Designation: C1321 – 15

Standard Practice for Installation and Use of Interior Radiation Control Coating Systems (IRCCS) in Building Construction[1]

This standard is issued under the fixed designation C1321; 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 has been prepared for use by the designer, specifier, and applicator of Interior Radiation Control Coating Systems (IRCCS) for use in building construction. The scope contains instructions related to the use and installation of IRCCS that are sprayed, rolled, or brush applied. Examples that this practice is intended to address include: (*1*) low emittance surfaces in vented building envelope cavities intended to retard radiant transfer across the vented airspace; (*2*) low emittance surfaces at interior building surfaces intended to retard radiant transfer to or from building inhabitants; and (*3*) low emittance surfaces at interior building surfaces intended to reduce radiant transfer to or from heating or cooling systems.

1.2 This practice covers the installation process from pre-installation inspection through post-installation. It does not cover the production of the Interior Radiation Control Coating Materials.

1.3 This practice is not intended to replace the manufacturer's installation instructions, but it shall be used in conjunction with such instructions. This practice is not intended to supersede local, state, or federal codes.

1.4 This practice assumes that the installer possesses a good working knowledge of the application codes and regulations, safety practices, tools, equipment, and methods necessary for the installation of Interior Coating Materials. It also assumes that the installer understands the fundamentals of building construction that affect the installation of an IRCCS.

1.5 When the installation or use of Interior Radiation Control Coating Materials, accessories, and systems pose safety or health problems, the manufacturer shall provide the user appropriate current information regarding any known problems associated with the intended use of the products and shall also provide direction on protective measures to be employed for safe utilization. The user shall establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.

1.6 *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.* Specific precautionary statements are contained in Sections 5 and 7.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C168 Terminology Relating to Thermal Insulation

C1371 Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers

E84 Test Method for Surface Burning Characteristics of Building Materials

E96/E96M Test Methods for Water Vapor Transmission of Materials

2.2 *NFPA Standards:*[3]

NFPA 54 National Fuel Gas Code

NFPA 211 Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances

2.3 *Other Documents:*

CPSC Guide to Home Wiring Hazards[4]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminology C168.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *applicator*—the person or persons who apply interior reflective coating materials in buildings.

3.2.2 *conditioned space*—any space in a building that is served by a heating or cooling system.

[1] This practice is under the jurisdiction of ASTM Committee C16 on Thermal Insulationand is the direct responsibility of Subcommittee C16.21 on Reflective Insulation.

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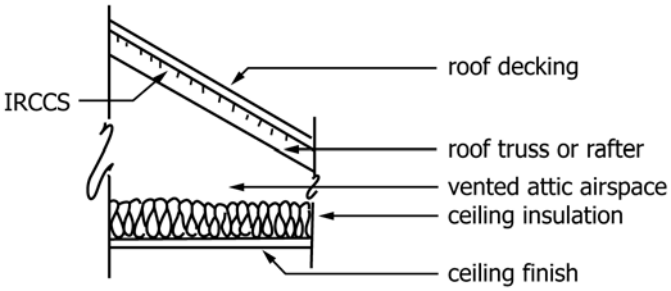
[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

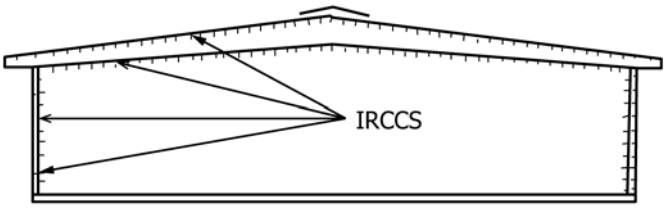
[3] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, http://www.nfpa.org.

[4] Available from Consumer Product Safety Commission, https://www.cpsc.gov.



NOTE 1—Apply IRCCS to cover the exposed roof deck area including support structure directly connected to the roof deck (such as purlins, rafters, and top chord of the trusses). The low-emittance surface of the IRCCS must face the interior of the attic.

FIG. 1 Typical Residential Use



NOTE 1—Apply the IRCCS to cover the entire interior surface area. The low-emittance surface of the IRCCS must face the interior of the building.

FIG. 2 Typical Industrial, Commercial, and Agricultural Use

3.2.3 *Interior Radiation Control Coating Systems (IRCCS)*—a building construction consisting of a low emittance (0.25 or less) surface bounded by an open air space. An IRCCS is used for the sole purpose of limiting heat transfer by radiation and is not specifically intended to reduce heat transfer by convection or conduction.

3.2.4 *open air space*—a vented building cavity (for example, a vented attic) or a large conditioned or unconditioned building space.

3.2.5 *Discussion*—A large building space is defined as one whose minimum dimension exceeds two feet.

3.2.6 *owner*—the person, partnership, corporation, agency, or other entity who owns the building in which the IRCCS is to be applied whether such ownership is by virtue of deed, contract, or any other instrument for acquiring legal title under the laws of the state in which the building is located.

