

CertainTeed

Fiber Glass Insulation Product Knowledge

Master Craftsman Education & Development Program



CertainTeed
SAINT-GOBAIN

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Fiber Glass Insulation — Product Knowledge

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Introduction

Fiber Glass Product Knowledge Workbook and Manual is one of two key pieces in the Insulation portion of CertainTeed's Building Solutions education program. (The other piece is *Fiber Glass Installation Basics*.) First, use it to increase your understanding of the fundamental science of insulation — how it works, what the different types are, etc. — and more specifically CertainTeed's line of insulation products. Then, keep it as a ready reference you can consult as needed.

The more you know about insulation basics and CertainTeed's broad offering of insulation products, the better you'll be able to discuss the many available options with your customers. This means more differentiation from your competitors, more products to sell, better estimates, and, in general, more profits for you.

As you finish reading each section in this manual, take a few minutes to check your product knowledge by completing the self-tests. These will prepare you for the Product Knowledge Exam, which can earn you valuable rewards as an Insulation Course Graduate. These rewards — and more importantly, the leg up you'll have on the competition — are not available to everyone, just to those who have successfully passed the Product Knowledge Exam.

When you pass, you will receive:

- A free listing on www.certainteed.com.
- A Certificate of Completion. This can be used to help market your business..

If you complete two or more Building Solutions education programs, you'll receive:

- Higher recognition as a "Specialist," including an enhanced listing on www.certainteed.com.
- Specialist Certificate of Completion.
- 24" Bucket Boss Tool Organizer for keeping tools organized and accessible on the job. Fits any five-gallon bucket and holds more than most toolboxes.

Glossary

Because this manual was written for building professionals, we have freely used the language and jargon of the industry. To avoid confusion, we thought it would be a good idea to share our understanding of each of these terms with you.

Heat Transfer

Heat transfer occurs naturally by one of three methods:

Conduction — the flow of heat directly through a solid material; heat that escapes from a home through the roof, walls, windows; responsible for most heat loss or gain in a residence.

Convection — the transfer of heat by air currents; for example, gravity, hot air furnace.

Radiation — the transfer of heat by electromagnetic waves; for example, heat from the sun.

BRITISH THERMAL UNIT (BTU)

Fuel values, heat loss, and heat gain are measured in BTUs. A BTU is the amount of heat required to raise the temperature of 1 lb of water 1°F. For example: 1 gallon of fuel oil releases approximately 138,000 BTU; 1 cubic foot of natural gas, 1,000 BTU; and 1 kilowatt-hour of electricity, 3,413 BTU.

R-VALUE (THERMAL RESISTANCE)

R-Value and RSI are measures of the ability of a material or a construction to retard heat flow. The higher the R-Value/RSI, the greater the insulating power. It is convenient to use because the R-Values of materials in a series combine to determine the total thermal resistance of a construction. Therefore, the R-Value of every component in a wall can be added to get the wall's total R-Value:

R-Value	
Inside air film	0.7
.5 in. gypsum wallboard	0.5
R-13 insulation	13.0
.5 in. wood fiber sheathing	1.3
Wood siding	0.8
Outside air film	0.2
Total R-Value	16.5

U-VALUE (THERMAL TRANSMITTANCE)

U-Value is a measure of an entire construction's ability to conduct heat. It is the reciprocal of the material's or construction's R-Value (1/R). Because U-Values are for constructions, they always include air film resistances. Using the previous example:
 $U = 1/R = 1/16.5 = 0.061$

C-VALUE (THERMAL CONDUCTANCE)

C-Value is a measure of a material's or a construction's ability to conduct heat. It is the same as U-Value but without air film resistance.

From the previous example, the wall's R-Value without air films is
 $16.5 - 0.7 - 0.2$, or 15.6.

K-VALUE (λ) (THERMAL CONDUCTIVITY)

K-Value is a measure of the ability of a homogeneous material to conduct heat, based on its thickness. If we multiply a material's C-Value by its thickness, we have its K-Value: $\lambda = C \cdot t$

If we know the K-Value of a material, we can calculate the R-Value or the C-Value of a specific thickness of that material. For instance, the R-Value of 3 in. insulation whose K-Value is 0.23 can be calculated this way: $\lambda = t/R$

Multiply both sides of the equation by R. Divide both sides of the equation by λ . The equation becomes $R = t/\lambda$. The R-Value of 3 in. of insulation with a K-Value of 0.23 is: $R = 3 \text{ divided } 0.23 = 13$.

HEATING DEGREE DAY

A heating degree day is a unit to measure "coldness." The number of heating degree days in any given day is the average temperature for that day subtracted from 65°F. The number of heating degree days per year is used to estimate yearly heat loss in BTUs. The approximate climate zones on climate zone maps are differentiated by heating degree days per year, and insulation recommendations vary in accordance with these heating degree days.

VAPOR RETARDER

A material that resists the passage of water vapor is a vapor retarder. Vapor retarders are applied to insulation or other surfaces to prevent vapor from traveling to cooler areas, where it may condense. The material's ability to resist the flow of moisture is measured in "perms" (for permeance). The lower the perm rating, the better the vapor barrier, so a material is considered a vapor barrier if it has a perm rating of 1 or less.

CertainTeed's MemBrain™ Smart Vapor Retarder & Air Barrier Film actually *changes* permeability based on ambient humidity conditions (see DryRight™ sections on page 14 for more on MemBrain). Materials that are commonly used as vapor barriers include:

Kraft facing on insulation = 1 perm
 Foil facing on insulation = 0.5 perms
 4 mil polyethylene = 0.08 perms

SELF-TEST #1: GLOSSARY

- Heat that flows through walls to the outside does so by
 - conduction
 - convection
 - radiation
 - thermal resistance
- A hot air furnace heats a home because of
 - conduction
 - convection
 - radiation
 - thermal resistance
- Heat loss and gain are measured in
 - R-Values
 - RSIs
 - BTUs
 - heating degree days
- A heating degree day is used to measure
 - conduction
 - convection
 - radiation
 - coldness
- Common vapor retarders include
 - kraft facing
 - foil facing
 - polyethylene
 - MemBrain Smart Vapor & Air Barrier Film
 - all of the above

1 Insulation Basics

HOW DOES INSULATION WORK?

Heat flow is the principle behind insulation: Heat always flows from hot to cold. Homeowners don't want to lose heat in winter or gain heat in summer. While they can't stop the natural movement of heat from hot to cold, homeowners can control heat flow.

The materials used to build a home all help slow heat flow. Some do a better job than others, so builders and building materials suppliers use construction materials to reduce heat flow and make homes warmer. Few products outperform fiber glass insulation as a cost-efficient barrier against heat flow, and the information that follows should help you understand why.

FIBER GLASS INSULATION

Mineral fiber insulation is either fiber glass or rock wool. Both are inorganic. The raw materials — glass, rock, or slag — are melted and spun or blown into noncombustible blankets, which are then processed into finished insulation. For use in residential or light commercial construction, insulation is supplied in either batts, blankets, or blowing wool (for pneumatic installation).

Mineral fiber insulation was first produced in 1840 in Wales. The first plant in the United States went into operation in 1875, manufacturing insulation from the iron slag by-product of gun manufacturing. For approximately 50 years, loose fill insulation, which was installed by hand, was the only mineral fiber insulation product. In the 1920s, blowing wool and pneumatic application were developed, soon followed by the introduction of batts and blankets. Fiber glass joined the mineral insulation family in the mid-1930s. Fiber glass is composed of specially formulated blends of sand, other mineral ingredients, and recycled content called glass cullet.

At CertainTeed, we start with common sand and recycled glass in the manufacture of fiber glass. This mixture is heated to form molten glass, which is then spun into tiny fibers that eventually form a blanket of fiber glass.

Through the years, manufacturing technology has steadily advanced. Manufacturers now have close control of fiber diameter and length, binder content and distribution, density, resiliency, dimensions, and thermal properties. Also, constant monitoring and

inspection and frequent testing ensure consistent quality of the finished product.

