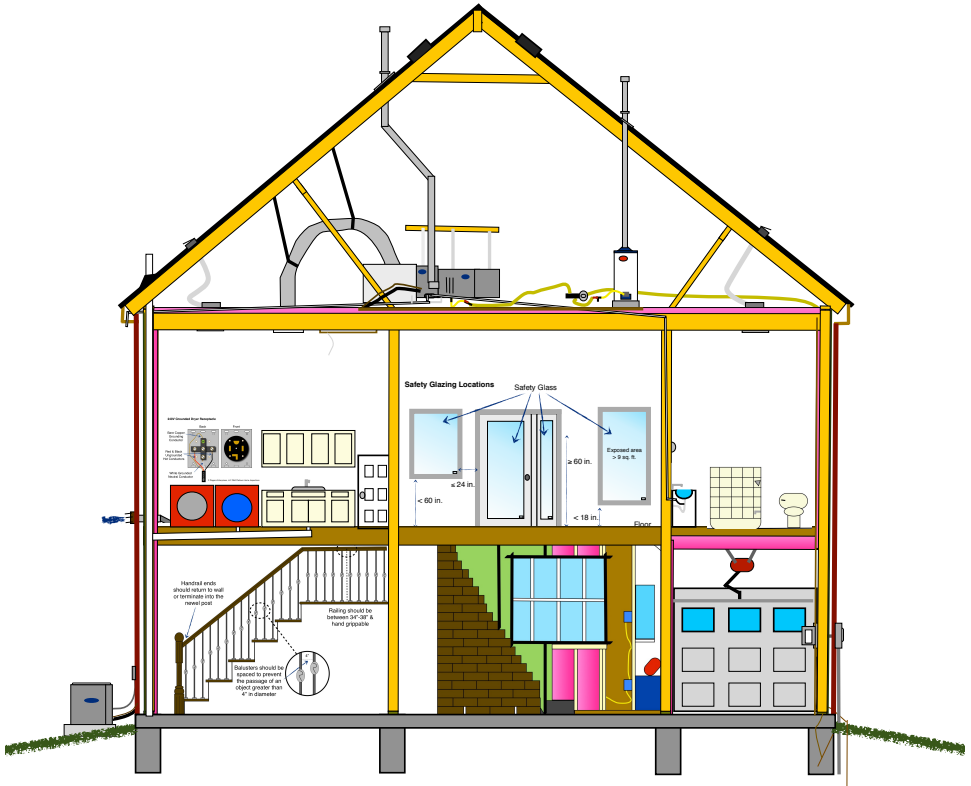


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*My Check List*

- Yard Safety
- Add Caulking
- Check GFCI's
- Smoke Detectors
- Fire Extinguishers

**TAREI**



Texas  
Association  
of  
Real Estate  
Inspectors  
Since 1977

# Home Maintenance Guide & Energy Saving Tips 2012 Edition

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## About TAREI



The Texas Association of Real Estate Inspectors (TAREI) is a professional organization formed in 1977. TAREI promotes a professional code of ethics for its members, reviews and upgrades minimum standards, provides recommendations to the Texas Real Estate Commission, and conducts statewide continuing education programs for all inspectors.

**Our Mission:** The mission of the Texas Association of Real Estate Inspectors is to enhance consumer protection by providing quality education and training to our members. TAREI provides leadership in our industry and promotes excellence within our profession by establishing and maintaining the highest standards and ethics.

### Why Use a TAREI Inspector?

In any professional endeavor you'll find a select few who stand out from the rest; the leaders, the achievers, those who excel. The Texas Association of Real Estate Inspectors (TAREI) is a state trade association comprised of real estate inspectors and those interested in the profession who are dedicated to applying higher standards to every aspect of their businesses.

### Texas Association of Real Estate Inspectors

P.O. Box 90745

Austin, Texas 78709-0745

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# Home Maintenance Guide & Energy Saving Tips 2012 Edition

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## All Around the House: 4

- A Safe Home 4
- Rain Gutters and Downspouts 6
- Trees and Shrubs 7

## Foundations: 7

- Concrete Slabs 7
- Pier & Beam 7

## Outside of the House: 8

- Foliage 8
- Decks and Balconies 8
- Clearance from the Ground 8
- Wood & Cement Sidings 9
- Masonry Veneer 9
- Stucco Type Veneer 9
- Exterior Doors 10
- Windows 10

## Roofing: 11

- Overhanging Trees 11
- Roof Flashings 11
- Roof Surfaces 12

## An Energy Efficient Home: 12

- Sealing Air Leaks 12
- The EnergyGuide & ENERGY STAR Label 13
- Legislation of the Light Bulb? 13

# Home Maintenance Guide & Energy Saving Tips 2012 Edition

- Recessed Light Fixtures 14
- Radiant Barriers 14
- Attic Ventilation 14
- Seasonal Energy Efficiency Ratio (SEER) 15
- Programable Thermostats 15
- Insulation 15

## Laundry Room 16

- Laundry Connections and Dryer Vent 16

## Fire Safety Tips: 16

- Smoke & Carbon Monoxide Detectors 16
- Fire Extinguishers 17

## Heating, Ventilation & Air Conditioning Systems (HVAC): 17

- Return Air Filters 17
- Heating 18
- Air Conditioning 18

## Electrical: 20

- Electrical Outlets 20
- Ground Fault Circuit Interrupters Protection 20
- Arc Fault Circuit Interrupters (AFCI) 21

## Plumbing: 22

- Plumbing Fixtures & Drains 22
- Water Heaters 22

# Home Maintenance Guide & Energy Saving Tips 2012 Edition

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## All Around the House:

### A Safe Home

Maintaining a safe home is an on going process, so you should periodically walk around the house with an eye to safety. Share this information with your family so that they can be aware of home safety also. Here is a check list of a few things to look for:

