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Standard Practice for Application of Spray-Applied Fibrous Thermal Insulation for Elevated Temperatures¹

This standard is issued under the fixed designation C 762; 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 practice covers the application recommendations for spray-applied fibrous insulations consisting of uniform mixtures of thermally resistant binders and inorganic fibrous materials for use on substrates operating at elevated temperatures above 100°F (38°C).

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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 720 Specification for Spray-Applied Fibrous Thermal Insulation for Elevated Temperature²

2.2 Other Documents:

Occupational Safety and Health Act (OSHA), current issue³

3. Terminology

3.1 *Definitions*—See Terminology C 168.

3.1.1 *high-temperature substrates*—those substrates which are at temperatures above 212° F (100° C) during application of spray-applied fibrous thermal insulations.

3.1.2 *overspray*—that portion of material from a spray-pattern not adhering to intended substrates.

3.1.3 *spray-applied fibrous thermal insulation*—material applied by pneumatic conveyance in a dry state and then wetted with an atomizing liquid at the spray nozzle.

3.1.4 *spray liquid*—usually potable water or mixes of water-soluble adhesives and water.

3.1.5 *spray nozzle*—a tube with a liquid atomizing unit attached to intermix fibers and liquid. These nozzles can be produced to operate with or without compressed air.

3.1.6 *tamping insulation*—procedure by which sprayed insulations are flattened with a tool to achieve a desired uniform thickness or pleasing appearance.

4. Significance and Use

4.1 The purpose of this practice is to provide standard application procedures, specifically regarding surface preparations, general sprayed fiber techniques, reinforcement and mechanical supports, and finish applications and limitations, and to provide common precautions necessary to avoid application and performance difficulties.

4.2 When thermal insulations are not applied in accordance with prescribed and proven procedures, poor adhesion and appearance often occur. The various sections of this recommended practice explain certain methods suitable for obtaining optimum results with spray-applied fibrous thermal insulation.

4.3 This practice is only a guide. The requirements herein discussed are general in nature and considered practical. They are not intended as specific recommendations.

5. Apparatus, Utilities, and Operational Requirements

5.1 *Application Machine and Related Spray Equipment*—The insulation shall be applied with manufacturer-approved spray application machines, spray nozzles, and other necessary equipment, in strict accordance with manufacturer's instructions and recommendations.

5.2 *Utilities and Operational Requirements*—Unless otherwise specified, the following services are normally provided:

5.2.1 *Electricity*—220 V, 60 A.

5.2.2 *Water*—4 gal (15 L)/min at 60 psi (4.1 atm) (414 kPa) at the application level.

5.2.3 *Air*—10 ft³ (0.28 m³)/min at 100 psi (6.8 atm) (689 kPa).

5.2.4 *Illumination*—Sufficient illumination shall be provided for proper application.

5.2.5 *Ventilation*—Sufficient air circulation must be provided to reduce any accumulated dust during application and to allow adequate drying of applied insulation after application.

5.2.6 *Protective Equipment*—Current OSHA regulations shall apply. As a guide, personnel working within 15 ft (4.6 m) of the spraying or feeding operation shall wear approved masks, and goggles or face shields, if desired.

5.2.7 *Adhesives*—Adhesives, when used, shall be in accordance with manufacturer's recommendations.

5.2.8 *Reinforcement*—Pins, studs, and other attachments, when used, shall be secured to substrates prior to application of insulation.

5.2.9 *Windbreaks*—As necessary, in order to minimize overspray, provide windbreaks within the application area.

6. Materials

6.1 The fibrous thermal insulations shall consist of min-

¹ This practice is under the jurisdiction of ASTM Committee C-16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.23 on Blanket and Loose Fill Insulation.

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

³ Available from OSHA, 200 Constitution Ave., NW, Washington, DC 20210.

