

MORE

What's in a Name?

Using precise names for electrical components prevents confusion

Bruce Barker, ASHI Member

It didn't matter to Juliet by what name she called Romeo. That which we call a rose by any other name would smell as sweet.

But to those who read and use your inspection reports, by what name you call a component could make all the difference in the world. Knowing the difference between electrical components that have similar names, functions or appearances will help you make better calls and write more accurate reports. Using accurate names will reduce unnecessary and embarrassing questions and reduce liability.

All code references found in this article are from the 2003 International Residential Code (IRC).

WIRES AND CABLES

Electricity travels through wires, right?

The accepted name for wires is conductors. In residential systems, conductor types include service drop or lateral conductors, service entrance conductors, feeder conductors, grounding electrode conductors and branch circuit conductors.

What do you get when you place two or more conductors in an insulating jacket? You get a cable. This is the accepted name for almost all of the "wires" you see in homes. The primary exception is a knob and tube system in which individual insulated conductors run separately.

The most common type of cable you see in modern homes is Romex, right?

Actually, Romex is a trade name and is properly used to describe cable manufactured by Southwire. The accepted name is non-metallic sheathed cable and is abbreviated NM.

A cable with a flexible metallic jacket is called BX, right?

Actually, BX is a trade name and is properly used to describe cable manufactured by a division of General Electric. The accepted name is armored cable and is abbreviated as AC.

Using trade names to describe a generic product is potentially dangerous. It's more professional to use the accepted name for a component unless you are certain that the holder of the trade name manufactured the component. In other words, don't call electrical cable Romex or BX unless you are sure it is Romex or BX brand cable.

OUTLETS AND RECEPTACLES

How many of us have used the name outlet to describe the place where you plug in an electrical device? Receptacle is the accepted name for the device into which you insert plug- and cord-connected electrical equipment. An outlet is the accepted name for any place from

which electricity is drawn to power electrical equipment. An outlet could provide electricity to a dedicated appliance such as an oven or furnace, or to a luminaire (the IRC term for a light fixture) or to a receptacle.

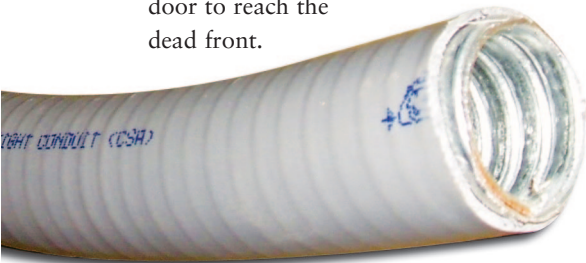
CABINETS AND PANELBOARDS

When it's time to inspect electrical panels, what components are you inspecting? In most cases, you start with the cabinet. A cabinet is an enclosure that contains electrical equipment. A cabinet could contain a meter, or it could contain service equipment, or it could contain a panelboard. A cabinet is simply an enclosure. Because cabinets and panelboards are often shipped as one ►►



unit for residential construction, many people think they are one, single component. They are not, and because cabinets, panelboards and related components such as circuit breakers are tested and listed to work together, it is usually not appropriate to mix components from different manufacturers in a cabinet.

When inspecting most panelboard cabinets mounted inside the building, you will remove the dead front (dead front cover). The dead front is a type of guard that protects persons or objects from accidental contact with energized parts. For panelboard cabinets mounted outside, you will usually open a cabinet door to reach the dead front.



Liquidtight Flexible Conduit (LFC)

Once you have removed the dead front, you will see a panelboard. Manufacturers refer to panelboards as load centers. A panelboard consists of ungrounded (hot) bus bars for attaching overcurrent protection devices (circuit breakers or fuses) and grounded (neutral) bus bars for attaching the grounded and grounding conductors and the grounding electrode conductor(s). The grounded bus bars are also known as terminal bars.

BRANCH-CIRCUIT AND GROUNDING CONDUCTORS

Branch-circuit conductors distribute electricity from panelboards (load centers) to outlets. These conductors include ungrounded (hot) conductors, grounded (neutral) conductors and equipment grounding conductors. The grounding electrode conductor connects the grounding electrode to the grounded service conductor at the service equipment. Grounding electrodes include driven rods, metal underground water pipe, and concrete-encased metal rod sometimes called an ufer ground. With

rare exceptions, the grounding electrode conductor is bonded to the neutral (grounded) conductor only at the service equipment.

SERVICE CONDUCTORS AND SERVICE EQUIPMENT

The conductors that bring electricity to the home are the service-drop or service-lateral conductors. Service-drop conductors run overhead. Service-lateral conductors run underground. In most cases, the utility owns these conductors.

The utility-owned conductors connect with the building conductors at the service point. The service point is where the utility's responsibility usually ends and the building owner's responsibility usually begins. The IRC does not specify a required service point location. For a single-family detached home, the service point could be at any location inside or outside the building, depending on the utility company's rules. One restriction on service-point location is that service for one building may not run through another building.

The service point for an overhead-service drop is usually at the weatherhead where the service drop conductors connect to service-entrance conductors. The service-entrance conductors bring electricity from the tap at the weatherhead to the service equipment. Conductors between the tap at the weatherhead and the service equipment are all service entrance conductors, regardless of what equipment (such as a meter) they run through before reaching the service equipment.