- Trip hazards like raised edges in a sidewalk and missing covers at water meters & sprinkler boxes.
- Look for low hanging branches and keep bushes and shrubs well trimmed, especially around doors and windows.
- Consider installing timers or sensors for outdoor lighting to keep the exterior well illuminated & check to see if all outdoor light bulbs are working.
- Be familiar with the locations of all utility shut offs and that they are readily accessible.
- Separate old or unused paints, insecticides, toxic cleaners, and depleted household batteries for hazardous waste pickup or delivery to an approved disposal site.
- Check the batteries in your smoke detectors and install a smoke detector in each bedroom and bedroom hallways.
- If you have gas appliances in your home or an attached garage, install a carbon monoxide detector.
- Know the locations of the fire extinguishers and if they require service. Make sure to have one on each floor of the house.
- Test your GFCI & AFCI devices for proper operation.
- Keep your water heater set at 120°F or just below the medium setting to prevent scalds and burns.
- Have a licensed trained professional inspect, clean, and tune-up your home's HVAC system once a year to keep your system working properly.
- Remember, you can contact your TAREI Home Inspector for guidance and more information about your home.

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## Texas Soils & Site Drainage

Texas is the second largest state in the U.S covering over 268,000 square miles, so it is no surprise that there are multiple soil types in regions throughout the state. Each region has unique soil types from expansive clay to sand, while some areas may have a mixture of several soil types. It is best to talk with your inspector or a local specialist for the type of soil in your area and any maintenance recommendations they may have for your home. Some of these soil types and their areas are listed below:

### Blackland Soil

The blackland region of Texas is in a narrow band that runs north to south through the east central part of the state. The soil is thick expansive black clay.

### Sandy Loam

Deep sandy loam soils are found in the Piney Woods area in the eastern quarter of the state. It is a mixture of sand and red clay that is suitable for agricultural production.

### Sand

Pure sand is found in the area of Texas between the blackland soil and sandy loam of the Piney Woods. Called "sugar sand" or "blow sand", most of the region that is covered in sandy soil is known as the Post Oak Savannah.

### Yellow Clay

The Edward's Plateau region of Texas is covered with a thin layer of yellow clay that has a solid layer of limestone underneath.

### Alluvial Soil

The alluvial soil and clay that is pervasive in the Western Gulf Coastal region is often referred to as black gumbo clay.

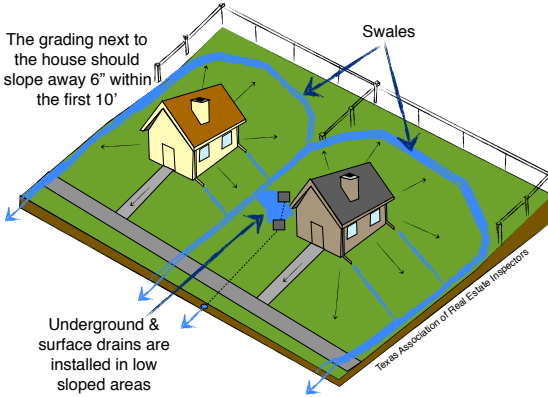
With expansive clay soils, you should maintain the moisture content by watering the yard around the house and ensuring proper drainage. Over watering is a common mistake that can lead to expansion and upheaval in clay soils. The goal is to achieve a balanced moisture content in these clay soils by not over or under watering. Under watering allows the soil to dry out and separate from the edges of the foundation resulting in gaps between the soil and the slab.

Keep your grass and soil happy by watering "uniformly" with a sprinkler system that provides uniform coverage or by using "soaker hoses" placed about 18 to 24 inches away from the foundation to supply slow, steady, uniform watering around the house.

## Site Drainage

Solutions to drainage problems are as varied as the terrain and may include rain gutters, proper extensions for downspouts, french drains, swales, catch basins, retaining walls, and even sump pumps. The goal is to make sure water drains away from the house.

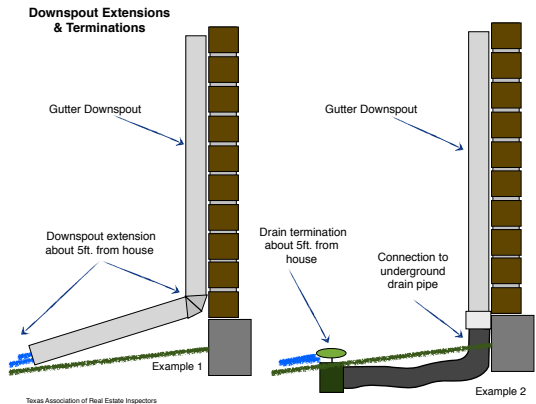
### Rear to Front Surface Drainage, Swales & Drains



## Rain Gutters and Downspouts

If you don't have rain gutters, consider adding them. Properly installed gutters and downspout terminations can help solve drainage problems or prevent them from occurring.

Clean rain gutters and downspouts as needed to keep them flowing freely. In an area of heavy trees, cleaning may be required several times a year. Inspect gutters for proper drainage (standing water can breed mosquitoes), leaks at seams or end caps, loose or missing gutter spikes, and loose or missing downspouts. Look behind gutters for rotted fascia and repair as needed. Splash blocks or downspout extensions should direct water into the yard well away from the foundation.



## Trees and Shrubs

Allow air to freely circulate next to the house. This is easily accomplished by locating decorative plants several feet away from exterior walls and keeping them trimmed. By keeping the veneer & siding easily visible, maintenance problems will be detected early and unwanted guests won't have a place to hide. Vines growing on any exterior surface will cause serious damage over time and should be removed. Do not try to remove vines by pulling them off. Instead, sever them at the ground and wait until the plants have died before removing them. Trees should be planted far enough away from the house that their canopy will not overhang the roof when they are fully mature. A tree's root system mimics its canopy. Roots growing under a foundation can destabilize it in several ways. For instance, by removing moisture from the soil that a foundation needs for its structural support. When trees are close to the house, their limbs should never touch the house or roof. Damage can result by branches touching the roof as well as providing a pathway for insects and rodents to your home. Be aware too, that growing root systems can lift sidewalks, patios, and driveways, causing damage and creating trip hazards.

