

U.S. Department of Energy - Energy Efficiency and Renewable Energy
A Consumer's Guide to Energy Efficiency and Renewable Energy
Types of Insulation

When insulating your home, you can choose from many types of insulation. To choose the best type of insulation, you should first determine the following:

- Where you want or need to install/add insulation
- The recommended R-values for areas you want to insulate.

The table below provides an overview of most of the available insulation forms, insulation materials, their installation methods, where they're applicable to install in a home, and their advantages.

Table 1. Types of Insulation

Form	Insulation Materials	Where Applicable	Installation Method(s)	Advantages
Blanket: batts and rolls	Fiberglass Mineral (rock or slag) wool Plastic fibers Natural fibers	Unfinished walls, including foundation walls, and floors and ceilings.	Fitted between studs, joists, and beams.	Do-it-yourself. Suited for standard stud and joist spacing, which is relatively free from obstructions.
Concrete block insulation	Foam beads or liquid foam: <ul style="list-style-type: none"> • Polystyrene • Polyisocyanurate or polyiso • Polyurethane Vermiculite or perlite pellets	Unfinished walls, including foundation walls, for new construction or major renovations.	Involves masonry skills.	Autoclaved aerated concrete and autoclaved cellular concrete masonry units have 10 times the insulating value of conventional concrete.
Foam board or rigid foam	Polystyrene Polyisocyanurate or polyiso 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.
Insulating concrete forms (ICFs)	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.
Loose-fill	Cellulose Fiberglass Mineral (rock or slag) wool	Enclosed existing wall or open new wall cavities; unfinished attic floors; 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.
Reflective system	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, and beams	Do-it-yourself. All suitable for framing at standard spacing. Bubble-form suitable if framing is irregular or if

				<p>obstructions are present.</p> <p>Most effective at preventing downward heat flow; however, effectiveness depends on spacing.</p>
Rigid fibrous or fiber insulation	Fiberglass Mineral (rock or slag) wool	Ducts in unconditioned spaces and 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.
Sprayed foam and foamed-in-place	Cementitious Phenolic Polyisocyanurate Polyurethane	Enclosed existing wall or 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.
Structural insulated panels (SIPs)	Foam board or liquid foam insulation core Straw core insulation	Unfinished walls, ceilings, floors, and roofs for new construction.	Builders connect them together to construct a house.	SIP-built houses provide superior and uniform insulation compared to more traditional construction methods; they also take less time to build.