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MOUNTAIN FIBER
INSULATION, INC.

Attic Manual

Mountain Fiber Low Dust Cellulose

1.0 SCOPE
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.

2.0 SIGNIFICANCE
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.

3.0 APPLICABLE DOCUMENTS
3.1 ASTM Standards
C-168 *Standard Definition of Terms Relating to Thermal Insulating Materials*
C-739 *Standard Specification for Cellulosic Fiber (Wood Base) Loose Fill Thermal Insulation*
C-755 *Standard Recommended Practice for Selection of Vapor Barriers for Thermal Insulation*
C-1149 *Standard Specification for Self-Supported Spray Applied Cellulosic Thermal/Acoustical Insulation*
C-1015 *Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation*
E-241 *Standard Recommended Practice for Increase Durability of Building Constructions Against Wear Damage*

4.0 DEFINITIONS
4.1 Backer Board – a rigid, non vapor barrier forming material such as rock lath, treated cardboard, plywood, ect.
4.2 Blocking – a material used to retain the insulation in place in open areas.
4.3 Fill Tube – a tube which enables a cavity to be filled through a single entry hole.
4.4 Enclosed Ceiling Cavities – a ceiling area which is covered on both top and bottom.

5.0 PRELIMINARY INSPECTION
5.1 An inspection of the building should be made prior to installation. Special consideration should be given to the following areas.
5.1.1 Holes in ceilings or sidewalls, that would allow the insulation to escape, should be sealed.
5.1.2 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.
5.1.3 Walls with alterations, such as build-in bookshelves and cabinets, which may create isolated cavities, will require special entry holes.
5.1.4 Wall cavities, which are used as air ducts for heating or air conditioning systems, must not be filled with insulation.
5.1.5 Openings in heating or air conditioning air systems, in insulated areas, must have blocking placed around them but not restricting air flow.
5.1.6 Wall cavities, which open into basements or crawl spaces, must be sealed.
5.1.7 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)

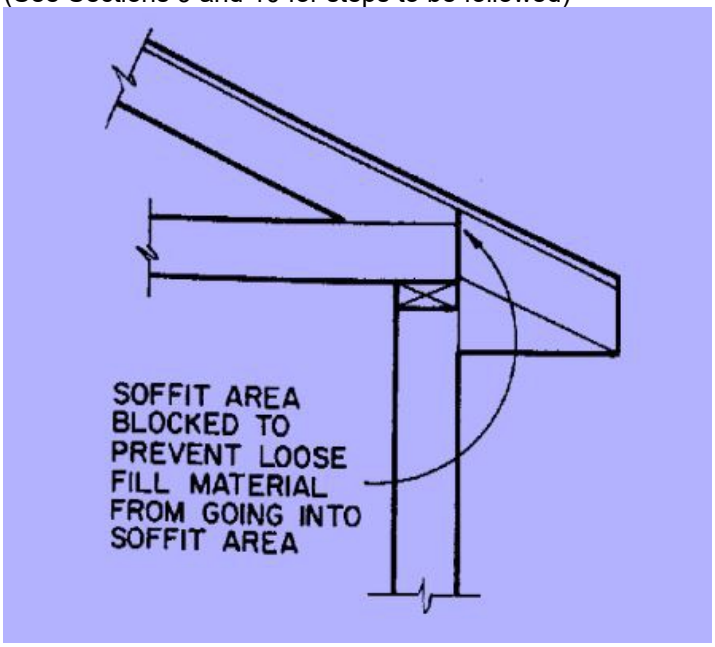

Figure 1A

6.0 PREPERATION
6.1 New Construction
6.1.1 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.
6.1.2 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).
6.1.3 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 tight that frames are distorted.
6.1.4 Insulating the corners of attics in buildings with hip roofs may require special nozzles or placement tools.

