



# ***Maintaining the Home:***

## ***Energy-Efficient Heating and Cooling***

# Maintaining the Home:

## Energy-Efficient Heating and Cooling

---

If you are looking for ways to keep your home comfortable year-round while contributing to a cleaner environment, try:

- Replacing your old heating and cooling equipment with more energy-efficient equipment, or
- Getting recommendations on how to increase the performance of your new or existing equipment during all seasons to save energy and money.

### When is it time for a change?

It is time to replace old heating and cooling equipment or improve the performance of the overall system when:

- The heat pump or air conditioner is more than 10 years old.
- The furnace or boiler is more than 15 years old.
- Equipment needs frequent repairs and energy bills are going up (heating and cooling equipment may have become less efficient).
- Some rooms are too hot or cold. Improper equipment operation, duct problems or inadequate insulation could be the cause.
- No one is home for long periods of the day and there is not a programmable thermostat. Programmable thermostats can save significant amounts of energy while you are away or even while you are sleeping.
- The home has humidity problems. Poor

equipment operation, inadequate equipment and leaky ductwork can cause the air to be too dry in the winter or too humid in the summer.

- The home has excessive dust. Leaky ducts can pull particles and air in from attics, crawlspaces and basements and distribute them throughout the house. Sealing ducts may be a solution.
- The cooling system is noisy. There could be an undersized duct system or a problem with the indoor coil of the cooling equipment.
- The score measured from the ENERGY STAR © Home Energy Yardstick is below five. That means you are using more energy at home than most Americans and probably paying more than you need to on energy bills. ENERGY STAR © is a government-backed program that helps consumers protect the environment through superior energy efficiency. For more information, go to the ENERGY STAR © Web site listed at the end of the article.

### Maintenance

Maintain equipment to prevent future problems and unwanted costs. Keep heating and cooling systems at peak performance by having a contractor do annual preseason checkups.

### Maintenance checklist:

- Check thermostat settings to ensure the cooling and heating system turns on and off at the right temperatures.
- Tighten all electrical connections and measure

voltage and current on motors. Faulty electrical connections can cause unsafe operation of the system and reduce the life of major components.

- Lubricate all moving parts. Parts that lack lubrication cause friction in motors and increase the amount of electricity used.
- Check and inspect the condensate drain in a central air conditioner, furnace and/or heat pump (when in cooling mode). If plugged, the drain can cause water damage in the house, affect indoor humidity levels and breed bacteria.
- Check controls of the system to ensure proper and safe operation. Check the starting cycle of the equipment to assure the system starts, operates and shuts off properly.
- Inspect, clean or change air filters once a month in central air conditioners, furnaces and/or heat pumps. A contractor can show you how to do this yourself. Depending on the system, the filter may be found in the duct system versus the heating and cooling equipment itself. A dirty filter causes increased energy costs and can damage equipment, leading to early failures.

### **Cooling specific checklist**

- Clean evaporator and condenser air conditioning coils before warm weather. Dirty coils reduce the system's ability to cool a home and cause the system to run longer, costing more energy dollars and decreasing the life of the equipment.
- Check the central air conditioner's refrigerant pressures and adjust charge if necessary. Too much or too little refrigerant charge can damage the compressor, reducing the life of the equipment and increasing costs.
- Clean and adjust blower components to provide proper system airflow for greater comfort levels. Proper airflow over the coils will improve

equipment efficiency and reliability. Airflow problems can reduce the system's efficiency by up to 15 percent.

### **Heating specific checklist**

- Check all gas (or oil) connections, gas pressure, burner combustion and heat exchanger. Improperly operating gas (or oil) connections are a fire hazard and can contribute to health problems. A dirty burner or cracked heat exchanger causes improper burner operation. Either can cause the equipment to operate less safely and efficiently.

### **Sizing and installation**

When purchasing heating or cooling equipment, make sure the unit is properly sized. Bigger is not always better. With heating or cooling equipment, a larger-sized product is intended to meet the needs of a larger area. However, if the equipment is too large for the home, you will experience increased costs and less comfort. Oversized equipment will operate in short-run cycles, not allowing the unit to reach efficient operation or deliver even temperatures throughout the home.

Also, don't assume that the size of your new system will be the same as the old system. Changes, such as additions or insulation improvements, may have been made to the house since the original equipment was installed—or the equipment may have been the wrong size from the start.

A contractor can calculate the right size for your new system.

