



TECHNICAL BULLETIN

CELLULOSE INSULATION AND THE
INTERNATIONAL STANDARDS & CODES

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Introduction

Cellulose building thermal insulation is made from up to 85% recycled paper and cardboard—higher than almost any other commonly used building material. Other elements in cellulose insulation include chemicals like boric acid, which is used in cellulose insulation as a flame retardant and to repel insects but found in everything from industrial to agricultural to medical products.

Cellulose insulation is the lowest embodied carbon building material commercially available. It is also the only widely accessible form of insulation that stores carbon in the product itself.¹ Our insulation gets installed in homes that see immediate effects on thermal performance and home energy costs. This ultimately benefits all homeowners who use cellulose insulation, ranging from new construction to those who take advantage of weatherization programs and conduct retrofits using the state and federal tax incentives available to them. Other characteristics of cellulose insulation include sound control, fire protection, and moisture protection. When properly installed, it can function well for decades.

Members of the Cellulose Insulation Manufacturers Association (CIMA) have written this document to serve as a tool for builders, architects, and other stakeholders to learn more about the standards and codes by which manufacturers of cellulose insulation in the United States and Canada must comply to sell their product. Purchasing cellulose insulation from a CIMA Producer Member means your insulation has met these stringent requirements.

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; note that individual tests may have additional requirements:

- 16 CFR Part 1209 (The CPSC Safety Standard)
- 16 CFR Part 460 (The FTC R-Value Rule)
- SOR/2016-177 (Cellulose Fibre Insulation Regulations - Canada Consumer Product Safety Act)
- ASTM C739 (Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation)
- ASTM C1149 (Standard Specification for Self-Supported Spray Applied Cellulosic Thermal Insulation)
- ASTM E84 (Standard Test Method for Surface Burning Characteristics of Building Materials)
- CAN/ULC-S703 Standard for Cellulose Fibre Insulation for Buildings

¹ Builders for Climate Action - Low-Rise Buildings as a Climate Change Solution. <https://www.buildersforclimateaction.org/>

Country-Specific Regulations, Codes, and Standards

United States

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.

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.

In complying with 16 CFR Part 1209, several International Code Council (ICC) Residential and Building codes are deemed to be in compliance when using cellulose insulation. Due to the fire resistive nature of the material, it is considered a Class I material, meaning it can be left exposed in occupied spaces such as basements. Cellulose insulation can also be used as a fire blocking material and adds 15 minutes to wood-framed firewall assemblies. Because cellulose insulation saves energy by reducing thermal transfer, using cellulose insulation in your walls also reduces air infiltration, further increasing its effectiveness at lowering utility bills as well as reducing the air change rate that is required by the energy code.

Cellulose insulation products manufactured in the United States are certified via evaluation reports from third-party testing laboratories.

Canada

In Canada, the minimum legal requirement for cellulose insulation is the Canada Consumer Product Safety Act (CCPSA) and its specific regulation on cellulose insulation. Similar to the United States, the regulation covers a subset of product attributes: corrosiveness, open flammability (critical radiant flux), separation of chemicals, and smoldering combustion.

The CCPSA ensures that the most critical aspects of cellulose insulation, those that are related to the safety of persons and buildings, are adequately monitored and complied with. Health

Canada monitors all cellulose insulation sold in Canada and ensures that all products meet the requirements for these four attributes.

Beyond CCPSA regulation, cellulose insulation is also covered in building codes. The national model codes, as well as all provincial codes, require cellulose insulation to comply with CAN/ULC-S703, the national standard for cellulose insulation. This standard includes requirements, in addition to those found in CCPSA, for thermal performance, moisture vapor sorption, and fungi resistance. It also contains the test method to use to determine the density of cellulose insulation upon installation.

As for certifications of cellulose insulation in Canada, the most common product evaluation organization of building materials is the Canadian Construction Materials Centre (CCMC). CCMC is part of the National Research Council of Canada and provides to manufacturers an evaluation service for materials used in buildings. A CCMC evaluation confirms compliance of a product based on third-party testing and confirming the conformity of the product to the applicable sections of the building codes. Several cellulose insulation manufacturers have published CCMC evaluations, which can be found in the CCMC Registry of Product Assessments (free registration required). Manufacturers will also typically post their CCMC evaluation on their own website.

Other entities, such as Underwriters Laboratories, also publish evaluation reports for building materials. Evaluation reports are an additional tool used to enhance confidence of building officials and the public in general in the quality of building materials.

Spray-Applied Cellulose

Cellulose insulation formulated and labeled as self-supporting, spray-applied material is 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 type 1 qualifies as a Class I or Class A interior finish as defined by all model building codes.

Stabilized Cellulose

Stabilized cellulose is another form of cellulose typically used in loose-fill applications but generally considered to be a spray product. It uses adhesive, which is activated by a small amount of water, to limit settling. 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 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.

Full installation instructions can be found within the CIMA Technical Bulletins focused on installation for the United States and Canada.

For more information on cellulose insulation, visit

www.cellulose.org