

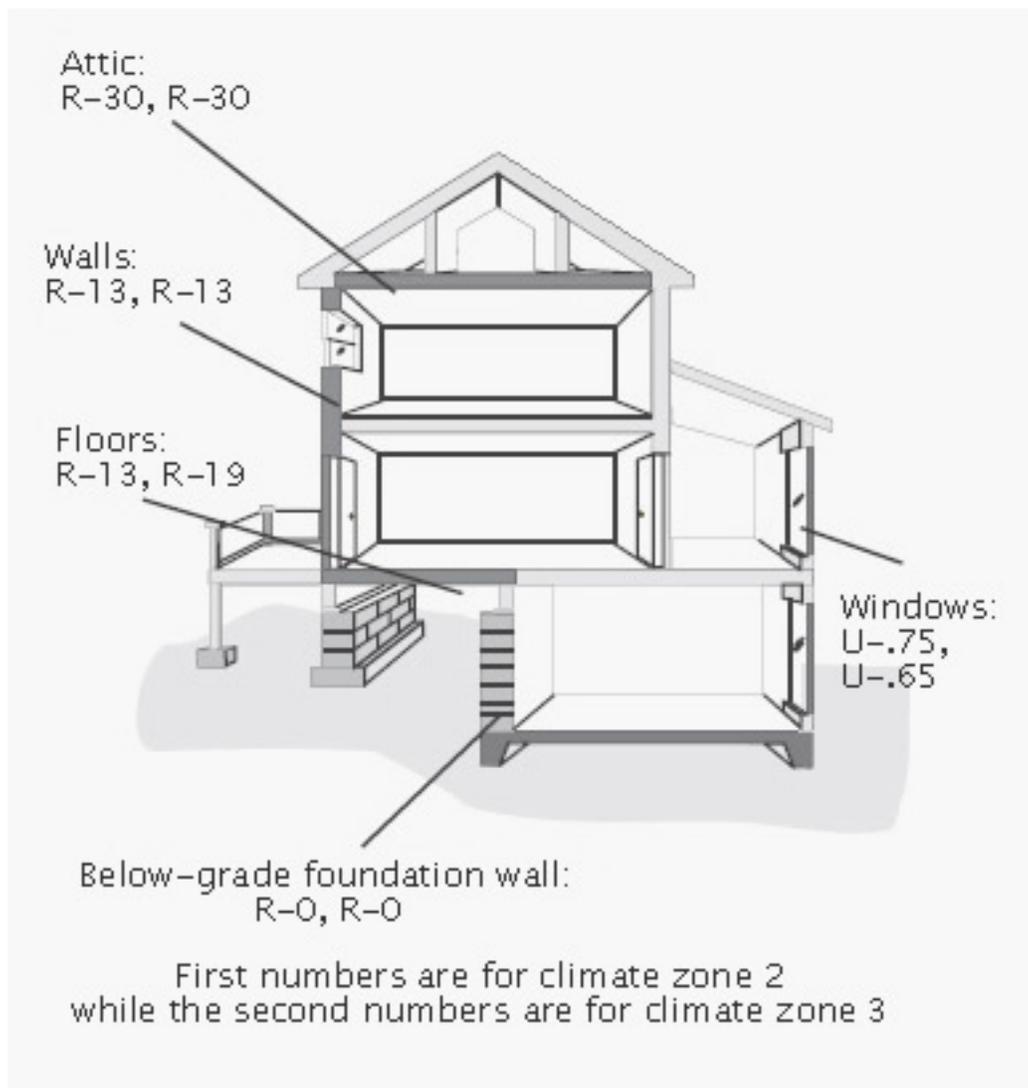
BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: INSULATION MATERIALS AND TECHNIQUES

By
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The *Builder's Guide to Energy Efficient Homes in Louisiana (Builder's Guide)* is being updated to reflect new code requirements. This is the fifth in a series of articles that will summarize the information in the guide and highlight updates.

The key to an effective insulation system is acquisition and proper installation of quality insulation products. A house should have a continuous layer of insulation around the building envelope. Insulation should be in direct contact with the continuous air barrier around the residence for maximum R value (Figure 1). Studies show that improper or incomplete insulation installations can cut performance of the insulation by 30% or more.

