

Mineral Wool Makes a Comeback

This natural spun-stone insulation is enjoying a resurgence in popularity—and for good reason

BY MIKE MAINES

Mineral-wool insulation has been in use since the late 1800s, so it's nothing new. But as the market shifted in the 1960s to less-expensive and better-promoted fiberglass insulation, the mineral-wool industry shifted its focus to industrial and manufacturing applications, where mineral wool became a perfect replacement for the asbestos materials being phased out due to health concerns. Yet over the last 25 years, the cost of energy, the public's awareness of health and environmental impacts, and building-science research have led to a renewed interest in mineral wool for the residential market also.

It's not hard to see why mineral wool is regaining lost ground. It's got an R-value of 3.8 to 4.3 per in., it's chemically inert, it contains almost no VOCs, it's fireproof, it absorbs sound, and its embodied energy is lower than that of most petroleum-derived foams. Sold most commonly as batts, it's also available as boards and as loose fibers for blown installations, and it can be used in all the critical locations: walls, floors, ceilings, roofs, exteriors, and even below grade. It is vapor permeable—which has its disadvantages as well as its advantages—and is fairly easy to install well. In a category that has long been dominated by fiberglass batts, mineral wool is worth a fresh look. □

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THE OPTIONS LOOK FAMILIAR



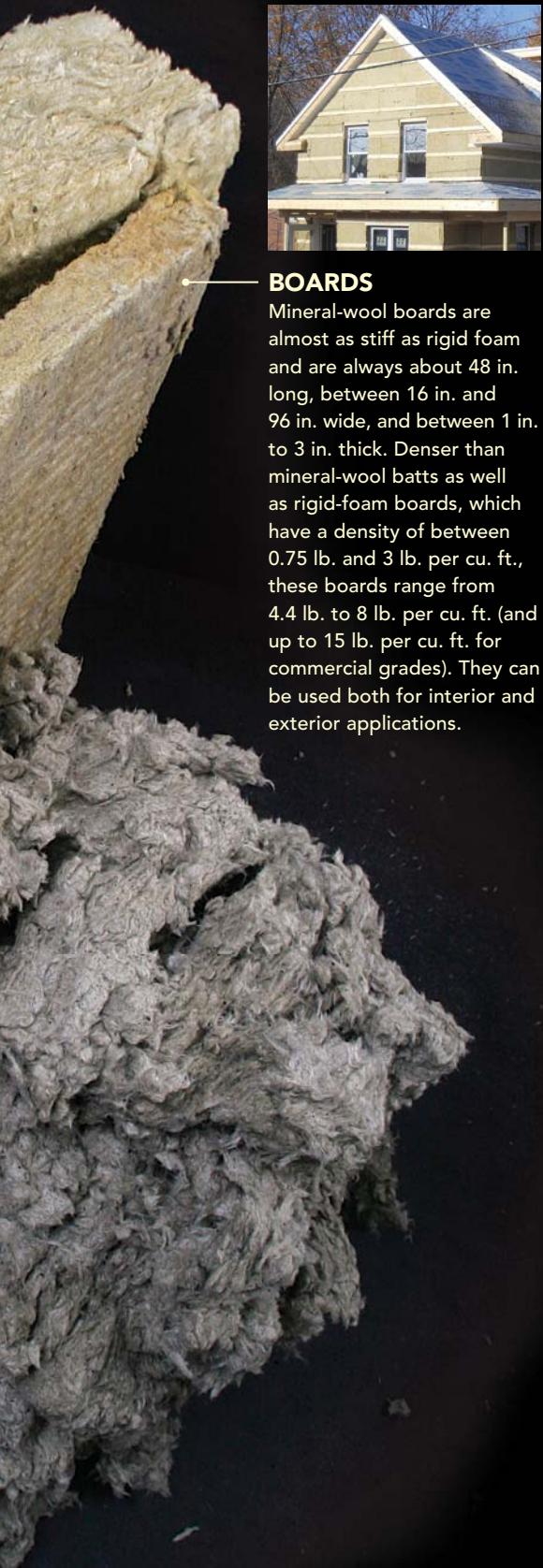
BATTS

Mineral-wool batts come in widths and thicknesses typical for residential construction, but only in 48-in. (or sometimes 47-in.) lengths, and never in rolls. Batts are formed slightly wider than typical 16-in. or 24-in. framing cavities to create a tight friction fit, and they don't move or change significantly over time or with changes in temperature. Mineral wool is dense, ranging from 2 lb. to 4 lb. per cu. ft. versus 0.4 lb. to 1.4 lb. per cu. ft. for fiberglass.



