BUYING & INSTALLING
A HOME HEATING SYSTEM

INCLUDES SHOPPING CHECKLIST

Table of Contents

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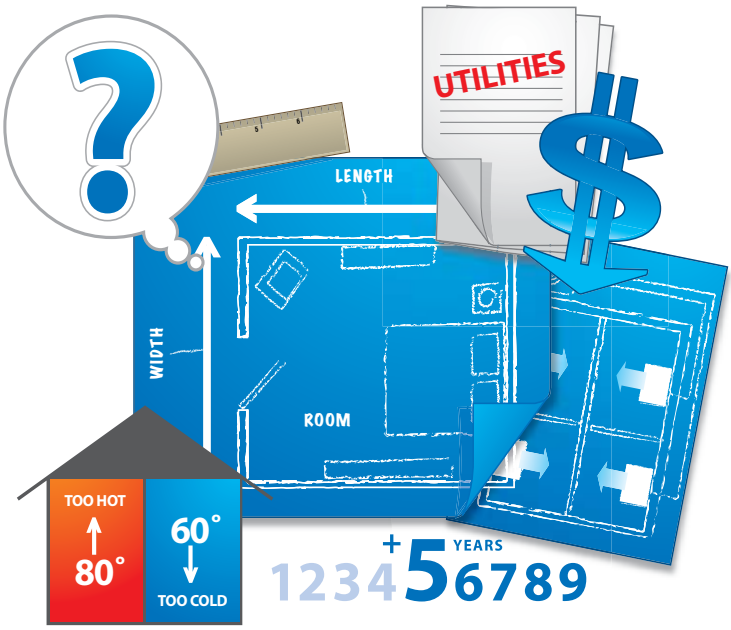


Shopping for a new home heating system might seem overwhelming at first. What size, brand, type and efficiency should you choose? What does any of this even mean? After all, it's not every day that you shop for a home heater or furnace – most of us make an equipment purchase like this only once every 10 years or so and we don't have much experience. Well, don't worry, because this guide will make your shopping clear and simple. It will educate you so you can navigate all the jargon with ease and confidence, even if you have no previous knowledge of residential furnaces or heaters. You'll learn in plain language:

- How to choose the right size unit
- How to lower your utility bills
- What accessories are important to you, and which ones aren't
- What really matters when comparing brands
- How to know if installing it yourself is a good idea or not
- How to get a great deal from a contractor to install your equipment
- Included is an easy shopping checklist to help you keep track of what you've learned and what to do next
- And much more!

Full Service Contractor vs. DIY

There are three paths you can take to get your new heating system depending on how much work you are willing to do on the project yourself, your mechanical skill level, your willingness to get involved and most of all how much money you want to save. Your options are:

1 Do what most people do and you can have a local heating contractor supply the equipment and install the unit for you as a complete package deal. This is the simplest approach, but also the most expensive.

2 Buy the equipment yourself online, and then hire a local contractor to do the installation for you. This is relatively easy, and will usually save you a several hundred dollars on a heating system.

3 If you are skilled in doing your own home projects and want to save even more money, you can buy the furnace yourself from an online store, do some or most of the installation yourself, and then have a local heating contractor finish up the job, or just do the final inspection and startup. This will likely save you several hundred to several thousand dollars.

If you'd like to take path 2 or 3, you can save quite a bit of money. This shopping guide is designed to help you through the selecting and online buying process where you are in charge, and your savings will be the greatest.

1) Selecting the right equipment

Your project likely falls into one of two categories: replacing an existing heating system, or installing a new heating system for the first time in a new home or renovated home. If you are replacing equipment, it is most likely that you will be selecting the same kind of equipment that you have, meaning your new equipment will use the same kind of fuel, be the same type and be the same size. In this case, the information below is to help you identify what equipment you have now.

If you are installing new equipment the information below is to give you an overview of the various types and features of different heating systems. This will help you decide which will be best for you.

Fuel / Energy

The first thing to do is to select a fuel or energy type your system will use. Different types of home furnaces operate on different types of energy or fuel to create heat. The four choices are: natural gas, propane gas, oil or electricity only. If you are

replacing a heater, you'll likely use the same fuel or energy type for the new unit as the old unit used. If you are installing a heater in a new construction home, you can talk to your city's local mechanical department or local utility companies to find out which fuel costs the least in your area, and which are available in your neighborhood. If one fuel type is much lower cost per BTU (unit of heat measurement), then you'll likely use that one. Keep in mind how the fuel or energy is brought to the home: natural gas (where available) and electricity are supplied as needed automatically without having to refill anything, whereas oil and propane require having a service truck visit your home to periodically fill a tank in the yard.

Type

Next select the type of unit you'll need or want. (Not all heater types listed below are available in all fuel / energy types.)

The seven common types are:

1) Standard Forced Air Furnaces

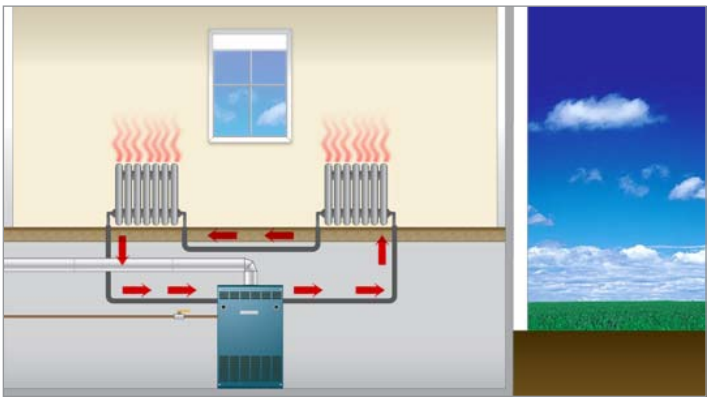
These are the most common heaters. Standard forced air heaters install inside the home and are connected to ductwork which distributes the warm air to each room. One of the advantages of a forced air furnace is that you can add central air conditioning to it so you can have a complete heating and cooling system. These heaters come in three basic orientations, depending on where in the home you install it and which way you want the air to blow from the unit.

- "Up-flow" units blow the air up, and are installed usually in a basement or closet.
- "Down-flow" units blow the air downwards and are usually installed in a closet.
- "Horizontal-flow" units are installed horizontally and blow the air out the side, and are usually installed in attics and crawlspaces.

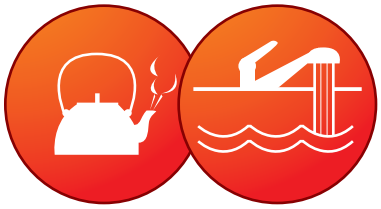
If you are building a new home and haven't decided where you want to put the heater yet, any of these locations can work for you. If you are replacing a standard forced air furnace, choose the furnace with the same orientation as the one you already have.

Since gas and propane forced air furnaces are so popular, manufacturers make them available with high efficiency and increased comfort features.

2) Boilers



Boilers heat water and circulate the hot water or steam through pipes to radiators in each room. There is no ductwork connected to boilers, and they aren't central air conditioning compatible – they are used for heating only. Some people say that they like the way the heat feels from a boiler system since it is radiant; gentle rays of heat come from the room radiators instead of warm air being blown into the room like with a forced air heater.



