

& COOLING

HEATING



A homeowner's guide



SOUTHWEST GAS

As you read this guide, you may find you have additional questions about your heating and cooling system. This booklet provides general information and is not intended to replace the manufacturer's use and care manual, which is the primary source for any appliance.

If the manufacturer's use and care manual is not available, the Energy Specialists at Southwest Gas are there to help. They can also refer you to licensed heating and cooling contractors. See "For More Information" on the back cover.



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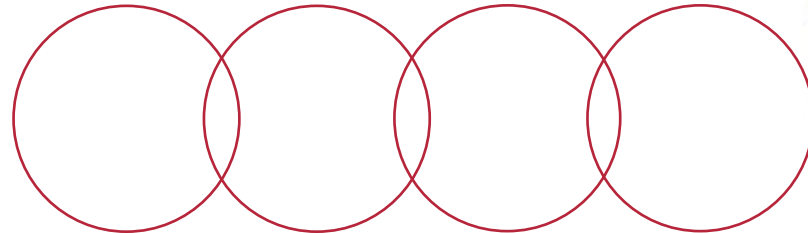


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About your homeowner's guide to

Heating & Cooling



Owning a home is both rewarding and challenging. With all that's happening in your busy life, you probably take your home's heating and cooling system, often nicknamed HVAC (Heating, Ventilation and Air Conditioning) system, for granted. While it works hard to keep your home comfortable throughout the year, there are a few things you should know that may help you create an even more satisfying home environment.

In most cases, your HVAC system is fueled by both natural gas and electricity. Natural gas is used for heating, and electricity is used for cooling. This combination is commonly referred to as balanced energy.

Your natural gas company, Southwest Gas, provides this Homeowner's Guide to Heating & Cooling to explain the basics of your HVAC system. This guide may help if you have questions about your system. There is also a list of handy energy-saving tips that may save you money and help make your system even more efficient.

Heating & Cooling Design Basics

One big decision the HVAC system designer must make is what size equipment to install. In hot climates, cooling requirements often exceed heating needs, so the equipment is sized to make sure there is enough cooling capability. Cooling units are sized in tons, which is a measure of cooling capacity. For example, a 1,600 square foot home in the Southwest would likely require a 4-ton air conditioning unit, while the same home located in a cooler climate might only require a 3-ton unit.

BTUH

Furnace Sizing

Furnace sizing is measured differently. Heating ability of a natural gas furnace is rated in British thermal units per hour (BTUH), which is the measure of heat energy. The more heat a furnace can make in an hour, the higher its BTUH rating. For example, a 100,000 BTUH furnace can produce twice as much heat in an hour as a 50,000 BTUH model. Your system designer determines what furnace rating meets your home's needs.

Designing your system also includes deciding the number and placement of air registers and returns as well as how ductwork should be installed throughout the home.

In most of the Southwest, systems are designed to maintain a minimum indoor temperature of 68° Fahrenheit (F) in the winter, assuming outdoor temperature lows of about 25° to 35° F. With outside temperatures of up to 115° F in the summer, your system should be able to maintain 78° F inside your home. Of course, these figures may vary depending on your geographic location and local climate conditions.



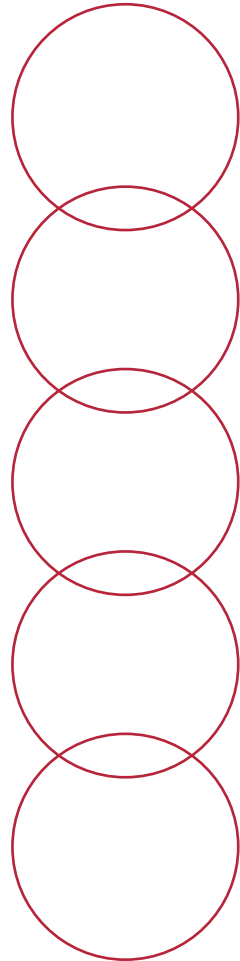


Types of Heating & Cooling Systems, and How They Work

The location and overall design of your home determine the style of HVAC system. There are two basic types: **packaged systems** which contain the heating and cooling components in one unit, and **split systems** in which heating and cooling units are separated.

Packaged Systems. Typically mounted on the roof of your home, a packaged system, often referred to as a gas pack, twin, dual or combination system, includes all natural gas heating and electric cooling components in one unit. It is connected directly to your home's ductwork.

