For Fire and Acoustics: Fiberglass or Stone Wool?

TWO OPTIONS NOT INSULATED FROM INTENSE COMPARISON

Both fiberglass and stone wool insulation have merit, promote fire protection and sustainability, and offer value to architects, contractors and property owners alike. It's very much like the classic Ford or Chevy argument, or even the ongoing PC versus a Mac debate. The intent of this article is to present a scientific examination of the benefits of using each and, in particular, to meet fire and acoustic requirements and codes.

As consumers, we could ask any hardware home center retail associates or distributors, “Do you have (name a brand) sound insulation?” The quick, honest answer is not exactly. Insulation does not have a Sound Transmission Class (STC) rating. STC ratings are indicated for the system, not its components. The use of any insulation can increase the partition assembly STC rating 4–10 points.

MAKING A SOUND CASE

Sound moves through material and, of course, air as well. Let’s first look at sound moving through air, with an emphasis on mitigating it using insulation. Noise reduction has become a hot topic in recent years.

Stone wool and fiberglass soundproofing insulation is available in multiple panel packages. Both are manufactured with good tolerances to fit snugly in between wall studs and ceiling joists. Full wall assemblies with fiberglass or stone wool will perform comparably in curtailing noise. They fit into the cavities via friction press to ensure there is no air gap allowing sound to leak into adjoining rooms.

Insulation panels are two-to-three inches thick and are rigid enough to be easily cut to shape around electrical outlets and studs. You can use a drywall saw to precisely cut out the notches to make each panel fit into place. Walls and ceilings can be finished off with standard or soundproof grade drywall. No vapor barriers are required.

No one wants to occupy buildings where they are subjected to unacceptable levels of noise pollution. Architects design sound reduction into healthcare facilities, schools, offices, restaurants, high-rises and multi-family homes. It’s reasonable to assume that unwanted sound can affect our personal and professional lives, making us unhappy and unproductive.

Insulation (in simplistic terms) reduces the transfer of sound through the air. The material used in the partition’s structure determines how much sound vibrates through to the other side. Metal studs used in place of wood have less surface area to transfer sound; therefore, yielding a higher STC in the wall system. Using resilient channel helps break some of the structural pathway sounds will travel.

While fiberglass and mineral fiber insulations were designed originally to insulate, both deliver the added benefit of keeping sound from bouncing back into a room or vibrating through. Sound reducing capabilities are inherent in these products. While specific chemicals may be added to select materials as a fire retardant, nothing added to insulation enhances its properties for sound absorption.
An R-11 batt offers little difference in sound properties when compared to an R-13 batt. What matters is consistently filling the cavity with the insulation material. To further enhance a wall system's acoustic performance, additional elements like resilient channel or acoustic gypsum boards can be added into the design.

All insulation buffers sound and there are specialty products on the market today. For commercial use, specialty fiberglass board products are manufactured for sound in a variety of densities and thicknesses. Of course, they also insulate. However, according to testing performed at several independent laboratories, a variation in density has little or no effect on overall STC ratings. Insulation thickness remains the determining factor.

**IT'S SAFE TO SAY: FIRE SAFETY IS A FACTOR**

It's certainly not the first thing you would connect to insulation. However, it should be a factor due to the fact that most common insulations such as fiberglass, rock wool, slag wool, cellulose and spray foam perform in very different manners when it comes down to fire safety. For example, **fiberglass, rock wool, and slag wool — being inorganic — are noncombustible.** These insulations often are used as acceptable fire blocks in wood frame walls.

The International Building Code (IBC) and the International Residential Code (IRC) have compiled a list of insulation products approved for use as fire-blocking materials, including batts or blankets of mineral wool or glass fiber and other approved materials installed properly to be retained securely in place.

It is important to note that most vapor retarder facings used on fiberglass insulation are flammable. Faced insulation should be covered soon after installation with gypsum board or other building code approved finished material.

Member manufacturers of the North American Insulation Manufacturers Association (NAIMA) place the following caution on kraft paper and foil retarders (batt and roll insulations): “This vapor retarder is flammable and should NOT be exposed.” In addition, it is printed on most packaging and product literature.

In applications such as garage walls or warehouse ceilings and other storage areas (where the vapor retarder is left exposed), flame spread-resistant (FS-25) faced fiberglass insulation is available.

**SHEAR FACTS ABOUT STONE WOOL**

Stone wool (sometimes called rock wool) insulation is not a new product, but its use is growing in the United States, thanks to improved distribution provided by several major manufacturers.

The term mineral wool is derived from the manufacturing process in which fiber materials are formed by spinning or drawing molten materials (or “synthetic” minerals, such as slag and ceramics). Since there are various product subsets, its nomenclature can simply be done by putting the parent/raw material to wool (e.g., wool from glass is glass wool, wool from rock is rock wool, etc.).

