



Designation: G28 – 24

Standard Test Methods for Detecting Susceptibility to Intergranular Corrosion in Wrought, Nickel-Rich, Chromium-Bearing Alloys¹

This standard is issued under the fixed designation G28; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods cover two tests as follows:

1.1.1 *Method A, Ferric Sulfate-Sulfuric Acid Test* (Sections 3 – 10, inclusive)—This test method describes the procedure for conducting the boiling ferric sulfate—50 % sulfuric acid test which measures the susceptibility of certain nickel-rich, chromium-bearing alloys to intergranular corrosion (see Terminology G193), which may be encountered in certain service environments. The uniform corrosion rate obtained by this test method, which is a function of minor variations in alloy composition, may easily mask the intergranular corrosion components of the overall corrosion rate on alloys N10276, N06022, N06059, and N06455.

1.1.2 *Method B, Mixed Acid-Oxidizing Salt Test* (Sections 11 – 18, inclusive)—This test method describes the procedure for conducting a boiling 23 % sulfuric + 1.2 % hydrochloric + 1 % ferric chloride + 1 % cupric chloride test which measures the susceptibility of certain nickel-rich, chromium-bearing alloys to display a step function increase in corrosion rate when there are high levels of grain boundary precipitation.

1.2 The purpose of these two test methods is to detect susceptibility to intergranular corrosion as influenced by variations in processing or composition, or both. Materials shown to be susceptible may or may not be intergranularly corroded in other environments. This must be established independently by specific tests or by service experience.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3.1 *Exception*—Some desired corrosion rate units in 8.1.1 are given in inch-pound units.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Warning statements are given in 5.1.1, 5.1.3, 5.1.9, 13.1.1, and 13.1.11.

1.5 *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.*

2. Referenced Documents

- 2.1 *ASTM Standards:*²
- A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
 - D1193 Specification for Reagent Water
 - G193 Terminology and Acronyms Relating to Corrosion

METHOD A—Ferric Sulfate—Sulfuric Acid Test

3. Significance and Use

3.1 The boiling ferric sulfate-sulfuric acid test may be applied to the following alloys in the wrought condition:

Alloy	Testing Time, h
N06007	120
N06022	24
N06030	120
N06059	24
N06200	24
N06455	24
N06600	24
N06625	120
N06686	24
N06985	120
N08020	120
N08367	24

¹ These test methods are under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and are the direct responsibility of Subcommittee G01.05 on Laboratory Corrosion Tests.

Current edition approved Nov. 1, 2024. Published December 2024. Originally approved in 1971. Last previous edition approved in 2022 as G28 – 22. DOI: 10.1520/G0028-24.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.