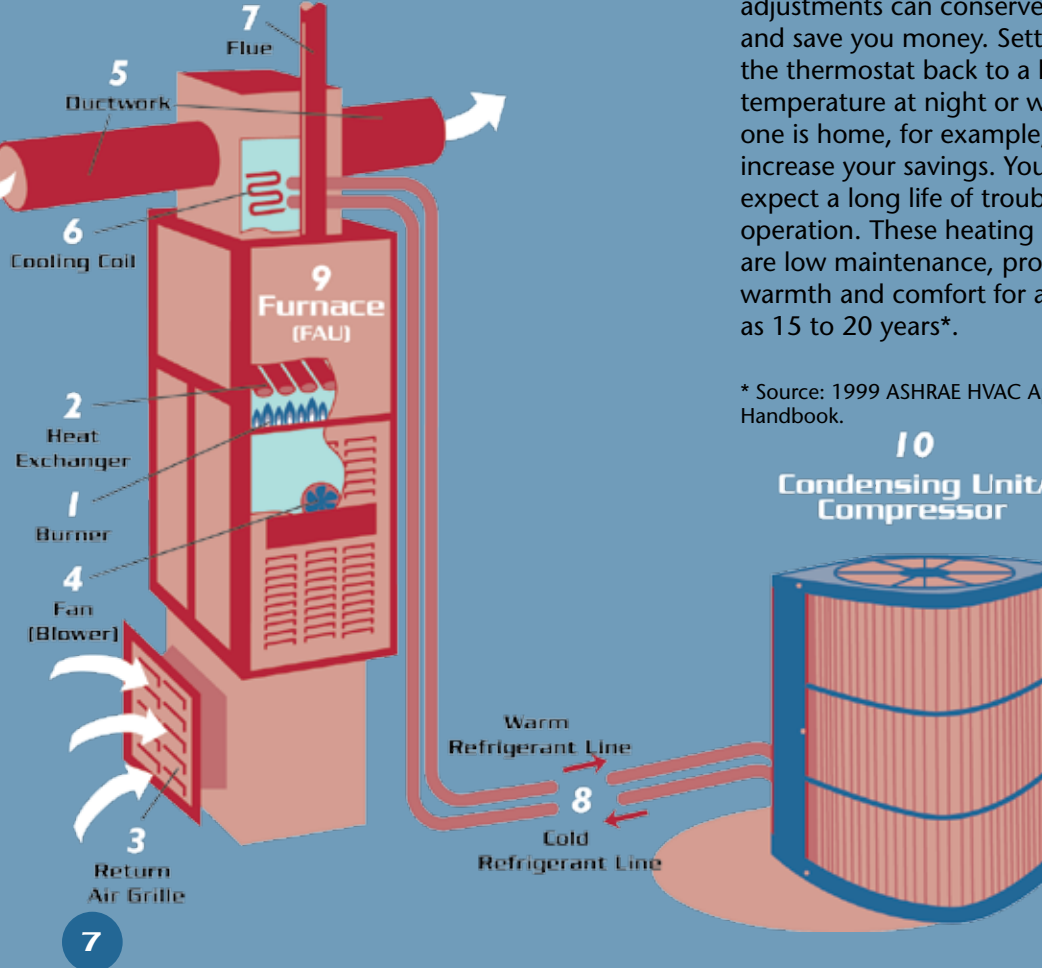
Split Systems. If you have a cooling unit which is separate from your heating unit, then your home is equipped with a split system. Typically, the main cooling unit, known as the **condenser**, is located outdoors, often on the ground. It contains the **compressor** and a fan. The indoor portion of your system is called the **forced air unit (FAU) or furnace**. The furnace is usually located in your garage, attic or an interior closet. It contains the **burner** (1), the **heat exchanger** (2), and the **fan or blower** (4). Warmed or cooled air is distributed throughout your home via the **ductwork** (5). The furnace also contains the **cooling coil** (6), which operates during the cooling season. Combustion by-products are vented to the outside through the **flue** (7).



Heating Your Home With Natural Gas

Your gas furnace's operation is quite simple. A natural **gas burner** (1) heats up a **heat exchanger** (2). As air from inside your home enters the **furnace** (9) through the **return air grille** (3), the **fan** (4) blows air across the heat exchanger to pick up warmth and move it into your home through the **ductwork** (5).

Whether you have a split system or a gas pack, natural gas heating systems, over the years, have been enhanced with new features and innovative designs to increase performance and energy efficiency. Natural gas delivers warm air without the cool draftiness often associated with the 90° F air of electric heat pumps. Gas-heated air is about 110° to 130° F, which is warmer than body temperature, so you feel comfortable. The heated air circulates quickly, creating a cozy warmth.



