

Special National Electrical Safety Month Issue!

# Electrical Safety Illustrated

**5** Easy Steps  
to a Safer Home

**CRACKING THE CODE?**

What YOU should know about  
the National Electric Code®.

**AFCI vs. GFCI**

*Knowing the difference  
could save your life.*

**Take the Test!**

Are YOU safety savvy?

**Protect Your  
Community**

Free guide inside to help  
make your community safer!

Would you invest

**50¢**

to protect a child?

**Deadly  
Deals**

What you don't know  
about counterfeits  
could kill you.

For more information  
about electrical safety  
visit [www.esfi.org](http://www.esfi.org).

ESFi.org



# Powerful Thoughts from the President

Electrical Safety Foundation International

Twenty years ago the Electrical Safety Foundation International (ESFI) was founded as a cooperative effort by the National Electrical Manufacturers Association (NEMA), Underwriters Laboratories (UL), and the U.S. Consumer Product Safety Commission (CPSC) to advance the public's electrical safety awareness with the provision of unbiased information. We've accomplished a lot in our twenty years, though we know the need for electrical safety education is ever-present. With our nation's growing dependence on electricity, more people are recognizing the need for ongoing and evolving public education addressing the hazards associated with our electrified lives. It is in this pursuit that ESFI develops our programs and initiatives and we applaud you for taking a proactive approach to protect against electrical hazards.

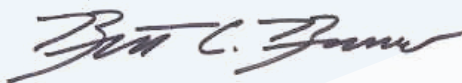
ESFI commemorates "National Electrical Safety Month" each May with the release and promotion of new and updated electrical safety resources. As part of our campaign's growing momentum, governors across the nation have issued proclamations recognizing National Electrical Safety Month in their states and encouraging their constituents to renew their commitment to safety. For Electrical Safety Month 2014, we are excited to announce the launch of *Electrical Safety Illustrated*. In this magazine we will discuss timely electrical safety issues and equip you with the knowledge to better protect your home, family and communities from electrical hazards.

While we touch on a variety of topics, we recognize that we must also go back to the basics to ensure a fundamental understanding surrounding electrical safety. Each section provides only an overview of the issues and we encourage you to visit our website, [www.esfi.org](http://www.esfi.org), to delve deeper into the subjects. We also invite you to follow us on Facebook, Twitter, LinkedIn and YouTube to stay abreast of emerging electrical safety concerns and receive reminders about how you can protect yourself.

We hope that you will also share this magazine with your neighbors, co-workers, friends and family. Included in the magazine, is a "Safety Advocate Guide" to help you inspire others to get involved and become passionate about electrical safety. After all, the National Fire Protection Association (NFPA) estimates 47,700 home structure fires reported to U.S. fire departments each year involved an electrical failure or malfunction as a factor contributing to ignition. These fires resulted in 418 civilian deaths, 1,570 civilian injuries, and \$1.4 billion in direct property damage.

Awareness and education are the only ways we will reduce the incidence of electrical fires, and we appreciate your involvement in National Electrical Safety Month 2014.

Sincerely,



Brett Brenner  
President, Electrical Safety Foundation International



Brett Brenner, President, Electrical Safety Foundation International

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# ▶ Table of Contents



**Page 10**  
**Surge and Protect**  
Prevent costly damage caused by power surges.

**5 Easy Steps to a Safer Home** Page 6  
Follow these steps to protect your family and your home.




**Deadly Deals**  
Learn how to spot counterfeit electronics.

**Page 9**

**3** **Cracking the Code**  
What everyone should know about the National Electrical Code®.

**AFCI vs. GFCI**  
Do you know the difference? **You should.** It just might save your life.

**Page 5**



**Page 4**  
**Code Facts and Figures**  
Electrical safety and the National Electrical Code® by the numbers. You might be surprised.

