CertainTeed

Fiber Glass Insulation

Insulation and Weatherization Guide

CertainTeed
SAINT-GOBAIN

CertainTeed … Leading the way since 1904

Adding insulation to your home keeps year-round temperatures more comfortable and consistent. Your HVAC system won't have to work as hard, reducing your monthly energy bills. But how much will you really save? What about available rebates and incentives? And what's the best type of insulation for different areas of your home?

Save money when you buy insulation by taking advantage of the many rebates and incentives offered by government agencies and utilities. Find out what's available to you and get the forms you'll need to claim your money.

Upgrading your home's insulation can make a real difference in your heating and cooling bills. This calculator will help you find out how much you could save.

To find out the recommended R-values for different areas of your home that will improve overall energy efficiency and reduce monthly energy bills, simply select the state and county where you live. The insulation calculator can also help you determine the total square footage of product that you'll need for your project(s).

Go to: www.certainteed.com/itools

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Why Choose CertainTeed?

Through the responsible development of innovative and sustainable building products, CertainTeed has helped shape the building products industry for more than 100 years. Founded in 1904 as General Roofing Manufacturing Company, the firm's slogan "Quality Made Certain, Satisfaction Guaranteed" quickly inspired the name CertainTeed. Today, CertainTeed is North America's leading brand of exterior and interior building products, including roofing, siding, fence, decking, railing, trim, insulation, gypsum and ceilings.

CertainTeed offers a complete line of insulation products, including time-tested and trusted fiber glass batts, rolls and blown-in insulation, innovative vapor retarder technology, and highly regarded HVAC products and spray foam insulation. All of CertainTeed's insulation products can help building professionals earn credits to meet environmentally conscious construction standards like the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) and the National Association of Home Builders' (NAHB) National Green Building Standard.

CertainTeed insulation is GREENGUARD Gold Certified and meets the most stringent standards for very low volatile organic compound (VOC) emissions, including formaldehyde.

ENERGY STAR® is a joint effort of the U.S. Environmental Protection Agency and the U.S. Department of Energy. Its purpose is to encourage the ongoing development of more energy-efficient products and practices. CertainTeed fiber glass insulation products meet ENERGY STAR requirements. For six consecutive years, CertainTeed Corporation and our parent company, Saint-Gobain, have received an ENERGY STAR Partner of the Year award — fours years at the highest level of Sustained Excellence. We were the first manufacturer of fiber glass insulation to receive this honor.

CertainTeed Insulation Product Line

CertainTeed Standard Fiber Glass Insulation

Fiber glass insulation is a thermally and acoustically efficient inorganic insulation solution for your entire home. The lightweight flexibility of CertainTeed fiber glass makes installation quick and easy. And because fiber glass is inorganic, it's noncombustible*, noncorrosive and will not deteriorate or retain moisture.

CertainTeed standard fiber glass insulation is available in batts and rolls, either unfaced or with kraft facing. A batt is a pre-cut piece of insulation, usually 48" or 93" long. Standard widths are available for 16" and 24" on-center spacing. Rolls are available in lengths of 18' to 70'. CertainTeed SMARTBATT™ with MoistureSense Technology™ is fiber glass insulation with an integrated smart vapor retarder to help manage moisture.

* Please note: Most vapor retarder facings attached to fiber glass insulation are flammable and should not be left exposed. Standard facings should be installed behind, and in substantial contact with, the back surface of wall or ceiling finish materials. Only unfaced fiber glass insulation, or insulation with flame-resistant facings such as CertainTeed's FSK faced fiber glass insulation, can be left exposed.

Create a More Comfortable Home

Your insulation choice impacts thermal performance as well as moisture management, air tightness and acoustics. It's important to choose wisely during a home's construction, as upgrading later can be difficult and expensive. When your insulation system successfully controls all the following aspects, you can achieve a higher level of Complete Comfort in your home.

Thermal Performance

Highly efficient fiber glass and spray foam insulation help save on energy bills* and create a more comfortable living space.

Air Tightness

Sealing air leaks stops unpleasant drafts and noise, while helping ensure thermal performance. It creates a tighter building envelope that influences every other aspect of a comfortable home.

Moisture Management

An effective vapor retarder can reduce the risk of mold and mildew, improving indoor air quality and helping avoid potentially costly damage from rot.

Acoustics

Acoustics play an important role in a home's overall comfort. Insulation helps block disturbing outside noise and, when added to interior walls, limits room-to-room noise.

Thermal Performance + Air Tightness + Moisture Management + Acoustics = Complete Comfort

* For more information, visit www.energystar.gov

TrueComfort®

Adding attic insulation is easy with the TrueComfort system, which comprises fiber glass blown-in insulation and the blowing machine used to install it. The machine is portable and simple to operate. The insulation is super-expanding, requiring fewer bags than competing products to achieve the same R-value. Do-it-yourselfers can rent the machine at a local retailer or lumberyard to retrofit attics, the area of the house where adding insulation will usually have the most significant effect on energy consumption and thus on energy bills.

TrueComfort is a good choice for attics that have no insulation; it can also be installed over existing insulation.

TrueComfort®

SMARTBATT™

Moisture is unavoidable and must be managed in order to prevent condensation within your walls. The average family of four can generate up to three gallons of internal moisture vapor in a home on a daily basis. Without proper protection, this can lead to mold and mildew growth in the wall cavity. SMARTBATT with MoistureSense Technology is a first-of-its-kind fiber glass insulation batt that changes permeability based on relative humidity, reducing the potential for mold and mildew growth. SMARTBATT effectively manages moisture while addressing thermal comfort.