Figure 1. Insulating the Building Envelope – Recommended R-values



The following guidelines are critical for optimum performance when installing any insulating material:

- Seal all air leaks between conditioned and unconditioned areas.
- Obtain complete coverage of the insulation.
- Minimize air leakage through the material.
- Avoid compressing insulation.
- Avoid lofting (installing too much air) in loose fill products

Insulation Materials:

- **Fiberglass** (R value 2.4 – 4.4 per inch) comes in batts, rolls, and loose fill products. It is also available in high density board material. Recycled glass is used in the production process. Fiberglass is used for insulating almost every building component, including the foundation, attics, and ductwork.
- **Cellulose** (R value 3.0 – 3.6 per inch), which is made from recycled newsprint, comes mainly in loose fill form. Loose fill cellulose is used for insulating attics. It can be used in walls when installed with a binder, netting, or covering. Because of its high density, cellulose has the advantage of helping to stop air leaks as well as providing insulation value. Cellulose batts are now on the market also.
- **Rock wool** (R value 2.6 per inch) is mainly available as a loose fill product, and can be installed in attics or blown, using damp spray methods, into walls. It is fireproof, and several manufacturers use recycled products in the production process.
- **Molded–expanded polystyrene (MEPS)** (R value 4.0 to 5.0 per inch), known as beadboard, is a foam product made from molded plastic beads. It has the lowest R-value per inch; but it is also the cheapest of the foam insulations. MEPS is used in several building products including insulated concrete forms (ICF's) and structural insulated panels (SIPS). It performs well in below grade applications.
- **Extruded Polystyrene (XPS)** (R value 5.0 per inch) is a homogeneous polystyrene foam product. It comes in characteristic colors of blue, pink, and green. It is an excellent product for below grade applications as well as exterior sheathing.
- **Polyisocyanurate and polyurethane** (R value 6.8 to 7.2 per inch) are insulating foams with some of the highest available R-values per inch. They are not designed for use below grade.
- **Open–cell polyurethane sprayed foam** (R value 5.5 to 6.5 per inch) is used primarily to seal air leaks and to provide an insulating layer.
- **Icynene Foam** (R value 3.6 per inch) is used primarily to seal air leaks and provide an insulating layer. It is made with carbon dioxide rather than with more polluting gases such as Pentene or hydrochlorofluorocarbons used in other foams. It is either sprayed or injected.

- **Aerated concrete**, including lightweight, autoclaved concrete (processed at high temperature) can provide a combination of moderate R-values and thermal masses for floors, walls, and ceilings.

Fiberglass, rockwool, and cellulose products are the most economical and should serve as bulk insulation in attics, walls, and floors. In attics, loose –fill products are usually more expensive than batts or blankets. Blown cellulose and rockwool are denser than fiberglass helping reduce air leakage. Foam products are most economical when they can be applied in thin layers as part of a structural system or to help seal air leaks. Foundation wall or slab insulation, exterior sheathing over wall framing, insulation as part of structural panels for walls and roofs, and spray applied foam insulation are some examples.

Many of Louisiana’s homes have slab-on-grade floors for the first story of conditioned space. Since Hurricanes Katrina and Rita in 2005, Louisiana has adopted a new statewide building code restricting where new homes can be built on concrete slabs below certain elevations. The Department of Natural Resources cautions and warns home builders, contractors, architects, and licensed home designers to contact the local permit office before commencing any forming, excavating, or slab pouring. Most permit offices require submission of a finish slab elevation to be submitted and approved prior to any physical work taking place on the site.

Where permitted, in northern sections of the state particularly, insulating the exterior of the slab can reduce winter heating bills up to 10% to 20%. However, because subsurface termite and Formosan termite infestation is so prevalent in Louisiana, preventing termites is a key goal for any building in the state. This is especially pertinent when a visual inspection is not possible. Figures 2 and 3 show suggested slab details that will help to prevent termite infestation.

The following guidelines are also suggested to assist in termite prevention:

- Proper drainage - slope soil away from home and install foundation drainage.
- Remove organic matter - remove all wood from around foundation before backfilling.
- Direct moisture away from the home - use well maintained gutters and downspouts that connect to a drainage system.
- Provide continuous termite shields - protect pressure treated wood sill plate and other framing members with continuous aluminum or galvanized termite shield.
- Treat soil and monitor pests - homeowners should be sure to hire a reputable termite company that will provide a full guarantee against pests. Install termite traps or other monitoring methods so occupants can see if pests are near the building.