For a quality installation, make sure the contractor follows each step below:

### **Cooling installation checklist**

- Replace the indoor coil of the equipment when replacing the outdoor unit. You should have a matched set. An old coil will not work

efficiently with a new outdoor unit.

- Check proper level of refrigerant charge and airflow through the registers that deliver cool air to your rooms. Confirm that the level of refrigerant charge and the airflow across the coils meets the manufacturer's recommendation.
- Place the condenser in an area that can be protected from rain, snow or vegetation, as recommended by the manufacturer. Use a cover over outside equipment during the winter to protect it from snow or ice.
- Provide adequate room around the equipment for service and maintenance.

#### Heating installation checklist

- Test and verify proper airflow (if a furnace or heat pump).
- Make sure the furnace or boiler has been tested for proper burner operation and proper venting of flue gases. The vent piping should be inspected for leaks or deterioration and repaired or replaced as necessary.
- Provide adequate room around the equipment for service and maintenance.

### Finding the right contractor

To purchase and have new equipment installed, you will need to hire a contractor. The following information will help you find the right contractor, get quality and value from the contractor and your new equipment, and get a signed agreement on the work to be done.

#### 1. Reputable contractors should:

- Perform an on-site inspection of the job you want done and provide a detailed bid in a timely manner.
- Demonstrate to you that they are A) licensed as a legitimate contractor in your area, recognized by your local municipality; and B) licensed and

insured to repair or install heating and cooling equipment (many states require this).

- Be able to provide their certification for refrigerant handling, required since 1992.
- Have several years in business in your community.
- Provide examples of other quality installation work, with names of customers that you can contact.

Ask whether a contractor's service technicians are certified by North American Technician Excellence (NATE) to professionally install and service heating and cooling systems. For a list of contractors that employ NATE-certified technicians in your state, visit [www.natex.org](http://www.natex.org).

#### 2. For quality and value, have the contractor:

- Show you a layout of where the equipment is going to be installed.
- Calculate the size of your new equipment.
- Show certifications of savings for installing high-efficiency, ENERGY STAR © qualified equipment.
- Diagnose and repair your duct system, if needed.
- Provide financing for the purchase, if necessary.
- Explain the warranty on equipment, parts and labor.

#### 3. Sign an agreement before work begins.

**Both you and your contractor should sign a written proposal before work gets started. The agreement or proposal should:**

- List in detail all the work that is being contracted.
- Specify all products by quantity, name, model number and energy ratings.
- Provide manufacturer's warranty and documents for products and contractor installation

### Maintaining the Home: Energy-Efficient Heating and Cooling

warranty information.

- Give the payment schedule.
- State the scheduled start and completion date for the project.
- Describe how disputes will be resolved.
- State the contractor's liability insurance and licenses if required.
- Outline paperwork and permits needed for project.

### **Improving your home envelope**

Improvements that increase the energy efficiency and comfort of your home include sealing air leaks, adding insulation and replacing windows.

In old homes, and even new homes, it is common to find air leaks and missing or inadequate insulation. The holes, cracks and gaps in an average home can allow as much air leakage as an open window.

To address this problem, the Environmental Protection Agency has developed ENERGY STAR Home Sealing, a recommended approach to improving a home's envelope—the outer walls, ceiling, windows and floors. Home sealing can make your home quieter by reducing outside noise and help prevent pollutants such as pollen, chemical vapors from the garage and car exhaust from entering your home.

### **Home-sealing recommendations**

Seal air leaks to reduce drafts and get the full performance from insulation. The largest leaks are usually hidden in the attic and the basement. Caulk and spray foam products can seal many of these holes. Always work to reduce air leaks before installing insulation.

Add insulation to keep your home comfortable and energy efficient even during periods of

extreme temperatures. The most effective place to add insulation is usually in the attic. The U.S. Department of Energy offers recommended insulation levels for each part of the house in different climates. Visit [www.energystar.gov](http://www.energystar.gov) and click on "Home Improvement" to see home insulation recommendations.

Choose ENERGY STAR © qualified windows when replacing or adding windows to a home. Be sure to select windows that are rated for your climate zone.

Whether you seal your home yourself or have a contractor do the job, it is important to have a professional perform a combustion safety test afterward to be sure all your gas or oil-burning appliances are working properly.

