

ASK THE INSPECTOR COLUMN FOR JULY 27, 2016
HEADLINE: WHAT IS A GFCI?

Every time we do a residential inspection our testing equipment confirms the operation of the Ground Fault Circuit Interrupter. I am surprised at the number of these receptacles that don't work and the number of home buyers who don't understand how important they are. Let's start with a simple fact. In the US, nearly 300 electrocutions happen every year, burn and electrical shock injuries in residences are increasing at an alarming rate.

After the fuses or breakers in your electrical panel, the next line of defense against electrical shock are some specialized breakers in your panel called GFCI breakers or plugs in your kitchen, bathroom or exterior that are manufactured with this feature built into the plug. In newer homes, you have an additional safety feature called an Arch Fault Circuit Breaker, which protects the circuits in your bedrooms. The term GFCI is a bit stretched; they really don't protect the circuit, rather the plug or plugs wired behind this Ground Fault Interrupter.

First let's understand what a GCFI, or GFI as they are also called, does. Take a common duplex plug that you connect your hair dryer into. The left side of the plug is called the neutral side; its slot is slightly larger. The right side is called the hot side and the half round hole at the bottom is the ground. If your hair dryer is working properly then the electricity flows from the hot to the neutral and back to your panel. Now you have just stepped out of the shower and are drying your hair. You are filling your sink to shave or wet your hair. You accidentally drop the hair dryer in the sink and you instinctively reach for your hair dryer. The only problem is that there is an electrical current in the water ready to electrocute you. Now, if you have operational GFI plugs, this plug detects the amount of current traveling from hot to neutral and, if there is any imbalance, in less than 1/30 second it will trip and cut off the electrical current to your hair dryer. These GFI plugs are so sensitive they can detect a current loss as small as 4-5 milliamps.

We first saw the use of GFI protection when whirlpool tubs became popular. The electrical code required that this type of tub was protected by a GFI. Most commonly they used a GFI breaker in the service panel. In the late 80's, the Ontario Electrical Code mandated GFI protection on all exterior and bathroom plugs. At first they were permitted to install one in a bathroom and then wire the rest of the bathrooms behind this GFI to protect the rest of the plugs. While they work, it was annoying when the GFI tripped in the main floor bathroom and you are drying your hair in the second floor master bath while your husband is entertaining those early dinner guests. Today, bathrooms have individual GFI duplex plugs.

How do you know if your GFI duplexes are working? In theory, every GFI should be tested every month for operation. Did you know that you should trip every breaker in your household breaker panel at least once a year to make sure they are working? Most homeowners are not aware that these are recommended tests.

We tend to forget how important these plugs are. Every GFI duplex has a test and reset button. Different makers use different buttons, some are colored for identification. They are marked "Test" and "Reset." If you push the test button the reset should pop out and, if you have the kind with a small light, it should go out, as this means the power is no longer present at the plug. If the reset button pops out and the small light stays on the GFI is not wired correctly and your electrician should correct this. One make of GFI that I find "fussy" is the Leviton GFI's installed in the late 90's and early 2000's. If you don't push the reset button squarely on, it won't reset. Later model buttons were not colored and the reset button was so recessed it did not look tripped when it was. You have to push with steady and even pressure on this make.

If you push the test button and the reset button pops and then won't reset, its time to replace the GFI. When you do this test, use a small table lamp or night light that is turned on just to be sure the GFI is doing its job.

The modern electrical code has improved immensely over the past 15-20 years, mainly in development of safety related plugs and switches, but if you don't test them, they may just fail you with serious consequences.

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