Another increasingly popular way to use a boiler is for in-floor heating. Tubing is placed under the floor that the hot water circulates through, which makes the entire floor warm. This is especially nice if you have tile flooring which is typically cold to walk on in the winter. Whichever way a boiler is used, with room radiators or with in-floor tubing, pipes or tubing are required throughout the home to circulate the boiler's hot water or steam. If you have a boiler and piping already, the best home heater choice for you is to replace it with another boiler.

3) Split-System Heat Pump

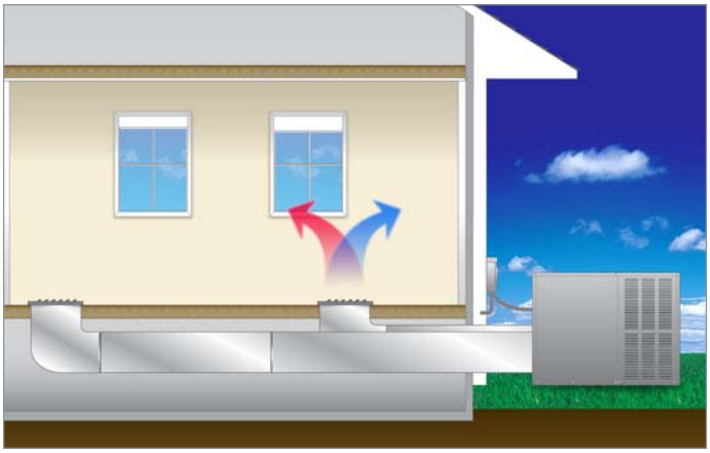
A heat pump is a central air conditioner that provides cooling in the summer, and then runs backwards in the winter to also provide heating. It operates entirely on electricity and is usually a low-cost way to heat a home. A split-system heat pump has two parts, the heat pump which sits outside in the yard, and an air handler which sits inside the home and connects to ductwork to distribute the warm or cool air throughout the home. Heat pumps work best in warmer parts of the country, but can be used in the North as well when accompanied by a secondary source of heat (either an electric heater coil installed in the air handler or a gas furnace.)

A split-system heat pump is a great choice if you:

- You live in the Southern USA
- You want air conditioning too
- Electricity is relatively affordable in your community (compared to gas or propane)
- You have or will be installing ductwork in the home
- You are replacing a split-system heat pump

4) Package Units

A packaged unit type of equipment means the entire equipment sits outside the home. The only thing in the home is the ductwork which exits the home and connects to the packaged unit. Package units usually come with air conditioning as well as heating combined in the same equipment. The two types of packaged units are:



- Packaged Heat Pumps – These run entirely on 220v electricity, and provide both heating and cooling
- Gas Packs – These run on natural gas or propane for heat, and 220v for air conditioning

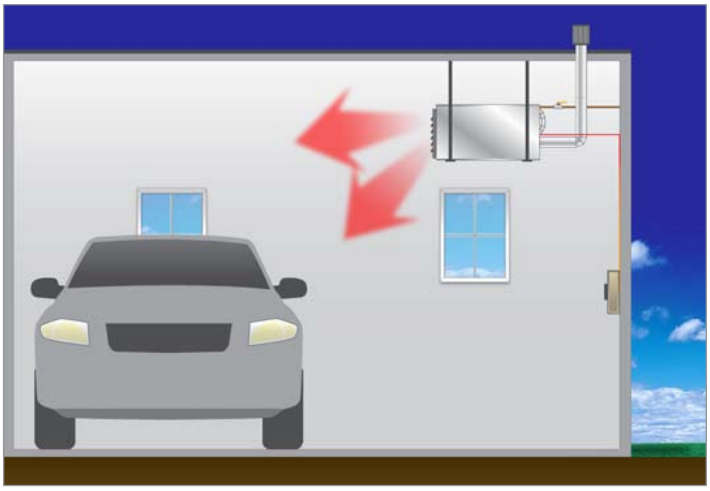
Packaged units are a good choice if:

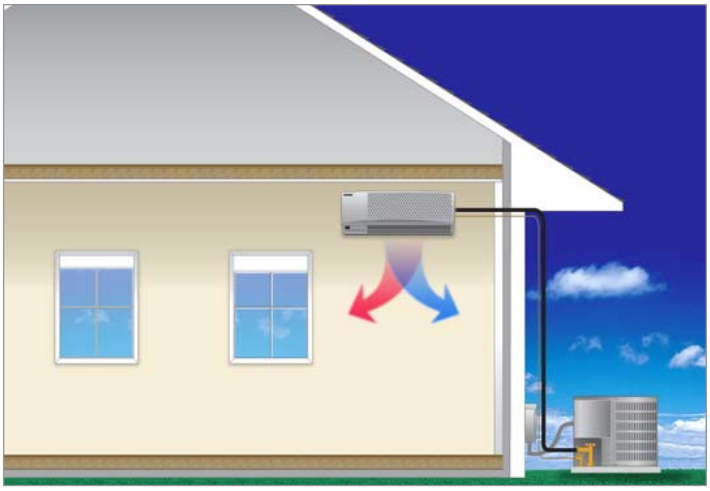
- You have no space inside the home for heating equipment
- You live in a mobile or modular home (they blow the air properly through these home's special ducting)
- You are replacing an existing packaged unit

5) Hanging Furnaces

A hanging furnace operates on natural gas or propane, and is suspended from the ceiling. Hanging furnaces (often called a "garage furnace") are used in warehouses, garages, workshops, and other similar spaces. No ductwork is required, as the unit blows the warm air directly into the space.

Hanging furnaces are not capable of being connected to a central air conditioning system, and most manufacturers don't





make high efficiency models. However, they are an affordable and convenient way to heat warehouses, garages and workshops.

6) Electric Baseboard Heaters

Baseboard electric heaters are narrow units that attach to the wall of a room along the baseboard and radiate heat. Usually one or more baseboard heater is installed in each room. These heaters have no moving parts, and operate entirely on electricity, either 110v or 220v. They are inexpensive to purchase, and easy to install in newly constructed or renovated homes where running high voltage wiring through the walls is feasible.

While electric baseboard heaters are quite inexpensive to purchase, they are costly to operate, since they are not an efficient use of electricity compared to other electrical heating options such as heat pumps. Also, since wiring has to be provided to each unit, it is not usually practical to install them in homes that are already built. They are not usually recommended as a primary source of heating for an entire home.

Electric baseboard heat is a good option in room additions that are being constructed when an inexpensive heater is needed.

7) Mini-Split System

Mini-split systems have been popular in Europe and Asia for a long time, and in recent years have gained rapid popularity in the USA. Mini-splits require no ductwork. A mini-split provides cooling, and if it is a heat pump type, it will provide heating too. A mini-split is made up of two components, the outdoor condenser, and the indoor air handler which mounts to the wall of a room. The system temperature is operated by a remote control.

