

## HELP TO PROTECT YOUR HOME FROM FIRE. RECENT HEADLINES

- January 5, 2011 – Fire damages Sandy Creek Home.
- January 4, 2011 – Family of five displaced by fire.
- December 28, 2010 – Ft. Walton Beach home destroyed.
- November 19, 2010 – Navarre, Single mom loses home.
- November 9, 2010 – Fire rips through apartment complex.
- November 8, 2010 – Valparaiso home ruined, pets lost in fire.
- October 13, 2010 – Destin family saved by smoke alarms.
- October 8, 2010 – Santa Rosa Beach, one million dollar home totaled, pets lost.

These are just a few of the most recent fires that have taken place in our area over the past few months. Thankfully, there were no human fatalities in the homes mentioned above, but there were ample losses felt by the owners and occupants of these homes. It is a devastating feeling to be left outside of your burning home while all of your personnel belonging are being disintegrated by a fire. It is a painful reality that will stay with the homeowners and occupants as long as they live. The majority of the above fires' ignition was from an electrical source energized from the homes wiring system or the homes wiring system itself. The list need not go on and on as it has in the past. Read on as we discover some of the problems and some of the solutions that may help prevent many of these type fires in the future.

Over the last few decades the increases of electronics in our homes, such as computers, audio/video equipment, electronic gaming systems, and numerous additional appliances has contributed to overload circuits and arc faults that cause fires in existing homes throughout our area. Okaloosa and Walton counties have experienced an alarming number of house fires that resulted in loss of property and the loss of life over the past year. The electrical systems in some of our homes simply can not withstand the increase in the additional loads without proper maintenance and upkeep. These additional loads in addition to loose and worn connections at receptacles and other electrical connections can produce arcing or arc faults. Arc faults are one of the major causes of the over 40,000 residential fires that we experience in the U.S. each year, says the Consumer Product Safety Commission in a report about arcing faults and Arc Fault Circuit Interrupters (AFCI's).

Arcing can often occur when loose connections, deteriorated cords, damaged wires, poorly installed receptacles or switches, natural aging and heat damaged cords are overlooked and permitted to go unrepaired. This arcing causes additional heat in the system which builds until one or more combustible materials actually catches on fire. These fires result in over 350 deaths and 1400 injuries each year. At Gulf Coast Electric we believe that educating the public about AFCI circuit breakers is important as is the education that we have been undergoing about smoke alarms for the past few decades. Smoke alarms have proven to save lives over and over again as they did in the October 13, 2010 article that appeared in the Northwest Florida Dailey News. Arc Fault Circuit

Interruptioners also can save lives, but they can also save your property by alerting you that something is loose or arcing in your electrical circuits before a serious fire breaks out.

The 2002 addition of the National Electrical Code required that all new homes be provided with AFCI protection in all bedrooms only. This was required because conventional circuit breakers will not protect your home against arc faults. The typical circuit breaker does not have the intelligence in sensing circuitry to discriminate between normal and unwanted arcing in a circuit. The new combination AFCI breakers use a very unique sensing circuitry to monitor current flow through the AFCI and it can detect an undesirable arc in the circuit and de-energize the circuit before it has a chance to do any damage. An Arc Fault Circuit Interrupter will not trip during normal arcing that occurs while opening a switch or unplugging something from a receptacle. It is designed to trip under the type of sustained arcing that causes eventual combustion of the building materials or furnishings in your home. The current 2008 addition of the National Electrical Code requires that AFCI technology be used throughout the residence in a new home on the majority of the electrical circuits. However it is important to note that older homes with older wiring and worn receptacles and switches are in an even greater need of the protection that Arc Fault Circuit Interrupters have to offer. The new Arc Fault Circuit Interrupters are available for almost every type of circuit breaker panel and they can be economically installed by a licensed electrician. They can be added to any home to make your home safer and less vulnerable to fires caused by arcing. Remember, your electrical system is like your car, it must be maintained and kept in good condition if you want it to be safe and reliable. Visit our website at [www.gcedestin.com](http://www.gcedestin.com) for more information and tips about safety and maintenance of the electrical system in your home.