SMARTBATT™

MemBrain™

MemBrain Continuous Air Barrier and Smart Vapor Retarder, is a patented smart vapor retarder with MoistureSense Technology that helps provide superior moisture management needed in an airtight envelope. MemBrain adapts its permeability based on the humidity levels to help keep wall cavities dry, preventing moisture vapor from entering the cavity in the winter and allowing moisture buildup to escape the cavity in the summer.

MemBrain™

Why You Should Insulate – The Benefits

Without adequate amounts of properly installed insulation, your home loses heat in the winter and gains heat in the summer. That can lead to higher energy bills and uncomfortable living conditions. Insulation, which helps to control heat flow in your home year-round, provides these benefits:

- Reduce energy costs. Insulation protects your home with a thermal blanket that can help reduce costly energy loss. This can help you save on fuel bills during both the heating and cooling seasons.*
- Sound control. Noise in your home can be reduced by strategically installing insulation to help absorb sound.
- More comfortable living environment. A well-insulated home is a more comfortable home, room to room, floor to ceiling.
- Higher home resale value. By upgrading your home's insulation to optimum levels for your geographic region, you can expect your home to increase in value at resale time.
- Conserves natural resources. If you increase the insulation in your home, you will decrease the amount of energy used to heat and cool it. That means fewer pollutants are released into the atmosphere. It also means fewer power plants are needed to produce energy to heat and cool your home – which helps conserve natural resources. For every BTU used to manufacture fiber glass insulation, on average 12 BTUs are saved per year.

* Savings vary. To find out why, go to www.energystar.gov.
Higher R-values mean greater insulating power.

Insulation – The Facts

There are three main types of insulation materials commonly used in homes today: fiber glass, polyurethane and cellulose.

Fiber Glass

Fiber glass insulation is spun from molten sand and recycled glass into fibers. It is inorganic, naturally noncombustible and will not deteriorate, settle over time or lose its R-value.

Fiber glass

Polyurethane

Polyurethane is a two-component water–blown spray foam that comes in two types – open cell and closed cell. Foam provides thermal insulation for the interior of buildings and reduces air infiltration through the building envelope.


Polyurethane

Cellulose

Cellulose is made from recycled newspapers. Since it's flammable, it must be treated with chemicals (up to 20% by weight) to reduce the risk of fire. Cellulose can still burn when exposed to a heat source, such as a light fixture.


Cellulose

8 Reasons Fiber Glass is Preferred By Homeowners

These are the eight key reasons why fiber glass is clearly the type of insulation most used and preferred by homeowners.

1. CertainTeed fiber glass is permanent. Fiber glass insulation will last for the life of a home without losing its effectiveness. It won't settle or deteriorate over time.

2. CertainTeed fiber glass can help reduce energy costs. A properly insulated home can reduce your energy costs during the heating and cooling seasons.*

3. CertainTeed fiber glass won't retain moisture. Fiber glass will not retain moisture. Other insulation products absorb and hold moisture, which can result in permanent loss of R-value.

4. CertainTeed fiber glass provides sound control. Fiber glass is an excellent acoustical material in interior and exterior walls. Strategically placed, it can act as a sound barrier to unwanted noise from appliances, stereos, TVs, running water and ventilation systems. It's perfect for master bedroom suites, bathrooms, in-home offices and entertainment rooms.

5. CertainTeed fiber glass is noncombustible. Because it's inorganic, fiber glass insulation is noncombustible. However, the vapor retarder on most faced insulation products is flammable and should never be left exposed. For more information on faced insulation, see pages 13-14.

6. CertainTeed fiber glass is proven to work in independent tests. Its effectiveness in improving thermal performance has been confirmed in third-party tests performed by the NAHB Research Center, Inc.

* Savings vary. To find out why, go to www.energystar.gov. Higher R-values mean greater insulating power.

7. **Fiber glass is safe.** Fiber glass insulation is one of the most tested building products in the world. Research into the health aspects of fiber glass spans 50 years and tens of millions of dollars. Fiber glass insulation is safe to manufacture and install when simple, recommended work practices are followed. You'll find these practices outlined in this guide.

8. **Renewable. Recycled.** Fiber glass insulation is made of rapidly renewable content (sand), a high percentage of recycled glass and a plant-based binder.

Measuring Insulation's Power – R-value

Thermal insulation's effectiveness is measured in R-value. R stands for thermal resistance to heat flow. R-values reflect an insulation's ability to resist the flow of heat, out of your home in the winter and into your home in the summer. The higher the R-value, the greater the insulating power and the greater your potential energy savings.

R-values are determined by thickness and density. For example, two different insulation products can have an identical thickness of 3-1/2", but because one product is much denser – has more fibers per cubic inch – it has greater insulating power and a higher R-value. CertainTeed manufactures three different 3-1/2" products, R-11, R-13 and R-15.

Insulation R-values can be added together for a higher total R-value. For example, two layers of R-19 insulation can be stacked on top of each other to achieve a total R-value of R-38.

