



BEYOND THE BASICS: Insulation

Written by Greg Crabtree, Isaman Design

What is Insulation?

In today's modern buildings and homes, insulation is commonplace and is used to provide resistance to heat flow both in and out of buildings. Although the state building code mandates a minimum level of insulation, providing higher levels of insulation will lower the heating and cooling costs of your building as well as create a more comfortable space in which to live and/or work.

Heat naturally flows from warmer places to cooler places. In a heated building, the heat will flow from interior spaces to the exterior through roofs, floors, exterior walls, windows and doors. By creating a good barrier to this heat flow through the use of good insulation you will be able to lower your energy bills for as well as reduce greenhouse gasses and your buildings overall carbon footprint.

"R-value" measures the thermal resistance in insulation; the higher the R-value, the higher the level of thermal resistance. Although our mild climate allows for R-values as low as R-13, a more appropriate level is R-19 or higher for walls and R-30 or higher for roofs. Proper installation is critical to achieve the stated R-value, and installation techniques vary depending on the product. When choosing a product, consult a reputable insulation installer. Verify that they have appropriate certification and manufacturer knowledge of the product in order to get the most out of your investment and your new insulation.

Insulation Types

Batt Insulation:

One of the most common types of insulation, batt is inexpensive and easy to install. Batts are pre-cut panels of insulation available in a variety of widths common to stud spacing and a variety of "R-values" depending on depth. Batt R-values are typically around R3.5 per inch. Although typically made of fiberglass, batt can also be made of other materials, including cotton. One drawback of batt is the difficulty in achieving a proper installation. Gaps frequently occur, and can quickly lead to dramatically reduced R-values.



Loose-Fill Insulation:

The most common loose-fill insulation types are cellulose, fiberglass, and mineral (rock or slag wool), all of which are typically made from recycled materials (e.g., newspaper is used to create cellulose).

Loose-fill R-values range from approximately R2.5 per inch for fiberglass up to as high as R3.8 per inch for cellulose. This insulation is



common in attics, and with new methods of installation, it can now be installed very effectively in walls. While loose-fill can be a great "green" product, one thing to watch out for is settling, which over time causes a reduction in R-value.



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Rigid Foam Board Insulation:

Rigid foam board insulation is a versatile product that can be used to insulate anything from roofs to foundations, and comes in varying R-values (from R4 up to R8 per inch) depending on type and thickness.

Rigid foam board may be a good choice when space is an issue. Some modern foam board insulation products can even be attached to building exteriors, replacing shear panels.



Sprayed Foam Insulation:

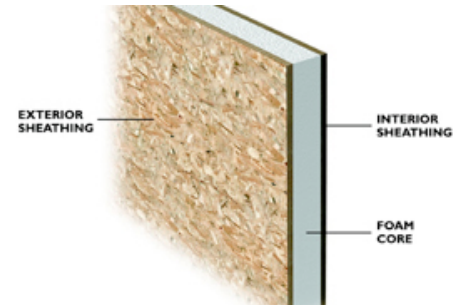
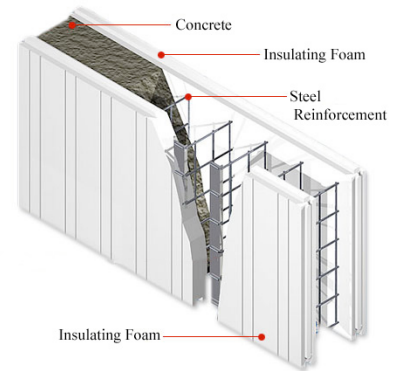
Liquid foam insulation can be sprayed, formed in place, injected, or poured, and due to its ability to fill and seal even the smallest of cracks, has R-values that double the value per inch of traditional batts.

Today's foam insulation materials can be used free of CFCs and HCFCs and some manufacturers produce even greener options utilizing soy as a base. One main consideration of using foam insulation is a higher initial cost; however, the improved air and moisture barrier it creates may reduce costs in other areas associated with weatherizing your building.



Insulated Wall Assemblies:

There are several manufactured wall and roof systems that utilize rigid insulation as part of a structural system, including Insulated Concrete Forms (ICF) and Structurally Insulated Panels (SIP). ICF are rigid foam forms for poured-in-place concrete walls. The foam remains in place after construction as part of the finished wall assembly. The ICF system has building insulation built right into the structure and typically provides R-values above R-17. SIP consist of sheets of oriented strand board (OSB) sandwiching rigid foam.



These insulated assemblies (and others like them) typically have faster construction, higher insulation, and lower air infiltration when the project is complete.

What the Future Holds

Due to increased energy costs and current issues such as global warming, manufacturers will continue to make better-performing and greener products. A high-performance, properly installed insulation system for your home or business is very cost effective and one of the most important things you can do to create an effective, energy-efficient building.