

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

G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)⁴

G35 Practice for Determining the Susceptibility of Stainless Steels and Related Nickel-Chromium-Iron Alloys to Stress-Corrosion Cracking in Polythionic Acids

G36 Practice for Evaluating Stress-Corrosion-Cracking Resistance of Metals and Alloys in a Boiling Magnesium Chloride Solution

G37 Practice for Use of Mattsson's Solution of pH 7.2 to Evaluate the Stress-Corrosion Cracking Susceptibility of Copper-Zinc Alloys

G39 Practice for Preparation and Use of Bent-Beam Stress-Corrosion Test Specimens

G41 Practice for Determining Cracking Susceptibility of Metals Exposed Under Stress to a Hot Salt Environment

G44 Practice for Exposure of Metals and Alloys by Alternate Immersion in Neutral 3.5 % Sodium Chloride Solution

G49 Practice for Preparation and Use of Direct Tension Stress-Corrosion Test Specimens

G103 Practice for Evaluating Stress-Corrosion Cracking Resistance of Low Copper 7XXX Series Al-Zn-Mg-Cu Alloys in Boiling 6 % Sodium Chloride Solution

G123 Test Method for Evaluating Stress-Corrosion Cracking of Stainless Alloys with Different Nickel Content in Boiling Acidified Sodium Chloride Solution

³ 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.

⁴ The last approved version of this historical standard is referenced on www.astm.org.