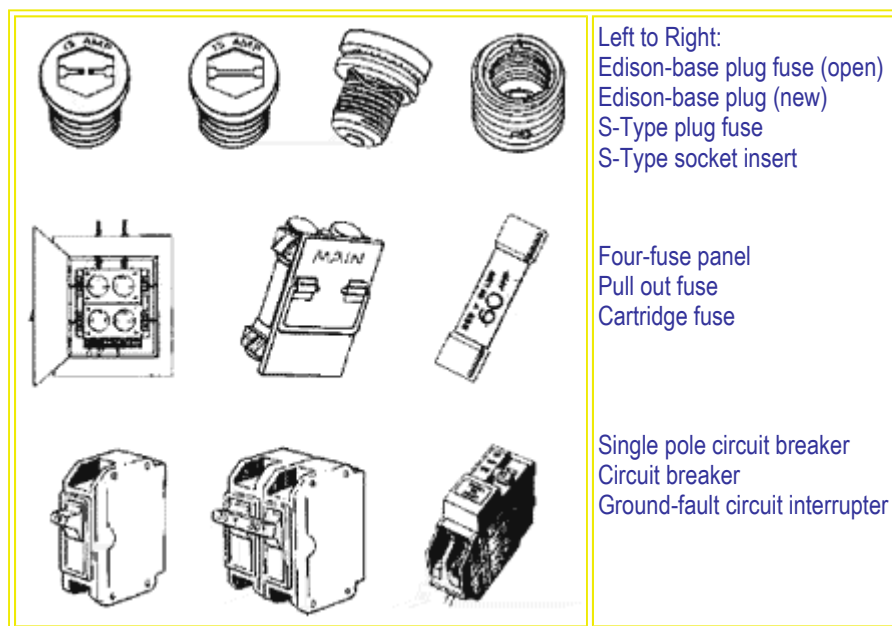


With your **circuit** map and power audit done, it's time to take a run through the house with a keen eye on safety. Use the following checklist on a regular basis to ensure your home remains electrically safe year in and year out. If you haven't already had an electrical inspection performed by a qualified, licensed electrician or electrical inspector, this list can also help identify clues that an inspection and/or repairs are needed.

Fuses/Circuit Breakers

Fuses and **circuit breakers** are safety devices located in your electrical panel that help prevent overloading and fires. They stop the electrical current if it exceeds the safe level for some portion of the home electrical system. Overloading means that the appliances and lighting on the **circuit** regularly demand more electrical current than the **circuit** can safely deliver.



If the demand for electrical current exceeds the safety level, a **fuse** opens once and must be replaced to reconnect the **circuit**. A **circuit breaker** "trips" its switch to open the **circuit**, and the **circuit** is reconnected by dosing the switch manually.

Fuses

Replacing a correct size fuse with a larger size **fuse** can present a serious fire hazard. Doing so will allow excessive current to flow and possibly overload the **outlet** and the house wiring to the point that a fire can begin.

- Be certain that correct-size **fuses** are used (if you do not know the correct sizes, have a qualified, licensed electrician identify and label the sizes to be used).

NOTE: Fuses should be rated according to the wire that makes up the branch circuit, not the connected load. Most of the screwbased fuses

used should be 15 amperes. Ensure that all fuses rated higher than 15 amperes are compatible with the branch circuit wiring.

Edison-base/S-type Fuses

Consumers sometimes replace a **fuse** that repeatedly "blows" with a higher **ampere** rated fuse. Although the new **fuse** may not open, it also may not protect the branch **circuit**. Doing so masks the real problem of too high a demand being placed on the **circuit**. The **fuse** will not open at the appropriate load for that **circuit**.

Instead of using an inappropriate **fuse**, take something off the **circuit** to bring the demand to an appropriate level.

- To prevent future installation of **fuses** that allow currents too high for your wiring, your fuse panel should be converted to S-type sockets that accept only **fuses** of the correct **amperage** rating. If you have Edison-base fuse sockets, have them fitted with the S-type socket inserts.

If **fuses** continue to "blow," keep track of which branch **circuits** are affected and which appliances are in use when the power outage occurs. Consult a qualified, licensed electrician to correct the problem.

Circuit Breakers

Just like **fuses**, **circuit breakers** provide overcurrent protection by opening the **circuit**, or "tripping" when an unsafe level of demand has been placed on the **circuit**.

Circuit breakers are also rated for various current levels, such as 15 or 20 **amps**. Breaker systems offer more flexibility for new protective technologies like **ground fault circuit interrupters (GFCIs)** and **arc fault circuit interrupters (AFCIs)**. They also offer you the ability to reset the breaker once tripped, getting lights up and running quickly to prevent accidents resulting from the lack of power in the home. Resetting a **circuit breaker** is quicker than replacing a **fuse** and avoids the hazards of oversized fuses.