**Save a Child With 50¢**  
An inexpensive way to show you care.

**8**



**7** **Are you safety savvy?**  
**Take the test to find out!**

**11** **Protect your Community**  
An easy guide to help your community stay electrically safe.

**Advertisements** **12**  
Electrical safety products and reminders.

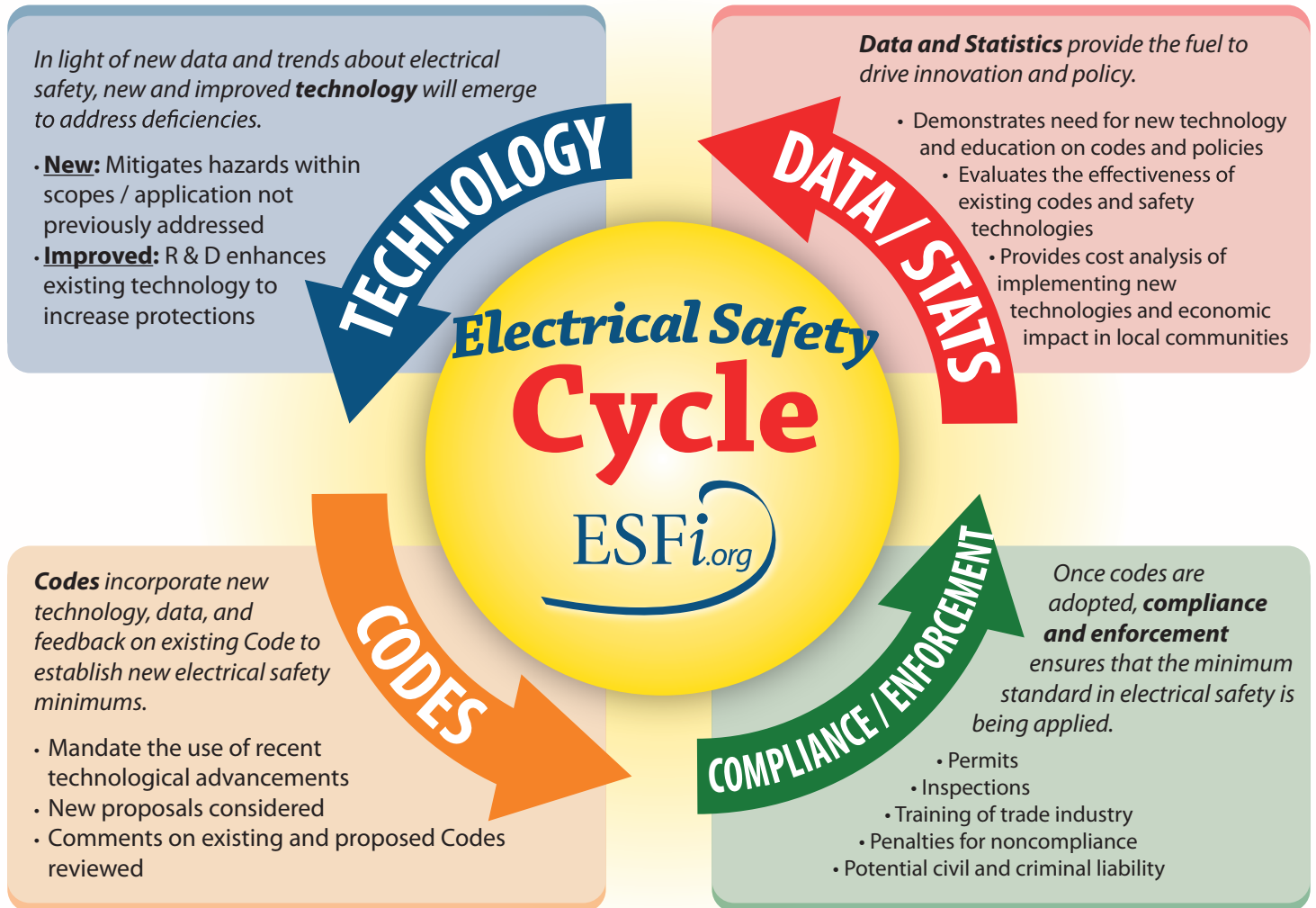
### What is the Code?

The National Electrical Code® (NEC) codifies the minimum requirements for safe electrical installations in a single, standardized source. While the NEC is not itself a U.S. law, the NEC is commonly mandated by state or local law. Local jurisdictions and code enforcement boards inspect for compliance with the minimum standards, as set forth in the code.

### What is the revision process?

The NEC is revised by the National Fire Protection Association's Committee on the National Electrical Code, which consists of 19 code-making panels and a technical correlating committee. Revision occurs *every three years* to ensure that the code takes into account the latest in technology and safety. Following the release of a new edition, the development process continues;

soliciting proposals for amendment. *Anyone*, including the public, may submit proposals but they should demonstrate evidence that clearly indicates a need for the revision. Panels then review all proposed revisions and comments and, through voting consensus, establish the rules that then make up the next version of the NEC.



