



Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel¹

This standard is issued under the fixed designation C 795; 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 Department of Defense.

^{ε1} NOTE—Editorial changes were made in September 1998.

1. Scope

1.1 This specification covers non-metallic thermal insulation for use in contact with austenitic stainless steel piping and equipment. In addition to meeting the requirements specified in their individual material specifications, issued under the jurisdiction of ASTM Committee C-16, these insulations must pass the preproduction test requirements of Test Method C 692, for stress corrosion effects on austenitic stainless steel, and the confirming quality control, chemical requirements, when tested in accordance with the Test Methods C 871. These thermal insulations may be either homogeneous or non-homogeneous and either organic or inorganic.

1.2 *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:

- C 168 Terminology Relating to Thermal Insulating Materials²
- C 692 Test Method for Evaluating the Influence of Thermal Insulations on the External Stress Corrosion Cracking Tendency of Austenitic Steel²
- C 871 Test Methods for Chemical Analysis of Thermal Insulation Materials for Leachable Chloride, Fluoride, Silicate, and Sodium Ions²

3. Terminology

3.1 *Definitions*—Terminology C 168 should be considered as applying to the terms used in this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *basic material specification*—any of the material specifications for homogeneous insulation covered in any of

the pertinent *Annual Book of ASTM Standards*.

3.2.2 *lot*—a lot shall be defined in accordance with Criteria C 390 by agreement between the purchaser and the manufacturer.

3.2.3 *stress corrosion cracking*—the failure of metal, taking the form of cracks that may occur under the combined influence of certain corrosive environments and applied or residual stresses.

3.2.4 *wicking-type insulation*—insulation material that, by virtue of its physical characteristics, permits a wetting liquid to infiltrate it by capillary attraction.

4. Significance and Use

4.1 Stress corrosion cracking of austenitic stainless steel is a metallurgical phenomenon. One cause of stress corrosion cracking is the presence of contaminants in water solution, which can be concentrated at the stressed surface by evaporation of the water.

4.2 There is an apparent correlation between stress corrosion cracking of austenitic stainless steel and the use of insulation which either contains water-leachable chloride or, by reason of its water absorptivity, may act as a vehicle through which chlorides from outside the system may be concentrated at the surface of the stainless steel.^{3,4,5}

4.3 Studies have shown that insulation containing certain water-soluble compounds may retard or prevent chloride-induced stress corrosion. Numerous materials thought to inhibit stress corrosion cracking have been tried with varying degrees of success. An inhibiting compound commonly used is sodium silicate. Present knowledge indicates that the sodium silicate dissociates in the presence of water, leaving the silicate ion to form a protective mechanism that inhibits or prevents the chloride ion from attacking the stainless steel. Under adverse

¹ This specification is under the jurisdiction of ASTM Committee C-16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.20 on Homogeneous Inorganic Thermal Insulations.

Current edition approved June 15, 1992. Published August 1992. Originally published as C 795 – 77. Last previous edition C 795 – 89.

² *Annual Book of ASTM Standards*, Vol 04.06.

³ Schaffer, L. D., and Klapper, J. A., "Investigation of the Effects of Wet, Chloride-Bearing, Thermal Insulation on Austenitic Stainless Steel," *Report No. ESI-25-(a)-1*, Oak Ridge National Laboratory, and Ebasco Services Inc., November 1, 1961.

⁴ Dana, A. W., Jr., "Stress-Corrosion Cracking of Insulated Austenitic Stainless Steel," *ASTM Bulletin*, October 1957.

⁵ Louthan, M. R., Jr., "Initial Stages of Stress Corrosion Cracking in Austenitic Stainless Steels," *Corrosion*, NACE, September 1965.