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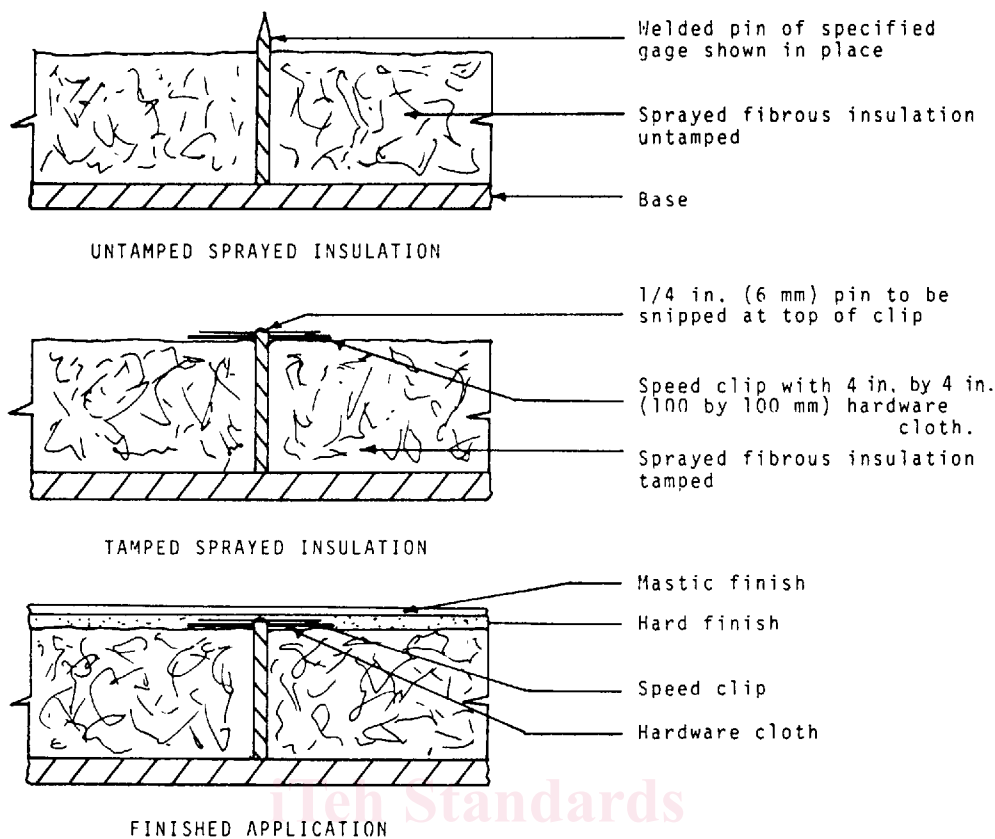


FIG. 1 Application Technique for Mechanical Support Using Pins and Hardware Cloth

eral or refractory fibers or both, combined with thermally resistant binders in accordance with Specification C 720.

7. Application

7.1 The application of spray-applied thermal insulating materials shall consist of:

- 7.1.1 Fluffing the otherwise compacted fiber and metering it through an application machine,
- 7.1.2 Pneumatically conveying this processed fiber through a flexible hose to the fiber spray nozzle,
- 7.1.3 Introducing an atomized liquid as the fiber emerges from the nozzle, and
- 7.1.4 Directing the wetted material to a substrate in an even, uninterrupted pattern.

8. Preconditions

8.1 Prior to commencing the application of spray-applied fibrous thermal insulations, certain preconditions shall be observed:

8.1.1 *Type of Spray Nozzle*—The type of atomizing spray nozzle shall be as specified by the manufacturer. Atomization may be accomplished by direct water pressure, compressed air, or by blower pressure.

8.1.2 *Liquid/Fiber Ratio*—Normally 0.75 to 1.25 lb of liquid per pound (0.75 to 1.25 kg per kilogram) of insulation is used. Specific recommendations of the thermal insulation manufacturer must be followed. Liquid flow tests should be made periodically to assure a proper ratio.

8.1.3 *Prewetting Surfaces*—Surfaces shall be pre-wetted prior to application of insulation; adhesives, when used, must

be applied in accordance with manufacturer's instructions.

9. Application Conditions and Limitations

9.1 *Application Conditions:*

9.1.1 *Surface Preparation*—The surface to be treated shall be clean and free of loose paint, rust, oil, grease, or any other condition that would prevent good adhesion of the sprayed fibrous thermal insulation to the substrate. Certain substrates, such as painted surfaces, may need adhesive in order to obtain an adequately adhering bond.

9.1.2 *Application Temperature*—Application temperatures must be observed. Application should not be made under ambient conditions where freezing can occur. Ice formation within the insulation or at the substrate interface can cause delamination.

9.1.3 Material may be applied under two temperature conditions of the substrate:

9.1.3.1 Temperature of substrate below 212° F (100° C).

9.1.3.2 High temperature substrate that is above 212° F (100° C).

9.1.4 When treating high temperature substrates apply a minimal thickness of insulation and allow to dry before application of additional insulation. This will reduce blow-offs and poor adhesion of the applied insulation from the steam created.

9.2 *Limitations on Maximum Thickness*—A maximum thickness of 2 in. (51 mm) shall be applied without reinforcement. Applications in excess of 2 in. (51 mm) shall follow the reinforcement recommendations in Table 1.