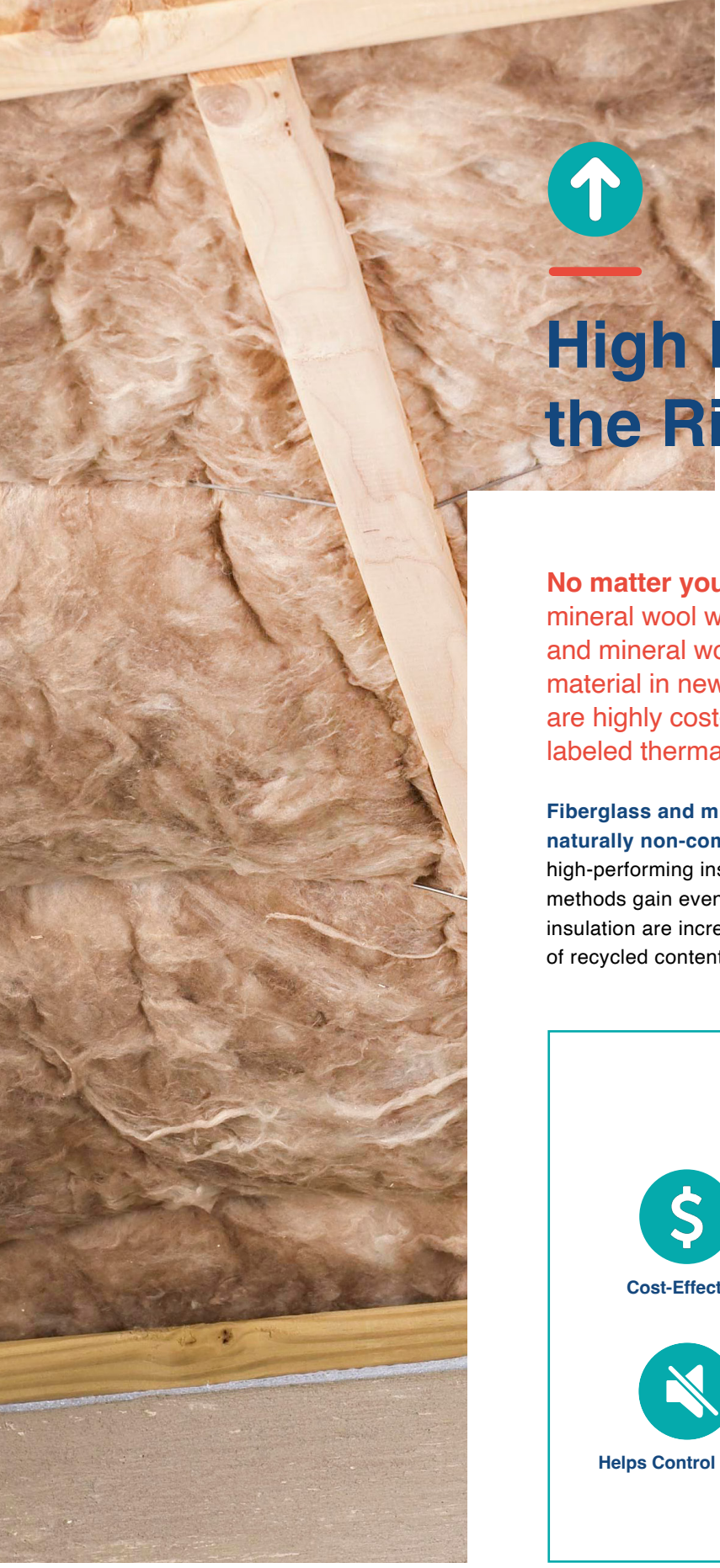
Fiberglass & Mineral Wool

High Performance Priced Right

Insulation Institute™

KNOWLEDGE. LEADERSHIP. CONFIDENCE.



