

# PLUG INTO ELECTRICAL SAFETY™

## A HOME ELECTRICAL SAFETY CHECK



The National Electrical Safety Foundation was created in July, 1994 with the belief that through its efforts electrical accidents could be prevented and lives saved. To accomplish its mission the National Electrical Safety Foundation has three primary goals:

- ✓ To promote public awareness through ongoing education
- ✓ To serve as a resource for electrical safety information
- ✓ To sponsor National Electrical Safety Month

Multiple copies are available to education and non profit organizations upon request.

## INTRODUCTION

Each year many Americans are injured in and around their homes. Unsafe conditions such as overloaded circuits and damaged insulation as well as the misuse of extension cords and electrical products create fire hazards and may result in electrocutions.

The most recent U.S. Consumer Product Safety Commission statistics show that 40,000 fires a year are caused by problems with home electrical wiring, resulting in one life being lost every 25 hours (over 350 fires lost annually), approximately 6,800 injuries and over 2 billion in property damage.<sup>1</sup> Workplace statistics show one person is electrocuted in the workplace every day<sup>2</sup>; and millions of dollars are lost in corporate and personal productivity and assets because of related litigation.

Take a few minutes to look for and correct electrical safety hazards in your home. It does not take too long to check the insulation on a cord, move an appliance away from water, check for correct wattage light bulbs or install a GFCI (Ground Fault Circuit Interrupter).

Invest your time. It could prevent an electrical safety hazard and save lives.

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<sup>1</sup> CPSC, May 22, 1996

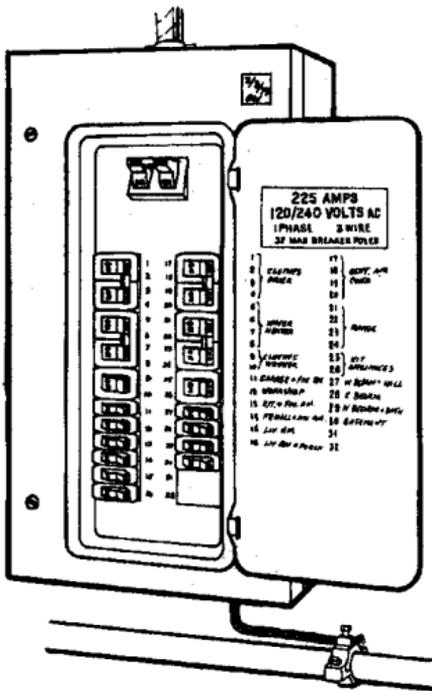
<sup>2</sup> OSHA

# HAVE YOUR ELECTRICAL SYSTEM INSPECTED

Consumer Product Safety Commission studies of residential electrical fires show that the majority of serious fires need not have occurred. The conditions that caused the fires probably would have been detected by an electrical inspection. These problems were not detected or corrected because no inspection had been made for several years. In a number of cases investigated by CPSC, homes ranging from 40 to 100 years old had not been inspected since they were built. A safety inspection should be performed by a qualified electrical or licensed electrical inspector.

To insure the electrical safety of your home, your electrical inspection should be up-to-date and defects corrected. There are no hard-and-fast rules about frequency of inspection but here are some suggestions:

To determine when your electrical system was last inspected, examine the door and cover of your electrical panel(s). The panel should contain a label or tag with a date, a signature, or initials on it. If there is more than one date, the most recent one should be the date of the last inspection. **DO NOT** remove the service-panel cover. This is a job for a qualified electrician.



