



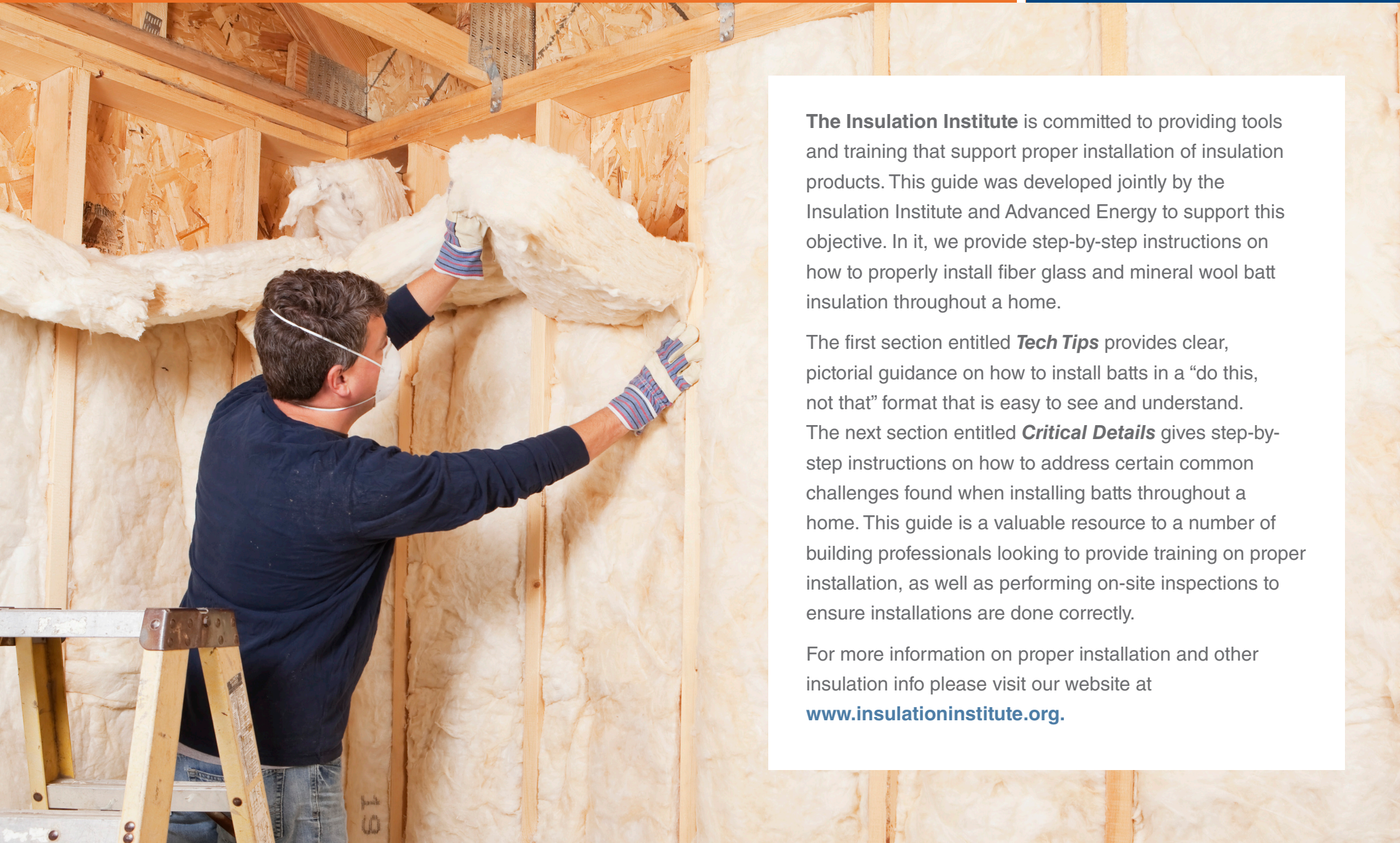
advanced
energy

INSULATION:

A GUIDE TO PROPER INSTALLATION

Insulation
Institute™

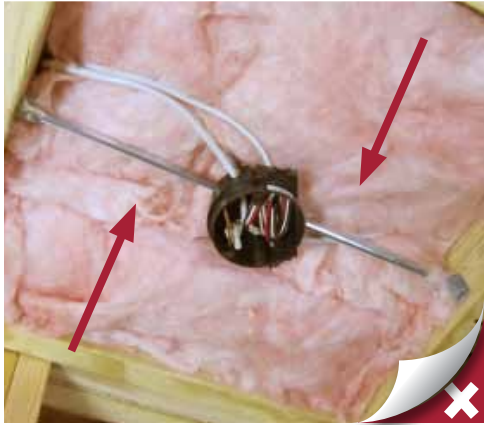
KNOWLEDGE. LEADERSHIP. CONFIDENCE.