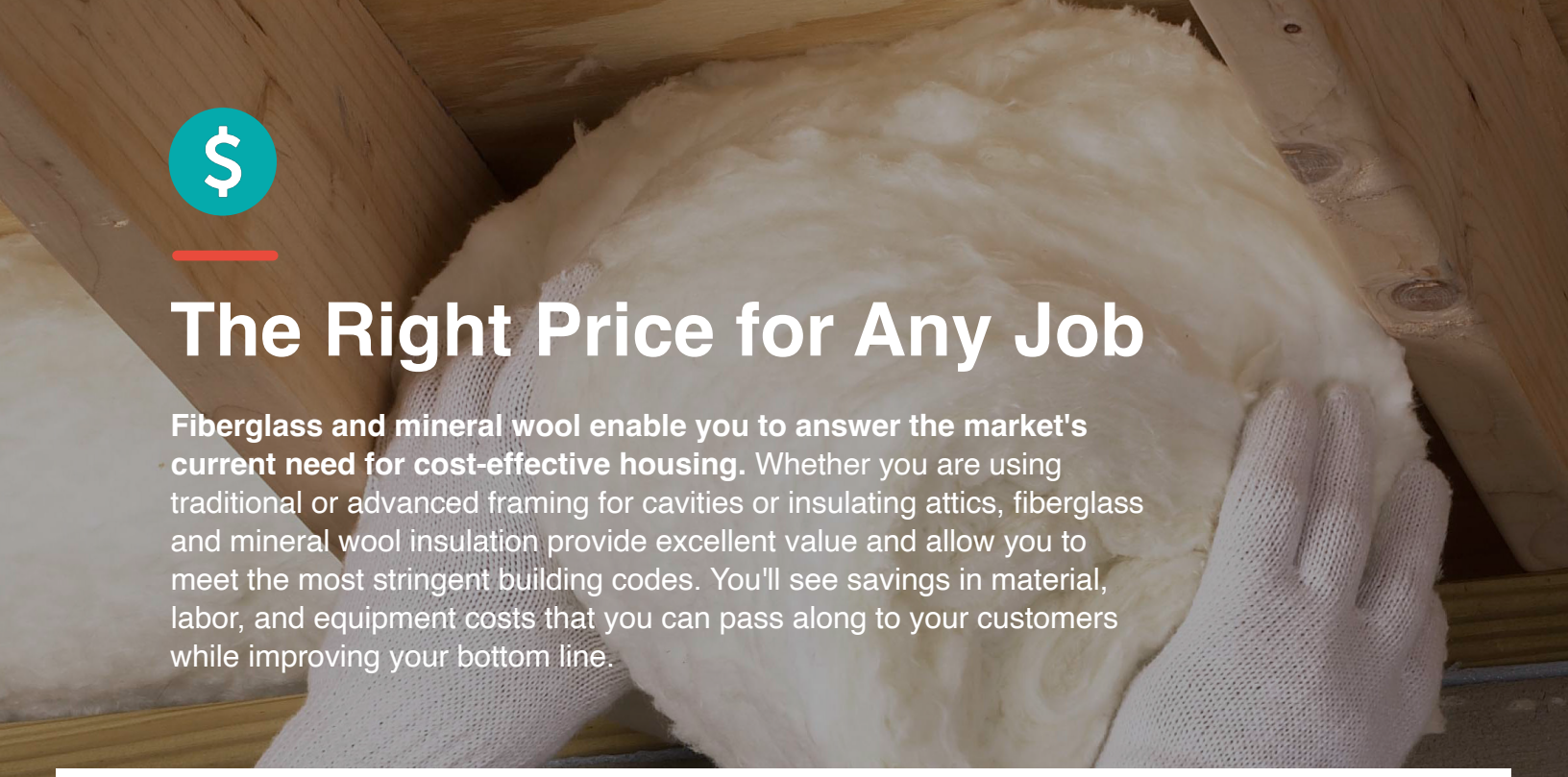
High Performance at the Right Price

No matter your building challenge, fiberglass and mineral wool will meet the job's demands. Fiberglass and mineral wool insulation make up 72% of the insulation material in new homes for a reason.[1] Both products are highly cost-effective selections to meet desired labeled thermal performance.

Fiberglass and mineral wool insulation products are made from naturally non-combustible fibers and help control sound for high-performing insulation solutions. As sustainable home construction methods gain even more popularity, fiberglass and mineral wool insulation are increasingly valued for having industry-high amounts of recycled content and promoting indoor air quality.

