

# FURNACE REPLACEMENT CONSIDERATIONS

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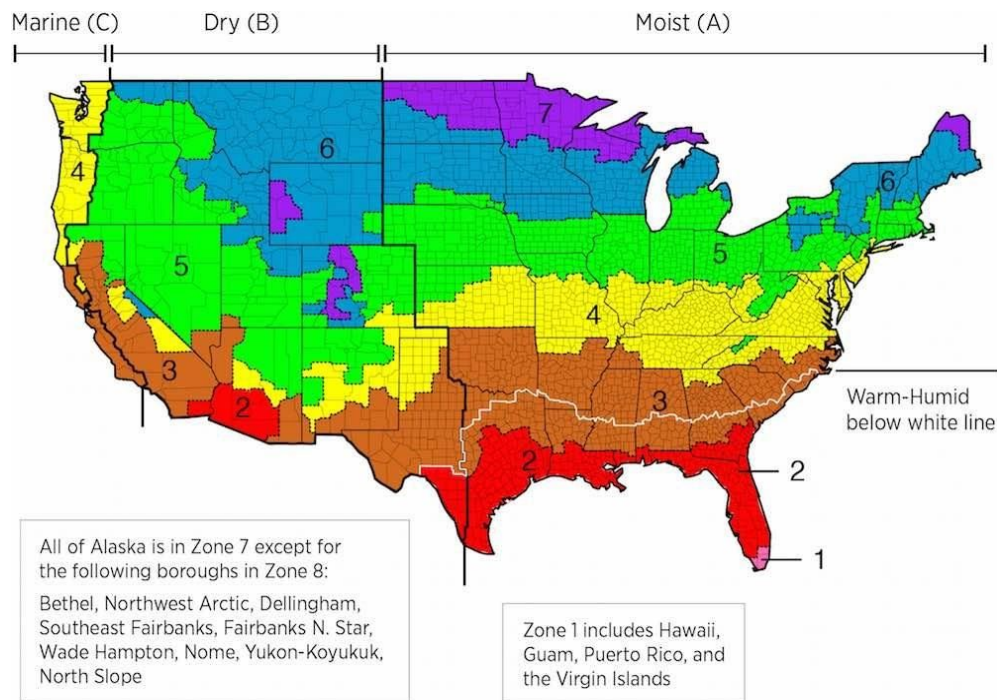
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## What is the Best Efficiency Rating?

The quick answer is that the colder your climate, the more efficient the furnace should be. This map helps.



Zones 1-3: An 80% furnace is a good choice for zones that don't have extreme cold. In these regions, it would take 10+ years of lower heating bills to recoup the higher cost of a high-efficiency furnace.

Zones 4 & 5: A furnace with at least 90% efficiency is a good choice here. To be most cost-effective, something like a single-stage 93% or two-stage 95% furnace makes sense.

Zones 6 & 7: Definitely consider a 90%-plus furnace here. How efficient it is and how much you're willing to pay for premium 2-stage or variable capacity performance is a matter of budget and personal preference.

## What Size Furnace Do I Need?

Getting the right size furnace for your home is very important. One that is too small won't heat sufficiently, will run constantly and will have premature mechanical problems.

A furnace that is too large will make more noise than necessary, and in most cases, it will heat past the set point, creating hot spots and significant temperature fluctuations.

Many HVAC contractors simply recommend the "same size as the old one." There are several reasons that could be a bad idea:

- Contractors typically put larger-than-needed furnaces in homes "just to be sure they get the job done," so the old furnace might be too big.
- If the home has been modified with extra insulation and more-efficient doors, windows and weather stripping, the new furnace will need to be smaller.
- If the home has been added to or you want to heat a finished basement or converted garage, the new furnace will probably need to be bigger; large additions require their own furnace.
- If the new furnace is more efficient, and it probably will be if the old furnace was 15+ years old, you'll need a smaller furnace to deliver the same heating capacity.

The first step is to determine how much heat you need in your home. This is called the Load Calculation. There are two ways to determine this.