Some consider stone wool easier than fiberglass batts for cutting, handling and fitting into framing cavities. Others applaud its water-shedding benefits and fireproof qualities. Playing devil’s advocate is as simple as talking to those on the side of fiberglass.

Many believe stone wool batts to be more rigid, firm and dense than fiberglass batts. The truth is that it is so out of necessity, not by design. When glass fibers are spun to make fiberglass batts, the fibers are long. As a result, they hang together easily to make a cohesive batt. On the other hand, with mineral wool, the fibers are much shorter. Therefore, in order to keep the batts in one piece, they have to be packed to a higher density level.

A good number of installers believe that stone wool is the optimal system performer for virtually any project; essential to creating a high-performance insulation system in the most progressive builds. They see it applicable to any building challenge. Stone wool has the product depth; application flexibility and value versatility that help you exceed every job’s demands.
A FEW MORE WORDS ON STONE WOOL

Many feel that stone wool places optimal system performance within reach for virtually any project. Considered as a high-performance insulation system in the most progressive builds, stone wool offers product depth, application flexibility/value and the versatility needed to meet or exceed what should be expected of insulation on any job.

THERMAL PERFORMANCE AT-A-GLANCE

Fiberglass and stone wool keep buildings warm when it’s cold and cool in the summer heat. They are offered in a range of products, with some of the highest possible thermal values.

- Consistently achieve high R-values that surpass many new energy codes/green building program requirements
- Can achieve a RESNET Grade 1 wall, with a proper installation and air sealing solution
- Is UV stable (no shrinkage or thermal performance loss over time)
- Effective at reducing air infiltration to near zero (in tandem with standard sealing practices)
- Thermal performance maintained for the life of a building (batts do not settle and loose-fill only to a negligible amount)

RESISTANCE TO MOISTURE AND MOLD

With multiple layers of moisture resistance, mineral wool helps defend property owners from potential construction defect litigation related to these conditions.

- Requires no drying or curing time during installation and therefore does not introduce moisture into the cavity, unlike cellulose and spray foam, which are typically applied wet
- Being inorganic in structure, mold cannot feed on them (as with other insulation types)
- Many fiberglass batts include:
  - Specialty facings
  - Advanced smart vapor retarders (helping moisture escape the cavity)
- Absorbs less than 1% of its weight in moisture (cellulose absorbs 5%–20% of its weight)

SOUNDING OFF ABOUT NOISE LEVELS: FIBERGLASS & STONE WOOL

Fiberglass and stone wool achieve a high level of sound control between interior rooms and floors and from outside sources.

- Can absorb up to 25% more sound (Noise Reduction Coefficient – NRC of up to 1.00, vs. cellulose with an NRC of .75)
- Batts afford easy application of acoustical control to interior walls (without altering build practices)

FIRE SAFETY AT-A-GLANCE

High ratings ease fire worries since fiberglass and stone wool are naturally noncombustible

- Withstand temperatures up to 2150°F (1177°C)
- No reliance upon harsh chemicals (fire retardants)
- Excellent in meeting/exceeding stringent fire/smoke rating requirements (e.g., NFPA 220, ASTM E 136 standards)

SAVING TIME INCREASES PROFITS

According to the National Association of Home Builders (NAHB), the average jobsite...
builder’s daily operating cost is nearly $300. A single trained installer can complete an insulation installation in a 3,500-square-foot home in just one day with fiberglass or stone wool batts.

In general, installing fiberglass or stone wool batts requires just a cutting tool, staple hammer and logical protective equipment. The batts come in pre-cut sizes for standard wall cavities and heights to increase productivity and reduce cleanups.

**GOING TO BAT FOR FIBERGLASS AND STONE WOOL BATTs**

- One of the most viable options for acoustical insulation between rooms — delivering a high level of acoustical performance (easily installs into studs prior to installing drywall)
- No specific installation temperature (to achieve maximum thermal performance), unlike some other options
- Easily install in existing structures for a highly flexible retrofit solution
- Achieves high R-values in high-density cathedral batts (fitting lightly between cathedral rafters), leaving ventilation space (baffles not required)

**TRULY SUSTAINABLE INFORMATION**

Offering high renewable and recycled content, fiberglass or stone wool deliver sustainable energy savings that can lower a building’s carbon footprint for many years.

