

FIBER GLASS & MINERAL WOOL

VS.

CELLULOSE INSULATION:

COMPARING THE FACTS



NO MATTER WHAT the building challenge, fiber glass and mineral wool insulation have the product variety, application flexibility and value to help satisfy every job's demands. When compared with cellulose insulation, fiber glass and mineral wool offer the following compelling benefits:

- ✓ An array of solutions, allowing builders and homeowners to choose the best option at the right value for their construction budget
- ✓ Safe to manufacture, install and use when recommended work practices are followed
- ✓ Will not absorb and retain moisture
- ✓ Virtually no settling when properly installed
- ✓ Ease of installation makes easy work for do-it-yourselfers or skilled contractors
- ✓ Fiber glass and mineral wool insulation products are supported by 75 years of health and safety research that demonstrates they are the most thoroughly evaluated insulation materials on the market



VS.





SAFETY

KNOW THE CONCERNS WITH CELLULOSE:

Fiber glass and mineral wool insulations are naturally fire resistant. Cellulose insulation is naturally flammable and has been linked to increased fire spread.

FEATURES	FIBER GLASS	CELLULOSE	MINERAL WOOL
Fire Performance	Naturally fire resistant and non-combustible. ¹³ It requires no additional fire-retardant chemical treatments. The kraft paper facings on some products is flammable and should not be left exposed.	Naturally flammable. Cellulose insulation manufacturers must apply approximately 20%, by weight, of fire retardants to reduce flammability. ¹⁴ This adds fire-resistance, but the material is not non-combustible or smolder-resistant. If the insulation is exposed to fire that smolders in the insulation, it is difficult to extinguish. ¹⁵ The Consumer Products Safety Commission requires cellulose manufacturers to warn customers that the product presents a fire hazard.	Naturally fire resistant. ¹⁶ Noncombustible. It requires no additional fire-retardant chemicals.
Corrosiveness	Non-corrosive. ¹⁷	When chemical fire retardants are used, it can lead to corrosion. ¹⁸	Non-corrosive. ¹⁹
Product Testing for Health and Safety	Thoroughly tested product. ²⁰	Limited health and safety testing. The true health impacts of cellulose fibers remain unclear. More testing is needed because with any respirable fiber, carcinogenicity is a concern until research reveals otherwise. ²¹	Thoroughly tested product. ²²

KNOW THE CONCERNS WITH CELLULOSE:

The Consumer Products Safety Commission requires companies selling cellulose to consumers to warn them of the fire hazard cellulose presents, specifically, when installed too close to heat-producing devices like furnaces and heaters, as well as recessed lighting fixtures.²³

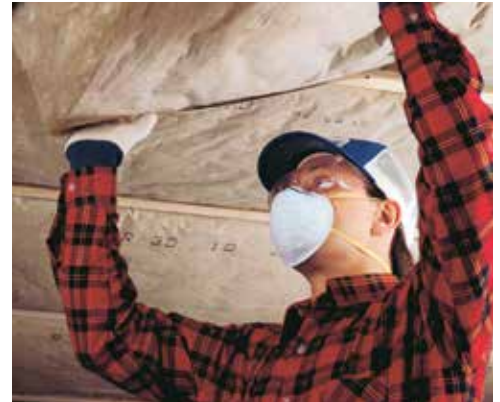


Cellulose Concerns:

- ✓ Cellulose insulation has limited health and safety testing
- ✓ Settles as much as 20% following installation, which can lead to diminished thermal performance over time
- ✓ Moisture and wetting: as a paper-based product, cellulose will absorb and retain moisture
- ✓ Cellulose insulation is regulated by the CPSC as a fire threat¹
- ✓ Cellulose insulation, under certain conditions (poorly air sealed, moisture-rich, cold environment) can contribute to corrosion in steel and copper pipes, whereas, mineral wool and fiber glass do not
- ✓ Wet applied cellulose requires up to 36 hours or more to dry out, reducing jobsite productivity. If wall cavities are enclosed before the cellulose insulation has balanced moisture content, mold may develop²

INSTALLED IN
90%
OF HOMES

FIBER GLASS IS A LEADER IN THE INSULATION INDUSTRY



KNOW THE CONCERNS WITH CELLULOSE:

Fiber glass and mineral wool batt insulation will not settle when properly installed. Cellulose insulation can settle up to 20 percent, which is considered in the R-Value calculations. In addition, introducing wet-applied cellulose insulation into a wall cavity can create moisture issues, which can lead to mold growth.