Mini-split systems are a great choice if you want to heat and cool:

- A room addition, such as a sun room
- A small apartment or small home that doesn't have ductwork

Size

Furnaces come in different sizes. Generally speaking, big homes need big furnaces, and small homes need small furnaces. Sizes are rated in BTUs (British Thermal Units) listed in thousands, such as 70,000 BTU (a mid-sized gas furnace). Furnace sizes move up in about 20,000 BTU increments, so you select the size closest to your needs since an exact BTU size isn't available or even necessary. Furnace labels often show furnace "input" BTU ratings as well as "output" BTU. "Output" means how much heat the furnace will actually put into the home, and is the BTU listing you will want to note when selecting a new home furnace.

How do you know what size furnace is right for you? There are several ways to find out, some which are more accurate than others:

1) Manual J Load Calculation

This is a scientific approach and is the most accurate. It consists of taking information about your home's constructions materials, insulation levels, sizes of rooms, etc., and then makes a calculation based on those to determine the appropriate heating and cooling requirements needed. You can purchase online software from a software provider at this link if you wish to use this method. It will take several hours to calculate it this way.

2) Use the Sizing Estimator.

This is an online tool that will give you a quick, rough estimate. It won't be exact, but when used in connection with other information it can provide a fairly close approximation.

3) Compare your home to similar homes in your area.

Does you neighbor have the same size home as you? If he has a properly sized furnace, then the same size unit may also work for you.

4) Ask a contractor.
Most furnace professionals give free in-home estimates for installing new heating equipment during which they will recommend a unit size. A contractor familiar with the homes in your neighborhood will likely be able to give you an idea of what size you might need. Keep in mind that while a contractor's opinion is valuable, it is just that – an opinion – unless he performs a heat load calculation.

5) If you are replacing an existing furnace, look at what size you have.
If the unit you have now is the correct size for your home, replace it with the same size. How do you know what size you currently have? Look at the name plate on the furnace usually located somewhere inside the unit (remove service panel to find). Remember, you want to look at the "output" BTUs here. Newer furnaces are higher efficiency, meaning for every input BTU, you get more output BTUs (heat) in your home. Therefore a new furnace will be smaller (a lower input BTU rating) than your existing furnace.

Replacing a furnace with the same size one might work if you have lived in the home long enough to go though a winter season and decide that it is operating properly. However, if you've added insulation or upgraded your windows, a smaller furnace may be needed. On the other hand, if you've expanded the home, a larger furnace may be needed.

Depending on the type of furnace you're shopping for, there are only a few sizes to choose from which move in about 20,000 BTU increments. So while the sizing process might involve a bit of educated guesswork, since there are only few sizes to choose from, the likelihood of getting the right size furnace is actually very good. Also, if you are shopping for a gas or propane forced air furnace, you might want to select what's called a two-stage furnace. A two-stage furnace is actually two furnace sizes combined into one unit, so using one of these furnaces means it covers a wider spread of sizing capabilities.

Efficiency

The next thing to do is choose what efficiency you want for the equipment. This is a personal choice, based on how much money you want to save on your fuel or electric bill when operating the heater.

Heaters that operate on gas, oil or propane have different efficiency ratings which are indicated as an AFUE percentage (Annual Fuel Utilization Efficiency), and indicated as a HSPF number (Heating Season Performance Factor) on electric heat pumps. The higher the AFUE percentage or HSPF rating the more efficient the unit. Higher efficiency equipment produces the same amount of heat as lower efficiency units of the same output BTU size; the difference is that higher efficiency heaters use less fuel or energy to do so, thereby saving you money on your utility bills.

Heaters that are 20+ years old usually have efficiencies of 65% to 70%. Old heat pumps usually have HSPF ratings of 5 or 6. This equipment costs a lot of money to operate compared to new equipment.

New boilers and forced air gas furnaces have efficiency ranges starting at 80% up to 95+% (also called "direct vent" heaters). There is also a bonus if you buy a heater that is 95% efficiency or higher: the Federal government gives a $150 - $200 rebate for this equipment purchased in 2007. Each percentage of increase in equipment efficiency means the same decrease in your monthly fuel bill. For example, let's say you have an old propane furnace that is 65% efficient, and your current gas bill is $200/month in the winter. If you replace it with a 95% propane furnace, you will see a 30% savings (95 minus 65). That means your new propane bill monthly would be $140, or a $70/month savings.

Heat pumps (and air conditioners) are rated for their cooling efficiency by SEER (Seasonal Energy Efficiency Ratio). The higher the SEER, the less electricity used to create the same amount of cooling. New heat pumps have efficiency ratings from 13 SEER up to 16 SEER. Each additional SEER rating equals about 7% savings on your electric bill. More good news: the Federal government gives a $300 rebate for buying a heat pump in 2007 that is 15 SEER or higher.

A high efficiency heater is a particularly good idea if:

- You live in central or northern USA
- You plan on staying in your home for more than 4 years
- You want to help preserve the environment by using less electricity

To help with your decision from a financial perspective, you can use this Equipment Efficiency Comparison Calculator to see how much money you might save in operating costs by comparing different efficiency units for your particular home.

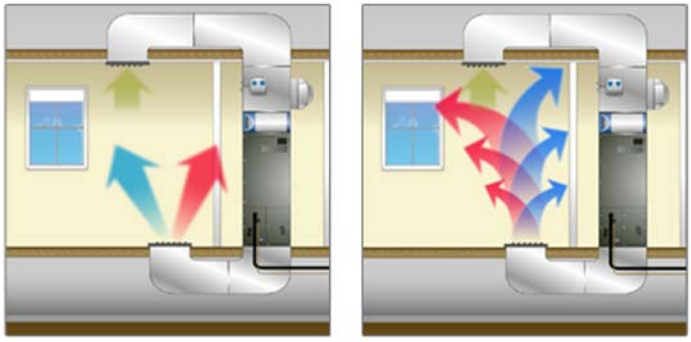
Comfort Features

The primary goal of a heater is to keep you warm, and the measurement of that is if your home is the temperature that you set your thermostat for. If you set your thermostat for 72 degrees, and the furnace achieves 72 degrees, the furnace has accomplished its primary comfort function. Besides this basic functionality on forced air furnaces there are only about two real comfort feature options.

The two features that can increase your comfort, though, are noteworthy and valuable. They are two-stage heating, and self-adjusting blower speeds. Both of these are available for forced air furnaces.

Before explaining what these features are, first let's look at how a home furnace works:

When the temperature in the room gets about 1 degree colder than what you've set your thermostat for, the heater comes on at full capacity. The heater runs until the temperature in the room gets about 1 degree higher than what you've set the thermostat for, then the furnace shuts off. And the cycle continues; on and off. When the heater is on, the flames in the furnace (if it is gas, oil or propane) are on at full capacity, and when the unit is off, the flames are completely off; there is no in-between flame level. The same thing happens with the blower (the fan inside the furnace that pushes the air through your home's ducting). The blower is either on at full speed, or off; there is no in-between blower speed.



Now, two stage furnaces improve on this operation. These central heating systems have advanced burners with two flame levels, high and low. When your home needs less heat, the furnace will operate on low flame; when your home needs more heat it will automatically operate on high flame.

