

AFCIs are available as circuit breakers (CB) and as receptacles (Outlet Branch Receptacle - OBC). CB AFCIs are tested and Listed to UL-1699 requirements. OBC AFCIs are tested and Listed to UL1699A requirements. Both types can be installed per the 2014 National Electrical Code®. A standalone paper is available for each AFCI type. This paper addresses OBC AFCIs. The CB AFCI is described in a similar document available at [CB AFCI@afcisafety.org](mailto:AFCI@afcisafety.org). Cross-referencing the two papers provides the user/specifier/installer with all the important facts to decide which type best suits the intended installation.

Guide to Prevention of Arcing Ignited Fires in Homes

This NEMA guide for Arc Fault Circuit Interrupter (AFCI) protection is intended to provide information to help prevent undesirable electrical arcing from potentially starting a house fire. AFCI protection should detect and interrupt arcing to help prevent fire ignition. Arcing can occur through loose wire connections, by physical damage to extension cord insulation, wire insulation damaged by long term exposure to moderate heat, electrical surges, or even from a misplaced drywall screw or picture hanger nail.

More than 40,000 electrical fires occur in homes every year, resulting in hundreds of deaths, 1,000 plus injuries and more than a billion dollars in property damage. Electrical fires can be devastating and lethal as quite often they occur when we least expect them and in locations that may be hidden from view. Fire statistics show that most fire deaths occur at night, when people are sleeping. In most cases, victims die from the smoke, not from the fire, thus fire prevention, not just detection, is critical. There are steps a homeowner can take to help mitigate the effects of electrical arcing and sparking that often cause these types of fires. This guide will help you be pro-active when it comes to protecting your family from these seemingly hidden sources of fire.



Regularly Inspect for Hazards

- 1. Connected Cord Inspection:** When plugging and unplugging various appliances found in your home, take the time to inspect the cords. Look for any signs of damage due to wear and tear including cracked, cut or crushed insulation, discoloration or melting due to heat. Sometimes plugs can be crushed between furniture and the wall, weakening the conductor insulation. Cords can also be damaged through abuse by improperly removing them from the receptacle outlet, being stepped on, or placed under the legs of chairs or other types of furniture.
- 2. Extension Cords:** Examine the use of extension cords throughout your home. Look for locations where these cords are not being used properly, like being run underneath carpets or area rugs. Extension cords should NEVER be tucked under baseboard molding or under carpets or area rugs. These cords are not designed as permanent wiring for appliances in your home and you may be exceeding the rating of these products. Electrical ratings of the product should be reviewed to ensure that the cord is sized properly for the application. Inspect cords for visible damage such as strain at plug connections, cuts or crushed insulation, and discoloration or melting caused by high temperature exposure. Dispose of any cords with these dangerous signs.
- 3. Appliances:** When using appliances, look for signs of damage. Heat damage can appear as pitted or corroded electrical contacts, discolored wire insulation or plastic, and melted or deformed plastic. Ensure you are using appliances in the manner intended by the manufacturer. Consult the manufacturer if needed. Repair or replace questionable appliances.
- 4. Arc Fault Circuit Interrupter Protection:** Combination AFCI technology continuously monitors for both parallel and series arcing, 24 hours a day, 7 days a week, and can automatically disconnect electricity to faulty wires to stop arcing and its associated heat. Circuit breaker AFCI technology, commercially available since about 1998, retrofits into your electrical panel. Outlet branch circuit (OBC) AFCI receptacle technology, a newer technology commercially available since 2012, retrofits into the first outlet box on a branch circuit. To get the best arc fault protection from AFCI breakers, install "combination-type AFCI" breakers, not parallel branch/feeder - type AFCI circuit breakers. In contrast, ALL outlet branch circuit (OBC) AFCI devices contain protection for BOTH series and parallel arcing.

Outlet Branch-Circuit (OBC) AFCI devices come in the form of regular duplex receptacles and are

intended to be installed at the first outlet location of the branch circuit to provide arc fault protection for the whole branch circuit, extension cords and appliances. Series arc-fault protection is provided for the entire circuit when an OBC AFCI device is properly installed. Both series and parallel arc-fault protection are provided downstream from the OBC AFCI device. OBC AFCI receptacle protection can be installed by replacing the first outlet in a branch circuit or by installing a new outlet box and OBC AFCI right next to the circuit breaker panel for each circuit you wish to protect. When an outlet AFCI trips it is due to detection of an arcing condition, in contrast to a breaker that also detects overload and short circuit conditions. OBC AFCIs trip only due to detection of arcing conditions therefore simplifying troubleshooting.

AFCI devices should be regularly tested for proper operation using the Test and Reset buttons clearly marked on the devices. AFCI receptacles are typically installed within reach so you can easily Test and Reset the devices on a regular basis to test they are functioning properly. To identify if your circuit breakers or outlets contain AFCI protection, look for "AFCI" identification mark on the breaker or outlet face. If you do not have AFCI protection in your home, install it as soon as possible for added fire protection. Many new homes will have these advanced arc fault circuit interrupters in place, but even new homes will have opportunities to increase the level of protection. Updating the circuits in your home from standard devices to those that are designed to detect arcing and sparking that may cause electrical fires provides that additional level of protection against arcing faults. Use a qualified electrician to ensure a proper, safe installation.

5. **Hire a Professional:** It is always best to hire a qualified electrical contractor to help you perform a safety check in your home. Hiring a professional who is trained on the equipment and on electrical safety is a good place to start. Give your family a safe home.



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Wiring Devices Section

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