



## Buildings for the 21st Century

Buildings that are more energy-efficient, comfortable, and affordable...that's the goal of DOE's Office of Building Technology, State and Community Programs (BTS). To accelerate the development and wide application of energy efficiency measures, BTS:

- Conducts R&D on technologies and concepts for energy efficiency, working closely with the building industry and with manufacturers of materials, equipment, and appliances
- Promotes energy/money saving opportunities to both builders and buyers of homes and commercial buildings
- Works with State and local regulatory groups to improve building codes, appliance standards, and guidelines for efficient energy use
- Provides support and grants to States and communities for deployment of energy-efficient technologies and practices



# ATTIC ACCESS

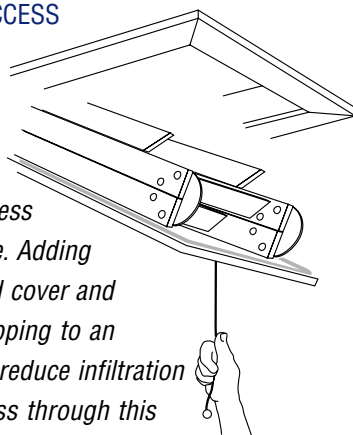
*Provide adequate insulation coverage and air sealing for the access between living space and the unconditioned attic*

## DON'T LEAVE A HOLE IN THE CEILING

A home's attic access, such as an attic hatch, pull-down stairs, or knee-wall door, often goes uninsulated, representing one of the biggest deficiencies in the thermal barrier between the attic and conditioned space. This gap in the attic insulation increases heat loss in winter and heat gain in summer, and makes indoor living areas uncomfortable.

Such accesses are often not sealed properly. A ¼-inch gap around the perimeter of an attic access can potentially leak the same amount of air supplied by a typical bedroom heating duct (~100 CFM). Unsealed, the attic access in a home leaks energy dollars and causes the house to be less comfortable.

## ATTIC ACCESS

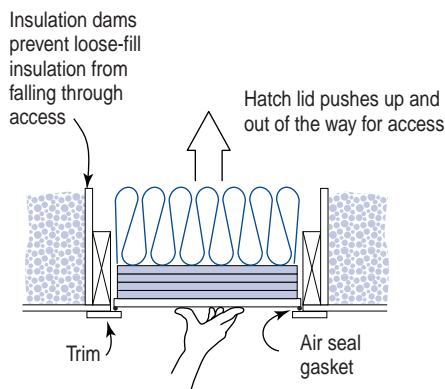


*An attic access is a big hole. Adding an insulated cover and weatherstripping to an access can reduce infiltration and heat-loss through this passageway. Latch bolts (not shown) may be installed to help ensure an even tighter seal.*

## ATTIC HATCH

One inexpensive and common type of attic access is referred to as a *scuttle hole* or *attic hatch*, which is simply a removable portion of the ceiling that allows entry to the attic above. A scuttle hole is commonly located in a closet or main hallway.

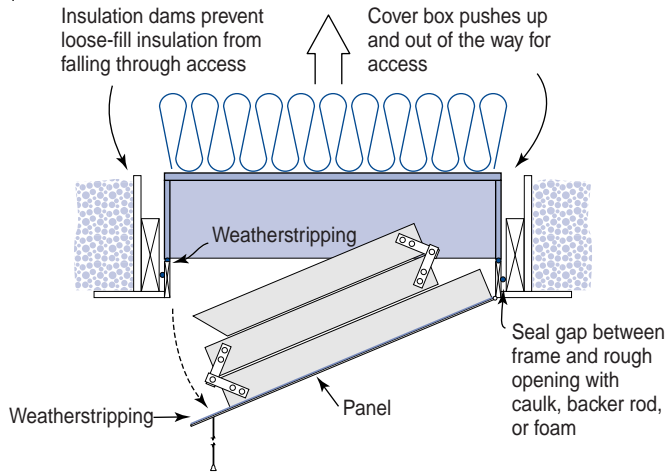
## SCUTTLE HOLE COVER



To create the hatch, the installer should cut a plywood piece or save the ceiling drywall piece that is cut out for the hole. To ensure a tight fit, securely fasten the trim around the hole to the ceiling and make sure that it is flat and level. An uneven base can cause air leakage. Weatherstripping can be installed either on the hatch itself or on the inside of the trim or base where the hatch rests. Adding a latch bolt will help ensure a tighter seal.