This life saving information has been brought to you by your friends at Gulf Coast Electric. Call us for all of your electrical needs.

# Arc Fault Circuit Interrupter (AFCI) FACT SHEET

## THE AFCI

The “AFCI” is an arc fault circuit interrupter. AFCIs are newly-developed electrical devices designed to protect against fires caused by arcing faults in the home electrical wiring.

## THE FIRE PROBLEM

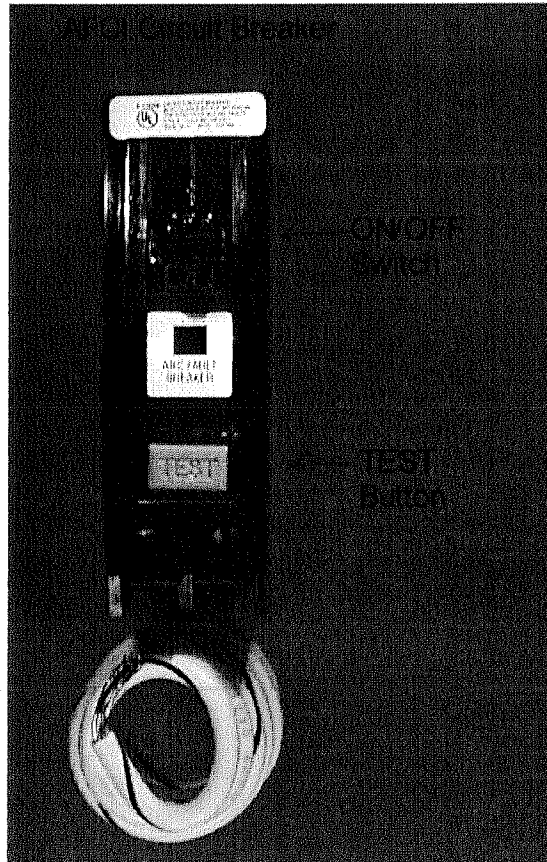
Annually, over 40,000 fires are attributed to home electrical wiring. These fires result in over 350 deaths and over 1,400 injuries each year<sup>1</sup>. Arcing faults are one of the major causes of these fires. When unwanted arcing occurs, it generates high temperatures that can ignite nearby combustibles such as wood, paper, and carpets.

Arcing faults often occur in damaged or deteriorated wires and cords. Some causes of damaged and deteriorated wiring include puncturing of wire insulation from picture hanging or cable staples, poorly installed outlets or switches, cords caught in doors or under furniture, furniture pushed against plugs in an outlet, natural aging, and cord exposure to heat vents and sunlight.

## HOW THE AFCI WORKS

Conventional circuit breakers only respond to overloads and short circuits; so they do not protect against arcing conditions that produce erratic current flow. An AFCI is selective so that normal arcs do not cause it to trip.

The AFCI circuitry continuously monitors current flow through the AFCI. AFCIs use unique current sensing circuitry to discriminate between normal and unwanted arcing conditions. Once an unwanted arcing condition is detected, the control circuitry in the



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<sup>1</sup> Ault, Singh, and Smith, “1996 Residential Fire Loss Estimates”, October 1998, U.S. Consumer Product Safety Commission, Directorate for Epidemiology and Health Sciences.

AFCI trips the internal contacts, thus de-energizing the circuit and reducing the potential for a fire to occur. An AFCI should not trip during normal arcing conditions, which can occur when a switch is opened or a plug is pulled from a receptacle.

Presently, AFCIs are designed into conventional circuit breakers combining traditional overload and short-circuit protection with arc fault protection. AFCI circuit breakers (AFCIs) have a test button and look similar to ground fault circuit interrupter (GFCI) circuit breakers. Some designs combine GFCI and AFCI protection. Additional AFCI design configurations are anticipated in the near future.