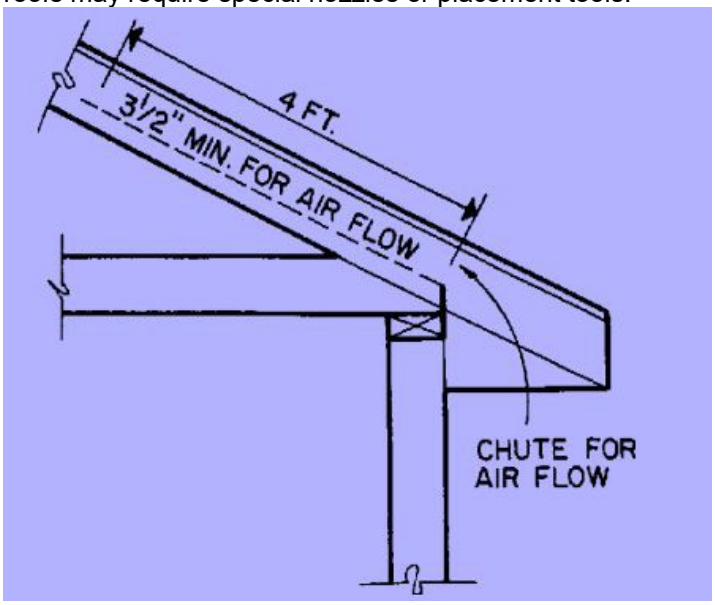

Figure 1B
Alternately, corners can be insulated with suitable

insulation before the drywall or plasterboard is installed. Any other areas inaccessible after the interior finish is installed must be handled in like manner.

6.2 Existing Structures

6.2.1 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 Fig 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.

6.3 New and Existing Structures

6.3.1 Blocking should be placed around access to the attic to prevent insulation from falling out.

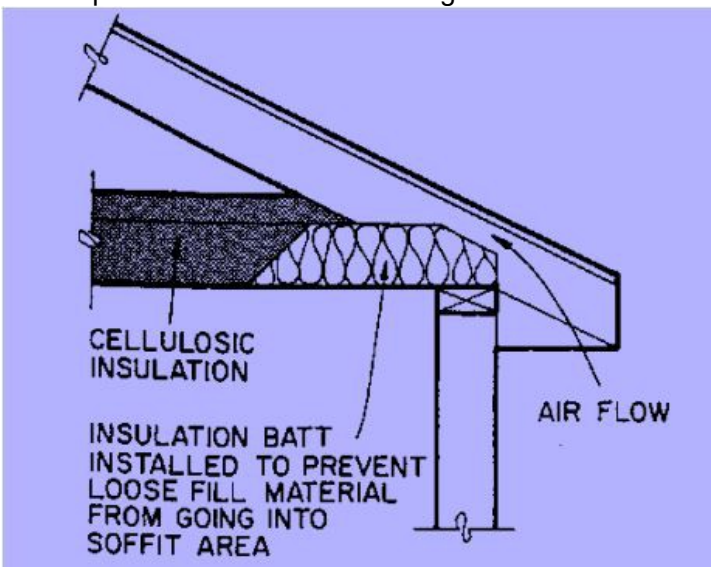

Figure 2

6.3.2 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. 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 should not be insulated per the National Electrical Code.

6.3.3 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).

6.3.4 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 Fig 3).

7.0 COVERAGE REQUIREMENTS

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.

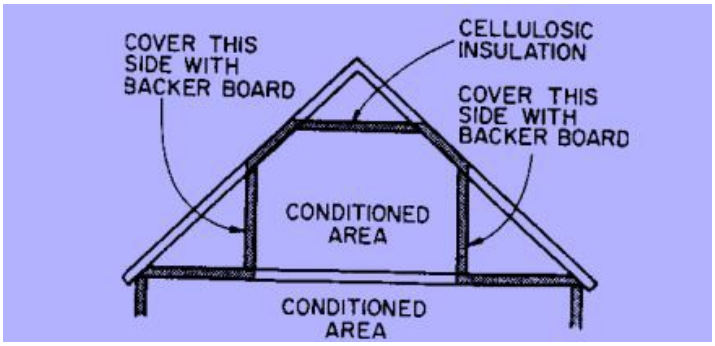

Figure 3

8.0 APPLICATION PROCEDURES

8.1 Ceiling Areas

8.1.1 Accessible Ceilings

When installing insulation by pneumatic means, it is important that the application machine be set as recommended by the machine manufacturer.

8.1.2 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. With cathedral ceilings , loose fill insulation is to be installed at or above 3.5 pounds per cubic feet (pcf).

8.2 Sidewalls (Existing Buildings)

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.

8.2.1 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 ¾ inch (1.59 to 1.9 cm) in diameter drilled in the mortar joints. All holes should be filled with suitable plugs (see Fig 4).