When resetting a tripped **circuit breaker**, be aware that your **circuit breaker** may trip to an intermediate position close to "ON" instead of the "OFF" position (sometimes it is difficult to see that it has tripped). To reset, move the switch fully to "OFF" and then to "ON."

- Before resetting a tripped **circuit breaker**, turn off or unplug appliances or lamps on the **circuit** to bring the demand back down to an acceptable level.

Outlets & Switches

Switches are used to turn the power on and off. **Outlets**, or receptacles, are usually mounted on a wall or floor to supply electricity through a cord and plug to appliances, lamps, TV, etc. These are the key points in our electrical systems that give us our first line of control to our electrical use, and they are critical connection points. With time and use, these connections can become loose,

creating potential hazards.

- Check to make sure **outlet** and switch plates are not unusually hot to the touch. If they are, immediately unplug cords from these outlets and do not use the switches. Have a qualified, licensed electrician check the wiring as soon as possible.
- Look for discoloration as another indication of potentially dangerous heat buildup at these connections. Stand across the room and look for a tear-drop shaped darkening around and above **outlet** and switch cover plates.



With outlet and switch cover plates, warm to the touch may be okay, but hot is not.

- Check that all **outlet** and switch cover plates are in good condition so that no wiring is exposed. Replace any missing, cracked or broken cover plate.



- Be sure to use safety caps with unused outlets.

Exposed wiring is a shock hazard.

Power Cords

Power cords, part of electrical products and appliances, connect the item to the power supply by plugging into the outlet. They need to be kept in good condition. Even an electrical item that is in otherwise good working order can still represent a shock and fire hazard if its power cord is damaged.

- Check to make sure electrical cords are intact and in good condition, not frayed or cracked.
- Check to make sure lamp, extension, telephone and other cords are placed out of the flow of traffic. Cords stretched across walkways may cause someone to trip. If you must use an extension cord, place it on the floor against a wall where people cannot trip over it.
- Whenever possible, arrange furniture so that outlets are available for lamps, entertainment products, or appliances without the use of extension cords.
- Check to make sure furniture is not resting on cords.

Electric cords need ventilation. Cords that run under carpeting or behind baseboards can overheat and cause a fire.

- Check to make sure electrical cords do not run under furniture or carpeting, or behind baseboards.



Nails or staples can damage cords, presenting fire and shock hazards.

- Check to make sure electrical cords are not attached to the walls, baseboards, etc. with nails or staples. Disconnect power before removing nails and staples from on or around electrical cords.
- Do not attempt to repair cords yourself. Take any item with a damaged power cord to an authorized repair center, or cut the cord, safely dispose of the item, and purchase a new one.

Cutting off the cord when disposing of a damaged electrical product reduces the likelihood of someone else "salvaging" the item and bringing the hazard home with them.

Extension Cords

Extension cords can be very helpful in delivering power right where we need it. However, no matter what the **gauge** or rating of the cord is, the extension cord is designed as a temporary solution, not as long-term extension of your household's electrical system. With continuous use, the extension cord can more rapidly deteriorate, creating a potentially dangerous electric shock or fire hazard. In addition to the same safety tips that apply to power cords, keep the following principles in mind when using extension cords.

- **Extension cords should only be used on a temporary basis; they are not intended as permanent household wiring. Unplug and safely store extension cords after every use.**
- A heavy reliance on extension cords is an indication that you have too few outlets to address your needs. Have additional outlets installed where you need them.



- Make sure extension cords are properly rated for their intended use, indoor or outdoor, and meet or exceed the power needs of the appliance or tool being plugged into it.
- Assume 125W per **amp** when calculating power (**wattage**) to determine if the extension cord you intend to use is properly rated for the appliance being connected to it.
- Replace No. 18 **gauge** cords with No. 16 **gauge** cords. Older extension cords using small

(No. 18 gauge) wires will overheat at 15 **amps** or 20 **amps**.

- Change the cord to a higher rated one or unplug some appliances, if the rating on the cord is exceeded because of the power requirements of one or more appliances being used on the cord.

Overloaded extension cords can and do cause fires.

- Use cords with polarized and/or **three-prong plugs**.
- Buy only cords approved by an independent testing laboratory, such as [Underwriters Laboratories \(UL\)](#), [ETL-SEMKO \(ETL\)](#) or [Canadian Standards Association \(CSA\)](#).



Power strips and surge protection



Power strips give us the ability to plug more products into the same outlet, which can be a help, but also a hindrance to safety if used inappropriately. Power strips and surge suppressors don't provide more power to a location, just more access to the same limited capacity of the **circuit** into which it is connected. The **circuit** likely also still serves a variety of other outlets and fixtures in addition to the multiple electrical items you might be supplying with the power strip. In addition to the tips above, keep these safety principles in mind when using power strips and surge suppressors.

