



## CIMA Technical Bulletin: Cellulose Insulation and the International Codes

*A comprehensive body of federal regulations, private procurement specifications, building code requirements, and effective, time-proven voluntary industry standards makes cellulose insulation a building material you can buy, specify, and install with confidence.*

### 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.

### Applicable Standards

Architects, specifiers, inspectors, contractors, buyers, and occasionally even manufacturers are sometimes unsure about the laws, regulations, specifications, and standards that apply to cellulose building insulation. These requirements have been identified and met in the following federal regulations, federal procurement specifications, and industry standards:

- 16 CFR Part 1209 (The CPSC Safety Standard)
- 16 CFR Part 460 (The FTC R-Value Rule)
- ASTM C739 (Standard Specification for Cellulosic Fiber [Wood-Base] Loose-Fill Thermal Insulation)
- ASTM C1149 (Standard Specification for Self-Supported Spray Applied Cellulosic Thermal/Acoustical Insulation)
- ASTM E84 (Standard Test Method for Surface Burning Characteristics of Building Materials)

Individual tests may have additional requirements.



## **CPSC & ASTM Standards**

The minimum legal requirement for cellulose insulation is the CPSC (United States Consumer Product Safety Commission) standard, which covers four product attributes: critical radiant flux, smoldering combustion, corrosiveness, and settled density.

The CPSC standard adequately addresses safety issues, but safety -- important as it is -- is only one factor in insulation performance. The standard for loose-fill cellulose insulation accepted by the insulation industry is ASTM C739, which provides tests for R-value, odor, moisture vapor sorption, and fungi resistance, as well as critical radiant flux, smoldering combustion, corrosiveness, and settled density, the attributes covered by CPSC standard.

In addition to omitting four material characteristics that are not safety-related, the CPSC standard has not been amended since 1978. Accordingly, it does not reflect changes that have occurred since then. Most notable of these changes is widespread use of compressive packaging. To compensate for this, ASTM C739 added a pre-blow step to the settled density test procedure to reflect actual installation procedures more closely. Other than this, 16 CFR Part 1209 and C739 are essentially identical in the test procedures for their four common material characteristics. Although there is not necessarily a direct relationship, cellulose insulation conforming to ASTM C739 would also be expected to meet the requirements of 16 CFR Part 1209 and qualify as Class I material under ASTM E84.

Cellulose insulation manufacturers are entitled to claim compliance with 16 CFR Part 1209 on the basis of compliance with ASTM C739 and C1149. This authority is clearly stated in 16 CFR Part 1209.33(b), which states, in part: "A reasonable testing program may include either the tests prescribed by the standard, or any other reasonable test procedures." Since the C739 procedures are obviously "reasonable," cellulose that complies with C739 is, by definition, in compliance with 16 CFR Part 1209.

Building codes are required by the Consumer Products Safety Act to follow the CPSC standard. Thus, cellulose insulation conforming with the federal standard is approved for installation in any code jurisdiction.

## **Spray-applied Cellulose**

Cellulose insulation formulated and labeled as self-supporting, spray-applied material is legally required to conform with the CPSC safety standard for loose-fill cellulose. The CPSC procedures assure the safety of this type of cellulose insulation, but do not address all the important characteristics of the material as installed. ASTM C1149 is a more appropriate material standard.

Although many of the tests described in C1149 differ from those in C739 and the similar CPSC 16 CFR Part 1209 procedures, manufacturers are justified in claiming CPSC compliance on the basis of the C1149 methodology since the tests described in C1149 are "reasonable test procedures." ASTM C1149 covers nine material attributes: density, thermal resistance, surface burning characteristics, adhesive/cohesive strength, smoldering combustion, fungi resistance, corrosion, moisture vapor absorption, and odor. Material installed using liquid adhesive (Type I)



also has substrate deflection and air erosion characteristic requirements. Obviously, under C1149 spray-applied material is tested in the sprayed state.

Spray-applied cellulose installed in closed walls and in attics is approved for use in every code jurisdiction on the basis of conformance with the CPSC standard. Exposed spray-applied cellulose insulation may be subject to the interior finish requirements of the building codes. Cellulose insulation conforming with ASTM C1149 qualifies as a Class I or Class A interior finish as defined by all model building codes.

### **Stabilized Cellulose**

A relatively new form of cellulose is used in typically loose-fill applications but is generally considered to be a spray product. This material is sometimes referred to as "stabilized cellulose," although that term remains unofficial. It uses adhesive, which is activated by a small amount of water, to limit settling. It's normally used in attics, but may also be installed in walls, if it meets the performance requirements defined for Type II material by ASTM C1149.

Like all cellulose insulation products, stabilized cellulose must conform with the CPSC safety standard. The ASTM material standard for stabilized cellulose is C1497 (Standard Specification for Cellulosic Fiber Stabilized Thermal Insulation).

### **Installation Standards & Practices**

Loose-fill cellulose insulation, like all loose-fill insulation, should be installed in accordance with ASTM Standard C1015 (Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation).

In wall applications, standard practice is to compact loose-fill cellulose to a density that will prevent settling. CIMA recommends abiding by the industry standard of a density of at least 3.5 PCF for cellulose insulation in walls. Research has confirmed that settling is virtually nil with any cellulose insulation at densities of 3.5 PCF or higher. Specifiers do not need to compensate for settling in attics, since federal law (the CPSC standard and the FTC R-Value Rule) requires R-value and coverage data to be stated at settled density.

Specifiers, installers, and buyers need to understand that the "minimum thickness" column on cellulose coverage charts represents settled thickness, if the chart has only one thickness column. This is not done to confuse or mislead. It results from the fact that there is no accepted procedure for determining blown thickness that has been proven to correlate with the amount of material, by weight, required to yield the desired R-value. Some manufacturers provide initial installed thickness recommendations, but this is only a guideline to aid installers. The bag count and weight columns are the "official" coverage statements.

**For more information on cellulose insulation, visit  
[www.cellulose.org](http://www.cellulose.org)**