



CIMA Technical Bulletin: Standard Practices for Installation

Cellulose insulation can be installed in attics, walls, ceilings, and other building assemblies using a variety of standard accepted techniques. This guide covers typical assembly designs and some of the more common installation methods that can be used to insulate new and existing residential structures.

About Cellulose

Cellulose building thermal insulation is a recycled product made from recovered newsprint and other paper fibers.

Dry loose-fill cellulose insulation is installed in attics and walls with pneumatic blowing machines. Existing walls may be insulated by blowing insulation in through access holes. The holes may be at the top, bottom, and either inside or outside the building. A variety of methods are used to insulate new walls with dry cellulose. Techniques include using jigs or forms to fill open face cavities prior to installation of sheetrock. Various types of permanent retainers are also used in walls, crawl spaces, or cathedral ceilings.

Cellulose insulation spray-applied in damp form is a self-supporting material. It relies on water, adhesive, or a combination of both to build bond strength to a substrate and within itself. Spray-on products may be used in wall cavities (fully open and dried before covering) or on other suitable exposed wall or overhead surfaces.

1. SCOPE

- a. This recommended practice covers the application of cellulosic loose fill thermal insulation in attics, sidewall cavities and between floors of single and multi-family dwellings by means of pneumatic equipment and by pouring in place in attics.

2. SIGNIFICANCE

- a. The purpose of this recommended practice is to inform installers, system designers and consumers of acceptable procedures to insure proper installation. It also identifies precautions which need to be taken.

3. APPLICABLE DOCUMENTS

- a. ASTM Standards
 - i. C168 *Standard Definition of Terms Relating to Thermal Insulating Materials*
 - ii. C739 *Standard Specification for Cellulosic*

Fiber (Wood Base) Loose Fill Thermal Insulation

- iii. C755 *Standard Recommended Practice for Selection of Vapor Barriers for Thermal Insulation*
- iv. C1149 *Standard Specification for Self-Supported Spray Applied Cellulosic Thermal/Acoustical Insulation*
- v. C1015 *Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation*
- vi. E241 *Standard Recommended Practice for Increase Durability of Building Constructions Against Water Damage*
- b. Federal Regulations
 - i. 16 CFR Part 1209 Consumer Products Safety Commission Interim Safety Standard for Cellulose Insulation
 - ii. 16 CFR Part 460 FTC Trade Regulation Rule, Labeling and Advertising of Home



Insulation

4. DEFINITIONS

- a. Backer board: a rigid, non-vapor barrier forming material such as rock lath, treated cardboard, plywood, etc. which is used to cover the open side of an existing wall and forms a cavity which may be filled with loose fill insulation. It must have sufficient strength to withstand the pressure developed when filling the cavity.
- b. Blocking: a material used to retain the insulation in place in open areas.
- c. Fill tube: a tube which enables a cavity to be filled through a single-entry hole.
- d. Enclosed ceiling cavities: a ceiling area which is covered on both top and bottom.

5. PRELIMINARY INSPECTION

- a. An inspection of the building should be made prior to installation. Special consideration should be given to the following areas:
 - i. Holes in ceilings or sidewalls, that would allow the insulation to escape, should be sealed.
 - ii. Weak areas of interior walls that may not be able to withstand pressures during the filling operation, should be reinforced or filled using less pressure.
 - iii. Walls with alterations, such as built-in bookshelves and cabinets, which may create isolated cavities, will require special entry holes.
 - iv. Wall cavities, which are used as air ducts for heating or air conditioning systems, must not be filled with insulation.
 - v. Openings in heating or air conditioning air systems, in insulated areas, must have blocking placed around them but not restricting air flow.
 - vi. Wall cavities, which open into basements or crawl spaces, must be sealed.
 - vii. The external siding of existing buildings should be inspected for paint peeling or other evidence of moisture problems. Insulation alone may not solve such problems. Other remedial actions may be

necessary. (See Sections 9 and 10 for steps to be followed.)