- Be sure you are not overloading the **circuit**. Know capacity of the **circuit** and the power requirements of all the electrical items plugged into the power strip and into all the other outlets on the **circuit** as well as the light fixtures on the **circuit**.
- A heavy reliance power strips is an indication that you have too few **outlets** to address your needs. Have additional **outlets** installed where you need them.
- Understand that surge suppressors only protect the items plugged into it, not back along the **circuit** into which it is connected.

- In the event of a large surge or spike, such as a lightning strike, the surge suppressor is a one-time-use protector and will likely have to be replaced.
- Consider purchasing surge suppressors with cable and phone jacks to provide the same protection to your phone, fax, computer modem and television.
- Not all power strips are surge suppressors, not all surge suppressors can handle the same load and events. Be sure the equipment you buy matches your needs.
- For homes in areas with a high incidence of lightning, consider having a surge arrestor installed at the **fuse** box or breaker panel for whole house protection

Light Bulbs

We've come to take the light bulb for granted, but there is a wide variety of bulbs available that provide different levels and quality of light, and that demand different levels of power. Make sure you are selecting the bulbs that are appropriate for your intended use and for the power rating of the intended lamp or fixture.

- Use a bulb of the correct type and wattage. If you do not know the correct wattage, contact the manufacturer of the lamp or fixture.
- Read and follow light bulb manufacturers' safety instructions.
- Make sure bulbs are screwed in securely -loose bulbs may overheat.
- Place halogen floor lamps (torchieres) away from curtains, beds, rugs or other furnishings. These lamps can become very hot and can cause a fire hazard. Consider replacing halogen torchiere lamps with models that use cooler, more efficient fluorescent bulbs.

A bulb of too high wattage or of the wrong type may lead to fire through overheating. Some ceiling fixtures and recessed lights can trap heat.

Portable Space Heaters

Portable space heaters can be a blessing in a cold and drafty house in the deep of winter. But space heaters, and any electrical product with a heating element, can demand a lot of power. By their nature, they also produce a lot of heat, and, if not used carefully, can become a fire hazard. Make sure to follow these safety principles with portable space heaters:

- Plug portable space heaters directly into an outlet; do not use an extension cord.
- Make certain the **circuit** into which you plug a space heater can adequately and safely handle the added demand.
- Never remove the **grounding** feature on a plug by clipping or grinding off the third prong.



- Use an adapter to connect the heater's **3-prong plug**, if you do not have a 3-hole outlet.

- Make sure the adapter ground wire or tab is attached to the outlet ground.
- Relocate heaters away from passageways and keep all flammable materials such as curtains, rugs, furniture or newspaper at least three feet away.
- Unplug and safely store portable space heaters when not in use.

Plug portable space heaters directly into an outlet; do not use an extension cord.

Small Appliances and Tools

Follow these simple safety precautions with all your small appliances and tools:

- Make certain all small appliances and tools are approved by an independent testing laboratory, such as [Underwriters Laboratories \(UL\)](#), [ETL-SEMKO \(ETL\)](#) or [Canadian Standards Association \(CSA\)](#). (See example on page 18.)
- Use small appliances and power tools according to the manufacturer's instructions.
- Unplug all small electrical appliances, such as hair dryers, shavers, curling irons, clothes irons, and toasters, when not in use.
- Be sure you have **ground fault circuit interrupter (GFCI)** protection anywhere electricity and water are within six feet of each other, such as in your kitchen, bathroom and outdoors, to protect against electric shock. For more information, see the section on **GFCIs**, page 25.
- Take any damaged electrical appliance or tool to an authorized repair center, or cut the cord, safely dispose of the item, and purchase a new one.



Even an appliance that is not turned on, such as a hairdryer, can be potentially hazardous if it is left plugged in. If it falls into water in a sink or bathtub while plugged in, it can electrocute you. New hair dryers should always have a safety device called an appliance leakage circuit interrupter (ALCI) on their power cords to protect against electrocution.

- Never reach into water to get an appliance that has fallen in without being sure the appliance is unplugged or the **circuit** is shut off.

"Tucking in" an electric blanket or placing additional coverings on top of it can cause excessive heat buildup, which can start a fire.

- Do not tuck in electric blankets.
- Don't allow anything on top of the blanket while it is in use. This includes other blankets or comforters and even pets sleeping on top of the blanket.
- Do not use electric blankets on children.

- Never go to sleep with a heating pad that is turned on. It can burn you. Newer heating pads have an automatic cut off switch.

Sleeping with a heating pad that is turned on can cause serious burns even at relatively low settings.