### Is it necessary to update the Code every three years?

As the unbiased authority on electrical safety, the Electrical Safety Foundation International (ESFI) is a staunch supporter of the National Electrical Code® and its current three-year revision

cycle. The process is accountable to the public, both in soliciting public participation in the development process and the resulting protections provided by the Code. ESFI strongly encourages states and jurisdictions to adopt the most recent NEC edition to protect its residents with the latest

advancements in electrical safety. The NEC saves lives and its importance should not be minimized; it is the agreed upon minimum standard for safety, as determined by experts, and should be promptly adopted in full.

# • FACTS AND FIGURES •

The National Electrical Code ® (NEC) is **in effect** only

## AFTER

it is adopted by the state or local jurisdiction.

## 3,810

Average number of fires in dorms and barracks. The 2014 NEC will now require AFCI protection in living areas of these residences.

## 1/3

of Americans have four or more TVs and the average home now has more TVs than people.



As of March 2014, **10** states are using the 2008 NEC, **35** states are using the 2011 NEC, 1 state using the 2014 NEC, and four states without a statewide adoption.

## 3 vs. 6

Some jurisdictions are considering extending the revision cycle of the NEC from three to six years. This proposed extension would prevent the code from incorporating new technology that was not previously available and leave some residents over **15 years** behind in terms of safety.

The average home in the US was built in

## 1974

At that time **only one in six** homes had central air conditioning.

## 7 children

are treated in hospital emergency rooms for electrical shock or burn injuries caused by tampering with a wall outlet. **The 2008 NEC mandated the installation of tamper-resistant receptacles (TRRs)** in all new residential construction to reduce this risk.

## Did you know?

Adoption of the **current NEC** provides the necessary level of safety to protect you from electrical fire and shock hazards. Upgrades exceeding the minimum requirements increase the safety and convenience of your home's electrical system.

## 3,745

proposals were submitted to NFPA to be considered for incorporation into the 2014 NEC.



### Electrical Safety Foundation International

Visit [www.esfi.org](http://www.esfi.org) for free resources and more information about electrical safety.

## True or False?

**The National Fire Protection Association (NFPA) revises and disseminates the Code.**

**TRUE.** After the first NEC was created, the **National Conference on Standard Electrical Rules disbanded** and transferred responsibility to NFPA in 1911. Eight editions preceded before NFPA gained ownership.

**Only manufacturers can influence the National Electrical Code making process.**

**FALSE.** Participation in NFPA's codes and standards revision is open to input and comment from anyone and can be accessed at [www.nfpa.org](http://www.nfpa.org).

**The cost of the NEC supports code development**

**TRUE.** **NFPA is a non-profit organization** devoted to fire, life, and electrical safety. Funds from the sale of codes and standards support updating the codes as well as other safety-related activities.

# AFCI vs GFCI

Arc Fault Circuit Interrupter

Ground Fault Circuit Interrupter

Though both provide enhanced electrical safety and have similar acronyms, AFCIs and GFCIs protect against very different things. Use this table to learn the differences and values of these safety technologies.



**AFCI**

## • Motto •

"The best fire protection is prevention."

**GFCI**



"Protecting people from the path to harm."

## • Protects Against •

Arc faults – a dangerous electrical problem caused by damaged, overheated, or stressed electrical wiring or devices that may result in a fire.

Ground faults - an unintentional electrical path between a power source and a grounded surface. A person who becomes part of a path for leakage current will be severely shocked or electrocuted.

## • Maintenance •

Test AFCIs each month. If the device does not trip when tested, it should be replaced. See page 6 for instructions.

Test GFCIs each month. If the device does not trip when tested, it should be replaced. See page 6 for instructions.



**AFCI**

## • How they Work •

AFCIs detect hazardous arcing conditions and shut down the electricity before a fire can start.



**GFCI**

GFCIs prevent deadly shock by quickly shutting off power to the circuit if the electricity flowing into the circuit differs by even a slight amount from that returning, indicating a leakage current.

## • Need •

The U.S. Consumer Product Safety Commission estimates that AFCIs could prevent roughly 50% of the electrical fires that occur every year.