After the trim or base is aligned to seal properly, insulation should be added to the attic side of the hatch. Rigid insulated sheathing is recommended. Cut the insulated sheathing ¼ inch smaller than the hatch size to allow for clearance when moving the access panel. Apply 3 or 4 inches of insulation to the hatch with construction adhesive and screws. As an added measure, glue the kraft-paper side of batt insulation to the top of the last layer of rigid insulation. Try to achieve the same total R-value as recommended by the 1995 Model Energy Code (MEC)(see page 4) or DOE Insulation Fact Sheet. Order the Insulation Fact Sheet (DOE/CE-0180) from the Energy Efficiency and Renewable Energy Clearinghouse or access it from the Internet at [www.ornl.gov/roofs+walls](http://www.ornl.gov/roofs+walls).

## PULL-DOWN ATTIC STAIRS



*An attic stair cover box is made from rigid insulation. It drops down from the attic side to seal and insulate the pull-down stairs.*

## ATTIC STAIRS

Pull-down stairs are another common type of attic access. The frame for the stairs fits in a rough opening and leaves a gap, much like that for a door or window, which must be sealed. If the gap is small (less than  $\frac{1}{2}$  inch), caulk can be used as the sealant. If a larger opening exists, then non-expanding foam or a backing material (backer rod) is recommended in conjunction with caulk. Expanding foam can be used, but care must be taken because of its highly expansive nature; it could warp the frame and interfere with the ability of the stairs to open or close properly. To ensure a tight fit between the stairs' flat panel and the frame, weatherstripping or gasket material should be added either to the frame or the panel. Latch bolts may be installed to help ensure a tighter seal.

To insulate attic stairs access, a lightweight, moveable box can be constructed from rigid foam or fibrous ductboard to fit over the stairs from the attic side. Insulating kits are also available through weatherization suppliers or from local hardware stores.

As with all home projects, follow the attic stairs manufacturer's instructions for proper installation. Manufacturer's guidelines often provide unique techniques and safety considerations for each particular unit. For safety and the extended life of the stairs, be sure to cut the stairs to the proper length. This action will prevent strain on the hinges and reduce wear on the pivotal joints of the stairs.

## ATTIC ACCESS LOCATION

Location of an attic access is important. If possible, locate the access in an unconditioned part of the house (e.g., garage, covered patio, or porch) that is also secure against potential break-ins. A garage location, where the vented attic is uninsulated, can eliminate the need for sealing and insulation.

For a pull-down attic staircase, make sure that opening the stairs will not interfere with the placement of furniture. The position of the staircase in relation to ceiling joists might also affect location—placing the staircase between joists instead of across joists can speed installation because structural cross-member framing is not as complicated.

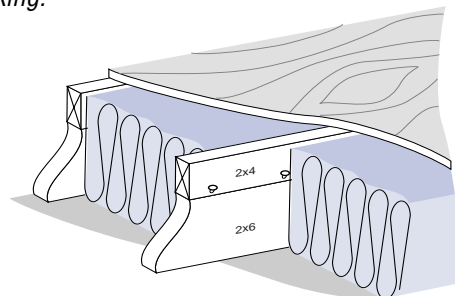
## ATTIC DECKING

Attic decking is often used to provide additional storage space or a platform for an HVAC unit or hot water tank installed in the attic. The decking is often installed directly on top of the ceiling joists; this limits the amount of space available for insulation and lowers the attic's average R-value.

To ensure proper insulation depth, the attic decking must be raised above the ceiling joists. To accomplish this "edge-nail" 2x4's or 2x6's to the tops of the ceiling joists where the decking is to be located or, as an option for trusses, lag 2x4 members to the truss webbing at the desired height. Install the decking securely to the top of the raised lumber after the insulation has been installed.

## INCREASE ATTIC INSULATION LEVELS UNDER DECKING

*For many products, an insulation depth of 10 to 14 inches is needed to achieve an R-30 to R-38 insulation value. Thus, a 2x4 or 2x6 extension needs to be added to a 2x6 joist to provide sufficient depth before installing decking.*



# ATTIC ACCESS

## CONSTRUCT AN ATTIC STAIRS COVER BOX

Use the template shown here to cut pieces from a single 4x8 foot sheet of ½-inch rigid insulation for a box 53½ inches long (51½ inches inside), 24¾ inches wide (22¾ inches inside), and 9 inches high inside. This box will fit stairs with an outside framing dimension of 53½ inches by 24¾ inches. Adjust dimensions to fit the specific stairs being installed. Be sure to carefully measure both inside and outside dimensions to the appropriate length, width, and depth clearances for the cover box.

