



INSULATION

Heat energy flows naturally from hot areas to cold areas or from areas where heat energy is sparse. When heat transfer occurs through an intervening substance, the process is known as conduction. Some materials, like iron or copper, are good conductors of heat energy. Other materials, like Styrofoam or rock wool, are very poor conductors of heat energy. The poorest conductors are used as insulation. The measure of a material's ability to insulate is called its R-value. The greater the R-value, the greater the resistance to conducting heat flow.

No insulation, regardless of its R-value, can totally stop conducted heat flow. All structures have voids, gaps or weak spots such as doors and windows. Properly installed insulation slows conducted heat flow to allow heating and air conditioning systems to maintain comfortable indoor conditions at reasonable costs. Because different areas of the structure are exposed to different conditions, they may require different levels of insulation to perform efficiently.

Insulation derives its ability to resist heat flow (R-value) from the millions of tiny pockets of trapped air or gas within the material. R-value can be diminished or lost if the insulating material is compressed or compacted. Care should be exercised to match the insulation material to the area to be insulated to avoid compacting and assure proper R-value. Generally speaking, insulation is of four basic types; rigid board, blankets and batts, loosefill, and sprayed foam.

Rigid Board Insulation

- These are usually foam boards made from Polystyrene or urethane.
- Some are closed cell materials that will not absorb moisture and can be installed below grade or in damp locations.
- Offers the highest R-value per inch thickness, but is usually more expensive than other types.
- Are best for applications where restricted space or moisture concerns make other insulation types impractical.

Blankets or Batt

- These are made from glass fiber or rock wool.
- Available in various thicknesses (R-values) and widths to accommodate spacing between wall studs, rafters and floor joists.
- Easily installed during construction, but are difficult to retrofit to finished structures.

Radiant Barrier

Radiant barrier is a layer of aluminum foil placed in an air space to block radiant heat transfer between a heat-radiating surface (such as a hot roof) and a heat-absorbing surface (such as conventional attic insulation). Attic radiant barriers made of aluminum foil are becoming a popular way for homeowners living in warm weather states to save energy, money and increase comfort. Radiant Barrier blocks 95 percent of the heat radiated down by the roof. This creates a cooler attic transferring less heat into air conditioner ducts resulting in a more efficient cooling system. Depending on your lifestyle, radiant barrier can save 8-12 percent of your annual cooling costs in the Southeast.

| Product Used | R-6 | R-11 | R-19 | R-30 | R-38 |
|------------------------------|------------------------------|--------|--------|--------|---------|
| | FIBERGLASS BATTS OR BLANKETS | 1 1/2" | 3 1/2" | 6" | 9" |
| FIBERGLASS LOOSEFILL | 2 1/2" | 4 1/2" | 7 1/2" | 12" | 15 1/4" |
| CELLULOSE LOOSEFILL | 13/4" | 3" | 5 1/8" | 8 1/8" | 10 1/4" |
| RIGID POLYSTYRENE BOARD | 1 1/4" | 2 1/4" | 3 3/4" | 6" | 7 1/2" |
| RIGID POLYURETHANE BOARD | 1" | 1 3/4" | 3 1/8" | 5" | 6 3/8" |
| RIGID POLYISOCYANURATE BOARD | 7/8" | 1 1/2" | 2 3/4" | 4 1/8" | 5 1/4" |

Loose-Fill Insulation

- These products may be glass fibers, rock wool or cellulose fiber.
- Generally the least expensive of all insulation types.
- Its most practical application is on attic floors; however, finished frame walls and the underside of floors can sometimes be insulated with loose fill.
- May be installed by hand with an insulation blower.
- Freshly-blown insulation may appear to be deeper than it should be but will settle over time. Refer to manufacturers coverage ratings to determine the number of bags required to provide a given R-value for an area.
- Avoid blocking vented soffits when blowing loose-fill insulation to attics. The table below shows the insulation thickness of various products required to attain typical R-values:

| AREA | RECOMMENDED INSULATION | LEVEL |
|------------------------|---|------------|
| Ceiling or Attic Floor | R-19 meets state code | Acceptable |
| | R-38 meets Good Cents Specifications | Optimum |
| Outside Frame Walls | R-11 wood frame walls | Acceptable |
| | R-3 outside C.B.S. walls (meets state code) | |
| | 3/4" R-4 sheathing board (concrete block walls) | Optimum |
| Common Walls Floors | R-11 (between house & garage) | Acceptable |
| | R-11 (over unconditioned space) | Acceptable |

Sprayed-Foam Attic Insulation

- This product is sprayed on the roof decking on the inside part of the attic.
- Seals the home from leaks when applied properly.
- The insulating R-value's performance is higher than the actual R-value because of where it is applied (attic roof decking).
- Helps in reduction of HVAC size due to its ability to prevent attics from reaching temperatures over 100 degrees Fahrenheit.
- Make-up air to the home is highly recommended when using sprayed foam insulation.