INSULATION FACTS #21

NAIMA
North American Insulation Manufacturers Association

www.naima.org

High-Performance Batts for Walls and Cathedral Ceilings Offer Energy and Money Saving Construction Alternatives

In this issue we look at high-performance fiber glass batts, which can significantly improve the energy efficiency of walls and cathedral ceilings and achieve higher R-values without necessarily adding to the cost of building a home.

There's good news for builders, remodelers and homeowners who are building new homes, or remodeling existing ones, and looking for increased energy efficiency. High-performance batts, which are higher density and have higher insulating ability than standard fiber glass batts, can increase the energy efficiency of walls and ceilings without necessarily increasing the building costs.

Specifically designed for sidewalls and cathedral ceilings, high-performance batts offer design alternatives that enable homes to meet or exceed current recommended levels of insulation, often at a lower total cost.

Super-Insulated Sidewalls

The latest energy-efficiency recommendations for homes call for insulation levels of R-19 for sidewalls in most areas. High-performance batts enable homes to meet these recommendations easily and cost-effectively.

Traditionally, to achieve an R-value of 19 in sidewalls, builders install standard insulation batts along with insulated sheathing. High-performance batts offer a cost-effective alternative. They are available for 2″ x 4″ and 2″ x 6″ construction, the latter of which represents nearly 1/2 of all new homes.

Walls Built With 2″ x 4″ Construction

To achieve an R-19 with this construction, a builder could use the 3-1/2″ thick R-15 high-performance batt in combination with an R-4 sheathing material. This would enable the builder to meet R-19 less expensively and avoid using 2″ x 6″ construction. Using R-15 high-performance batts allows the use of a thinner, less expensive insulated sheathing and lowers the total cost of the sidewall.

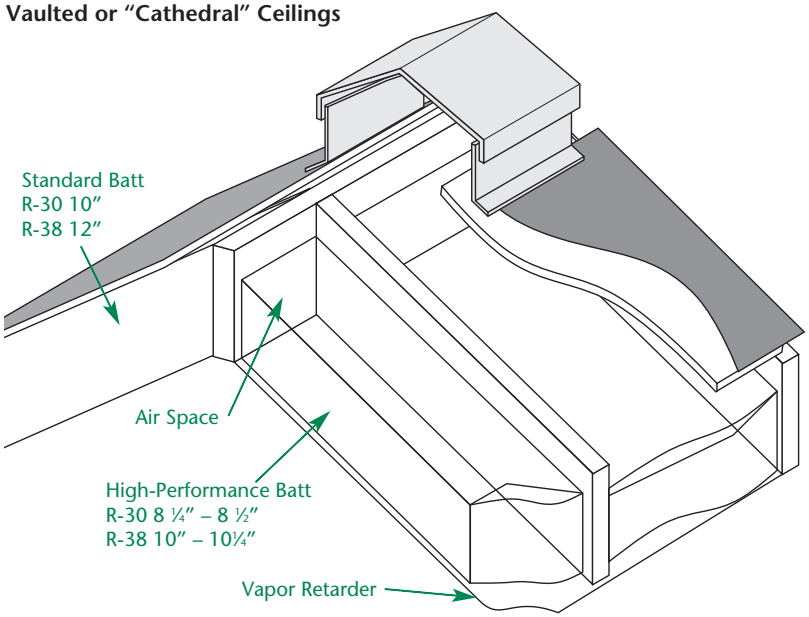
Homes Built With 2″ x 6″ Construction

When standard R-19 insulation is used to fill 5-1/2″ cavities it must be compressed to fit. This reduces its value to R-18. The R-21 high-performance batt offers the highest R-value in a 5-1/2″ wall cavity.

Energy-Efficient Cathedral Ceilings

Despite their popularity, vaulted, or cathedral ceilings are more difficult to insulate to today's recommended energy standards than traditional flat ceilings. Cathedral ceilings should achieve an R-value of 30 or 38 to meet the energy efficiency requirements of the International Energy Conservation Code and many state codes in a large portion of the United States. Until recently standard fiber glass batt thickness requirements to meet these codes were approximately 10″ and 12″ respectively. Because most cathedral ceilings provided insufficient space for standard insulation and air space, larger joists or roof baffles were needed to allow for ventilation of

Vaulted or "Cathedral" Ceilings



the roof deck. This involved additional costs and labor to install.

Higher R-Values in Less Space

High-performance batts are specially designed for the space limitations in common cathedral ceilings. They have R-values of either 30 or 38. R-30 high-performance batts are 8-1/4″ to 8-1/2″ thick as opposed to standard R-30 fiber glass insulation batts of 9-1/2″ to 10″ (thickness may vary by manufacturer). The R-38 high-performance batts are 10″ to 10-1/4″ thick as opposed to standard R-38 fiber glass insulation batts of 12″. Because high-performance batts achieve the same R-value as standard insulation — but are not as thick — they need not be compressed to fit the angles and spaces typically found in cathedral ceilings.

Ventilation and Moisture Control No Longer a Problem

Compressing standard insulation products in typical cathedral roof/ceiling constructions can restrict the air flow under a building's roof deck. Ventilation with outdoor air is an important moisture control consideration for attics and ceilings. Without proper ventilation, a roof deck could be damaged by excessive moisture condensation. Water stains, wood deterioration, mold and mildew can result from inadequate ventilation or inadequate vapor retarders.

The R-30 and R-38 high-performance batts can be installed easily between the ceiling rafters without compression. Installed properly, high-performance batts leave the space necessary for ventilation in cathedral ceilings without the need for baffles or larger roof joists, thereby saving the homeowner money in the long run.

In addition to ventilation, NAIMA recommends the use of vapor retarders in cathedral ceilings to limit water vapor transmission into building cavities. Vapor retarders limit the migration of water vapor from heated areas to cold areas where it could condense to liquid water.

Installation Recommendations

Cathedral ceilings with vapor retarders need a vent area of 1 sq. ft./300 sq. ft. of ceiling. Without a vapor retarder, the vent area should be doubled. For most heating dominated areas of the country, insulation with a vapor retarder facing should be installed toward the warm-in-winter side of the construction. This means that in cathedral ceilings the vapor retarder faces down. High-performance batts are held in place either by pressure against the sides of the rafters or by staples. Follow the manufacturers recommendations for installation. With the exception of reverse-flange insulation, the stapling flanges are on the same side as the vapor retarder. In warm, humid climates, local practice should be followed regarding the use of and/or placement of vapor retarders. If unfaced fiber glass insulation is used, a separate vapor retarder should be applied after the insulation is installed.

Conclusion

High-performance batts are an excellent way to achieve higher recommended energy efficiency levels in sidewalls and cathedral ceilings without increasing the costs of construction.

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.

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