BLOWN

Mineral wool is available for blown installations either by itself as loose fill (generally for attics), or mixed with a binder and sprayed into framing cavities or onto foam as a fire retardant.

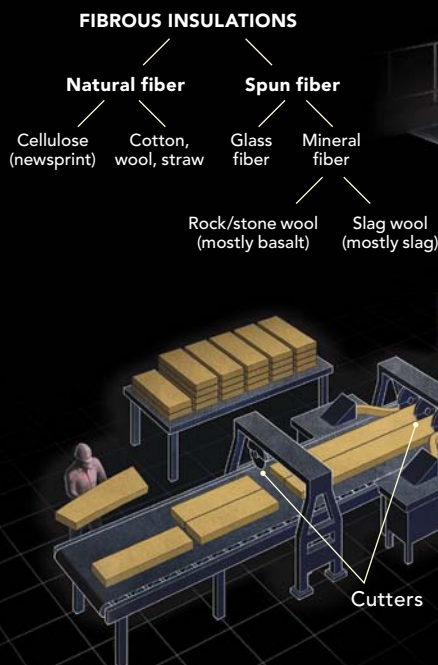


BOARDS

Mineral-wool boards are almost as stiff as rigid foam and are always about 48 in. long, between 16 in. and 96 in. wide, and between 1 in. to 3 in. thick. Denser than mineral-wool batts as well as rigid-foam boards, which have a density of between 0.75 lb. and 3 lb. per cu. ft., these boards range from 4.4 lb. to 8 lb. per cu. ft. (and up to 15 lb. per cu. ft. for commercial grades). They can be used both for interior and exterior applications.

YES, IT'S MADE OF ROCKS

Ranging from tannish-yellow to greenish-brown, mineral wool has a matted-wool texture that's coarser and denser than fiberglass, thanks to its main ingredient: rock. Part of the fibrous insulation family of products, mineral wool is made by spinning molten basalt and/or blast-furnace slag (a by-product of the processing of iron ore and other minerals) to form short, multidirectional fibers.



SUPPLY AND DEMAND Although more available than ever before, mineral wool still competes for shelf space. Battis are typically 60% to 70% more expensive than fiberglass, and boards are at least 80% more expensive than rigid-foam boards.

Johns Manville

Thermal batts (TempControl) and sound-control batts (Sound & Fire Block); no board insulation for the residential market
AVAILABILITY Widely available at Lowe's from the Southeast to the West Coast
COST PER SQ. FT. R-15 batts = 63¢

Owens Corning/Thermafiber

Thermal batts, also good for sound and fire control (UltraBatt); no board insulation for the residential market
AVAILABILITY UltraBatt distributed in the north-central United States through Menards.
COST PER SQ. FT. R-15 batts = 77¢ to 93¢, R-23 batts = \$1.08 to \$1.16, R-30 batts = \$1.53 to \$1.58

Roxul

Thermal batts (ComfortBatt) and sound-control batts (Safe'n'Sound) in widths designed for 16-in. and 24-in. framing cavities; board insulation (ComfortBoard IS insulating sheathing) in 1¼-in., 1½-in., 2-in., and 3-in. thicknesses, and in 24-in.,

