Designation: C 1015 – 99

Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation[1]

This standard is issued under the fixed designation C 1015; 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 describes procedures for the installation of cellulosic and mineral fiber loose-fill insulation in ceilings, attics, and floor and wall cavities of new or existing housing and other framed buildings.

1.2 This practice applies only to the installation of dry loose-fill thermal insulation consisting of cellulosic materials or mineral fiber by pneumatic or pouring application.

1.3 This practice covers the installation process from pre-installation inspection through post-installation procedure. It does not cover the production of the insulation materials.

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

1.5 This practice assumes that the installer possesses a good working knowledge of the applicable codes and regulations, safety practices, tools, equipment, and methods necessary for the installation of thermal insulation materials. It also assumes that the installer understands the fundamentals of residential construction that affect the installation of insulation.

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

1.7 *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.* For specific precautionary statements, see Section 5.

2. Referenced Documents

2.1 *ASTM Standards:*

C 168 Terminology Relating to Thermal Insulating Materials[2]

C 739 Specification for Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation[2]

C 755 Practice for Selection of Vapor Retarders for Thermal Insulation[2]

C 764 Specification for Mineral Fiber Loose-Fill Thermal Insulation[2]

E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C[3]

2.2 *NFPA Standards:*

NFPA 31 Standard for Oil Burning Equipment[4]

NFPA 54 National Fuel Gas Code[4]

NFPA 70 National Electrical Code[4]

NFPA 211 Standard for Chimneys, Fireplaces, Vents and Solid-Fuel Burning Appliances[4]

2.3 *HUD Standard:*

Minimum Property Standards (MPS) for Housing, 1994 Edition[5]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard: Definitions*—For definitions of terms used in this practice, see Terminology C 168.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *installer*—the person or persons who apply thermal insulation materials in residential buildings whether or not such person or persons have contracted with the owner to perform the work.

3.2.2 *cellulosic loose-fill thermal insulating materials*—those materials that meet the minimum requirements specified in Specification C 739.

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

3.2.4 *mineral fiber loose-fill thermal insulating materials*—those materials that meet the minimum requirements specified in Specification C 764.

3.2.5 *owner*—the person, partnership, corporation, agency, or other entity who owns the residential building to be insulated 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.

3.2.6 *residential building*—a building used for residential

[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] *Annual Book of ASTM Standards*, Vol 04.07.

[4] Available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

[5] Available from the Department of Housing and Urban Development, 451 Seventh St. NW, Washington, DC 20410.

occupancy and that has a mechanical or electrical system for heating or for cooling, or for both.

3.2.7 *vapor retarder*—a material (membrane or paint) that has a water vapor permeance (perm) rating of 5.7 kPa·s·m^2 (1 perm) or less as defined in Practice C 755.

4. Significance and Use

4.1 This practice recognizes that effectiveness, safety, and durability of insulation depend not only on the quality of the insulating materials, but also on their proper installation.

4.2 Improper installation of insulation can reduce its thermal effectiveness, cause fire risks and other unsafe conditions, and promote deterioration for the structure in which it is installed. Specific hazards that can result from improper installation include fires caused by (*1*) heat build-up in recessed lighting fixtures, (*2*) deterioration or failure of electrical wiring components, and (*3*) heat build-up resulting from overcurrent protection devices incorrectly matched to wiring; or deterioration in wood structures and paint failure due to moisture accumulation.

4.3 This practice provides general procedures that will help ensure the installation of insulation in a safe and effective manner. It must be noted that actual conditions in existing buildings vary greatly, and in some cases substantial additional care and precaution must be taken to ensure effective and safe installation.

5. Safety Precautions

5.1 All pneumatic equipment shall be operated in accordance with the recommended operating and safety procedures of the equipment manufacturer and the insulation manufacturer.

5.2 The installer shall wear proper clothing and equipment as recommended by the insulation manufacturer. If in doubt of the effects of the insulation, protective clothing, gloves, eye or breathing protection, or all, should be worn.

NOTE 1—For breathing protection use a NIOSH/MSHA approved disposable dust respirator such as a 3M model #8710 or #9900 or equivalent.

5.3 In areas where insulation will be installed, components of the electrical system shall be in good condition. If the electrical system is faulty, proper inspection and repair shall be accomplished before installation of the insulation.

NOTE 2—The Consumer Product Safety Commission[6] has identified the following signs of potential electrical deficiencies: Lights dimming, fuses blowing, circuit breakers tripping frequently, electrical sparks, and" glowing" from receptacles, lights flickering; and coverplates on switches and outlets that are warm or hot to the touch.