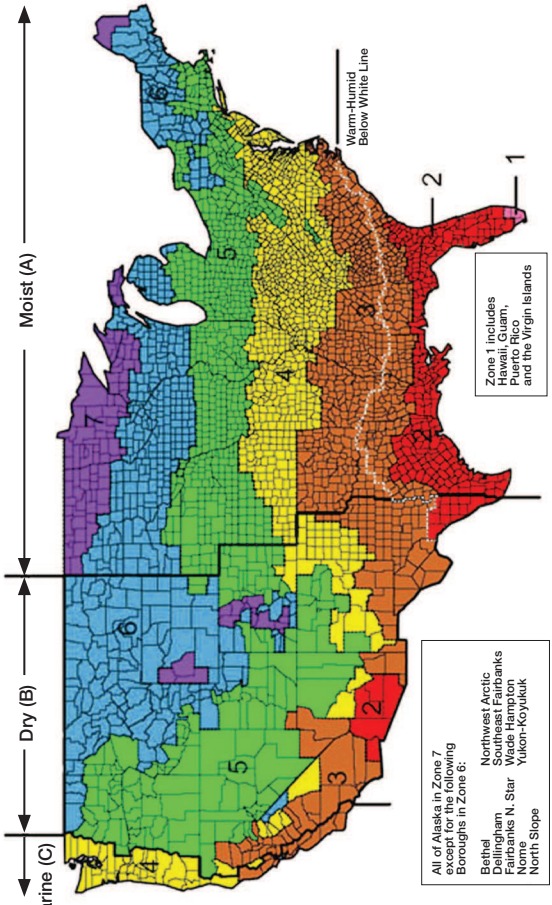
Recommended R-values

Use the map and charts on this page with the house diagram on page 16 to select the proper CertainTeed insulation product for your specific do-it-yourself project.

Homes not insulated to today's energy standards can experience substantial heat loss in winter and heat gain in summer. Installing the proper amount of thermally efficient fiber glass insulation is one of the most cost-effective energy conservation measures that can be taken.

Climate and fuel costs determine how much insulation should be used for maximum economic return. As fuel and electric costs increase, higher R-values are usually justified.

In many areas both heating and air-conditioning costs contribute to the insulation recommendations shown here.



IECC 2012 Thermal Requirements for Homes (R-values are installed minimums)

CLIMATE ZONE	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE [f]	FLOOR R-VALUE	BASEMENT [a] WALL R-VALUE	SLAB [b] R-VALUE & DEPTH	CRAWLSPACE [a] WALL R-VALUE
1	30	13	3/4	13	0	0	0
2	38	13	4/6	13	0	0	0
3	38	20 or 13+5[e]	8/13	19	5/13[c]	0	5/13
4 except Marine	49	20 or 13+5[e]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	49	20 or 13+5[e]	13/17	30[d]	15/19	10, 2 ft	15/19
6	49	20+5 or 13+10[e]	15/20	30[d]	15/19	10, 4 ft	15/19
7 and 8	49	20+5 or 13+10[e]	19/21	38[d]	15/19	10, 4 ft	15/19

a. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

b. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.

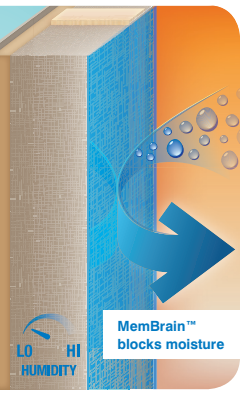
c. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

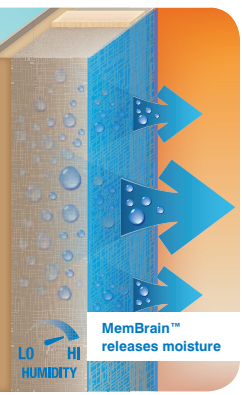
d. Or insulation sufficient to fill the framing cavity, R-19 minimum.

e. First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.

f. The second R-value applies when more than half the insulation is on the interior of the mass wall.

Moisture and Vapor Retarders





A vapor retarder is any material that limits the transmission of water vapor. Every household generates moisture, which is carried through the air as water vapor. It's generated by everyday activities such as cooking, cleaning, bathing and laundering. A family of four can generate up to 2 to 3 gallons of water vapor in a 24-hour period.

During the heating season, this water vapor moves from a home's warm interior to the cooler exterior. If its passage into attics and exterior walls isn't slowed by a vapor retarder, condensation can occur when the vapor reaches a cold surface. Continued or prolonged condensation can cause wood rot and the growth of mildew and mold. And when fiber glass insulation gets wet, it loses some of its R-value until it dries. In warm, humid regions with a long air conditioning season and high exterior humidity, water vapor sometimes moves in a continuous flow from the warm exterior to the cooler interior of the home.

Vapor retarders can be pre-attached to the fiber glass insulation when you purchase it. A vapor retarder can also be purchased separately, then attached after installation of unfaced insulation.

For years polyethylene sheeting has been used with unfaced insulation when a continuous, airtight vapor retarder film was desired. However, polyethylene does not allow excess moisture, which

can accumulate in a cavity, to escape. As a replacement, CertainTeed recommends MemBrain™ Continuous Air Barrier and Smart Vapor Retarder.

Other vapor retarders include special low perm paints, plywood, waferboard, foil-faced polyisocyanurate, closed cell polyurethane and 3/4" or thicker extruded polystyrene. All of these, if properly installed with joints taped and holes or tears repaired, are vapor retarders.

