

GFCI'S, 3 PRONG TESTERS and the *Informed Purchase Decision*

I stepped into the bathroom at my wife's favorite restaurant, and on seeing the electrical outlet with the shiny buttons next to the basin I was seized with an irresistible urge to press the test button. The black button called to me, "Test me; press the black button. Go on, you will like it. Try it just one time, it will feel good...." And like a fool I reached over and pressed the black button.

"Hey! What happened to the lights??" The large fellow in the stall next to me said with some irritation.

"Don't worry, they will come back on soon," I said as I reached over to press the reset button. It was dark; I mean, really dark as my fingers slipped over the MERSA coated walls. It was right here. Here, here, no here. Where is it!! What is that? Never mind, just find the stupid button. Awe, here it is, now push the button, what? Push it again. Damn stupid DEFECTIVE GFCI.

"Did you do something to the lights?" the menacing voice loomed out of the darkness. It sounded like a growl emanating from a bear being interrupted from an important bodily function.

"Beats me." I said as I stepped through the swinging door into the sunlight.

"Excuse me miss, there is a problem with the wiring in the men's bathroom." I said to the waitress as I returned to the table. That's the last time I would push the test button on a public GFCI...

The home inspection report is the only purchase related document created specifically for the homebuyer. While there are reams of reports created to protect the lender, real estate agent, title/escrow companies, the homebuyer stands alone relying almost completely on his agent's integrity. The home inspector is the only instrument by which the homebuyer can obtain a truly unbiased opinion on the condition of his prospective purchase.

California Real Estate Inspection Law

<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=bpc&group=07001-08000&file=7195-7199>

7195. For purposes of this chapter, the following definitions apply:

(a) "Home inspection" is a noninvasive, physical examination, performed for a fee in connection with a transfer, as defined in subdivision (e), of real property, of the mechanical, electrical, or plumbing systems or the structural and **essential components** of a residential dwelling of one to four units designed to identify material defects in those systems, structures and components. "Home inspection" also includes any consultation regarding the property that is represented to be a home inspection or any confusingly similar term.

One of the most important components of a home inspection is the electrical system which includes the convenience outlets. The primary tool for inspecting these outlets has been the basic 3-prong tester. The three-prong convenience outlet tester is very basic. It gives us a *surface* indication of the condition of the convenience outlet. First, it tells us if power is present, and secondly, if the wiring in the plug, not inside the wall, conforms to the wiring as recommended by the tester's manufacturer. It makes no statement regarding any wiring inside the walls or at the panel. While it is true that the wiring in the panel or in the walls can be inappropriately conformed to trick the tester into reporting a properly wired outlet, the vast majority of improperly wired outlets have been properly reported with this basic device.



GFCI circuit breakers can also be installed inside electrical panels

Accordingly, there is considerable controversy regarding the proper use of 3 prong testers. Many inspectors do not use any tester during a home inspection. California law specifies a “visual” inspection only, and does not require that any tools be used to complete the inspection. Many inspectors, particularly the franchise companies, do not advocate using the tester. Non-use of the tester speeds up the inspection, thereby increasing the number of inspections performed each day, which of course, increases profits. It also decreases the amount of reported issues, thereby keeping the agents happy, thereby increasing referrals. There is a significant, built in conflict-of-interest between the real estate agent and the home inspector. By refusing to test convenience outlets or *locate* GFCI'S the inspector is abrogating his primary function to help his client to make an **Informed Purchase Decision**.

There are a number of authors have written prominent papers regarding the inherit problems with the 3 prong tester. All of these authors point out the different ways a tester can be fooled into reporting a properly wired outlet when the wiring is actually hazardous and for that reason the 3 prong tester should not be used during a home inspection. Some authors have indicated there are up to 120 different ways a circuit can be mis-wired and still be reported as proper by the tester. What these authors do not address is that by advocating the non use of the basic three prong tester, they cheat the potential buyer out of making an informed purchase decision, the very reason why they hired a home inspector in the first place. These authors fail to understand the relationship between the homebuyer, their home inspector and the real estate industry. The home inspector's clients are entitled to *at least* know **whether there is power available** to the outlet and that at least a superficial attempt has been made to determine its condition.



