



## Rock and Slag Wool Insulation

*Sustainable Choices for Conserving Energy  
and Preserving the Environment*

# rock and slag wool insulation

Rock and slag insulations, sometimes referred to as mineral wool, have been produced naturally for centuries. During volcanic eruptions, when a strong wind passes over a stream of molten lava, the lava is blown into fine silky threads that look like wool. From this natural inspiration sprung one of the most innovative and versatile insulation products on the market today. Today's rock and slag wool insulations are high-tech versions of their predecessors, produced from plentiful basalt and industrial slag. Their versatility allows them to be used in a wide variety of residential, commercial and industrial applications to provide sustainable thermal and acoustical comfort and, perhaps most uniquely, to serve as passive fire protection. Although rock and slag wool are not as well known among North American consumers as other insulation products, these fiberized products have been used effectively in buildings around the world for more than a century and remain some of the most innovative and versatile insulations in use today.



**Residential Insulation**



**Industrial Pipe Insulation**



**Commercial and Industrial Insulation**

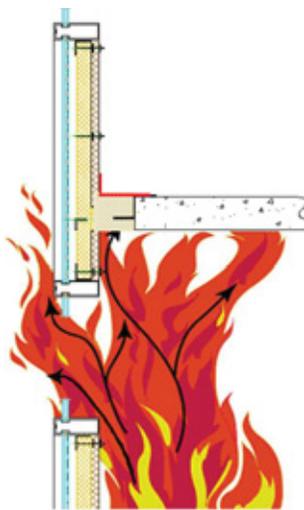


# rock and slag wool benefits

Rock and slag wool insulation offers a wide array of benefits for specifiers, designers and builders interested in using materials offering environmentally responsible characteristics and demonstrating proven performance.

## Outstanding Thermal Performance

Thermal performance is a critical determinant in choosing an insulation product and the product must be thoroughly tested and proven to perform at the same level as when installed for the life of the building. Rock and slag wool insulation is tested to all applicable industry standards to ensure its R-value does not deteriorate over time. Loose-fill rock and slag wool insulation resists settling<sup>1</sup>, and batt products spring back after average compression so that installed thermal performance is maintained over the life of the product. The insulation also lends to the sustainable nature of the structure by protecting the building from moisture<sup>2</sup> and fire damage<sup>3</sup>. Further, the higher density of rock and slag wool insulation allows it to achieve higher R-values in a typical wall cavity than most other insulation products.



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## Excellent Fire Resistance

The performance of building materials in a fire is a key factor in protecting the occupants of the building and allowing them to escape safely. Rock and slag wool insulation is naturally non-combustible and remains so for the life of the product without the addition of harsh and potentially dangerous chemical fire retardants<sup>4</sup>. The insulation can resist temperatures in excess of 2,000°F<sup>5</sup>. Because these products have a high melting temperature, they can be used in a wide variety of applications that call for these unique properties. These products meet NFPA 220 and ASTM E 136 standards and test methods and are Class A product tested per ASTM E 84 and NFPA 101.

Rock and slag wool insulation is used as passive fire protection in many buildings. Manufacturers of these products encourage a balanced design, which includes a combination of active, detective and passive fire protection in building codes to ensure the safety of building occupants.

## Excellent Sound Absorption

The fibrous structure and high density of rock and slag wool insulation offer excellent sound absorption properties<sup>6</sup>, making these products an outstanding part of overall wall systems designed to reduce sound transmission.

## Mold, Fungi and Bacteria Resistant

Rock and slag wool insulation resists the growth of mold, fungi and bacteria because it is inorganic<sup>7</sup>. These products offer enhanced protection against damaging moisture infiltration that can rob insulation of R-value<sup>2</sup>.

1. Bengt Svennerstedt, "Field Data on Settling in Loose-fill Thermal Insulation," *Insulation Materials: Testing and Applications*, D.L. McElroy & J.F. Kimpfner, eds (Philadelphia, PA: ASTM, 1990), pp. 231-236.