Fiberglass & Mineral Wool Benefits

- Cost-Effective
- Excellent Thermal Performance
- Has High Amounts of Recycled Material
- Helps Control Sound
- Made from Naturally Non-Combustible Fibers
- Promotes Good Indoor Air Quality



The Right Price for Any Job

Fiberglass and mineral wool enable you to answer the market's current need for cost-effective housing. Whether you are using traditional or advanced framing for cavities or insulating attics, fiberglass and mineral wool insulation provide excellent value and allow you to meet the most stringent building codes. You'll see savings in material, labor, and equipment costs that you can pass along to your customers while improving your bottom line.

Ref#	Component	Unit	Material	Labor	Equip.	Sub-Total	Cost to Builer[A]	Cost to Consumer[B]	Cost per R-Valiue[C]	Cost per House[D]
Cavity Insulation for 2" x 4", 16" on-center wood frame wall										
1	Fiberglass batt, unfaced, R-13	SF	0.33	0.18	N/A	0.51	0.66	0.81	0.06	2,105
2	Fiberglass batt, unfaced, R-15	SF	0.41	0.22	N/A	0.63	0.80	0.99	0.07	2,552
3	Fiberglass batt, Kraft faced, R-13	SF	0.35	0.22	N/A	0.57	0.74	0.91	0.07	2,361
4	Fiberglass batt, Kraft faced, R-15	SF	0.55	0.22	N/A	0.77	0.96	1.19	0.08	3,063
5	Mineral wool batt, R-15	SF	0.84	0.18	N/A	1.02	1.22	1.51	0.10	3,892
6	Closed cell-spray foam, 2" thick, R-13[E]	SF	1.10	0.22	0.21	1.53	1.83	2.26	0.17	5,838
7	Closed cell-spray foam, 3" thick, R-19.5[E]	SF	1.65	0.34	0.32	2.31	2.75	3.40	0.17	8,773
Cavity Insulation for 2" x 6", 16" on-center wood frame wall										
8	Fiberglass batt, unfaced, R-21	SF	0.88	0.22	N/A	1.10	1.33	1.64	0.08	4,246
9	Fiberglass batt, Kraft faced, R-21	SF	0.89	0.25	N/A	1.14	1.39	1.72	0.08	4,439
10	Mineral wool batt, R-23	SF	1.32	0.18	N/A	1.50	1.75	2.16	0.09	5,583
11	Closed cell-spray foam, 4" thick, R-26[E]	SF	2.21	0.45	0.43	3.09	3.67	4.53	0.17	11,708
12	Closed cell-spray foam, 5" thick, R-32.5[E]	SF	2.76	0.56	0.54	3.86	4.58	5.65	0.17	14,611
Ceiling Insulation[F]										
13	Blown fiberglass, 16" thick, R-38	SF	0.69	0.61	0.36	1.66	2.14	2.64	0.07	3,139
14	Blown fiberglass, 20" thick, R-49	SF	0.91	0.76	0.45	2.12	2.73	3.37	0.07	4,004
15	Blown fiberglass, 24" thick, R-60	SF	1.13	0.91	0.54	2.58	3.32	4.10	0.07	4,869
16	Closed cell-spray foam, 4.625" thick, R-30[E]	SF	2.55	0.52	0.49	3.56	4.24	5.23	0.17	6,219
17	Closed cell-spray foam, 6" thick, R-39[E]	SF	3.31	0.67	0.64	4.62	5.50	6.79	0.17	8,067
18	Closed cell-spray foam, 8" thick, R-52[E]	SF	4.41	0.89	0.85	6.15	7.33	9.05	0.17	10,751
19	Closed cell-spray foam, 9.25" thick, R-60[E]	SF	5.10	1.03	0.98	7.11	8.47	10.46	0.17	12,423

Notes

[A] Cost to Builder includes overhead and profit applied to individual components to represent the cost charged by the sub-contractor ($/SF).

[B] Cost to Consumer is based on applying a builder's gross profit margin of 19.0% to the builder's cost ($/SF).