## Furnace sizing estimate

This approach goes by the general rule that you'll need 30-60 BTU/hour of heat per square foot of house depending on your climate. This climate zone map will help:

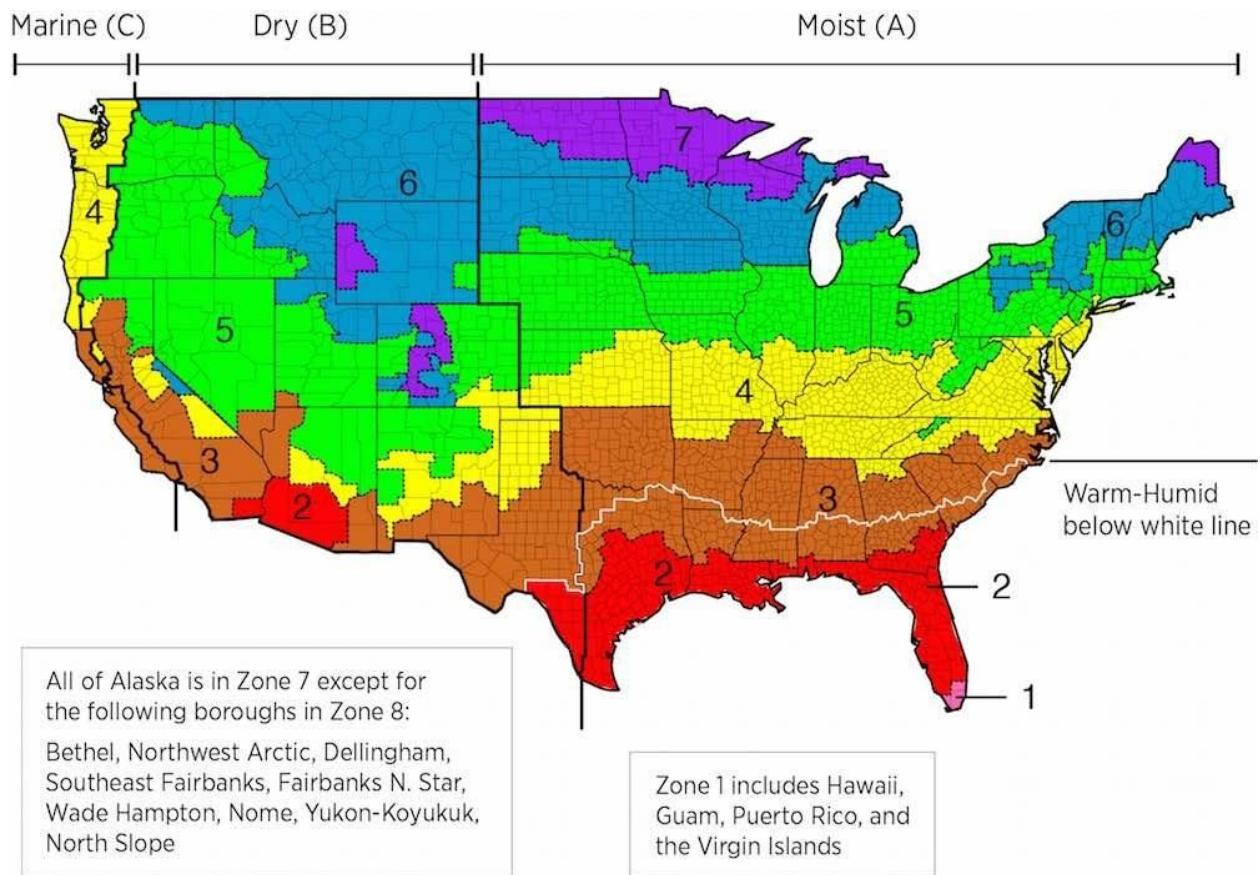


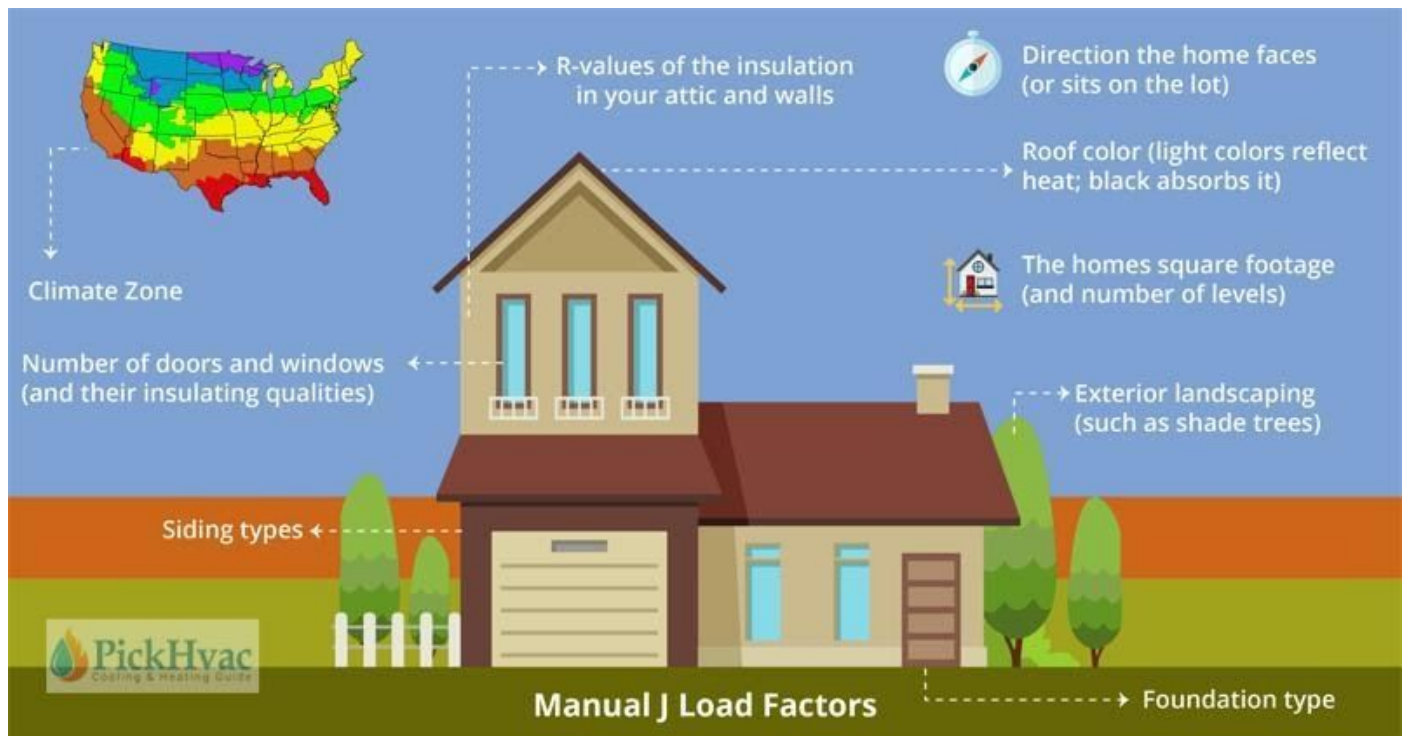
Image Source: [basc.pnnl.gov](http://basc.pnnl.gov)

- Zones 1 & 2 (hot): 30-35 Btu/sq. ft.
- Zone 3 (warm): 35-40 Btu/sq. ft.
- Zone 4 (moderate): 45 Btu/sq. ft.
- Zone 5 (cool): 50 Btu/sq. ft.
- Zone 6 (cold): 55 Btu/sq. ft.

- Zone 7 (very cold): 60 Btu/sq. ft.

Homes of 2,000 square feet will need differently sized furnaces in each zone:

- Zones 1 & 2 (hot):  $2,000 \times 30/35 =$  a 60,000 to 70,000 Btu furnace
- Zone 3 (warm):  $2,000 \times 35/40 =$  a 70,000 to 80,000 Btu furnace
- Zone 4 (moderate):  $2,000 \times 45 =$  a 90,000 Btu furnace
- Zone 5 (cool):  $2,000 \times 50 =$  a 100,000 Btu furnace
- Zone 6 (cold):  $2,000 \times 55 =$  a 110,000 Btu furnace
- Zone 7 (very cold):  $2,000 \times 60 =$  a 120,000 Btu furnace



## Manual J load calculation

This is the professional way to get an exact-fit furnace for your home. They were done by hand using the old Manual J for decades. Now, your HVAC contractor will determine the size furnace you need by entering information into a software program including:

- Your climate zone information
- Direction the home faces or sits on the lot
- Exterior landscaping such as shade trees
- Foundation type
- Siding types and general home construction details
- Roof color (light colors reflect heat; black absorbs it)
- R-values of the insulation in your attic and walls
- Number of doors and windows and their insulating qualities
- The homes square footage and number of levels
- It's easy to see how a load calculation will yield a more accurate estimation of the size of the furnace required for your home.