The service point for an underground-service lateral is often at the meter cabinet. The names for conductors leaving a lateral's service point depend on



Left: Intermediate-Metal Conduit (IMC)

Right: Electrical-Metallic Tubing (EMT)

whom you ask. From the home inspector's point of view, the names for conductors leaving the lateral's service point are not important.

The service equipment is where the building can be cut off from the source of electricity. Service equipment can be a switch, a single main breaker, or a group of switches or breakers. Common service equipment locations include in the meter cabinet, in a separate cabinet between the meter cabinet and the first panelboard (load center), and in the first panelboard (load center) cabinet.

Several rules govern service equipment. Some means of disconnecting the building from the source of electricity required. The service disconnecting means must be permanently marked as such. The cabinet for the service equipment must be listed as "suitable for service equipment." The disconnecting means >>>



Flexible Metal Conduit (FMC)

WHAT'S IN A NAME *continued*

must be readily accessible. This means that a building occupant must be able to quickly reach the disconnecting means without having to remove obstacles such as locks or climb on ladders. The disconnecting means must consist of no more than six devices, located together, but not necessarily in the same cabinet.

CONDUIT AND TUBING

How many of us have used the name conduit to describe all enclosures in which conductors and cables are run? Raceway is the accepted name for a metallic or non-metallic channel in which conductors and cables are run. Conduit is correctly used only for raceways with conduit in the name. These include flexible- and rigid-metal conduit, rigid-nonmetallic conduit and liquid-tight flexible conduit. Several types of raceways look similar to conduit, but use tubing in the name. These include flexible-metallic tubing, electrical nonmetallic tubing and electrical-metallic tubing. Installation and support requirements are different for conduit and tubing. If you are not sure what you are looking at, raceway is a good generic name.

SHORTS AND FAULTS

When a 120-volt residential electrical circuit is functioning as intended, electricity flows through the ungrounded (hot) conductor to the outlet, performs work in the attached equipment and returns through the grounded (neutral) conductor. Sometimes, because of improper wiring or damaged conductors, current flows directly between ungrounded conductors or between an ungrounded and grounded conductor. When this happens, a short circuit, or simply a short, occurs. One function of the overcurrent-protection device is to detect the short and open the circuit before additional damage or a fire occurs.

Sometimes, metal that is not supposed to be energized becomes energized. This usually occurs because of damaged equipment or conductors. Unintentionally energized metal could include the metal case of some equipment, a metal raceway or metal pipe. When current "leaks" from its intended path, a ground fault occurs. If people are part of the ground-fault current path, they can be electrocuted. A ground-fault circuit interrupter (GFCI) detects this leak as an imbalance of the current flow between the ungrounded and grounded conductors and opens the circuit.

CONCEALED AND ACCESSIBLE

Wiring within a building is accessible if one can reach it for inspection, maintenance or replacement without damaging the structure or its finishing materials. Access need not be easy and may require removing a panel, but so long as reasonable access is possible, the wiring is considered accessible. For example, most conductor splices and connections must be accessible in a covered box or conduit body (E3805.1). The box or conduit body may not be located behind drywall or other finish material.

Conversely, a component is concealed if access to it requires damaging the structure or finish materials. NM cables behind finished walls or in a raceway are considered concealed. This cable may be run in attics or crawl spaces, with certain restrictions. One commonly ignored restriction occurs in attics equipped with permanent stairs or pull-down ladders. In these attics, if NM and UF cable is installed over attic flooring or on top of attic joists, or across the face of studs or rafters, then substantial guard strips at least as high as the cable must protect the cable. If attic access is by a scuttle hole, protection is required only within six feet of the nearest edge of the hole (E3702.2.1).

Rigid Nonmetallic Conduit (RNC)

Some electrical equipment, such as service equipment and panelboard cabinets, must be readily accessible. Readily accessible equipment must be reached without removing or opening locks, moving obstacles or belongings, or using ladders (E3401 & E3305.4). During a fire or electrical emergency, quick access to such equipment can be a life or death issue.

DAMP AND WET LOCATIONS

Electricity and water don't coexist well. Electrical equipment and wiring that might come in contact with water must be listed for such contact.

A damp location is one where the equipment or wiring will not be saturated with water. Outdoor examples include under canopies and roof-covered porches. Indoor locations include some basements, barns, storage sheds, detached garages, and most ceilings in showers and tub/showers.

A wet location is one where the equipment or wiring could be saturated with water. This includes all uncovered outdoor locations and all underground locations. Also included is concrete and masonry in direct contact with the ground. Buried raceways are a wet location because water can accumulate there.

Equipment listed for wet locations may be used in damp locations. Equipment listed for damp locations may be used in damp or dry locations, but not in wet locations. Wiring listed for wet locations has the letter W included in the conductor type and must be used in wet and damp locations.

IT PAYS TO BE PRECISE

Your clients may only know the common or slang names for many of the components covered in your report. If so, it is helpful to define the terms for

them as you conduct the inspection, and also explain that you are careful to use the correct names to prevent confusion and misunderstandings. In this way, you present yourself as a careful, thorough and considerate professional.

In short, use the correct names for components and you should live happily ever after. Use the wrong names and your business may wind up like Romeo and Juliet. ■

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All photos courtesy of Bruce Barker.