This outlet was defective and exploded. The tester was undamaged

There have been some claims that there have been instances of these testers exploding in the user's hand. They have even been referred to as “fishing lures” by some prominent inspectors. I have personally performed somewhere close to 4,000 inspections, each with *at least* 10 outlets tested for a total approaching 40,000 tests with no explosions. In my previous career I attended countless code inspections where the inspectors used these testers on final inspections with no ill effects. I can find no recall notices on the Internet

in this regard. I suspect this is an urban legend that has been promoted to inhibit the use of these devices; and to characterize these important tools as “fishing lures” is unfair.

Outlet Circuit Testers and Similar Indicating Devices UL 1436

1 Scope

1.1 These requirements apply to outlet circuit testers, including screwdriver and pen-style voltage presence indicators, for use on 15-, 20-, and 30-A, 3-wire, 125-, 250-, 277-, 480-, or 600-V receptacles, ground-fault circuit-interrupter testers and arc-fault circuit-interrupter indicators for use on 15- and 20-A, 3-wire, 125-V receptacles, and similar indicating devices that are:

a) *Intended to be connected to the receptacle for a period of time only as long as is necessary to note the indicated pattern of lights or other similar indicating means, and*

b) *Not intended to be a comprehensive instrument or to determine the quality of the grounding circuit.*



Typical 3-prong tester with GFCI trip button

The complete listing can be purchased from Underwriters Laboratories for about \$875.00.

[http://www.comm-2000.com/productdetails.aspx?sendingPageType=BigBrowser&CatalogID=Standards&ProductID=UL1436_4_S_19980428\(ULStandards2\)](http://www.comm-2000.com/productdetails.aspx?sendingPageType=BigBrowser&CatalogID=Standards&ProductID=UL1436_4_S_19980428(ULStandards2))

NFPA 73: Electrical Inspection Code for Existing Dwellings

<http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=73>

1. Receptacles should have proper wiring when tested with a **listed receptacle tester**. The tester shall provide indications when branch circuit conductors are not connected to the intended terminals on the receptacle.
2. Where receptacles and branch-circuit conductors are identified for polarization, any installed receptacles must be properly polarized.
3. All grounding-type receptacles must be properly grounded. Circuits that do not have an equipment-grounding conductor should use a non- grounding-type receptacle or should have a ground-fault circuit-interrupter (GFCI) protection installed. Any GFCI receptacles installed in ungrounded circuits should be marked “No Equipment Ground” on the faceplate. Any receptacles that appear “loose” or do not appear to make proper contact with the plug blades should be reported and replacement recommended.

Most home inspectors are reluctant to use the next step up in testers like the "sure test" as they are cumbersome to use, require a more intimate knowledge of electricity and in my opinion exceeds the expertise of the home inspection profession. Their use is well outside the scope



Ideal® SureTest® Arc Circuit Tester

of a home inspector's responsibilities. My position is that the issues reported by the basic three prong tester greatly outweigh the negative aspects of the tester. The inspector should never forget that this is a basic tool that should not be used without first considering the age of the building, the upgrades, changes or additions to the property, the condition of the electrical panels and their bonding, and whether the wiring was professionally installed. This information must be determined and reported in conjunction with using the tester. Usually, this information will be the foundation of the reportable issues with the tester providing only supporting information. In effect, the tester provides only one small aspect of the information necessary to help the prospective buyer make an informed purchase decision.