The **Insulation Institute** is committed to providing tools and training that support proper installation of insulation products. This guide was developed jointly by the Insulation Institute and Advanced Energy to support this objective. In it, we provide step-by-step instructions on how to properly install fiber glass and mineral wool batt insulation throughout a home.

The first section entitled **Tech Tips** provides clear, pictorial guidance on how to install batts in a “do this, not that” format that is easy to see and understand. The next section entitled **Critical Details** gives step-by-step instructions on how to address certain common challenges found when installing batts throughout a home. This guide is a valuable resource to a number of building professionals looking to provide training on proper installation, as well as performing on-site inspections to ensure installations are done correctly.

For more information on proper installation and other insulation info please visit our website at www.insulationinstitute.org.



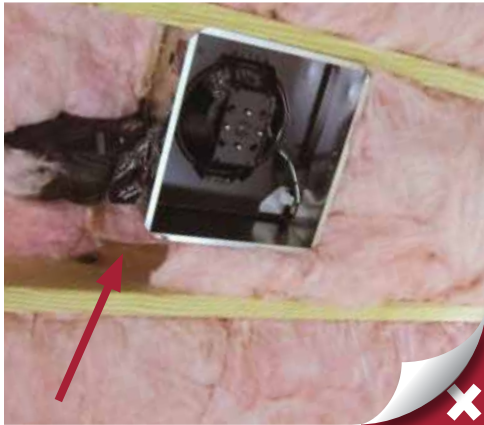
1. Boxes (electrical, smoke, CO, etc.): Cut and/or split insulation around wiring and boxes.

2. Ceiling fan boxes: Cut and/or split insulation around ceiling fan boxes, wiring and any support bracing.



3. Recessed Lights (IC and ICAT rated only): Cut and/or split insulation around wiring and recessed lights and fit snugly to boxes.
Notice: Recommend using ICAT rated.

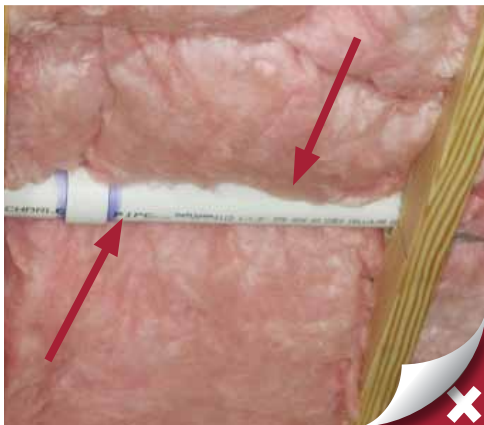
4. Wires (electrical, cable, security, low voltage, etc.): Cut and/or split insulation around wiring and fit snugly to boxes and other obstructions.



- 5.** Exhaust/ventilation fans: Cut and/or split insulation around exhaust fan boxes, ductwork, wiring and any support bracing and fit snugly to boxes.



- 6.** Ducts/connectors: Cut and/or split insulation around HVAC Boots and insulated ductwork and any support bracing.



- 7.** Pipes (water supply, plumbing vents, etc.): Cut and/or split insulation around pipes.

NOTICE: The clearance between insulation and fossil-fuel appliances, chimneys, recessed lights and other hot surfaces must meet the requirements of the National Fire Protection Association (NFPA) and International Code Council (ICC) building codes, and the appliance manufacturers' recommendations - whichever is most restrictive.

