

Air Sealing Details

Air Seal to Reduce Air Infiltration Between the Attic and Living Spaces



SKILL SET

Do it yourself or hire a professional. Two people make the task easier. Familiarity with small hand tools is essential, power tools are optional.

SAFETY

This job requires working in unconditioned attic spaces, tight clearances and under task lighting. Use a dust mask/respirator, gloves, safety glasses and kneepads.

TOOLS

Hammer, screw-gun, utility knife, table or circular saw, caulk gun, measuring tape, lights, straight edge and markers

MATERIALS

Foam/caulk/construction adhesive
Cavity insulation – batts
Rigid foam – blocking material
Sheathing – drywall, OSB/plywood, code-approved foam board or bubble-wrap radiant barrier
Fasteners – screws with washers or button-capped nails

COST BENEFIT

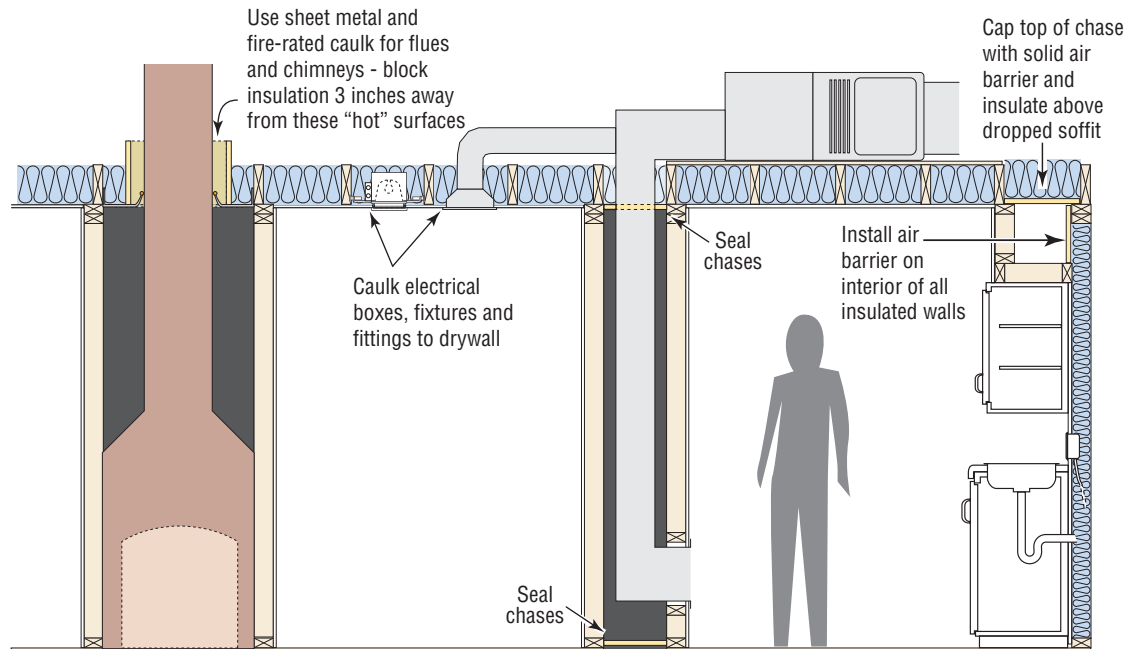
Materials are inexpensive, labor is the big cost. An effective installation ensures proper insulation and air blocking in the attic, which provides greater comfort.

PRIORITY LEVEL

LOW MED **HIGH**

SKILL LEVEL

DIY PRO



Some chases extend from attic to basement or crawlspace - block and seal both ends.

Attic Air Sealing

Attics are not the only places where leakage can occur in homes, but leaks between the house and the attic are especially troublesome during the winter when warm air inside the home naturally tends to rise and flow out through leaks into the attic. This could lead to drafts (as colder outside air must be pulled in to offset the amount of air that flows up and out), condensation on the roof decking in the attic and high energy bills to heat the unconditioned air that leaks in.

In the summer, poor comfort and indoor air quality can result as leaks from an attic allow hot, humid and dusty attic air to enter a home when exhaust appliances such as kitchen or bathroom fans and clothes dryers operate. In some homes, powered attic ventilators, actually waste considerable energy in the summer because they unintentionally pull conditioned air out from the house and up to cool the attic.