Ground Fault Circuit Interrupters pose a special problem because they are not only convenience outlets; they have the added function of ground fault protection. There is a fundamental mis-understanding in the home inspection industry between *testing* GFCI's and *locating* GFCI's. Every document I have been able to find regarding the testing of a GFCI is to test and reset the outlet's test button: i.e., take a lamp and go around to see if the power is on. Nowhere can I find a USA based tester recommended by the GFCI manufacturer to test the GFCI. While there are many so called GFCI testers available, they are not approved by the GFCI manufacturers for testing their outlets. I suspect the Europeans would get a good laugh at our "lamp tester."

Testing or Locating? My position is that by testing a downstream GFCI protected outlet with a tester, a home inspector has *merely located or confirmed* its presence. However the inspector has not actually *tested* the safety mechanism. This is an effort in semantics, but it is an important distinction. Take for example, the exterior outlet next to a swimming pool. Is it **protected** by a GFCI, or is it **not protected** by a GFCI? There is no way to visually determine if the outlet is GFCI protected or not. **By using a tester to "test" this outlet what the inspector has really done is to confirm or deny the existence of a remote GFCI that protects that particular location.** While the tester has not properly tested the GFCI safety mechanism, **it has confirmed or denied its existence.** The prospective buyer can now use this information to help make an informed purchase decision *and* protect his family. The inspector has also protected himself for possible liability should a child be electrocuted in the pool.

Business Considerations: There are some important drawbacks to locating GFCI's. Shutting down important computer systems, turning off freezers, the inability to locate a GFCI for reset, and even safety has been forwarded. I submit that these issues are either covered by the purchase contract or by simple communication with the owner or listing agent.

Computer systems may lose valuable information if inappropriately shut down. First, the computer manufacturers do not recommend computers to be placed on GFCI circuits. Second, these computer systems are subject to district wide electrical failures and as such should be equipped with backup batteries to prevent information loss. Digital clocks, ovens, and VCR's will need to be reset if they are inadvertently shut down. The



GFCI protected outlet



An unprotected outlet. How can you know which is which?

California Association of Realtors purchase contract allows for visual inspections only and prohibits *intrusive and destructive* inspections. Testing a GFCI is hardly intrusive and is well within the provisions of the purchase contract and California inspection law. Every home inspector should be well acquainted with the real estate purchase contracts used in their areas. Consider a seller who sells a home with a defective GFCI and a child is electrocuted. The seller almost certainly failed to test the outlet as recommended by the manufacturer. Next, this seller refused to allow the inspector to test the GFCI because it was hooked up to a computer. The seller not only failed to disclose this defect, he refused to have it inspected. What defense does he have? Not much. Educated sellers should welcome the GFCI testing to limit their own liability. Educated agents understand the importance of complete inspections and will counsel their sellers to cooperate with the inspection.

It takes time to locate the GFCI's. The time required to review the GFCI system is the real reason they are excluded from home inspections. The ability to perform multiple inspections every day is the lifeblood of franchise inspection companies. Anything that slows down an inspection is disclaimed in the standards of practice and in the inspection contract. This is a huge conflict-of-interest.

What do the Europeans Know that We Don't?

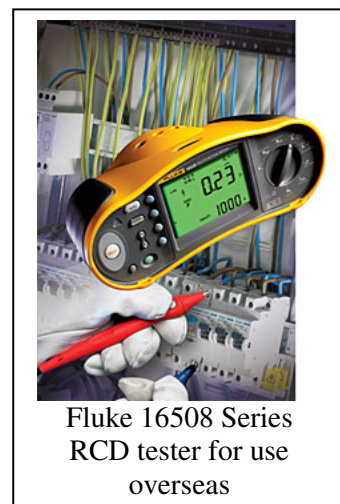
Residual Current Operated Device. In Europe and some other countries GFCI'S are known as RCD's or "Residual Current Operated Devices," in Australia they are known as "Safety Switches" and in Great Briton, as "Trips," or "Trip Switches." Their **International Electrotechnical Commission, IEC, Section 60364** requires that these Ground Fault Safety Devices be tested by a separate tester to verify function. Our overseas friends apparently believe it is important to test these devices and not rely completely on the integral test button. What do they know that don't?