CertainTeed Fiber Glass Insulation is Available in a Variety of Facings

Unfaced insulation is manufactured in a variety of widths to insulate attics and to allow pressure-fit installation in wall cavities. This insulation is used with a separate vapor retarder or when no vapor retarder is required. The most common types of separate vapor retarders used are made from polyethylene or nylon, available in several roll sizes. Separate vapor retarder installation instructions are found in Vapor Retarder Installation Guidelines on page 22.


Unfaced

Kraft faced insulation is manufactured with a kraft paper vapor retarder attached. The kraft paper is coated with a thin layer of asphalt adhesive and the coated side is applied to the unfaced fiber glass insulation material. The asphalt adhesive bonds the kraft paper and the insulation together. This type of insulation is used in most parts of the country. It is flammable and should never be left exposed. Most types of kraft faced insulation have formed stapling flanges at the edges for either face or inset stapling.


Kraft faced

SMARTBATT™ with MoistureSense™ Technology is a first-of-its-kind fiber glass insulation batt that changes permeability based on relative humidity, helping to reduce the potential for mold and mildew growth. SMARTBATT™ blocks moisture in the winter, and opens enough for complete drying in the summer, providing the highest level of moisture management protection while addressing thermal comfort.


SMARTBATT™ faced

Why It's Important to Ventilate

Since vapor retarders (see pages 12-13) work to retard the flow of water vapor from inside homes into attics and wall cavities, you should provide a way for the excess moisture to escape to the outside. This is done by providing adequate ventilation in attics/flat ceilings and crawlspaces.

In the summer. Proper ventilation prevents the attic from becoming a hot-box that spills unwanted heat down through the attic floor (even if the attic is insulated) into the living area. This could help reduce your air conditioning costs.

In the winter. Proper ventilation could help prevent moisture from condensing on the insulation, rafters or roof deck.

Adequate ventilation creates a positive flow of air that allows the house to "breathe" and helps prevent moisture from damaging your attic and walls year-round.

How to Ventilate Your Home

In an attic/flat ceiling. The most common ventilation method is the natural or static ventilation system, which consists of simple vent openings in your attic. Eave vents – openings under the eaves – combined with roof or gable vents provide an effective way to create positive movement of air out of the attic. Always provide at least two vent openings for proper air flow. Air will flow into one opening and out the other opening. Install attic baffles to make sure insulation does not block eave vents.

As a general rule, you should provide one square foot of net open vent area for each 150 square feet of attic floor when there is no vapor retarder in the ceiling. If the ceiling has a vapor retarder, provide one square foot of net open vent area for each 300 square feet of attic floor area.

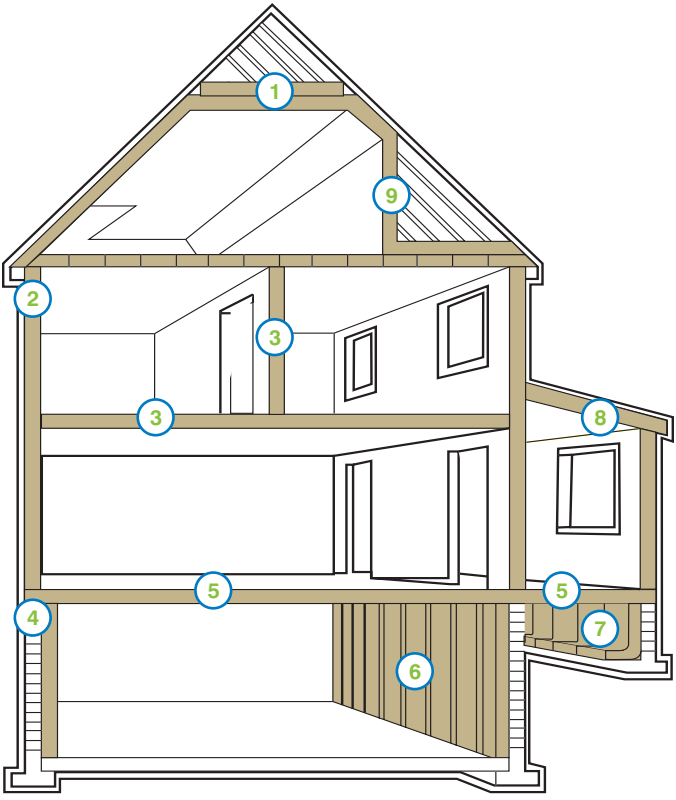
Ideally, 50% of the required ventilation should be provided by vents located in the upper portion of your attic, with the remaining 50% provided by eave vents.

If you're planning to add insulation to your attic, it's important not to cover eave vent openings and to maintain a 1" space between the insulation and roof sheathing so that air can move freely from the eaves to the ridge or gable vents.

In a crawlspace. Providing at least two crawlspace vents will allow a positive flow of air in and out of the crawlspace. One square foot of free vent area is recommended for every 1,500 square feet of floor area covered with a polyethylene ground cover. (In crawlspaces that are unheated or have a dirt floor, it is recommended that the floor be covered with a polyethylene vapor retarder.)

Cathedral ceilings. Cathedral ceilings are sloped ceilings where insulation is installed in rafter spaces and the ceiling finish layer is fastened directly to the rafters. In this type of ceiling, a vented air space between insulation and roof sheathing is usually recommended. CertainTeed manufactures special high-density insulation for use in cathedral ceilings. R-30C (cathedral) is 8-1/4" thick for use in 10" rafters and R-38C (cathedral) is 10-1/4" thick for use in 12" rafters – this allows for a 1" air space above the insulation.