2. Harold B. Olin, John L. Schmidt & Walter H. Lewis, *Construction: Principles, Materials and Methods 4th ed.* (Chicago, IL: The Institute of Financial Education, 1980), p. 105-11.

3. M.A. Sultan and G. D. Lougheed, "Results of Fire Resistance Tests on Full Scale Gypsum Board Wall Assemblies," *Institute for Research in Construction, National Research Council Canada, August 2002.*

4. *Fire Protection Handbook, 18th ed.*, Arthur Cote, Ed. (Quincy, MA: National Fire Protection Association, 1997) p. 4-208.

5. Independent testing conducted per ASTM E 199 (Standard Methods of Fire Test of Building Construction and Materials), United States Gypsum Research Facility, March 29, 1974. See also [www.builtgreen.org/checklist/guide.aspx?ChecklistID=150](http://www.builtgreen.org/checklist/guide.aspx?ChecklistID=150).

6. Mason Wyatt, Noise Control, *Understanding Noise Control, Sound Absorbing Materials at [www.noisecontrol.net/materials.html](http://www.noisecontrol.net/materials.html).*

7. NAIMA Insulation Facts #34.

# rock and slag wool composition

Rock wool and slag wool insulation is comprised of basically the same raw materials but in different proportions and is produced in the same way. Manufacturers use a mechanized process to spin a molten composition of rock and slag into high temperature-resistant fibers. Their similar properties also produce fairly similar performance attributes. The major difference is in the specific volumes of the various raw materials used to make each product.



rock

## Rock Wool Insulation

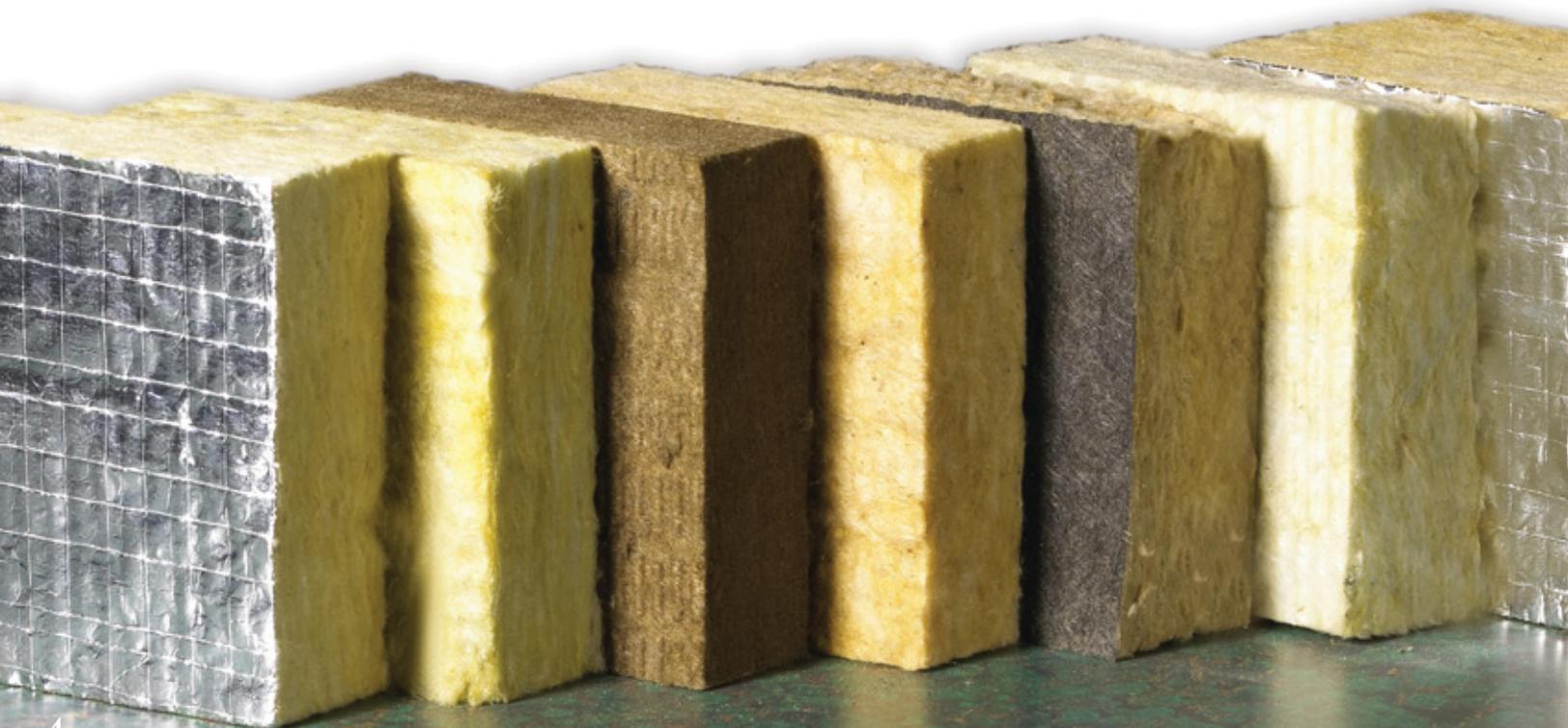
Rock wool insulation is composed principally of fibers manufactured from a combination of aluminosilicate rock (usually basalt), blast furnace slag and limestone or dolomite. Slag is a byproduct from steel production that would otherwise wind up in landfills. Binders may or may not be used, depending on the product. Typically, rock wool insulation is comprised of a minimum of 70 - 75 percent natural rock. The remaining volume of raw material is blast furnace slag.