Speaking of binder content, in 2010 CertainTeed introduced Sustainable Insulation®, fiber glass insulation that features an organic plant-based binder that has no added formaldehyde, acrylics or dyes. Sustainable Insulation also incorporates significant rapidly renewable content and significant level of recycled glass. Sustainable Insulation is used in a number of CertainTeed products.

BENEFITS

The principal benefit of fiber glass insulation is that it reduces energy consumption in both winter and summer, and this helps reduce heating and cooling costs. The exact amount of savings depends upon several variables — climate, local energy rates, and the design and construction of homes — but the FTC maintains "Savings vary. . . [but] higher R-Values mean greater insulating power."

Thermal Effectiveness

Fiber glass insulation is highly effective in retarding heat flow in all climates during all seasons of the year.

Noncombustible

Fiber glass is noncombustible; however, the vapor retarders on most batts and rolls are flammable and should be covered with gypsum wallboard or other building code-acceptable finish material.

Dimensionally stable

When installed properly, fiber glass insulation will not settle or shrink.

Moisture absorption

Fiber glass will not absorb moisture. This is important because wet insulation is not an efficient insulator.

Noncorrosive

Fiber glass insulation contains no chemicals to corrode steel, copper, or other metal. ASTM C 665 requires that glass fiber insulation be no more corrosive than sterile cotton.

Durability

Because fiber glass is inert, the insulation is permanent. It will last for the life of a home without losing its insulating properties. And it won't deteriorate over time.

Starch content

Fiber glass does not contain starch, and thus provides no food to attract vermin and pests.

Safety

Fiber glass also contributes to fire safety. When it fills a wall cavity, it is recognized as a fire stop by the Uniform Building Code and the National Association of Home Builders Research Center. Unfaced fiber glass insulation in ceilings will retard the downward spread of fire originating in the attic or on the roof.

Popularity

Fiber glass is the most commonly used insulation because it has characteristics that homeowners and builders love. First, fiber glass insulation helps save money. Homes that are properly insulated with fiber glass insulation cost less to heat and cool than poorly insulated homes.

Second, a well-insulated home is a comfortable home, room to room and floor to floor.

Third, fiber glass is preferred because it is noncombustible and non-absorbent. Thus, fiber glass will not support a flame (although the facing on fiber glass is often combustible), nor will it compress if it gets wet.

Fourth, CertainTeed fiber glass is made with the environment in mind. As we said earlier, recycled glass is used to produce CertainTeed fiber glass. This not only reduces the amount of glass in landfills, but it also reduces the amount of fossil fuel used to produce fiber glass and, thus, greenhouse gases. In fact, a typical pound of fiber glass insulation saves 12 times as much energy in its first year in place as the energy used to produce it.

Fifth, homeowners like fiber glass insulation because it can help increase the resale value of a home. And as energy costs rise, this factor becomes even more important.

Finally, fiber glass is an excellent acoustical insulator. This acoustical insulation property applies to interior walls as well as exterior, so savvy builders use it around bathrooms, bedrooms, and game rooms.

ADDING INSULATION TO EXISTING HOMES

For top-floor ceilings (attic floors), CertainTeed recommends R-60 fiber glass insulation for most areas. If 6 in. or less of insulation exists in the space, the recommendation is to add at least R-21. Fiber glass insulation without a vapor retarder should be added on top of any type of existing insulation.

When insulating 2 x 4 existing walls where the space between wall studs is accessible, install R-13 or R-15 fiber glass batts and cover them with an interior finish material; 2 x 6 walls can be insulated with R-19 or R-21 batts.

Finished walls may be insulated by an insulation contractor with blown insulation.

For floors above cold spaces, R-19, R-21, or R-25 batt insulation is recommended.

WHERE TO INSULATE

Exterior walls: Sections sometimes overlooked are the wall between the living space and an unheated garage or storage room, dormer walls, and the portion of wall above the ceiling of an adjacent lower section of a split-level home.

- Ceilings with cold spaces above, including dormer ceilings.
- Knee walls, when attic space is finished as living quarters.
- Between beams and rafters, leaving an open space above for ventilation.
- The perimeter of a slab on grade.
- Floors above crawlspaces. When a crawlspace contains pipes and/or ducts, insulation is applied to crawlspace walls instead of the floor above.
- Floors over unheated or open spaces such as over a garage or porch; floors over unheated basements; the cantilevered portion of a floor.
- Basement walls when below-grade space is finished for living purposes.
- Band joists, the wall sections at floor levels.
- Common walls and floors between separately heated apartment or townhouse units.

Cathedral ceilings: A cathedral ceiling is a sloped ceiling where insulation is installed in the rafter spaces, and the ceiling finish layer is fastened directly to the rafters. In this type of ceiling, a vented air space is recommended between insulation and roof sheathing.

VENTILATION

For insulation to do its job, attics and crawlspaces must be adequately ventilated. Vents should remain open throughout the year.

According to CABO/HUD, "The net free ventilating area shall not be less than 1 to 150 of the area of the space ventilated (1 ft.² of ventilation for each 150 ft.³ of attic). If 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 ft. above eave or cornice vents and 50 percent of the required ventilation is provided by eave or cornice vents, the net free cross ventilating area may not be less than 1 to 300 of the area of the space ventilated (1 ft.² of ventilation for each 300 ft.³ of attic). When a vapor barrier having a transmission rate not exceeding 1 perm is installed on the warm side of the ceiling, the net free ventilation area may not be less than 1 to 300 of the area of the space ventilated."

In cathedral ceilings, there should be continuous eave or soffit vents and a ridge vent to allow moisture to escape before it can condense on the roof sheathing. A vented air space is recommended between insulation and roof sheathing, and faced insulation should be used to retard the flow of moisture into the rafter spaces. In more severe winter climates, a continuous vapor retarder is recommended.

VAPOR RETARDERS AND GROUND COVERS

In every household, occupants generate moisture that is carried through the air as water vapor. It is generated by such everyday activities as cooking, cleaning, bathing, and laundering. For example, a family of four can generate up to 20 lbs. of water (approximately 2.5 gallons) in a 24-hour period. Cooking and dishwashing alone give off about 5.7 lbs. per day, and each shower releases about .5 lb. of water.

During the heating season, this water vapor moves from the heated interior toward the cold exterior. If the passage of water vapor into exterior walls is not blocked or retarded by a vapor retarder, condensation can occur when the vapor contacts any sufficiently cold surface in the wall cavity. Moisture can be trapped within the wall if exterior building materials have a high vapor resistance and/or siding is sealed air tight with several coats of paint. Continued or prolonged condensation can cause wood to rot and mold and mildew to grow. It is for this reason that a vapor retarder is recommended if an exterior vapor retarder (foil faced sheathing, .5 in.

plywood or waferboard, or .75 in. or thicker extruded polystyrene) is used. The vapor retarder could be a continuous sheet like CertainTeed MemBrain™ Smart Vapor Retarder & Air Barrier Film.

In most areas, vapor retarders should be installed on the warm-in-winter side of the insulation (toward the interior). For some warm and humid areas, vapor retarders — if used — should be installed outside the heating or building envelope. (It is not appropriate to install kraft faced fiber glass with the facing toward the exterior.) Check local practice and/or building codes before installation.

As indicated earlier, vapor retarders are generally recommended for exterior walls, but they are not a standard recommendation for attics.

Always check local codes.

If the attic has a continuous vapor retarder and a similar air infiltration barrier is installed in sidewalls, mechanical ventilation such as a heat recovery ventilator (e.g., an air-to-air heat exchanger) should be installed to prevent trapping air pollutants and moisture within the house. Moisture buildup within the house can cause mildew on walls and ceilings. This is a common problem when infiltration is reduced to a minimum and ventilation is ignored.