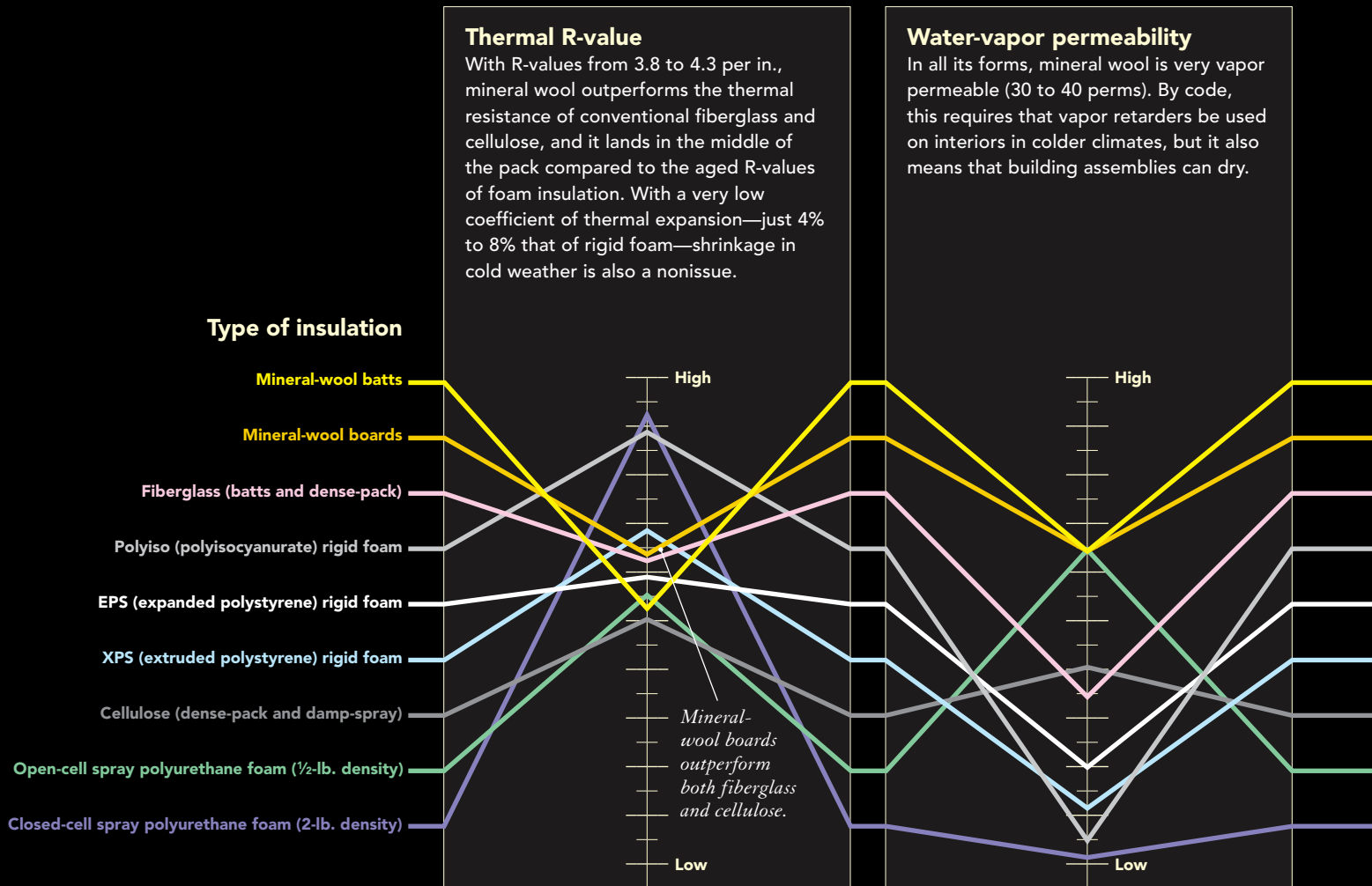
36-in., and 48-in. widths (also available is the 1-in.-thick ComfortBoard FS firestop product, sold in 16-in. and 24-in. widths)
AVAILABILITY Battis commonly available nationwide; board insulation typically special ordered and only in large quantities, but internet retailer Small Planet Workshop stocks smaller quantities
COST PER SQ. FT. R-15 batts = 66¢ to 79¢, R-23 batts = \$1.00 to \$1.15, sound-control batts = 74¢ (3 in. thick), board insulation = \$1.80 (2 in. thick) and \$2.79 (3 in. thick)