Areas in Your Home to Insulate



1. Attics and Ceilings
2. Exterior Walls
3. Interior Ceilings, Floors and Walls
4. Band Joists
5. Floors Over Unheated Spaces
6. Basement Walls
7. Crawlspaces
8. Cathedral Ceilings
9. Kneewalls

The following list refers to locations shown in the diagram on the left.

1. Attics, the most important area of a home to insulate. Ceilings with cold spaces above; this includes dormer ceilings.
2. Exterior walls. Sections that are sometimes overlooked are walls between living spaces and unheated garages or storage rooms, dormer walls, and the portions of walls above ceilings of adjacent lower sections of split-level homes.
3. Interior ceilings, floors and walls where sound control is desired.
4. Band or header joists, the wall section between floor levels.
5. Floors over unheated or open spaces such as garages and porches. Floors over unheated basements. The cantilevered portions of floors and under windows.
6. Basement walls.
7. Floors above vented crawlspaces. Insulation may also be placed on crawlspace floors and walls.
8. Sloped walls and ceilings (cathedral ceilings) of attic spaces finished as living quarters.
9. Kneewalls of attic spaces finished as living quarters.

Sound Control

The key areas to insulate are exterior and interior sidewalls, ceiling/floor assemblies and the perimeter of any room addition. Interior walls are especially important to insulate in order to keep noise from traveling between rooms.

Estimating – How Much Insulation Will You Need?

Here's an easy seven-step method for calculating the number of insulation packages you'll need to complete your project.

Step one: Measure the length and width (height, for walls) of the area to be insulated.

Step two: Measure the length and height of door and window openings for square footage that will NOT be insulated.

Step three: Length x Width (height, for walls) of the area to be insulated – square footage of doors and windows that will NOT be insulated = total square footage to be insulated.

Step four: Measure the distance between studs or joists to determine the correct insulation width for the job. CertainTeed insulation is available in a variety of sizes for 16" and 24" on-center framing.

Step five: To compensate for joists or studs, use the following:

- For 16" – Total square footage to be insulated x .90 = square feet of insulation
- For 24" – Total square footage to be insulated x .94 = square feet of insulation

Note: When applying a second layer of insulation in the attic, lay the insulation across the joists and do not compensate for joists.

Step six: Choose the appropriate recommended insulation R-value for the area of the home that you're insulating (refer to the charts and diagram on pages 10-11 and 16).

Step seven: Square feet of insulation ÷ square footage listed on one insulation package = total number of packages needed for the job.

Helpful Hints – Preparing to Install Insulation

- Because packaged insulation is highly compressed and expands greatly when the wrapper is opened, leave insulation in its wrapper until you're ready to use it.
- For easier installation, use pre-cut batts in walls and floors.
- Use continuous rolls in attics because of larger spans.
- To cut insulation, lay it on a board with the facing down, if applicable. Lay a straightedge or 1" x 2" piece of lumber over the area of insulation to be cut. Press your straightedge down hard and cut with a utility knife, using the straightedge as a guide. Replace your utility knife blade frequently for large jobs.
- Before you begin any insulation project, make sure you minimize air infiltration by caulking and sealing all top and bottom plates, sealing any wires or open penetrations, and weather stripping attic access openings.

Opening the wrapper

Continuous roll insulation

Cutting insulation to size

Getting Started

The Supplies You'll Need

The tools required for an insulating project vary depending on the area of the house being insulated and the type of job – new construction or retrofit. Some equipment, such as protective gear, should be used with every job.

Tools and Equipment

- Utility knife and extra blades
- Tape measure
- Straightedge for cutting the insulation (either metal or a piece of wood like a 1" x 2")
- Stapler and staples (hand-squeeze or hammer type)
- Boards or sheets of plywood to place across joists when kneeling in the attic (they can also be used as cutting surfaces)
- Polyethylene or nylon sheeting if a separate vapor retarder is needed
- Duct tape for sealing tears in the vapor retarder
- Long pole or broom handle for positioning pieces of insulation near attic eaves
- Baffles if insulating near soffit vents
- Insulation supports (mesh screen or chicken wire, wire and nails, or wire rods) for holding insulation up against floors

Protective Gear

- Work gloves
- Protective glasses
- Disposable dust respirator – NIOSH rating of N95 or higher
- Long-sleeve shirt
- Cap or hard hart (a hard hat is recommended in the attic to protect against protruding nails overhead)

Installation Basics

Installing Faced Insulation With Stapling Flanges

There are three commonly accepted methods of installing faced insulation in wood framing members.

1. Inset stapling

- Place the insulation in the cavity and check to be sure it completely fills the cavity, top to bottom.
- Be sure that each piece is butted closely to the next one before fastening. Gently press the insulation at the sides into the framing cavity, until the outside edge of the stapling flange is flush with the face of the framing.

Inset stapling

- When inset stapling insulation between inclined or vertical framing members, start stapling at the top and work down. Use enough staples to hold the insulation firmly in place (approximately every 8") and avoid gaps and fishmouths between the flanges and framing.

Face stapling

2. Face stapling

(Not recommended where drywall will be glued to studs)

- Place the insulation between framing members and check to be sure it fits the cavity at both ends. With facing material flush to the face of the framing, the flanges will overlap the framing. Staple the flanges to the face of the framing, using enough staples to hold the insulation firmly in place (approximately every 8") to avoid gaps and fishmouths.
- The flange of the faced insulation placed in the next cavity will overlap the previously stapled flange. When more than one piece is used, they must be snugly butted.

