Designation: C 929 – 94 (Reapproved 2004)ε1

Standard Practice for Handling, Transporting, Shipping, Storage, Receiving, and Application of Thermal Insulation Materials For Use in Contact with Austenitic Stainless Steel[1]

This standard is issued under the fixed designation C 929; 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.

ε[1] NOTE—Sections 6.2 and 9.4 were editorially revised in May 2005.

1. Scope

1.1 This practice is intended to provide guidance and direction in the handling, transporting, shipping, storage, receiving, and application of thermal insulating materials to be used as a surface treatment or as part of the thermal insulation system in contact with austenitic stainless steel.

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:* [2]

C 168 Terminology Relating to Thermal Insulation

C 692 Test Method for Evaluating the Influence of Thermal Insulations on the External Stress Corrosion Cracking Tendency of Austenitic Stainless Steel

C 795 Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel

C 871 Test Methods for Chemical Analysis of Thermal Insulation Materials for Leachable Chloride, Fluoride, Silicate, and Sodium Ions

3. Terminology

3.1 *Definitions*—Terminology C 168 shall apply to this practice.

3.2 *Descriptions of Terms Specific to This Standard:*

3.2.1 *shipment*—that material being received from the same source of manufacture on the same day or each carload, whichever is smaller.

3.2.2 *water damage*—damage caused by water seeping into cartons of insulation or soaking into the insulation that is left exposed to the weather, both of which increase the possibilities of absorption of chloride ion compounds.

3.2.3 *weathertight*—protected from rain and wind. A dry, sheltered condition wherein reasonable precautions are taken to prevent indiscriminate water from coming in contact with the insulation.

4. Significance and Use

4.1 Insulations that are used as a part of the thermal insulation system in contact with austenitic stainless steels may become contaminated with water soluble chloride ions which, in turn, if permitted to reach the stainless steel surface, could contribute to external stress corrosion cracking (ESCC). Therefore, it is important to reduce the exposure of such insulating materials to water-soluble chloride ion compounds at all stages of manufacture, handling, shipping, storage, and application. During manufacture, precautions shall be taken to minimize water soluble-chloride ion content, both in the material and as surface contamination. Once the manufacture is complete, care must be exercised during handling, transporting, shipping, storage, receiving, and application to avoid contamination with chloride ions that can be transported by water through the insulation materials onto the stainless steel surface. This practice presents criteria which, if followed, will minimize the risks of ESCC associated with the application of insulation materials. It should be emphasized, however, that because of the many variable factors present, complete freedom from ESCC can not be assured under all circumstances, even when following the guidance of this practice.

4.2 Continued protection of the insulation and the stainless steel surface from moisture and contamination after the insulation system is installed and over its entire service life is of significant importance. In-service contamination can occur from many sources; for example, from airborne contaminates, rain or salt spray, periodic fire sprinkler system tests, washdowns, or process leakage. Weather barrier jacketing systems and proper application should be chosen to provide long-term protection in the intended use environment.

[1] This practice is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.20 on Homogeneous Inorganic Thermal Insulations.

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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.

4.3 The entire insulation system should be periodically inspected and maintained. Insulation that is suspected of contamination should be retested or immediately replaced. Wash down of insulated pipe and equipment should be avoided. Whenever possible, protective coatings or finishes should be applied directly to the stainless steel surface as the primary source of corrosion protection.

5. General

5.1 Only materials that have been tested and qualified (see Note 1) should be used as a surface treatment or as a part of the thermal insulation system applied to austenitic stainless steel. Requirements for preproduction or qualification testing and subsequent lot testing by the manufacturer or seller shall be specified by the purchaser when ordering.

NOTE 1—For example, thermal insulation shall be tested in conformance to Specification C 795 using Test Method C 692 and Test Method C 871.

5.2 Where possible, qualified and unqualified materials should be kept physically segregated. Where conditions make it necessary to have both qualified and unqualified materials of the same type at the job site, storage area, or in the same shipment, all qualified materials should be clearly identifiable from unqualified materials. The need for special identification should be specified by the purchaser when ordering.

