

# furnaces

get the right heating system



## taking responsibility

As an individual, your efficient use of energy brings benefits such as lower bills, improved comfort levels in your home and a reduced personal impact on the environment.

Acting together, our individual choices add up—for the benefit of our community, our environment and our energy future. That's the power of working together.

As your community energy company, we are committed to sharing our experience and energy expertise. You can always contact us for:

- Answers to your energy questions.
- Energy efficiency information and advice.
- Help in evaluating energy-saving options.
- Assistance in finding energy-efficient products.

## Need a new furnace?

Comparing warranty coverage terms and conditions are important steps. Beyond warranties, this booklet offers practical advice to consider when shopping for a furnace. While MGE doesn't recommend brands or contractors, our goal is to help you make a better decision. For more information, visit *mge.com* or call us at 252-7117.

## Table of contents

Put our experience to work . . . . .	2
Need a new furnace? . . . . .	2
Just because it's old doesn't mean it's low-efficiency . . . . .	3
Variable-speed furnaces . . . . .	3
Sizing a new furnace. . . . .	5
Supplemental furnace equipment. . . . .	6
Furnace terms and buying tips . . . . .	7
Maintaining high-efficiency condensing furnaces . . .	9
How much will replacing a low-efficiency furnace save? . . . . .	9
Questions for your contractor . . . . .	10
Read the warranty. . . . .	11
Resources . . . . .	12

Please note: MGE representatives are available to discuss furnace options. They cannot recommend or endorse specific brands or installation contractors.

## Put our experience to work

Remodeling? Buying new appliances? Making your home more comfortable? Check with the experts at MGE. Call the Home Energy Line at 252-7117 for:

- Answers to energy-related questions.
- Resources to help you save energy.
- Help selecting the right energy-saving products.

## Need a new furnace?

### Look for two features

#### 1. Sealed combustion.

MGE recommends sealed combustion furnaces. Sealed combustion furnaces have two plastic pipes, an air-intake pipe as well as an exhaust pipe. Using outside air for combustion:

- Prevents furnace damage caused by vapors from laundry products. The vapors can mix with indoor combustion air to corrode furnace parts.
- Avoids using indoor air that you have already paid to heat.
- Reduces the danger of backdrafting (pulling exhaust gases down a chimney).

#### 2. 90% or higher efficiency.

There are two furnace-efficiency range choices: 89% to 98% (condensing furnaces) and 78% to 83% efficient. We recommend condensing furnaces.

Nine out of 10 new furnaces sold in the Madison area are condensing furnaces. They cost about \$400 to \$700 more than those in the 80% efficiency range.

## Just because it's old doesn't mean it's low-efficiency

High-efficiency furnaces came on the market in the 1980s.

**Q:** How do I know if I already have a high-efficiency furnace?

**A:** If your furnace vents through plastic pipe it's a high-efficiency furnace. However, it may or may not have an efficient fan motor (ECM) that saves electricity.



*Low-efficiency furnaces vent through metal pipes*



*High-efficiency furnaces vent through plastic pipes*

**Q:** Does MGE offer furnace rebates?

**A:** Not directly, but as of 2015 our partner Focus on Energy does. Visit [focusonenergy.com](http://focusonenergy.com) or call 1-800-762-7077. The 2015 rewards required 95+%-efficient multistage furnaces with ECM blower motors. Many furnace contractors can tell you which furnaces qualify for Focus on Energy rewards.

## Variable-speed furnaces

Variable-speed furnaces can operate at low fan speed and low fire (reduced burner output). Variable-speed furnaces can have two-stage, multistage or modulating burners. The result is quieter operation, slower airflow from registers and tighter temperature control.

# Variable-speed furnaces Q&A

## What is a variable-speed furnace?

Variable speed means the furnace fan can automatically change the airflow through the ducts as needed.

