Basic Electrical Terms

As industry professionals, we regularly see various technical reports that reference certain terms that relate to the electrical systems in dwellings and buildings. While consultation with a licensed, certified electrical specialist is always recommended when any type of electrical problems are discovered, it is important as industry professionals to be familiar with some basic terms that are commonly used when describing residential and commercial electrical systems.

Basic Electrical Units of Measurement

- **Voltage (V)** Described technically as "*A measure of potential energy per unit of charge*".

  

  Huh???...

  Let's use the "water in a pipe analogy" to explain:

  Voltage in any electrical system is *just like water pressure in a plumbing system*.

  A lot of water *pressure* in a pipe means that a lot of water can be "pushed" through the pipe, giving you more *pressure* at the faucet. It's the exact same concept as voltage in a wire: A lot of **voltage** in a wire means that the wire can "push" a lot of electricity to the user (Your lamp, your computer, your dryer). Simple!

  Most household current is "pushed" by voltage at either 120 or 240 volts. This is why the wires connected to your clothes dryer are a heck of a lot bigger than the wires connected to the outlet that powers your desk lamp.

  "Bigger Wire = More Voltage" / "More Voltage = More Power"

  "Voltage Does the Pushing"

- **Amperage (A)** Described technically as "The *measure of the electron flow in the same direction in a conductor*". Amperage is measured in ***amps.***

  Amperage is also known as *current.* Think of a fast-moving river. A river has a current, and so does a wire in an electrical circuit. The amperage in a circuit is nothing more than the *strength of the current* in the circuit, just like the strength of the current in a river!

- **Resistance (R)** Described technically as "*The measure of the restriction of flow of electrical current through a material*".

  If you've ever had a "Super-Hero Action Figure" flushed down your toilet, the result is due to the *resistance* created by spider-man in the drain pipe!

  A *Resistor* is nothing more that an electrical component put into a circuit to slow down the current flow. Resistors can come in unlimited sizes and shapes, from microscopic to massive. If you've ever seen those big brown ceramic-looking things on an overhead electrical wire pole or at a transformer station near your neighborhood, those are probably resistors!

- **Power (P)** Described technically as "*A measure of the overall amount of work being done in a system in relation to time (or energy used per second)"*

  Simply put: Power is the voltage multiplied by amperage in a circuit. Power is measured in *Watts*.

  Why should we care about power? Here in Florida, a lot of people consider buying or installing generators as backup power systems for their homes. **All generators are rated in the amount of continuous power that they can provide (Rated in Watts or Kilovolt Amps - KVA).**

  If you know what the AMPERAGE and the VOLTAGE of your home's electrical system is, you can figure out what size generator you will need to power the whole house simply by multiplying the AMPS times the VOLTS!

  Quick Example:

  House voltage = 220 V House Amperage = 150 A

  220 x 150 = 33,000 Watts (or 33 KVA)

  Total "full wattage" (*meaning everything in the home on at full power at the same time*) required to power the entire home's electrical system would be 33,000 Watts or "33 KVA".

Bear in mind, that you will probably NEVER need the generator to provide that much "full wattage" because you will rarely have every single electrically-powered item in your home ON at the same time (especially during a hurricane).

Fortunately most modern generators come with a "Power Usage Matrix" that tells you what items you can typically power with the *wattage* or *power* that the generator provides.

Which one is dangerous: Voltage or Current?

A common saying goes, "*It aint the volts that'll get you, it's the AMPS!"*

This is essentially correct. However, ***if voltage wasn't also dangerous, you'd never see one of those signs that read:***

DANGER -- HIGH VOLTAGE!

It is electric current (Amps) that can burn tissue, freeze muscles, and fibrillate hearts. But current doesn't just happen on its own. It needs voltage to push it.

Track your feet across carpet on a dry winter day and you will actually charge your body up to several thousand volts. If you then touch a metal surface, the resulting "static discharge" will have a voltage many times greater than a typical home's electrical system, yet you will be perfectly safe because the current cannot sustain itself.

Why? Because a person's body is like a "big resistor" that presents resistance to current!

The following two variables partly determine whether an electric shock will cause bodily harm:

- **Individual Body Chemistry.** Some people are highly sensitive to current. This hyper-sensitivity may cause involuntary muscle contraction with shocks from static electricity. Other people are not as sensitive and can draw large sparks from discharging static electricity and hardly feel it, much less experience a muscle spasm.

- **Where the Contact is Made**. Examples are hand-to-hand, hand-to-foot, foot-to-foot, hand-to-elbow, etc.

  An electric shock that travels from one hand to the other will pass through the heart and potentially lead to cardiac arrest. The same current, if it travels through just one hand, will not be as dangerous. Also, contact with a wire by a sweaty hand or open wound will offer much less resistance to current than contact made by clean, dry skin. Sweat and blood are rich in salts and minerals, which make them excellent conductors.

Electricity is part of our daily lives, and we would be “back in the stone age” without it. However, a basic knowledge of its nature and potential dangers is important to you as an industry professional.

It should go without saying (but we’ll say it anyway) that any electrical-related issues that are discovered as part of a professional property inspection or technical evaluation, be evaluated and repaired by a licensed, certified electrical specialist.