slag

## Slag Wool Insulation

Slag wool insulation is composed principally of fibers manufactured by melting the primary component, blast furnace slag, with a combination of some natural rock, with or without binders, depending on the product. Typically, slag wool insulation uses approximately 70 percent blast furnace slag, with the remaining volume of raw materials being natural rock.



# conserving energy

## Preserving the Environment

One of the most important environmental benefits of rock wool and slag wool insulation is their ability to make buildings more energy efficient. A thermally efficient building reduces the amount of energy required to maintain a comfortable indoor environment. A reduction in energy consumption conserves non-renewable fuel supplies and reduces air pollution and greenhouse gas emissions such as CO<sub>2</sub> and NO<sub>x</sub>. According to a Harvard University School of Public Health study, this reduction in emissions as a result of energy efficiency through the use of thermal insulation greatly improves public health and saves lives.<sup>8</sup>

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## Wise Resource Use

Slag wool is made from blast furnace slag, a byproduct of steel production and a waste product. The industry estimates that over 90 percent of the slag used for insulation is purchased directly from steel manufacturers. The remaining 10 percent is mined from waste disposal sites and landfills. Between 1992 and 2005, slag wool insulation manufacturers used over 13 billion pounds of waste blast furnace slag in the production of insulation.<sup>9</sup>

Both rock and slag wool insulations use natural rock such as basalt in the manufacture of the products. This material is available near to the rock and slag wool insulation plants in North America. By mixing waste materials with raw materials that are found abundantly and widely in nature, rock and slag wool insulation manufacturers report that they are able to use less energy during production than by using strictly the natural rock.

## Re-Engineering Manufacturing Processes

Many insulation manufacturers are reducing process waste by instituting conservation measures. These measures include re-engineering manufacturing processes to incorporate production scrap back into the primary production process, or reprocessing it into other products. Technology, engineering and process control have played key roles in developing a cleaner, stronger, and easier-to-handle product over the last 20 years. Most mineral wool plants operate with a closed loop system; thus, there are no wastewater discharges. Mineral wool manufacturing plants also operate under a Maximum Achievable Control Technology (MACT) standard to reduce and limit air emissions.