3. Friction fit – no stapling

- CertainTeed offers a variety of products that do not require stapling. These products are slightly wider and the additional width keeps the insulation in place.


Friction-fit insulation

- To install faced products by friction fit, gently place the insulation into the cavity space between framing members. Make sure the insulation facing is flush with the face of the stud. The insulation must fit snugly at the sides and ends.
- To install faced products that do not have flanges, such as Speedy R™, follow the same instructions given below for installing unfaced insulation.


Unfaced insulation

Installing Unfaced Insulation

To install unfaced insulation, gently place the insulation into the space between framing members. It's important that insulation be correctly sized for the cavity and fit snugly at the sides and ends. Wherever batts or rolls of any type are too short to fill a stud cavity, a piece should be cut to size to fill the gap. When insulation is too long, it should be cut to fit properly, not doubled over or compressed.

Vapor Retarder Installation Guidelines

- For most of the United States, vapor retarders should be installed in exterior walls on the warm-in-winter side of the insulation (toward the interior).
- For some warm and humid areas, such as Florida, the Gulf Coast and Hawaii, vapor retarders should be installed outside the building envelope. Check local building practice and/or building codes to be sure. Continuously applied low permeance vapor retarders, like polyethylene, are not recommended because there may be times of high relative humidity when the water vapor moves from the exterior toward the interior. In these situations, a discontinuous vapor retarder – such as kraft faced or SMARTBATT insulation – will retard the passage of vapor from inside the home into framing

cavities, yet allow walls to dry toward the interior when needed. This helps prevent moisture buildup in the wall cavity and decreases the potential for condensation.

- Vapor retarders are not a standard requirement for attics. Except for very cold regions and in isolated cases where there is high humidity in the house during the winter, attic vapor retarders aren't required if the attic has adequate ventilation. As a rule of thumb, one square foot of vent opening is needed for every 150 square feet of ceiling area. See page 15 for more information on ventilation.

Installing MemBrain™

- If installed in an attic, a continuous vapor retarder also helps to reduce air infiltration. If your home is built this way – and a similar air infiltration retarder is installed in the exterior walls – you should consider adding mechanical ventilation, such as a heat recovery ventilator, to prevent trapping air pollutants and moisture within the house. Moisture buildup can cause mildew on the walls and ceilings.
- Never leave faced insulation exposed. The facings on most insulation products will burn and must be installed in substantial contact with an approved ceiling, wall or floor construction material.
- Flame-resistant foil (FSK-25) is the only insulation facing that can be left exposed.
- Separate vapor retarders are used in some constructions. They should be installed toward the interior of the home. They are available in many different roll sizes, and are installed by stapling to the face of the framing. If more than one sheet is required, a double fold should be made at the meeting of the two pieces and stapled, or the sheets may be overlapped and taped. The pieces, if stapled, should meet only at a stud or a joist. Foil-backed gypsum board and special low perm paints are also effective vapor retarders.
- Cover the vapor retarder with gypsum drywall or other approved interior material, as required by local codes, as soon as the insulation and vapor retarder have been installed.

Specific Insulation Projects

Whenever insulation is installed, it's very important that it fit snugly on all sides. If the insulation is too long for a space, cut it to the correct size. If it's too short, cut a piece to fill the void.

Here are specific instructions and recommendations for various do-it-yourself insulation projects. Be sure to carefully read CertainTeed's installation instructions printed on the packaging of batt and roll insulation to be sure it's properly installed.

Adding Insulation to Under-Insulated Attics

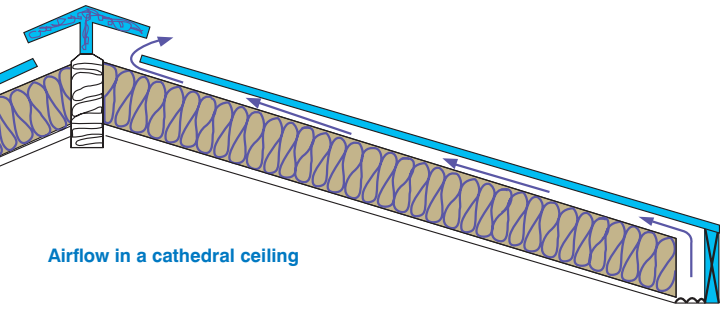
- Measure the amount of insulation already in your attic. Check the map and charts on pages 10-11 or your local building codes for your area's recommended R-values.
- Use unfaced insulation over existing insulation, bringing the level of insulation between the floor joists up to the top of the joists.
- Starting on one side of the attic, place unfaced insulation perpendicularly across the top of joists and work toward center. If necessary, push insulation under the eaves with a broom handle or long stick. If the eaves overhang provides ventilation, be careful not to block the vents.
- If you encounter pipes, beams or other obstructions, cut the insulation to fit snugly around them.
- Do not cover lighting fixtures, exhaust fan motors or vents protruding into the attic. Leave a 3" space between the insulation and electric motors or lighting fixtures. Only IC (Insulation Contact) rated lighting fixtures may be covered or be in direct contact with insulation.
- Attics that are used as living spaces should be insulated. See the diagram on page 16.

