



Standard Test Method for Evaluating the Influence of Thermal Insulations on External Stress Corrosion Cracking Tendency of Austenitic Stainless Steel¹

This standard is issued under the fixed designation C692; 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 two procedures for the laboratory evaluation of thermal insulation materials to determine whether they contribute to external stress corrosion cracking (ESCC) of austenitic stainless steel due to soluble chlorides within the insulation. This laboratory procedure is not intended to cover all of the possible field conditions that contribute to ESCC.

1.2 While the 1977 edition of this test method (Dana test) is applicable only to wicking-type insulations, the procedures in this edition are intended to be applicable to all insulating materials, including cements, some of which disintegrate when tested in accordance with the 1977 edition. Wicking insulations are materials that wet through and through when partially (50 to 75 %) immersed in water for a short period of time (10 min or less).

1.3 These procedures are intended primarily as a preproduction test for qualification of the basic chemical composition of a particular manufacturer's product and are not intended to be routine tests for ongoing quality assurance or production lot compliance. Test Methods C871, on the other hand, is used for confirmation of acceptable chemical properties of subsequent lots of insulation previously found acceptable by this test method.

1.4 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.

1.5 *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 test method is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.31 on Chemical and Physical Properties.

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2. Referenced Documents

2.1 ASTM Standards:²

- A240/A240M Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- A370 Test Methods and Definitions for Mechanical Testing of Steel Products
- C168 Terminology Relating to Thermal Insulation
- C795 Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel
- C871 Test Methods for Chemical Analysis of Thermal Insulation Materials for Leachable Chloride, Fluoride, Silicate, and Sodium Ions
- G30 Practice for Making and Using U-Bend Stress-Corrosion Test Specimens

3. Terminology

3.1 *Definitions:* Refer to Terminology C168 for definitions relating to insulation.

4. Summary of Test Method

4.1 The procedures in this test method consist of using a specimen of insulation to conduct distilled (or deionized) water by wicking or dripping to an outside surface, through the insulation, to a hot inner surface of stressed Type 304 stainless steel for a period of 28 days. If leachable chlorides are present, they are carried along with the water and concentrated at the hot surface by evaporation in much the same way as has been experienced in actual industrial process situations.

4.2 Exposed stainless steel coupons are examined visually, and under 10 to 30× magnification, if necessary, to detect ESCC after the prescribed period of exposure.

5. Significance and Use

5.1 An inherent characteristic of some alloys of austenitic stainless steel is their tendency to crack at stress points when

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.