## What’s the difference between a variable-speed furnace fan and a conventional furnace fan?

Most variable-speed furnace fans use energy-efficient fan motors which save electricity. Typically, these motors are called ECMs (electronically commutated motors) or brushless DC (direct current) motors. Conventional AC (alternating current) motors are less efficient but are found in some variable-speed furnaces. Be sure to ask if the variable-speed furnace you’re considering has an ECM motor that saves electricity.

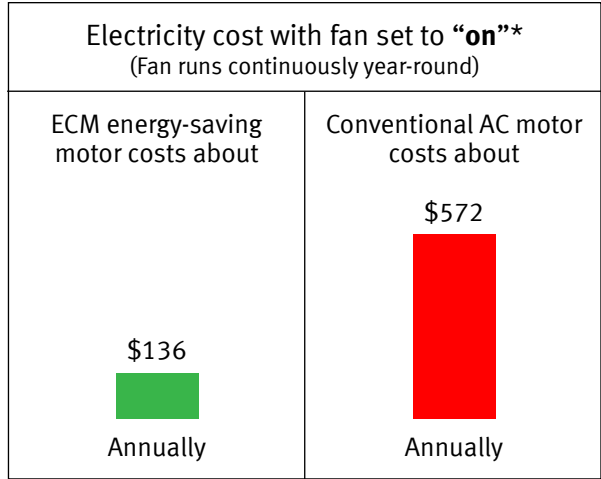
## What are the benefits of furnaces with ECM motors?

In addition to the electricity savings from ECM motors, variable-speed furnaces with ECM motors are quieter and reduce temperature swings.

## How much do ECM fan motors save?



Electricity cost with fan set to <b>“auto”</b> * (Fan cycles on and off when heating or air-conditioning)			
ECM energy-saving motor costs about		Conventional AC motor costs about	
\$24	\$16	\$65	\$26
Heating season	A/C season	Heating season	A/C season



*\*\*At \$.13 per kilowatt-hour. Actual savings will vary.*

Setting the fan to “on” increases electricity use and hurts humidity removal when running a central air conditioner.

Beware! Not all multistage furnaces have ECMs. A multistage furnace with a conventional AC motor doesn’t save any electricity.

### Check the warranty

ECM motors can cost several hundred dollars to replace, so check the warranty coverage carefully.

### Sizing a new furnace

Heating contractors recommend a furnace sized to match the heat loss of your home. Size refers to the output in Btu per hour. Pay attention to the **output** when comparing furnaces.

MGE recommends getting more than one bid before buying a new furnace. A contractor should not size a furnace based solely on the square footage of the house. Insulation levels, window area and air leakage should be considered. If you plan on insulating and sealing air leaks, ask your contractor how this will affect sizing options.

If you plan on using thermostat setbacks, ask your contractor how long the furnace will take to “catch up” on a very cold day.

Oversizing a single-stage furnace can cause uncomfortable temperature swings and too much airflow out of the heating registers.

If you choose a furnace with a multi-stage burner, moderate oversizing is seldom a problem because the furnace will simply run at low-fire and low-fan speed more of the time. If you like to set back your thermostat, a multistage furnace can recover more quickly after a setback if sized appropriately.

## Supplemental furnace equipment

These products can increase the efficiency or safety of your furnace.

A **chimney liner** for the furnace is often required by the furnace manufacturer if the new furnace is in the 80% efficiency range. Never vent a new furnace into a chimney that doesn't meet the manufacturer's requirements.

A chimney liner for the water heater is usually needed when the new 90%+ furnace is vented with plastic pipe, leaving the gas water heater as the only device that still vents to the chimney. Ask your heating contractor if a chimney liner is required. If a liner is required for the water heater, compare the cost of a liner to the cost of replacing the water heater with a power-vented model that doesn't need a liner.

**Filters** or **air cleaners** help to avoid furnace repairs.

Pleated 1-inch- or 2-inch-thick filters provide better dust removal and last longer than unpleated filters. However, they plug up more quickly if neglected.