Amerrock

Loose mineral wool for blown installation (Rockwool Premium Plus) and FireStopTB sprayed thermal barrier; no boards or battis
AVAILABILITY Nationwide through insulation distributors, or direct from the manufacturer
COST PER SQ. FT. R-38 = \$2.40 installed (\$8.50 for a 30-lb. bag), which is about 30% higher than cellulose but less than half the cost of closed-cell foam

HOW MINERAL WOOL STACKS UP

Although it's not easy to do a direct comparison, mineral wool proves to be a strong



MORE POINTS OF COMPARISON

Health concerns

Although mineral wool is chemically inert and contains essentially no VOCs (the products with formaldehyde binders are cured before leaving the factory), respirators and other personal protective equipment are still recommended during installation, as with installations of other types of fibrous insulation. Some people find the fibers itchier than fiberglass, but others consider them less so. According to manufacturers, the fibers settle out of the air quickly due to their relatively heavy weight, so the itch factor may depend on the individual and whether the itch is from contact or airborne fibers. MSDS documents list mineral wool as “not classifiable as carcinogenic to humans.” Although products with a mineral-oil additive may create some smoke in the presence of fire, there is no danger of the thick, toxic smoke that accompanies burning foam.

Mold

As do the manufacturers of many building products, mineral-wool producers exercise care with the phrasing “does not support mold growth.” In other words, the insulation itself does not provide a food source for mold or other fungal growth, but if temperature and humidity levels are high enough, mold could still appear in framing cavities. In fact, one of mineral wool’s other markets is as a growing medium for plants.

TO OTHER TYPES OF INSULATION

contender in many areas.

Airflow resistance

Although dense enough that wind washing (diminished insulating value due to movement of air) is not a big concern for board products or in attics, mineral wool is still air permeable, and even when it's tightly fit, there still may be some gaps in the installation. For this reason, batts in framing cavities should be combined with some form of air barrier.