Gas heating systems are economical to operate and small adjustments can conserve energy and save you money. Setting the thermostat back to a lower temperature at night or when no one is home, for example, can increase your savings. You can expect a long life of trouble-free operation. These heating systems are low maintenance, providing warmth and comfort for as long as 15 to 20 years*.

* Source: 1999 ASHRAE HVAC Application Handbook.

Cooling Your Home

Cooling your home is a different process than heating it. Your cooling system, whether split or packaged, consists of the **condensing unit** (10) connected with **copper lines** (8) to the **cooling coil** (6). The copper lines contain a refrigerant that circulates back and forth between the cooling coil and the compressor.

As warm air from inside your home enters the furnace cabinet through the **return air grille** (3), it becomes cool by giving up its heat to the refrigerant in the cooling coil. The heated refrigerant returns outside to the condenser where it is cooled down once more. This process is repeated for as long as your cooling system is running. The **fan** (4) then blows the cooled air into your home's **ductwork** (5).

Although your HVAC system may look different, most systems have the components illustrated in this diagram.

Setting Your Thermostat

Your thermostat is used to turn your heating and cooling system on and off, and to set and maintain the desired temperature inside your home. There are three basic types of thermostats - dial, setback and programmable. They all offer three selections or modes: HEAT, OFF and COOL. Your fan control probably has two settings: ON and AUTO. When the fan control is set to ON, it runs continuously, regardless of the mode or thermostat setting. When it is set to AUTO, your fan operates automatically, cycling on and off as required.

For maximum efficiency, your thermostat should be set at a comfortable temperature, avoiding wide swings in temperature demand. A programmable thermostat allows you to arrange different automatic settings for day and night.



Heating Operation

During the heating season, it is recommended you set your thermostat at 66° to 68° F, health permitting. Because warm air rises, the second floor of your home may often be several degrees warmer than the first floor. By setting the fan switch to ON, you'll generate a constant circulation of air, which will help even out temperatures.

Heating

(All Weather)

HOUSE TYPE

Single-story and two-story house with separate units for each floor

Two-story house with a single heating/cooling unit

OPERATION

- Set thermostat to desired indoor temperature.
- Set fan switch to "AUTO."
- Set thermostat to desired indoor temperature.
- Keep fan switch "ON" as often as possible during the day and early evening. Set fan switch to "AUTO" at bedtime.

Cooling Operation

In the cooling season, a 78° to 80° F thermostat setting is usually appropriate, health permitting. Your cooling unit turns on when the temperature of the air surrounding the thermostat exceeds your thermostat's temperature setting. If the rooms with exterior walls heat up too much before your cooling system turns on, Air Balancing may help (see page 12).

Cooling

WEATHER

Warm Weather
(Outside Temperatures
Up to 100° F)

HOUSE TYPE

Single-story house
and two-story house
with separate heating
and cooling units for
each floor.

OPERATION

- Set thermostat to desired indoor temperature.
- Set fan switch to "ON" or "AUTO" depending on your preference for air movement.

Warm Weather
(Outside Temperatures
Up to 100° F)

Two-story house with
one unit.

- Set thermostat to desired indoor temperature.
- Set fan switch to "ON" or "AUTO" depending on your preference for air movement.

Hot Weather
(Outside Temperatures
Over 100° F)

All houses.

- Set fan switch to "ON."

Air Balancing

Nothing is more critical to the comfort of your home than air balancing. It helps you save money on your energy bills and be comfortable at all times. Although your home was probably air balanced when it was built, you may want to make small changes for additional comfort.

If you're already comfortable, there's no need to change anything. However, by understanding the basics of how your HVAC system works and making minor adjustments to equalize temperatures throughout your home, you can control the air balance to suit your lifestyle.

You can balance for any season by adjusting the vent openings in wall or ceiling registers. It is recommended that if air balancing is necessary, you do so in both the heating and cooling seasons to maximize efficiency. To start, simply follow these important steps:

- Set vents in every room to the full open position.
- Open the doors of all rooms that have vents.
- Set your thermostat so the heating or cooling unit turns on and stays on until the air balancing process is complete.
- Allow time for your home to heat or cool. While the unit is still operating, walk through your home and notice the temperature in each room.