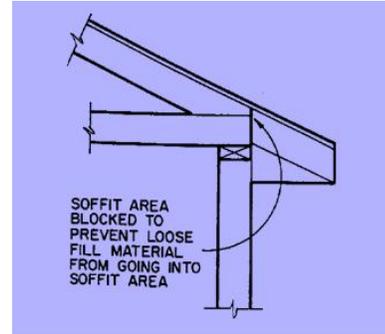


Figure 1A

6. PREPARATION

- a. New Construction
 - i. Where individual vents are used in the soffit, the rafter space immediately in front of and on either side of the vent should be provided with an air chute (see Fig. 1A and Fig. 1B). Other spaces should be totally blocked.
 - ii. Where a continuous strip vent is used in the soffit, an air chute should be provided every third rafter space with the other spaces completely blocked (see Fig. 1A and Fig. 1B).
 - iii. Small cavities around door and window frames should be insulated prior to the installation of the interior covering. The material should not be forced into the cavity so tightly that frames are distorted.
 - iv. Insulating the corners of attics in buildings with hip roofs may require special nozzles or placement tools.

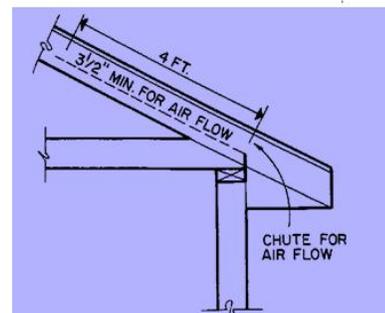


Figure 1B



- v. Alternately, corners can be insulated with suitable insulation before the drywall or plasterboard is installed. Any other areas inaccessible after the interior finish is installed must be handled in like manner.
- b. Existing Structures
 - i. In joist areas, where soffit vents are installed, the opening from the attic into the soffit area may be blocked by batt type insulation between and at the ends of the joists (See Figure 2). Insulation should not totally fill the space between ceiling and roof. There should be a 1 inch (2.54 cm) opening next to the roof for ventilation from the soffit area. Or a chute may be installed per Section 6.0 and Figure 1B.
- c. New and Existing structures
 - i. Blocking should be placed around access to the attic to prevent insulation from falling out.

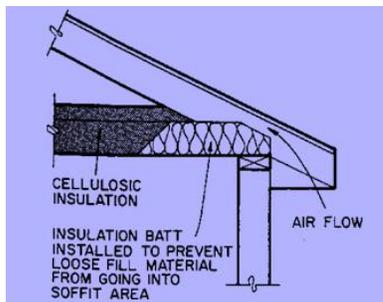


Figure 2

- ii. Blocking should be placed around recessed light or heating fixtures, chimneys and flues. Clearance between heat producing elements and combustible construction should follow applicable codes.
- iii. Blocking should be permanently placed so as to keep insulation a minimum of three inches away from all sides of recessed lighting fixtures and other heat-producing devices.
- iv. The open area above recessed lighting fixtures and other heat-producing devices should not be insulated per the

- National Electrical Code.
- v. Cabinet bulkheads, stairway wells and wall cavities which open into the attic should be covered by backer board to support the insulation. (See 4.1)
- vi. The open side of any wall between a heated and unheated area should be covered by backer board to form a cavity to retain loose fill material (see Figure 3).

7. COVERAGE REQUIREMENTS

- a. When installing insulation, care should be taken not to exceed the square foot coverage shown on the label. The labeled thickness is the minimum thickness required for a given R-value. The initial installed thickness in ceiling applications will exceed the settled thickness shown on the coverage chart. The bag count and weight-per-square-foot requirements of the coverage chart must be followed to provide the specified R-value at settled density.