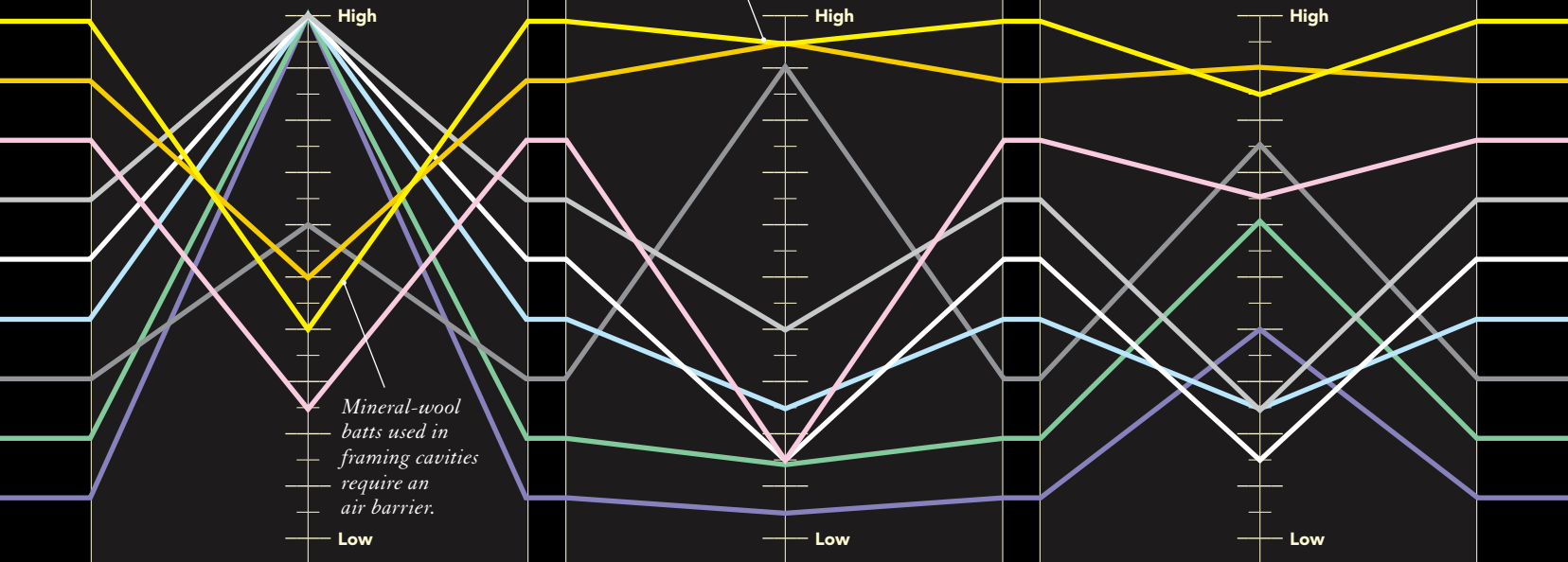
Fire control

Naturally fire resistant and noncombustible without relying on chemical additives, mineral wool has a melting point of over 2000°F and is code approved for use as both draft stopping and as fire blocking. Its flame-spread and smoke-development ratings are low to zero, depending on the specific product.

Sound control

The physical characteristics of mineral wool make it excellent at absorbing sound. "Sound batts," made somewhat denser and in different sizes than batts intended solely for thermal use, can be installed in interior framing cavities to minimize sound transfer. Manufacturers note that mineral wool is only one part of a sound-attenuation strategy, though; for the best performance, refer to assemblies rated for sound-transmission class (STC).

Mineral wool has a melting point nearly twice that of fiberglass.



Environmental impact

Considered green for its typically high recycled content (although some brands use all virgin material), fire resistance, low formaldehyde content, high thermal resistance, and vapor-permeable composition, mineral wool compares favorably to most other insulation products in terms of environmental impact. According to a Building Green report, mineral wool's lifetime global-warming potential is lower than that of most foam products and about the same as fiberglass. The only insulation material that scored significantly better than mineral wool was cellulose.

Liquid water

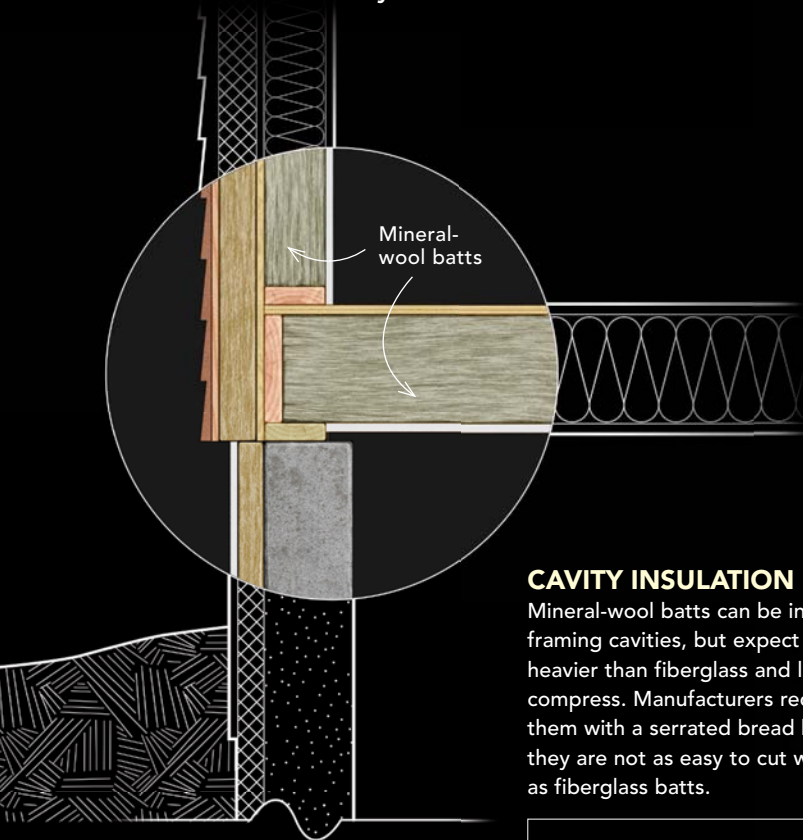
Thanks both to a light-bodied oil added during the manufacturing process and to the nonporous nature of its fibers, mineral-wool insulation is highly resistant to water absorption. Mineral-wool fibers are stocky, allowing liquid water to drain without harm, even in batt products.