In general, when installing insulation in contact with or near hot surfaces:

1. Check the manufacturer's instructions for equipment and appliances to determine any insulation requirements or restrictions.
2. Check the applicable building code for insulation clearance requirements. These are typically contained in the fire, building and mechanical codes. If there are any questions - consult your local building department for the applicable requirements.
3. Mineral fiber insulation (fiber glass, rock and slag wool) are noncombustible but may have flammable facings which cannot be used in hot applications. These insulations are also available with noncombustible facings and facings which have flame spread and smoke developed indices appropriate for most code requirements.
4. When it is permissible to insulate in hot applications, note that most fiber glass products used in building insulation melt at approximately 800 degrees F and rock wool products used to insulate buildings melt at approximately 1200 degrees F. Both fiber glass and rock wool materials are available which have higher melting temperatures.



1. Stairs/landings: Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.



2. Tubs/showers: For walls that will not have an interior finish and are separating conditioned and unconditioned spaces, wall cavities are insulated and an interior rigid air barrier is installed.

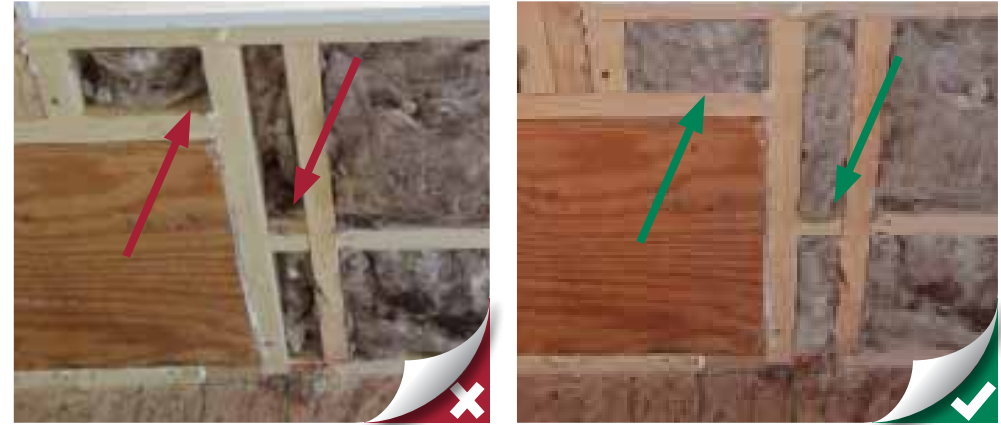


3. Fireplaces: For walls that will not have the same interior finish and are separating conditioned and unconditioned spaces, wall cavities are insulated and an interior rigid air barrier is installed.

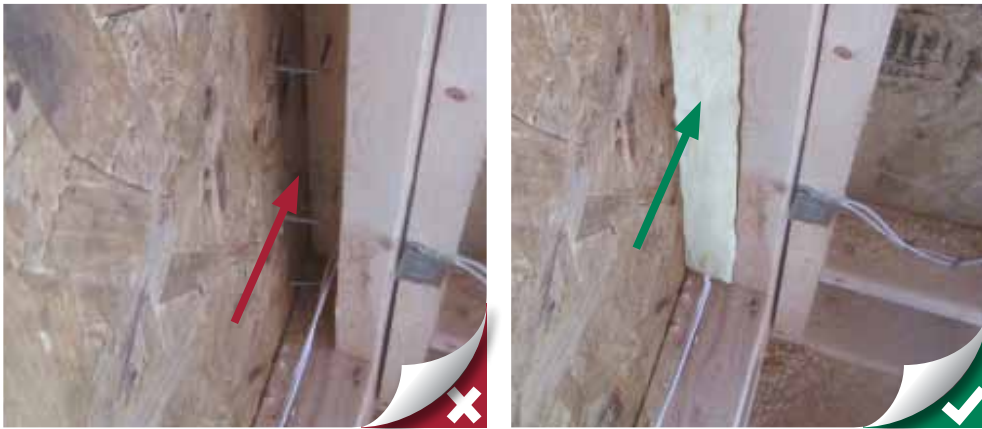
Note: Limited Access and Special Situations are areas on exterior walls that may be easier to insulate before covering up. It is advisable to insulate these cavities first/before other wall cavities are insulated.



- 1.** Narrow cavities: Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.



- 2.** Odd cavity: Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.



- 3.** Corners: Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.