- A typical pound of fiberglass or stone wool insulation saves 12 times as much energy (in its first year in place) as it took to produce it — continuing to save energy for the life of the building
- Compression packaged (allows more product per truck) for a reduction in transport and overall environmental impact
- Batts can be removed from existing structures and re-installed:
  - Placing them among few reusable forms of insulation
  - Demonstrating lasting sustainable performance
- Since 1992, NAIMA members’ plants have diverted more than 46.3 billion pounds of recycled materials from the waste stream

**A DYED-IN-THE-WOOL CONCLUSION**

Fiberglass and stone wool offer a versatile, sustainable solution, saving time and money. This is true regardless of the size and/or type of home or building. There also is no need to invest in expensive machinery or specialized personal protective gear.

**FIBERGLASS OFFERS A RICH DIET OF BENEFITS**

Introduced in 1938, fiberglass has remained the preeminent insulation material for commercial and residential construction. The product has proven its ability to make buildings more energy efficient, reduce utility costs and increase occupant comfort. These attributes and more have solidified its role as a staple insulation material in sustainable building projects.

Manufactured most often in two different forms — pre-cut batts/rolls and blown-in loose-fill — fiberglass insulation is used primarily for thermal and acoustical purposes in wall cavities, attics and other critical open spaces in building assemblies.

Fiberglass insulation offers real value, with a lower installed price than many other types of insulating materials and for equivalent R-value performance.
**FIBER FACTS**

Fiberglass batt insulation products come in pre-made R-values, ranging from R-8 to R-40, whereas loose-fill fiberglass can be blown-in with specialized machines and equipment to meet almost any R-value requirement. Blown-in fiberglass insulation also can be installed over existing batt insulation in renovation projects to increase overall R-value.

Since it is inert and does not settle, properly installed fiberglass insulation maintains its R-value over a long period of time. Fiberglass insulation batts and rolls must always be installed at their full designed thickness to achieve the stated R-value — compressed fiberglass insulation loses R-value.

For example, R-20 (RSI-3.5) fiberglass insulation with a thickness of 6-1/4 inches (159 mm) compressed to 5-1/2 inches (140 mm) will experience a reduction in R-value to R-19 (RSI-3.34). If the material is allowed to regain its original thickness, however, the full R-value is restored. Installers should always ensure the insulation completely fills construction cavities without gaps or voids.

**THERMAL PERFORMANCE AT-A-GLANCE**

Fiberglass insulation offers optimal indoor comfort in every climate, with occupants being able to maintain consistent temperatures year-round. It’s offered in a comprehensive range of products, delivering the right thermal performance and comfort for every type of environment.

- Achieves a RESNET Grade 1 wall, with a proper installation and air sealing solution.
- National Association of Home Builders Research Center (NAHB), among other independent tests, states that when pairing fiberglass with standard air sealing practices (including taped house wrap or caulk), air infiltration can be effectively reduced to near zero.
- Full cavity installation is easily achieved (both batt and blow-in deliver consistent R-value throughout the entire cavity)
- Thermal performance is maintained for the life of the building (fiberglass batts do not settle/loose-fill settles a negligible amount)
- UV stable: it does not experience shrinkage or thermal performance loss over time (like spray foam)

**SOUNDING OFF ABOUT NOISE LEVELS: FIBERGLASS**

Fiberglass gives buildings an edge by achieving a high level of sound control between interior rooms and floors and from outside sources.

- Achieves a STC of 43 (as part of complete exterior 2"x4" wood-framed wall system)
- Absorbs up to 25% more sound: Noise Reduction Coefficient (NRC) of up to 1.00 (cellulose NRC of .75)
- Gives buildings an edge via a high level of sound control (between interior rooms/floors and exterior sources)
- Fiberglass batts are an easy way to apply acoustical control to interior walls without changing build practices

Sound absorbent by its nature, fiberglass insulation significantly reduces sound transmission in wall, ceiling, floor and HVAC assemblies. The first inch of fiberglass insulation in a building cavity can increase an assembly’s STC value by three or four points (in some constructions). Each additional inch can further increase the STC rating (by two points).

Fiberglass insulation is a very good sound absorber because it has many interconnecting air pockets. Other effective sound absorbers, called resonators, typically employ small perforations or slots that allow sound to enter but not to escape easily. Wood slat panels and slotted concrete masonry units operate on this principle.
FIRE SAFETY AT-A-GLANCE

Fiberglass is naturally noncombustible and outperforms all other standard insulating materials.

- Fiberglass does not rely upon harsh chemical fire retardants
- Fiberglass resists melting up to 1300°F (704°C)

Naturally noncombustible, fiberglass maintains this inherent quality for its entire product life. As such, it requires no additional fire-retardant chemical treatments. Many building codes also recognize fiberglass insulation as an acceptable fire stop in wood- and steel-framed wall assemblies.

Unfaced fiberglass is recognized as an acceptable fire stop in residential wood frame walls (by building code groups). Kraft and some foil facings are themselves combustible; such products should not be left exposed. These products, when properly installed in rigid compliance with a code approved thermal barrier, pose no fire hazard.