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## Foundations:

### Concrete Slabs

Periodically walk around and visually inspect the interior and exterior for any evidence of movement. The most noticeable results of these movement indicators may be sheetrock cracks; sticking, not latching and out of square doors; unevenness in floors; exterior mortar or brick fractures; separations around window or door frames, at the frieze and trim boards; and excessive cracks in the grade beams, patios, garage floors, or porches of your home. Any of these items, along with many others, may be indications of undesirable foundation movement. If you suspect any of these problems, we suggest contacting a professional engineer to further evaluate these conditions at your home and make recommendations.

### Pier & Beam

Walk around the perimeter of the house looking for cracks or damage to the crawl space beam or skirting and ventilation openings. Skirting and vent screens should be kept in good condition to prevent animal access and to maintain adequate ventilation year-round. Inadequate venting or blocked vents can lead to moisture build-up under the house, possibly leading to wood rot and wood-destroying insect activity. The crawl space should not be used for storage such as an attic would be. An inspection of the crawl space should be completed annually and is best left to a qualified inspector.



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## Outside of the House:

### Foliage

Remove or thin dense foliage close to the house to allow for inspection of exterior surfaces and good air circulation. Vines should not be allowed to grow on or cover walls. The foliage holds moisture, promotes rot, and damages all siding types.

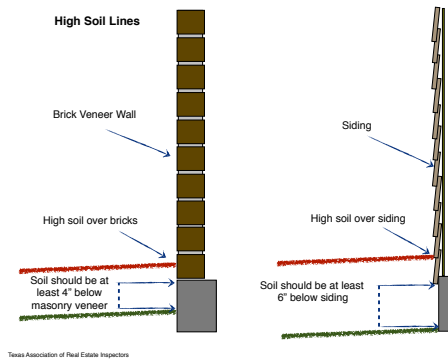
### Decks and Balconies

Inspect deck and balcony steps and surfaces for loose fasteners, nails backing out, rotting or loose deck boards, and properly operating gates and latches. Replace damaged wood and framing members with treated or other exterior rated materials. Loose fasteners should be removed and replaced with ring shank nails or decking screws for better holding power. Aluminum or stainless steel fasteners may cost more but will not rust. Rebuild any loose, missing or rotted railings, benches or steps. Current safety standards require railings to be at least 36-inches in height and baluster spacing to be four inches or less for the safety of small children when decks are over 30-inches from the ground.

The presence of dirt, mold and mildew can be slippery when the deck is wet and will reduce the life of the decking. They can usually be removed from deck surfaces by a power washer or a deck cleaning solution. After the surface is clean, finishing it with a deck sealant or wood stain will result in a longer lasting deck.

### Clearance from the Ground

Clearances from the ground to the bottom of the exterior veneer should be maintained to minimize the possibility of moisture damage and insect infestation. Soil lines may build up over time in flowerbeds when adding mulch so take care not to cover the foundation beam with mulch. The amount of clearance between the ground and veneer will vary based on the type of exterior veneer that is on your house. 2 inches should be between the concrete flatwork and siding, and 6 inches between the grade and siding to prevent the absorption of water, resulting in decay, and to provide sufficient space to check for termite activity. If soil is graded to improve siding clearance, take care that water does not pond at the foundation edge.

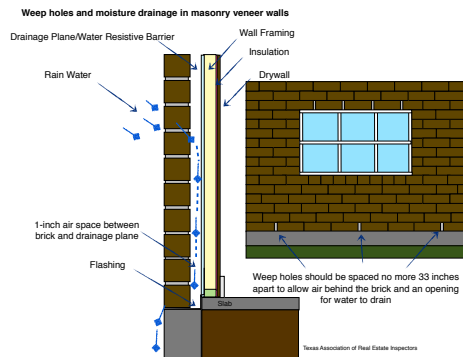


## Wood & Cement Sidings

Exterior sidings such as wood and cement board siding should be checked for blistered or flaking paint; rusted fasteners and “nail pops”; loose or rotted wood, panels and trim; gaps between panels, and water damage. Remember to thoroughly paint the bottom edge of these panels for greatest protection. Loose fasteners can be replaced with large-headed screws (with washers if necessary) for a more permanent repair. Gaps or cracks at trim or between panels should be sealed with a good quality exterior caulk. When repainting exterior surfaces, pay special attention to surface repair and preparation so your paint job will last.

## Masonry Veneer

Masonry walls should be inspected for soft or missing mortar, cracks or separations in mortar joints, and cracked or loose bricks or stones. A brick mason can replace soft or missing mortar. Cracked masonry or mortar joints may indicate foundation distress and should be inspected by a qualified structural engineer who can recommend any needed repairs or remedial action. Weep holes are openings in the bottom of brick or stone walls and above window and door lintels designed to allow an escape route for moisture that enters the wall cavity. Weep holes are usually spaced about 33 inches apart and should not be obstructed or sealed.



## Stucco Type Veneer

Carefully inspect stucco surfaces for cracks and evidence of moisture penetration. Stucco is often installed without provision for moisture to escape from wall cavities. Moisture seeping through cracks can do serious damage before detection and professional repairs are recommended. Stucco siding should terminate several inches above the soil, roof surfaces and walking surface, such as a sidewalk, balcony or driveways. Transition joints between stucco surfaces and adjoining wall finishes should be sealed with approved materials by the stucco manufacture to prevent water penetration.

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## Exterior Doors

Check doors, door trim, and thresholds for wood rot or water damage. Remove and replace any deteriorated exterior caulking with a quality caulking compatible with door and wall materials. Loose hinges and door hardware should be secure. Properly installed weather-stripping at exterior doors not only keeps moisture out but helps lower your energy bills.