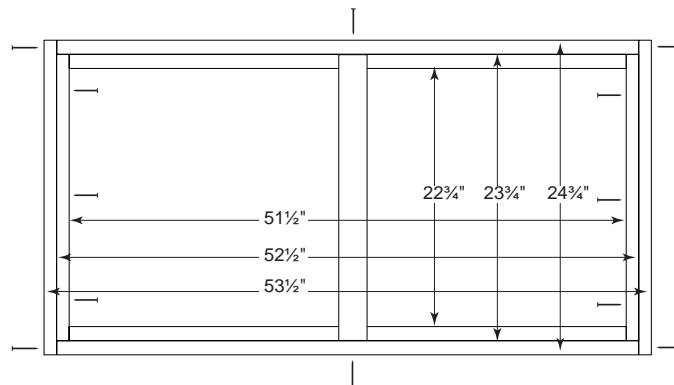
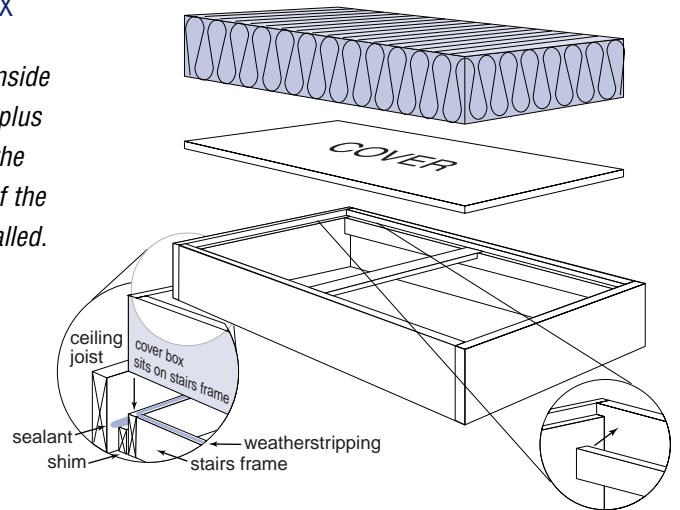
Create the box as shown: Apply adhesive/mastic and use roofing nails to construct the two end and two side pieces. Assemble the side and end pieces into a box using adhesive and longer nails. Add the center support brace and cover piece with glue and nails. A faced insulation batt may be glued to the cover piece with adhesive applied to the paper backing.

### ✓ MATERIALS NEEDED:

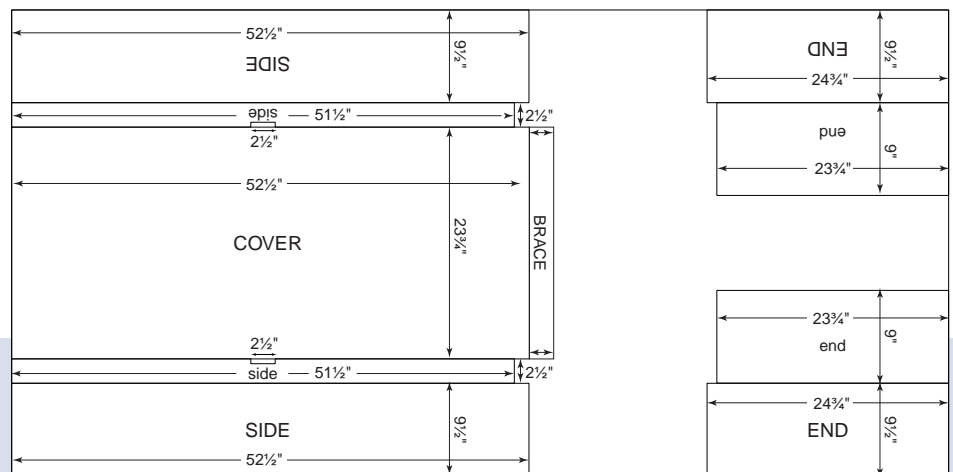
- ½-inch rigid insulation
- Insulation batt (optional)
- Duct sealing mastic or construction adhesive
- 1-inch roofing nails (8d or 16d)
- Tape measure, sharp utility knife and straight-edge, or table/circular saw
- Weatherstripping/gasket material with adhesive

## ATTIC STAIRS COVER BOX

Pay careful attention to inside and outside dimensions plus height requirements for the specific measurements of the attic staircase being installed. The cover box should rest squarely on top of the attic stairs frame. Shim and seal the gap between the frame and rough opening and install weatherstripping.



Assemble side pieces, end pieces, and brace as shown. The cover piece will drop in and be attached with adhesive and nails.