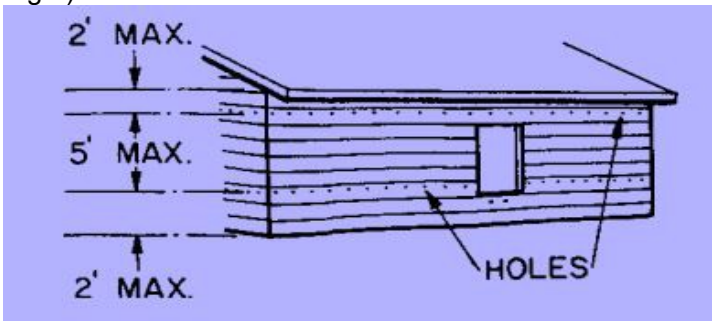

Figure 4

8.2.2 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 the hole which can be drilled. (See Figures 5A and 5B for alternate pints of entry for the fill tube.)

8.3 Sidewalls (New Construction)

The same installation techniques used with existing walls

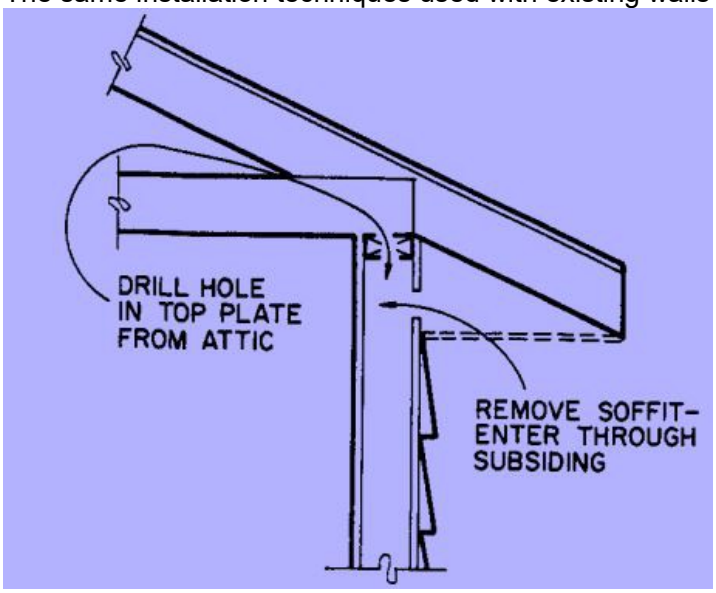

Figure 5A

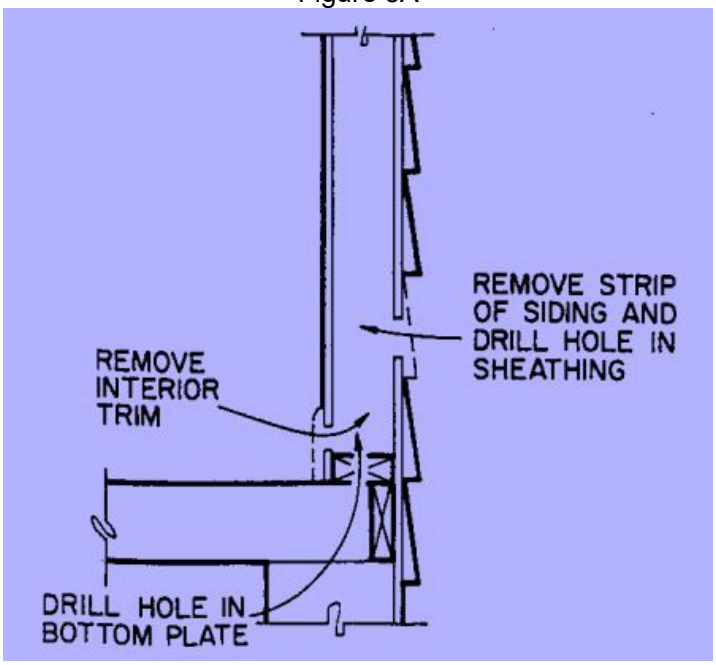

Figure 5B

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.