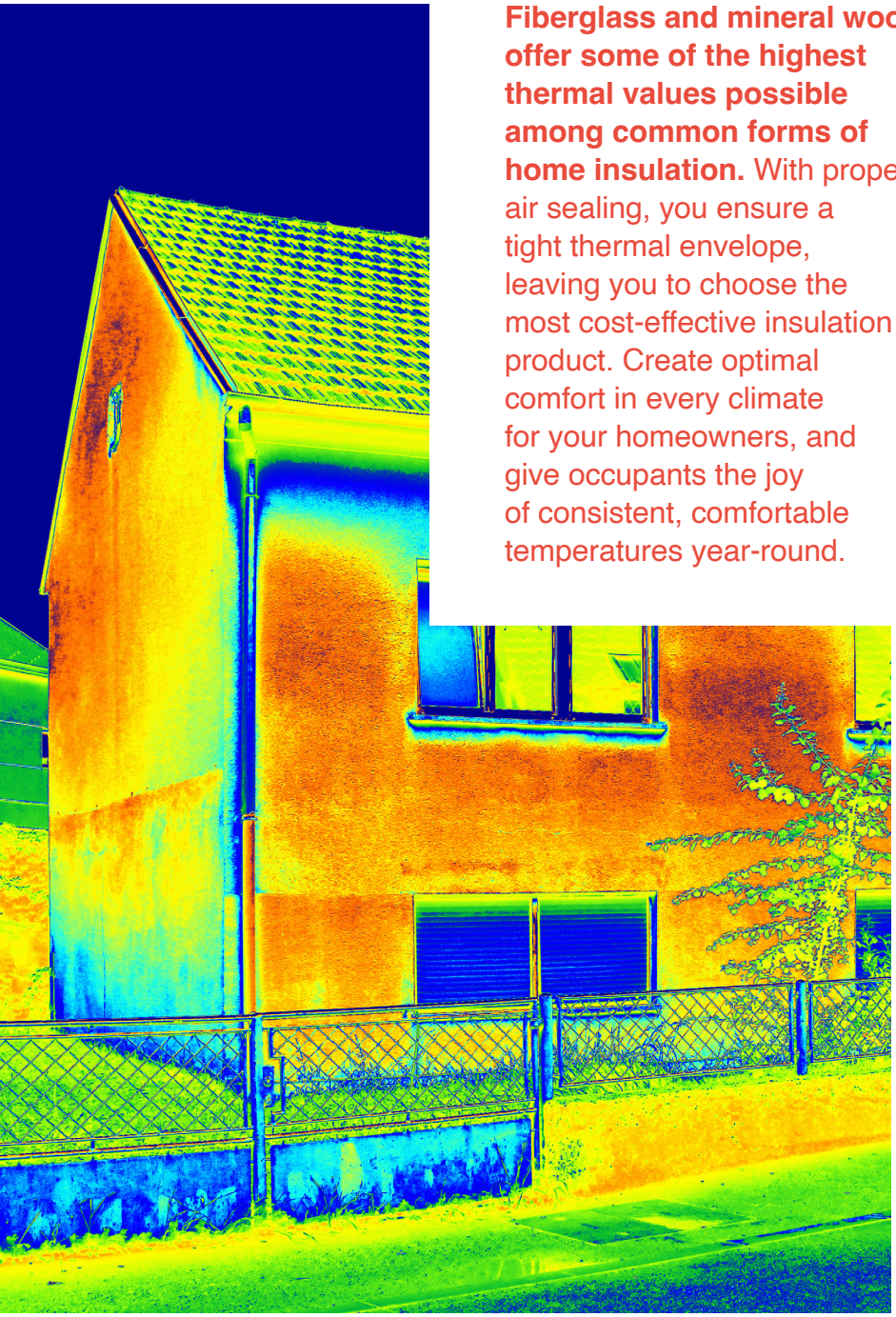
[C] Cost per R-value is the Cost to Consumer divided by the insulation value ($/SF/R-value).

[D] Cost per House is the Cost to Consumer applied to a U.S. Department of Energy prototype home with 1,188 SF ceiling area and 2,584 SF gross wall area ($/house).

[E] The insulation value of closed cell spray foam for a given thickness is based on R-6.5/inch; R-value/inch can vary by manufacturer.

[F] Ceiling insulation: all types installed at the attic floor above the ceiling for this analysis. The cost of any additional ceiling support that may be required in some cases at higher levels of insulation is not included in this analysis.

Pay the Perfect Price for Optimum Thermal Performance



Fiberglass and mineral wool offer some of the highest thermal values possible among common forms of home insulation. With proper air sealing, you ensure a tight thermal envelope, leaving you to choose the most cost-effective insulation product. Create optimal comfort in every climate for your homeowners, and give occupants the joy of consistent, comfortable temperatures year-round.