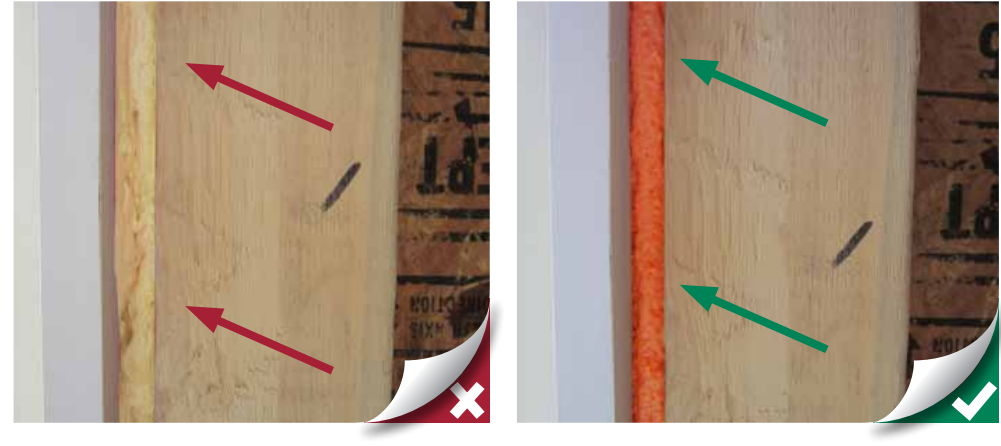
- 4.** Ladder T (interior/exterior wall intersection): Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.

TECH TIPS

WALLS: NARROW AND ODD CAVITIES



- 5.** Vapor retarder: Where a vapor retarder is required, cover the warm-in-winter side of the narrow space with vapor retarder facing.



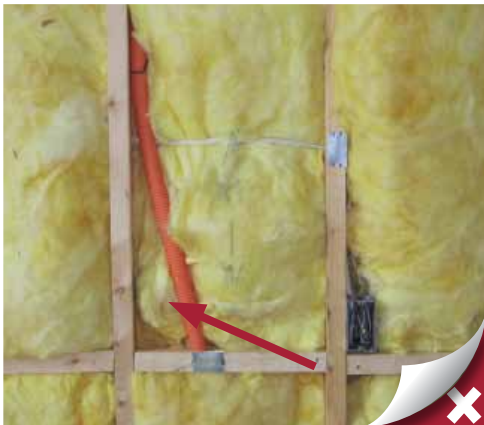
- 6.** Windows/doors: Air seal around windows and doors using backer rod, caulk or low expansion foam. Do not use fibrous insulation or air-permeable foam.



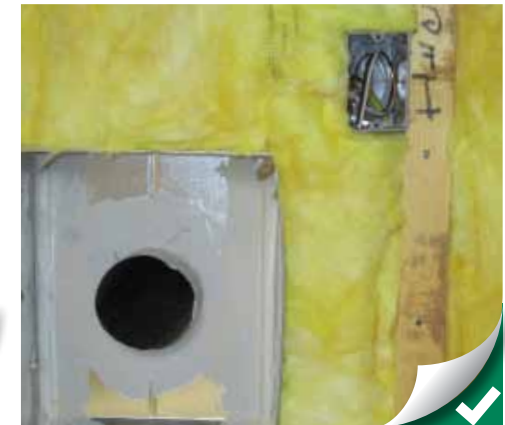
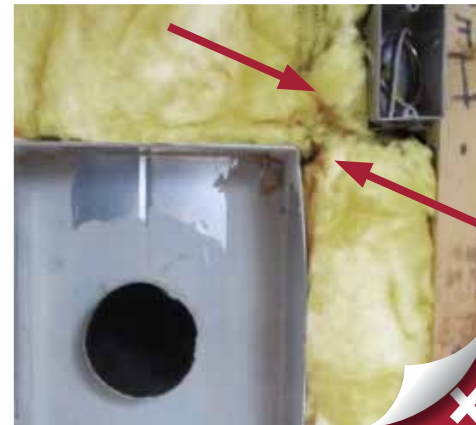
- 1.** Boxes (electrical, smoke, CO, etc.): Cut and/or split insulation around wiring and boxes and place a piece of insulation behind the box.



- 2.** Electrical panel: Cut and/or split insulation around electrical panel wiring.



- 3.** Wires (electrical, cable, security, low voltage, etc.): Cut and/or split insulation around wiring.



- 4.** Dryer/Exhaust: Cut and/or split insulation around exhaust fan boxes, ductwork, wiring and any support bracing.



