

How to measure dirty electricity using a Stetzer meter



The Stetzerizer Microsurge Meter can be used to measure “dirty electricity”, which has been linked with long-term health effects in the general population and chronic effects in people who are particularly sensitive.

The meter can inspect incoming power from the grid as well as from inverters, UPS'es and portable generators. It can also be used to identify appliances in the home which backfeed dirty power into the household wiring.

Dirty power is more specifically “transients” and “harmonics”, which are tiny spikes in the electricity. These spikes turn the household wiring into a large antenna, radiating the frequencies of these spikes.

The Stetzer meter displays a GS number which is based on the number and shape of the spikes in the voltage. The GS number does not have a unit, so it can only be compared to itself. The number displayed ranges from zero to 2000. If the value is above 2000, the meter will only display the number 1.

Good clean electricity will have a GS number below 25, below 50 is acceptable, all according to the manufacturer.

The meter looks at the transients and harmonics in the 4 kilohertz to 150 kilohertz range. There can be dirty power frequencies above 150 kilohertz and below 4 kilohertz, but the majority will be in the range of the meter.

Dirty electricity has many sources

Many types of household appliances can generate dirty electricity, such as:

- TV
- radio
- clock radio
- computer
- internet modem (DSL, Wi-Fi, etc.)
- UPS battery system
- battery charger
- cell phone charger
- cordless phone base station
- electronic phone
- electric toothbrush
- electric shaver
- washing machine
- refrigerator
- electric stove
- low-energy lights (CFL, LED, ESL)

The amount of dirty electricity can vary dramatically between different models of the same type of electric appliance.

The majority of the listed appliances generate dirty electricity even when they are “off”. To be truly off, the plug must be pulled out of the wall or be put on a power strip and turned off there.

Dirty electricity can also enter the household from the outside, being carried on the incoming electrical line. It can come from nearby households’ use of electronic appliances, or from modern electronic utility meters — especially those which use the power line for communication, rather than wireless.

Measuring dirty electricity from the outside

If you want to measure the quality of the power delivered to your home, it is essential that all appliances are turned off in the building. Otherwise, they can greatly affect the reading.

It is best to simply turn off the power using the breakers, to be sure that all electronics are truly off and none have been forgotten.

Leave the circuit breaker on for a circuit that is not otherwise used. Then plug the meter into an outlet on this circuit.

If all electronics in the entire house are turned off, the meter should display the same GS number regardless of where it is plugged in. If some electronics are on, the readings will usually be higher when the meter is plugged into an outlet on the same circuit as the active electronic appliance.

The quality of the incoming electricity can change over the day, depending on what is happening elsewhere in the area. The power in an office may be better at off hours, and worse during office hours.

In a residential area, the power may be worse in the evening and during weekends, and best in the middle of a weekday.

Measuring dirty electricity from appliances in your home or office

To get an idea what your home or office is like in general, turn on the appliances that are normally on (refrigerator, computer, lights, etc.). Then plug the Stetzer meter into a few outlets.

If you wish to check how much dirty electricity a specific appliance puts out:

- plug the appliance/electronics into a power strip.
- nothing else can be fed by that power strip.
- plug the power strip and the Stetzer meter into the same wall, next to each other.
- turn off as many other appliances/electronics as possible.

Turn the appliance/electronics on and off using the power strip. Watch how the Stetzer meter changes.

Then turn off the appliance using its own built-in off button. You may find that it still produces much dirty electricity.

Questions and answers

Q. I get different readings in various parts of the house, even when all appliances are off.

A. You may simply have forgotten some small appliance somewhere, such as a thermostat or an electric toothbrush. This is very common.

Otherwise, it may be because you share a transformer with a neighbor. This is standard in apartments and common in suburbia. From the transformer comes two (North America) or three (Europe) phases into your home.

If a neighbor dumps dirty power on one phase and not another, you'll see different readings in different parts of your house (even different parts of the same room).

Q. I get about 300 Stetzer units in the bathroom, and less elsewhere in the house. This is when I have everything off in the house.

A. The cause may be the GFCI outlets in the bathroom. They contain electronics which can be dirty in some cases. You could try to replace them with a better model. Currently, the Cooper brand is good.

There could also be an arcing on a wire somewhere. This is a fire hazard.

Q. I get high readings in one room, but nothing is on in there.

A. Try to find out which circuit breaker the outlet is on. It may also serve another room in the house where something is on that causes the dirty electricity. Or perhaps a "hidden" appliance, like a thermostat or smoke detector.

There could also be a bad connection with arcing, which is a fire hazard.

Q. I plugged in a computer, but the Stetzer meter barely changed. Does that mean there is no dirty electricity?

A. Maybe you do have a really good power supply. However, it is more likely that the power supply switches at a much higher frequency which the Stetzer meter cannot detect. Some power supplies now go as high as 1000 Hertz; the meter can only go to about 150 Hertz.

Limitations of the Stetzer meter

The Stetzer meter is low cost and very easy to use. However, there are several trade-offs. The meter does not provide the full story.

The Stetzer meter works best in the frequency range of 4 kilohertz to 150 kilohertz, which is where most of the dirty electricity presently is. There are some forms of dirty power below that range, such as some power line carrier communication systems used by utility smart meters in rural areas.

There are also some sources of higher frequencies, and there will be more of them in the future. This includes some fast switch-mode power supplies and Broadband over Powerline (BPL) communication systems. Some compact fluorescents are rumored to run at higher frequencies as well.

The Stetzer meter measures the modulation of the line voltage, not of the amperage. The number it displays is derived from the abrupt fluctuations in the voltage (dV/dt).

The reading will be the same whether there is any power (amps) going through a line or not, and the amps are what creates the magnetic field. However, if power *is* going through the wire, the Stetzer meter gives an idea how modulated the magnetic field will be. It does not give any idea how powerful this field is, however.

The meter tells us how the electrical field around the wire is modulated. It does not tell us how strong the field is, which depends on the voltage on the wire.

Both the strength and the modulation are important factors for human health effects from electrical and magnetic fields.

The manufacturer's statement about which levels of the GS units are good and acceptable does not appear to be well documented. They should only be used as a loose guideline.

For more information about the workings of the Stetzer meter, see patent 6914435 on the U.S. Patent Office website.