STANDARDS AND GUIDELINES

There are many online resources with information about the requirements and recommendations for insulation. Here are several of the most relevant ones:

- International Code Council (ICC) International Energy Conservation Code (IECC): <http://www.iccsafe.org/Pages/default.aspx>
- ICC International Green Construction Code: <http://www.iccsafe.org/cs/IGCC/Pages/default.aspx>
- U.S. Green Building Council, LEED for Homes: <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=147>
- National Association of Home Builders National Green Building Program, Green Approved Products page: <http://www.nahbgreen.org/Resources/greenapprovedproducts.aspx>
- State and local building codes

CERTAINTEED'S RECOMMENDED R-VALUES

As you know, R-Value is a measure of the ability of a material to retard the flow of heat. With fiber glass insulation, the higher the R-Value, the greater the insulating power. R-Values are marked or identified on batts and blankets and their packages.

The R-Values listed below represent CertainTeed recommendations for achieving optimum thermal performance for the average climate zones shown on the map. They are based on CertainTeed's interpretation of the latest Model Energy Code, the Department of Energy recommendations, and the IECC recommendations. Depending upon the building design, other insulation combinations will also comply with the code.

Material quality is extremely important to the safety and effectiveness of installed insulation. CertainTeed fiber glass insulation meets the requirements of the current edition of ASTM C665 Standard Specification for Mineral Fiber Blanket Thermal Insulation, and our products are audited by the NAHB Research Center to verify R-Value.

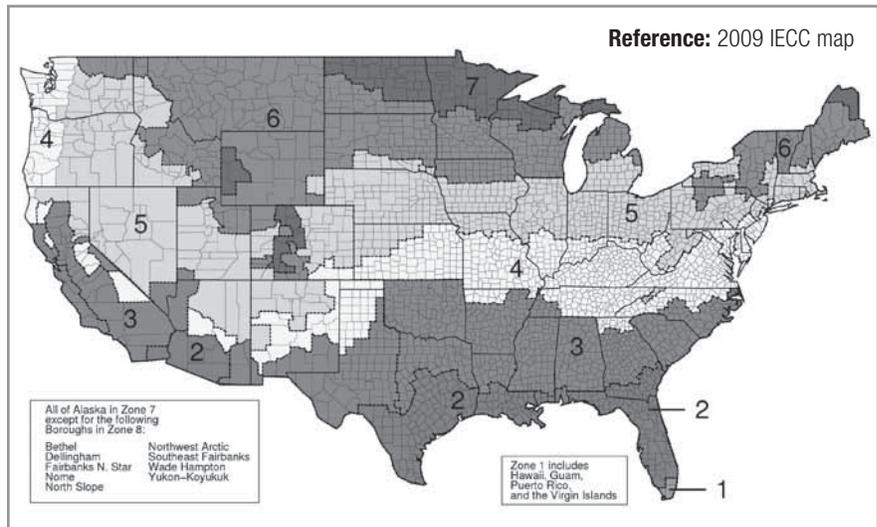
When building a new home, consumers and builders alike should make sure their homes are insulated to save energy and to provide more comfortable living.

The R-Value table at right is our interpretation of the 2009 IECC requirements and should be used as a guide for evaluating the energy efficiency of new detached one- and two-family residential buildings. The zone map approximates the major climate zones in the United States.

VAPOR RETARDER MATERIALS

Several materials can be used as vapor retarders. The most common materials are vapor retarder facings on building insulation. CertainTeed MemBrain™ Smart Vapor Retarder & Air Barrier Film or polyethylene sheeting are commonly used when a continuous, airtight retarder is wanted. Other vapor retarders include plywood, waferboard, foil faced polyisocyanurate, and .75 in. or thicker extruded polystyrene. All of these, if installed with taped joints, are continuous barriers.

CertainTeed faced fiber glass insulations are available with kraft facing (rating of 1 perm or less); MemBrain™ Smart Vapor Retarder



2009 IECC R-VALUE BY ZONE

ZONE	Ceiling	Wood Wall	Mass Wall	Floor	Basement Wall	Slab	Crawlspace	Vapor Retarder
1	R-30	R-13	R-3/4	R-13	R-0	R-0	R-0	N/A
2	R-30	R-13	R-4/6	R-13	R-0	R-0	R-0	N/A
3	R-30	R-13	R-5/8	R-19	R-5/13	R-0	R-5/13	N/A
3 Warm-Humid	R-30	R-13	R-5/8	R-19	R-0	R-0	R-5/13	N/A
4	R-38	R-13	R-5/10	R-19	R-10/13	R-10, 2 ft	R-10/13	N/A
4 Marine	R-38	R-20 or 13+5	R-13/17	R-30 (or fill cavity, min. R-19)	R-10/13	R-10, 2 ft	R-10/13	N/A
5	R-38	R-20 or 13+5	R-13/17	R-30 (or fill cavity, min. R-19)	R-10/13	R-10, 2 ft	R-10/13	N/A
6	R-49	R-20 or 13+5	R-15/19	R-30 (or fill cavity, min. R-19)	R-15/19	R-10, 4 ft	R-10/13	N/A
7	R-49	R-21	R-19/21	R-38 (or fill cavity, min. R-19)	R-15/19	R-10, 4 ft	R-10/13	N/A
8	R-49	R-21	R-19/21	R-38 (or fill cavity, min. R-19)	R-15/19	R-10, 4 ft	R-10/13	N/A

& Air Barrier Film facing (ranges from less than 1 perm to greater than 30 perms depending on humidity); standard foil (0.5 perm or less); or flame resistant FSK 25 foil (0.02 perm or less). Kraft faced insulation is the most commonly used insulation. Kraft, MemBrain™, and standard foil facings must be concealed; that is, installed behind and in substantial contact with the back surface of wall or ceiling finish materials. Flame resistant FSK 25 foil is the only facing that can be left exposed.

Unfaced building insulation is used when a separate vapor retarder such as MemBrain™ Smart Vapor Retarder & Air Barrier Film or 4- or 6-mil polyethylene is used, or where a vapor retarder is not needed. It is also used in retrofitting when additional insulation is installed over existing insulation in attics.

SELF-TEST #2: INSULATION BASICS

- Heat always flows
 - from up, down
 - from the center, out
 - from cold to hot
 - from hot to cold
- Fiber glass is an inorganic material.
 - true
 - false
- At CertainTeed, fiber glass is manufactured from
 - common sand and recycled glass
 - silver sand and other minerals
 - iron slag
 - polyvinyl chloride
 - polyethylene