FEATURES	FIBER GLASS	CELLULOSE	MINERAL WOOL
Thermal Performance R-Value ranges – Batts ³ 2 x 4 wall (3.5") 2 x 6 wall (5.5") Dense pack loose-fill fiber glass	R-13 to R-15 R-19 to R-21 3.7 – 4.3 R-Value ⁴	3.2 – 3.8 R-Value ⁵	R-13 to R-15 R-20 to R-23
Settling	Batts: No settling when properly installed. Blown-In: May settle 1 to 3%. Virtually no reduction in thermal performance. ⁶	Batts: N/A Blown-In: (Dry) Can settle up to 20% over time, which is considered in R-Value calculations. ⁷	Batts: No settling when properly installed. Blown-in: May settle 1 to 3%. Virtually no reduction in thermal performance. ⁸
Moisture Absorption Building codes require vapor retarders to be installed on the “warm-in-winter” side of most walls in cold climates (for climate zone 5 and above). ⁹	Will not absorb and retain moisture. ¹⁰	Will absorb moisture and “mat down,” losing R-Value. Absorbed moisture may diminish the applied fire retardant. Will absorb moisture and hold it until drying conditions occur. ¹¹	Will not absorb and retain moisture. ¹²

Is Cellulose Really That Green?

Green is an often used term these days, in part because it is both broad and not always well-defined. Cellulose manufacturers market their product as being very green, but a look at the facts raises doubts:

- ✓ Unlike fiber glass and mineral wool, cellulose has chemical additives applied to deal with fire hazards. Cellulose insulation has a minimum of 20% fire retardant by weight.
- ✓ Cellulose naturally absorbs and retains moisture, which can lead to mold growth, which is, of course, a health hazard.
- ✓ Fiber glass and mineral wool is safe to manufacture, use and install when safe work practices are followed. After years of rigorous testing, fiber glass and mineral wool are the most thoroughly researched product on the market. With cellulose, the jury is still out, but we do know that some testing indicated a risk of carcinogenicity from non-respirable fibers.

Cellulose, on average, has slightly more recycled content than fiber glass and mineral wool, but all products have high recycled content. Being green is about more than a few percentage points of recycled content; it is about a holistic assessment of a product's impact on the environment as well as human health and safety. Understood in this way, is it worth re-considering how green cellulose is?

KNOW THE CONCERNS WITH CELLULOSE:

The true health impacts of cellulose fibers remain unclear and more testing is needed, because with any respirable fiber, carcinogenicity is a concern until research reveals otherwise.²¹



KNOW THE CONCERNS WITH CELLULOSE:

Fiber glass and mineral wool insulation do not require drying time. Cellulose insulation takes up to 36 hours to dry out.



FEATURES	FIBER GLASS	CELLULOSE	MINERAL WOOL
Drying Time Required (Blown-in Applications)	No. ²⁴	Yes. ²⁵	No. ²⁶
Installation Considerations	Do-it-yourself application or professional installation. For blown-in, the installer must have a machine capable of installing fiber glass. These are available to homeowners at most big-box home improvement stores.	Dry application: Do it yourself or professional installation. Wet application: Professionally installed using a blowing machine to add water. To prevent fires, heaters and recessed light fixtures and other high temperature surfaces must not come in contact with the product. ²⁷	For blown-in, professional installation is recommended. The installer must use a machine capable of installing rock wool.