A U.S. Consumer Product Safety Commission study found 47% of the electrocutions could have been addressed with the inclusion of GFCI protection in homes.

## • Typical Cost •

Approximately \$35 for Branch/feeder AFCIs.

As little as \$15 for GFCI outlets.

*As codes and standards evolve, AFCI receptacles were introduced in 2013 to offer added protection from arc faults.*



*AFCI and GFCI technologies can coexist with each other to provide the most complete protection that can be provided on a circuit.*



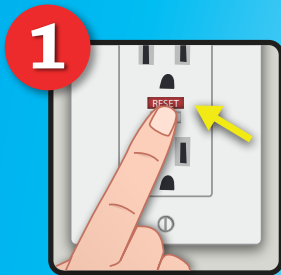
# 5 Easy Steps to a Safer Home

How to Test AFCIs and GFCIs

## GFCI

In order to provide enhanced protection, your AFCIs and GFCIs need to be functioning properly. Follow these easy steps to test them each month.

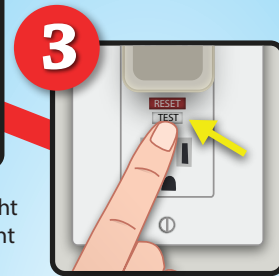
26% of respondents who claimed to have tested their GFCIs have discovered **one** that was **not working properly**.\*



1 Push the reset button to prepare the outlet.



2 Plug an ordinary nightlight in and turn it ON. The light should now be on.



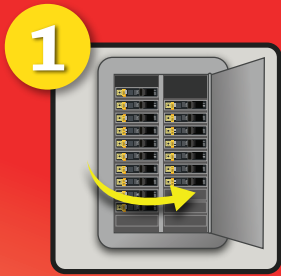
3 Push the "test" button. The nightlight should turn OFF.



4 Push the "reset" button again. The nightlight should now go ON again.



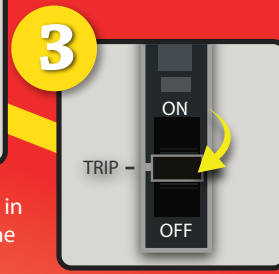
5 If the nightlight does not turn off when the "test" button is pushed, contact a licensed electrician to correct the problem.



1 Open the electrical service panel.



2 With the breaker's switch in the ON position, press the TEST button.



3 It should trip, causing the switch to move to either the OFF position or the TRIP position if the breaker includes one.



4 If it trips, it is working. Turn it OFF and then ON again to reset.



5 If it does not trip, contact a licensed electrician to replace it.

## AFCI

In the US, arcing faults cause about **30,000** home fires each year, resulting in hundreds of deaths and injuries and more than **\$862 million** in property damage.\*\*



# ARE YOU SAFETY SAVVY?

**1 True or False. Using a corded telephone during a lightning storm is safe.**

- a. True
- b. False

**2 Why do some outlets have three holes?**

- a. Provides more voltage
- b. The third prong is the "ground"
- c. To accommodate foreign appliances
- d. It keeps the plug from falling out

**3 When using a portable generator in a power outage, you should:**

- a. connect generators directly to the household wiring *only when* an appropriate transfer switch is installed to prevent backfeed along power lines that poses a risk to utility lineworkers making repairs
- b. position the generator outside the home and away from doors, windows and vents that can allow carbon monoxide to enter the home
- c. make sure your generator is properly grounded
- d. plug it into a ground fault circuit interrupter (GFCI)
- e. All of the above

**4 The \_\_\_\_\_ industry alone sustained 52% of all workplace electrical fatalities.**

- a. natural resources and mining
- b. manufacturing
- c. trade, transportation and utilities
- d. construction

**5 The most common scenario for electrocutions while using power tools is \_\_\_\_\_.**

- a. the equipment coming into contact with water
- b. the equipment coming into contact with electrical wires
- c. the equipment malfunctioned
- d. exposure to bare wires by grabbing a cord with cracked or broken insulation

**6 Smoke alarm batteries should be changed every:**

- a. month
- b. 6 months
- c. year
- d. 2 years

**7 You shouldn't swim near docks or marinas because:**

- a. Boats may not see you and run you over
- b. There could be residual fishing equipment like hooks
- c. The water may be electrified by docks or boats that leak electricity into the water
- d. All of the above

