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Alpha "AC Electric Field" Meter Instructions

For Measuring ELF & VLF "Electric Fields"

Important Note About The Battery!

Always turn the meter OFF after each use, or the battery will run down quickly. When you see the message "LOW BATTERY" in the display, the battery needs to be replaced. To change the battery, slide down the lower panel in back of the meter, and replace with a fresh 9-Volt battery.

How To Take A Measurement…

First, turn the test meter ON by moving the small switch on the right side up. Allow the meter a few seconds to initialize itself before testing.

Always hold the meter by the bottom half, keeping your fingers below the switch. The sensor is located in the top half of the meter, so you should keep your hand away from the top half to avoid shielding the test meter from the *electric fields*.

Extend your arm and hold the meter as far away from you as possible. Hold the meter completely still for a few seconds, and read the number on the display. Slowly move the test meter around in various directions to find the orientation with the highest measurement. When you find the highest direction, hold still in that position for a few seconds. Write down this maximum measurement, as well as the time and location, so that you have a complete record of all your measurements.

Where To Take Measurements…

In each room, take measurements in various different locations, because the *electric fields* can vary greatly from one place to another. Typically the fields will be strongest near the electrical wiring (hidden in walls, floors and ceilings), and also near the power cords for lamps and appliances

The most important locations to test are the places where you and your family spend the most time. At each bed, take several readings – for example, at the head of each bed, in the center, and at the foot of the bed. Similarly, take several readings on

the couch where your family watches TV, at each chair around the dining table, outside where children play, etc.

What You Are Testing…

The Alpha Electric Meter is a wide spectrum meter which detects electric fields in both the ELF and VLF ranges. Thus, this meter can be used to measure the electric fields from any source, including power lines, building wiring, computers, televisions, appliances, and even inside automobiles. This meter specifically measures the strength of the *electric fields* in units called "volts per meter" (abbreviated "V/m").

An important note: ELF (extremely-low-frequency) *electric fields* are emitted from power lines, electrical wiring, lights, appliances — virtually everything that runs on regular electricity. VLF (very-low-frequency) *electric fields* include the higher frequencies around 10,000 Hz and more – emitted from computers, televisions, fluorescent light fixtures, compact fluorescent bulbs, and other electronic devices.

For Greater Accuracy…

Your body attracts *electric fields*, similar to the way that the antenna of your radio picks up the EMF signals from radio stations. The *electric fields* around you "collapse" and cause a measurable AC voltage on your skin. Thus your body can interfere with accuracy by "shielding" the meter from some of the *electric fields*.

To reduce this shielding effect, hold the test meter away from your body as far as you can, while still being able to read the display. Most important, keep your hands away from the sensor at the top of the meter by holding the meter only at the bottom.

For greater accuracy, try positioning the test meter on a cardboard box, table or counter top, and then step away a few feet to take the reading. Another effective method to reduce the shielding effect, is to tape the test meter to a plastic or wooden pole (do not use metal) and extend the meter farther away from your body.

The most sensitive and accurate way to measure *electric fields* is with a special type of meter called a "Body Voltage Meter". With this type of meter, you use the fact that your body already is a "sensor" and simply measure the AC voltage on your skin from the *electric fields* around you. This gives very high accuracy because there is nothing else shielding the "sensor" (you), and you also get information about how your body position attracts the electric fields (e.g., lying in bed vs. standing, or sitting).

The Alpha Electric Meter is somewhat limited, because it is a single-axis meter. Thus, you must move the meter around in all possible directions to find the highest field strength. For example, first hold the meter with the top end facing up. Then try slowly tilting the top of the meter toward the left or right. Then, reposition the meter so that the top end faces up again, and slowly tilt the meter down so that the top end faces away from you. In contrast, a triple-axis meter allows you to hold the meter once in any orientation, and get an accurate three-dimensional reading. (An

alternative test method is to use a Body Voltage Meter, which gives you triple-axis information.)

What Are Electric Fields?

There are three basic kinds of electromagnetic fields (EMFs) – *magnetic* fields, *electric* fields and *radio frequency* (RF) fields. *RF fields* are emitted from cell towers, cell phones, cordless phones, wireless devices, and many other high frequency sources. *Magnetic fields* are emitted from power lines, building wiring, lights, appliances — everything that runs on regular electricity. *Magnetic fields* are the component most often linked to serious health effects such as childhood cancer in the scientific research. They are measured in units of milligauss (mG).