RESISTANCE TO MOISTURE AND MOLD

Fiberglass offers multiple layers of moisture resistance for added protection against expensive moisture damage and defect litigation.

- No drying or curing time required during installation (no introduction of moisture into the cavity), unlike cellulose, which is typically applied wet
- Mold cannot feed on it like it can on other types of insulation (unfaced fiberglass is inorganic)
- Absorbs less than 1% of its weight in moisture (cellulose absorption is 5%–20%)
- Specialty facings (on many batts) and advanced smart vapor retarder technology can promote moisture escaping the cavity

TIME SAVED = AN IMPROVED BOTTOM-LINE

The average jobsite builder’s daily operating cost is nearly $300, according to the National Association of Home Builders (NAHB). Fiberglass helps you achieve the most time and money savings.

Downtime with fiberglass is nearly zero; compared to cellulose, which is applied wet and requires at least several days to setup prior to drywall installation.

During fiberglass installation, other contractors can safely continue working. With spray foam, installation requires 24-hour evacuation. Nothing more than a cutting tool, staple hammer and minimal personal protective equipment are needed to install batts – no machines or power source required.

Batts are available in pre-cut sizes fitting standard wall cavities and wall heights, so productivity increases while cleanup is reduced. Or batts can easily be cut to fit any size cavity or small spaces.

In addition, the product is lightweight, flexible and compression-packaged, speeding jobsite handling and installation while minimizing warehouse requirements and transportation costs and demands.
FIBER FLEXIBILITY
Fiberglass gives ultimate flexibility to meet most building challenges regardless of structure, application or climate region. Choose to use fiberglass alone as a complete insulation solution or as part of advanced hybrid applications. It is also easily installed into an existing structure for a highly flexible retrofit solution.

No specific temperature is required at time of installation to achieve maximum thermal performance (unlike some other insulation types). For adding acoustical insulation between rooms, batts offer the most viable, cost-effective option. Fiberglass also delivers outstanding acoustical performance and is easily installed into studs prior to drywall installation (on either side).

The product (high density cathedral batts) fits tightly between cathedral rafters to achieve high R-values. This leaves ventilation space so baffles are not required.

FIBER BUILDS BUSINESS MUSCLE
- Solutions for every insulation and application
- Solid value for any performance level (provides the same R-values for as low as one-quarter the installed cost of other insulation types)
- Wide range of products and performance levels (allows for optimal R-value within any budget)
- Reduced installation time
- Answers the market’s current need for cost-effective/energy-efficient housing

A SUSTAINABLE DIFFERENCE
Fiberglass insulation offers among the highest renewable and recycled content in the industry and delivers ongoing energy savings that lowers carbon footprint for many years.

- One pound of fiberglass insulation saves 12 times as much energy in its first year in place as the energy used to produce it (continues saving for the life of the building)
- Made from silica sand, one of the most abundant and renewable minerals and an average of 50% (up to 60%) recycled post-consumer glass product.
- Compression packaged, allowing for more product on each truck, reducing transportation demands and impact on the environment
- Batt can be removed from an existing building and re-installed, making them among the few reusable forms of insulation (demonstrating lasting sustainable performance)
- Since 1992, NAIMA members’ plants have diverted more than 46.3 billion pounds of recycled materials from the waste stream

Between 1992 and 2008, the fiberglass insulation industry recycled over 18 billion pounds of pre- and post-consumer glass containers, eliminating the need for millions of cubic feet of landfill space.

Between 1992 and 2008, the fiberglass insulation industry recycled over 18 billion pounds of pre- and post-consumer glass containers, eliminating the need for millions of cubic feet of landfill space. Many fiberglass insulation manufacturers have plants that use up to 40% or more recycled materials in their products. The current industry average is 30% recycled content. Manufacturers currently are exploring ways in which their use of recycled materials can be increased without compromising the performance of insulation products.
A SAFE BET

• As one of the most thoroughly tested insulation products on the market, fiberglass is proven safe to use when recommended work practices are followed.

• The majority of fiberglass products contain no added formaldehyde and can pass Environmental Specification 1350.

• Do not contain chemical fire retardants required in other insulation types.

• Many are also certified for low emissions by a third party program such as GREENGUARD® Gold Certification or the Scientific Certifications System’s (SCS) Indoor Advantage Gold Certification.

• Installing fiberglass requires minimal safety equipment (gloves, protective eyewear and an optional dust mask).

WRAPPING IT ALL UP

Both fiberglass and stone wool can help block noise. Each has its fire safety dynamics. Just like a PC or Mac will allow you to create, alter and save documents, either one of these insulation products provides sensible solutions for savings and sustainability.

In the end, building professionals will make the choice based on preference, price, profitability and performance.