

## WHAT IS THE DIFFERENCE BETWEEN A GROUND FAULT AND AN ARC FAULT?

There is a major difference between the functioning of an AFCI as compared to a GFCI (Ground Fault Circuit Interrupter). The function of the GFCI is to protect people from the deadly effect of electric shock that could occur if parts of an electrical appliance or tool become energized due to a ground fault. The function of the AFCI is to protect the branch circuit wiring from dangerous arcing faults that could initiate an electrical fire.

AFCI and GFCI technologies can co-exist with each other and are a great complement for the most complete protection that can be provided on a circuit.

### IT'S ALL ABOUT SAFETY

Smoke alarms, fire extinguishers and escape ladders are all examples of emergency equipment used in homes to take action when a fire occurs.

AFCIs are products designed to detect a wide range of arcing electrical faults to help reduce the electrical system from being an ignition source of a fire. Conventional overcurrent protective devices do not detect low level hazardous arcing currents that have the potential to initiate electrical fires.

AFCIs are the next generation product in electrical circuit protection. As you evaluate your new home's construction or consider upgrading or remodeling your current electrical system, consider enhancing the protection of your electrical system with AFCI.

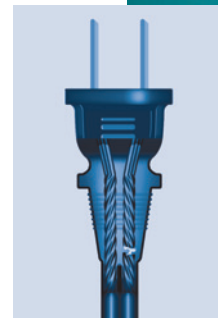
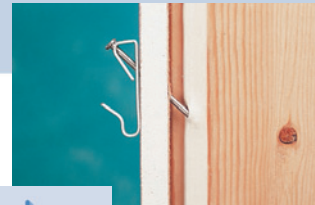


## NEMA AND ELECTRICAL SAFETY

For more than 80 years, manufacturers of low voltage distribution equipment have been working to ensure public safety by standards writing efforts and the dissemination of important industry information through the National Electrical Manufacturers Association (NEMA), one of the most respected standards development organizations in the world.

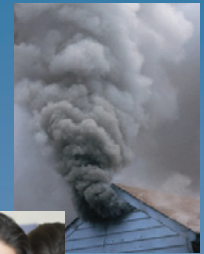
Headquartered in Rosslyn, Virginia, NEMA has approximately 400 electroindustry companies, including large, medium and small businesses. To learn more about NEMA visit [www.nema.org](http://www.nema.org).

To learn more about AFCIs, visit our AFCI web site at [www.afcisafety.org](http://www.afcisafety.org).



NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION  
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# arc faults and electrical safety



**PROTECTING HOMES & FAMILIES  
FROM ELECTRICAL FIRES  
WITH ADVANCED TECHNOLOGY**



NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION  
Low Voltage Distribution Equipment Section

## ELECTRICAL FIRES KILL THOUSANDS EVERY YEAR

According to the U.S. Fire Administration\*, home electrical problems accounted for an estimated 67,800 fires and \$868 million in property losses in 2003. Electrical fires also cause an estimated 485 deaths annually and injure almost 2,300 more individuals.

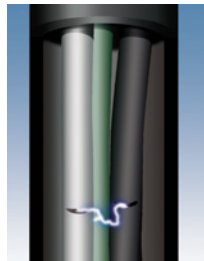


Electrical fires can be caused by a number of failures. Appliance defects or misuse, incorrectly installed wiring, or misapplied extension cords can lead to electrical hazards.

In 1992, the Consumer Product Safety Commission (CPSC) contracted with Underwriters Laboratories (UL) to provide research and evaluation of products and technology that could reduce the likelihood of residential fires. A result of the research, UL identified an electrical hazard called "arcing faults" that could eventually lead to the ignition of a fire as one possible cause of residential fires.

## WHAT IS AN ARC FAULT?

Most people are familiar with the term arcing. Arcing may be intended, such as with an arc welder or unintended, such as when a tree falls on a power line during a storm creating a current discharge between conductors or to ground.



An arc fault is an unintended arc created by current flowing through an unplanned path. Arcing creates high intensity heating at the point of the arc resulting in burning particles that may easily ignite surrounding material, such as wood framing or insulation. The temperatures of these arcs can exceed 10,000 degrees Fahrenheit.

\*USFA. 2006. "On the Safety Circuit: A Factsheet on Home Electrical Fire Prevention." U.S. Fire Administration.

## HOW ARE ARCING FAULTS DETECTED?

Traditional overcurrent protective devices cannot detect these types of arcs. The capability now exists to detect many of these arcing conditions and disconnect the problem circuit through the use of Arc Fault Circuit Interrupters (AFCIs).

## HOW DOES AN ARC FAULT CIRCUIT INTERRUPTER (AFCI) WORK?

In essence, the detection is accomplished by the use of advanced electronic technology to monitor the circuit for the presence of



"normal" and "dangerous" arcing conditions. Some equipment in the home, such as a motor driven vacuum cleaner or furnace motor, naturally create

arcs. This is considered to be a normal arcing condition. Another normal arcing condition that can sometimes be seen is when a light switch is turned off and the opening of the contacts creates an arc.

## WHY IS IT IMPORTANT TO HAVE AN AFCI BREAKER INSTALLED IN MY HOME?

AFCIs were developed in response to an identified electrical problem causing fires in the home as noted by the Consumer Product Safety Commission and other prominent organizations.

An AFCI provides a higher level of protection than a standard circuit breaker by detecting and removing the hazardous arcing condition before it becomes a fire hazard.

## WHERE ARE THEY REQUIRED TO BE INSTALLED BY THE NATIONAL ELECTRICAL CODE?

The 2005 National Electrical Code states that AFCIs must be placed on bedroom power and lighting circuits. The 2008 NEC may expand this requirement to other areas in the home. As with all property protection and life saving devices, the ultimate use, beyond the Code, rests with the homeowner. Whether new construction or retrofit, NEMA supports that you utilize the maximum electrical protection level available to reduce the chance of an electrical fire.



## CAN I HAVE AFCIS INSTALLED EVEN IF MY STATE OR MUNICIPALITY DOESN'T REQUIRE THEM?

Absolutely, do you only place locks on the front door of the house? Just like placing locks on all external doors and windows for security reason, it is logical to request AFCI protection on all 15 and 20A branch circuits, not just those in the bedroom, to protect the entire home from an electrical arcing ignition hazard.

AFCIs are available through electrical distributors and in many home centers and hardware stores nationally. The only major physical requirement is that the AFCI requires directly wired hot and neutral wires on the circuit you're going to protect.