All pieces can be cut out of one 4'x8' sheet of rigid insulation. Use a table saw for smooth, accurate cuts.

# ATTIC ACCESS

For more information, contact:

**Energy Efficiency and Renewable Energy Clearinghouse (EREC)**  
1-800-DOE-3732  
[www.eren.doe.gov](http://www.eren.doe.gov)

Or visit the BTS Web site at  
[www.eren.doe.gov/buildings](http://www.eren.doe.gov/buildings)

Or refer to the Builder's Guide Energy Efficient Building Association, Inc.  
651-268-7585  
[www.eeba.org](http://www.eeba.org)

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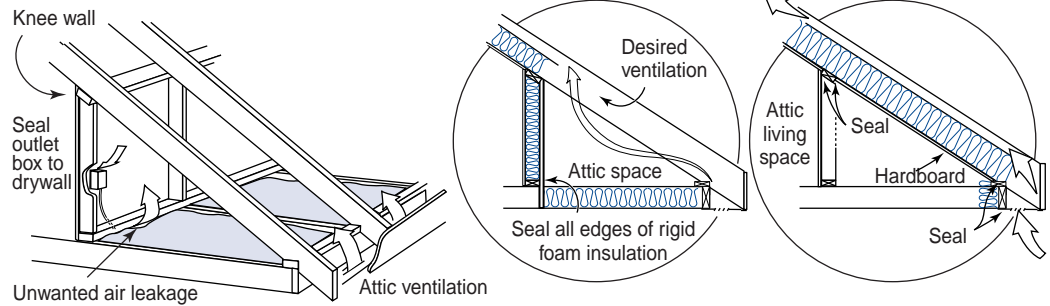
**Oak Ridge National Laboratory**  
Buildings Technology Center  
423-574-5178  
[www.ornl.gov/ORNL/BTC](http://www.ornl.gov/ORNL/BTC)

The Model Energy Code can be obtained from the International Code Council by calling 703-931-4533

MECcheck, a companion compliance software package, can be ordered from DOE by calling 1-800-270-CODE or downloaded directly from the Web at [www.energycodes.org/resid/resid.htm](http://www.energycodes.org/resid/resid.htm).

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## ATTIC KNEE WALL



The attic knee wall is often underinsulated and leaky. Install adequate insulation and air seal around the living space for continuity in the building envelope when addressing the knee-wall door.

## KNEE WALLS

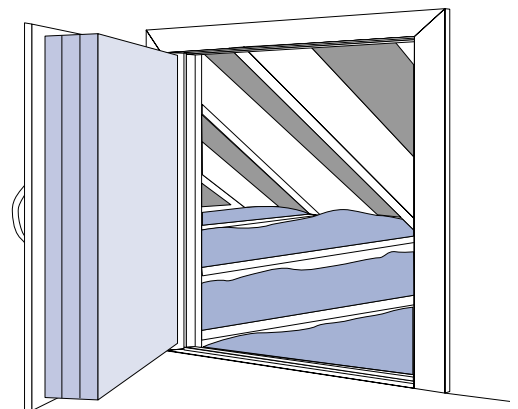
Another type of attic access is a knee-wall door. A knee wall is typically a partial height wall that is usually found in the upstairs level of finished-attic homes. Knee walls are notoriously leaky and often poorly insulated. Make sure that the knee-wall door is weatherstripped and has a latch that pulls it tightly against the frame and weatherstripping to achieve a solid seal. Use construction adhesive and screws to attach rigid insulation to the attic side of the door. Some attic doors are full-height interior doors which should be insulated, weatherstripped, and equipped with a tight threshold.

Inspect the rest of the knee wall and adjust insulation levels to meet those recommended in the 1995 MEC or DOE Insulation Fact Sheet. If not enough insulation is installed, first air seal the knee wall before insulating. Consider covering the back of the vertical knee wall with rigid insulation. Insulated sheathing, with the seams caulked or sealed with housewrap tape, reduces heat flow and minimizes the comfort problems commonly associated with drafty attic knee walls.

In new construction, an improved approach is to insulate and air seal the rafter space along

the sloped ceiling of the knee wall. The rafters should be covered with a sealed air barrier, such as drywall, rigid insulation, or foil-faced hardboard. One advantage of this approach is that the storage area as well as any ductwork is now inside a more tempered space.

## KNEE-WALL DOOR



Add R-value to a knee-wall door by adhering rigid insulation boards (sandwiched together with construction adhesive and screws) to the back of the door. Pay special attention to the clearance between the insulation and the door frame and air sealing details.



Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 20% postconsumer waste.

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