Self-adjusting blowers come in two types, multi-stage and variable speed. Multi-speed means the blower operates on two speeds in heating, low and high, changing automatically as heating demand changes. Variable speed is a smooth ramping blower that increases or decreases rotational speed as needed.

The benefits of a two-stage furnace with variable speed blower are that it makes you more comfortable due to more even temperatures throughout the home, maintains a more steady temperature (keeps the house at nearly the exact temperature you set your thermostat), increases your air conditioning efficiency about 8% (if you have air conditioning), has a lower operating cost (due to a DC voltage variable blower motor), increases efficiency of any attached air cleaner, and is quieter than other furnaces.

The benefits of a two-stage furnace with multi-speed blower are similar to the Two-Stage Variable Speed models. However the Two-Stage Variable Speed models are even more quiet, even more electrically efficient, and even more comfortable. Still, they are the second-best furnace available, and an outstanding heater for the price.

Brand

There are many different equipment brands available. The top two selling companies by sales volume in the USA are 1) Bryant / Carrier, and 2) Goodman Manufacturing.

Everyone seems to have an opinion about which brand is best or worst. Contractors often claim their brand is the best, and everyone else's brand inferior because they want to sell you their brand. Unfortunately, much information available is biased and unreliable, whether it is from a contractor or in an online article. So how do you know which brand is a good buy? The best approach is to compare objective facts about the equipment, found on manufacturer's web sites or the manufacturer's product specification sheets. Three fundamental things to know and compare among brands are:

1. **Features** – What is the furnace fuel efficiency (AFUE)? How many stages of heat does it have? Does it have a self-adjusting blower fan? Make sure to compare "apples-to-apples" (features-to-features) when looking at different brands.

2. **Warranty** – How long is the manufacturer's standard warranty? The longer the warranty, the better the value. Length of warranty is also a good indication of product quality. If a manufacturer is willing to "put their money where their mouth is" so to speak by backing up their product, it is likely well built. Keep in mind that manufacturer's warranties are for parts only, not labor costs in the event of a repair.

3. **Price** – Price alone doesn't tell you whether the furnace brand is a good deal or not. A low priced brand doesn't mean it is a good or bad product, and a high price doesn't mean the brand will be high quality or not. However, when combined with feature and warranty information, pricing is very useful in selecting a brand. Your goal should be to select a furnace brand with the features and warranty you want at the lowest price.

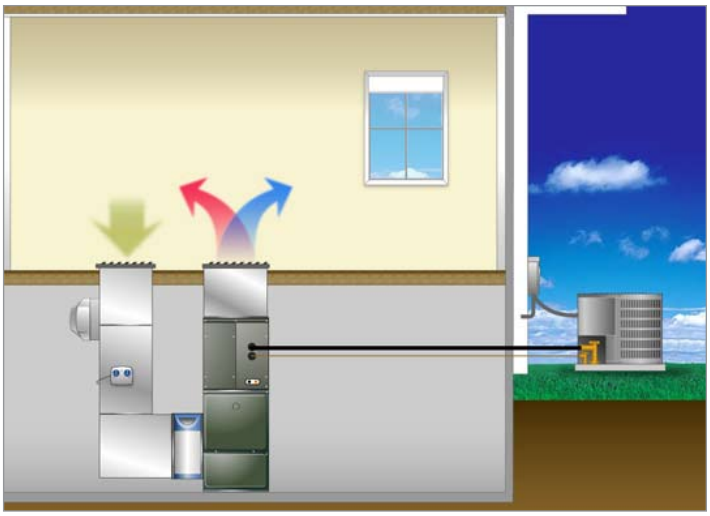
Here is a chart of popular forced air residential brands, with warranty and price rankings as of January 2008:

Brand	Highest Furnace Efficiency Rating Available (AFUE)	Parts Warranty	Heat Exchanger Warranty	10 Year Furnace Replacement Warranty*	Long-Lasting Silicon Nitride Ignitor	Price Rank	Comments
Goodman www.goodmanmfg.com	96%	10	Lifetime	Yes	Yes	●●	All furnaces and air conditioners of all efficiency ratings have a 10 year parts warranty
Lennox www.lennox.com	95%	10	Lifetime	No	No	●●●	All other furnaces with lower efficiencies are 5-year warranties
Tempstar www.tempstar.com	92%	7	Lifetime	Yes	Yes	●●	
Bryant www.bryant.com	96%	5	Lifetime	No	No	●●●	
Carrier www.carrier.com	96%	5	Lifetime	No	No	●●●	
York www.york.com	95%	5	Lifetime	No	No	●●	10 year furnace warranty available if you purchase a new air conditioning system at the same time
Armstrong www.armstrongair.com	95%	5	Lifetime	No	No	●●●	
Whirlpool www.whirlpoolhvac.com	95%	5	Lifetime	No	Yes	●●●	
Coleman www.colemanac.com	95%	5	Lifetime	No	No	●●	
Trane www.trane.com	93%	5	Lifetime	No	Yes	●●●	10 year furnace warranty available if you purchase a new air conditioning system at the same time
Rheem/Ruud www.rheem.com	93%	5	Lifetime	No	No	●●	
American Standard www.americanstandard.com	93%	5	Lifetime	No	No	●●●	
Payne www.payne.com	92%	5	Lifetime	No	No	●	
Ducane www.ducane.com	92%	5	Lifetime	No	No	●	

* furnace will be replaced if heat exchanger fails in first 10 years

Consider Air Conditioning

If you already have central air conditioning currently, there is likely no reason why you couldn't continue to use it with your new heating system. Regardless of differences in brands between your new furnace and your existing air conditioner, they will likely be compatible if you decide to keep you existing air conditioner.



But if you are thinking of getting air conditioning or upgrading to a new one, now is a good time for that consideration. Buying it at the same time as your heating system has advantages. Firstly, since only some types of heating systems can be coupled with air conditioning, now would be the time to make sure your heater is compatible with a cooling system. All central air conditioning systems are a "forced air" system, meaning the air is blown through ductwork throughout the home. If you want to have central air, then make sure to choose a forced air heating system as your heating type as well. For example, if you were deciding between installing a boiler or a gas forced air furnace to heat your home, you'd want to choose the forced air furnace since it will work with and support central air conditioning, where as the boiler won't. If you have a boiler, you can still have air conditioning in your home, but you will need to purchase an air handler unit for the indoors, and install ducting in the home in order to have central air conditioning.

One of the main components of a central air conditioning system is the evaporator coil. This is a type of radiator that installs directly next to your forced air furnace into the duct system (it might look like part of the furnace or ductwork when installed). If you install the evaporator coil at the same time you install the furnace, the evaporator coil installation will be fast and simple. If you install the furnace and then later decide to add the evaporator coil, it will require the ducting to be reworked, which will increase your air conditioning installation costs if you are hiring a professional to do it for you.

Replacement or new installation

If you are replacing an existing heater system, equipment swap-out will be a faster and easier installation than if installing a new heating system in a new home or renovated property. If you replacing an existing gas forced air furnace, you will connect the furnace to your existing ductwork. A sheet metal transition kit can make the job easier to connect the existing ductwork to the new furnace.