KNOW THE CONCERNS WITH CELLULOSE:

In 2015, Allstate Insurance sued a cellulose company over a house fire allegedly caused by improper installation of cellulose insulation.²⁸

KNOW THE CONCERNS WITH CELLULOSE:

The efficacy of fire retardants added to cellulose is significantly impacted by environmental conditions, meaning fire resistance may degrade over time, depending on where the insulation was installed geographically.²⁹



SUSTAINABILITY

KNOW THE CONCERNS WITH CELLULOSE:

Fiber glass and mineral wool insulation contain from 50 to 75 percent recycled content and they can both be recycled. While cellulose insulation is made from recycled newspaper, it cannot be recycled because of the fire retardants used in the product.

FEATURES	FIBER GLASS	CELLULOSE	MINERAL WOOL
Reuse³⁰	Yes.	No.	Yes.
Major Raw Material Components	Recycled glass and sand, a renewable and abundant resource. ³¹	Newspapers or wood fiber treated with chemical fire retardant and insect protection. ³²	Minerals like basalt or diabase and blast furnace slag. ³³
Recycled Content	Yes. ³⁴	Yes. ³⁵	Yes. ³⁶



VALUE/VERSATILITY

KNOW THE CONCERNS WITH CELLULOSE:

Fiber glass and mineral wool insulation provide a wide range of versatile products for a variety of different applications – including wall, attic, and pipe insulation applications. Cellulose insulation comes in three types and is used exclusively for attics and wall cavities. It's also more expensive than fiber glass insulation.

FEATURES	FIBER GLASS	CELLULOSE	MINERAL WOOL
Cost per R-Value	Because there is no settling with fiber glass, the stated R-Value is real, so cost is for listed R-Value.	For dry blown, settled R-Value is real R-Value. Costs must be evaluated using real R-Value.	Because there is no settling with mineral wool, the stated R-Value is real the R-Value, so cost is for listed R-Value.
Installed Cost	With fiber glass batts, no equipment rental is needed, so no extra costs are incurred for installation. Loose-fill would require a blower.	Whether dry or wet applied, installation requires a blower, which increases installed costs.	With mineral wool batts, no equipment rental is needed, so no extra costs are incurred for installation. Loose-fill would require a blower.
Versatility of application	Fiber glass insulation offers a solution for every need throughout the building.	Cellulose insulation can be used only for attics and walls.	Mineral wool insulation comes in a variety of types and forms for uses throughout the building.

FIBER GLASS AND MINERAL WOOL INSULATION: TRUSTED CHOICES

Proven performance, affordability, product versatility and decades of health and safety testing give fiber glass and mineral wool insulation a clear advantage over cellulose. Choose fiber glass and mineral wool insulation and enjoy the peace of mind of products that have been proven to perform for you and your homebuyers.