Electric fields make up the other half of the *"electro"*magnetic fields emitted by power lines, electrical wiring, power cords, lights, appliances, etc. *Electric fields* also have important biological effects, but they have been studied less than the other two types of EMF. Anecdotally, *electric fields* are often involved when people feel strong "sensitivity" or report "symptoms" related to electrical sources. They are measured in units of *volts per meter* (V/M).

What Are The Health Concerns?

Various research studies have linked electromagnetic fields (EMFs) to increased risks of leukemia, lymphoma, brain cancer and nervous system tumors, Alzheimer's disease, ALS, miscarriage, birth defects, suicide, depression, stress and immune system effects. While most of the research has been focused on magnetic fields, the studies show that *electric fields* may also have important health effects.

Electric fields from common sources such as building wiring cause measurable electric voltages to "collapse" onto the skin. This voltage then causes small electric currents to flow on the skin and in the body, at the exact same frequencies as the *electric fields*. These currents then cause new *magnetic fields* directly on the skin and inside the body. Anecdotally, *electric fields* may be a major concern for people with conditions such as electromagnetic hypersensitivity (EHS).

A wealth of anecdotal evidence suggests that many people who are "sensitive" to electrical sources – reporting symptoms such as sleep difficulties, headache, fatigue, nausea, dizziness, mental confusion, anxiety, memory problems, uncomfortable skin sensations, tinnitus and irritating sounds, and other health issues – may be adversely affected by the level of *electric fields* found in many modern homes and workplaces.

What Level Is Considered Safe?

There is still great controversy about the potential health effects from EMFs such as *electric fields*, and so it is difficult to define any specific level as safe or unsafe. We recommend that you research the scientific literature and decide for

yourself what level to consider as safe or unsafe. The following information is based on anecdotal experience from my own professional practice, as well as from other EMF experts and health professionals.

The average level of *electric fields* in homes across the country is probably around 20 to 30 volts per meter (V/m). In every home, the levels will vary greatly from place to place, because the levels are strongly influenced by the close proximity of hidden wiring in walls, floors and ceilings, and nearby cords for lamps and appliances. In most homes, the levels will range from less than 5 V/m in some places, to over 50 V/m in other locations.

In my own professional practice, I usually try to keep long-term exposure levels for healthy people down to 20 V/m or less. And since sleep is such a critical time for rest and rejuvenation of the human body, I usually try to reduce the levels at the beds down to 5 V/m or less at night.

Anecdotally, a level of 10 V/m is often enough to trigger the various "symptoms" reported by sensitive individuals. And many will report symptoms at even lower levels. Thus, many electrically sensitive individuals will have trouble in most buildings, because the typical levels found in modern buildings are already high enough to trigger their symptoms. In practice, I usually need to reduce the *electric fields* down to 1 or 2 V/m, or less, to relieve the symptoms reported by sensitive clients.

Thus, for individuals who are sensitive to EMFs – or have other severe health problems like cancer, chronic fatigue, chemical sensitivity, autoimmune disorders, etc. – I usually try to reduce all long-term exposures down to 5 V/m or less, and perhaps most important, down to 1 V/m or less at the beds. For sensitive clients, I also recommend using a Body Voltage Meter to get even more sensitive and accurate measurements.

Special note: For millions of years before the invention of electricity, the ELF/VLF *electric field* measurements would have been zero almost everywhere. And today, in nature – outside under the trees, at the beach, or anywhere far enough away from electricity and power lines – the *electric fields* are usually close to zero. With special shielding, the exposure level in homes can be significantly reduced.

Sleep problems and fatigue are the two most common symptoms that I hear from people who live in high *electric fields*. The most striking case that I have ever witnessed was with a young client who suddenly could not work or concentrate. She was extremely fatigued, and would unexpectedly collapse into an "unconscious state" for many hours of the day. Her problems began immediately after moving into a new home. My testing found that the *electric fields* in her home generated up to 34.5 AC volts on her skin (120 is the voltage of electrical wiring!). Once I repaired the wiring problems, she recovered fully within a couple days.