If you are installing a new boiler, new hot water piping and radiators will need to be installed throughout the home. If you are installing the more common heater, the forced air furnace, you will need to install a duct distribution system to carry the air throughout the home. The same ductwork is used for both your heating and cooling system, if you have cooling.

Ductwork

Ducts are the passageways that transfer the air throughout the home. A duct system has two main duct types, called the supply air and return air ducts. Supply air ducts are all the ducts that are connected to the furnace that blow the air from the furnace to the rooms. The return air ducts are all the ducts that pull the air from the rooms back to the furnace. When a furnace is operating, it is both blowing air to the rooms and pulling the air from the rooms back to the furnace at the same time. As much air as is blown from the furnace is being drawn back to it.

You can design and install your own duct system if you are handy and want to save quite a bit of money compared to having a professional install it for you. Designing a duct system is relatively simple to do when you know how to do so. There are two primary things to know:

1. You need to have return air ducting that can provide the same air flow back to the furnace as the supply air ducting is blowing out.

2. Your system's total air volume has to be enough to supply adequate air flow for your furnace (and air conditioning if you have it). Keep in mind that the most common duct design problem is too little air flow caused by ducting that is too small, or because there are simply not enough ducts. This causes equipment performance and maintenance problems. Ask a professional for advice and it will quickly speed up your design time learning curve.

Venting

Venting refers to the pipe that connects to the furnace and goes to the outdoors to remove the furnace's combustion gasses (also referred to as a flue or chimney). Lower efficiency furnaces (in the 80% efficiency range) have metal vent pipes which often connect into a brick chimney; or the metal vent pipe goes vertically through the home and terminates through the roof. Instead of metal, most new high efficiency furnaces (in the 90% efficiency range) use a plastic PVC vent pipe (such as used for plumbing) and can be vented vertically or horizontally out the home. Plastic vent piping is used because the vent gasses from the high efficiency furnaces aren't hot, and so a metal pipe isn't required. The heat goes into the home instead of out the chimney, which is an important money-saving benefit.

If your existing low efficiency furnace vent terminates into a brick chimney along with a water heater venting into the same chimney, and you're replacing the furnace with a new high efficiency model which will no longer vent into the chimney, a chimney liner will need to be installed for your water heater. A chimney liner is required by code in this case, and needed to insure the water heater's combustion gasses stay warm enough to rise through the chimney to the outdoors as well as to protect the chimney from deterioration. If you are installing a new low efficiency furnace which will reconnect to the brick chimney with a metal pipe, code requires that both appliances be vented through the chimney liner. Aluminum chimney liners (used for gas products) cost about $100-$300 and are relatively easy to install.

2) Selecting the right accessories

Some heating systems have accessories that might be required for your application. Some of these could be:

- LP Conversion Kit – This is a kit that is used to convert the new gas furnace so it can operate on liquid propane (LP) instead
- High Altitude Conversion Kit – Just as it sounds like, this is a kit that would be required for gas or oil heaters used at high altitudes, typically when the installation is above 5,000 or 7,000 ft
- Thermostatic Expansion Valve – This is a valve required for operation for high efficiency heat pumps

Accessories of this type are mentioned on the manufacturer's specification sheets.

Then there are accessories that are not required, but you might want to get to improve the performance of your heater, make installation simpler, to increase your comfort and to improve the health of your home's occupants. For more information on improving indoor air quality, see the government's web site at www.epa.gov/iaq.

There is a greater variety of optional accessories available for forced air furnaces than for other types of heaters such as boilers. Here are some useful accessories for your forced air furnace to consider at the time of your furnace purchase:

Thermostat

A thermostat is required to operate all types of heaters. You can likely use the one you currently have, unless you are changing system type (ask your heating professional). Even if you already have a thermostat, there are advantages to upgrading to a new one. For one thing, if you don't already have a digital programmable thermostat, you should certainly consider getting one. They are much more accurate which will significantly stabilize the home temperatures making you feel noticeably more comfortable. Also, programmable thermostats allow you to have the temperatures change at different times throughout the day automatically, to increase your comfort and save money. According to Consumer Reports, "You can shave up to 20 percent off your heating costs by lowering your home's thermostat 5 degrees at night and 10 degrees during the day if no one is home."

Another useful digital thermostat feature is called "cycle time" that some models offer, such as the popular Honeywell VisionPro touch-screen thermostat. Cycle time makes your home's temperatures very even and comfortable by anticipating when the temperature will drop before it even happens and turn on the furnace proactively.

Select a thermostat that works with your type of heating system, as indicated on the thermostat description. Some thermostats, like the Honeywell VisionPro models work with all types of heating and cooling systems.

Sheet Metal Transition Kit

Since your new furnace will likely be a different physical size

from your old one, ductwork will need to be adapted to get the new furnace to fit properly. A sheet metal transition kit makes replacing an existing forced air furnace easier.

Furnace Mounting Blocks

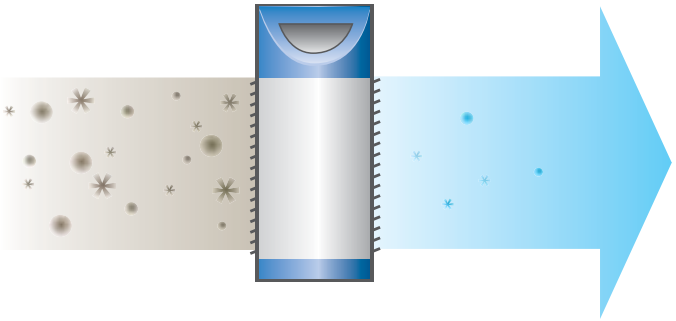
Furnaces installed in a basement are subject to water damage should water enter there. It is a good idea to mount the furnace on a support to keep it a few inches off the floor. Bricks can be used, or specially designed furnace mounting blocks.

Humidifier

When a forced air furnace runs in the winter it consistently dries the air. Dry air in the home can cause dry skin, nose and throat discomfort and static electricity. It also can cause wood floors and wood trim in your home to shrink, walls to crack and wood instruments to warp. You can replenish moisture levels in your home by installing a whole-house humidifier. The humidifier connects to your furnace ducting and home water supply and will operate automatically as needed.

Air Cleaner

An air cleaner unit mounts between a furnace and the return air duct to capture airborne particles such as dust, pollen, bacteria, dander and spores. Some units are non-electric "media" and some have combined media and electric functionality such as the Aprilaire 5000 which perform even better. Consumer Reports says that "among the top performing whole house models are the Aprilaire 5000 . . ." Performance is measured in terms of efficiency at trapping micron-sized particles. (A human hair is 100 microns in diameter.) Removing a higher percentage of contaminants from the air may reduce the incidence of associated illnesses and allergy symptoms. Select an air cleaner based upon how many particulates it captures, as well as one with dimensions that most closely match your furnace's or air handler's dimensions where the air cleaner will be installed.