CIRCUIT BREAKER PANEL

# POTENTIAL ELECTRICAL HAZARDS AND THEIR SYMPTOMS

<b>POWER OUTAGES</b>	fuses need replacement or circuit breakers need resetting frequently
<b>OVERRATED PANEL</b>	electrical panel contains fuses or circuit breakers rated at higher currents than the ampacity (current capacity) of their branch circuits, some times called "overamped" or "overfused"
<b>DIM/FLICKERING LIGHTS</b>	lights dim or the size of your television picture shrinks often
<b>ARCS/SPARKS</b>	bright light flashes or showers of sparks anywhere in your electrical system
<b>SIZZLES/BUZZES</b>	unusual sounds from the electrical system
<b>OVERHEATING</b>	parts of your electrical system, such as switch plates, wall outlet covers, cords and plugs may be warm. These should never be hot—painful to touch, or discolored from heat
<b>PERMANENTLY INSTALLED EXTENSION CORDS</b>	used to extend the home wiring system for a long period, instead of being used temporarily to connect some appliance with a cord too short to reach the wall outlet
<b>LOOSE PLUGS</b>	attachment plugs that wobble or pull out of a wall outlet easily
<b>DAMAGED INSULATION</b>	cut, broken, or cracked insulation

## If your last inspection was

- ✓ 40 or more years ago, inspection is overdue
- ✓ 10-40 years ago, inspection is advisable, especially if substantial electrical loads (high-wattage appliances, lights and wall outlets or extension cords) have been added or if some of the warning signs discussed are present.
- ✓ Less than 10 years ago, inspection may not be needed, unless some of the warning signs, described are present or temporary wiring has been added.

You may live in an area that is not served by state or local electrical inspectors, so that no inspection record will be found on your electrical panel. In that case, use the age of the house as a guide to the probable need for an inspection.

## APPLIANCE POWER BUDGET

Circuits can only handle a specified total wattage of all the electrical products connected to that circuit. If too much wattage is plugged into a circuit, serious electrical problems can result. Here is a guide to knowing what a circuit can handle:

15-ampere branch circuit can carry 1500 watts.

20-ampere branch circuit can carry 2000 watts.

Find the nameplate on each appliance indicating its power (watts) rating. Add up the total watts for appliances that you may use at the same time on the same branch circuit. Examples:

Hair Dryer



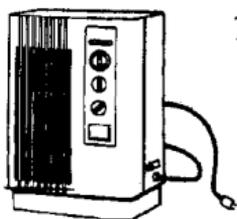
1400 watts

Iron



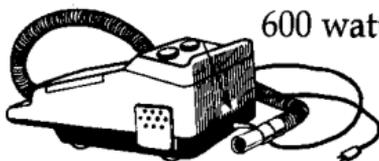
1000 watts

Portable Heater



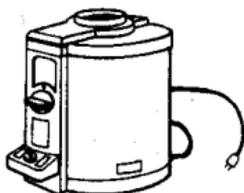
1200 watts

Vacuum Cleaner



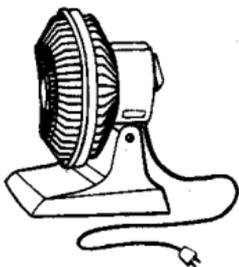
600 watts

Deep Fat Fryer



1300 watts

Portable Fan



150 watts

Most home lighting and wall outlet branch circuits may carry as much as 1500 watts (15 ampere branch); some kitchen circuits, as much as 2000 watts (20 ampere).

## CORDS

**Q. Are lamp, extension, telephone and other cords placed out of the flow of traffic?  Yes  No**

*Cords stretched across walkways may cause someone to trip.*

- ✓ Whenever possible, arrange furniture so that outlets are available for lamps and appliances without the use of extension cords. Extension cords should not be used as a substitute for permanent wiring.
- ✓ If you must use an extension cord, place it on the floor against a wall where people cannot trip over it.
- ✓ Move the phone so that telephone cords will not lie where people walk.

**Q. Are cords out from beneath furniture and rugs or carpeting?**  Yes  No

*Furniture resting on cords can damage them. Electric cords which run under carpeting can overheat and cause a fire.*

✓ Remove cords from under furniture or carpeting.

✓ Replace damaged or frayed cords.