Sliding glass door rollers may wear and dirty tracks can make the doors hard to operate. Most rollers can be adjusted or replaced to keep the door operating smoothly. Sliding glass door locks often fail to latch and a supplementary lock will increase home security.

Garage doors should be balanced for proper and safe operation. To test if the door is properly balanced, release the automatic operator from the door with the pull cord if one is present and with the door in the down position. The door should easily open to its full height and close smoothly without falling towards the floor. A balanced door will stay in place when opened to a height of five or six feet. Rollers and hinges should not be loose and should operate smoothly. Regular servicing of rollers and tracks will help keep them working smoothly. Check the cables for signs of fraying or damage. Since springs and cables are under great tension and can cause serious injury or damage if mishandled, adjustments are best left to a qualified contractor.

A properly adjusted automatic garage door opener will automatically reopen when striking an obstruction. This can be tested by placing a 2x4 board flat on the floor under the center brace of the garage door. When the door hits the board it should reverse to the full open position. Adjustments of the operator motors can correct movement and sensitivity in the opener. Caution: lightweight metal doors can be damaged if the reverse mechanism does not function properly during this test. Door operators manufactured after 1993 will also have optical sensors installed within 6 inches of the floor on each side of the door opening. If the beam between the sensors is broken while the door is closing, it should reverse directions and open. If the optical sensors are not properly aligned, the door will not function as intended. Do not attempt to circumvent these safety features. They are designed to minimize the risk of a large, heavy, moving object.

## Windows

Open and close all the windows in your house making sure the bedroom windows are accessible for safety. Clean and lubricate any that are stiff and difficult to operate. Be sure no glass is cracked or broken and that the window locks function properly. Double-pane windows have a layer of air between the panes. Double-pane windows insulate about twice as well as single-pane windows, so only half as much heat passes through the window. The space between the two panes can also be filled with argon or krypton gas, which insulate better than air. If you notice fogging or moisture between the panes of glass then the sealed

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air space between the glass panes has lost its seal. This does not necessarily mean the window is no longer insulated. If there was a sealed air space between the panes of glass then you still have the air space to act as an insulating space. However, if there was argon or krypton gas between the panes that has escaped, and now there is just an air space, then some insulating value has been lost. A window and glass company can replace the window panes with lost seals while keeping the same window frame in place.

## Roofing:

Do not attempt to access and walk on a roof unless you are completely comfortable, have the proper equipment for access, and wear appropriate clothing—including rubber-soled shoes. If you have any doubts, ask a qualified roofing contractor or inspector to check the roof. Most roof repairs are best left to a qualified roofing contractor.

## Overhanging Trees

Tree limbs rubbing on a roof can do serious damage. Overhanging branches should be kept trimmed to provide adequate clearance even in a high wind to prevent insect infestation and to minimize leaves and debris from falling onto the roof surface. Trees can grow rapidly and should be inspected at least twice a year. Oak wilt is a serious problem in many areas of Texas and can best be prevented by trimming oaks during the coldest or hottest times of year. Sterilize pruning tools with bleach and promptly cover cuts with wound paint. Major trimming is best left to a certified arborist.

## Roof Flashings

A common area for water leaks found on a roof is at the flashings and penetrations in the roofing, such as vents. “No-Caulk” plumbing vent pipe flashings are very commonly used and typically last 10–15 years. They may need to be replaced before the roofing material in some cases. Lead type plumbing vent pipe flashings may last longer, however squirrels will chew and damage the lead around the vent pipe allowing water leaks. Masonry chimney caps may crack while rusting may occur on metal type chimney caps. Cracking or rusting should be repaired to prevent water penetration and deterioration around the chimney. The chimney or roof level sidewall sidings or trim may be counter flashing for the step flashings. These materials should be maintained and any wood type products kept painted to prevent water leaks and deterioration.

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## Roof Surfaces

On **composition shingle** roofs, look for signs of damage or wear. Remove leaves and debris because they can hold moisture. Worn surfaces, missing granular coating, cracked, pitted, brittle or swollen shingles are signs that shingles may be reaching their usable life expectancy and need to be replaced. Raised shingle tabs may indicate improperly seated fasteners that can be carefully resealed. Take care not to tear the shingle or poke a hole in it. Split, torn or missing shingles may cause leaks and should be replaced immediately. Check the condition of roof level sidewalls and chimneys not visible from the ground.

**Metal roofs** are best observed from a ladder at the eaves. Walking on a metal roof can bend panels, creating leaks. Look for loose fasteners, rusted panels, open seams, bent flashing and deteriorated caulking.

**Flat or built-up roofs** may be surfaced with several different types of roofing materials. Generally, check for areas of water ponding, areas of missing aggregate coverings or gravel, tears or blisters in the surface, and deep alligator cracking. Also, check the condition of flashings at edges and vents. Flat roofs are prone to leak and require regular maintenance, therefore a qualified roofing contractor should further investigate any such problems. Leaves and debris left on the roof will hold water and speed deterioration.

**Concrete and clay tile roofs** are easily damaged and a thorough inspection is best left to a qualified roofing contractor. Walking on a tile roof is not recommended. From the eaves you can check the general roof condition. Look for rotted fascia, loose, missing or cracked tiles, deteriorated caulking and sealant.

## An Energy Efficient Home:

### Sealing Air Leaks

Air leaks in a house can result in increased heating and cooling cost. Sealing these air leaks can decrease energy cost and make your home more comfortable. Sealing joints and penetrations with caulking, gaskets, weather-stripping, or other air barrier materials where accessible will help reduce air loss and air infiltration. Some of these areas include gaps around windows, doors, attic accesses in the conditioned areas of the home, recessed lights, and electrical outlets. This is often the most cost effective way to improve energy efficiency and comfort. There are many different types of products at home improvement stores that can be used to address different types of air leaks. Caulking is the most common for sealing smaller leaks, along with spray foam, and weather stripping. Materials such as plywood, drywall, or rigid foam insulation can be used to cover larger holes.