- Check to make sure power tools have a **3-prong plug** or double-insulated cords, and consider replacing old tools that have neither.
- Use a properly grounded 3-prong adapter for connecting a 3-prong to a 2-hole receptacle.
- Consider using a portable **GFCI** when using power tools.
- Replace guards that have been removed from power tools.
- There have been many recalls of power tools due to problems with the safety guard sticking. Be sure your model has not been recalled, as this hazard poses a serious risk of injury. Check online at www.recalls.gov.
- Check power tools before each use for frayed cords, broken plugs or cracked housing.

Test and Protect!-Ground Fault Circuit Interrupters (GFCIs)

Ground fault circuit interrupters (GFCIs) which protect against accidental electric shock or electrocution by acting immediately to shut off the **circuit** if they sense a ground fault, or "leak" of current off the **circuit** - have been in homes since the early 70s on **circuits** that come within six feet of water. Homeowners, however, should consider having **GFCI** protection on general purpose receptacles throughout the home.

- There are outlet **GFCIs** protecting everything in that outlet and downstream on the **circuit**, **circuit breaker GFCIs** protecting the entire **circuit**, or portable **GFCIs** that protect just at the point of use.

Outlet type GFCI



Circuit Breaker type GFCI



Portable type GFCI



A **GFCI**-protected **outlet** can provide power without giving an indication that it is no longer providing shock protection. Be sure your **GFCI** is providing protection from fatal electric shock by testing it monthly and after every major electrical storm.

- You should test your **GFCIs** monthly and after every major electrical storm. Here's how:
 - Push the "Reset" button of the **GFCI** receptacle to prepare the unit for testing.
 - Plug in a night light and turn it on. Light should be ON.
 - Push the "Test" button of the **GFCI** receptacle. Light should go OFF
 - Push the "Reset" button again. Light should go ON.

A light plugged into the **GFCI** receptacle should go out when the test button is pushed. If the light remains on when the button is pushed, either the **GFCI** is not working properly or has not been correctly installed. If the "RESET" button pops out but the light does not go out, the **GFCI** has been damaged or was improperly wired and does not offer shock protection at that wall outlet. Contact a qualified electrician to correct any wiring errors or replace defective **GFCIs**.

- If you have a home without **GFCIs**, consult a qualified, licensed electrician about adding this important protection, or purchase plug-in units or a portable **GFCI** to provide individual receptacle or load protection.

New Protection-Arc Fault Circuit Interrupters (AFCIs)

Newer **arc fault circuit interrupters (AFCIs)** can help prevent fires that often result from problems at the **outlets**, switches and frayed and cracked cords connected to the **circuits**. The **AFCI** senses the particular signature of an arc-where electricity has to jump through an insulating medium-and, like the GFCI, acts immediately to shut off the **circuit**, thus reducing the risk of fire associated with arcing faults.



AFCIs are currently required by the National Electrical Code® in new construction in all bedroom **circuits**, but should be considered in all homes and all general purpose receptacles. Consult a qualified, licensed electrician to determine if your home is compatible with **AFCI** protection.

Other technology

Over the years, we have begun to safety engineer our electrical products to include some of the same technology that has been applied to our electrical systems. Immersion detection circuit interrupters (IDCIs) and appliance leakage current interrupters (ALCIs) are typically found on hair dryer and specific appliance cords. They operate in slightly different ways but perform essentially the same function. Leakage current detection interrupters (LCDIs) are protective devices that help prevent fires due to damage to cords. They are presently being built into the plug cap of room air conditioners. If the cord is damaged, the LCDI circuitry detects an abnormal condition and

immediately shuts off power. LCDI technology is also available in select extension cords and power strips.

Batteries

When used correctly, batteries provide a safe and dependable source of power. However, if they are misused or abused, overheating, leakage, or in extreme cases explosion or fire, can occur. Follow these safety principles when using batteries:

- Always follow warnings and manufacturers instructions for both the batteries and the battery-operated product. Use only the correct type and size battery indicated.
- Check the contacts of both the battery and the battery-operated product for cleanliness.
- Always insert the batteries correctly with regard to polarity (-/+), matching the positive and negative symbols of both battery and product. Putting them in backwards, the product will sometimes still operate, but may inadvertently charge the batteries resulting in venting or leaking.



- Remove and safely dispose of exhausted batteries immediately.
- Replace all batteries in battery-operated products at the same time and with the batteries of the same type and manufacture.
- Do not short circuit batteries. When the positive (+) and negative (-) terminals of a battery are in contact with each other, the battery can become short circuited. For example, loose batteries in a pocket with keys or coins can be short circuited possibly resulting in venting or explosion.
- Do not heat batteries.
- Do not crush, puncture, dismantle or otherwise damage batteries.
- Do not charge non-rechargeable batteries.
- Keep batteries out of reach of small children.

Congratulations! You've just completed a thorough electrical safety check of your home. The few minutes you took to check your home using this booklet could prevent a safety hazard and save a life.