9. The principal benefit of fiber glass insulation is
- it is easy to install
 - it dries quickly
 - it can be cut to fit
 - it reduces energy consumption
10. Fiber glass
- helps save money
 - is safe and noncombustible
 - is an acoustical insulator
 - all of the above
 - none of the above
11. Fiber glass is
- combustible
 - inert and permanent
 - flammable
 - corrosive
12. According to the Uniform Building Code, fiber glass insulation can be a fire stop.
- true
 - false
13. For attic floors, CertainTeed recommends
- R-11 insulation
 - R-19 insulation
 - R-60 insulation
 - no insulation
14. For existing 2 x 4 walls where the space between wall studs is accessible, CertainTeed recommends
- a minimum of R-13 insulation
 - a minimum of R-19 insulation
 - a minimum of R-30 insulation
 - no insulation
15. For floors above unconditioned spaces, CertainTeed recommends
- a minimum of R-11 insulation
 - a minimum of R-19 insulation
 - a minimum of R-30 insulation
 - no insulation
16. Ceilings with unconditioned spaces above should never be insulated.
- true
 - false
17. When insulating cathedral ceilings
- hot air heat exchangers must be used
 - never use a vapor retarder
 - leave a vented air space between the insulation and the roof sheathing
 - cathedral ceilings should not be insulated
18. In cathedral ceilings
- insulation is installed in the rafters
 - insulation is installed on the ceiling finish layer
 - insulation is never installed
19. When a crawlspace contains pipes or ducts, insulation is installed
- on the floor of the crawlspace
 - on the floor above
 - on crawlspace walls
 - all of the above
 - none of the above
20. When an attic space is finished as living quarters
- knee walls should be insulated
 - knee walls should never be insulated
 - knee walls will require ventilation
 - all of the above
 - none of the above
21. The net free ventilating area should be not less than
- 1 to 50 of the area of the space to be ventilated
 - 1 to 150 of the area of the space to be ventilated
 - 1 to 500 of the area of the space to be ventilated
 - 1 to 1500 of the area of the space to be ventilated
22. The net free ventilating area can be decreased to 1 to 300 of the area of the space to be ventilated if
- the high-low balance is 75 percent above the eave or cornice vents to 25 percent low
 - the high-low balance is 50 percent above the eave or cornice vents to 50 percent low
 - the high-low balance is 25 percent above the eave or cornice vents to 75 percent low
 - the net free ventilating area cannot fall below 1 to 150
23. Installing a vapor barrier on the warm side of an attic ceiling
- decreases the need for ventilation
 - increases the need for ventilation
 - does not affect the need for ventilation
 - it depends on the high-low balance
24. During the heating season, water vapor moves
- from the heated interior toward the cold exterior
 - from the cold exterior to the heated interior
 - from the rafters to interior ceilings
 - from uninsulated garages to living areas
25. Water vapor forms on cold surfaces because of
- convection
 - conductivity
 - condensation
 - consternation
26. Vapor retarders should be installed on the warm-in-winter side of insulation.
- true
 - false
27. In an attic, a continuous vapor retarder would be installed
- to keep the rain out
 - to protect the roof deck
 - to reduce air infiltration
 - continuous vapor retarders are never installed in attics
28. Requirements and recommendations for insulation are available from
- IECC
 - NAHB
 - state and local building authorities
 - all of the above
 - none of the above
29. In warm, humid climates
- kraft faced vapor retarders should not be installed toward the exterior
 - vapor retarders should be installed on interior walls
 - both of the above
 - neither of the above
30. CertainTeed faced fiber glass insulation is available with
- a kraft vapor retarder
 - a foil vapor retarder
 - a flame resistant foil vapor retarder
 - all of the above
 - none of the above

2 How Insulation Can Boost Your Profits

With the cost of new housing beyond reach for many, people are opting to remodel their existing homes rather than move. In fact, remodeling contractors are busier than ever, and they often are finding themselves involved in more and more major renovations and additions.

CertainTeed has some ideas on how you can use the benefits of one of the most basic materials used in many remodeling jobs — fiber glass insulation — to help you sell. The typical remodeling contractor may not be aware of the different types of insulation products and their various uses. Insulation is often installed as a simple necessity, not as the business-building opportunity it can be. Why not be the exception? Learn how to sell insulation to your prospects and differentiate yourself from other remodelers.

SELL ENERGY EFFICIENCY

Saving energy is still very important to homeowners. Surveys indicate that many homebuyers are willing to pay more money up front to save on future energy bills.

Installing the proper levels of CertainTeed fiber glass insulation is one of the best and least expensive ways to make your customers' remodeled homes energy efficient. Insulating to at least the latest R-Value levels recommended by the Department of Energy or the IECC can help save your customer money on monthly energy bills, in both the summer and the winter. It can also offer you and the homeowner more design alternatives in the project planning stage.

OFFER DESIGN ALTERNATIVES

Many homeowners want aesthetically pleasing features like cathedral ceilings or larger windows in their remodeled space. With the use of CertainTeed high performance batts, you can provide such features without risking higher energy bills in the home.

For instance, if you upgrade a conventional 2 x 4 sidewall from 3.5-in.-thick R-15 to high performance sidewall batts and R-4 windows, you can more than double the window space and still deliver a sidewall that offers the same comfort and energy efficiency. CertainTeed also offers a 5.5-in.-thick R-21 sidewall batt that allows for increased thermal protection in 2 x 6 construction.

SELL SOUND CONTROL

In addition to being an excellent thermal barrier, fiber glass insulation also acts as an acoustical barrier. Using CertainTeed fiber glass insulation in interior walls and floors is an excellent way to help reduce sound transmission from room to room. As you can imagine, it is especially easy to sell around noisy, high-traffic areas like home offices, bathrooms, and entertainment rooms.

Another perfect place for fiber glass insulation is around water pipes and heating and air ducts. By insulating these areas while you're remodeling, you can help reduce any future noise problems, which would be much more difficult and costly to fix later.

SELL SPACE

Open, airy spaces are becoming very popular with today's homeowners. If your customer likes the idea of the height and space that a cathedral ceiling can offer, there is no reason to worry about energy efficiency.

There is a way to keep a cathedral ceiling (even one with skylights) energy efficient. CertainTeed's 8.25-in.-thick R-30 cathedral ceiling batt is designed for use with 2 x 10 joists to provide full thermal protection while allowing enough air space for ventilation between the roof deck and the insulation. If the homeowner prefers even higher thermal performance, install 2 x 12 joists and CertainTeed's 10-in.-thick R-38 cathedral ceiling batts.

SELL THE BENEFITS OF FIBER GLASS OVER CELLULOSE INSULATION

If the house you're renovating has cellulose insulation, consider selling the benefits of replacing the cellulose with safe, thermally efficient fiber glass insulation.

The cellulose industry has yet to spend a dime on medical or health studies.

Yet wood dust has been linked to cancers of the upper respiratory tract and certain nasal cancers. Also, paper has dyes, inks, and impurities within it that are questionable from a health standpoint. In addition, boric acid, borax, sulfuric acid, ammonium sulfate, and calcium carbonate (often used to treat cellulose insulation for fire retardance) are all considered toxic materials at certain exposure levels, and they pose health risks over time,

including nasal irritation, fever, weight loss, vomiting, diarrhea, skin rash, convulsions, and anemia.

Fiber glass, on the other hand, is one of the most thoroughly tested and researched products made by man. Over the years, the industry has spent tens of millions of dollars in medical and health-related research. This includes animal, human, and environmental studies. All these have shown no direct link between fiber glass and cancer.

Cellulose manufacturers often say that their insulation, when spray-applied, makes homes more airtight, resisting air filtration.

And yet, no matter how well insulated a home may be, there will always be air infiltration around doors, windows, and vents because insulation is not installed to prevent air infiltration. Proper caulking, sealing, and exterior wraps are. Properly installed fiber glass insulation performs as well as cellulose to stop the movement of air from warm to cold.

Cellulose insulation, because it is made of ground-up newspapers, readily absorbs moisture. If wet, it can take a long time to dry. This can cause problems because, for cellulose to perform to its R-Value, the material must be dry. Also, wet cellulose usually compresses, which can severely affect its R-Value. Assuming existing cellulose does dry after becoming wet, there is a concern that the fire-retardant chemicals can wash away, leaving an unsafe insulation material behind. While it is not good for any insulation to get wet, fiber glass insulation does not absorb moisture. And if it does get wet, it will regain its original R-Value after drying out.

The chemicals used to make cellulose insulation fire retardant (particularly sulfates) can cause pipes and wires to corrode. There is even a documented case where the fire-retardant chemicals used in cellulose insulation caused metal roof trusses to corrode and collapse.

Fiber glass insulation is noncorrosive to pipes and wires because it does not contain any flame-retardant chemicals that can corrode metals.

Cellulose insulation (even the so-called light density type) weighs more than fiber glass insulation. Consequently, if a builder wishes to use cellulose for attic

insulation above R-30, a traditional .5-in. ceiling drywall, 24-in. O.C., should not be used. Fiber glass insulation is lightweight, yet extremely thermally efficient. It can be installed to thicknesses greater than those recommended by the IECC with no threat whatsoever to the ceiling construction of a home, without any changes to construction details.