6. Pre-Installation Preparation

6.1 In the areas where insulation will be installed, the installer should locate and plan for subsequent blocking around recessed lighting fixtures, motors, fans, blowers, heaters, flues, chimneys, and other heat-producing electrical or mechanical devices.

6.1.1 Install blocking, such as wood, metal, or unfaced mineral wool batts, securely fastened in place around all heat-producing devices to exclude loose fill insulation and permanently maintain the clearances specified in 6.1.2 and 6.1.3, or the exception in 6.1.4. Install all required blocking at least as high as the height of the finished insulation and in a manner that ensures that all devices that require maintenance or servicing remain accessible after the insulation is installed.

6.1.2 Install blocking to provide a 3-in. (75-mm) minimum clearance around all sides of recessed lighting fixtures, unless such fixtures are approved for installation in direct contact with insulation (IC rated), including fixture wiring compartments and ballasts, and other heat-producing devices not covered in 6.1.3. The open area above these devices must not be covered, in order to allow free air circulation unless they are specifically approved devices for operation when covered with thermal insulation (see 410-66, NFPA 70, National Electric Code).

6.1.3 Do not place insulation in air spaces surrounding metal flues, chimneys or fireplaces. Provide the minimum clearances specified in NFPA-31, NFPA-54 or NFPA-211 or as required by local building codes.

6.1.4 Inspect the roof, walls, ceilings, and attic floors to identify areas where previous or existing moisture problem has caused paint peeling, warpage, stain, visible fungus growth, rotting, or other structural damage. Insulation should not be installed in such areas until the owner has been informed and these conditions have been corrected and their source(s) eliminated.

6.1.5 The installer shall block all openings in ceilings, floors, and sidewalls through which the insulating material may escape. Block all wall cavities that open into a basement or crawl space before wall insulation is installed.

6.1.6 Proper attic ventilation and the use of vapor retarders shall be provided before installation in accordance with building requirements or practices.

NOTE 3—HUD Minimum Property Standards states the following attic ventilation requirements: Ratio of total net free ventilating area to area of ceiling shall be not less than 1/150, except the ratio may be 1/300 provided: (*1*) a vapor retarder having a transmission rate not exceeding 1 perm is installed on the warm side of the ceiling or (*2*) at least 50 % of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated with the balance of the required ventilation provided by eave or cornice vents.

When the attic has soffit vents at the eaves, rigid blocking shall be installed to restrain loose-fill insulation from clogging the vents, thus restricting attic ventilation. Blocking shall be installed to ensure free movement of air through soffit vents into the attic.

[6] CPSC Product Safety Fact Sheet No. 18, "The Home Electrical System," available from the Consumer Product Safety Commission, 1111 Eighteenth St. NW, Washington, DC 20207.

7. Procedure

7.1 *Installation*:

7.1.1 The insulation material shall be handled in accordance with manufacturer's instructions and should be kept free of extraneous materials. The materials should be kept dry and should not be in contact with the ground or other sources of water.

7.1.2 The application of insulation in attics should be uniform covering all areas to be insulated and to provide the required *R*-value in accordance with the manufacturer's coverage chart, to assure both proper minimum insulation weight per square foot and minimum thickness.

7.1.3 Enclosed cavities should be filled to rejection of the material to ensure that cavity is free of voids and that the proper amount is installed in accordance with the manufacturer's coverage chart.

7.1.4 For pneumatic installation, use only equipment compatible with the insulation material, and operate the equipment in accordance with the manufacturer's instructions.

7.1.5 In pouring applications, install insulation in accordance with the manufacturer's recommended coverage.

7.2 *Post-Installation*:

7.2.1 Inspect the coverage and depth of the insulation. Fill all pockets and voids in the insulation. Level insulation in a manner that will not damage wiring or any other items. Turn off the electric power and clear all electric wall outlet boxes and switch boxes of any insulation material. Check all baffles and vents for insulation accumulation. Remove all temporary blockings that were installed over vent openings in attics.

7.2.2 The installer must provide a signed and dated statement describing the insulation installed, stating thickness, coverage area, *R*-value, and number of bags used or pounds installed (see Trade Regulation Rule 16 CFR 460, Labeling and Advertising of Home Insulation[7]).

8. Keywords

8.1 cellulose; installation; light frame construction; loose fill; mineral fiber

[7] Federal Register, Vol 45, No. 160, Aug. 15, 1980.