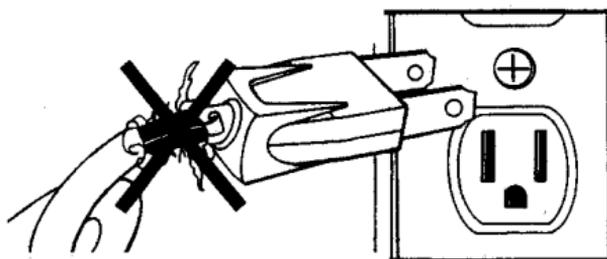
**Q. Are cords attached to the walls, baseboards, etc. with nails or staples?**  Yes  No

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

✓ Remove nails and staples from cords after disconnecting power.

✓ Check wiring for damage.

✓ Use tape if necessary to attach cords to walls or floors.



**Q. Are electrical cords in good condition, not frayed or cracked?**  Yes  No

*Damaged cords may cause a shock or fire.*

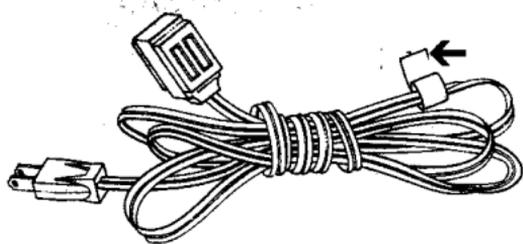
✓ Replace frayed or cracked cords.

✓ Do not use frayed electrical cords

**Q. Do extension cords carry no more than their proper load, as indicated by the ratings labeled on the cord and the appliance?**  Yes  No

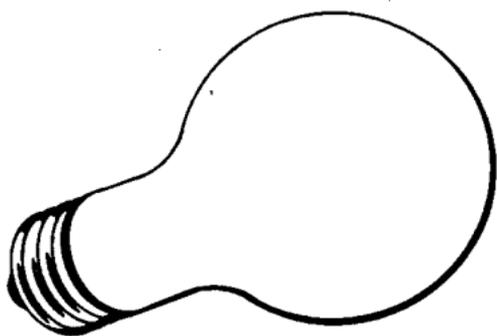
*Overloaded extension cords may cause fires.*

✓ Replace No. 18 gauge cords with No. 16 gauge cords. Older extension cords using small (No. 18 gauge) wires can overheat at 15 amps or 20 amps.



**RATED FOR  
1625 WATTS**

- ✓ 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.
- ✓ Use an extension cord having a sufficient amp or wattage rating, if an extension cord is needed.

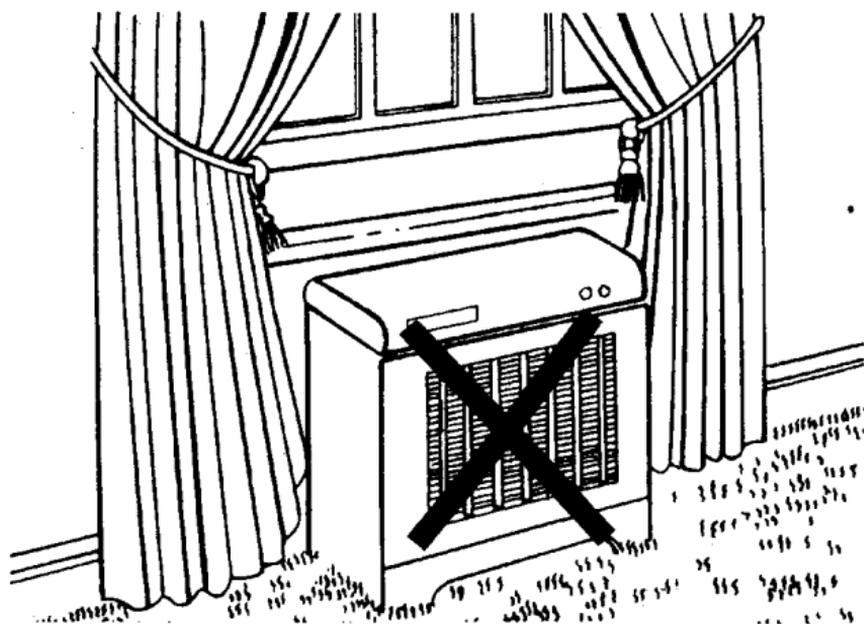


## **LIGHT BULBS**

**Q. Are the light bulbs the appropriate size and type for the lamp or fixture?**  Yes  No

*A bulb of too high wattage or the wrong type may lead to fire through overheating. Ceiling fixtures, recessed lights, and "hooded" lamps will trap heat.*