8.3.1 Mountain Fiber Wall Spray Insulation should only be installed by a professional insulation applicator using equipment and application procedures especially designed for this product and application. The insulation is sprayed into the wall cavities from inside the building, using a water mist to activate a dry adhesive in the insulation. Mountain Fiber Insulation's instructions with regard to application equipment and its use should be followed explicitly, as should Mountain Fiber Insulation's instructions on the amount of liquid to be used during application. All pipes, ducts, conduits, wiring, outlets, etc. 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 using duct tape. Additionally, 2 or 4 mil Polyethylene sheeting works well for covering larger, finished areas such as windows and fireplaces.

8.3.2 After application the insulation is made even with the stud faces by using a “wall scrubber”. Do not install interior finish until the insulation moisture content is within the guidelines set forth in precautions 11.9 and 11.10. For details regarding sprayed wall cavity insulation please see the *Wall Spray Manual: Mountain Fiber Cellulose Wall Spray.*

9.0 VAPOR RETARDERS

9.1 New Construction

Consult local or state building codes about the use of vapor retarders if applicable. 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 wall-spray cellulose and normally grant exceptions when the material is used. See 11.10 for precautions if required to use a vapor retarder with Mountain Fiber Insulation.

9.2 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).

10.0 VENTILATION

10.1 Attic Ventilation

10.1.1 In vented attic 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.

10.1.2 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.

10.1.3 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.

10.2 Unheated Crawl Space Ventilation

There should be 1 square foot (.093 m²) of net vent area for each 150 square feet (13.94 m²) of floor area.

11.0 PRECAUTIONS AND LIMITATIONS

11.1 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.
11.2 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.
11.3 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.
11.4 The homeowner should be advised that in tightly constructed homes or when insulation 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.
11.5 The homeowner should be advised the the relative humidity within the living area should be kept below 40% R.H. when outside temperatures fall below 32º F (0º C).
11.6 This insulation is not recommended for use in below grade exterior walls and/or floors.
11.7 This insulation is not recommended for filling the cavities of masonry walls.
11.8 Mountain Fiber Cellulose Wall Spray should only be installed by a professional insulation applicator using equipment and application procedures especially designed for this product and application. The instructions on the amount of liquid to be added and the recommended moisture content of the product during application must be followed.
11.9 When used in an enclosed cavity, adequate drying time after installation is required before covering. While many variables affect the length of the required drying time, the moisture content must be 25% or lower before enclosing the insulation if no vapor retarder is used.
11.10 The moisture content of Mountain Fiber Cellulose Wall Spray and the ambient moisture of surrounding building materials, such as framing members, must be in equilibrium prior to activation of air conditioning or prior to covering if used in conjunction with a vapor retarder. Typically moisture equilibrium will be achieved around 12% moisture content, however, moisture equilibrium must be verified at each job as ambient conditions have a profound impact on moisture content and drying times
11.11 This insulation is to be used in the temperatures range of -50º F to 180º F (-45.6º C to 82.2º C).
11.12 It is recommended that installers wear dust masks.
11.13 Installers and specifiers are advised to refer to the other relevant documents, including the National Electrical Code, ASTM Standard Designation C1015, CIMA Technical Bulletin #1 *Cellulose Insulation: Codes, Regulations, and Specifications,* and *Wall Spray Manual: Mountain Fiber Cellulose Wall Spray,* for more information.
11.14 DO NOT INSTALL WHERE TEMPERATURES MAY EXCEED 180º F.

The <u>Natural</u> Superiority of Cellulose

Higher R-per-inch values than most comparable fiber insulation materials.

Tightens buildings against air infiltration better than fiber glass insulation. A study by the University of Colorado School of Architecture and Planning found cellulose at least 36% better than fiber glass in tightening buildings.

Not subject to convective heat loss, which has been shown to reduce the actual R-value of loose-fill fiber glass insulation by 20% - 40% under winter conditions. Oak Ridge National Laboratory measured R-values as low as R-12 at an attic temperature of 9º F for an “R-19” fiber glass installation.

Less subject to installation defects that can seriously erode the installed performance of batt systems.

Increases fire resistance of walls up to 55%; fiber glass slightly decreases fire resistance.

“R” for “R” requires much less energy to produce than mineral fiber insulation, which is made in gas-fired furnaces. According to authoritative estimates it takes from 20 to 200 times more energy to make fiber glass than to produce an equivalent amount of cellulose.

Productively recycles the largest single component of the residential waste stream.

Overall, insulates homes better. Colorado University researchers reported that cellulose performs 26% better than fiber glass in temperature climates and as much as 38% better in cold climates.