"Testing RCDs with the Fluke 1650B Series"

<http://instrumentation.co.za/papers/C13214.pdf>

From the Fluke Application Notes:

"Why do we test RCDs? Most RCDs have an integral test button, but even a successfully completed test using this facility does not necessarily confirm that the RCD is working correctly. Additional tests to measure tripping time are necessary to verify that the RCD will perform correctly under fault conditions, while extra tests may also be carried out to determine the actual tripping current. In standard regulations, testing RCDs fall under 'Verifying protection by automatic supply disconnection'. Depending on the type of system, that is TN, TT or IT, various test procedures are used. These include measurement of the fault loop impedance, measurement of the earth-electrode resistance for exposed-conductive-parts of the installation, and measurement or calculation of the first fault current. In all these procedures, verifying the characteristics and operation



Fluke 16508 Series
RCD tester for use
overseas

of protective devices such as circuit breakers, fuses and RCDs is critical.”

According to our overseas friends, just pushing the test button on a GFCI is not good enough to insure proper ground fault protection.

Every woman is aware of her hair dryer tripping the GFCI. In the old days refrigerators were not recommended to be plugged into a GFCI outlet. The refrigerator/freezer was usually placed in the garage, which sometimes had GFCI protection. Older GFCI outlets were very sensitive and could misread a spark in the motor as a ground fault and trip. When this happened the refrigerator would stop resulting in the spoiling of the contents of the unit. This could happen at any time without any warning. In the old days it was recommended to be a standard dedicated single outlet reserved for operating refrigerators or freezers to eliminate this problem.



This GFCI failed to reset

On occasion a GFCI will fail to reset. I have had several instances where a GFCI has failed to reset. This is a difficult circumstance as the seller is sometimes upset at the inspector for “breaking” their outlet. When this happens I leave a note at the house and inform the seller that the GFCI was defective and that it should be repaired by an electrician.



This is why GFCI protection is so IMPORTANT!!

“To the owner or occupant: The Ground Fault Circuit Interrupter located at the xxxx failed to trip or reset after by evaluation as allowed by the purchase contract. Ground Fault Circuit Interrupters or GFCI’s as they are commonly known are an important electrical safety device located near wet areas to protect children from electrocution. Manufacturers recommend these devices be tested monthly to insure proper operation. I recommend that all the GFCI’s in your home be evaluated and repaired by a qualified electrician for your family’s safety.”

Once the seller is informed they rarely cause trouble. But if you leave without informing them, then they will be upset and the inspector will probably be installing a new GFCI.

In 4,000 inspections I have had to deal with not being able to reset a tripped GFCI several times. The garage walls were covered with personal items so that the GFCI’s could not be accessed and I had already tripped the breaker. In order to keep the freezer operating I “donated” my electric cord to the household by finding a standard outlet and using it to operate the freezer. I carry a low cost extension cord that can be left at the inspection site just for this purpose so I do not have to return to the job. Always remember the inspector can exclude any system for lack of access, so if the walls are covered by personal items then do not locate the GFCI. Just inform your client of the circumstances and recommend that the GFCI’s be confirmed when access is provided. On older homes, a prudent home inspector would recommend that the GFCI’s in the garage be upgraded to

modern units. Recent improvements to GFCI's has increased their reliability and reduced their nuisance tripping and recent code changes have eliminated the need for a dedicated outlet. But always remember, home inspectors do not perform code inspections.

On older homes with a 2 wire, or non-grounded system, or a retrofit 3 prong system that is missing the grounding conductor, I will sometimes recommend installing GFCI's on the circuits rather than installing a ground wire. This retrofit will approach the safety standards for a modern 3 wire grounded system and is accepted by the code authorities as a reasonable upgrade, and it avoids the cost and inconvenience of installing the ground wire. A label stating "No Equipment Ground" must be attached to each outlet to inform the user that the ground wire is not present. It is interesting to note that the 3 prong tester will not trip a GFCI that is not grounded. Also it is important to remember that a computer surge protector requires a ground wire to operate properly. Clients who need a surge protector will have to install a ground to at least that computer location. Using GFCI's to upgrade a 2 wire ungrounded system can be very effective but these limitations must be explained to the client.