Cellulose insulation is made of ground-up newspapers; even though it has fire-retardant chemicals in it, it will burn with prolonged exposure to the heat of a fire (at as low as 450°F). Once ignited, the spread of fire from one end of an attic to another is very possible. However, fiber glass insulation is noncombustible and will not contribute to the spread of fire. If it comes into contact with the prolonged heat of a fire above 1200°F, it simply melts. However, kraft and foil facing on insulation are flammable and should not be left exposed.

Cellulose insulation is naturally flammable and must be treated with chemicals like borax, boric acid, sulfuric acid, ammonium sulfate, aluminum sulfate, and calcium carbonate in order to meet fire safety requirements. Recently, doubts have been raised concerning the permanence of the fire resistance of cellulose. For example, after some attic fires in California, the California Bureau of Home Furnishings and Thermal Insulations conducted a series of tests with cellulose. The Bureau analyzed the material to determine the effect of aging on its flame resistance. The results of the third year of testing show that flame-spread resistance had declined to levels below what is required for new material.

Fiber glass insulation is permanently noncombustible. It does not have to be treated with fire-retardant chemicals. Unfaced fiber glass insulation is, in fact, recognized by building code groups as an acceptable fire stop in residential wood framed walls.

Cellulose is composed of 80 percent recycled (ground-up) newspapers and 20 percent fire-retardant chemicals. The percent of recycled glass in fiber glass varies by the plant where it is produced. Currently, CertainTeed is using between 29 and 70 percent recycled glass.

When cellulose is installed, it settles. Cellulose manufacturers must state both initial installed and settled thicknesses on their product packages to ensure that contractors install enough product to give homeowners the desired R-Value.

Settling is not a factor in the thermal performance of fiber glass insulation. Fiber glass batts and rolls do not settle. Fiber glass loose fill settles very slightly over time, usually less than 1 percent. All in all, fiber glass insulation, when installed correctly, maintains its thermal performance for the life of the dwelling.

High-density cellulose insulation offers higher per-inch R-Values, in the range of R-3.0 to R-3.7. However, R-Value per inch is really only an advantage if the area being insulated is only inches deep. Standard fiber glass batts and rolls offer an R-Value of approximately 3.0 per inch. In addition, CertainTeed's new high-performance fiber glass insulations are manufactured to provide higher R-Values per inch than cellulose and standard fiber glass insulation.

SELF-TEST #3: BOOSTING YOUR PROFITS

31. Studies demonstrate that homeowners are willing to spend money up front to save on future energy costs.
 - a. true
 - b. false
32. Installing picture windows and cathedral ceilings does not always result in decreased energy efficiency.
 - a. true
 - b. false
33. Installing high-performance sidewall batts and R-4 windows in a room lets you
 - a. double the window space without sacrificing energy efficiency
 - b. triple the window space without sacrificing energy efficiency
 - c. double the window space with a 50 percent decrease in energy efficiency
 - d. triple the window space with a 50 percent decrease in energy efficiency
34. Fiber glass insulation acts as an acoustical barrier around
 - a. water pipes
 - b. heating ducts
 - c. entertainment rooms
 - d. all of the above
 - e. none of the above
35. For cathedral ceilings, CertainTeed recommends
 - a. R-19 cathedral ceiling batts
 - b. R-21 cathedral ceiling batts
 - c. R-30 cathedral ceiling batts
 - d. R-35 cathedral ceiling batts
36. Cellulose insulation
 - a. is safer than fiber glass insulation
 - b. is naturally flammable
 - c. will not burn
 - d. does not settle
37. Cellulose insulation stops air infiltration better than fiber glass.
 - a. true
 - b. false
38. Cellulose insulation
 - a. will not compress
 - b. will not settle
 - c. absorbs moisture
 - d. retains its loft
39. Fiber glass insulation is significantly lighter than cellulose.
 - a. true
 - b. false
40. The fire-retardant chemicals in cellulose insulation will not degrade.
 - a. true
 - b. false
41. Fiber glass batts and rolls
 - a. don't settle
 - b. settle 10 percent or less
 - c. settle 20 percent or less
 - d. settle 1 percent or less
42. When comparing fiber glass loose fill insulation to cellulose, you should remember that
 - a. cellulose settles
 - b. fiber glass loose fill settles less than 1 percent
 - c. cellulose is composed of up to 20 percent fire retardant chemicals
 - d. all of the above

3 CertainTeed Insulation Products

BUILDING INSULATION

Building insulation is a light-density fiber glass blanket, used in residential construction for thermal and acoustical insulation of walls, ceilings, and floors. It is available in batts and rolls.

Unfaced insulation is manufactured in widths that permit pressure fit installation in wall cavities. This insulation is used with a separate vapor retarder or where a vapor retarder is not required. CertainTeed unfaced building insulation complies with ASTM C665, Type 1.

Kraft faced insulation is manufactured with an integral vapor retarder. The kraft facing has formed attachment flanges at the edges which are used for either face or inset stapling. The kraft facing, applied with asphalt to the fiber glass insulation, has a vapor transmission (permeance) rating of 1 perm or less. CertainTeed kraft faced building insulation complies with ASTM C665 Type II, Class C, Category I.

Product Benefits

- Quick, easy installation
- Lightweight, flexible, and easily cut for fitting irregular areas
- Noncombustible, per ASTM E136 (unfaced only)
- Noncorrosive inorganic glass fiber; will not rot or mildew or otherwise deteriorate
- Will not absorb moisture

Installation

Unfaced and kraft faced insulation products are manufactured in widths required for standard wood or metal stud construction. Faced material should be stapled with the vapor retarder toward the warm-in-winter side with staples about 8 in. apart when using wood studs. Unfaced and tabless material can be pressed snugly between studs.

Standard Sizes: Unfaced Insulation

R-Value		Thickness		Width	
R	RSI	in.	mm	in.	mm
R-11	1.9	3.5	89	15	381
R-11	1.9	3.5	89	15.25	387
R-11	1.9	3.5	89	23.25	591
R-13	2.3	3.5	89	15.25	387
R-13	2.3	3.5	89	16	406
R-13	2.3	3.5	89	23.25	591
R-13	2.3	3.5	89	24	610
R-15	2.6	3.5	89	15.25	387
R-19	3.3	6.25	159	15	381
R-19	3.3	6.25	159	15.25	387
R-19	3.3	6.25	159	16	406
R-19	3.3	6.25	159	19.25	489
R-19	3.3	6.25	159	23	584
R-19	3.3	6.25	159	23.25	591
R-19	3.3	6.25	159	24	610
R-21	3.7	5.5	140	15.25	387
R-21	3.7	5.5	140	16	406
R-21	3.7	5.5	140	23.25	591
R-22	3.9	6.5	165	24	610
R-25	4.4	8	203	15	381
R-25	4.4	8	203	16	406
R-25	4.4	8	203	23	584
R-25	4.4	8	203	24	610
R-30	5.3	10	254	16	406
R-30	5.3	10	254	19.25	489
R-30	5.3	10	254	24	610
R-38	6.7	12	305	16	406
R-38	6.7	12	305	24	610

Standard Batt Lengths are 47", 48", 93", 94", 96", & 105" (1194mm, 1219mm, 2362mm, 2388mm, 2438mm, 2667mm)

Roll Lengths vary.

List represents typical sizes and are subject to change. For availability, specific width and length combinations, and made to order (MTO) sizes, contact your CertainTeed Representative.