### **Don't forget the ducts**

Your heating and cooling system is only as good as the system that carries the heated or cooled air. Central air conditioners, heat pumps and forced air furnaces rely on a system of ducts to circulate air throughout your home. To maintain comfort and good indoor air quality, it is important to have the proper balance between air supplied to each room and the air returning to your heating and cooling equipment. Sealing ducts increases the efficiency of the system, potentially saving you money each year.

### **Duct improvement checklist**

- Identify any leaks with diagnostic equipment.
- Seal the ducts with mastic, metal-backed tape or aerosol sealant. Duct tape should not be used; it cannot withstand high temperatures.
- Test airflow after ducts are sealed.
- Insulate ducts to keep the air at its desired temperature as it moves through the system. The contractor should use duct insulation material rated at R-6 to insulate ducts located

in unconditioned spaces such as the attic.

- Conduct a combustion safety test after ducts are sealed to be sure all gas or oil-burning appliances are working properly.

This material was adapted from publications provided by Environmental Protection Agency. EPA information can be found on the Web at [www.energystar.gov](http://www.energystar.gov).

*This resource is one in a series on **Maintaining the Home** which include:*

---

### **Interior Maintenance**

Preventive Home Maintenance Checkup  
Make a Basic Toolkit for Simple Home Repairs  
Selection and Use of Home Cleaning Products  
Discovering the Secrets of Successful Storage

### **Heating**

Furnace Care  
Fireplace and Chimney Care

### **Cooling**

Evaporative Cooler  
Air Conditioner  
Ceiling Fans

### **Plumbing**

Fixing Plugged Sink Drains  
How to Unclog a Toilet  
Repairing Dripping Faucets

### **Electrical**

How to Set or Reset a Circuit Breaker  
How to Replace a Fuse

### **Appliances**

How to Buy an Energy Efficient Home Appliance  
Choosing a Water Heater

#### **Maintenance:**

Dishwasher Care and Dishwasher Cleaning  
Dryer Care and Dryer Cleaning  
Freezer Care and Freezer Cleaning  
Garbage Disposal Care and Cleaning  
Range and Oven Care and Range Cleaning  
Refrigerator Care and Refrigerator Cleaning  
Small Electrical Appliance Care and Cleaning  
Washer Care and Cleaning

### **Flooring**

Buying new carpet  
Carpet Care and Cleaning  
Wood Floors Care and Cleaning  
Ceramic Tile Floors Care and Cleaning  
Vinyl Floor Coverings Care and Cleaning

### **Walls**

Selecting and Applying Paint  
Wallpaper Selection and Cleaning  
Repairing Walls

### **Furniture**

Furnishing Your New Home: Color and Design  
Selecting Fabric For Home Furnishings

### **Exterior Maintenance**

#### **Home Exterior**

Foundations, Basements and Yards  
Exterior Walls, Windows, and Doors

#### **Roof**

A Guide To Roofs  
Roof Maintenance

#### **Landscaping and Lawn Care**

Principles of Xeriscape  
Watering Your Lawn

### **Home Safety**

Child-Proofing Your Home  
Is Your Home Safe From Fire Hazards?  
Smoke Alarms Save Lives  
Carbon Monoxide Alarms  
Are Your Children Safe From Poisons?  
Protecting Yourself Against Burglary

---

## Conservation

Weatherize Your Home  
Easy Tips to Save Money and the Planet  
How to Stop Air Leaks Around Windows  
Energy-Efficient Heating and Cooling  
Indoor Water Conservation Tips  
Outdoor Water Conservation Tips

## Environment Issues

Green Building  
Reduce-Reuse-Recycle: Alternatives for Waste Management  
Create a home recycling center  
Healthy Indoor Air for New Mexico Homes  
Dealing with Mold  
Household Hazardous Waste  
Hazardous Household Substances: Alternatives That Are Relatively Free of Toxic Effects  
Radon

## Pest Control

Cockroaches and Their Control  
Southwest Insects

## Accessible Living

Update your home for a lifetime of living  
Vision Loss & Hearing Loss  
Hand Dexterity, Strength and Range of Motion  
Cognitive Difficulties  
Mobility Impairments, Balance and Coordination

---

Sponsored by New Mexico State University and the City of Las Cruces. Supported by U.S. Department of Housing and Urban Development. New Mexico State University is an equal opportunity/affirmative action employer and educator. NMSU and the U.S. Department of Agriculture cooperating. © 2005 NMSU Board of Regents. All rights reserved.



---

## Maintaining the Home: Energy-Efficient Heating and Cooling