Get the Facts for a Stronger Business

Learn more about fiber glass insulation at InsulationInstitute.org



- 1: <http://www.gpo.gov/fdsys/pkg/CFR-2012-title16-vol2/pdf/CFR-2012-title16-vol2-part1404.pdf>
- 2: www.mnshi.umn.edu/kb/scale/insulation_densepack.html
- 3: Thermal performance ranges for fiber glass batt insulation in 2 x 4" and 2 x 6" walls found in manufacturers' data and submittal sheets (2008, 2009).
- 4: http://howtohomeinsulation.com/insulation_basics_fiberglass_cellulose.html
- 5: <http://www.energy.gov/energysaver/articles/types-insulation>
- 6: <http://www.energyideas.com/insulation-loose-fill.php>
- 7: Abe Kruger and Carl Seville, Green Building, Principles and Practices in Residential Construction (Cengage Learning, 2012) p.107.
- 8: <http://www.energyideas.com/insulation-loose-fill.php>
- 9: Moisture Absorption: Local building codes likely will require vapor retarders (or materials that retard vapor transmission like vapor retarder paints) to be installed on the "warm-in-winter" side of walls in cold climates except on basement walls, the part of any wall below grade and any wall where moisture or freezing will not damage the materials. Refer to local building codes for specific vapor retarder requirements as they may not be the same as the model building codes.
- 10: "Plastic foams, on the other hand, are not particularly liable to absorb moisture and neither are such materials as rock wool, glass fibre, etc.," R.M. E. Diamant, Insulation of Buildings – Thermal and Acoustic. (The Chapel River Press, Ltd. 1965), p. 106. Fiberglass and rock wool absorb less than 1 percent of their weight, whereas cellulose absorbs 5-20 percent of its weight. Richard T. Bynum, Jr., Insulation Handbook (New York McGraw-Hill, 2001), p.78.
- 11: Moisture absorption, ranging from 5-20% of its weight, is one disadvantage of cellulose insulation. Richard T. Bynum, Jr., Insulation Handbook (New York: McGraw-Hill, 2001), p.83. <http://www.tntinsulation.ca>: Cellulose insulation is made of shredded newspaper and will absorb moisture. Also, if soaked, cellulose will 'mat' down and thermal performance can be permanently reduced. Assuming existing cellulose does dry after becoming wet, there is a concern that the fire retardant chemicals may 'wash away' leaving insulation materials insufficiently protected. In addition, studies conducted in Canada, New England and Ohio demonstrated that wet-spray applications of cellulose insulation do not achieve their advertised R-Value until dry and may take as long as two months to dry. In many cases, wet-spray applications may need to remain uncovered until completely dry. <http://www.house-energy.com/Insulation/Cellulose.htm>: Cellulose insulation can absorb more moisture than most other types of insulation. If wall cavities aren't perfectly dry, or if there is a risk of wetting, then cellulose may favor mildew growth. Well designed and implemented walls and attics are essential to the use of cellulose insulation. If this isn't possible, then you should look for other solutions.
- 12: "Plastic foams, on the other hand, are not particularly liable to absorb moisture and neither are such materials as rock wool, glass fibre, etc.," R.M.E. Diamant, Insulation of Buildings – Thermal and Acoustic. (The Chapel River Press, Ltd. 1965), p.106. Fiberglass and rock wool absorb less than 1 percent of their weight, whereas cellulose absorbs 5-20 percent of its weight. Richard T. Bynum, Jr., Insulation Handbook (New York McGraw-Hill, 2001), p.78.
- 13: Fiber glass is naturally fire resistant, but faced insulation will contribute to flame spread unless flame-resistant materials are used. Richard T. Bynum, Jr., Insulation Handbook (New York: McGraw-Hill, 2001), p. 131 <http://www2.buildinggreen.com/article/flame-retardants-under-fire>
- 15: William Perkins Spence, "Insulating, Sealing & Ventilating Your House," (Toronto, Ontario, Canada: Sterling Publishing, 2006), p.56.
- 16: Naturally fire resistant. "The fibers [rock and slag wool] are noncombustible." Richard T. Bynum, Jr., Insulation Handbook (New York: McGraw-Hill, 2001), p.147.
- 17: K. Sheppard, R. Weil, and A. Desjarlais, "Corrosiveness of Residential Thermal Insulation Materials under Simulated Service Conditions," Insulation Materials, Testing and Applications, D.L. McElroy and J.F. Kimpfen, eds. (Philadelphia, PA: ASTM, 1990), pp.634-654.
- 18: Sarfraz A. Siddiqui, A Handbook on Cellulose Insulation (Malabar, Florida: Robert E. Krieger, 1989), p.76; K. Sheppard, R. Weil, and A. Desjarlais, "Corrosiveness of Residential Thermal Insulation Materials under Simulated Service Conditions," Insulation Materials, Testing and Applications, D.L. McElroy and J.F. Kimpfen, eds. (Philadelphia, PA: ASTM, 1990), pp.634-654.