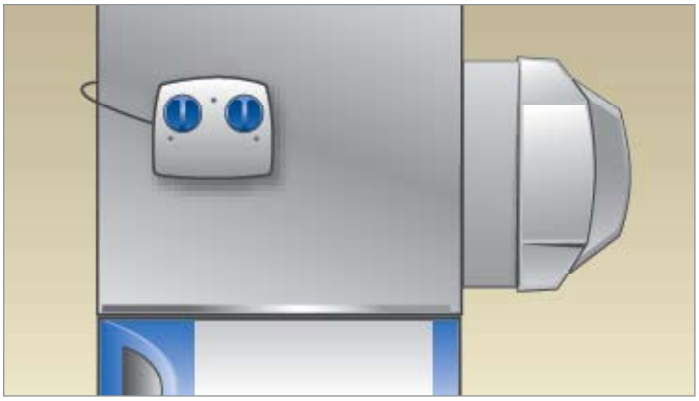
Fresh Air Ventilation System

According to the EPA, indoor air is 5 times more polluted than the outdoor air. It is recommended to install an air exchanger or fresh air ventilation system to bring outdoor air into your home. Doing so will increase the oxygen in the home, as well as reduce carbon dioxide (which builds up when people breathe) as well as reduce other pollutants that are in home air such as airborne chemicals from cleaning materials, paint, furniture, pressboard and insulation (used in construction), plastics and personal cosmetics.

There are two kinds of air ventilation systems. The best type brings in fresh air from the outdoors, and also expels stale indoor air at the same time. These systems cost about $1,100–$1,500, such as the Aprilaire 8100. The second type just pull in fresh air automatically based on outside air temperature, humidity, and your home's size. Systems like this cost around $200-$300, such as the Aprilaire 8126.

Ultraviolet Purifier

An ultraviolet purifier mounts on your furnace's duct system and emits short-wave ultraviolet light into the ducts. This germicidal light kills a high percentage of micro-organisms in the air passing by it. U.V. technology has been widely used in hospitals, pharmacies, kitchens and water treatment plants to kill airborne and surface microorganisms like mold, bacteria, viruses and fungus. Reducing bacteria and pathogens in the home may reduce the incidence of associated health problems. UV Purifiers cost between $200–$500.



Zone Controls

Last but not least is the option to add zone controls to your forced air system. Zoning controls can be added to any forced air furnace as an accessory. A zone controlled furnace allows you to adjust the temperature in various parts of your home independently, a luxury you might enjoy. Each area of the home has its own thermostat, and you can set the temperature for what you like for heating (and cooling) for just that area. For example, you might want your living room and dining room to be set at 71 degrees, but maybe you like it warmer in your bedroom at 75 degrees. You can do that with a zone controlled furnace system.

You get to pick how many zones you want to have, from 2

zones on up, with most homes using 2 to 6 zones. The components required are:

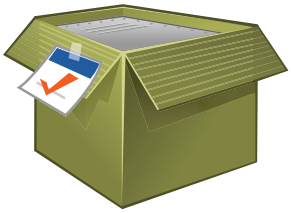
1 electronic zone dampers to be installed inline with the ductwork

2 zone control panel (the "brain")

3 thermostats for each zone.

If you are planning on adding zone controls to existing ductwork, the area where the ductwork attaches to the furnace will need to be accessible. For new construction, creating a zone system is easiest since all the ductwork is accessible, a requirement to install the dampers. A qualified heating professional can recommend the right zone components for your new furnace.

3) Buying



To make a successful purchase, you'll want to first confirm that you are buying the correct products so you get what you need, not what you don't. Then find a reputable online store that has the products you want and that will assist you before and after your purchase.

Help with Selecting Equipment and Accessories

Once you have an idea of what you want, talk to a heating and air conditioning professional before you buy. This could mean talking to an online store, or a local contractor who gives free estimates (understand that industry experience and product knowledge differ greatly from contractor to contractor.) Ask a qualified heating and cooling professional about:

- **Equipment size** – Is this the right size for my home?
- **Equipment type** – Is this the right type of equipment for my home and my area?
- **Efficiency** – Is this a good efficiency option for considering how long I plan to live here and my geography?
- **Comfort features** – Are any product features available you'd recommend?
- **Accessories** – Are there required accessories I need? What optional accessories might be a good idea?

In the back of this guide is a "Shopping Checklist" to help you organize and compile your questions that you'll want to ask a professional before going ahead with your purchase.

Some online stores have automatic shopping tutorials that can walk you through the buying process. They can make recommendations for your equipment, as well as required and optional accessories. Ask retailers if they have such a tool to assist you.

Selecting a Store

There are a number of stores that sell heating and cooling equipment online, but since all are not equal knowing what to look for when selecting one will save you money, time and potential headaches later. A reputable web store will become important to you if you need their assistance should any problems arise with your shipment or if you need technical or warranty support after the sale. Knowing what to look for can weed out the fly-by-night operations from those who can provide you with a good offering.

You can search online for heating and air conditioning stores. Once you've seen a few stores, do some homework and see if there are any unresolved complaints against these companies. You can checkout some web sites where consumers register complaints they've had with poor service with companies they've shopped at. Some of these resource sites are www.complaintsboard.com, www.my3cents.com, and www.consumeraffairs.com. You can search for specific company names, and see if any of their customers had a bad experience. For example, if you search for "furnace", you'll find some "scary" stories, such as the couple with a baby who bought from a name-brand department store and whose furnace went out and was ignored by the store, or the customer who bought from an auction site and didn't get the product they ordered and the web store didn't do anything to resolve the matter.

You can avoid this happening to you, and assure you get a good deal in the process. Upfront, have a conversation with the prospective companies of your choice. Ask them:

- How long have you been in business? Are you registered with the Better Business Bureau? Have you won any customer service awards?
- Can I get referrals, or see comments and photos from satisfied customers?
- Do you sell products that are used or refurbished, or are they new?
- What is the warranty on the equipment?
- If I find the products for a lower price from a competitor, will you beat that price?

- Are the products in stock? Will the order ship the same day?

- If there is shipping damage, are products fully insured? Will you send me a new product and handle the claim with the shipping company for me?

- Do you have a return allowance? Do you charge restocking fees for returns?

- Do you charge cancellation fees if I cancel my order before it ships?

- Do you process manufacturer warranty claims for me if I need repair parts down the road?

- Do you have free technical support for as long as I own the products?

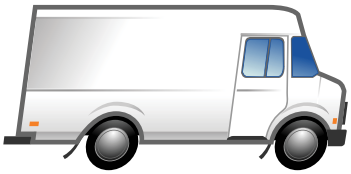
- Do you have free installation videos?

- Do you have a free contractor locator service to help me find a contractor to install the products?

When you are spending hundreds or thousands of dollars over the internet, it becomes especially important that who you buy from is reputable. For detailed information on selecting an online store, you can review our report 20 Questions To Ask Before Buying Your Heating and Cooling Equipment Online.

Shipping

Products ordered online will usually ship directly to your home or location of your choice. Some things to ask the online store regarding shipping are:



- How is the equipment packed to reduce the likelihood of damage?

  » A good company will put on a wood pallet, shrink-wrap, use guarding, and have an inspection process to make sure it is packed soundly before shipping.