More information on energy savings features, and the full text of the *Builder’s Guide*, can be found on the DNR Technology Assessment Division website at URL: <http://www.dnr.louisiana.gov/tad>.

CORRECTION: In the *Builder’s Guide to Energy Efficient Homes in Louisiana: Air Leakage and Sealing - Materials and Techniques* (featured in the July 2007 Energy Facts) Figure 2 should be titled “Mechanical System Infiltration” and Figure 3 should be titled “The Stack Effect”.

Fig.2 Possible Monolithic Slab Details

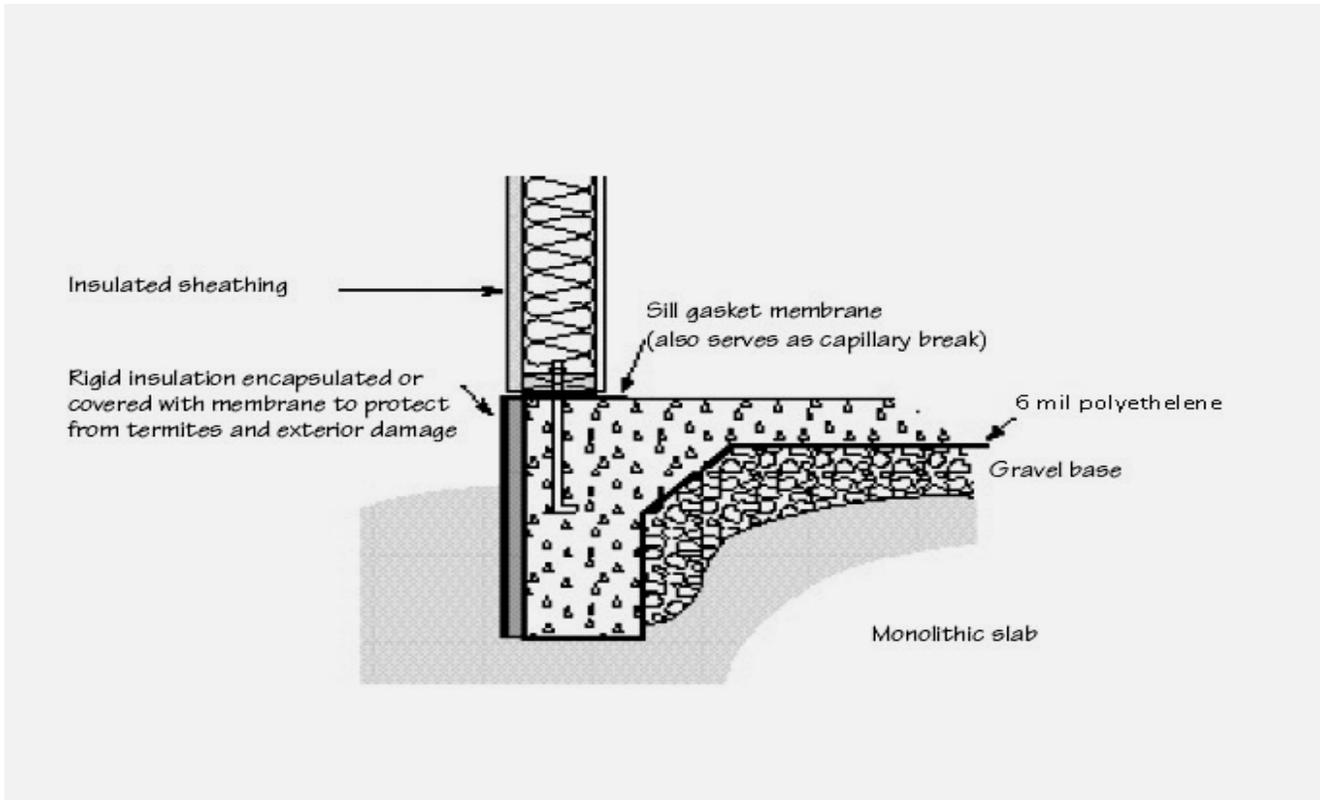


Figure 3. Possible In-Fill Slab Details