- ✓ Replace with a bulb of the correct type and wattage. (If you do not know the correct wattage, contact the manufacturer of the fixture.)
- ✓ Place halogen lamps away from curtains. These lamps become very hot and can cause a fire hazard.



## SPACE HEATERS

**Q. Are heaters which come with a 3-prong plug being used in a 3-hole outlet or with a properly attached adapter?  Yes  No**

*The grounding feature provided by a 3-hole receptacle or an adapter for a 2-hole receptacle is a safety feature designed to lessen the risk of shock.*

✓ Never defeat the grounding feature.

✓ 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.

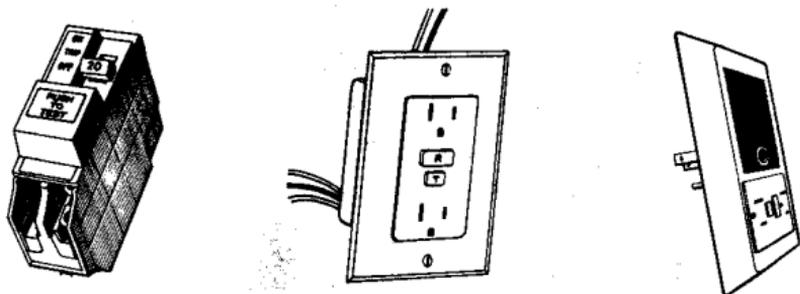
**Q. Are heaters placed where they can not be knocked over, and away from furnishings and flammable materials, such as curtains or rugs?**

Yes  No

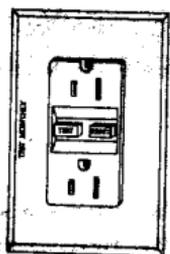
*Heaters can cause fires or serious burns if they cause you to trip, if they are knocked over or if they are placed near home furnishings.*

✓ Relocate heaters away from passageways and flammable materials such as curtains, rugs, furniture or newspaper.

# SHOCK PROTECTORS



## GROUND-FAULT CIRCUIT INTERRUPTERS



## CIRCUIT BREAKER RECEPTACLE PLUG-IN

A Ground Fault Circuit Interrupter (GFCI) detects any loss (leakage) of electrical current in a circuit that might be flowing through a person using an electrical product. When such a loss is detected, the GFCI turns electricity off before severe injuries or electrocution can occur. (However, you may receive a painful shock during the time that it takes for the GFCI to cut off the electricity.)

GFCI wall outlets can be installed in place of standard outlets to protect against electrocution for just that outlet, or a series of outlets in the same branch.

A GFCI Circuit Breaker can be installed on some circuit breaker electrical panels to protect against electrocution, excessive leakage current and overcurrent for an entire branch circuit.

Plug-in GFCIs can be plugged into wall outlets where appliances will be used.

**Q. Have you tested your GFCIs to be sure they still offers protection from fatal electrical shock?**

Yes  No

*A GFCI can provide power without giving an indication that it is no longer providing shock protection. Be sure your GFCI still provides protection from fatal electric shock.*

✓ Test monthly. First plug a night light or lamp into the GFCI-protected wall outlet (the light should be turned on), then depress the "TEST" button on the GFCI. If the GFCI is working properly, the light should go out. There will be an indicator to show if it is working properly or not. If it is working, it will disconnect the power from the protected circuit or plug. If not, have the GFCI replaced. Reset the GFCI to restore power.