- 19: Materials, Testing and Applications, D.L. McElroy and J.F. Kimpfen, eds. (Philadelphia, PA: ASTM, 1990), pp.634-654. K. Sheppard, R. Weil, and A. Desjarlais, "Corrosiveness of Residential Thermal Insulation Materials under Simulated Service Conditions," Insulation Materials, Testing and Applications, D.L. McElroy and J.F. Kimpfen, eds. (Philadelphia, PA: ASTM, 1990), pp.634-654.
- 20: As the most thoroughly tested insulation products on the market, fiber glass and rock and slag wool insulation products are well known products and the industry stands behind them as safe to manufacture, install and use when work practices are followed. In contrast, there has been limited health and safety research on other types of insulation, making the possibility of significant and unexpected health risks far greater as research develops. An inadequately tested or analyzed product should not be deemed safe or free from health risks simply because its manufacturer has refused or failed to test its product. Indeed, failure of a product to be adequately tested by its manufacturer should be a critical factor in determining that a product should NOT be considered for use. Dr. J.M.G. Davis of the Institute of Occupational Medicine Ltd. reaffirms this concept in the following statement: "It is disappointing to find that...some fibre products are being manufactured and promoted as safe when this really means they are untested. A current example of this concerns the increasing use of materials based on cellulose fibres." Davis' statement is equally applicable to all other types of insulation. JMG Davis, "The need for standardized testing procedures for all products capable of liberating respirable fibers: the example of materials based on cellulose," British Journal of Industrial Medicine, 1993: 50: 187- 190. Fifteen years after this admonishment, cellulose insulation manufacturers have still not adequately tested their products.
- 21: Davis JMG Need for Standardized Testing, British Journal of Medicine, 1993.
- 22: Health and safety research testing for mineral wool has been ongoing for more than 50 years. Richard T. Bynum Jr., Insulation Handbook. (New York, McGraw Hill, 2001), pp.107.
- 23: <http://www.gpo.gov/fdsys/pkg/CFR-2012-title16-vol2/pdf/CFR-2012-title16-vol2-part1404.pdf>
- 24: Typically fiber glass insulation products will not require any drying time. Certain spray applied fiber glass products may require drying. Consult manufacturer's installation instructions.
- 25: "The disadvantage of needing a drying operation with the associated energy requirements should be balanced against the benefits of the process." Sarfraz A. Siddiqui, A Handbook on Cellulose Insulation (Malabar, Florida: Robert E. Krieger, 1989), p.33. See pp.32-35. ("...Spray insulation takes time to dry and may take as long as a week or more to completely dry out.") Ibid. at p. 34. www.buildernews.com/viewsnews.pl?id=273: Cellulose can be sprayed into the wall cavity dry behind netting or with a fine water mist that allows the material to stick to cavity surfaces, eliminating the need for netting. "Typically it takes 24-48 hours to dry depending on time of year and location."
- 26: Typically, rock and slag wool insulation products will not require any drying time. Spray products intended for fireproofing would require drying time.
- 27: Requires pneumatic blowing machines. Heaters and recessed light fixtures must not come in contact with the cellulose insulation. See 16 C.F.R. Part 1404S
- 28: <http://madisonrecord.com/stories/510630132-allstate-alleges-faulty-insulation-installation-caused-house-fire>
- 29: Environmental Cycling of Cellulosic Thermal Insulation and Its Influence on Fire Performance. <http://fire.nist.gov/bfrlpubs/fire84/PDF/f84005.pdf>
- 30: Wet or damaged insulation of any type should not be reused.
- 31: Richard T. Bynum, Jr., Insulation Handbook (New York McGraw-Hill, 2001), pp.120. 144. Nelson Shaffer, "The Time of Sands; Quartz Sand Deposits as a Renewable Resource," University of Idaho; Electronic Green Journal, Winter 2006.
- 32: <http://insulation.sustainable-sources.com/>
- 33: Slag wool insulation is produced from blast furnace slag, a waste material. Richard T. Bynum, Jr., Insulation Handbook; (New York: McGraw-Hill, 2001), p.144.
- 34: Fiber glass insulation contains an average of 50 and up to 60% recycled glass, depending upon the manufacturer and specific facility. <http://www.naima.org/publications/N012.PDF>
- 35: Cellulose insulation is made from recycled paper products and can contain up to 85% recycled product. <http://www.energy.gov/energysaver/articles/insulation-materials>
- 36: Mineral wool insulation contains an average of 75% post-industrial recycled content. <http://www.energy.gov/energysaver/articles/insulation-materials>