## Green Rating Systems

Green and sustainable building programs are beginning to drive the choice of materials used in buildings. One method, used by the US Green Building Council (USGBC) to promote green and sustainable buildings, is a rating system called Leadership in Energy and Environmental Design (LEED™). LEED allocates points to a building that meets specific targets, and specific point levels determine the building's LEED rating. Rock and slag wool products can help green building developers earn points toward a LEED rating, especially in the area of materials and resources where credits are earned for recycled content and regional material content.

In using these point-based systems, however, it is easy to forget that the core purposes of insulation are to conserve energy and improve comfort, which are key pillars of sustainable construction. Therefore, all insulation is technically green. What matters more than just points in selecting an insulation material is its suitability for the project based on a number of environmental criteria and specification of proper levels of insulation for the application, which are typically beyond the minimum mandated by codes. Rock and slag wool insulations embody a number of characteristics that make them advantageous choices in green and sustainable building.

8. Jonathan I Levy, Yurika Nishioka and John D Spengler, "The Public Health Benefits of Insulation Retrofits in Existing Housing in the United States," *Environmental Health: A Global Access Science Source*, 2003, 2:4.

9. NAIMA Member Company Annual Recycling Survey.

10. Green and Competitive: The Energy, Environmental, and Economic Benefits of Fiber Glass and Mineral Wool Insulation Products. Energy Conservation Management, Inc; The Alliance to Save Energy; Barakat & Chamberlin, Inc., June, 1996.

*For every Btu consumed in the production of insulation, 12 Btu are saved each year.<sup>10</sup>*

# rock and slag wool applications

The fibrous composition of rock and slag wool insulation provides a flexibility and versatility not found in most other insulations. Rock and slag wool insulation comes in a wide variety of forms, shapes and sizes, including board, batt, loose-fill, spray-applied and pipe insulation for many common and specialized applications..

## Insulation Protects Occupants, First Responders, Building Structures and Contents.

Although active fire protection is mandated by most building safety codes, reports show that these systems have a relatively high failure rate. To truly protect building occupants and help keep the structure intact during a fire incident, it is critical to have a combination of active, detective and passive fire protection in place.

In October 2004, a fire spread from the 34th to 56th top floor of the eastern tower at the Torre Parque Central complex in Caracas, Venezuela. As the world watched, the fire burned for more than 19 hours, but the building did not collapse. Although the sprinkler system failed to operate, the mineral wool spray-applied fire resistive material protected the steel framing and averted potential disaster. Another fire at the 38-story Meridian Bank Building in Philadelphia, Pennsylvania in 1991 ravaged for more than 18 hours, but the passive fire protection in the form of mineral wool products helped keep the structure intact. Mineral wool insulation products designed for residential structures can similarly help minimize damage and save lives.

## Applications Include:

### Residential

- Thermal (walls and attics)
- Foundation Drainage Systems
- Acoustical (walls and ceilings)



### Commercial

- Thermal (walls and roofs)
- Fire Stopping and Containment
- Acoustical Applications
- Acoustical Ceiling Tiles



### Industrial

- Thermal (ovens, boilers, kilns, etc.)
- Fire Stopping and Containment
- Acoustical (sound absorbers)
- Emissions Control
- Pipe/Mechanical Systems
- Fillers



# product stewardship

NAIMA and its member companies are committed to ensuring that rock and slag wool products can be safely manufactured, installed and used. NAIMA member companies have funded tens of millions of dollars of research at leading independent laboratories and universities in the United States and abroad to investigate the possible human health effects of rock and slag wool. The weight of scientific research confirms that these materials are safe to manufacture, install and use when manufacturers' recommended work practices are followed.

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# about NAIMA

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.

## NAIMA Rock and Slag Wool Members

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For more information, contact:



44 Canal Center Plaza, Suite 310 • Alexandria, VA 22314  
Phone: 703-684-0084 • Fax: 703-684-0427

[www.naima.org](http://www.naima.org)