



Standard Practice for Making and Using Precracked Double Beam Stress Corrosion Specimens¹

This standard is issued under the fixed designation G168; 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 practice covers procedures for fabricating, preparing, and using precracked double beam stress corrosion test specimens. This specimen configuration was formerly designated the double cantilever beam (DCB) specimen. Guidelines are given for methods of exposure and inspection.

1.2 The precracked double beam specimen, as described in this practice, is applicable for evaluation of a wide variety of metals exposed to corrosive environments. It is particularly suited to evaluation of products having a highly directional grain structure, such as rolled plate, forgings, and extrusions, when stressed in the short transverse direction.

1.3 The precracked double beam specimen may be stressed in constant displacement by bolt or wedge loading or in constant load by use of proof rings or dead weight loading. The precracked double beam specimen is amenable to exposure to aqueous or other liquid solutions by specimen immersion or by periodic dropwise addition of solution to the crack tip, or exposure to the atmosphere.

1.4 This practice is concerned only with precracked double beam specimen and not with the detailed environmental aspects of stress corrosion testing, which are covered in Practices G35, G36, G37, G41, G44, and G50.

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.*

2. Referenced Documents

2.1 ASTM Standards:²

D1193 Specification for Reagent Water

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 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.

E399 Test Method for Linear-Elastic Plane-Strain Fracture Toughness K_{Ic} of Metallic Materials

E1823 Terminology Relating to Fatigue and Fracture Testing

G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)³

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

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

G50 Practice for Conducting Atmospheric Corrosion Tests on Metals

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *stress corrosion cracking (SCC) threshold stress intensity, K_{Isc}* —the stress intensity level below which stress corrosion cracking does not occur for a specific combination of material and environment when plane strain conditions are satisfied.

3.1.1.1 *Discussion*—Terms relative to this subject matter can be found in Terminologies G15 and E1823.

4. Summary of Practice

4.1 This practice covers the preparation and testing of precracked double beam specimens for investigating the resistance to SCC (see Terminology G15) of metallic materials in various product forms. Precracking by fatigue loading and by mechanical overload are described. Procedures for stressing

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