It is important to note that AFCIs are designed to mitigate the effects of arcing faults but cannot eliminate them completely. In some cases, the initial arc may cause ignition prior to detection and circuit interruption by the AFCI.

The AFCI circuit breaker serves a dual purpose – not only will it shut off electricity in the event of an “arcing fault”, but it will also trip when a short circuit or an overload occurs. The AFCI circuit breaker provides protection for the branch circuit wiring and limited protection for power cords and extension cords. Single-pole, 15- and 20- ampere AFCI circuit breakers are presently available.

#### WHERE AFCIs SHOULD BE USED

The 1999 edition of the National Electrical Code, the model code for electrical wiring adopted by many local jurisdictions, requires AFCIs for receptacle outlets in bedrooms, effective January 1, 2002. Although the requirement is limited to only certain circuits in new residential construction, AFCIs should be considered for added protection in other circuits and for existing homes as well. Older homes with aging and deteriorating wiring systems can especially benefit from the added protection of AFCIs. AFCIs should also be considered whenever adding or upgrading a panel box while using existing branch circuit conductors.

#### INSTALLING AFCIs

AFCI circuit breakers should be installed by a qualified electrician. The installer should follow the instructions accompanying the device and the panel box.

In homes equipped with conventional circuit breakers rather than fuses, an AFCI circuit breaker may be installed in the panel box in place of the conventional circuit breaker to add arc protection to a branch circuit. Homes with fuses are limited to receptacle or portable-type AFCIs, which are expected to be available in the near future, or AFCI circuit breakers can be added in separate panel boxes next to the fuse panel box.

#### TESTING AN AFCI

AFCIs should be tested after installation to make sure they are working properly and protecting the circuit. Subsequently, AFCIs should be tested once a month to make sure they are working properly and providing protection from fires initiated by arcing faults.

A test button is located on the front of the device. The user should follow the instructions accompanying the device. If the device does not trip when tested, the AFCI is defective and should be replaced.

#### AFCIs vs. GFCIs

The AFCI should not be confused with the GFCI or ground fault circuit interrupter. The GFCI is designed to protect people from severe or fatal electric shocks while the AFCI protects against fires caused by arcing faults. The GFCI also can protect against some electrical fires by detecting arcing and other faults to ground but cannot detect hazardous across-the-line arcing faults that can cause fires.

A ground fault is an unintentional electric path diverting current to ground. Ground faults occur when current leaks from a circuit. How the current leaks is very important. If a person's body provides a path to ground for this leakage, the person could be injured, burned, severely shocked, or electrocuted.

The National Electrical Code requires GFCI protection for receptacles located outdoors; in bathrooms, garages, kitchens, crawl spaces and unfinished basements; and at certain locations such as near swimming pools. A combination AFCI and GFCI can be used to satisfy the NEC requirement for GFCI protection only if specifically marked as a combination device.



# Arc-fault Circuit Interrupters

What are Arc-fault Circuit Interrupters (AFCIs)?

The 2008 *National Electrical Code*® (NEC®) requirement for AFCI protection considerably expands this fire prevention technology to the majority of circuits installed in new and renovated homes. The type of AFCI currently available commercially is a next-generation circuit breaker that not only provides the conventional safety functions, but its advanced design also rapidly detects potentially dangerous arcs and disconnects power in the circuit before a fire can start. Fire safety officials endorse AFCIs as a significant step forward in electrical fire safety.

Why should they be installed in homes?