**8 In a study conducted by Temple University's Biokinetics Laboratory, what percent of children ages 2 to 4 years old were able to remove plastic outlet covers from the sockets in less than ten seconds?**

- a. 25%
- b. 50%
- c. 75%
- d. 100%

**9 Across the U.S., a fire department responds to a fire once every:**

- a. 23 seconds
- b. 7 minutes
- c. 28 minutes
- d. 52 minutes

**10 The proper way to safely move away from a downed power line is to \_\_\_\_\_ until you are 35 feet away.**

- a. take small hops with your feet together
- b. shuffle away with small steps, keeping your feet together and on the ground at all times
- c. skip so that only one foot is on the ground at a time
- d. crawl on all fours

**11 True or False. You can be electrocuted using a tree trimmer near a power line even if you don't touch the wires.**

- a. True
- b. False

**12 True or False. Swallowing a button-cell battery can be fatal.**

- a. True
- b. False

**13 What age group has the highest risk of death from fire?**

- a. 15 years and under
- b. 21-35 years
- c. 50-64 years
- d. Adults over 65

**14 Birds are able to perch on power lines without risk of injury because:**

- a. Those power lines do not have power running through them at that time
- b. The unique skin on the feet of birds protects them
- c. Sitting on one wire does not provide a ground or connect a circuit, so the current doesn't leave the wire and continues on its path
- d. Their bones are hollow allowing the current to pass through them without harm

**15 When a new version of the National Electrical Code ® is adopted by a jurisdiction \_\_\_\_\_ must follow it.**

- a. all buildings currently being utilized
- b. new buildings
- c. renovations
- d. b and c

Answers: (1)b, (2)b, (3)e, (4)d, (5)b, (6)c, (7)d, (8)d, (9)a, (10)b, (11)a, (12)a, (13)d, (14)c, (15)d





# 50¢ to Protect a Child

The cost of installing a TRR in a newly constructed home is only about **50¢ more** than a traditional receptacle.

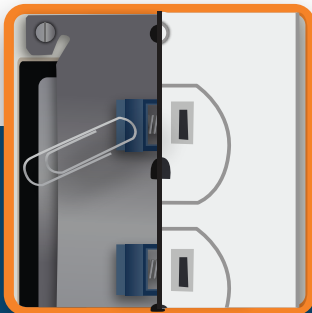
TRRs should only be installed by a **licensed electrician**.

## What are Tamper Resistant Receptacles (TRRs)?

Though they look like standard outlets, only TRRs include a built-in shutter system that **prevents foreign objects from being inserted**. Only a plug that applies **simultaneous, equal pressure to both slots** will disengage the cover plates, allowing access to the contact points. Without this synchronized pressure, the cover plates remain closed, preventing the insertion of foreign objects.

Existing homes can be **retrofitted** with TRRs for as little as **\$2.00** per outlet.

Be sure to purchase TRRs that have been **certified** by a nationally recognized, independent testing lab (i.e. UL, ETL, or CSA).



The curiosity of kids knows no boundaries and sometimes leads to dangerous behaviors. Located in practically every room in every house throughout the United States, electrical receptacles present a constant and real danger to these little explorers.

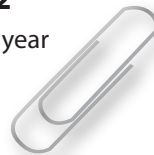


## TRRivia

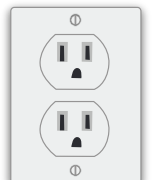
Each year **2,400 children** suffer severe shock and burns resulting from inserting objects into the slots of electrical receptacles.



It is estimated that **6-12 child fatalities** each year result from children tampering electrical receptacles.



Tamper Resistant Receptacles (TRRs) provide **affordable and permanent** protection.



# ▶ Counterfeits

## Deadly Deals

The saying, "If it's too good to be true, it usually is," should come to mind when you find electrical products that are far below competitor prices. But electrical products are uniquely hazardous when impersonated. They have not undergone testing by an independent laboratory, likely do not comply with industry safety requirements, and since its origin is often unknown, its manufacturer isn't held accountable for the potentially deadly results. Learn what to look for and help protect yourself and your loved ones from fires or injuries associated with counterfeit products.