Standard Sizes: Kraft Faced Insulation

R-Value		Thickness		Width	
R	RSI	in.	mm	in.	mm
R-11	1.9	3.5	89	11	279
R-11	1.9	3.5	89	15	381
R-11	1.9	3.5	89	16	406
R-11	1.9	3.5	89	23	584
R-11	1.9	3.5	89	24	610
R-13	2.3	3.5	89	11	279
R-13	2.3	3.5	89	15	381
R-13	2.3	3.5	89	16	406
R-13	2.3	3.5	89	23	584
R-13	2.3	3.5	89	24	610
R-15	2.6	3.5	89	15	381
R-15	2.6	3.5	89	23	584
R-19	3.3	6.25	159	11	279
R-19	3.3	6.25	159	15	381
R-19	3.3	6.25	159	16	406
R-19	3.3	6.25	159	19.25	489
R-19	3.3	6.25	159	23	584
R-19	3.3	6.25	159	24	610
R-21	3.7	5.5	140	15	381
R-21	3.7	5.5	140	23	584
R-22	3.9	6.5	165	15	381
R-30	5.3	10	254	11	279
R-30	5.3	10	254	16	406
R-30	5.3	10	254	19.25	489
R-30	5.3	10	254	24	610
R-38	6.7	12	305	16	406
R-38	6.7	12	305	19.25	489
R-38	6.7	12	305	24	610

Standard Batt Lengths are 47", 48", 93", 94", 96", & 105" (1194mm, 1219mm, 2362mm, 2388mm, 2438mm, 2667mm)

Roll Lengths vary.

List represents typical sizes and are subject to change. For availability, specific width and length combinations, and made to order (MTO) sizes, contact your CertainTeed Representative.

DRYRIGHT™

Basic Use: DryRight™ insulation is intended for use in either residential or commercial construction as thermal and acoustical insulation in wall and ceiling cavities. It is a good choice in very cold, cold, and mixed warm and cold climates because it incorporates MemBrain™ Smart Vapor Retarder & Air Barrier Film, which actually changes permeability as ambient humidity changes. Designed for use in standard wood stud assemblies. Helps prevent mold and mildew growth by mitigating naturally occurring moisture movement and accumulation. Provides excellent acoustical performance. Sized for friction-fit installation. Lightweight, easily fabricated and installed.

Standard Sizes: DryRight™ Insulation

R-Value		Thickness		Width	
R	RSI	in.	mm	in.	mm
13	2.3	3.5	89	15.25	387
13	2.3	3.5	89	16	406
13	2.3	3.5	89	24	610
15	2.6	3.5	89	15.25	387
19	3.3	6.25	159	15.25	387
19	3.3	6.25	159	16	406
19	3.3	6.25	159	24	610
21	3.7	5.5	140	15.25	387

Standard Batt Lengths are 93", 96" & 105" (2362mm, 2438mm, 2667mm)

List represents typical sizes and are subject to change. For availability, specific width and length combinations, and made to order (MTO) sizes, contact your CertainTeed Representative.

HIGH-PERFORMANCE BATTS

High-performance batts meet the energy saving requirements of today's codes for sidewalls and cathedral ceilings, with virtually no changes in construction technique.

High-Performance Sidewall Batts:

Available as R-15/3.5-in.-thick or R-21/5.5-in.-thick batts to fit standard construction without loss of R-Value due to compression.

R-15 batts installed in a 3.5-in. cavity provide an increase of 36 percent in insulation value over standard R-11 batts.

Available either kraft faced or unfaced for easy installation.

High-Performance Cathedral Ceiling Batts:

Available as R-30/8.25-in.-thick or R-38/10-in.-thick high-density batts to allow an airspace between the insulation and roof deck for ventilation.

Available either kraft faced or unfaced for easy installation.

Standard Sizes: High-Performance Insulation

R-Value		Thickness		Width		Facing
R	RSI	in.	mm	in.	mm	
R-15	2.6	3.5	89	15	381	Kraft Faced
R-15	2.6	3.5	89	15.25	387	Unfaced
R-15	2.6	3.5	89	23	584	Kraft Faced
R-21	3.7	5.5	140	15	381	Kraft Faced
R-21	3.7	5.5	140	15.25	387	Unfaced
R-21	3.7	5.5	140	16	406	Unfaced
R-21	3.7	5.5	140	23	584	Kraft Faced
R-21	3.7	5.5	140	23.25	591	Unfaced
R-30C	5.3	8.25	210	15	381	Kraft Faced
R-30C	5.3	8.25	210	15.25	387	Unfaced
R-30C	5.3	8.25	210	23	584	Kraft Faced
R-30C	5.3	8.25	210	23.25	591	Unfaced
R-38C	6.7	10.25	260	15	381	Kraft Faced
R-38C	6.7	10.25	260	15.25	387	Unfaced
R-38C	6.7	10.25	260	23	584	Kraft Faced
R-38C	6.7	10.25	260	23.25	591	Unfaced

Standard Batt Lengths are 48" & 93" (1219mm & 2362mm)

List represents typical sizes and are subject to change. For availability, specific width and length combinations, and made to order (MTO) sizes, contact your CertainTeed Representative.

NOISEREDUCER™ ACOUSTICAL INSULATION

Sound Attenuation Batts

Sound Attenuation Batts are unfaced fiber glass batts designed for use in steel construction to improve acoustical performance in residential and commercial applications. They are slightly wider and longer than conventional fiber glass batts.

Acoustical Ceiling Batts

Acoustical Ceiling Batts are designed to lie directly on suspended ceilings, providing excellent thermal protection and acoustical performance. They are available unfaced or with a kraft facing. Kraft faced Acoustical Ceiling Batts have no stapling flanges.

Residential Sound Control Batts

Residential Kraft Sound Control Batts are for wood stud interior walls and floors. They provide a sound absorber that fills the void between interior studs. This absorber effectively breaks the path of sound. They are lightweight and easy to install, and (depending upon how they are installed) can add 4 to 12 points to the Sound Transmission Class rating of an area.

R-Value		Thickness		Width		Facing
R	RSI	in.	mm	in.	mm	
R-8	1.4	2.5	61	16	406	Unfaced Sound Control Attenuation Batts
R-8	1.4	2.5	61	24	588	Unfaced Sound Control Attenuation Batts
R-11	1.9	3.5	89	15	368	Residential Kraft Faced Non-Vapor Batts
R-11	1.9	3.5	89	16	406	Unfaced Sound Control Attenuation Batts
R-11	1.9	3.5	89	24	588	Unfaced Sound Control Attenuation Batts
R-19	3.3	6.25	159	24	588	Unfaced Sound Control Attenuation Batts
R-19	3.3	6.25	159	24	588	Tabless Kraft Faced Batts

MASONRY WALL INSULATION

Batts of unfaced fiber glass insulation are designed for use behind paneling in masonry-type construction where cavity depth is limited by the furring strips used. No stapling is required because the batts fit tightly between furring strips. A polyethylene vapor retarder (which should be installed facing the heated area of the structure) may be used over the furring strips and the insulation. (Exception: Warm, humid areas such as the Gulf Coast.)

Available Sizes: Masonry Insulation

R-Value		Thickness		Width	
R	RSI	in.	mm	in.	mm
R-3	0.5	.75	19	15	381
R-3	0.5	.75	19	23	584
R-6	1.1	1.75	44	15	381
R-6	1.1	1.75	44	23	584

BASEMENT WALL INSULATION

CertainTeed Basement Wall Insulation is designed for use in both residential and commercial applications where code or builder preference specifies an insulated basement area.

This product is intended for use in applications where the insulation will be left exposed. The product has a white reinforced polypropylene facing, which is the exposed finished surface. It can be applied either half-wall or full-wall. (Half-wall is not recommended for hollow block walls; they should be insulated full height.)