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The heating and cooling systems ducts are used to distribute conditioned air throughout the house. In a typical house about 20 percent of the air that moves through the duct system is lost due to leaks and poorly sealed connections. The result is higher utility bills and difficulty keeping the house comfortable. Accessible ducts in the attic and crawlspaces can be sealed with duct sealant (also called duct mastic). Insulating metal ducts or replacing ducts with deteriorated insulation also can save significant energy.

## The EnergyGuide & ENERGY STAR Label

Look for the EnergyGuide and ENERGY STAR® labels when replacing appliances and compare the labels to other models. The Federal Trade Commission requires EnergyGuide labels on most home appliances. EnergyGuide labels provide an estimate of the product's energy consumption or energy efficiency. They also show the highest and lowest energy consumption or efficiency estimates of similar appliance models.

ENERGY STAR labels are on appliances that meet strict energy efficiency criteria established by the U.S. Department of Energy and U.S. Environmental Protection Agency. The ENERGY STAR labeling program includes most home electronics and appliances except for stove ranges and ovens.

## Legislation of the Light Bulb?

For new construction homes, the 2009 International Residential Code (IRC) requires at least fifty percent of the lamps in permanently installed fixtures to be high-efficiency. This is intended to help eliminate the use of incandescent bulbs for permanently installed light fixtures. The phasing out of incandescent lighting is set to begin in 2012 with the 100-watt bulb and end in 2014 with the 40-watt bulb increasing the overall efficiency by 70 percent by 2020 compared to today.

Two common energy efficient bulbs today are compact fluorescents (CFL), and light-emitting diode or LED. When choosing a CFL you should look for bulbs that are ENERGY STAR® qualified because they have been tested to meet stringent performance criteria established by the U.S. Department of Energy and the EPA. LED lighting is ultra-compact and dramatically more efficient than traditional incandescent bulbs – up to 85% more efficient – and over 10% more efficient than compact fluorescent bulbs (CFL's). Under the new rule, the back of each package of light bulbs will have a "Lighting Facts" label modeled after the "Nutrition Facts" label that is currently on food packages. The Lighting Facts label will provide information about brightness; energy cost; bulb's life expectancy; light appearance; wattage; and if the bulb contains mercury.

## Recessed Light Fixtures

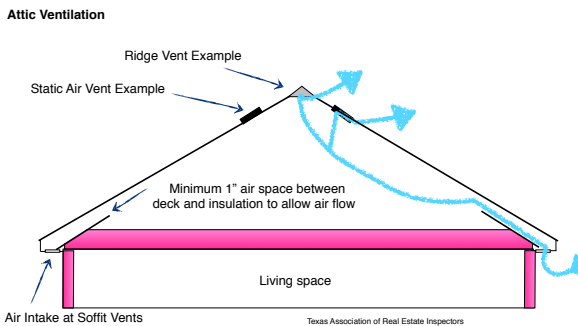
The 2009 International Residential Code (IRC) also requires that all recessed light fixtures be sealed with caulking or gaskets and IC rated, (insulation contact). This is intended to limit air leakage between the conditioned and unconditioned spaces and reduce energy loss due to air leaks at the fixtures.

## Radiant Barriers

Reflective insulation, also called a radiant barrier, is a metallic foil material (usually aluminum) designed to block radiant heat transfer across open spaces. Reflective insulation is most effective in reducing cooling bills in hot, sunny climates. The performance and long-term cost-effectiveness of the product depends on a number of factors including where the product is installed, how the product is installed, and the amount of existing insulation currently in the home.

## Attic Ventilation

A properly balanced attic ventilation system removes moisture and heat from the attic contributing to a healthy house. Under current building standards, one (1) square foot of free vent area should be provided for every one hundred and fifty (150) square feet of ceiling area. Depending on the ventilation product used, there are other considerations and methods. Soffit vents intake air into the attic space while your upper roof vents exhaust air to the exterior. Upper roof vent types include static vents, ridge vents, turbines, and power ventilators.



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## Seasonal Energy Efficiency Ratio (SEER)

SEER stands for Seasonal Energy Efficiency Ratio. It's a number that describes how well air-conditioning equipment works. A higher SEER means better efficiency and lower energy bills. SEER is calculated by dividing the amount of cooling supplied by the air conditioner or heat pump (Btu's per hour) by the power (watts) used by the cooling equipment under a specific set of seasonal conditions. As of January 2006, all residential air conditioners sold in the United States must have a SEER of at least 13. ENERGY STAR qualified Central Air Conditioners must have a SEER of at least 14.

## Programable Thermostats

Installing a programable thermostat in your home is an easy way you can save energy and money on your utilities. Programable thermostats allow you to regulate your home's temperature to your schedule and cycles when you're home or away.

## Insulation

Texas spans through climate zones 2, 3 & 4 (Except Marine). Depending where you live, your insulation requirements will vary. Insulation requirements for these climate zones was provided by the 2009 International Energy Conservation Code (IECC). Insulation is rated by thermal resistance called R-value, which indicates the resistance to heat flow. The higher the R-value, the greater the insulating effectiveness. The R-value of thermal insulation depends on the type of material, its thickness, and its density. Adequate attic insulation helps keep your home comfortable and lowers heating and cooling costs. Look at the insulation in your attic spaces and consider adding insulation if ceiling joists are visible, the insulation is compacted or unevenly distributed, or does not meet the requirements for your climate zone. Additional access doors and hatches between the living space and attic should also be insulated and weatherstripped. An insulation specialist can help you determine the best solution for your home.