- Do you have free shipping?

  » Some companies offer free shipping, and some don't. If shipping is extra, make sure to add it to the price of the product for a complete cost.

- Do you charge additional fees such as for expedited shipping, liftgate on the delivery truck, insurance, residential delivery charges, or fuel surcharges?

  » Sometimes extra fees aren't made clear on a website until you are ready to check-out. Make sure you know what all the fees are upfront.

- If there is shipping damage, are products fully insured? Will you send me a new product and handle the claim with the shipping company for me?

  » You'll want to have your products fully insured in case there is any shipping damage. Also, make sure the company you buy from will take care of all the claim paperwork, or provide a new product to you immediately if needed.

- Will the freight company call me in advance to schedule a delivery time at my convenience?

  » Most freight companies can arrange the delivery time with you at your convenience. Find out if this is the case with whom you buy from.

Liftgate

Your equipment will come delivered on a freight truck. Unless you request what is called liftgate service, you'll need to help the driver lift the products from the truck to the ground. A power liftgate can be arranged, usually for a fee, which will automatically lower the heavy products from the truck to the ground for you. If you are interested, ask the store you buy from if this is available, and for how much. Otherwise, be prepared to do some lifting when your order arrives. Once the product is on the ground, whether you get liftgate service or not, you will still need to move the product into the home yourself, as the freight companies usually won't do this for you.

4) Installation

Doing It Yourself

If you're someone who does his own home mechanical projects, such as plumbing, electrical or carpentry, you might be able to do some or most of your own installation.

If you're interested in how to install a furnace, there are four areas of consideration for you to contemplate:

Legal

There are no federal or state laws that prohibit a homeowner from purchasing and installing a furnace in his own home. Unless your local municipality has laws that state otherwise, legally you can buy and install your own heating system, provided you get local permits and install the product according to manufacturer and building codes. However, you cannot service or install heating equipment in another person's home unless you are licensed to do so, which is regulated by your state or city.

Most towns and cities require one or more permit(s) to be obtained when installing a new heating system or replacing an existing one. The purpose of obtaining a permit is so that your local building authorities can inspect your project if they wish to make sure it was done according to national mechanical, electrical and gas piping code (published standards for how a proper installation should be done).

Obtaining a permit usually involves calling your city permit department, giving them your address and specifications for the heater you're installing, and sometimes making a payment. If you need permits, the three types are mechanical, electrical and plumbing (plumbing permit for the gas piping). Permits range from no cost to $50 each on average. Call you local city permit department for details and costs for your area.

Safety

The most important consideration regarding how to install a furnace is making sure it is done correctly and safely for the home's occupants. The two greatest potential hazards from improper installation are leaking vent piping or leaking fuel piping. This can occur due to improper materials, wrong or no sealants used, or loose connections.

The potential hazard of a leaking vent (chimney) pipe is that if the furnace has incomplete combustion (caused by a dirty furnace that needs cleaning or a tune-up) then carbon monoxide will form and be vented into the home through the leaking pipe. Carbon monoxide is an invisible odorless gas that when breathed blocks oxygen from entering the blood and within a short period of time will cause poisoning and death. Each year about 80 people in the US die from carbon monoxide poisoning.

The other potential major hazard could come from a fuel pipe leak, whether it is gas, propane or oil. If there is a large enough fuel leak and an open flame or spark is nearby, an explosion will occur. The result could be a massive catastrophe that would demolish the home and almost certainly kill any occupants in it at the time. Needless to say, a very major problem.

Other hazards that need to be taken seriously are:

- Electrocution from mishandling or improperly wiring high voltage lines
- Fire caused by improper wiring or improperly sized breakers/fuses
- Fire caused by improper clearances from combustibles
- Cuts from mishandling sheet metal
- Damage to property due to leaking water from improper installation of certain units

This isn't an exhaustive list of hazards or everything you need to know to be safe. The standards for how to install a furnace are outlined in the manufacturer's installation instructions included with the product (see example here).

Practical

Next, consider the practical aspects of installing it yourself:

- **Skill Level** – Do you know how to do these types of mechanical projects? Installing a furnace is similar to installing a modern water heater. It involves skills from the plumbing, electrical and sheet metal trades. If you have experience with such, you might consider doing some of this work yourself. If you don't have experience with such, now would not be a good time to learn. Due to the above mentioned safety concerns it is strongly recommended that you perform your own furnace installation only if you have experience in these skills.
- **Tools** – Assuming you have the skill level, do you have the basic tools required?
- **Time** – Do you have the time to do this yourself? Replacing an existing forced air furnace, boiler or packaged unit will take an amateur about one to two days, depending on the home and installer skill level.

Installation Guidance

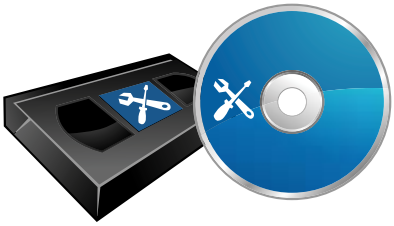
Installation Manuals

All manufacturers include installation instructions with their equipment. The instructions are detailed in all technical aspects of the installation, as well as safety requirements for doing the job properly. You can see some sample installation instructions below to learn more about how to install a furnace or heater:

Gas Forced Air Furnace
Gas Boiler
Packaged Unit

If you do the installation yourself, be safe and read the entire installation instruction manual provided by the manufacturer before proceeding.

Videos



Some companies that sell equipment also offer installation videos for some parts of the job, or for installing the equipment accessories. Watching someone else in the video do the job first, and then following their lead makes the job go more smoothly. Check around to see what videos are available to you.

Technical Support

What happens if you have a question when you are working on the project that you can't find the answer to in the installation instructions? It is good to have someone to talk to who is experienced with the product that can help you out. Many stores who sell heating equipment and furnaces have experts on staff to answer your questions should you need them. When you buy from a company, make sure they have technical support for you after the purchase. Find out if the support is offered free with your purchase, and if it is unlimited and available for as long as you own your equipment. Having a pro available can make the difference between frustration and a smooth installation.

Inspection and Startup

If you do decide to install your furnace or heater yourself, it is very strongly recommended that you have a professional heating contractor do the final inspection and start-up of the equipment. The contractor will make sure that the equipment is properly installed. He will also turn on the equipment for the first time, make any necessary adjustments such as to fuel pressure, if needed, and watch to see that everything is operating properly. Having this professional do the startup and inspection gives you the assurance that your system will operate safely. It might also be required by some product suppliers or manufacturers to validate the warranty.

Any heating contractor who works on your type of heater can provide the inspection and startup for you. It should take the service technician less than an hour to do, and will cost the visit minimum which is usually $70 to $130, depending on where you live. If you need help finding a contractor to do this for you, the store you bought the product from might be able to assist you in locating a contractor – ask them and find out if they offer this service.