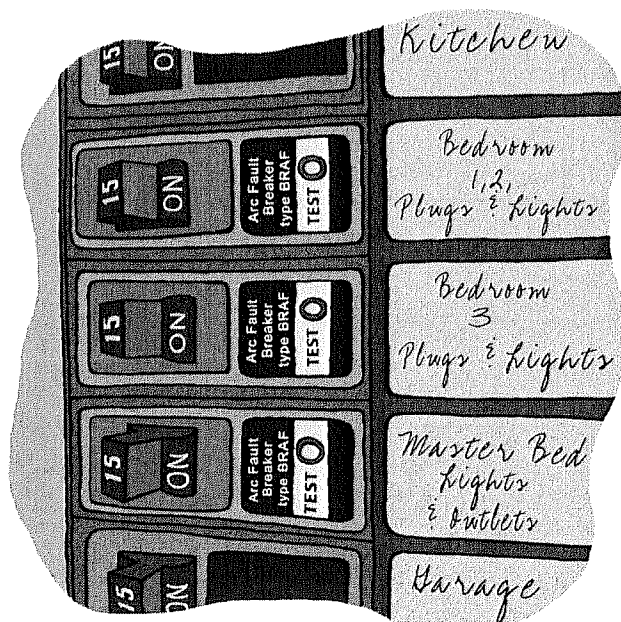
AFCIs will save lives and make homes safer. In 2005, there were an estimated 20,900 home structure fires that involved electrical distribution or lighting equipment and resulted in 500 civilian deaths, 1,100 civilian injuries, and \$862 million in direct property damage. Roughly half of these fires cited arcing as a factor contributing to ignition. Arcing is the principal electrical failure mode resulting in fire.

Why mandate AFCIs for newer homes when statistics show the majority of problems have occurred in older homes?

Fire safety officials recommend the use of AFCIs in all dwellings but recognize that installation is easier and more affordable during original construction. More importantly, every new home will become an older home with time. More years of use mean more opportunities for cords and wires in the house or in its electrical appliances to be damaged. Installation errors can occur at any point. AFCIs prevent such damage or errors from causing fires. Once installed, AFCIs provide protection for the life of the electrical system.

How do you know AFCIs will prevent fires and save lives?

Since 1999, AFCIs have been thoroughly field-tested. Underwriters Laboratories, the National Association of State Fire Marshals (NASFM), the U.S. Consumer Product Safety Commission, and many other experts have found AFCIs to be reliable and effective. By eliminating a significant source of electrically related fires, future statistics will demonstrate a reduction in fires of electrical origin.



Are AFCIs expensive?

The cost of the enhanced protection is directly related to the size of the dwelling and the number of circuits installed. Current retail prices of AFCI-type circuit breakers at several national building supply chains are in the range of \$35 to \$40 per unit. Even for larger homes with more circuits, the cost increase is insignificant compared to the total cost of the home and is mostly offset by the increased level of safety over the life of the equipment.

Do AFCIs interfere with smoke alarms and appliances, or trip unnecessarily?

AFCIs do not interfere with power supply reliability. These state-of-the-art devices identify problems that current circuit breakers are not designed to protect against, which can result in what appears to be an unexplained circuit breaker trip. By actually identifying these problems, residents are safer.

What is the NEC?

The NEC is the *National Electrical Code*. The NEC's mission is to provide practical safeguards from the hazards that arise from using electricity. It is the most widely adopted safety code for the built environment in the United States and the world, and it is the benchmark for safe electrical installations. The NEC is an evolving document, developed through an open consensus process. A new edition is issued every three years.

**Keeping Your Community Safe and Energized!**

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#### SHORT CIRCUITS:

[Calculator](#)

[Reference Data](#)

#### ARC FLASH:

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[Arc Analytic 3.2](#)

[Arc Analytic 2.0](#)

[DC Calculator](#)

[NFPA 70E Calc](#)

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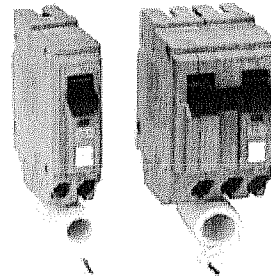
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### Arc Fault Circuit Interruptors - AFCIs

- [Product Features and Specifications](#)
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- [AFCI Protection Features](#)
- [Wiring Diagram](#)
- [F.A.Q.s and Code Requirements](#)
- [Publications](#)



Electrical fires in homes break out more than 40,000 times each year in the U.S. alone. A significant portion of these fires result from unintended electrical arcs in a circuit that standard circuit breakers are unable to detect. Arc-fault circuit interrupter (AFCI) detects arcing faults and opens the circuit to stop the flow of electricity.