✓ If the "RESET" button pops out but the light does not go out, the GFCI has been improperly wired and does not offer shock protection at that wall outlet. Contact a qualified electrician to correct any wiring errors.

**PROBLEM:** Electric shocks can be more serious in certain locations of the home such as bathrooms, kitchens, basements and garages where people can contact heating radiators, water pipes, electric heaters, electric stoves and water in sinks and bathtubs. If a person touches one of these and a faulty electrical appliance at the same time, they can receive a shock and may be electrocuted.

✓ If you have a home without GFCIs, consult with a qualified electrician about adding this protection.

✓ If you want to install some GFCI protection yourself, use plug-in units to protect individual wall outlets. Both two-conductor and three-conductor receptacle outlets can be protected with plug-in units.

✓ You may have a newer home that is equipped with GFCIs in the home areas mentioned above.

# FUSES/CIRCUIT BREAKERS



Edison-Base Plug  
Fuse (open)



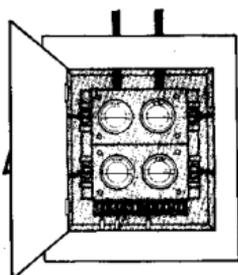
Edison-Base Plug  
Fuse (new)



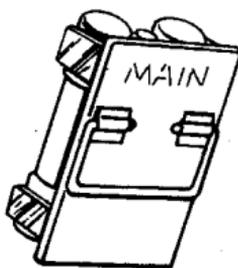
S-Type Plug  
Fuse



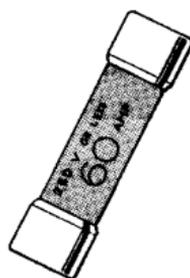
S-Type Socket  
Insert



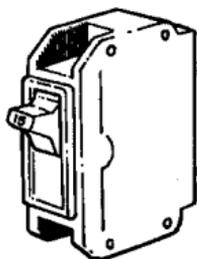
Four Fuse Panel



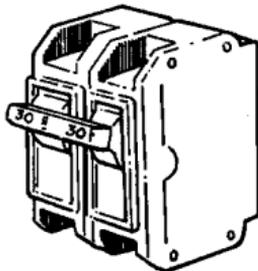
Pull out Fuse



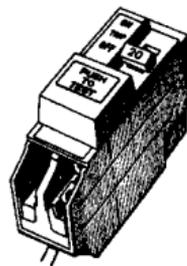
Cartridge Fuse



Single Pole Circuit Breaker



Circuit Breaker



Ground-Fault Circuit-  
Interrupter

Fuses and circuit breakers are safety devices located on your electrical panel to prevent over-loading 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 in the home regularly demand more electrical current than the home electrical system 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 closing the switch manually.

There are at least two different types of circuit breakers. One has a control handle that swings all the way to "OFF" when it is tripped. The other has an intermediate position, close to "ON" (sometimes it is difficult to see that it has tripped).

Both types of circuit breakers must be reset with the hand control after the problem has been eliminated.

The first type should simply be moved back to "ON," the second moved first to "OFF" and then to "ON."

**Q. If fuses are used, are they the correct size for the circuit?**  Yes  No

*Replacing a correct size fuse with a larger size fuse can present a serious fire hazard. If the fuse in the box is rated higher than that intended for the circuit, excessive current will be allowed to flow and possibly overload the outlet and 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, plan to have a qualified electrician identify and label the sizes to be used.)

**NOTE:** Most of the screw-based fuses used should be 15 amp. If all, or nearly all, fuses used are 30-amp, these fuses may be rated too high for the circuits.

## FUSES

**PROBLEM:** Your fuse panel has Edison-base plug fuses (screw base like a light bulb) installed. Fuses of different ratings will fit in Edison sockets.