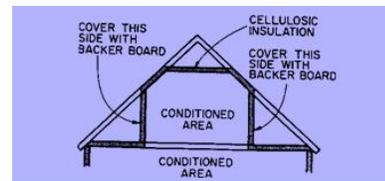


Figure 3

8. APPLICATION PROCEDURES

- a. Ceiling Areas
 - i. Accessible Ceilings: When installing insulation by pneumatic means, it is important that the application machine be set as recommended by the machine manufacturer.
 - ii. Enclosed Ceiling Cavities: Installations of this type must be made by pneumatic means and the cavity should be completely filled. This is done by inserting a fill tube into each cavity and withdrawing it as the cavity is filled. The air setting on the machine should be set as recommended by the machine manufacturer for sidewall application. Coverage will be proportional to that



shown on the manufacturer's coverage chart under sidewalls, depending on the cavity size.

b. Sidewalls (Existing Buildings)

i. Installation into sidewall cavities must be made by pneumatic means. The air setting on the machine should be set as recommended by the machine manufacturer according to the size nozzle being used. After fill holes are drilled, all cavities should be checked for fire blocks or other obstructions with an electrician's fish tape or other similar tool. A mathematical check should be made in the first few stud space to assure that the proper amount of insulation is being installed (See Manufacturer's Coverage Chart).

ii. Filling through external siding in applications of this type, the following procedure is recommended. Drill holes 5/8 inch to 2 inches (1.59 to 5.08 cm) in diameter, depending on the siding, in each wall cavity. Vertical distance between the holes and top or bottom plate should not exceed 2 feet (.62 m) and the vertical distance between holes should not exceed 5 feet (1.52 m). Homes with shingle or lapped siding should have the holes drilled as near the shadow line as possible. Homes with brick veneer should have holes 5/8 inch to 3/4 inch (1.59 to 1.9 cm) in diameter drilled in the mortar joints. All holes should be filled with suitable plugs. (See Figure 4).

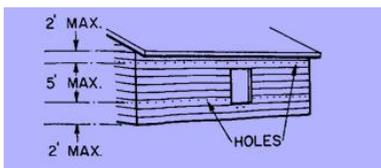


Figure 4

iii. Filling with fill tube in some applications is desirable. When using this method, only one entry hole per cavity is necessary. The fill tube should be inserted far

enough to reach within 18 inches (45.72 cm) of the plate farthest from the point of entry. Fill tube size will depend upon the size of hole which can be drilled. (See Figures 5A and 5B for alternate points of entry for the fill tube.)

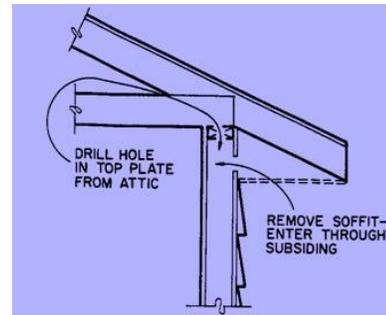


Figure 5A

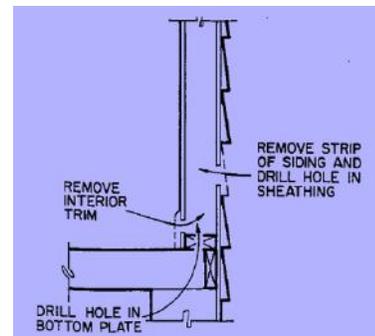


Figure 5B

c. Sidewalls (New Construction)

i. The same installation techniques used with existing walls are occasionally employed in new construction, however insulation is usually installed in new walls before the walls are closed using spray-on or dry application techniques.

ii. The insulation is sprayed into the wall cavities from inside the building. Many application systems are proprietary and are designed for use with specific products. Manufacturer's instructions regarding application equipment and its use should be followed explicitly, as should the manufacturer's instructions on the amount of liquid to be added during application. All pipes, ducts,



conduits, wiring, and outlets should be installed in the wall before the insulation is applied. Windows and areas from which insulation is to be excluded, such as electrical boxes, should be masked.

- iii. After application the insulation is made even with the stud faces by a "stud scrubber." The wall can be closed shortly after installation of the insulation, however vapor retardant material, such as some types of paint and vinyl wallcoverings, should not be applied to the inner surface of the wall until the insulation has reached moisture equilibrium. Most authorities agree that vapor retarders of any type should not be used with spray-applied cellulose. This recommendation may conflict with some building codes, but knowledgeable code officials understand the special nature of spray-on cellulose and normally grant exceptions when the material is used.
- iv. A CIMA guideline for installation of cellulose wall cavity spray is available from CIMA or the Insulation Contractors Association of America.
- v. Various types of permanent retainer systems are used to install dry cellulose insulation in new walls. All systems are proprietary, and the manufacturers provide detailed instructions, and often special training programs, for their use. All systems require pneumatic installation and compression of the material to sufficient density to prevent settlement. The Insulation Contractors Association of America recommends a density of 1.5 times nominal settled density for side wall installations. Some manufacturers recommend an installed density of at least 3.5 PCF in side walls.
- vi. Dry cellulose insulation can be installed in new walls using temporary retainers that are clamped in place to create a closed cavity. Insulation is blown into the temporary cavity at sufficient density to keep it in place when the retainer is

