

HEAT DISTRIBUTION



Heat Ducts.

As you may recall from the “drag ‘n drop” activity on the Central Ducted Air Systems page, the main components of a forced-air heating system include the furnace, main duct, branches, and registers.

In a hot-air system, warm air is distributed via a **main duct** and a series of **branches** that lead to individual rooms or zones. Where the branches meet the main duct, heat is controlled by **dampers** (act as valves for air flow), which open or close to release or block heat from entry. These dampers, usually motorized, are run by thermostatic controls at each zone. Individual **registers** may also be closed to block heat, but this is a less efficient use of the energy and heat produced than are thermostatic or automatic controls.

An **upward-flow furnace** draws cold air in through the bottom and sends heated air out the top. Upward-flow furnaces are often used in houses that have basements or that deliver heat through overhead ductwork.

A **downward-flow or counter-flow furnace** draws cool return air through the top and delivers heated air out the bottom. This type is favored where there is no basement, or where air ducts are located in the floor.

A forced-air heating system can be combined with air conditioning (for cooling), a humidifier (for maintaining proper moisture balance), and an air filter (for purifying the air). Ductwork is generally metal, wrapped with insulation to help keep heat in. In some cases, flexible insulation-style ductwork is preferred. This system has several advantages and disadvantages as described below.

Advantages

- Air ducts and registers distribute heat from a central furnace, providing rapid heat delivery.
- The system can also be used to filter and humidify the household air, to provide central air conditioning.
- The system circulates air for ventilation.

Disadvantages

- Air coming from the heating registers sometimes feels cool (especially with certain heat pumps), even when it is warmer than the room temperature.
- There can also be short bursts of very hot air, especially with oversized units.
- Ductwork may transmit furnace noise, and can circulate dust and odors throughout the house.
- Ducts are also notoriously leaky, typically raising a home's heating costs by 20% to 30%.