Research Findings on Fiberglass & Mineral Wool Insulation and Thermal Performance:

All insulations perform to stated R-Value in a wall system built to code, which requires air sealing.[3]

A commonly held belief is that cavities and insulation are the biggest culprits for air leaks; however, that this is not where—or even how—most air leakage occurs.[4]

When fiberglass or mineral wool is paired with standard air sealing practices, including taped house wrap or caulk, air infiltration is effectively reduced to near zero and has the same thermal performance of any insulation of the same R-Value.[5]

Fiberglass and mineral wool can cost-effectively achieve a RESNET Grade I with proper installation and air sealing solutions.[6]

With proper installation, fiberglass and mineral wool batts do not settle over time in either attics or walls. Loose fill may settle +/- 1%, but that does not affect R-value.[7]

Fiberglass and mineral wool products are available at the high R-Values needed to achieve demanding energy-efficient building certifications such as Energy Star, Zero Energy Ready Homes, and Passive House.[8]

Economical Installation

Fiberglass and mineral wool insulation require minimal set-up time, equipment, and downtime. And they can be installed in any area of the building, making for a simple yet comprehensive insulating solution. The NAHB estimates the average cost of construction of a typical single-family residential house in 2019 to be $114 per square foot.[9] Every construction hour counts, and fiberglass and mineral wool help you save more time—and more money.

A 3,500 square-foot home can be completely insulated in a day by one trained installer using fiberglass or mineral wool batts and does not require multiple passes like other forms of insulation.

Fiberglass and mineral wool require nearly 0% downtime, compared to other types of insulation that can require at least 1–2 days to dry or cure before drywall installation can begin.

Other trades can safely continue working during fiberglass and mineral wool installation, unlike other types of insulation that require the evacuation of the entire structure for 24 hours.

Installing batts generally requires nothing more than a cutting tool, staple hammer, and minimal personal protective equipment—no machine or power source needed.

Fiberglass batts are available in pre-cut sizes that fit standard wall cavities and wall heights—increasing productivity and reducing cleanup requirements. They can also be easily cut to fit any size cavity and small spaces.

Fiberglass is lightweight, flexible, and compression packaged, speeding jobsite handling and installation while minimizing warehouse requirements and transportation demands.

Fiberglass and mineral wool insulation also don't require a specific temperature at installation to achieve maximum thermal performance, unlike some other insulation types.[10]

Fiberglass can achieve high R-Values in condensed cathedral batts, which fit tightly between cathedral rafters and leave ventilation space, so baffles are not required.

"I was impressed by the speed of installation and the condition of the property once the insulation was installed. There was very little residue, making cleanup very quick."

– Shawn Stolte, President of Stolte Construction

Excellent Fire Protection

Give ultimate peace of mind with high fire ratings. Fiberglass and mineral wool fibers are naturally non-combustible and outperform all other standard insulating materials.

Mineral wool is an excellent choice for applications with especially stringent fire and smoke rating requirements, such as achieving compliance when ASTM E119, NFPA 220, or ASTM E 136 standards are required.

Mineral wool will not melt until reaching 2150°F (1177°C), and fiberglass resists melting up to 1300°F (704°C).[11]

Loose-fill fiberglass and mineral wool don't require an ignition barrier when used as attic, wall, or roof insulation, unlike other types of insulation.

Fiberglass & Mineral Wool

Made from naturally fire-resistant fibers.