In order to understand the reluctance that many inspectors have in regards to inspecting GFCI's you must first have a basic understanding of one of the driving forces in our society, liability. Liability, for the lack of a better word, is the minimum standard of performance any specialist must meet in order to present a minimum defense in a court of law. Meeting this minimum performance standard however, does not prevent an inspector from being sued, (anybody can be sued for any reason), just, that he will have a reasonable probability of prevailing in court of law. Even though an inspector may prevail in court, he will still have to go through the expense, and mental anxiety of putting on a defense. If he has errors and omission insurance, then the "so called *deep pockets*" of the insurance company greatly increases the probability of attracting groundless lawsuits. The general population knows that the insurance company will settle the case rather than defend their client. In a world where profit becomes more important than right or wrong, the standard of practice changes from what is best for the client; to what is the minimum level of performance necessary to decrease an attorney's probability of *easily* extorting money out of the inspector's insurance company. So in this profit driven system once an inspector is sued he either loses a little, or he loses big, but the important lesson here is that even when the inspector wins, he still loses. The prevailing thought is that GFCI's are a high liability home inspection issue, therefore we will disclaim as much of the electrical system as possible to minimize liability.

I disagree with this assertion. Rather than trying to limit the scope of the inspection to items that are quickly evaluated, I believe it is better to take the extra time to explain to the client the various systems in their prospective home and teach them why they can or cannot be reported. I have found that by educating the client to the reasons why things are reported in certain ways we give them the necessary information to make an informed purchase decision, not one based on uncertainty. An uncertain or surprised client is an unhappy client. Unhappy clients will cause all sorts of problems for everybody involved in the purchase transaction. The elimination of uncertainty must be an important business consideration for every home inspector.

The building code is not generally understood; it is the minimum level of performance necessary to keep the builder out of court, not what is the minimum level of safety for the

occupant. *If it were otherwise we would see far more accidents in our older homes.* When the original building codes were instituted it was primarily for fire protection. The early history of our country is laced with the ill effects of fire. Later electrical, plumbing, and earthquake protection were included in the code. In the beginning there were real benefits derived from building codes and many lives were saved and many accidents avoided; the building codes provided a real benefit to society. As the code became more mature, it became more comprehensive and covered not only the obvious safety issues but also issues that were not as obvious and with a lower probability of occurring. The inevitable course of the building code, as with every governmental institution, is to include every possible safety issue imaginable to the point where people will be required to live in a padded cell for their own protection. In addition, lobbyists have successfully caused some dubious materials and practices to be adopted. Rather than educating the public as to the requirements and responsibilities of home ownership, we lower our standards to the lowest common denominator; the legal system. In my opinion, we have reached a point of *diminishing return* on the building codes where we have ever-increasing burdens on the homebuilder that must be weighed against the cost to the homebuyer. America's strength lies with the middle class, and the middle class derives much of its strength from home ownership. Every effort should be made by the government to promote home ownership and discourage any activity that discourages middle class home ownership.

Three prong testers are an important tool just the same as a hammer is to a carpenter or screwdriver to a mechanic. Basic tools for basic applications; just be sure you understand its limitations and they will provide a valuable service.

If you have any questions or comments please feel free to contact me at HomeInspect2020@aol.com.

Here are some interesting articles regarding this subject:

<http://www.cpsc.gov/cpscpub/pubs/99.html>

http://www.statefarm.com/learning/child_safety/learning_childsafety_elec.asp

<http://www.ul.com/consumers/groundfault.html>

<http://www.thecircuitdetective.com/testers.htm>

<http://www.thehomeinspector.com/MMMPromo/3D2004/4MMMPromo3.html>

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20/20 Home Inspections

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