removed. An installed density of 3.5 to 4.0 PCF may be necessary.

9. VAPOR RETARDERS

a. New Construction

- i. Many building scientists question prescriptive use of vapor retarders, however some building codes continue to require a vapor retarder on the warm side of insulated walls. Most cellulose manufacturers recommend against use of vapor retarders in walls insulated with spray-applied cellulose. CIMA is not aware of any endemic problems resulting from this practice.
- ii. A vapor retarder is not required under attic insulation when the attic is adequately ventilated. A vapor retarder must be used when the cold side of a ceiling cannot be ventilated (See Section 10.0 for Ventilation)
- iii. A ground surface vapor retarder such as plastic film is recommended when there is a crawl space beneath the floor. (See Section 10.0 for Ventilation)

b. Existing Construction

- i. Most cellulose producers regard vapor retarders as unnecessary with dense-pack cellulose under most conditions in the United States. Check your local building codes to see if an air barrier and/or vapor barrier is required.
- ii. A ground surface vapor retarder, such as plastic film, is recommended when there is a crawl space beneath the floor. (See Section 10.0 for Ventilation)

10. VENTILATION

a. Attic Ventilation

- i. In vented attics without vapor retarders standard practice is to provide one square foot (.093 m²) of net vent area for each 150 square feet (13.94 m²) of ceiling area.
- ii. In vented attics with vapor retarders standard practice is to provide one square foot (.0903 m²) of net vent area



for each 300 square feet (27.87 m²) of attic floor area.

- iii. When using a combination of roof and eave vents, and no ceiling vapor barrier, there should be 1 square foot (.093 m²) of net vent area for each 300 square feet (27.87 m²) of ceiling area. Vents should be installed with 50% of the total area in the eaves and 50% of the total area in the roof near the peak.

11. PRECAUTIONS AND LIMITATIONS

- a. Heaters and recessed light fixtures must not be covered by the insulation, unless the fixture has an IC rating. Local and national codes must be followed if applicable. A minimum of 3 inches (7.62 cm) of air space must be maintained between fixtures and the blocking.
- b. Cold air returns and combustion air intakes for hot air furnaces must not be blocked or insulation be installed in a manner which would allow it to be drawn into the system.
- c. Insulation must not contact chimneys or flues. A minimum of 3 inches (7.62 cm) of air space must be maintained with blocking used to retain the insulation.
- d. The homeowner should be advised that in tightly constructed homes or when insulating existing homes which have fuel fired heating

systems within the living area or basement, an air duct must be installed between the furnace room and a well ventilated outside area to provide combustion air. A local heating contractor should be contacted for proper duct size and installation.

- e. The homeowner should be advised that the relative humidity within the living area should be kept below 40% R.H. when outside temperatures fall below 32 degrees F. (0 degrees C.)
- f. This insulation is not recommended for use in sidewalls below grade.
- g. This insulation is not recommended for filling the cavities of masonry walls.
- h. This insulation is to be used in the temperatures range of -50 degrees F. to 180 degrees F. (-45.6 degrees C to 82.2 degrees C.)
- i. The installer must wear appropriate respiratory protective equipment.
- j. Installers and specifiers are advised to refer to other relevant documents, including the National Electrical Code, ASTM Standard Designation C1015, CIMA Technical Bulletin #1 Cellulose Insulation: Codes, Regulations, and Specifications, and CIMA Technical Bulletin #3 Standard Practice for the Installation of Sprayed Cellulose Wall Cavity Insulation, for additional information.

For more information on cellulose insulation, visit
www.cellulose.org