Once it is known how many Btu's are needed to keep your home comfortable in the coldest weather your region gets, you must factor in the furnace's efficiency to choose the right size. For example, if you need 100,000 Btu's of heat in the coldest weather, then you must choose a furnace with the capacity and efficiency to get that much heat into your home.

## Gas Furnace Installation Cost and Extras

How much does it cost to install a gas furnace? The answer depends on the variables that affect installation cost. Let's explore basic installation and the cost of extras you might need:

### **Basic gas furnace installation**

This is removing the old furnace and installing the new furnace using the same plenum and exhaust vent. The more advanced the furnace, the longer it takes to install and set up properly, so the higher the cost is:

\$1,050-\$1,625 | Budget furnace installation cost

\$1,175-\$1,725 | Standard furnace installation cost

\$1,350-\$1,975 | Premium furnace installation cost

## Sheet metal connections

When the new furnace is a different physical size than the old one, a new plenum to connect it to the ductwork must be made. New connections for the cold-air return and exhaust might be required too.

\$150-\$275 | Fabrication and installation of a new plenum

\$200-\$325 | Fabrication and installation of cold-air return connection and exhaust vent

## New Ductwork

In most installations, the ductwork other than the plenum and connections will work. However, if you're installing a furnace in new construction, then ductwork will have to be installed.

\$8-\$13.50 | Ductwork and grates per linear foot

## Repairing Ductwork

Leaky ductwork wastes heat and money. It makes noise, and prevents heat from getting to some rooms. If your ductwork is more than 12-15 years old, it should be inspected by an HVAC contractor to determine if it needs repair.

\$2-\$4 | Repair per linear foot of exposed ductwork

## Inspection

You will have to pull a permit from your local building department to have the new furnace inspected for safe, proper installation. Some utility companies offer them for free, or you might have to pay for one.

\$0-\$125 | New furnace inspection

## Thermostat

You will need to replace your thermostat if your new furnace has performance features like two-stage heating or continuous low-speed fan that are not supported by the old thermostat or if you're adding a central AC. Many homeowners also upgrade their thermostat to a programmable model that Energy Star says cuts the average heating and cooling costs by 10% or a Wi-Fi

thermostat like Nest that allows them to monitor and control their HVAC system with a smartphone and app. Most brands make programmable thermostats including Wi-Fi models, so one can be included in the estimates you receive.

\$12-\$100 | Non-programmable thermostat

\$15-\$124 | Basic programmable thermostat

\$135-\$375 | Wi-Fi programmable thermostat

## **HVAC Zoning Controls**

The cost of zoning system is typically around \$2,000 to \$3,300 depending on the number of zones.

## **Warranties**

Most manufacturers include a 5 to 10 year parts warranty. Ask your HVAC provider if you can purchase an extended labor warranty.

## **Tuning up cost**

A furnace should be tuned up yearly to every five years based on a range of factors, it costs \$115 to \$200 based on the checklist of services included. Average cost is \$140

## **Is a furnace maintenance agreement worth the money?**

It can be. Here are reasons to consider a service / maintenance agreement.

1. Your furnace manufacturer might require annual or bi-annual service to keep the warranty active.
2. A furnace that is cleaned, tuned and balanced every year or two will run more efficiently.

3. Minor issues can be caught before they become big issues or before they cause your furnace to break down during really cold weather. A common example is that hot surface igniters wear out. They can be quickly tested with a voltage meter and replaced for about \$50-\$75 during a service call if they are wearing out.

Shop around for a fair price and one with the perks you want. Cost ranges from about \$80 to \$200 per year. Those with higher cost usually have better perks. These include a 10-15% discount on parts and repairs and priority status on repairs. This means that if you need furnace service, you'll get it before others that do not have a service contract.

## Do You Need to Replace Your Air Conditioner at the Same Time?

The short answer is "No."

You should only replace the air conditioner and furnace at the same time:

- If your furnace is over 15 years old.
- If you are buying a high-efficiency air conditioner with SEER above 16.
- If the installation is complicated.
- If you don't want to worry about HVAC repairs and replacements for a while.

These should only be considered when you are buying or adding air conditioning, not when simply replacing an existing furnace.