

# Pipes and Vents

*Install and Air Seal Vents and Flues Through Walls and Roofs*

## SKILL SET

Be sure you have the experience needed for this job. If you are in doubt, hire a contractor.

## 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.

Ensure that all stack pipes, flues and exhaust vents terminate outside of the building.

## TOOLS

Utility knife, caulk gun, gloves and lights

## MATERIALS

Duct mastic, foil tape

Foam/caulk/construction adhesive

Duct insulation – duct wrap

Fasteners – sheet metal screws, duct attachment straps, duct support strapping

## COST BENEFIT

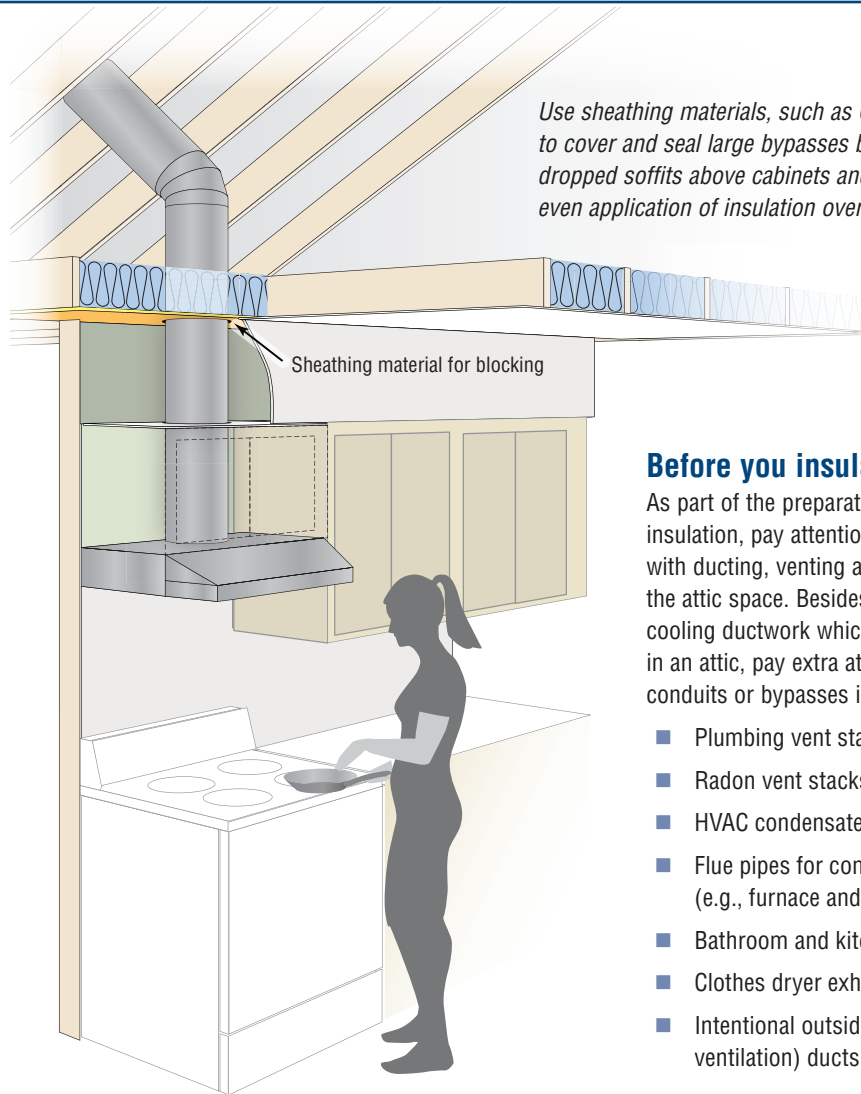
Air sealing penetrations between attic and living space prevents air infiltration, thus improving indoor air quality and saving energy.

### PRIORITY LEVEL

LOW MED HIGH

### SKILL LEVEL

DIY PRO



*Use sheathing materials, such as OSB board or rigid foam board, to cover and seal large bypasses between dead spaces, such as dropped soffits above cabinets and the attic. This allows for an even application of insulation over those areas.*

Sheathing material for blocking

## Before you insulate – what to look for

As part of the preparation for upgrading attic insulation, pay attention to issues associated with ducting, venting and piping running through the attic space. Besides the obvious heating and cooling ductwork which are sometimes located in an attic, pay extra attention to the following conduits or bypasses in the building envelope:

- Plumbing vent stacks
- Radon vent stacks
- HVAC condensate lines
- Flue pipes for combustion appliances (e.g., furnace and water heater)
- Bathroom and kitchen exhaust ducts
- Clothes dryer exhaust ducts
- Intentional outside air (whole house ventilation) ducts