Insulating around light fixtures

Insulating an attic

Insulating Attics in New Homes

- Faced insulation should be used where no insulation exists and where moisture condensation may occur. The vapor retarder should be installed toward the interior of the home.
- Check the chart on pages 10-11 or your local building codes for your area's recommended R-values.
- Start installation on one side of the attic, place insulation in between joists and work toward center. If necessary, push insulation under eaves with a broom handle or long stick. If the eaves overhang provides ventilation, be careful not to block the vents.
- If you encounter pipes, beams or other obstructions, cut the insulation to fit snugly around them.
- Do not cover lighting fixtures, exhaust fan motors or vents protruding into the attic. Leave a 3" space between the insulation and electric motors or lighting fixtures. IC rated fixtures may be covered by insulation.
- Attics that are used as living spaces should be insulated. See the diagram on page 16.
- If you're adding a second layer of insulation, always use unfaced insulation. Lay it across the joists and work from eaves toward the center of the attic, butting insulation against the wall at both ends.



Airflow in a cathedral ceiling

Cathedral Ceilings

As a general guideline, cathedral ceilings are insulated using the same method as flat ceilings.

- The insulation should be stapled or held in place by pressure against the sides of the rafters. An air space (at least 1") between the insulation and roof sheathing, ventilated at the ridge and soffit, is recommended.
- If using kraft faced insulation, the vapor retarder should be installed toward the interior of the home. Start at the eaves area and work toward the ridge. Make sure the batts are snugly butted together.
- If using unfaced insulation, a separate vapor retarder should be applied after the insulation is installed. Make sure the vapor retarder is continuous. For more information on vapor retarders, see pages 12-13.
- Fit the end of the batt snugly against the top plate at the beginning of the cathedral ceiling framing.
- Working down the flange, staple about 8" apart until you reach the end of the batt. Do this until the batts reach the exterior walls. Fit batts tightly against each other.
- Cover the batts with an approved material such as gypsum board. Do not leave exposed for an extended period of time.

Cantilevered Overhangs

- Don't overlook these areas. If the underside of the cantilever has been closed, insulation must be installed by sliding insulation into place from the room below.

Exterior Sidewalls

- Insulation should fit snugly against the framing on all sides. Even the smallest openings between framing members should be insulated.
- The vapor retarder should be installed toward the interior of the house except in some warm and humid areas, such as Florida, the Gulf Coast and Hawaii (see page 12).
- Fit the end of the batt snugly against the top piece of framing. Working down, staple the flanges, if attached, about 8" apart until you reach the bottom. Fit batts tightly against the framing bottom.
- CertainTeed unfaced batts do not need stapling. They should be installed in combination with foil-backed gypsum board or polyethylene or nylon film to provide optimum moisture protection. The vapor retarder film should cover framing members as well as the insulation. Do not leave exposed. Cover with an approved material such as gypsum board.

Narrow-Framed Cavities

- Insulate non-standard-width framed spaces by cutting the insulation and facing about an inch wider than the space to be filled. Staple the uncut flange as usual. Pull the facing on the cut side to the other stud and staple through the vapor retarder to the stud.
- Clearances around fossil-fuel appliances should meet the requirements of the National Fire Protection Association (NFPA) or the appliance manufacturers' recommendations. Use only unfaced fiber glass insulation between wood framing and masonry chimneys. Do not place insulation in air spaces surrounding metal chimneys or fireplaces.

Walls of Unheated Garages

- If the garage does not have studs, you will have to install them before insulating. This is a relatively easy job. Place studs 16" or 24" apart from the center of one stud to the center of the next.


Masonry wall installation

- Place insulation between studs with vapor retarder toward the interior of the home. Do not leave insulation exposed. Cover with an approved material such as gypsum board.

Masonry Walls

- CertainTeed Masonry Wall Batts of unfaced fiber glass are designed for use behind paneling in masonry-type construction.
- No stapling is necessary. Once the framing strips have been applied, just fit batts between strips.
- Vapor retarders are not recommended for installation over framing strips. Do not leave exposed. Cover with an approved material such as gypsum board.

Floors

- Install the insulation between floor joists and secure using one of the following three methods to hold insulation permanently in place: (a) Mesh screen or chicken wire can be applied by stapling the wire to the bottom of the joists. Other methods are to (b) lace wire back and forth around nails in the bottom of the joists, or (c) use wire rods available at most home centers.

Mesh screen or chicken wire: Use galvanized chicken wire, nylon mesh or galvanized screen to hold the insulation in place. After the insulation has been pushed into place, staple or nail the mesh or screen to the joist faces.

Wire lacing: Galvanized, malleable wire may be laced around nails protruding from the faces of the joists or the wire may be stapled to the joists. Space the wire and nails as needed to prevent the insulation from sagging.

Holding insulation with wire

Wire rods: The easiest and most effective way to hold insulation in place is to use straight, rigid wire fasteners (preferably galvanized), with pointed ends. Wire fasteners are available for a variety of joist spacing. Wedge the fasteners, which may be used against wood, metal or concrete and are slightly wider than the joist spacing, by hand between the joists and bowed upward so the insulation presses gently against the subflooring. Space the fasteners as needed to prevent the insulation from sagging (usually 12" to 24" apart, and not more than 6" from the ends of the batts and rolls).