Climate Zone	Ceilings	Wood Frame Walls	Floors
IECC Climate Zone 2	R30	R13	R13
IECC Climate Zone 3	R30	R13	R19
IECC Climate Zone 4	R38	R13	R19
DOE Climate Zones 2-4	R-60	-----	R19 to R30

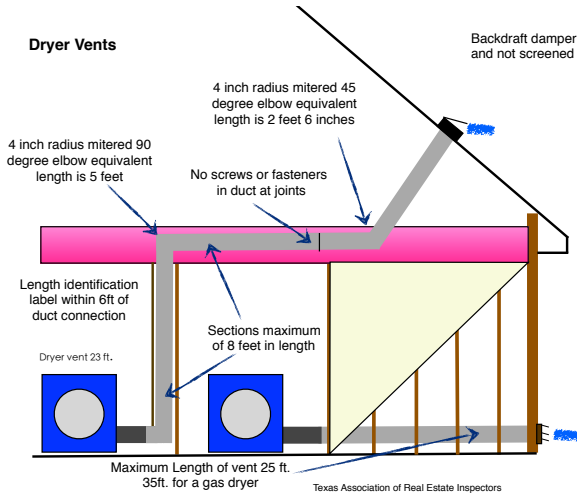


## Laundry Room

### Laundry Connections and Dryer Vent

Check the laundry room washing machine connections and hoses for leaks and corrosion. Corrosion at faucets may indicate a small leak that can turn into big leak. In hard water areas, periodically clean the screens in the hose at the washer connection. If the water supply hoses are more than 3 years old it is recommended they be replaced. Consider replacing them with the stainless steel braided hoses for increased safety.

If you notice that your clothes don't seem to be drying like they use to, it may not be your dryer but the dryer vent. Check your dryer vent connections for excessive lint buildup and clean the vent. In some cases the entire vent may need to be cleaned by a professional. Cleaning the dryer's lint screen before each use prevents lint buildup and saves energy.



## Fire Safety Tips:

### Smoke & Carbon Monoxide Detectors

Each month press the test button on your detectors to be sure they are working. At minimum once a year (the start of daylight savings time is a good reminder) change all batteries in all smoke detectors. If the smoke detectors are more than ten years old or you don't know their age, then it is time to replace them. If you don't have smoke detectors, install one in each bedroom, in bedroom hallways, and on each living level of the home.

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Carbon monoxide alarms should be installed outside each separate sleeping area in the immediate vicinity of the bedrooms of homes that have fuel fired appliances or in homes with an attached garage.

Never paint over a smoke or carbon monoxide alarm. Paint will seal the vents and interfere with the sensors ability to detect smoke and carbon monoxide. Clean the alarms by using a vacuum with a soft brush attachment to removed dust and dirt, and make sure to test the alarm after you are finished. Never use any detergents or solvent to clean the sensor.

## **Fire Extinguishers**

You do have one, don't you? Be sure the fire extinguisher is suitable for all types of fires. It should be marked "A, B, and C" to indicate what type of fires it can be used to extinguish. Having a fire extinguisher is one thing, having it ready in case of an emergency is another. It is recommended to have at least one fire extinguisher on each floor of your home. Also, keep them in plain sight and no more than five feet above the floor. The most important places to have a fire extinguisher are in areas that are more susceptible to fire the kitchen and garage. The best location to mount the fire extinguisher is by the door. Make sure all family members know the location of the extinguisher and how to operate it. Each month, check that the fire extinguisher is fully charged and has not passed its expiration date.

## **Heating, Ventilation & Air Conditioning Systems (HVAC):**

Having a qualified HVAC contractor inspect and service your heating and air conditioning equipment twice a year will keep them operating efficiently and maximize the life of the system.

## **Return Air Filters**

The single most important thing a homeowner can do to keep the heating ventilation and air conditioning system operating at peak efficiency is to keep the return air filters clean. Air filters should be properly sized so they do not lift or move when the blower cycles on allowing unfiltered air to bypass the filter. They should be cleaned or replaced when they start to become dirty and restrict air flow into the system. The filter manufacture's instructions on the packaging should say how often they should be replaced.

MERV ratings, 1-16 are used to rate the ability of a filter to remove dust from the air as it passes through the filter. MERV is a standard used to measure the overall efficiency of a filter. Higher MERV ratings mean fewer dust particles and other airborne contaminants pass through the filter. A filter rated between 5 to 8 MERV is a good choice and will collect particles as small as 3 microns. When using filters with ratings above 9 it is important to clean or replace them when recommended by the manufacturer since they will reduce air

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flow when they become dirty and cause performance problems and decrease the efficiency of the system.

## Heating

**Gas-fired heating systems** should be inspected yearly by a qualified HVAC professional to ensure proper and safe operation. Remember to install carbon monoxide detectors when a gas heating system is in place.

**Electric heat** requires little homeowner maintenance. Simply be observant, and if the unit does not seem to be heating adequately, contact your HVAC contractor to evaluate it.

A **heat pump** is intended for climates with moderate heating needs. They offer an energy-efficient alternative to electric heat. Because they move heat rather than generate heat, heat pumps can provide up to 4 times the amount of energy they consume.

The most common type of heat pump is the air-source heat pump which transfers heat between your house and the outside air. If you heat with electricity, a heat pump can trim the amount of electricity you use for heating by as much as 30%–40%. A heat pump's refrigeration system consists of a compressor and two coils made of copper tubing (one indoors and one outside), which are surrounded by aluminum fins to aid heat transfer. In the heating mode, liquid refrigerant in the outside coils extracts heat from the air and evaporates into a gas. The indoor coils release heat from the refrigerant as it condenses back into a liquid. A reversing valve, near the compressor, can change the direction of the refrigerant flow for cooling as well as for defrosting the outdoor coils in winter.

