



Standard Practice for Repair of a Rigid Cellular Polyurethane Insulation System on Outdoor Service Vessels¹

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1. Scope

1.1 This practice covers the repair of spray-applied polyurethane insulation on vessels normally operating at temperatures between -30 and $+107^{\circ}\text{C}$ [-22 and $+225^{\circ}\text{F}$].

1.2 **Warning**—At temperatures below 0°C [32°F] the application of a spray “foam” directly onto the cold substrate may not be possible. The term “foam” applies to spray-applied polyurethane or polyisocyanurate (PUR or PIR) rigid cellular plastic only, and not to any other plastic insulation.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns 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.* For a specific precautionary statement see 1.2.

2. Referenced Documents

2.1 *ASTM Standards*:²

C 168 Terminology Relating to Thermal Insulation

C 945 Practice for Design Considerations and Spray Application of a Rigid Cellular Polyurethane Insulation System on Outdoor Service Vessels

¹ This practice is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.40 on Insulation Systems.

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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.

3. Terminology

3.1 *General*—Definitions included in Terminology C 168 shall apply to the terms used in this practice.

4. Surface Preparation

4.1 All damaged or nonadhering foam shall be removed to the substrate in all directions, until dry, solidly adhering foam is encountered.

4.2 The remaining foam insulation shall be beveled on all sides to approximately a 45° angle.

4.3 The substrate shall be examined and if the existing primer is damaged, it shall be wire-brushed and reprimed, where feasible, in accordance with the primer manufacturer's instructions.

4.4 A covering shall be installed around the area to be repaired, prior to spray foam application, to protect the surrounding undamaged area from overspray and removed after completion of the repair work.

5. Repair Procedure

5.1 The repair shall be accomplished in one of the following manners:

5.1.1 Foam shall be spray applied to the prepared area and top-coated with the specified protective coating. (An open-weave reinforcing fabric may be embedded into the wet first coat if desired. Caution shall be taken to embed the reinforcing fabric totally within the coating.)

5.1.2 For substrate temperatures below 0°C [32°F], the following procedure shall be used: Cut to shape and install a thin layer of rigid PUR/PIR board (to insulate the surface) in the prepared area with a joint sealer. Apply spray foam in accordance with 5.1.1.

5.2 All horizontal areas shall be repaired in a manner to provide drainage and prevent free-standing water.

5.3 Spraying shall not be done in the presence of water (rain, fog, condensation, etc.) or wind velocities greater than 15 mph [24 km/h]. (With the owner's approval, shielded scaffolds may be used in wind velocities greater than 15 mph [24 km/h].)

5.4 On the scaffolding or on the horizontal areas, or both, sufficient buckets, plastic film, etc., shall be kept with the applicator to counteract a problem without depositing any foreign material on the substrate that could affect either initial adhesion to the substrate or interlaminant adhesion of the foam.

5.5 All prepared areas shall be repaired the same day or adequately covered to prevent the intrusion of moisture or other foreign materials, or both. On vessels operating below +70°F [21°C], repair them the same day without exception.

5.6 The spray-applied foam or rigid board shall be dry, clean, and free of dust before application of the protective

coating. If the insulation has been left uncoated for more than 3 days, the surface shall be brushed and air blown before applying the coating.

5.7 All surface preparation, accessory preparation, spray foam application, and protective coating application shall be in accordance with Practice **C 945**.

6. Keywords

6.1 coating; outdoor service vessels; spray foam

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