Pests

Other than its density, there is nothing in mineral wool to deter rodents or insects, and birds have been known to nest in exposed exterior mineral wool. As with most types of insulation, care should be taken in other ways to keep pests out.

AT HOME IN MOST APPLICATIONS

Manufacturers and insulation contractors cite sound attenuation and fire safety as the two major reasons for using mineral wool, but the product has plenty of thermal advantages as well. Here's what you need to know about installing it in various applications.

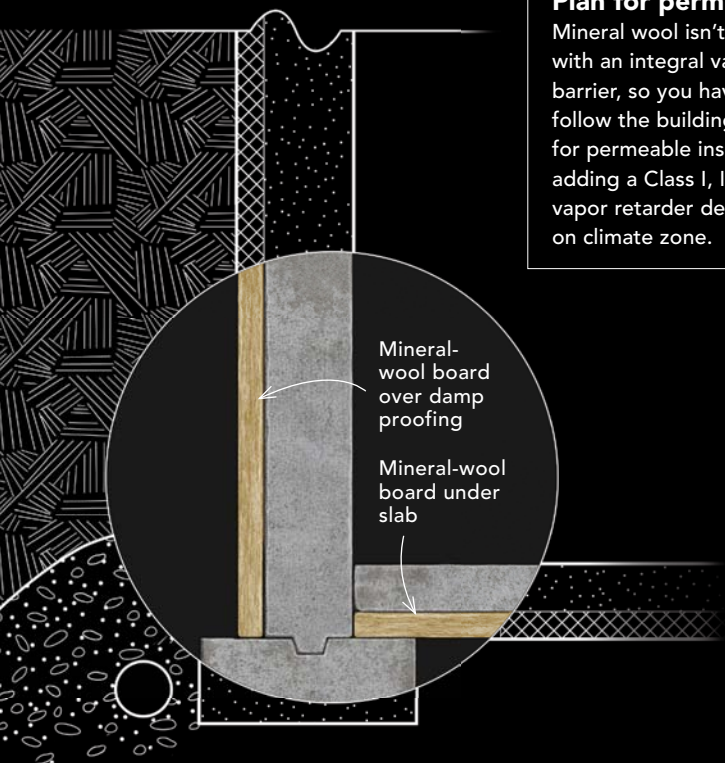


CAVITY INSULATION

Mineral-wool batts can be installed in framing cavities, but expect them to be heavier than fiberglass and less likely to compress. Manufacturers recommend cutting them with a serrated bread knife because they are not as easy to cut with a utility knife as fiberglass batts.

Plan for permeability

Mineral wool isn't available with an integral vapor barrier, so you have to follow the building code for permeable insulation, adding a Class I, II, or III vapor retarder depending on climate zone.



BASEMENTS AND FOUNDATIONS

When insulating first-floor joists, or the ceiling of a crawlspace or basement, keep the batts tight to the floor sheathing, and add a vapor retarder. Because of the risks involved, avoid using mineral wool or any permeable insulation on the interior face of a basement wall.

A study by the Danish Technological Institute found that mineral wool installed below grade remained effective and unaltered by compression over 30 to 35 years. Damp proof or waterproof the exterior face of the concrete before installing the mineral wool, backfill with well-draining soil and filter fabric, and extend the insulation to the top of the foundation wall. Cover it with cementboard, stucco, or another material.

Roxul's ComfortBoard IS is approved for use below slabs at non-load-bearing locations, but it is not approved for use under frost-protected shallow foundations.

Keep joints tight

Unlike foam (whose joints can be sealed with tape or spray foam) or faced fiberglass batts (which can be stapled into place), mineral wool relies on tight physical contact to avoid thermal "short circuits."

Plays well with others

Used regularly in flash-and-batt applications, mineral wool is a cost-effective companion to a thin layer of spray foam applied against the interior side of wall sheathing. This approach is also appealing for its acoustical performance, as closed-cell foam does little for sound control.