Professional Installation

You have three avenues for getting a new heating system installed with the assistance of a contractor:

1. Do what most people do and have a local heating contractor supply the equipment and install it as a complete package deal.
2. Buy the equipment yourself online, and then hire a local contractor to do the installation for you.
3. If you are skilled in doing your own home projects and want to save even more money, you can buy the furnace yourself from an online store, do some or most of the installation yourself, and then have a local heating contractor finish up the job, or just do the final inspection and startup.

If you want to go the first route, simply look in your local telephone directory under "heating" or "furnace" and you'll find plenty of contractors ready and willing to sell and install their equipment for you.

Assuming, though, that you want to save money by taking more control of the buying and installation process, you'll want to take routes number two or three. The following are some things to know about finding and selecting a contractor who will do a good job at a fair price.

Where to find a contractor (CAP)

The phone book of course has listings of contractors who can help you out. Call them up, tell them you have your own equipment, and ask if they can give you a price to install it. They will likely need to visit your home to see the job and to provide a price in writing.

You can also talk to the company you purchased the products from and see if they have a contractor location service to assist you in finding a contractor for you.

When you call contractors inquiring about their installation services, you'll find two basic types of responses:

- Some contractors won't want to work with you and will only want to sell and install their own equipment for you, since this is how they make the most money. They might tell you why what you are doing isn't a good idea, or the brand you like is a bad brand. This is common, since this is some contractor's method of trying to convince you to buy from them. Don't worry - there are plenty of other contractors that would be glad to have your business.

- The second type of contractor will be friendly and willing to come out and give you a quote and work with you. Call a lot of contractors and find several of the friendly ones in you area and get pricing from them. The key is to keep calling; the more you call the more cooperative contractors you'll find and the better pricing you'll get. Pricing for the same work can vary wildly between contractors, so you'll want to get multiple quotes to find the best deal.

What to look for when selecting a contractor

While price is certainly important, it is not everything when selecting a contractor. Here are some other important things to find out about the contractor before you make your selection:

- **Get the price in writing -** Make sure the quote clearly states what is included and that there are no additional fees other than what is stated to get the work done.

- **Permits –** If city or municipality permits are required to install the equipment, as they are in most communities, make sure that they contractor will be obtaining such on your behalf. This should be put in writing on your quote, and the price for the permits is included.

- **Insurance –** Any decent contractor will have liability insurance. Ask to be on the safe side; you can request documentation of such if you like.

- **References –** You can ask for the names of other satisfied customers and call them to see how they felt about the workmanship and service provided. Also, ask if the contractor is a member of the Better Business Bureau, and call the BBB to see if there are any outstanding complaints made against the company that haven't been resolved.

You're in Charge

Not that long ago, you had only one option when it came time to buying your home furnace or heater: getting it from your local contractor. While this is still a good option in many circumstances, you are no longer dependant on just your local contractor to provide you with product information, buying guides, product comparisons, answering your questions about installation and other details regarding this once-every-ten-years type of purchase. And you can now buy the equipment directly from wholesalers yourself – a whole new opportunity.

Over the past decade, the internet has provided consumers with a wealth of information and buying outlets for products they wish to buy to which they didn't have access previously. This in turn has raised service standards for merchants in all industries while at the same time lowered product costs due to increased competition among stores.

Information from this shopping guide as well as equipment manufacturer's web sites should empower you to make a smart purchasing and installation decision that is right for you. As an informed consumer, you're now in charge. Armed with this good information, you should be able to shop with confidence for your next home heating system.

Questions?

Talk to a heating and air conditioning professional and receive free advice at:

800-865-5931 Monday to Friday,
8:00 AM to 5:00 PM, CST.
or online at www.AlpineHomeAir.com

Shopping and Installation Checklist

1. The fuel or energy I want my system to operate on:

- Natural gas
- Propane
- Oil
- Electricity only

2. The type of heater I want:

- Forced Air Furnace
- Boiler
- Split system heat pump
- Packaged unit
- Hanging furnace
- Electric baseboard heater
- Ductless mini-split system

3. Approximately how many output BTUs my system will need to be (listed in 1,000's, such as 70,000 BTUs)

- _____ ,000 BTUs

4. The efficiency I want my system to be:

- 80+%
- 90+%

5. Will I be installing a new air conditioner too?

- Yes
- No

Items 6–8 are if your system type is going to be a forced air furnace:

6. The comfort features I would like:

- Two-stage heating
- Self-adjusting blower
- Neither – standard is okay

7. Based on where in my home the furnace is being installed, the orientation I will need:

- "Up-flow" units blow the air up, and are installed usually in a basement or closet.
- "Down-flow" units blow the air downwards and are usually installed in a closet.
- "Horizontal-flow" units are installed horizontally and blow the air out the side, and are usually installed in attics and crawlspaces.

8. Will I need to install new ductwork in the home, or do I have existing ductwork?

- Need to install new ductwork
- Have existing ductwork I will use

9. A list of any required or optional accessories I might need or want

- _____
- _____
- _____
- _____
- _____
- _____

10. The buying and installing method I will take:

- Buy from a contractor and have him install it as a complete package deal
- Buy product myself from an online wholesale store, and have a local contractor install it
- Buy product myself from an online wholesale store, do part or most of the installation myself and have a professional do the final inspection and startup

Items 12 – 25 are questions to ask online stores you might buy from:

11. How long have you been in business? _____ years

12. Are you registered with the Better Business Bureau? _____

13. Can I see comments from your other customers?
_____

14. Do you sell products that are used or refurbished, or are they new? _____
What is the warranty on the equipment? _____

15. If I find the products for a lower price from a competitor, will you beat that price? _____

16. Are the products in stock? Will the order ship the same day? _____

17. If there is shipping damage, are products fully insured? Will you send me a new product and handle the claim with the shipping company for me? _____

18. Do you have a return allowance? Do you charge restocking fees for returns?_____

19. Do you charge cancellation fees if I cancel my order before it ships? _____

20. Do you process manufacturer warranty claims for me if I need repair parts down the road? _____

21. Do you have free technical support for as long as I own the products? _____

22. Do you have free installation videos? _____

23. Do you have a free contractor locator service to help me find a contractor to install the products? _____

24. Do you charge additional fees such as for expedited shipping, liftgate on the delivery truck, insurance, residential delivery charges, or fuel surcharges? _____

25. I will need liftgate service when the product is delivered to lower the equipment from the truck to the ground: Yes _____ No _____

Items 26–31 are regarding doing part of the installation yourself

26. Are permits required? If so, which ones, and how much do they cost?

- None needed
- Mechanical $_____
- Electrical $_____
- Plumbing $_____

27. For safety and practical reasons, reading the manufacturers installation manual is required before doing the work. I will:

- Download the instructions from an online store and read them in advance
- Read them when the product arrives

28. Any tools that I don't have that I might need to obtain:

- _____
- _____
- _____
- _____

29. Any supplies or materials needed for the job that I don't yet have that I need to buy:

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

30. Expected time to complete the installation:

- _____hours

31. Contractors I might use to do the do the installation, or just the final inspection and startup of the equipment:

- Name _____

  Phone _____

  Charge $_____

- Name _____

  Phone _____

  Charge $_____

- Name _____

  Phone _____

  Charge $_____

- I will have the store I buy from help me find a contractor