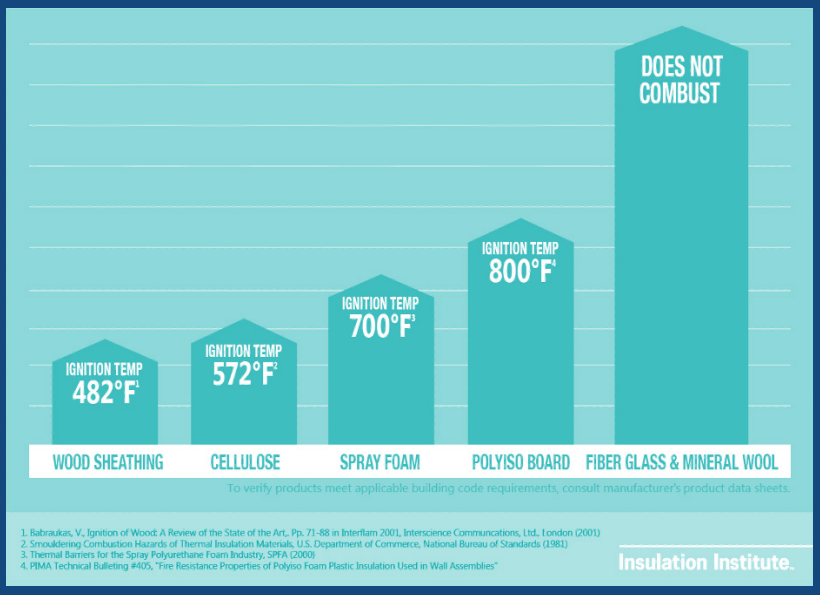
Cellulose

Naturally flammable. Cellulose insulation manufacturers must apply 20-23%, by weight, of fire retardants* to reduce flammability.[12, 13]

Spray Foam

Can be consumed by flame. Exposed foam must be protected using a 15-minute thermal barrier when installed in a habitable area.[14]

Ignition Temperatures of Insulation Products



15

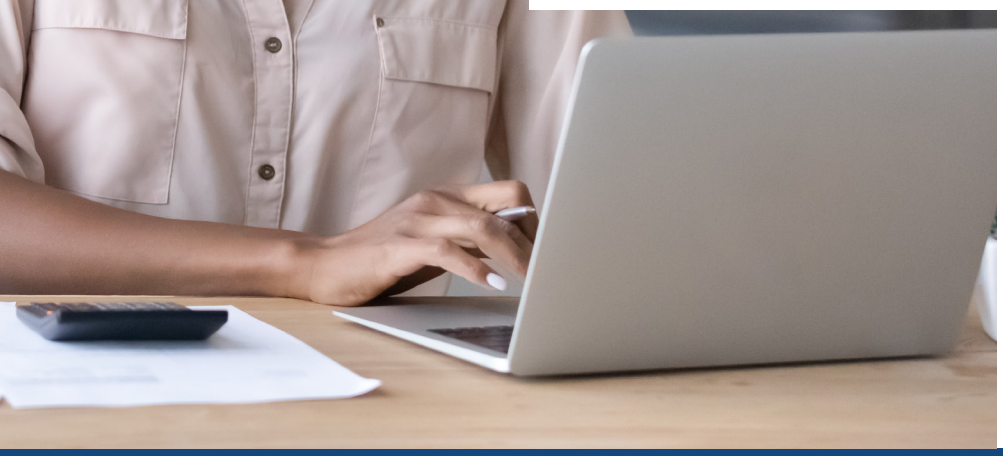
Choose the Acoustical Solution that Works for You

Provide acoustical environments where your customers can relax in a peaceful space or turn up the volume without disturbing others. Fiberglass and mineral wool give your builds an edge by achieving sound control between interior rooms and floors and from outside sources.

Adding insulation to interior walls is a great way to help control noise within a home. Building codes require a minimum amount of insulation to be installed in a home's exterior walls and ceiling for thermal control. It is less common to have insulation installed in interior walls between rooms since building codes do not require it.[16]

Batts are the most viable, practical option for adding acoustical insulation between rooms. They deliver solid acoustical performance and easily install into studs prior to drywall installation on either side.

Sound Transmission Class (STC) tests show that in a residential setting, it does not matter which insulation product is used to fill the cavity to achieve a consistent reduction in sound transmission. Since these products perform at around the same levels, you are free to use the most cost-effective option.[17]



Make Sustainable Attainable

Fiberglass and mineral wool, including rock and slag wool, offer among the industry's highest renewable and recycled contents and deliver ongoing energy savings that can lower your carbon footprint for years.

Fiberglass is made from an average of 50% (up to 60%) recycled post-consumer glass product.

Most rock wool contains an average of 10–15% recycled blast furnace slag. Slag wool insulation contains approximately 70-75% recycled blast furnace slag.

Since the industry's recycling program began in 1992, the North American Insulation Manufacturer's Association members' plants have diverted more than 67.9 billion pounds of recycled materials from the waste stream.[18]

Many fiberglass and mineral wool products are compression packaged, allowing for more product on each truck, reducing transportation demands and impacts on the environment.