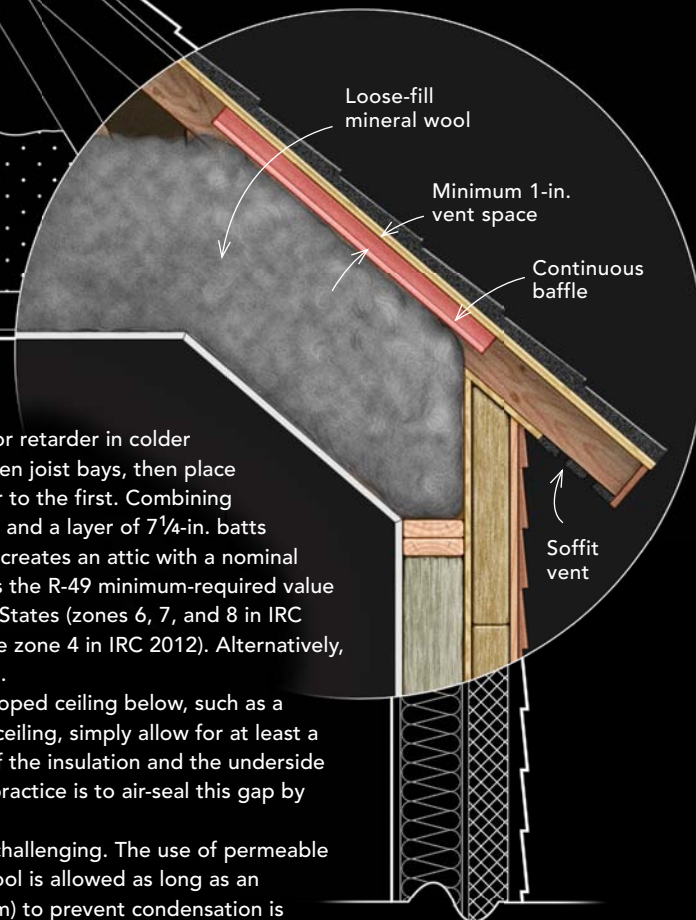


ATTIC AND ROOF

On attic floors (above a vapor retarder in colder climates), install batts between joist bays, then place a second layer perpendicular to the first. Combining a layer of 5½-in. batts (R-23) and a layer of 7¼-in. batts (R-30), with all seams offset, creates an attic with a nominal R-value of 53, which exceeds the R-49 minimum-required value for cold zones in the United States (zones 6, 7, and 8 in IRC 2009, plus zone 5 and marine zone 4 in IRC 2012). Alternatively, use the loose-blown product.

For a vented roof with a sloped ceiling below, such as a typical vaulted or cathedral ceiling, simply allow for at least a 1-in. gap between the top of the insulation and the underside of the roof sheathing. Best practice is to air-seal this gap by using continuous baffles.

Unvented roofs are more challenging. The use of permeable insulation such as mineral wool is allowed as long as an impermeable insulation (foam) to prevent condensation is installed either directly above or directly below the roof sheathing. Generally, a greater proportion of impermeable insulation is required the farther north you are.



EXTERIOR INSULATION

According to Building Science Corporation, the water-resistive barrier (WRB) should go on the face of the sheathing when installing exterior mineral-wool board insulation. You also can use a sheathing with an integral WRB, such as Huber's Zip System product. The WRB or sheathing layer is also a good location for the air barrier in all climates as long as the framing cavities allow drying toward the inside (i.e., no closed-cell foam). It is also a good location for the vapor retarder, when required, as long as the proportion of exterior insulation to interior insulation keeps the vapor retarder above the dew point. Keep in mind that because of its lower R-value per inch, a thicker layer of mineral-wool board insulation is required to reach the same R-value as foam.

Heavy hanger

Although commonly attached like rigid foam—with screws driven through wood strapping—mineral wool tends to compress slightly, so creating a flat plane for siding takes finesse. HECO screws (smallplanetnetworkshop.com) designed to attach strapping without overly compressing the insulation is one option; thermally broken fiberglass standoffs to support strapping are another.