Reduce Air Infiltration Pathways

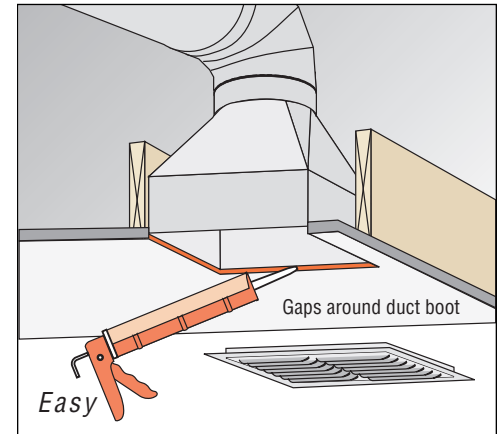
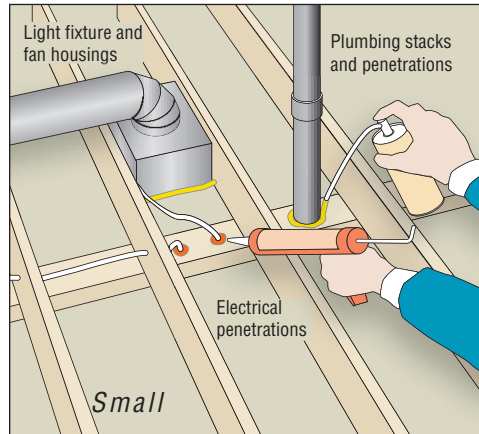
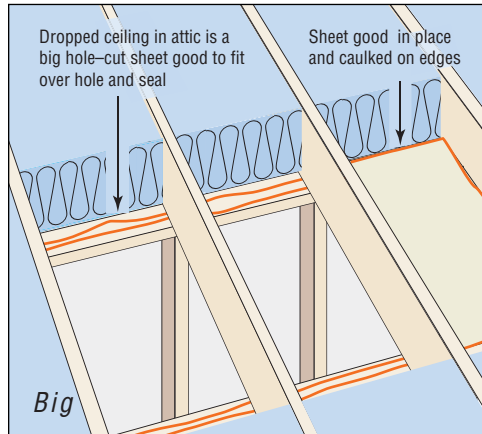
Attic air sealing is a critical step in upgrading an existing home's energy performance and should always be performed before adding additional attic insulation. Blocking and sealing chases and penetrations in a ceiling is one of the most cost effective means for improving the comfort of a home and reducing energy consumption and pollutant pathways.

Typical gaps, seams and other penetrations in a ceiling are fairly small in their dimension but significant in total area where they add up to considerable sized holes. Imagine having 25 to 30 quarter sized (~1" diameter) holes that represent electrical wire penetrations drilled through top plates – collectively, they'd represent a 5"-6" grapefruit sized opening into the attic.

As a general rule, you should measure and cut a piece of any sheet material to cover/block large openings, mechanically fasten the material in place with screws or nails and seal the edges of the sheet material using caulk or canned spray foam. Sometimes this requires the need for additional framing or ledgers to support and fasten to the sheet material. Insulation will be added later.

Work Big-to-Small

Air sealing in an attic can be broken down into two main parts – big holes and small gaps. Big holes receive the initial sealing priority since they represent huge pathways for leakage. Smaller gaps and seams should also be addressed since they can add up to be sizable leaks.



One rule is that if you are in the attic and can see the back side of an interior wall, you should seal and insulate over that chase. Some penetrations, such as duct boots, can be sealed from the living space side.

Action Steps - block the big holes

Large holes are generally so sizable that caulk and can spray foam alone is insufficient. Commonly referred to as chases or bypasses, these pathways must typically be closed off with sheet goods such as OSB, plywood, sheet metal, drywall or rigid foam board. Examples of large leak paths in attics include:

- **Chases** – around fireplace chimneys
- **Combustion flue chase** – where a fuel burning appliance vents vertically up through the ceiling (e.g., a water heater in a crawlspace)
- **Chases containing ductwork** – HVAC and clothes dryer vents
- **Chases containing plumbing** – such as a “wet wall” containing piping and sewer stacks
- **Blocking at changes in ceiling heights**
 - Hallways at lower or higher heights than adjacent rooms
 - Dropped soffits, such as in some kitchens
 - Over closets (with drop in ceiling height)
- **Blocking for balloon framing** – older homes may not have a top plate above balloon framed exterior walls (consider insulating the wall before blocking the top from the attic side).
- **Under kneewalls** – a critical stage in framing where the floor joists are open to the attic
- **Whole house fans not operating** – consider removing the old fan if not used or create an attic-side removable cover box or a house-side removable cover.

Action Steps - seal smaller gaps and penetrations

Most small penetrations can be sealed with caulk or canned spray foam. If necessary, push aside any existing insulation to gain access to sealing these often hidden leaks. Sometimes checking for dirty streaks in existing insulation is a great way of identifying where there has been a long term leak path since some types of insulation (mainly fiberglass) merely behave as a filter in a leak pathway.

Examples of common attic penetrations include:

- **Electrical and wiring**
 - Wire penetrations; Electrical junction boxes; Fixtures – recessed can lights; Audio speakers; Cable TV wires; Computer networking wires; Security system sensors; Smoke and CO detectors
- **Plumbing**
 - Individual pipe and sewer stack penetrations; Radon pipes; Sprinklers
- **Mechanical**
 - Exhaust fans; Duct boot penetrations
- **Framing**
 - Top plates; Pocket doors; Attic access – scuttle hole/hatch versus pull-down stairs; Common walls between units in multifamily dwellings (sometimes these can be large)