

# Lazerwebsites.com Newsletter

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## Insulation Standards

Insulation installation standards vary from state to state, jurisdiction and even by county. Most states and jurisdictions adhere to the International Energy Conservation Code or the IECC. They are the primary model for insulation building codes by states and municipalities.

## Code compliance guides

NAIMA has developed a series of brief building envelope compliance guides, for each state, for both the 2009 and 2012 versions of the IECC, which can be found at:

<https://insulationinstitute.org/im-a-building-or-facility-professional/residential/codes-standards/>

With due regard to code updates and changes it is best to consult the Building Codes Assistance Project at <https://bcapcodes.org/> for up to date code information compiled by state and then local jurisdiction.

A good resource on this website is the Consumer portal located at:

<https://bcapcodes.org/consumer-portal/> which provides useful information on insulation and codes whether you're buying a new home or remodeling your current home.

It is a good idea to educate yourself to your states codes and to make sure that whatever project you're considering, that you'll have to right information to stay within the guidelines set for your area and build or remodel within the allowed codes.

## Insulation R-Values

The common difference among varieties of insulation is the R-value. **R value is the measurement of thermal (hot/cold) resistance and measures the ability of heat transfer from one side of an object to another.** As an example: one inch of solid wood has an R-value of 1. In comparison, an inch of blown fiberglass insulation has an R-value of 3.1 - 3.4

an inch of blown cellulose has an R-value of 3.2 - 3.7

This chart shows the typical R values for Material and the R value per inch of material.

Material	R-value/in	3 1/2"	5 1/4"	10"	12"	15"
Fiberglass (batt)	3.1 - 3.4	10.8 - 11.9	16.3 - 17.8	31.0 - 34.0	37.2 - 40.8	46.5 - 51.0
Fiberglass blown (attic)	2.2 - 4.3	7.7 - 15.0	11.5 - 22.6	22.0 - 43.0	26.4 - 51.6	33.0 - 64.5
Fiberglass blown (wall)	3.7 - 4.3	12.9 - 15.0	19.4 - 22.6	37.0 - 43.0	44.4 - 51.6	55.5 - 64.5
Mineral Wool (batt)	3.1 - 3.4	10.8 - 11.9	16.3 - 17.8	31.0 - 34.0	37.2 - 40.8	46.5 - 51.0
Mineral Wool blown (attic)	3.1 - 4.0	10.8 - 14.0	16.3 - 21.0	31.0 - 40.0	37.2 - 48.0	46.5 - 60.0
Mineral Wool blown (wall)	3.1 - 4.0	10.8 - 14.0	16.3 - 21.0	31.0 - 40.0	37.2 - 48.0	46.5 - 60.0
Cellulose blown (attic)	3.2 - 3.7	11.2 - 12.9	16.8 - 15.0	32.0 - 37.0	38.4 - 44.4	48.0 - 55.5
Cellulose blown (wall)	3.8 - 3.9	13.3 - 13.6	19.9 - 20.8	38.0 - 39.0	45.6 - 46.8	57.0 - 58.5
Polystyrene Board	3.8 - 5.0	13.3 - 17.5	19.9 - 26.2	38.0 - 50.0	45.6 - 60.0	57.0 - 75.0
Polyurethane Board	5.5 - 6.5	19.2 - 22.7	28.9 - 34.1	55.0 - 65.0	66.0 - 78.0	82.5 - 97.5
Polyisocyanurate (foil-faced)	5.6 - 8.0	18.2 - 28.0	29.4 - 42.0	56.0 - 80.0	67.2 - 96.0	84.0 - 120.0
Open Cell Spray Foam	3.5 - 3.6	12.2 - 12.6	18.4 - 18.9	35.0 - 36.0	42.0 - 43.2	52.5 - 54.0
Closed Cell Spray Foam	6.0 - 6.5	21.0 - 22.7	31.5 - 34.1	60.0 - 65.0	72.0 - 78.0	90.0 - 97.5

Chart courtesy of:

<https://www.greatdayimprovements.com/insulation-r-value-chart.aspx>

## Types of Insulation Materials

There are many type of materials which to choose from when considering insulation in a new construction or adding to an already built home. You have to consider the whole area and the existing materials R value when looking to install or upgrade insulation materials.