What Are Common Sources?

Power lines can be a very strong source of *electric fields*, especially outside, near the tall metal towers for transmission lines, and the neighborhood distribution

lines on wooden poles. But they are usually not a large source of exposure inside the home.

Instead, the biggest exposure to *electric fields* for most people will be from unseen electrical wiring that is hidden in nearby walls, floors and ceilings. The second largest source is usually from nearby power cords for lamps, clocks, computers, appliances, etc.

Certain wiring and grounding conditions can also cause high exposures. For example, if you plug a computer into a wall outlet that is not properly grounded, the computer will often emit much stronger *electric fields* than if it was grounded. Other electrical devices that can emit high levels of *electric fields* include televisions, fluorescent lights and electric blankets.

Determine What Your Sources Are…

In general, the measurements will increase as you move toward a source and decrease as you move away from it. Be aware that if there are multiple sources nearby, the complex field patterns can mix in surprising and unpredictable ways.

Electric fields are emitted from a variety of electrical sources – and many of these will be unexpected, unseen or unknown to you. The following procedures can help you track down and determine the exact sources of the *electric fields* you are measuring.

Step 1. Turn "OFF" the main electrical breaker or switch for the whole building, so that all electricity inside the home is off. Measure and write down the *electric field* levels in various locations, especially in the bedrooms. These measurements show you the level of *electric fields* coming from everything *external* to the home, such as nearby power lines.

Step 2. Turn the main power back "ON" again. Also turn on all the lights and appliances that you would normally have on. Measure and record the levels in the exact same locations as you did in Step 1. These measurements show you the total *electric fields* from all *external* sources (power lines) **plus** all *internal* sources such as electrical wiring, lights, cords and appliances.

Step 3. On your data sheet, **subtract** the measurement in *Step 1* from the measurement in *Step 2*, for each location. These new numbers will give you a good estimate of the *electric fields* emitted from just the *internal* sources – electrical wiring, lights, cords and appliances.

Step 4. To test if a particular item, such as a lamp or clock next to your bed, is a significant source, take a measurement near the device. Then without moving or changing the position of the meter, unplug the electrical device completely and see if there is a significant reduction.

Step 5. You can also determine which particular electrical circuits are creating any *electric fields* where you sleep. A: Place the test meter on the bed, at the location

with the highest reading. B: Turn OFF all the circuit breakers – except keep the main breaker ON (so that the circuits can have power). C: Turn ON one circuit breaker at a time (while keeping all the others OFF), and take a measurement for each circuit breaker. Write down each measurement, and you will quickly see which particular circuits are causing the *electric fields* at the bed.

How To Reduce The Electric Fields…

In general, the readings will increase as you move toward a source and decrease as you move away from it. Once you know the source, you may be able to simply unplug it, or you can turn off the breaker for that entire circuit.

Sometimes you can simply move a bed, couch or table to a new location in the same room to greatly reduce the exposure to the *electric fields*. You can also unplug certain electrical cords for lights and appliances, especially those near beds.

At night, you can turn off the circuit breakers at the panel box that are causing the *electric fields* in the bedrooms. For your convenience, an electrician can install special relay switches so that you can use a remote control at your bedside to turn off the necessary circuits. (Call our office to schedule a phone consultation about convenient remote control switches for the bedrooms.)

If necessary, your electrician can also receive professional guidance from us to help troubleshoot and repair any wiring or grounding problems that are causing *electric fields*. And if the walls are open and the wiring is accessible, as in many remodels, the wiring can then be shielded for a relatively low cost.

For new and remodel construction, special “EMF-Free” electrical wiring materials and procedures can be used. And shielded cords can be installed for lamps and appliances, especially those near the beds. (Call our office to schedule a phone consultation on the installation of EMF-Free electrical wiring.)

If You Need More Help…

If you need more assistance, I provide professional EMF consultations over the telephone, at the rate of $120 per hour – prorated for actual time used. In northern California, I also provide a full line of onsite services – EMF testing, troubleshooting and shielding, as well as the design and/or installation of special EMF-Free wiring. If I can be of further help, please contact my office.

Sincerely,

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Owner, Consulting EMF Engineer
Neuert Electric & Electromagnetic Services