- When insulating floors where the insulation is less than the thickness of the joists and the method of installation does not hold the insulation up against the subflooring, it will be necessary to insulate the headers or band joists at outside walls. This is because there will be an air space between the top of the insulation and the subfloor that will allow heat to be lost at outside walls. It is recommended that the insulation be pushed up to the subfloor. If insulating over an unheated area, the vapor retarder should be in substantial contact with the subfloor. Where the header is parallel with the floor joists, it may be necessary to adhere insulation to the header or fill the joist area with insulation.

- For homes on pilings where the underside of the floor is exposed and readily accessible, the insulation should be covered with a suitable exterior material to protect it from high winds and physical abuse. Header and band joists should also be insulated.

- Place the insulation between the floor joists – start at one end and work out. Insulation will stay in place temporarily. If faced insulation is used, the vapor retarder should face toward the heated area of the home.

- Be sure the ends of the batts fit snugly up against the band joists, and the batt fits up flush against the bottom of the floor to prevent loss of heat.

Crawlspaces

- If your crawlspace has ducts or pipes, be sure to insulate them. See Ducts and Pipes section on page 31 for more information.

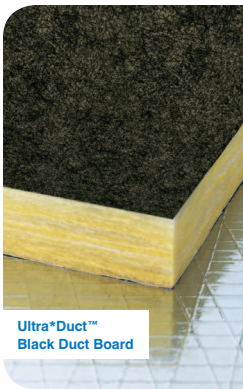
- An alternative approach to insulating ducts and pipes is to simply insulate the entire wall. Measure lengths of insulation from the top of the wall extending 2 feet along the ground. Hold the insulation in place at the top by the sill using a furring strip nailed over the insulation. The crawlspace floor should be covered with a 4 to 6 mil polyethylene vapor retarder.

Insulating at Bridging

- Insulate bridging or cross bracing of ceiling or floor joists by splitting a batt vertically at the center and packing one half into the lower opening and the other half into the upper opening. Another method is to butt the insulation to the bridging, then fill the bridging space with scrap insulation.

Ducts and Pipes

- Make sure your heating and air conditioning ducts are insulated. If you have metal ducts, wrap them in fiber glass insulation with a vapor retarder facing to help reduce heating and cooling costs. If you're adding new ducts, consider a high-efficiency fiber glass duct system, which is made from rigid fiber glass insulation boards formed into ducts. A fiber glass duct system thermally insulates as well as reduces the noise from your heating/cooling unit and noise from air travelling through the duct system to the rooms in your home. CertainTeed manufactures a full line of fiber glass HVAC products for all types of homes.



Ultra*Duct™ Black Duct Board

- Also make sure your pipes are wrapped with insulation. This will reduce the loss of heat from the hot water in the pipes.

Soft Touch™ Duct Wrap

A Systems Approach

Following are brief descriptions of steps you can take to ensure that you get the most value for your insulation dollar, and other ways to ensure that the elements of your home energy system work together more effectively while consuming less.

Sealing the Envelope

- If you think of your house as an envelope, seams, cracks and other openings are rips in that envelope – and they need to be sealed.

- An obvious area to focus on is cracks around windows and doors. Using caulk and weatherstripping to seal these leaks is one of the quickest and easiest ways to lower heating and cooling bills.

- Less obvious but just as important are places where plumbing, ductwork or electrical wiring penetrates through walls, floors, ceilings and soffits over cabinets. Narrower openings can be sealed with caulk; if the hole is larger, small pieces of standard fiber glass insulation, cut to fit snugly into the space, will help solve the problem. CertainTeed Handi-Fill™ is a multi-purpose fiber glass roll that is conveniently sized for these types of odd-sized jobs.

Windows and Doors

- In many homes, windows and doors are the leading culprits when it comes to the loss of conditioned air. Standard windows and doors can lose approximately five to eight times more energy than an insulated wall area of the same size, while leaky windows alone can account for 10% to 25% of your heating bill.

- Storm windows and doors are one way to help reduce energy loss. Even more effective are double- or triple-pane windows with high-performance glass (e.g., low-e glass). These windows have two or three pieces of glass fused together

around the edges, with the space in between filled with air or inert gas. Double-paned glass windows offer double the thermal efficiency of single-pane windows; triple-paned windows provide three times the efficiency.

Heating and Cooling Equipment

- The efficiency of a central heating and cooling system has a major effect on energy consumption. It's a good idea to have your system tested by a professional, especially if it's older.

- The thermostat is another aspect of the space conditioning system that should be evaluated. Installing an automatic setback thermostat will cut energy costs by automatically adjusting the home temperature to reflect your family's schedule. For example, the thermostat can be programmed to move to a lower temperature during winter days when no one is home, preventing the heater from running unnecessarily.

Water Heaters

- Heating water for showers, laundry and dishwashing can account for about 15% of the typical utility bill. Ways to reduce this usage include simply using less hot water, turning down the thermostat on the unit, and buying a new, more efficient model.

- Wrapping the water heater in a fiber glass insulation blanket is another step you can take to save energy. An insulated water heater can retain as much as 5% to 12% of the energy that would otherwise be lost. When insulating an electric water heater, be careful not to cover the unit's thermostat; if your unit is warmed by natural gas or oil, do not cover the top, bottom, thermostat or burner compartment.

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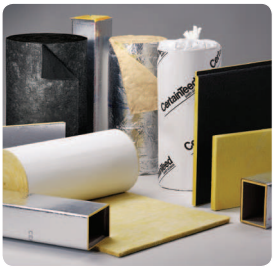

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