TYPE	MATERIAL	WHERE APPLICABLE	INSTALLATION METHODS	ADVANTAGES
<b><u>Blanket: batts and rolls</u></b>	Fiberglass Mineral (rock or slag) wool Plastic fibers Natural fibers	Unfinished walls, including foundation walls Floors and ceilings	Fitted between studs, joists, and beams.	Do-it-yourself. Suited for standard stud and joist spacing that is relatively free from obstructions. Relatively inexpensive.
<b><u>Concrete block insulation and insulating concrete blocks</u></b>	Foam board, to be placed on outside of wall (usually new construction) or inside of wall (existing homes): Some manufacturers incorporate foam beads or air into the concrete mix to increase <a href="#">R-values</a>	Unfinished walls, including foundation walls New construction or major renovations Walls (insulating concrete blocks)	Require specialized skills Insulating concrete blocks are sometimes stacked without mortar (dry-stacked) and surface bonded.	Insulating cores increases wall R-value. Insulating outside of concrete block wall places mass inside conditioned space, which can moderate indoor temperatures. Autoclaved aerated concrete and autoclaved cellular concrete masonry units have 10 times the insulating value of conventional concrete.
<b><u>Foam board or rigid foam</u></b>	Polystyrene Polyisocyanurate Polyurethane	Unfinished walls, including foundation walls Floors and ceilings Unvented low-slope roofs	Interior applications: must be covered with 1/2-inch gypsum board or other building-code approved material for fire safety. Exterior applications: must be covered with weatherproof facing.	High insulating value for relatively little thickness. Can block thermal short circuits when installed continuously over frames or joists.
<b><u>Insulating concrete forms (ICFs)</u></b>	Foam boards or foam blocks	Unfinished walls, including foundation walls for new construction	Installed as part of the building structure.	Insulation is literally built into the home's walls, creating high thermal resistance.
<b><u>Loose-fill and blown-in</u></b>	Cellulose Fiberglass Mineral (rock or slag) wool	Enclosed existing wall or open new wall cavities Unfinished attic floors Other hard-to-reach places	Blown into place using special equipment, sometimes poured in.	Good for adding insulation to existing finished areas, irregularly shaped areas, and around obstructions.
<b><u>Reflective system</u></b>	Foil-faced kraft paper, plastic film, polyethylene bubbles, or cardboard	Unfinished walls, ceilings, and floors	Foils, films, or papers fitted between wood-frame studs, joists, rafters, and beams.	Do-it-yourself. Suitable for framing at standard spacing. Bubble-form suitable if framing is irregular or if obstructions are

TYPE	MATERIAL	WHERE APPLICABLE	INSTALLATION METHODS	ADVANTAGES
				present. Most effective at preventing downward heat flow, effectiveness depends on spacing.
<b><u>Rigid fibrous or fiber insulation</u></b>	Fiberglass Mineral (rock or slag) wool	Ducts in unconditioned spaces Other places requiring insulation that can withstand high temperatures	HVAC contractors fabricate the insulation into ducts either at their shops or at the job sites.	Can withstand high temperatures.
<b><u>Sprayed foam and foamed-in-place</u></b>	Cementitious Phenolic Polyisocyanurate Polyurethane	Enclosed existing wall Open new wall cavities Unfinished attic floors	Applied using small spray containers or in larger quantities as a pressure sprayed (foamed-in-place) product.	Good for adding insulation to existing finished areas, irregularly shaped areas, and around obstructions.
<b><u>Structural insulated panels (SIPs)</u></b>	Foam board or liquid foam insulation core Straw core insulation	Unfinished walls, ceilings, floors, and roofs for new construction	Construction workers fit SIPs together to form walls and roof of a house.	SIP-built houses provide superior and uniform insulation compared to more traditional construction methods; they also take less time to build.

## New Home Insulation Installation

It is more cost-effective to install insulation during a new home construction than to install it after the house is completed. To properly insulate a new home, you will need to know the recommended R-values for those areas.

In most areas in the U.S., you will save money and energy when building a new home or addition if you install a combination of cavity insulation and insulated sheathing.

Reduce exterior wall leaks by taping the joints of exterior sheathing and caulking and sealing exterior walls.

## Adding Insulation to Existing Home

To determine whether or not you should add insulation, first you need to find out how much insulation and its location in your home. A qualified home energy auditor will include an insulation check as a routine part of a whole-house energy assessment.

With an energy assessment, or home energy audit, you will be able to identify areas of your home that are in need of air sealing. **Before you insulate, you should make sure that your home is properly air sealed.**

If you don't need an energy assessment, you do need to find out the following:

- Where your home is and is not properly insulated
- What type of insulation you have
- The R-value and the thickness or depth (inches) of the insulation you have

If you live in a newer house, you can probably get this information from the builder. If you live in an older house, you'll have to inspect the insulation.

Thickness must not be used as the sole factor in determining the R-value of loose-fill insulation, particularly for attic insulation.

## Determining Best R-Value

When you determine the R-values of your insulation either from an energy assessment, the home builder, or home inspection, you can then use the Home Energy Saver at: <http://hes.lbl.gov/consumer/> tool to determine how much insulation you should add and where you should add it for maximum energy efficiency.

**Important Tip:** The idea of your insulating system is to create a "building envelope," which means several types of insulation may be used in any given area.

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