6. Handling, Transporting, and Shipping

6.1 All handling and transporting of materials should be done in a manner that will prevent contamination from external sources.

6.2 Shipment of materials from the manufacturer to the installation location of the user should be in weathertight transportation. Provisions and responsibility for special transportation or packaging should be agreed upon between the purchaser and the seller or manufacturer.

7. Storage

7.1 All insulation shall be stored in a manner that will prevent contamination from external sources.

7.2 All insulation and accessory materials should be stored in weathertight buildings. Storage buildings should be situated and constructed so that they will not be subject to flooding. The floor should be paved, or equal, and welldrained.

7.3 Insulation shall be placed on pallets or shoring to prevent direction contact with the ground or floor.

7.4 If qualified and unqualified materials are stored in the same area, they should be segregated.

8. Inspection

8.1 Insulation and accessory materials should be inspected at various stages prior to application to further reduce the risk of contamination. Retesting may be desirable in a particularly critical application such as pressure vessels, or when contamination is suspected by visual examination.

8.1.1 External shipping containers, packages, or cartons should be visually inspected for evidence of water damage or contamination when received at the jobsite, when removed from storage, and just prior to application. Any containers showing evidence of water damage or contamination should not be used. They should be clearly marked and set aside for further inspection, testing, disposal, or used as unqualified material.

8.1.2 Documentation shall be supplied to show that the materials have met the requirements of Specification C 795.

9. Application Precautions

9.1 Although this practice will help to prevent stress corrosion cracking of austenitic stainless steel surfaces, it should be noted that the cleanliness of the surface to which it is applied is of equal importance. Stainless steel surfaces may be contaminated from external sources, such as airborne sea mist carried by onshore winds, chemical fumes, ink from marking pens, adhesive on tape, accidental spills of watersoluble chloride ion-bearing materials, melting salts used to clear ice and snow, and many other ways. The contaminant should be removed from the surface before insulation is applied and precautions should be taken to prevent their entrance during and after the installation.

9.2 Any material suspected of being contaminated during the application should not be used and should be clearly marked and set aside for further testing, disposal, or used as unqualified material.

9.3 When insulating cements are to be in contact with austenitic stainless steel surfaces, they shall be mixed with distilled or demineralized water.

9.4 Mixing containers and tools must be thoroughly cleaned and dried prior to use so as not to increase the chloride ion content of the material . Used containers, such as mortar boxes or empty paint or mastic pails, shall not be used as mixing containers.

10. Material Control Procedures

10.1 Specific material control procedures consistent with this practice should be agreed upon between the purchaser and the manufacturer or seller and the applicator as part of the purchase contracts. The procedures shall include the following:

10.1.1 *Packaging*—Packaging shall assure adequate protection for transportation, handling, and storage on the jobsite. If other than manufacturer's (seller's) standard packaging for this type of material, it is required it shall be so stated in the purchase order.

10.1.2 *Marking*—Marking shall be as specified or as agreed upon between the purchaser and the supplier.

10.1.3 *Inspection and Testing*—Any requirements for qualification, inspection, or testing should be specified. Provisions should be made for certification or submittal of test reports, if required.

10.1.4 *Transportation and Handling*—Responsibility for transportation of material at each stage should be established. The method of transportation and vehicle requirements should be agreed upon and specified.

10.1.5 *Storage*—Responsibility for providing adequate storage at each stage should be established and specific space requirements should be determined. Specific provisions for segregating qualified and unqualified materials should be specified.

10.1.6 *Rejected Material*—Specific procedures should be established for marking and segregating materials suspected of contamination. Provisions for testing, rejecting, and disposal of these materials should be specified.

11. Keywords

11.1 application; austenitic stainless steel; chloride ion; external stress corrosion cracking; handling; insulation; packaging; receiving; shipping; storage; transporting