EMFields

mG MagneMeter introduction and detailed user notes

Introduction

Exposure to ELF EMFs has been associated with various adverse health effects, including childhood leukemia, adult leukemia, brain tumors and breast cancer, depression, some forms of dementia and motor neurone disease. A statistically significant association between ELF EMFs and an increased risk of miscarriage has also been reported.

Our use of electricity generates power-frequency electric and magnetic fields (ELF EMFs). Many scientific studies over the last 40 years have shown that the incidence of childhood leukemia doubles when background magnetic field exposure exceeds 4 milliGauss (mG). The World Health Organisation's International Agency for Research on Cancer (IARC) has classified ELF EMFs as a Group 2B "possible human carcinogen" since 2002. Leading researcher, Professor Anders Ahlbom, speaking at the 2008 ICNIRP / WHO international workshop on "Risk-factors for Childhood Leukemia" said:
"There is relatively strong epidemiological evidence that ELF magnetic fields are a causal factor in the development of childhood leukemia. The evidence is stronger than that for passive smoking and lung cancer."

EMFs cannot be directly detected by our own senses. Measuring the fields is the only way to assess your exposure at home, school, work and during travel. It is then possible to reduce your exposure if it is higher than average.

There is evidence that long-term health, especially with depression or after cancer treatment, is likely to be worse if the person remains exposed to EMFs that are higher than about 1 mG (milliGauss).

Please read this leaflet carefully before taking your readings.

MagneMeter – ELF Magnetic Fields (mG EMF) Meter

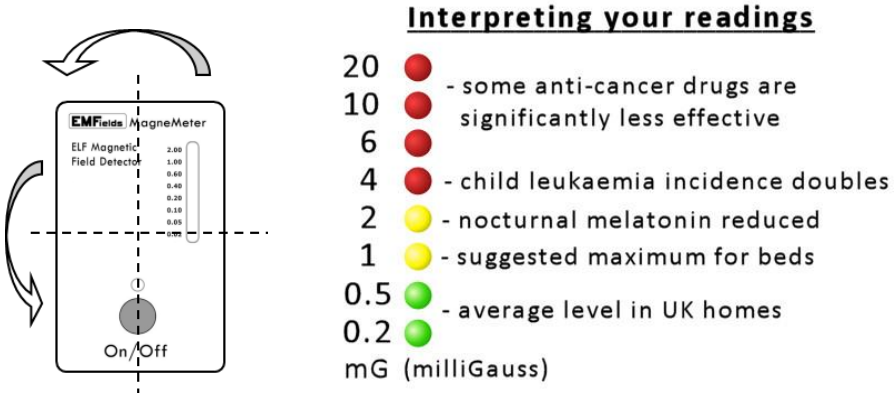
USER INSTRUCTIONS

The MagneMeter enables you to measure your exposure to power-frequency magnetic fields (ELF EMF) that arise from our use of electricity. They come from powerlines, electricity substations and associated cables. They also come from house wiring and all electrical appliances in the home. Trains and cars can also have high ELF EMFs.

The MagneMeter is easy to use. Press the On/Off button to turn it on. The LED display should flash briefly. A green LED above the On/Off button should appear. If this changes to red it indicates that the battery needs replacing. It will automatically turn off after a few minutes to save battery life or you can turn it off manually by pressing the button again.

The MagneMeter enables you to make a quick and informed measurement of power frequency magnetic field levels in your environment. Readings are shown on a series of LED lights.

The MagneMeter will give different readings when held at different angles. To get an accurate reading, it should be held in one place and slowly rotated/twisted through both axes indicated until the maximum reading is found.



Many countries use microteslas (μT) for magnetic fields. 10 mG is the same as 1 μT.

There is also a short-form user guide in the pouch with the MagneMeter.

What does the research say?

2 mG – Little evidence of health effects but some indications that the rise in child leukaemia may start by 1.5 mG. We recommend levels below 1 mG in your sleeping areas.
The UK average background level is about 0.4 mG.
Fields close to some electrical appliances can exceed this level.
Less than 2% of UK homes are thought to have background EMFs above 2 mG.

3 mG – Disruption of the production of melatonin has been found with night exposures above 3 mG, and sometimes even lower. Melatonin is a very important hormone regulating the body's self-repair mechanisms.

4 mG – A doubling in incidence of childhood cancers has been repeatedly shown at levels of 4 mG and above. In our opinion, 4 mG may increase the risk of long term health problems in the home.

Note: Despite the IARC classification of EMFs as a possible carcinogen for exposures as low as 4 mG, Public Health England still say that it is acceptable to expose members of the public to fields of up to about 3600 mG – the highest permitted level in Europe - as they do not admit to any "proven" increased risk of cancer caused by magnetic field exposure.

Measuring Magnetic Fields

Be careful to measure any electric appliances in your bedrooms, especially transformers for toys, radios, chargers, etc. They can give off very high fields and it is very unwise to have a transformer plugged into a socket near the bed.