5. Pipes (water supply, plumbing vents, gas lines, etc.): Cut and/or split insulation around pipes.



1. House-to-garage band joist: Ensure there is a complete air barrier between conditioned and unconditioned spaces.



2. House-to-outside band joist: Ensure there is insulation between conditioned and unconditioned spaces.



3. Conditioned crawl/basement-to-outside rim joist: Ensure there is a complete air barrier and insulation between conditioned and unconditioned spaces.

TECH TIPS

WALLS: STANDARD CAVITIES (FACED)



1. Gaps: Install insulation to fill the cavity completely between conditioned and unconditioned space without gaps.

2. Voids: Install insulation to fill the cavity between conditioned and unconditioned space without voids.



3. Misalignment: Install insulation to fill the cavity between conditioned and unconditioned space without misalignments.

4. Compression: Install insulation to fill the cavity between conditioned and unconditioned space without compression. Split or slit batts around the wires.



- 1.** Gaps: Install insulation to fill the cavity between conditioned and unconditioned space without gaps.



- 2.** Voids: Install insulation to fill the cavity between conditioned and unconditioned space without voids.



- 3.** Misalignment: Install insulation to fill the cavity between conditioned and unconditioned space without misalignments.



- 4.** Compression: Install insulation to fill the cavity between conditioned and unconditioned space without compression.



1. Gaps: Install insulation to fill the cavity between conditioned and unconditioned space without gaps.

2. Voids: Install insulation to fill the cavity between conditioned and unconditioned space without voids.



3. Misalignment: Install insulation to fill the cavity between conditioned and unconditioned space without misalignments.

4. Compression: Install insulation to fill the cavity between conditioned and unconditioned space without compression.



5. If using kraft-faced batts: Install kraft facing against the warm-in-winter side of cavity.



- 1.** Ducts/connectors: Cut and/or split insulation around HVAC Boots and insulated ductwork and any support bracing.



- 2.** Wires (electrical, cable, security, low voltage, etc.): Cut and/or split insulation around wiring.



- 3.** Pipes (Water supply, plumbing vents, gas lines, etc.): Cut and/or split insulation around pipes.

NOTICE: The clearance between insulation and fossil-fuel appliances, chimneys, recessed lights and other hot surfaces must meet the requirements of the National Fire Protection Association (NFPA) and International Code Council (ICC) building codes, and the appliance manufacturers' recommendations - whichever is most restrictive.

In general, when installing insulation in contact with or near hot surfaces:

1. Check the manufacturer's instructions for equipment and appliances to determine any insulation requirements or restrictions.
2. Check the applicable building code for insulation clearance requirements. These are typically contained in the fire, building and mechanical codes. If there are any questions - consult your local building department for the applicable requirements.
3. Mineral fiber insulation (fiber glass, rock and slag wool) are noncombustible but may have flammable facings which cannot be used in hot applications. These insulations are also available with noncombustible facings and facings which have flame spread and smoke developed indices appropriate for most code requirements.
4. When it is permissible to insulate in hot applications, note that most fiber glass products used in building insulation melt at approximately 800 degrees F and rock wool products used to insulate buildings melt at approximately 1200 degrees F. Both fiber glass and rock wool materials are available which have higher melting temperatures.



Option 1A: Permanently attach batt insulation to the attic access. Ensure that R-Value meets or exceeds surrounding insulation levels.



Option 1B: Permanently attach rigid insulation to the attic access. Ensure that R-Value meets or exceeds surrounding insulation levels.



Install dams around access holes to protect the surrounding insulation.



Install weatherstripping on access trim. Verify seal.

NOTICE: When insulating pull-down stairs, pre-fab or site-built, insulated and weatherstripped covers are recommended.

NOTICE: There are multiple options for attaching insulation to the access hatch. The intent is for the insulation to remain attached after repeated homeowner use and that the insulation has an equivalent R-Value of the surrounding attic insulation.

CRITICAL DETAILS

BATT INSTALLATION: CEILINGS WITH ATTICS



1

Verify insulation material is the correct width and R-Value for the location.