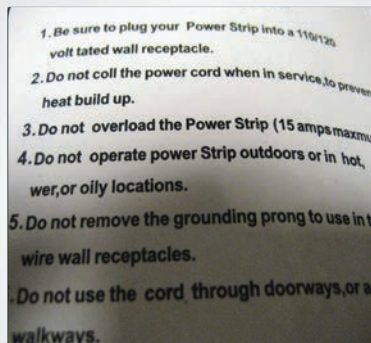


## ▶ Can you Spot the Counterfeit?

Which image(s) below are of a counterfeit product?



1



2



3

## ▶ What to Look For:

- Use **established vendors** who purchase their goods from **legitimate distributors** and **genuine manufacturers**.
- Read the **packaging and labels** carefully. Text should be free of **grammatical errors** and should not contain **spelling errors**.
- Packaging should contain the **name and contact information** of the item's manufacturer.
- Avoid **unknown brands** and products that **do not display any brand affiliation**.
- **Do your research**. The Consumer Product Safety Commission (CPSC), manufacturers, and testing laboratories (i.e. UL, ETL, or CSA) have information about product recalls, including those related to counterfeiting, on their websites.

## ▶ Answers and Evidence:

**Image 1:** Counterfeit. There is **no brand name** for this product. Additionally, the **cost is significantly lower** (\$2.99) than the average cost (\$10) of a cord of this length. While the label does display the mark of an independent testing laboratory (UL), these too can be impersonated. Visit the lab's website for tips about determining if a mark is real or fake.

**Image 2:** Counterfeit. Each of the first four bullets contains **typos**.

**Image 3:** Counterfeit. This product very closely resembles the legitimate product. Only by visiting the **Consumer Product Safety Commission** website would you learn that this is a **counterfeit** and is part of a voluntary recall that includes free inspection and a replacement or refund.

# Surge and Protect

Power Surges and How to Protect Yourself

## The Issue

### WHAT IS A "POWER SURGE"?

A power surge, or transient voltage, is a **sudden and unwanted increase in voltage that can damage, degrade or destroy** the sensitive electronic equipment in your home or business.



### CAUSES

The National Electrical Manufacturers Association (NEMA) estimates that **60-80% of surges are created within a facility**, such as when large appliances, like air conditioners, turn on and off. Surges can also originate from the **electric utility company during power grid switching**. Lastly, the most powerful surges can be caused by **lightning**.



### IMPACT

A spike in voltage can be **harmful to electrical devices** in your home if the increase is above the device's intended operating voltage. This excess voltage can cause an arc of electrical current resulting in **heat that damages** the electrical components. Repeated small-scale surges may slowly **damage your electronic equipment** and **shorten the life** of appliances and electronics involved.



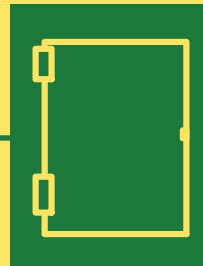
## The Solutions

### POINT-OF-USE SURGE PROTECTION DEVICES



Protect only the items that are **directly plugged into the device** from most electrical surges. It does not suppress or arrest a surge but **diverts the surge to ground**. Use point-of-use surge protectors that have an indicating light and/or audible alarm that alert when it needs replacement.

### SERVICE ENTRANCE SURGE PROTECTION DEVICES



Mounted in or on your main electrical panel or at the base of the electric meter, this device provides **protection for your entire electrical system**.

This device covers components that cannot be connected to a point-of-use device, such as outlets and light switches.

### REMINDERS

- ! No surge protection device can handle a **direct lightning strike**. The best surge protection is to **unplug devices from the wall** if you suspect a surge might be coming.
- ! Power strips **do NOT provide surge protection**. Be sure you are relying on the appropriate device for protection.
- ! Power strips and surge suppressors **don't provide more power to a location**, only more access to the same limited capacity of the circuit into which it is connected.

# Protect Your Community

If you're like most people and already use the internet and social media every day, ESFI has various ways you can engage with us and encourage your friends to do so as well. Education is the key to protecting your community from preventable electrical fires, injuries and fatalities. Knowledge IS power, but often people don't know the subjects in which they are lacking. Together we can help keep others safe.

- Learn new electrical safety tips and information through our status updates.

- Share our statuses or something you've learned so friends in your network stay safe.

- Encourage your friends to connect with us.

- Engage with other safety-minded people.

- Share with us your electrical safety activities and successes.