"Sustainability is the future of design. We need to be selecting materials that are high-performance with a long, useful life, while being less impactful to the environment."

– Loren Aiton,
LEED AP Architect

Improved Indoor Air Quality is a Breath of Fresh Air

As the most thoroughly tested insulation products on the market, fiberglass and mineral wool are proven safe to use when recommended work practices are followed. Most other insulation types have limited or no known health and safety testing. In fact, *A Guide to Healthier Upgrade Materials*, a report issued by the nonprofit organization Energy Efficiency for All, recommends fiberglass insulation as one of "the best insulation materials from a health perspective." [19]

Since 2017, no home fiberglass products such as batts or blown-in insulation made in the United States and Canada have formaldehyde in the binder. This change was the result of a voluntary effort by manufacturers to produce a formaldehyde-free insulation product.[20]

Fiberglass home insulation products are produced mostly from a combination of virgin and recycled materials such as sand and recycled glass.[21]

Because unfaced fiberglass and mineral wool are inorganic, mold cannot feed on them like it can on other types of insulation.

A comprehensive review of the scientific literature confirmed that fiberglass and mineral wool do not cause an allergic reaction. Fiberglass is the only insulation category to receive the Asthma and Allergy Friendly product certification from Allergy Standards.

Many fiberglass products are certified for low emissions by a third-party program such as GREENGUARD and GREENGUARD Gold Certification.

Installing fiberglass and mineral wool requires minimal safety equipment, including gloves, protective eyewear, and an optional dust mask.

Fiberglass insulation is the most thoroughly tested insulation material available. After years of research, the International Agency for Research on Cancer (IARC), the US National Toxicology Program (NTP), and the California Office of Environmental Health Hazard Assessment have all taken action to confirm that fiberglass thermal and acoustic insulations should not appear on their lists of possible carcinogens. Not all insulation materials have undergone the same level of rigorous testing and scrutiny when it comes to health and safety.[22]

Endnotes

[1] Insulation Choices Revealed in New Study, Home Innovation Research Labs, June 2019.
https://www.homeinnovation.com/trends_and_reports/trends/insulation_choices_revealed_in_new_study

[2] Insulation Costs for New Construction Homes, Home Innovation Research Labs, Sep 2021.
https://insulationinstitute.org/wp-content/uploads/2021/11/NAIMA-Insulation-Costs-FINAL-9.28.2021-rev1.pdf

[3] Thermal Metric Summary Report, Building Science Corporation, 2015.
https://insulationinstitute.org/wp-content/uploads/2015/12/Thermal_Metrics_Project_Report.pdf?__hstc=45788219.bca016f26f5b225e7fc903945ecf2991.1619100796765.1619100796765.1619100796765.1&__hssc=45788219.1.1619100796766&__hsfp=2066195033

[4] Characterization of Air Leakage in Residential Structures, Parts 1 & 2. Wolf, David and Frank Tyler, 2013 ASHRAE.

[5] Air Infiltration of Wood Framed Walls, NAHB Research Center, 2009.

[6] Grade I Insulation Installation: Why Builders Should Care, NAIMA, Pub. No. N085, February 2017.
https://insulationinstitute.org/wp-content/uploads/2017/03/Grade1installation-FINAL.pdf

[7] Lab Test vs. Eye Test: Slumping and Settling, NAIMA, August 2016
https://information.insulationinstitute.org/blog/lab-test-vs.-eye-test-slumping-and-settling-loose-fill-insulation

[8] High Performance at the Right Price, Four Ways to Use Fiberglass Batts in New Home Construction to Achieve Outstanding Thermal Performance that Costs Less, NAIMA, Pub. No. N084, April 2017.
https://insulationinstitute.org/wp-content/uploads/2017/04/Blog-Roll-Up-N084.pdf

[9] Cost of Construction, Special Studies, Ford, C., NAHB Economics and Housing Policy Group, January 2020.
https://www.nahb.org/-/media/8F04D7F6EAA34DBF8867D7C3385D2977.ashx

[10] Spray Foam in Accessible Spaces: Best Practices for Retrofit in Mixed-Humid Climates, Oak Ridge National Laboratory, Oct 2011. ORNL/TM-2008/00