Available Sizes: Basement Insulation

R-Value		Thickness		Width	
R	RSI	in.	mm	in.	mm
R-11	1.9	3.125	79	44	1118
R-11	1.9	3.125	79	48	1219
R-11	1.9	3.125	79	72	1829

SELF-TEST #4: INSULATION

43. Building insulation
- is a light-density blanket used in walls, ceilings, and floors
 - is used when a vapor retarder is not required
 - always has an integral vapor retarder
44. Unfaced insulation
- is not pressure fit
 - is used with a separate vapor retarder or when a vapor retarder is not required
 - has an integral vapor retarder
45. Kraft faced insulation
- is a light-density blanket used in walls, ceilings, and floors
 - is used when a vapor retarder is required
 - has an integral vapor retarder
 - all of the above
 - none of the above
46. Faced and unfaced insulation can be cut to fit irregular spaces.
- true
 - false
47. Faced insulation should be stapled
- every 2 in.
 - every 4 in.
 - every 8 in.
 - every 12 in.
48. Faced insulation should be installed with
- the vapor retarder toward the ceiling
 - the vapor retarder toward the floor
 - the vapor retarder toward the warm-in-winter side
 - the vapor retarder toward the cold-in-winter side
49. Insulation should be installed
- between sheathing and plumbing
 - between interior walls and plumbing
 - when the exterior temperature is above 32°F
 - when the exterior temperature is below 32°F
50. Where there is existing insulation in attics
- additional insulation should never be installed
 - continuous vapor retarders should be installed
 - unfaced insulation must never be installed
 - unfaced insulation should be added to bring the insulation up to today's standards
51. All CertainTeed insulation complies with ASTM E 136 for noncombustibility.
- true
 - false
52. CertainTeed High-Performance Sidewall Batts are available
- 3.5 in. thick
 - 3.5 and 5.5 in. thick
 - 8.25 in. thick only
 - 10 in. thick only
53. CertainTeed acoustical insulation is recommended for
- wood construction
 - steel construction
 - suspended ceilings
 - all of the above
54. CertainTeed unfaced NoiseReducer™ Batts are
- slightly thicker than conventional fiber glass batts
 - slightly lighter than conventional batts
 - slightly narrower and shorter than conventional batts
 - slightly wider and longer than conventional batts
55. CertainTeed Acoustical Ceiling Batts
- must be stapled along the flanges
 - must lie on a continuous vapor retarder
 - can lie directly on suspended ceilings
 - are available unfaced only
56. CertainTeed Masonry Wall Insulation is
- faced
 - unfaced
 - loose fill
 - available in R-11
57. CertainTeed Basement Wall Insulation is
- faced
 - unfaced
 - loose fill
 - available in R-19
58. CertainTeed Basement Wall Insulation is used
- in both residential and commercial applications
 - where the insulation will be left exposed
 - when insulation will be applied half-wall
 - all of the above
 - none of the above
59. CertainTeed Basement Wall Insulation is supplied in fiber glass rolls, with a white reinforced polypropylene facing.
- true
 - false

4 Checking The Finished Job

The best time to inspect an insulation job is before the drywall has been installed, but you should also do a thorough check of existing insulation before beginning any remodeling job.

Compression — Check to see that the insulation has been installed without excessive compression. Compressing the insulation will reduce its effectiveness.

Stapling — There are two ways to staple batts to studs: inset stapling and face stapling. With an inset-stapled batt, the flange should be flush with the front end of the stud. On batts that have been face-stapled, the flange should overlap the face of the studs.

Check to see that sufficient staples have been used and that they have been spaced correctly. Batts should be stapled about every 8 in., whether inset or face stapled.

The exception to stapling is when high-density batts are installed, such as R-15 and R-21. They will stay in position without staples.

Plumbing — Insulation should never be placed between plumbing and drywall. Water pipes, drains, and stack vents on outside walls should always be insulated on the cold or exterior side.

Unheated Rooms — The ceiling should be insulated in any unheated room, such as basements, crawlspaces, and garages under bedrooms. Check to see that the batts are snug against the ceiling, with no air gaps. The vapor retarder should always face the living space.

R-Value — Unfaced insulation should always be installed with the R-Value markings facing out, so you can verify that the correct R-Value has been installed. R-Value identification should be visible on kraft faced insulation as well.

Attic Openings — Check for insulation inside the attic access openings. Look for either a specially constructed insulated cover or a piece of kraft faced R-38 batt. The kraft side should be face down, toward the warm interior of the home.

Vapor Retarder Placement — When a vapor retarder is used anywhere in the house, it should always face the interior of the home. Consult your local building code if in doubt.

Vapor Retarder Integrity — Look for tears in the kraft facing or sheeting. Tears should always be taped over to maintain the integrity of the vapor retarder.

Separate Vapor Retarders — When unfaced batts are used and a separate vapor retarder is required, the vapor retarder should be CertainTeed MemBrain™ Smart Vapor Retarder & Air Barrier Film or 4- or 6-mil polyethylene sheeting. To prevent moisture from entering the wall cavity, the adjoining pieces should overlap at least 4 in. at the seams. The film should be stapled to both the top and the bottom plates around all openings in the walls, including windows.

Band Joists — Unfaced insulation or insulation with a nonflammable facing should be used at band joists. Because it is flammable, kraft faced insulation should not be exposed to living areas.

Wired Areas — Batts in cavities containing wiring should be installed by either splitting the batt around the wires or cutting slits into the batt for the wires so there is compression and a better insulation job.

Narrow Cavities — Batts should be cut to fit narrow cavities. Make sure that narrow cavities are completely filled with insulation on all sides. The best method is to carefully cut down a batt to be slightly larger than the opening. If a cavity has been filled with insulation scraps, there's no way of knowing the R-Value for that area.

Windows and Door Frames — Check window and door frames, as well as outside walls, to be sure that every space has been either stuffed with pieces of fiber glass and/or caulked.

Receptacle Boxes — Batts should be cut to fit around receptacle boxes, with the cut piece placed behind the box.

Bay Windows and Overhangs — Any surface that is exposed to the outside should be insulated. For example, in the case of a bay window, the outside wall and the floor of the extended bay must be covered. If the second floor of a home extends out past the first floor, then the floor, roof, and wall of the extension must be insulated as well.

Top Plate of Outside Walls — If possible, use a ladder to check that the top plate of outside walls is completely covered with either blown-in insulation or a batt.

Recessed Lighting — Lighting fixtures that are IC-rated may have insulation installed over them. However, non-rated fixtures should have a high hat around them, with a 3-in. space between the insulation and the high hat. If unsure of the type of fixture, refer to the label of the fixture.

Eave Baffles — Check to see that eave baffles are in place at the eaves, if they contain vents. Baffles may be foam, cardboard or pieces of batt insulation. For proper ventilation, the baffles should be stapled to the roof deck and extend down over the top plate into the eave area.

5 Product Knowledge Self-Test Answer Key

- | | | |
|-------|-------|-------|
| 1. a | 21. b | 41. a |
| 2. b | 22. b | 42. a |
| 3. c | 23. c | 43. a |
| 4. d | 24. a | 44. b |
| 5. e | 25. c | 45. d |
| 6. d | 26. a | 46. a |
| 7. a | 27. c | 47. c |
| 8. a | 28. d | 48. c |
| 9. d | 29. a | 49. a |
| 10. d | 30. d | 50. d |
| 11. b | 31. a | 51. b |
| 12. a | 32. a | 52. b |
| 13. c | 33. a | 53. d |
| 14. a | 34. d | 54. d |
| 15. b | 35. c | 55. c |
| 16. b | 36. b | 56. b |
| 17. c | 37. b | 57. a |
| 18. a | 38. c | 58. d |
| 19. c | 39. a | 59. a |
| 20. a | 40. b | |

6 Fiber Glass Insulation Product Knowledge Exam

Now that you've reviewed the Insulation Product Knowledge chapters and completed the Self-Tests at the end of each one, you are ready to take this exam.

Answer all questions with the best possible answer. Select one answer for each question. If you're unsure of the answer, review the material before proceeding. Indicate your answers on the answer sheet by

shading in the appropriate circle. If you make a mistake or change your mind, please erase completely before shading another circle.

When you've answered all the questions, fill in your name and mailing information and return the exam to us. The answer sheet is a postage-paid self mailer. Just tape it closed and drop it in the mail. Please allow four to six weeks for processing.

To pass, you must answer 36 of the 40 questions correctly. If you fail to pass the exam the first time you take it, you can keep trying until you pass.