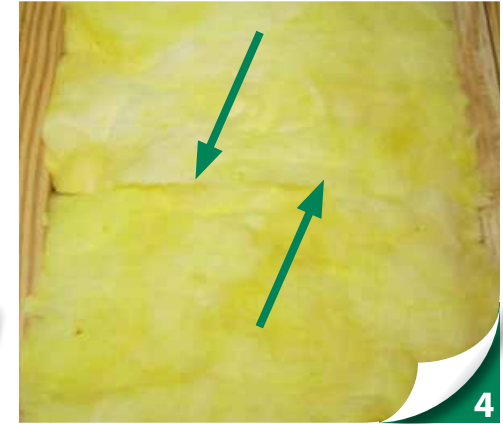
2

Friction fit insulation snugly between and parallel to all standard and narrow attic framing members.



3

Ensure insulation extends to the outside edge of the exterior top plates and is flush against any ventilation dams/baffles.



4

Ensure ends of insulation are butted together and flush to underside of framing.



5

When using kraft-faced batts: Fasten kraft face tabs of insulation to the underside of framing members. Note: no kraft paper overlapping required.



6

When using vapor retarder and unfaced batts: Fasten vapor retarder to underside of framing once batts are installed. Overlap seams at least 2 inches.



7

In the attic, install a card that indicates insulation levels in the house to meet code requirements.



Option: When installing multiple layers of insulation for optimal thermal performance, install the first layer (bottom layer) parallel to attic framing members and flush with both bottom and top. Install the second layer (top layer) perpendicular to attic framing members. Both layers combined must equal at least the required R-Value.

CRITICAL DETAILS | BATT INSTALLATION: CEILINGS WITHOUT ATTICS (UNVENTED)



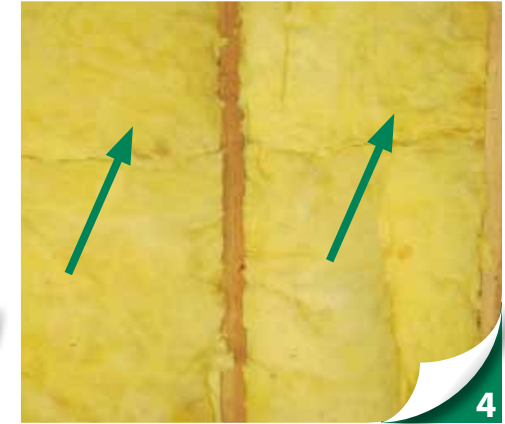
Verify insulation material is the correct width and R-Value for the location.



Friction fit insulation between and parallel to the attic framing members.



Ensure insulation extends to the outside edge of the exterior top plates and to the peak of the cathedral ceiling.



Ensure ends of insulation are butted together and flush to underside of framing.



When using kraft-faced batts: Fasten kraft face tabs of insulation to the underside of framing members. Note: no kraft paper overlapping required.



When using vapor retarder with unfaced batts: Fasten vapor retarder to underside of framing members once batts are installed.

CRITICAL DETAILS | BATT INSTALLATION: CEILINGS WITHOUT ATTICS (VENTED)



Verify insulation material is the correct width and R-value, and ventilation chutes and baffles have been installed per manufacturers' specs.



Friction fit insulation between and parallel to the attic framing members.



Ensure insulation extends to the outside edge of the exterior top plates and is flush against all ventilation dams and baffle boards.



Ensure ends of insulation are butted together and flush to underside of framing.



When using kraft-faced batts: Fasten kraft face tabs of insulation to the underside of framing members. Note: no kraft paper overlapping required.



When using vapor retarder with unfaced batts: Fasten vapor retarder to underside of framing members once batts are installed.



Verify insulation material is the correct width and R-Value for location. Also, verify the depth of roof rafters is at least the depth of the required R-Value.



Friction fit insulation between and parallel to the attic framing members.



Ensure insulation extends to the outside edge of the exterior top plates and to the peak of the cathedral ceiling.



Ensure ends of insulation are butted together and flush to underside of framing.

NOTICE: Ensure conditioned attic insulation strategy is compliant with local fire codes.

CRITICAL DETAILS

VENTILATION BAFFLES: CEILINGS WITH ATTICS



Verify that space between roof deck and top plate will accommodate the appropriate insulation and a minimum 1-inch of required air space.



Measure and mark the height on the baffle. Verify the height allows for 1-inch of required air space.



Cut side fin and fold baffle at the measured mark to allow for correct insulation height.