Edison-Base Plug  
Fuse (open)



Edison-Base Plug  
Fuse (new)



S-Type Plug  
Fuse



S-Type Socket  
Insert

### 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. Overloading can lead to fire.

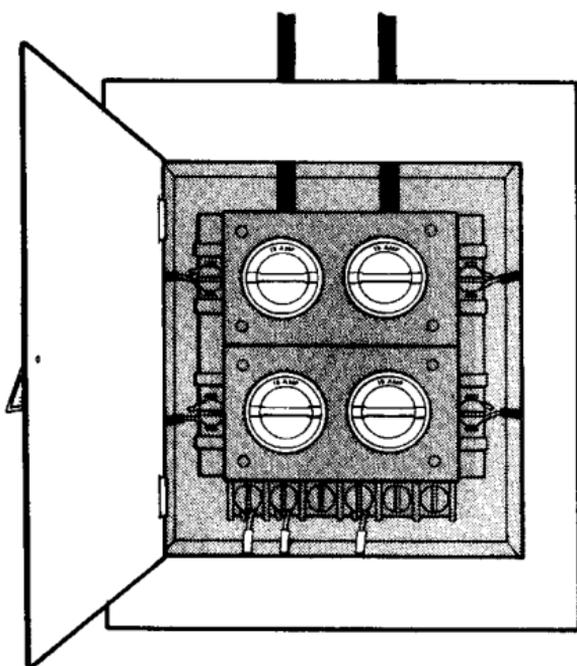
✓ To prevent future installation of fuses that allow currents too high for your wiring, your fuse panel should be converted to S-type sockets that accept only fuses of the correct amperage rating. If you have

Edison-base fuse sockets, have them fitted with the S-type socket inserts.

**PROBLEM:** If your home has a four-fuse panel (60-ampere) service, most of the fuses will be rated at 15 or, at most, 20 amperes. If you do not know for certain, have your electrical panel inspected to determine which branches should be protected at a 15-ampere level and which, if any, are adequate for 20 ampere safety devices. If it has one or more fuses rated above 20 amperes, someone may have tried to avoid power outages by substituting higher amperage fuses. Your wiring may be exposed to overloading that can lead to fire.

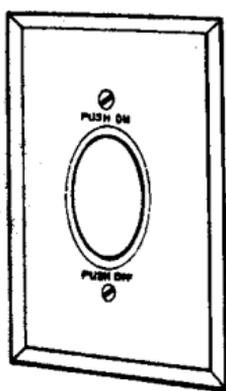
Reduce the fuses to 15-ampere rated ones, unless you are absolutely certain that a special circuit is wired for 20 amperes.

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 electrician to resolve the problem.

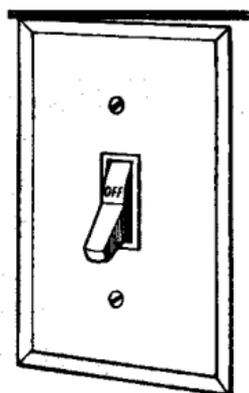


**FOUR FUSE PANEL**

# RECEPTACLE OUTLETS AND SWITCHES

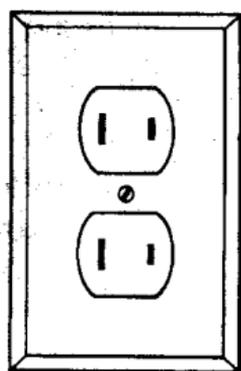


Push-Button Switch

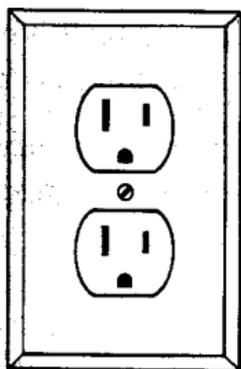


Toggle Switch

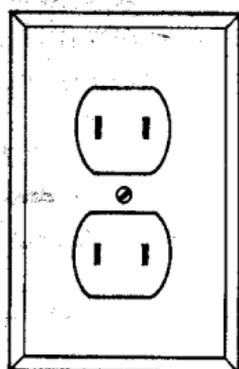
## SWITCHES



Two-Pole Polarized



Two-Pole Three-Wire Grounding



Two-Pole Non-Polarized

## RECEPTACLE OUTLETS

Switches are used to turn the power on and off. Receptacle outlets are usually mounted on a wall or floor to supply electricity to appliances through a cord and plug.