For better filtration, use deep-pleated filters about 9 inches thick or electronic air cleaners. These systems are most cost-



effective if installed along with a new furnace because the required duct modifications can be done as part of the furnace installation.

For convenient access, request an external filter slot. A cover for the filter slot helps to seal your ductwork.

**Programmable thermostats** allow you to wake up (or come home) to a comfortable home. Plus, they never forget to do desired setbacks.

Smart thermostats and Wifi thermostats allow you to change the temperature remotely via an app on your mobile device or via the Internet.

**Humidifiers** can be mounted in the ductwork above the furnace. They need to be serviced yearly, as leaks can severely damage your furnace. The humidity level in the house can go up after replacing a furnace that vented through metal pipe. You may not need to add a humidifier.

**Furnace zoning** allows the temperature in different areas (zones) of the house to be controlled by individual thermostats or sensors for increased comfort and efficiency.

Zoning for forced-air heating systems costs at least \$900 per zone.

## **Furnace terms and buying tips**

**AFUE**—Annual Fuel Utilization Efficiency. The higher the AFUE, the more efficient the furnace.

**Chimney liner**—A protective metal tube inserted into a chimney. Get a liner that has building code approval and is made for use as a chimney liner.

**Condensate**—The mixture of water and combustion by-products formed by a condensing furnace.

### Condensing furnace—

A furnace with an AFUE of 89% or higher. Efficiency is achieved by extracting heat from the exhaust to the point where water is condensed out.

**Ducts**—Supply ducts deliver heated air from the furnace to the home. Return ducts bring cooler air back to the furnace for reheating. If needed, seal ducts with butyl-backed foil tapes or water-based duct sealants. Common duct tape does not seal well. Pay special attention to sealing and insulating ducts in attics, garages and crawl spaces. Duct leaks in these areas can waste a lot of money. Focus on Energy can help you find contractors experienced in testing and fixing leaky ducts.

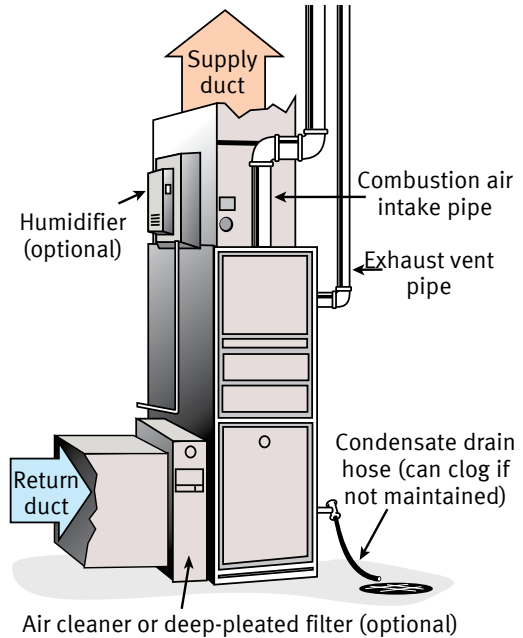
**Forced air**—A heating system that uses a blower to circulate warm air through the house.

**Heat exchanger**—The part of the furnace that transfers heat from the burners to the air circulating through the furnace.

**Heat loss**—The rate at which heat is lost from the home (measured in Btu per hour). The contractor should calculate the heat loss for the coldest weather expected (about 15°F below zero in Madison).

**Humidifier**—A device that adds moisture to the house air. Used only during the heating season. Not all homes need moisture added.

Typical condensing furnace



**Power venting**—To blow exhaust outdoors using a small fan. Usually, the vent pipes for a condensing furnace emerge from the side of the house.

**Sealed combustion**—All the air used by the furnace burners comes from outdoors.

**Setback**—To turn the thermostat down during sleeping hours as well as when no one is home. Setbacks are the best way to reduce your fuel costs. Programmable (clock setback) thermostats do setbacks automatically.



Ask your doctor the proper temperature for your home if you are elderly or have other health concerns.