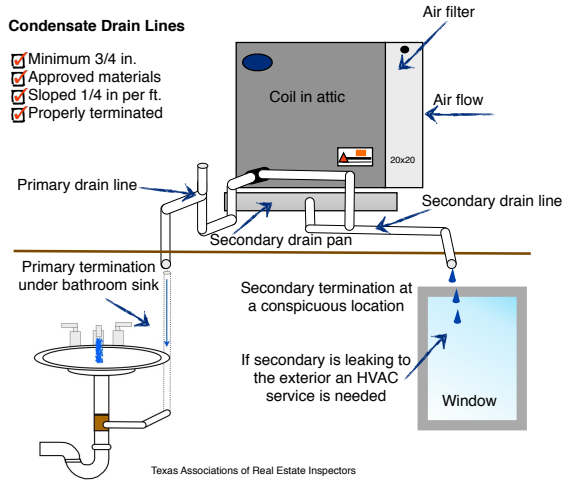
When outdoor temperatures fall below 40°F, a less-efficient panel of electric resistance coils, similar to those in your toaster, kicks in to provide indoor heating. This is why air-source heat pumps aren't always very efficient for heating in areas with cold winters. Some units now have gas-fired backup furnaces instead of electric resistance coils, allowing them to operate more efficiently.

## Air Conditioning

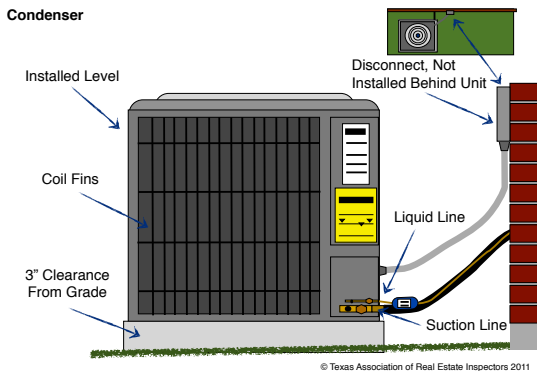
As the air conditioning system cools the air, it removes humidity and produces condensation. Most air conditioning systems installed in the attic above the first floor have two condensation drain lines installed. The primary drain is connected to the plumbing system, usually under a bathroom sink or a bathtub drain. An auxiliary drain line, or secondary drain line, is connected to the coil or a drain pan under the coil. This line is routed to the exterior over a “conspicuous location” normally over a window or door. While this acts as a back-up system, it is a “red flag” warning that the primary drain line is clogged. If you notice water leaking from this auxiliary drain, the primary drain may be

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obstructed or blocked. You can contact an HVAC technician to correct this condition. Some newer systems may also have a secondary sensor installed in the secondary drain port or drain pan to monitor condensate in the primary drain pan. This sensor detects condensate overflow backing up into the drain line, shutting off the HVAC unit and preventing an overflow of the primary drain pan, giving you time to correct the problem. If there is an opening or vent at the primary drain line, pour one cup of a 50% solution of chlorine bleach and water into the opening. Doing this in the spring and fall can help keep the drain line clear and open.



Outside the house, make certain to trim foliage back from the condensing unit coil fins for adequate air circulation and more efficient operation. Manufacturers recommend different clearances around a condenser unit and a minimum of five feet above the unit is usually required. Listen for unusual fan or motor noise that might signal impending failure. Damaged or bent metal coil fins can reduce the efficiency of the system. HVAC contractors have special tools for straightening bent coil fins.



## Electrical:

### Electrical Outlets

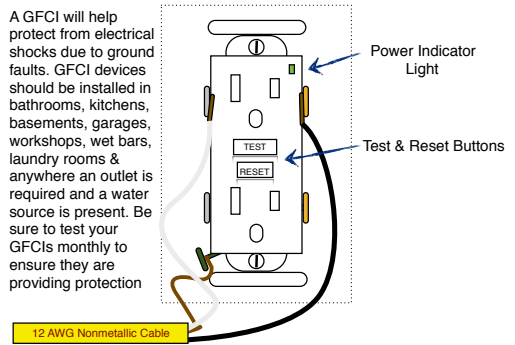
You may notice that newer receptacles are marked TR for Tamper-Resistant. The 2008 National Electric Code (NEC) required TR Receptacles in all new residential housing. This requirement results from a Consumer Product Safety Commission study that documented injuries in the home caused each year by children attempting to insert foreign objects into receptacles. They are safer than other preventive measures since they are permanent, offering continuous protection unlike plastic outlet caps that can be removed. When updating or replacing damaged receptacles you may consider installing Tamper-Resistant Receptacles.

Occupancy sensor switches turn lights ON when a person enters a room and OFF when they leave. That saves energy, provides convenience, and lowers electrical bills. With dimmer and light control switches you use just the right amount of light reducing electricity usage and extending bulb life. If a dimmer seems very warm to the touch, the light fixture may need lower wattage bulbs to prevent the dimmer switch from overheating.

### Ground Fault Circuit Interrupters Protection

Ground Fault Circuit Interrupters (GFCI) are safety devices used in place of a standard electrical outlet or can be a breaker type in the panel box. The 2008 National Electrical Code requires ground fault protection at all kitchen countertops, bathrooms, within six feet of a wet bar or laundry sinks, all garage and outdoor locations. A GFCI monitors the amount of current flowing from the hot to neutral side. If there is any imbalance in this, the circuit will trip. It is able to sense a mismatch as small as 4 to 5 milliamps. One example is using a blender in the kitchen and it splashes making the blender housing wet. When you touch the wet blender with your hands, there is a path from the hot wire inside the blender through you to ground. If electricity flows from that hot wire to the wet housing, say from a damaged cord, it will go to ground through you and could be fatal. The GFCI can sense the mismatch in current from hot to neutral tripping the circuit and cutting off the electricity to the appliance.