Like us:

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Follow us:

[www.twitter.com/ESFI.org](http://www.twitter.com/ESFI.org)



Link with us:

[www.linkedin.com/company/esfi](http://www.linkedin.com/company/esfi)



K

Help kids learn about electrical safety:

<http://kids.esfi.org/>

- Watch entertaining, kid-friendly videos featuring ESFI's mascot, P.I. Plug.

- Send free e-cards with electrical safety reminders to loved ones.

- Encourage children to play free interactive games that teach electrical safety.

- Free activities for teachers and parents to reinforce electrical safety topics.

## Above and Beyond

*Print out copies of this magazine and request permission to leave it in the waiting room of doctor's offices or hair salons in your area.*

*Encourage daycare providers to use our free teaching activities.*

*Contact your local newspaper and encourage them to devote a story to National Electrical Safety Month and its mission.*

*Include a post about National Electrical Safety Month in your town, neighborhood, community center or church newsletter.*



## Recovering from a flood?

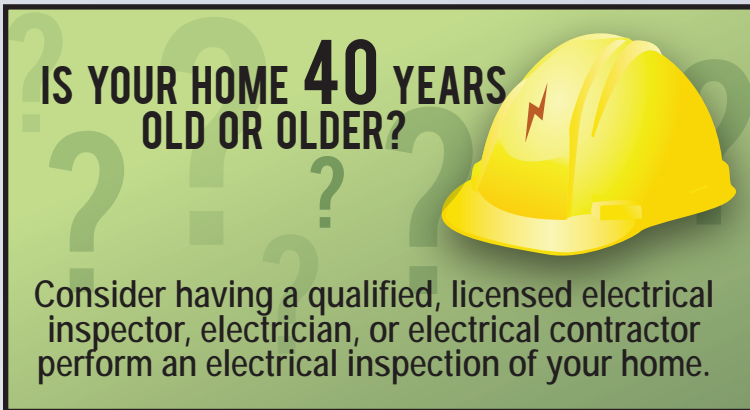
Allow an electrician or electrical inspector to determine which electrical equipment and appliances can be restored and which need to be replaced.



## DON'T BECOME A VICTIM OF THE "SILENT KILLER"!

Carbon Monoxide (CO) is an **odorless, colorless, tasteless** gas that is virtually undetectable without the use of detection technology like a CO alarm.

Install CO alarms on every level of your home and in a central location outside each sleeping area.




## IS YOUR HOME 40 YEARS OLD OR OLDER?

Consider having a qualified, licensed electrical inspector, electrician, or electrical contractor perform an electrical inspection of your home.



Continue to be the life of the party and remember: Water and electricity don't mix!

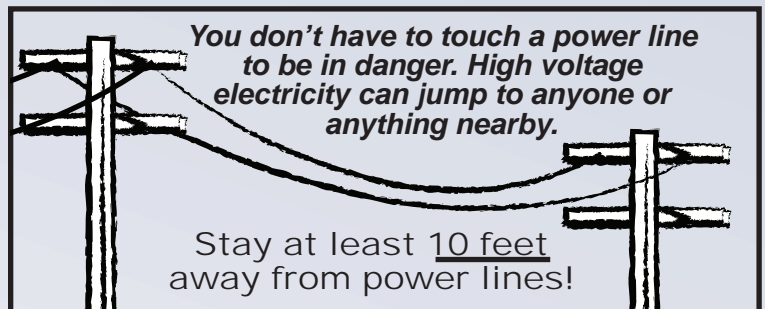
Don't use electronic devices around pools, spas or hot tubs.



**The Electrical Safety Foundation International (ESFI)** is a non-profit organization dedicated exclusively to promoting electrical safety in the home, school, and workplace.

We engage in public education campaigns throughout the year to increase electrical safety awareness and advocate for safe electrical practices. Education and awareness are the keys to reducing electrically-related fires, fatalities, injuries, and property loss.

For more information visit [www.esfi.org](http://www.esfi.org) or contact us at [info@esfi.org](mailto:info@esfi.org) or (703) 841-3229.



You don't have to touch a power line to be in danger. High voltage electricity can jump to anyone or anything nearby.

Stay at least 10 feet away from power lines!

## Protect your home and loved ones!



Smoke alarms should be installed:

- In every bedroom
- Outside each sleeping area.
- On every level of the home.

Test them **every month** and replace the batteries each year!