When you answer 36 of the 40 questions correctly, you will receive a personalized Certificate of Completion, ready to be framed and used to promote your professional services.

1. Where there is existing insulation in attic-type ceilings
 - a. additional insulation should never be installed
 - b. continuous vapor retarders should be installed
 - c. unfaced insulation must never be installed
 - d. unfaced or blown-in insulation should be added to bring the insulation up to today's standards
2. For existing 2 x 4 walls where the space between wall studs is accessible, CertainTeed recommends
 - a. a minimum of R-13 insulation
 - b. a minimum of R-19 insulation
 - c. a minimum of R-30 insulation
 - d. no insulation
3. Sound attenuation batts are
 - a. faced
 - b. unfaced
 - c. encased in a nonwoven fabric
 - d. loose fill
4. When comparing fiber glass loose fill insulation to cellulose, you should remember that
 - a. fiber glass loose fill settles 1 percent or less
 - b. fiber glass settles 5 percent
 - c. fiber glass settles 10 percent
 - d. fiber glass does not settle or compress
5. Installing a vapor barrier on the warm side of a ceiling
 - a. decreases the need for ventilation
 - b. increases the need for ventilation
 - c. does not affect the need for ventilation
 - d. it depends on the high-low balance
6. Fiber glass is
 - a. combustible
 - b. noncombustible
 - c. flammable
 - d. corrosive
7. CertainTeed faced fiber glass insulation is available with
 - a. a kraft vapor retarder
 - b. a foil vapor retarder
 - c. a flame-resistant foil vapor retarder
 - d. all of the above
 - e. none of the above
8. Fiber glass insulation
 - a. lessens the "cold wall" effect
 - b. reduces drafts
 - c. is an acoustical insulator
 - d. all of the above
 - e. none of the above
9. Installing picture windows and cathedral ceilings always results in decreased energy efficiency.
 - a. true
 - b. false
10. The net free ventilation area in an attic should be not less than
 - a. 1 to 50 of the area of the space to be ventilated
 - b. 1 to 150 of the area of the space to be ventilated
 - c. 1 to 500 of the area of the space to be ventilated
 - d. 1 to 1500 of the area of the space to be ventilated
11. Heat always flows
 - a. from up, down
 - b. from the center, out
 - c. from cold to hot
 - d. from hot to cold
12. Fiber glass insulation acts as an acoustical barrier around
 - a. water pipes
 - b. heating ducts
 - c. entertainment rooms
 - d. all of the above
 - e. none of the above
13. At CertainTeed, fiber glass is manufactured from
 - a. common sand and recycled glass
 - b. silver sand and other minerals
 - c. iron slag
 - d. polyvinyl chloride
 - e. polyethylene
14. When an attic space is finished as living quarters
 - a. knee walls should be insulated
 - b. knee walls should never be insulated
 - c. knee walls will require ventilation
 - d. all of the above
 - e. none of the above
15. Installing high-performance sidewall batts and R-4 windows in a room lets you
 - a. double the window space without sacrificing energy efficiency
 - b. triple the window space without sacrificing energy efficiency
 - c. double the window space with a 50 percent decrease in energy efficiency
 - d. triple the window space with a 50 percent decrease in energy efficiency
16. Common vapor retarders include
 - a. kraft facing
 - b. foil facing
 - c. polyethylene
 - d. all of the above
 - e. none of the above

17. When a crawlspace contains pipes or ducts, insulation is installed
- on the floor of the crawlspace
 - on the floor above
 - on crawlspace walls
 - all of the above
 - none of the above
18. Studies demonstrate that homeowners are willing to spend money up front to save on future energy costs.
- true
 - false
19. Fiber glass batts and rolls settle
- 1 percent or less
 - 10 percent or less
 - 20 percent or less
 - they don't settle
20. A heating degree day is used to measure
- conduction
 - convection
 - radiation
 - coldness
21. When insulating cathedral ceilings
- hot air heat exchangers must be used
 - never use a vapor retarder
 - leave a vented air space between the insulation and the roof sheathing
 - cathedral ceilings should not be insulated
22. In warm, humid climates
- kraft faced vapor retarders should not be installed toward the exterior
 - vapor retarders should be installed on interior walls
 - both of the above
 - neither of the above
23. Kraft faced insulation
- is a light-density blanket used in walls, ceilings, and floors
 - is used when a vapor retarder is required
 - both of the above
 - neither of the above
24. Requirements and recommendations for insulation are available from
- HUD
 - NAHB
 - state and local building authorities
 - all of the above
 - none of the above
25. Ceilings with cold spaces above should never be insulated.
- true
 - false
26. Faced insulation should usually be installed with
- the vapor retarder toward the ceiling
 - the vapor retarder toward the floor
 - the vapor retarder toward the warm-in-winter side
 - the vapor retarder toward the cold-in-winter side
27. Heat loss and gain are measured in
- R-Values
 - RSIs
 - BTUs
 - heating degree days
28. Insulation should be installed
- between exterior sheathing and plumbing
 - between interior walls and plumbing
 - when the exterior temperature is above 32°F
 - when the exterior temperature is below 32°F
29. In an attic, a continuous vapor retarder would be installed
- to keep the rain out
 - to protect the roof deck from condensation
 - to reduce air infiltration
 - continuous vapor retarders are never installed in attics
30. For floors above unconditioned spaces, CertainTeed recommends
- a minimum of R-11 insulation
 - a minimum of R-19 insulation
 - a minimum of R-30 insulation or R-38 insulation
 - no insulation
31. CertainTeed High-Performance Sidewall Batts are available
- 3.5 in. thick
 - 3.5 in. to 5.5 in. thick
 - 8.25 in. thick
 - 10 in. thick only
32. A hot air furnace heats a home because of
- conduction
 - convection
 - radiation
 - thermal resistance
33. In cathedral ceilings
- insulation is installed in the rafters
 - insulation is installed on the ceiling finish layer
 - insulation is never installed
34. Faced insulation should be stapled
- every 2 in.
 - every 4 in.
 - every 8 in.
 - every 12 in.
35. Heat that flows through walls to the outside does so by
- conduction
 - convection
 - radiation
 - thermal resistance
36. Acoustical ceiling batts
- must be stapled along the flanges
 - must lie on a continuous vapor retarder
 - can lie directly on suspended ceilings
 - are available unfaced only
37. During the heating season, water vapor moves
- from the heated interior toward the cold exterior
 - from the cold exterior to the heated interior
 - from the rafters to interior ceilings
 - from insulated garages to living areas
38. Unfaced insulation
- is a heavy-density blanket used in walls, ceilings, and floors
 - is used with a separate vapor retarder or when a vapor retarder is not required
 - has an integral vapor retarder
 - all of the above
 - none of the above
39. For cathedral ceilings, CertainTeed recommends
- R-19 cathedral ceiling batts
 - R-21 cathedral ceiling batts
 - R-38 cathedral ceiling batts
 - R-11 cathedral ceiling batts
40. CertainTeed Basement Wall Insulation is
- faced
 - unfaced
 - loose fill
 - available in R-19

Answer Sheet For Product Knowledge Exam

Indicate your answer by filling in the appropriate circle. Fill in each circle completely. If you make a mistake or change your mind, erase completely before shading in a second circle. Answers can be mailed to CertainTeed using this self-mailer or faxed to (610) 254-5436.

	<u>a</u>	<u>b</u>	<u>c</u>	<u>d</u>	<u>e</u>		<u>a</u>	<u>b</u>	<u>c</u>	<u>d</u>	<u>e</u>		<u>a</u>	<u>b</u>	<u>c</u>	<u>d</u>	<u>e</u>
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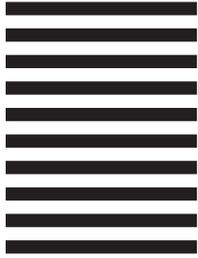
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