**Ground Fault Circuit Interrupter, GFCI**



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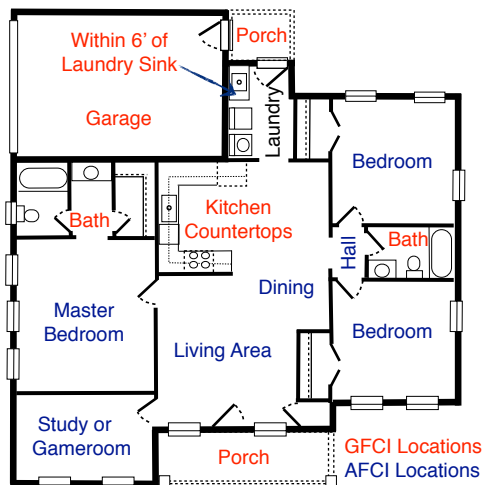
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GFCI devices should be tested monthly by pressing the “test” button to interrupt power and the “reset” button to restore electricity to the receptacle. A lamp or other small device plugged into the receptacle should turn off and on accordingly. Inexpensive circuit testers with GFCI testing devices can also be used. Defective GFCI receptacles should be replaced by a qualified electrician.

## Arc Fault Circuit Interrupters (AFCI)

Arc Fault Circuit Interrupters (AFCI) are breakers located in the panel box intended to provide protection from fire by opening the circuit if an arc fault is detected. The 2008 National Electrical Code requires combination AFCI breakers to be installed on all single phase 15 and 20-amp non-ground fault circuits supplying power to dwelling areas including family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sun rooms, recreation rooms, closets, hallways or similar rooms. Arc fault circuit breakers should be tested periodically by pressing the test button. This assures that the arc fault device is functioning. If the device does not trip it will need to be replaced.

**Ground Fault Circuit Interrupter, GFCI Locations  
Arc Fault Circuit Interrupter, AFCI Locations**



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## Plumbing:

### Plumbing Fixtures & Drains

Daily use of water faucets in the house should make it obvious when they are hard to turn off, start to drip, or splatter water on countertops. Replacing faucet washers can usually repair dripping faucets. Sediment in many water systems can build up in faucet aerators, restricting water flow and splattering water. To solve this problem, unscrew the aerator from the faucet spout, disassemble it (keeping parts in proper order), rinse away sediment, reassemble and screw the aerator back on. Occasionally it may be necessary to replace the aerator to achieve proper performance.

Periodically inspect supply shut-off valves under sinks and at toilets for proper operation, corrosion and leaks. A leaking or inoperable valve can create a lagoon of trouble if not caught and corrected early.

Occasionally fill sinks with water and look at the drain and P trap below while the water flows through the drain pipes. A properly draining sink will empty faster than it fills. At the same time, look under the sink for leaks in the drainpipes. Bathtubs and showers should also drain faster than the water runs, so you're not standing in a puddle of water while showering. Repairing these simple plumbing problems early can help avoid bigger problems later.

Another big water waster is a running toilet. Here's an easy test to see if you have a problem. Put a few drops of food coloring in your toilet tank—don't flush yet. After a while, if any color appears in the toilet bowl, you have a leak. Start by replacing the rubber flapper inside the tank. If the leak continues, then the seal between the tank and bowl may need to be replaced. While the lid is off the toilet tank, check flush mechanisms, handles, chain flappers and ball cock or fill valves. A poorly adjusted or worn ball cock valve (also called a fill valve) can cause additional water loss. Make sure your replacement ball cock or fill valve is an anti-siphon type, where the valve assembly is above the overflow tube in the toilet tank that avoids back siphoning and contamination of the drinking water supply. Check that the toilet bowl is firmly secured or anchored to the floor, with no leaks between the bowl, the tank, the floor or at the water supply valve on the wall.

### Water Heaters

Conventional storage water heaters remain the most popular type of water heating systems while tankless coil water heaters are becoming more common. A tankless water heater cycles on when a hot water faucet is turned on. The water flows through the heat exchanger and provides hot water on demand without a tank.

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To avoid scalding and to maximum efficiency, the temperature on both gas and electric water heaters should be at the lowest possible setting that still provides hot water. Setting your water temperature to 120°F can help your water heater last longer and operate at its maximum efficiency. Water heated to and over 140°F poses a safety hazard and can cause scalding.

Water Temperature	Time To Produce a Serious Burn
120°F	More than 5 Minutes
125°F	1 1/2 to 2 Minutes
130°F	About 30 Second
135°F	About 10 Second
140°F	Less than 5 Second
145°F	Less than 3 Second
150°F	About 1 1/2 Second
155°F	About 1 Second

Properly maintaining your water heater will provide years of dependable, trouble free service. Check your owner's manual for specific maintenance recommendations. Here are some routine maintenance tips for storage water heaters:

- Check for water leaks or corrosion at the supply pipe fittings and lower drain valve.
- A water heater's tank can act as a settling basin for solids suspended in the water. It is suggested that a few quarts of water be drained from the water heater's tank every month to clean the tank of these deposits.
- At least once a year, lift and release the lever handle on the temperature pressure relief valve, located near the top of the water heater, to make certain the valve operates freely. Allow several gallons to flush through the discharge line to an open drain.
- The anode rod should be removed from the water heater's tank annually for inspection and replaced when more than 6" of core wire is exposed at either end of the rod. This should only be done by a qualified plumber.



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- ☑ To ensure sufficient ventilation and combustion air supply, proper clearances must be maintained around gas fired water heaters.
- ☑ On gas fired water heaters, test for spillage at the draft hood relief opening after 5 minutes of burner operation. If spillage is detected, the water heater's internal flue must be inspected to be certain it is clean by removing the draft hood and flue baffle. Again, this should only be done by a qualified plumber.
- ☑ Visually inspect the pilot burner and main burners annually on gas fired water heaters. If debris or irregular flames are observed, servicing and cleaning may be required. For models with a burner chamber that is sealed, cleaning of the burner must be performed only by qualified service personnel. If the burner access door is removed, the burner access door gasket must be replaced.

