



Designation: C 1049 – 85 (Reapproved 1995)^{ε1}

Standard Practice for Installation of Granular Loose-Fill Thermal Insulation¹

This standard is issued under the fixed designation C 1049; 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.

ε¹ NOTE—Keywords were added editorially in May 1995.

1. Scope

1.1 This practice describes procedures for the installation of granular loose-fill insulation in ceilings, attics, 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 granular materials such as perlite and vermiculite 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 These procedures are 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 *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 safety procedures are contained in Section 5.

2. Referenced Documents

2.1 ASTM Standards:

C 168 Terminology Relating to Thermal Insulating Materials²

C 516 Specification for Vermiculite Loose-Fill Thermal Insulation²

C 549 Specification for Perlite Loose-Fill Insulation²

C 755 Practice for Selection of Vapor Retarders for Thermal Insulation²

E 136 Test Method for Behavior of Materials in a Vertical

Tube Furnace at 750°C³

2.2 NFPA Standards:

NFPA 31 Standard for the Installation of Oil Burning Equipment⁴

NFPA 54 National Fuel Gas Code⁴

NFPA 70 National Electric Code⁴

NFPA 211 Standard for Chimneys, Fireplaces and Vents⁴

2.3 Other Documents:

16 CFR 460 Federal Trade Commission Trade Regulation Rule; Labeling and Advertising of Home Insulation⁵

HUD Minimum Property Standards (MPS) for One- and Two-Family Dwellings⁶

CPSC Product Safety Fact Sheet No. 18 "The Home Electrical System"⁷

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms relating to thermal insulation refer to Terminology C 168.

3.2 Definitions of Terms Specific to This Standard:

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

3.2.3 *granular loose-fill thermal insulating materials*—those materials that meet the minimum requirements set forth in Specifications C 516 or C 549.

3.2.4 *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.

3.2.5 *residential building*—any building used for residential occupancy and which has a mechanical or electrical system for

³ Annual Book of ASTM Standards, Vol 04.07.

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

⁵ Federal Register, Vol 45, No. 160, Aug. 15, 1980.

⁶ Available from Department of Housing and Urban Development, 451 7th St. N.W., Washington DC 20410.

⁷ Available from U.S. Consumer Product Safety Commission, Washington DC 20207.

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.

heating or cooling, or both.

3.2.6 *vapor retarder*—any material (membrane or paint) that has a water vapor permeance (perm) rating of 57 ng/(Pa·s·m²) (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 and workmanlike 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 heat buildup in recessed lighting fixtures, deterioration or failure of electrical wiring components, and heat buildup 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 to 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. Protective clothing, gloves, and eye or breathing protection, or both, should be worn if there is any doubt about the effects of the insulation.

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

NOTE 1—The CPSC Product Safety Fact Sheet No. 18 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 Inspection and Preparation

6.1 In the areas where insulation is to be installed, the installer shall 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 all devices that require maintenance or servicing remain accessible after the insulation is installed.

6.1.2 Install blocking to provide a 3-in. minimum clearance around all sides of recessed lighting fixtures, unless such fixtures are approved for installation in direct contact with insulation, 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.

6.1.3 Install blocking around gas-fired appliances to provide the minimum clearances specified in NFPA-54. Install blocking around oil-fired appliances to provide the minimum clearances specified in NFPA-31. Install blocking around masonry chimneys or masonry enclosing a flue to provide a minimum 2-in. (50-mm) clearance from the outside face of the masonry. Install blocking around vents, chimney, and vent connectors and chimneys other than masonry chimneys to provide the minimum clearances specified in NFPA-211.

6.1.4 When installing granular insulation, which in addition to meeting all requirements specified in 3.2.3 also has successfully passed Test Method E 136, the blocking and airspace around vents and chimneys need not be provided unless specifically required by local building codes.

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

6.1.6 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.

6.1.7 Provide proper attic ventilation and the use of vapor retarders prior to installation in accordance with building requirements or practices (Note 2). When the attic has soffit vents at the eaves, install rigid blocking to restrain loose-fill insulation from clogging the vents, thus restricting attic ventilation. Install blocking in such a way as to ensure free movement of air through soffit vents into the attic.

NOTE 2—The Department of Housing and Urban Development 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 the following: (a) A vapor retarder having a transmission rate not exceeding one perm is installed on the warm side of the ceiling, or (b) 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.

7. Installation Procedures

7.1 Handle the insulation material in accordance with the manufacturer's instructions and keep the material free of extraneous materials. Keep the materials dry and not in contact with the ground or other sources of water.

7.2 Apply the insulation uniformly in attics covering all