We recommend that you check the magnetic fields the following way:

1. To determine the background level from external sources, switch everything off – ideally at the main switch. Measure it at a peak time (usually between 5.00 and 7.00 pm in residential areas). It is unlikely that you will be able to reduce this unless it is due to a 'stray' current (see below).
2. Switch the power on again. Plug a significant load (e.g. a kettle or heater) into a socket in the lounge. The room centre reading should not increase by more than 0.2 mG when this is switched on.
3. Repeat (2) with the appliance plugged into a socket in each room in the house in turn. Measure the field level, especially on the beds.
4. Check any lights with two-way switching such as a stair light. Check first with the light switched on using one switch and then with it switched on using the other switch. Take the measurement somewhere in the centre of the house. The magnetic field levels should not increase.

It is worthwhile measuring the fields from electric storage radiators when they are charging (after midnight) and next to electricity meter cupboards – please note that magnetic fields go through normal building walls.

Net and Stray currents

If the reading significantly increases during the tests in 2, 3 or 4 above, then there is a fault in the house wiring causing high magnetic fields by unbalanced current flow. A qualified electrician should be called to carry out a full test and repair on the wiring.

Magnetic fields from external overhead and underground cables can be very high. They only reduce with distance from the source: the higher the current, the further away you have to be before the magnetic field is at background levels.

Some properties have high levels of magnetic fields as a result of faults having developed in underground cables from the electricity substations. These produce unbalanced (net or stray) currents. If your background magnetic field is higher than about 1 mG, the fields are likely to be due to net or stray currents which can affect a few houses, or even a few streets.

'Stray' current can even enter the house on metal water (or gas) pipes and return through the electricity earth. Measure the field near to these pipes where they enter the house. If the reading rises significantly then there is information on our article 'Your low EMF home, section 1. House Wiring' explaining how you can minimise those 'stray' currents.

Our article contains a lot of practical information on this subject. If you wish to read about the research into power-frequency electromagnetic fields and the health effects that have been associated with different levels of exposure, you can find more information in the free library articles on our website, www.emfields-solutions.com There is some general information on the site, some on the FAQs part with more detail in the longer library articles.

Cars and trains can expose you to very high magnetic fields, especially over the wheel arches. If you have to commute over long-distances, it is worth measuring the fields you are exposed to in different seats and choose one carefully, particularly if you are likely to be pregnant. American research links exposure to abruptly changing magnetic fields (common in electric trains), with miscarriages, especially in the first 3 months of pregnancy.

What to do if your magnetic fields are high

If, as a result of taking the measurements you find the fields are high, what can you do to ensure you and your family can stay unaffected by EMFs?

The places people spend most time in are the most important ones to keep exposure low. Remember that magnetic fields travel through walls, so it is important to check what is on the other side of the wall behind the bed, or a favourite chair. Downstairs lighting circuits should be checked if you have a child who likes to play, draw or read on the floor of the room above.

Make sure the EMFs on the bed are low; that there are no electrical appliances (including mobile phones, transformers, etc.) near the bed. They should all be switched off overnight, or ideally moved out of the bedroom altogether. The bedroom should be a place where your body can repair any damage caused during the day.

The next room to consider is the one where you spend most of your time at home. Time spent on computers, TVs, games consoles and all electric and electronic toys should be carefully monitored and strictly limited if they give off high EMFs. Small children should stay out of kitchens when electrical appliances are in use.

There may be a substation and underground cables near your garden. Make sure play equipment is kept away from these, and thorny bushes, such as roses are planted as a barrier, if there are areas of high EMFs in the garden.

If your readings suggest a 'stray' current is affecting magnetic field levels in the house, the 'Your low EMF home, section 1. House Wiring' article explains how to remove it. If you detect a fault in the house wiring as a result of the tests carried out above, the article will help an electrician remedy the fault.

Many of the free articles in the library on the www.emfields-solutions.com website will help inform your decisions. Specific technical questions can be sent to technical@emfields-solutions.com.

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Technical Specification

Frequency response 15 Hz – 2000 Hz ±3dB

Accuracy for 50 Hz to 100 Hz is ±5% ±0.05 mG

Sensor: single-axis magnetic sensor coil

Main scale points: 0.2, 0.5, 1, 2, 4, 6, 10, 20 mG

When two LEDs next to each other are both lit, this indicates an extra scale point half-way between the printed ones (i.e. 0.35, 0.75, 1.5, 3, 5, 8 and 15 mG)

Battery: PP3 / MN1604 or equivalent 9 volt battery.
A new alkaline battery will last for about 30 hours use.

European Approvals

EN61000-6-3:2001+A11:2004, EN61000-6-1:2001, ROHS 2 2011 (2002/95/EC), and WEEE (2012/19/EU)(2002/96/EC)

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