Arc faults may occur for many reasons such as worn electrical insulation or damaged wire, misapplied or damaged appliance cords and equipment, loose electrical connections, receptacle leakage, neutral leads pinched to grounded metal box, wet connections or conduit, shorted wires, wires or cords in contact with vibrating metal, overheated or stressed electrical cords and wires, or driving a nail into a wall and having it inadvertently hit a wire. The possibility of arcing grows as a home ages since age and time will contribute to the possibility of these conditions occurring.

When an arc fault occurs, AFCI opens the circuit and stops the flow of electricity in a fraction of a second. While connected loads, such as fluorescent lighting, motors, dimmers and switches, may have inherent arcing as a normal mode of operation, the AFCI is designed to distinguish these arcing faults from hazardous arcing faults by monitoring the intensity, duration and frequency of the arcing fault.

#### GE Product Features and Specifications

- + Industry first: the only available AFCI breaker with a dual-function test button, providing two safety tests
- + Locate tripped breakers fast with trip notification flag and distinctive gray housing
- + 2-pole breaker solution for shared neutral wiring
- + Protects the entire circuit with an easy plug-in breaker design
- + Fulfills 2002 N.E.C. and C.E.C. requirements for dwelling unit bedrooms
- + Wire size 14-10 AWG 60/75 degree Celsius Cu/Al

#### Standards and Approvals

- + UL Recognized (Molded Case Circuit Breakers) UL 489
- + UL Recognized (Arc Fault Circuit Interrupters) UL 1699
- + CSA Recognized (Molded Case Circuit Breakers) CAN/CSA-C22.2 No. 5.1, 1 Pole Only
- + CSA Recognized (Interim Requirements for AFCIs) TIL No. M-02, 1 Pole Only

#### AFCI Protection Features

1. Parallel Protection  $\frac{1}{2}$  direct contact of two wires with opposite polarity (example: damaged extension cords)
2. Ground Protection  $\frac{1}{2}$  arc between a single conductor and ground (example: improperly installed wall receptacles)
3. Series Protection  $\frac{1}{2}$  arc across the break in a single conductor, which progresses to a ground or parallel arc (example: cable pierced by a nail from a wall hanger)
4. Overload Protection
5. Short Circuit Protection

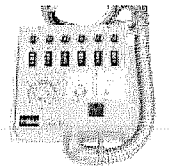
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*What are the Electrical Code requirements for AFCIs?*

*210-12 (N.E.C - National Electrical Code). Arc-Fault Circuit-Interrupter Protection*

*(a) Definition.* An arc-fault circuit interrupter is a device intended to provide protection from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to de-energize the circuit when an arc fault is detected.

*(b) Dwelling Unit Bedrooms.* All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter listed to provide protection of the entire branch circuit.

Article 100 Definitions:

Branch Circuit - The current conductors between the final overcurrent device protecting the circuit and the outlet(s.)

Outlet - A point on the wiring system at which current is taken to supply utilization equipment.

*26-722 (C.E.C - Canadian Electrical Code). Branch Circuits in Dwelling Units*

*(f) Branch circuits that supply receptacles installed in sleeping facilities of a dwelling unit shall be protected by an arc-fault circuit interrupter; and*

*(g) For the purpose of Paragraph (f) "arc-fault circuit interrupter" means is a device intended to provide protection from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to de-energize the circuit when an arc fault is detected.*

You should note that some areas may adopt other effective dates and may expand the requirements beyond the bedroom circuits. Contact your local authority having jurisdiction (AHJ) to verify code requirements for your area.

**Publications**



Please follow the links below for more informations on GE Arc Flash Circuit Interrupters:

[Arc Faults. A Guide for Contractors and Homeowners - DEA-234A](#)

[Homeowner and Installer Information - Single Pole DEH-40117R4](#)

[Homeowner and Installer Information - Double Pole DEH-40456](#)

[Arc Fault Circuit Interrupters - DET-204A](#)

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