



Standard Test Method for Determining Whether Gas-Leak-Detector Fluid Solutions Can Cause Stress Corrosion Cracking of Brass Alloys¹

This standard is issued under the fixed designation G186; 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 an accelerated test method for evaluating the tendency of gas leak detection fluids (LDFs) to cause stress corrosion cracking (SCC) of brass components in compressed gas service.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *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 to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

B135 Specification for Seamless Brass Tube

B135M Specification for Seamless Brass Tube [Metric]

D1193 Specification for Reagent Water

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

G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)³

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

G38 Practice for Making and Using C-Ring Stress-Corrosion Test Specimens

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.

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *Gas Leak Detector Solutions*—Also known as leak detection fluids, leak detector solutions, bubble solutions, and soap solutions, designated in this standard as LDFs, are fluids used to detect leaks in pressurized gas systems by the formation of bubbles at the leak site.

3.1.2 The terminology used herein, if not specifically defined otherwise, shall be in accordance with Terminology **G15**.

4. Summary of Test Method

4.1 This test method consists of three steps: The first step consists of running a sample of the test specimens to verify that they are susceptible to stress corrosion cracking using Mattsson's Solution (see Practice **G37**). The second step is to expose the specimens to a solution that does not cause SCC to verify that the test environment does not contain components that can cause SCC to brass. The third step is to test the LDF to determine if it causes SCC of the brass specimens within 15 wetting and evaporation cycles.

4.2 The specimen used in this test is a C-ring stressed to create at least 0.65 % strain in the outer fibers of the specimen.

4.3 Macroscopic examination of the specimens is carried out after every second wetting cycle and if cracking is suspected the specimen is examined at higher magnifications for confirmation. Metallographic sectioning through the stressed area is used to verify minor cracking at the end of the fifteen cycles.

4.4 LDFs that cause SCC in any specimens within 15 wetting cycles are considered to have failed this test and not suitable for use in pressurized gas systems with brass components.

5. Significance and Use

5.1 Brass components are routinely used in compressed gas service for valves, pressure regulators, connectors and many other components. Although soft brass is not susceptible to ammonia SCC, work-hardened brass is susceptible if its hardness exceeds about 54 HR 30T (55HRB) (Rockwell scale). Normal assembly of brass components should not induce sufficient work hardening to cause susceptibility to ammonia