For all eaves with vents, fasten bottom of baffle in place to allow insulation to completely cover the top plate.



Fasten top portion of baffle in place to allow for a minimum 1-inch space between baffle and roof deck.



NOTICE: If cathedral ceiling, fasten baffle boards to provide continuous unblocked airflow from soffit vent to ridge vent.



NOTICE: Carefully cut baffle around any framing obstructions to prevent air movement through insulation.

CRITICAL DETAILS | VENTILATION CHUTES: CEILINGS WITHOUT ATTICS (VENTED)



Fasten baffle board to underside of roof deck extending past the outside edge of the top plate and beyond the height of the insulation.



Measure and mark the height on the baffle. Verify the height allows for 1-inch of required air space.



Cut soffit dam material to allow for correct insulation height and any obstructions.



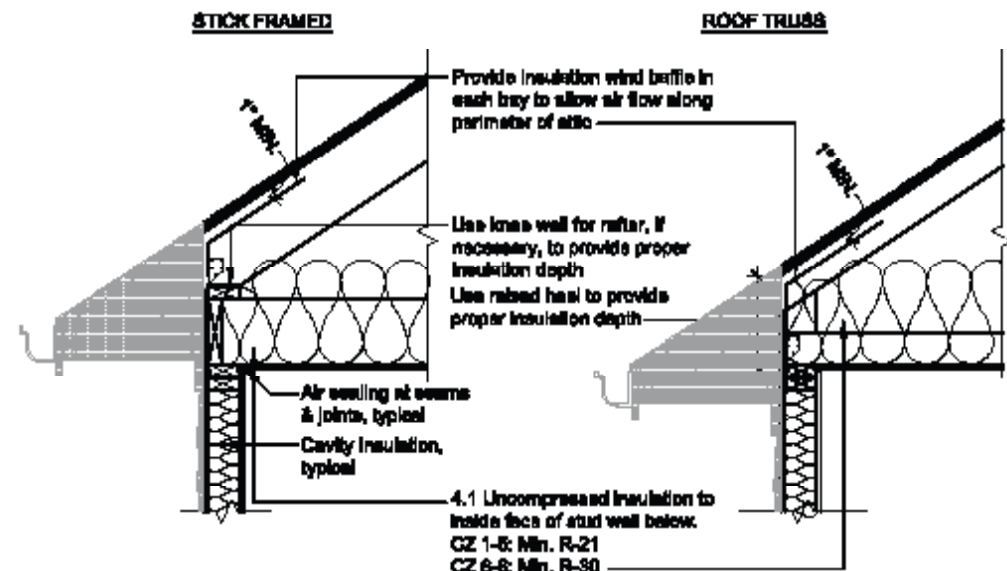
For all eaves with vents, fasten soffit dam material to the attic framing or permanent blocking so that insulation will completely cover the top plate.



NOTICE: For ceilings with attics, it is only necessary to install ventilation baffles. For ceilings without attics (vented), install both ventilation baffles and chutes.

NOTICE: Ventilation chutes should be installed with a 2" gap between the ends. Reduce gap to ½" when using blown-in insulation.

NOTICE: If cathedral ceiling, fasten baffle boards to provide continuous unblocked airflow from soffit vent to ridge vent.





Verify insulation material is the correct width and R-Value for location.



Verify that any necessary fire blocking and draft stops have been installed.



When using kraft-faced batts, install kraft facing against the warm-in-winter side of cavity. Do not leave kraft facing exposed.



Friction fit insulation between and parallel to the floor joist framing.



With wire fasteners, support insulation to be in full contact with the subfloor without being compressed.



Ensure insulation extends to the outside edge of each joist bay and is in contact with blocking or rim/band joist.



Ensure ends of insulation are butted together and in full contact with subfloor.



1

Verify insulation material is the correct width and R-Value.



2

Verify that top/bottom plates and a fire-rated rigid backing have been installed.



3

Friction fit insulation between and parallel to the framing members in full contact with rigid backing, top and bottom plates.



4

Ensure ends of insulation are flush and butted together.



5

When using kraft-faced batts: Fasten kraft face tabs of insulation to framing members. Note: no kraft paper overlapping required.



6

When using vapor retarder with unfaced batts: Fasten vapor retarder to face of framing members once batts are installed.