



Designation: G188 – 05 (Reapproved 2021)

Standard Specification for Leak Detector Solutions Intended for Use on Brasses and Other Copper Alloys¹

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INTRODUCTION

This specification is intended for purchasing agents to use in purchase orders for leak detection fluids (LDF). The primary purpose of the specification is to assign the responsibility for passing Specification **G186** to the manufacturers of these products. Previously the only corrosion related specification for LDFs was an obsolete Military Specification that required that the LDF not exceed a corrosion rate of 100 mpy in a total immersion test. The problem of stress corrosion cracking of brass has shown up as a major cause of failures in compressed gas service of brass components resulting from ammonia used to adjust the pH of LDFs. This specification will give the industrial gas industry a means to prevent these failures in the future.

1. Scope

1.1 This specification covers the requirements for leak detector solutions suitable for use in checking the leakage of valves, pipes, fittings, joints, and so forth of a pressurized gas system fabricated from brasses and other copper alloys.

1.2 This specification deals with the stress-corrosion cracking aspect of leak detector solutions. The effectiveness, chemical, physical and mechanical properties of leak detector solutions are not within the scope of this specification.

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, health, and environmental practices and to determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This specification 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. Referenced Documents

2.1 *ASTM Standards:*²

E300 Practice for Sampling Industrial Chemicals

G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)³

G186 Test Method for Determining Whether Gas-Leak-Detector Fluid Solutions Can Cause Stress Corrosion Cracking of Brass Alloys

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 **Other Definitions**—For other definitions used in this specification, refer to Terminology **G15**.

4. Performance Requirements

4.1 The leak detector solution shall not show stress-corrosion cracking of copper alloy specimens as shown in Test Method **G186**.

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.

4.2 Additional requirements are not part of this specification but may be negotiated by mutual agreement between the parties concerned.

5. Sampling

5.1 The manufacturer of the LDF shall be responsible for developing and carrying out a plan for sampling its products in accordance with Practice E300.

6. Significance and Use

6.1 Leak detector solutions may cause stress-corrosion cracking of different alloys. If a leak detector solution is found to cause stress-corrosion cracking in accordance with Test Method G186, it should not be used on brasses or other copper alloys. If a leak detector solution is found not to cause stress-corrosion cracking in accordance with Test Method G186, it may cause stress-corrosion cracking of copper or other alloys under unspecified conditions.

7. Certification

7.1 Certification of products conforming to this specification is mandatory.

8. Product Marking

8.1 Products conforming to this specification shall have a statement that the LDF meets the requirements of this specification on the product label.

9. Quality Assurance

9.1 The LDF manufacturer shall be responsible for developing and implementing a quality assurance plan that will provide assurance that its products intended for use on systems containing copper alloys, including brass and bronze, pass Test Method G186. As a minimum it is suggested that, for LDFs produced in batch processes, each batch shall be sampled as described in Section 5 and tested in accordance with Test Method G186. After five consecutive batches have passed the G186 test, the sampling and testing may be omitted for no longer than six months.

9.2 If any batch fails the G186 test, the batch must either be rejected or diverted to applications on systems that do not contain copper alloy components. Subsequently, adequate warnings must be placed on the labels that the product is not suitable for use on copper alloys.

9.3 If a batch of product fails a test, subsequent batches shall have testing continued until at least five consecutive batches pass.

10. Keywords

10.1 brass alloys; bubble solutions; copper alloys; gas-leak-detector solutions; leak detector solutions; soap solutions; stress-corrosion cracking

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