



CIMA Technical Bulletin: Guide for Installation of Cellulosic Fiber Stabilized Thermal Insulation

Stabilized cellulose insulation has become a widely used material in the attics of new conventional homes and manufactured housing units. This guideline presents application practices that have been found to be appropriate for installation of stabilized cellulose insulation in open or closed attic spaces.

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 guide covers the application of Stabilized cellulosic thermal insulation in open or closed attic spaces, regardless of slope.
- b. Stabilized cellulosic thermal insulation is produced with the addition of an adhesive to loose-fill cellulosic insulation. The adhesive may be added to the insulation at the time of manufacture and, if necessary, activated by the addition of a mist of water when installed or the adhesive may be added to the insulation at the time of installation.
- c. When installing Stabilized cellulosic fiber thermal insulation, it is essential that the instructions and recommendations of the manufacturer be followed. This Guide is not intended to supersede local, state, or federal regulations.
- d. This Guide 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 guide to establish appropriate safety and health guidelines and determine the applicability of regulatory limitations prior to use.

- e. This Guide shall be superseded by an ASTM standard for installing Stabilized cellulosic thermal insulation immediately upon publication

2. PURPOSE

- a. The purpose of this Guide is to inform installers, system designers and consumers of acceptable procedures to ensure proper installation. It also identifies precautions that should be taken.
- b. This Guide is to be used only as a guide and is not intended to augment, supplant, or override instructions provided by the manufacturer or applicable installation



standards be taken.

3. APPLICABLE DOCUMENTS

- a. ASTM Standards
 - i. C168 *Terminology Relating to Thermal Insulating Materials*
 - ii. C739 *Specification for Cellulosic Fiber (Wood Based) Loose-Fill Thermal Insulation*
 - iii. C755 *Practice for Selection of Vapor Retarders for Thermal Insulation*
 - iv. C1015 *Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation*
 - v. C1149 *Specification for Self-Supported Spray Applied Cellulosic Thermal Insulation*
- 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. Stabilized cellulose: a cellulosic insulation product treated to resist settling. Stabilized cellulose is defined as a cellulosic insulation that settles by no more than 5%.
- b. Internal wetting system - a tube that varies in length and diameter with internal mounted spray tips, mounted in-line with the blowing hose near the blowing machine, and pressure regulator whose purpose is to inject a metered mist of water into the product air stream of a blowing machine. Water for an internal wetting system is normally supplied by a standard water source, garden hose or a pump system attached to a water tank.

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. Seal all vertical penetrations where

- plumbing or electrical service is located in all interior and exterior wall top plates.
- ii. Install protective blocking around recessed lighting fixtures or other heat producing devices in accordance with ASTM C1015.
- iii. Cover open electrical boxes to protect them from filling with sprayed cellulose. Remove the covering after the installation is completed (duct tape is a quick and easy covering).
- iv. Ensure that proper attic ventilation has been provided.)

6. EQUIPMENT

- a. The fiber blowing machine should be capable of generating sufficient air volume to move the activated stabilized cellulose through the desired size and length of hose. The selected machine should be capable of adjustments to the product/air volume needed to move the desired amount of material. Operate the fiber-blowing machine in accordance with the manufacturer's instructions.
- b. An internal wetting system is needed to meter a mist of water into the product air stream as a control to the fiber / water ratio. The water can be supplied by means of a pump or hose bib connection with a typical garden hose.
- c. If a pump is used, it normally should be capable of 200-300 psig with a flow rate to meet the manufacturer's recommended add-on rate (depending on the desired rate of installation, an approximate flow rate of 2 gallons per minute is sufficient). Since a sufficient amount of water is usually supplied at 140-170 psig, the pump will not be overworked and will remain serviceable for a long time. Diaphragm pumps have been found to be the best because they are durable and supply a constant pressure. Consult the material manufacturer for pump type and size needed for application.
- d. The type, diameter and length of hose will affect the water mist distribution within the product. An air stream in a semi-spiral hose



has been found to promote sufficient mixing of the water mist and dry product. A semi-spiral hose allows the material to tumble and stay in the air stream. Smooth bore hose, as compared to semi-spiral hose, does not promote as much mixing action. Generally, a minimum of 75 to 100 feet of blowing hose is required.

- e. All connecting water lines must be rated to handle the pressure generated by the pump or the hose bib connection.

7. EQUIPMENT SETUP

- a. Upon arriving at the job site, pull the hose to the farthest point to be insulated. The hose length used should be no longer than necessary with as few bends as possible. The more bends there are in the hose the slower the air stream will be which can cause plugging or blocking in the hose. Next, attach the water line to the water supply. In cold weather take the proper precautions to avoid the water supply or water supply lines freezing.
- b. Adjust the blowing machine and internal wetting system to deliver the proper fiber to water ratio according to the manufacturer's recommendations. The proper fiber to water ratio ensures that the manufacturer's recommended coverage can be achieved. Separate time trials and weighing scales can be used to determine if the proper ratio of water mist and dry product is being delivered. One technique is to determine the flow rate for each separately before allowing the combined mixture of product and water mist to be conveyed by the air stream. The first step of this technique is to determine and adjust the flow rate for dry product for the desired output rate. The second step is to determine and adjust the water mist flow rate to achieve the manufacturer's recommended water add-on ratio based on the intended dry product flow rate. The third and final step is to combine both dry material and water mist for the desired output.
- c. Most manufacturers suggest the installation

ratio between water and dry stabilized cellulose thermal insulation is less than 20%. For example, during installation, approximately six pounds of water (approximately three quarts) should be added to a 30lb bag of dry stabilized thermal insulation with the internal wetting system.

- d. Placing 25 feet of hose that is 25-30% larger in diameter than the hose immediately after the internal wetting system can reduce fiber build up due to product-flow variations.

8. SPRAYING TECHNIQUES

- a. The hose position during application is an essential part of installing stabilized cellulosic insulation. Adjust the hose position so that the insulation is blown even across the floor of the open area.
- b. Spray to the minimum depth that is recommended by the manufacturer to achieve the desired installed R-Value. Additionally, ensure that the correct amount of stabilized material has been installed in the required area. This is often accomplished by "counting the number of bags" required per the manufacturer's coverage chart. Note: Only use the manufacturer's recommended ratio of material to water. Material to water ratios different than those recommended by the manufacturer can result in less coverage than stated.
- c. Periodically disconnect the hose after the internal wetting system and clean out any buildup of wet material.
- d. Excess material not removed from the blowing equipment or hose after installation is complete can hinder or block product flow for the next installation.

9. PRECAUTIONS

- a. Unless IC-rated (insulation contact), heaters and recessed light fixtures or other heat producing devices must not be covered by the insulation. Local or Federal codes should be followed. ASTM C1015 recommends that a minimum of 3 inches of air space be maintained between a heat source and



- blocking (unless rated differently) of any type insulation.
- b. Cold air returns and combustion air intakes for hot air furnaces must not be blocked by insulation.
 - c. Insulation should not be allowed to contact

chimneys or flues. Local and federal codes should always be followed. ASTM C1015 recommends that a minimum of 3 inches of air space be maintained between a heat source and blocking (unless rated for direct contact with insulation).

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