**Q. Are there outlets or switches which are unusually warm or hot to the touch?**  Yes  No

*Unusually warm or hot outlets or switches may indicate that an unsafe wiring condition exists.*

✓ Unplug cords from these outlets and do not use the switches.

✓ Have a qualified electrician check the wiring as soon as possible.

**Q. Do all outlets and switches have cover plates so that no wiring is exposed?  Yes  No**

*Exposed wiring presents a shock hazard.*

✓ Add a cover plate.

**Q. Are small electrical appliances such as hair dryers, shavers, curling irons, unplugged when not in use?**

Yes  No

## **SMALL APPLIANCES AND TOOLS**

*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 could electrocute you.*

✓ Install ground fault circuit interrupter (GFCI) protection near your kitchen and bathroom sinks to protect against electric shock. For more information, see the section on GFCIs.

✓ Unplug all small appliances when not in use.

✓ Never reach into water to get an appliance that has fallen in without being sure the appliance is unplugged.

**Q. Do you make sure that there is nothing covering your electric blanket when in use, and do you avoid "tucking in" the sides or ends of your electric blanket?**

Yes  No

*"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.

✓ Use electric blankets according to the manufacturer's instructions.

✓ Don't allow anything on top of the blanket while it is in use. (This includes other blankets or comforters, even pets sleeping on top of the blanket.)

✓ Do not use electric blankets on children.

**Q. Do you turn off your heating pad before you go to sleep?**  Yes  No

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

✓ Never go to sleep with a heating pad that is turned on.

✓ Do not use a heating pad if you are diabetic or obese.

**Q. Are power tools equipped with a 3-prong plug or marked to show they are double insulated?**

Yes  No

*These safety features reduce the risk of an electric shock.*

✓ Use a properly connected 3-prong adapter for connecting a 3-prong plug to a 2-hole receptacle.

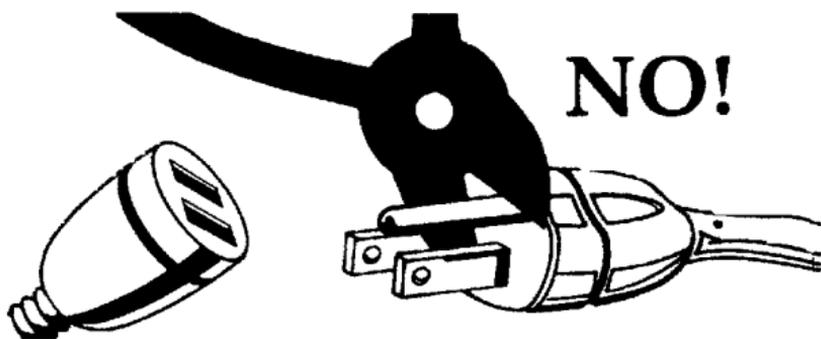
✓ Consider replacing old tools that have neither a 3-prong plug nor are double insulated.

**Q. Are power tool guards in place?**  Yes  No

*Power tools used with guards removed pose a serious risk of injury from sharp edges or moving parts.*

✓ Replace guards that have been removed from power tools.

**Q. Are the grounding features of any 3-prong plugs**



**being properly used i.e., the grounding pin has not been removed?**  Yes  No

*The third prong is there because the appliance must be grounded to avoid electric shock.*

The few minutes you took to check your home using this booklet could prevent a safety hazard and save a life!

# The National Electrical Safety Foundation

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**NESF**

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*"PROMOTING ELECTRICAL SAFETY IN THE HOME,  
SCHOOL AND WORKPLACE"*