## Bypasses – gaps in the building envelope

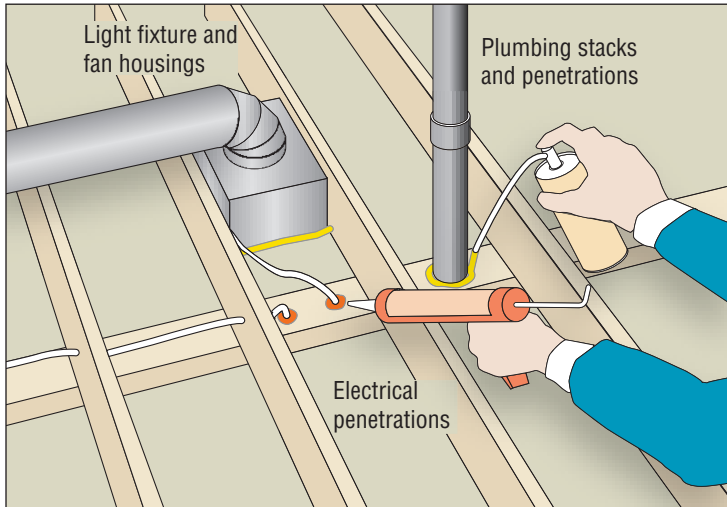
At some point, vent stack, flue pipes, condensate line and ducts are likely to penetrate the insulated flat ceiling. These potential air bypasses, as with all gaps in the building envelope, need to be sealed:

- Careful attention to air sealing each of these penetrations is crucial to preventing large air leakage bypasses.
- Caution must be taken, particularly with combustion flue pipes. Seal around flues carefully with proper materials to prevent danger of a fire.



Generally, ENERGY STAR® ventilation fixtures have a better ability to deliver the desired airflow (at least 50 cfm for bathrooms and ~100 cfm for kitchens) in a quiet and efficient manner.

- To achieve quiet operation these fans are installed with a larger 4-inch diameter duct instead of a 3-inch.
- Control options can include pre-programmed time selections, humidity sensors and occupancy sensors.
- Certain fans can be incorporated with variable speed controls and timers to help ensure adequate ventilation.



Any item that pokes through the building envelope is a candidate for sealing. Use caulk and spray foam for most applications.

## Stacks – vent pipes in the attic

**Plumbing and radon vent stacks** are intended to act as pressure relief devices and should penetrate the ceiling vertically through the attic and out through the roof. Often these pipes are vented through a “wet wall” (an interior wall with various plumbing pipes located inside it) and sometimes this interior cavity is air sealed inadequately at the top plate where it enters the attic. Materials such as plywood, rigid foam board, caulk and canned spray foam are all suitable for sealing these penetrations at the top plate.

**HVAC condensate lines** – Occasionally, these items will be routed down and through the ceiling. Air sealing these penetrations should be done in a similar fashion as stacks, using caulk and foam.

## Exhaust Ducting

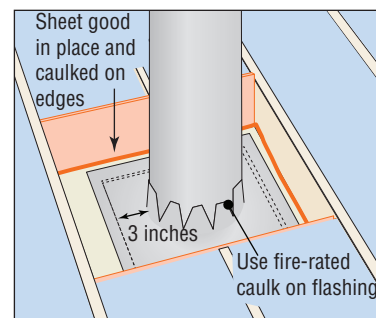
If a kitchen range hood, bathroom exhaust fan or clothes dryer is routed through an attic, make certain they are all fully ducted to the outside and never terminate inside the attic. The ducting should be as straight as possible with no pinching or crimping and the outside vent termination should be appropriate depending on whether it penetrates a roof, gable wall or soffit.

- **Kitchen range hood** - ranges/cooktops should always incorporate a non-recirculating exhaust fan that is fully ducted to the outside.
  - Metal ducting is the appropriate material and the exhaust line must include a damper at some point. A ¼"-½" mesh bird screen is recommended at the terminal device.
- **Bathroom exhaust fans** - have a notorious track record of being poorly ducted. The bath fan ducts should be installed with no unnecessary sags, bends or crimps.
  - In colder climates, the bath exhaust duct should be insulated to reduce risk of condensation if it is located in an unconditioned space.

- Metal duct is highly recommended except for short flex runs that are pulled tight. All exhaust duct connections and seams should be sealed with mastic; mechanical screws are used to connect metal joints and hose clamps are installed for flex connections.
- **Dryer vents** - Ideally clothes dryer vents should not be installed in the attic since this approach inherently involves “pushing lint up.” Metal conduit and a proper termination with damper and large mesh bird screen will need to be installed.

## Combustion Flue Pipes

Whether standard combustion appliances, such as conventional water heaters and furnaces, are located in the attic or somewhere below



the ceiling in the living space or foundation area, a metal flue pipe will be incorporated. This flue should always be vented with a positive slope of at least ¼" per foot, be routed upward and out through the roof and never terminate inside the vented attic.

- Metal flue pipes from appliances below the ceiling are often routed through a chase that is many times left unsealed as it opens into the attic. Sealing this chase is a very high priority. However, due to higher temperatures, not all conventional air sealing materials are appropriate.
  - Roll-metal roof flashing and high-temperature fire-rated caulk are the most common means of sealing from the combustion flue pipe to the surrounding ceiling surface, at least for the first 3" away from the flue pipe.
  - If the chase is large, metal and fire-rated caulk is often used for 3" and then a different sheathing material, such as plywood or OSB, is used to seal off the remaining portions of the chase.

## Whole House Ventilation Systems

Ideally, every home should be tightly air sealed since a tighter home will save more energy. In addition every home should also include whole house ventilation that is designed and installed in compliance with ASHRAE 62.2.

*Treat these ducts similar to the details mentioned above.*

- Sometimes outside air ducts will connect to an exhaust-only house ventilation fan (similar to a bath fan) or to a remote attic-mounted location via multiple ducts.
- Other ventilation systems include an Energy or Heat Recovery Ventilator (ERV or HRV) that includes multiple ducts and may tie into the main HVAC system.