**Vent**—The passageway that carries furnace exhaust gases outdoors.

## Maintaining high-efficiency condensing furnaces

Condensing furnaces have a plastic drain hose running from near the bottom of the furnace to a drain. Plastic exhaust pipe vents through the sidewall or roof. Both the drain hose and the vent pipes need to be kept free of obstructions for proper furnace operation.

## How much will replacing a low-efficiency furnace save?

Furnaces that vent through metal pipe are often around 70% efficient, which means they waste 30 cents of every heating dollar. Changing from a 70% efficient furnace to a 93% efficient furnace should save about one-quarter of your space-heating costs.

Call MGE's Home Energy Line at 252-7117 for help in estimating savings from improved furnace efficiency or from adding insulation and sealing air leaks.

## Questions for your contractor

### **Be sure to tell your contractor about comfort or noise problems.**

- How long is the warranty and what does it cover? (Extended warranties from manufacturers are usually more reliable than those from another firm.)
- Do you offer 24/7 service if the furnace needs repairs?
- If the furnace is vented through the sidewall, where will the vent go and what will it look like? (If you prefer another location, discuss it before the work starts.)
- If purchasing a condensing furnace, will the furnace be checked for proper condensate drainage? (Condensing furnaces need to be level. Exhaust piping must be properly supported and sloped so condensate can drain out.) Where will the condensate drain hose be placed?
- Does the furnace have sealed combustion with all combustion air drawn from outside?
- Do I need a chimney liner?
- Will the furnace be raised up on bricks or pads to prevent water damage if the basement gets wet?
- What's required to change or clean the filter? How often will it need changing? How much does a new filter cost?
- How long has this model been in production, and how long has the contractor installed it?

- Is a new thermostat included? How do I program it? If it has batteries, how do I change them, and how often?
- Can the existing ducts handle the airflow from the new furnace? If not, what will it cost to modify them?



*Checking a deep-pleated air cleaner.*

- What does the contractor charge to check and adjust the furnace after the first heating season?
- Did the contractor obtain the required permits?
- How did the contractor calculate the heat loss to size the furnace?
- Can the contractor supply references?

## Read the warranty

Warranty coverage varies with the manufacturer, so compare terms and conditions before you buy. Check the length of coverage, the parts covered and the type of service available. Keep the written warranty with your sales receipt.

## Resources



ENERGY STAR® labeled products use less energy, reduce your energy costs and help to protect the environment. We're an ENERGY STAR partner. Learn more about qualifying products at [energystar.gov](http://energystar.gov) or call the MGE Home Energy Line at 252-7117.

Focus on Energy – Cash-back rewards for furnaces and boilers that meet requirements. Call 1-800-762-7077 or visit [focusonenergy.com](http://focusonenergy.com).

**Focus on Energy**

[focusonenergy.com](http://focusonenergy.com)



**focus on energy**<sup>sm</sup>

Partnering with Wisconsin utilities

MGE partners with Focus on Energy to bring energy-saving resources and incentives to our customers.

(800) 762-7077

MGE Madison – YouTube video on how to tell if a furnace is high efficiency: [youtube.com/watch?v=KsYNtM0ldtY](https://www.youtube.com/watch?v=KsYNtM0ldtY)

## **listening. learning.**

MGE takes responsibility to provide information and education to serve our customers and stakeholders. We educate customers today to help inform their decision making. We educate tomorrow's stakeholders so they can help plan our energy future.

Check the furnace filter monthly. Change when dirty to prevent problems. *Working together we can make a difference.*

Contact us for information about:


- Heating/Air-conditioning.
- Insulating/Weatherizing.
- Lighting.
- Windows/Doors.
- Appliances.
- Water heating.

Get more home energy information at:

- [mge.com/home](http://mge.com/home).
- Home Energy Line 608-252-7117.
- 800-245-1125.

Questions about billing? Call:

- 608-252-7222.
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