Then follow these additional steps



Heating Specifics

- Partially close off vents in the warmer rooms. This will reduce air flow to the warmer rooms and force more air into the cooler rooms.
- Try adjusting upstairs vents in a two-story home with only one heating and cooling system to counter the effect of warm air rising from the first floor.
- Kitchens are particularly vulnerable to excessive warming, especially from the extra heat generated by cooking. Adjust the kitchen vents, if you have them, until the room is comfortable.
- Once you have adjusted all of the vents throughout your home so that the comfort level is more balanced from room to room, return your thermostat to your usual settings.

Cooling Specifics

- Partially close off vents in the cooler rooms. This will reduce air flow to the cooler rooms and force more air into the warmer rooms.
- Closing off unused rooms is NOT recommended during the cooling season. The energy savings are minimal and restricted air flow may cause the temperature inside the cooling coil to drop below the freezing point and ice up. This could damage the compressor, which may require costly repairs.
- Experiment with small changes. Beyond the half-closed position, the vent controls are very sensitive and slight adjustments may result in very large changes in air flow.
- Check your window coverings. Proper air flow to a room during the cooling season assumes some kind of draperies or shading on all windows. Any room without coverings, especially on south or west-facing windows, may be warmer than a room with an east or north exposure.

Balancing your home's air flow may take some time and patience. Changing one vent may adversely affect other vents, and very slight changes may result in large variations in air flow. Experiment until you're comfortable.

Energy Saving Tips

HVAC specialists recommend you have your heating/cooling system serviced by professionals a minimum of once per year. The ideal time is between the heating and cooling seasons. Call your installing contractor or the manufacturer's local representative. Before a contractor comes to your home, be sure to ask what their service includes. For a furnace checklist, see back cover.

Have your HVAC contractor check air ducts in your home for leaks. Much of your home's heating or cooling can be lost to leaky ducts. If necessary, ducts can be sealed with special tape or good quality mastic, both designed for this purpose.

Make a habit of replacing your furnace filters or cleaning your electrostatic filters every month or two. Use your monthly natural gas bill as a friendly reminder. Clogged filters waste energy and make your heating/cooling system work harder.

Look around your home for drafts and cracks that may be robbing your home of energy efficiency. A piece of tissue paper held up at one end is useful for locating drafts. Caulk and weather-strip doors and windows as needed. Don't forget about electrical outlets and switches, especially on exterior walls. You can purchase special insulation for outlets and switches at a hardware store. They're inexpensive and easy to install, and they may reduce your heating/cooling loss.



Keep windows covered whenever possible by closing drapes, blinds and shades during hot months. Open them on winter days to take advantage of the sun's warmth.

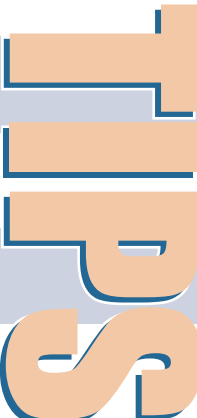
Encourage family members to be "energywise." Open doors waste energy. Minimize traffic in and out of your home as much as possible.

During the summer months, use your bathroom and kitchen exhaust fans sparingly. In as little as one hour, fans can remove a house full of cool air.

During the warm summer months, a 78° to 80° F thermostat setting is suggested, health permitting. For every degree you turn the thermostat up, you'll save money on your cooling bill.

In the summer, take cool baths and showers. Besides saving energy, you'll be more comfortable.

In the winter, turn your thermostat down at night and when you're not at home. For example, you might set your daytime temperature at 66° to 68° F and your nighttime temperature at a lower setting, health permitting. Programmable and setback thermostats allow you to make these changes automatically at times of the day you determine.



For More Information

Should you need assistance with your heating and cooling system, always refer first to your manufacturer's use and care manual. However, Southwest Gas can recommend licensed and insured HVAC contractors who can help.

Call The Energy Specialists at 1-800-654-2765.

Or, for a list of contractors in your area visit our Web site **www.swgas.com**.

Furnace Checklist

You should expect a contractor to check your furnace in some or all of the following areas:

- Complete Safety Check**
- Thermostat Calibration** - Contractor tests thermostat for correct temperature reading and to see if the unit is turning on at the set temperature.
- Examine the Filter**
- Check the Vent Piping**
- Determine the Temperature Split** - Measuring the temperature rise between the return air and supply air - temperature in and out of the unit.
- Cracks in the Heat Exchanger**
- Test the Limit Switch** - The switch that turns the furnace off before it gets too hot.
- Set the Heat Anticipator**
- Test the Fan**
- Test the Electronic Ignition**
- Check the Pilot Thermocouple**
- Check the HVAC System for Leaks** - Check for "apparent" air leaks at the unit and in the ductwork.