[11] Mineral wool products are stone wool insulations made from basalt rock and slag. This combination results in a non-combustible product with a melting point of approximately 2150°F (1177°C), which gives it excellent fire resistance properties. "Technical Data Sheet," June 2013; 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;Naturally fire resistant. "The fibers [rock and slag wool] are noncombustible." Richard T. Bynum, Jr., Insulation Handbook (New York: McGraw-Hill, 2001), p. 147. July 7th, 1997

[12] Cellulose is naturally flammable. Cellulose insulation manufacturers must apply 20 to 23 percent, by weight, of fire retardants to reduce flammability. Sarfraz A. Siddiqui, "A Handbook on Cellulose Insulation (Malabar, Florida: Robert E. Krieger Publishing Company), 1989, pages 27, 57-61, 63-74.

Endnotes *Continued*

[13] After discovering a high rate of failure of cellulose insulation products to pass the U.S. Consumer Product Safety Commission ("CPSC") fire tests (70 to 80 percent of the manufacturers), the CPSC developed regulations requiring that cellulose insulation be labeled as a fire hazard. 16. C.F.R. part 1404. See 16 C.F.R § 1404.4

[14] Spray foam can be consumed by flame. Building codes require a 15-minute thermal barrier when spray foam is installed in a habitable area. Exposed foam is a potential risk and should be protected from open flames during construction. Richard T. Bynum, Jr., Insulation Handbook (New York: McGraw-Hill, 2001), pp. 191, 195

[15] Babraukas, V., Ignition of Wood: A Review of the State of the Art,. Pp. 71-88 in Interflam 2001, Interscience Communcations, Ltd., London (2001); Smouldering Combustion Hazards of Thermal Insulation Materials, U.S. Department of Commerce, National Bureau of Standards (1981); Thermal Barriers for the Spray Polyurethane Foam Industry, SPFA (2000); PIMA Technical Bulleting #405, "Fire Resistance Properties of Polyiso Foam Plastic Insulation Used in Wall Assemblies"

[16] Insulating Your Home Office for Sound Control, NAIMA, Pub. No. N139, April 2021. https://insulationinstitute.org/wp-content/uploads/2021/04/N139.pdf

[17] Acoustical Performance of Wall Cavity Insulation Products, Full Scale Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC) Testing Results from Seven Residential Wall Assemblies, NAIMA, Pub. No. BI507, February 2021. https://insulationinstitute.org/wp-content/uploads/2021/03/NAIMA-AcousticsBrochure-FINAL_03242021.pdf

[18] Fiber Glass, Rock and Slag Wool Insulation – Materials for a Sustainable Planet," NAIMA Pub. No. N012, July 2021 https://insulationinstitute.org/wp-content/uploads/2016/01/N012-FG-RSW-Ins-Materials-For-Sustainable-Plant-2021.pdf

[19] Energy Efficiency for All. 2018. Making Affordable Multifamily Housing More Energy Efficient: A Guide to Healthier Upgrade Materials. https://www.energyefficiencyforall.org/resources/making-affordable-multifamily-housing-more-energy-efficient-guide-healthier-upgrade/

[20] Healthy Building Network. October 2015. Residential Fiberglass Insulation Transformed: Formaldehyde is No More. https://healthybuilding.net/blog/204-residential- fiberglass-insulation-transformed-formaldehyde-is-no-more

[21] Building for Environmental and Economic Sustainability (BEES) software. 2017. gov/services-resources/software/bees

[22] Fiberglass Insulation, A Guide to Better Indoor Air Quality, NAIMA, Pub. No. N138, February 2021. https://insulationinstitute.org/wp-content/uploads/2021/02/Fiberglass-and-Indoor-Air-Quality_03052021.pdf

Insulation Institute™

KNOWLEDGE. LEADERSHIP. CONFIDENCE.

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials. Through the Insulation Institute™, we leverage the collective insulation expertise of our organization and our members to empower homeowners and professionals to make informed insulation choices. Our mission is to enable a more comfortable, energy-efficient and sustainable future through insulation — and we are constantly working with building professionals, homeowners, government agencies, and public interest, energy and environmental groups to realize that vision.

Discover more insulation knowledge at InsulationInstitute.org

NAIMA
2013 OLDE REGENT WAY, SUITE 150, BOX 120 | LELAND, NC 28451 | P: 703-684-0084

PUB. NO. N150 1/21

insulationinstitute.org