4. Significance and Use

4.1 This practice recognizes that effectiveness, safety, and durability of an IRCCS depends not only on the quality of the materials, but also on the proper installation.

4.2 Improper installation of an IRCCS will reduce its thermal effectiveness, cause fire risks and other unsafe conditions, and promote deterioration of the structure in which it is installed. Improper installation has the potential to create specific hazards that include: heat buildup in recessed lighting fixtures, deterioration of failure of electrical wiring components, and deterioration of wood structures and paint failure due to moisture accumulation.

4.3 This practice provides directions for the installation of IRCCS materials in a safe and effective manner. Actual conditions in existing buildings will vary greatly.

4.4 The user shall consult the manufacturer for application and installation methods.

5. Safety Precautions

5.1 The applicator shall meet all of the requirements of the manufacturer, code, and their contract for safety.

5.2 Ventilation shall be provided to ensure that mist and overspray are immediately dispersed from the application area. When natural ventilation is not adequate, place OSHA approved fans in windows or doors adjacent to the application area to improve ventilation. Warnings shall be provided for areas where ventilation is exhausted. Ventilation of the areas of application shall meet all of the requirements of the manufacturer, code, and the installation contract.

5.3 The instructions provided by the manufacturer shall be consulted for all applicable handling and safety requirements.

6. Pre-Installation Inspection and Preparation

6.1 *Inspections:*

6.1.1 Inspect the roof, walls, ceilings, and floors to identify areas where previous or existing moisture problems have caused paint peeling, warpage, stain, visible fungus growth, rotting, or other structural damage. Do not apply IRCCS in such areas until the owner has been informed and has certified these conditions have been corrected and the source(s) eliminated.

6.1.2 In areas where the IRCCS is to be applied, components of the electrical system shall be in good condition. When there is reason to believe the electrical system is faulty, do not apply the IRCCS in such areas until the owner has been informed and qualified inspection and repair have been performed.

NOTE 1—The CPSC Guide to Home Wiring Hazards has identified the following signs of potential electrical deficiencies: lights dimming, fuses blowing, circuit breakers tripping frequently, electrical sparks and glowing from receptacles, light flickering, and cover plates on switches and outlets that are warm or hot to the touch. Useful safety information is also contained in the NFPA 54 and NFPA 211.

6.1.3 In areas where an IRCCS is to be applied, the applicator shall locate and plan the application around ventilation openings. The applicator shall not apply the IRCCS in a way that will plug or otherwise obstruct existing ventilation openings.

6.1.4 All inspections for wood grade stamps must be complete before application of the product.

6.2 *Preparations:*

6.2.1 All electrical wiring at or near the IRCCS application surfaces shall be protected to ensure that the IRCCS material cannot contact the electrical wiring system.

6.2.2 Where attic ventilation is compromised by the installation of an IRCCS or the subsequent application of fibrous insulation, vent baffles shall be installed at the soffits of the attic such that attic ventilation airflows are maintained in accordance with applicable building codes.

6.2.3 All materials shall be mixed for at least 2 min immediately before spraying. The instructions provided by the manufacturer shall be consulted for type of mixing equipment and mixing methods to be employed. When material is to be sprayed from a pressure pot, the pot shall be equipped with an air driven agitator.

7. Installation Guidelines

7.1 *Material Handling:*

7.1.1 The IRCCS materials shall be applied, handled, and stored in accordance with manufacturer's instructions.

7.1.2 The IRCCS materials shall not be applied in direct contact with corrosive building materials.

7.2 *Performance Considerations:*

7.2.1 The performance of the IRCCS depends on adherence to the installation instructions provided by the manufacturer. The installation instructions and local building codes shall be followed. The manufacturer shall provide product sheet(s) that specify the product's intended use(s), application method(s), health and safety considerations, and material properties to include: (*1*) the IRCCS surface emittance determined in accordance with Test Method C1371; (*2*) the applied material water vapor transmission rate, in accordance with Test Methods E96/E96M and; (*3*) the applied material surface burning characteristics in accordance with Test Method E84.

7.2.2 The performance of the IRCCS is dependent on the maintenance of an open airspace facing the low emittance surface.

7.2.3 The performance of the IRCCS are affected by foreign materials on the low emittance surface. After application, foreign materials shall be removed using manufacturer's instructions, taking care not to damage the IRCCS surface.

7.2.3.1 Some IRCCS will provide a high resistance to water vapor transmission. An IRCCS shall not be applied so as to lead to moisture accumulation and deterioration in the structure.

7.2.4 All roof support structure directly connected to the roof deck (such as purlins, rafters, and top chord of trusses) shall be coated on any exposed surface.

7.3 *Post-installation*—The applicator shall provide a signed and dated statement describing the IRCCS applicator, installed in accordance with Practice C1321 and the area covered.

8. Keywords

8.1 low emittance; paint—high reflectance; paint—high temperature; paint—low emittance; paint—spray-applied; radiation; radiation control coating; radiation control coating—interior