

Sandwich maker

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Satellite dishes and receivers

See 'Televisions and TV and radio transmitters' for further details.

Sauna

Fields measured within a working sauna, where a person would be sitting have been measured by one person as 17 V/m electric fields, and 0.03 – 0.04 microtesla magnetic fields. Despite having been told that saunas generate high EMFs, these readings do not seem to bear it out.

Far infrared saunas heat the person directly rather than the room. They will give off more EMFs than an ordinary sauna and these field levels are likely to be very different depending on the way the heating units are wired. It is cheaper to arrange the wiring in a way that gives off high fields. The only way to know for sure what you are being exposed to, is to measure the fields. One person measured between 1,000 and 1,500 V/m and 0.5 – 1 μ T.

A far infrared sauna blanket, sold for detoxifying the body, bought by one person registered 300 volts/metre electric fields when it was plugged in.

Scanner

Most give off negligible fields, although some have separate mains transformers, which give off high magnetic fields.

Security Systems

Most intruder sensors should not cause EMF hazards outside your home. You should know how to switch off **microwave** sensors when you are in the garden or in other areas the sensors cover. If you do not know, contact the installer and find out how this can be done as most systems leave the sensors active even when the system is not armed.

Sewing Machines

The motors give off high magnetic fields. Some machines with two-core mains cables give off high electric fields as well. Increases in Alzheimer's disease (Sobel [1995](#)) and brain tumours in the operator's children (Li [2009](#)) have been detected in machinists using industrial machines. There is some concern about the effect on breast cancers. High EMF exposure is more likely in older sewing machines (Szabó [2006](#)). There does not seem to have been research into domestic machine usage.

Li P et al 2009 – *Maternal occupational exposure to extremely low frequency magnetic fields and the risk of brain cancer in the offspring* Cancer Causes Control 20(6):945-55 PMID: 19224378

Sobel E et al 1995 – *Occupations with exposure to electromagnetic fields: a possible risk factor for Alzheimer's disease* Am J Epidemiol 142(5):515-24 PMID: 7677130

Szabó J et al 2006 - *Occupational 50 Hz magnetic field exposure measurements among female sewing machine operators in Hungary* Bioelectromagnetics 27(6):451-7 PMID: 16622866

Smoke detector

There are many types of these. The most common type are powered by a 9 volt battery and do not give off any EMFs, however they do use a very low level radioactive source and should only be installed on ceilings and disposed of carefully if you renew them.

Smoke detectors feeding a central fire alarm system often have both temperature detectors and infra-red detectors built in. These are quite safe and do not give off EMFs.

Sockets

Electrical power sockets always give off electric fields. "Leakage" and / or residual damp in walls can lead to high electric field levels all over walls.

Solar panel water heating

The system itself will not be an EMF hazard, except for the electric pump used to pump the water around. This could be outside or inside the house. Keep chairs, beds, etc. on the other side of the wall, at least one metre away from the pump.

Solar photovoltaic (PV) panels

These generate a DC voltage that may be fed to a battery for storage. Increasingly they feed an inverter that transforms the low DC voltage to mains AC voltage for selling back to the electricity grid under a UK government incentive scheme. The DC cabling does not cause EMF problems. The inverter and associated cabling will give off both electric and magnetic fields and should be located ideally two metres away from areas where you spend much time.

Soldering irons

Those which plug directly into the mains electricity are unlikely to be a problem. Many modern soldering irons run from a low-voltage transformer / controller unit which does give off high magnetic fields. Keep it at arm's length, when possible, when using it.

Spinners

The motors of a clothes spinner give off high EMFs. Bigger machines are used on the floor, draining into the sink via a hose. The field levels will be reasonably low at body height. Smaller units on draining boards, have smaller motors and lower fields, but potentially radiating more vital body areas as they are closer to the body.

Spot Lights

See the article "Lighting and EMFs".

Stairlift

Stairlifts have motors mounted on the actual chair, so you are exposed to high magnetic fields when using it. This probably is not a problem as long as you only use it relatively few times each day.

Static electricity

Static electricity can give rise to electric shocks to your system, which should be avoided. Wear natural materials, and do not have carpets made of nylon or mostly synthetic materials.

Electric shocks when getting out of a car are due to static electricity which is generated when people slide across seat covers as they prepare to get out of it. Car seat covers are usually made of synthetic material, generating static electricity, which the driver or passenger then discharges by touching the metal body of the car. This can easily be prevented by holding onto the metal of the car, perhaps the roof or the door pillar, accessible through the door opening, as you slide across to get out. This prevents static build-up, so there is no sudden discharge.

Storage Heater

See "Heaters" in Section D-H.

Sun beds

These give off high electric and magnetic fields as well as possibly dangerous levels of ultra-violet radiation. Many can give off five times as much UVA as would be expected from bright sunlight at the equator. They increase the risk of skin cancer, especially in fair-skinned people. Regular sun bed use before the age of 30 has been recognised by the International Agency for Research on Cancer (IARC) as a class 1 carcinogen. In 2010, it became an offence to permit people under 18 using a sun bed.

Sun lamp

These, too, give off possibly dangerous levels of ultra-violet radiation. Ultra-violet is a form of non-ionising radiation that we know causes skin cancers. One study (Clough-Gorr 2008) reported increased melanoma risk with use of sunlamps, which was increased if tanning beds were also used.

Clough-Gorr KM et al 2008 – *Exposure to sunlamps, tanning beds, and melanoma risk* *Cancer Causes Control* 19(7):659-69 PMID: 18273687

Tea maker

Keep a tea-making machine at least one metre from the head of your bed. It gives off high fields when in operation.

Telephone

Ordinary wired telephones are not usually a problem as one side of the telephone system is 'earthed'. However, some electrically sensitive people do have difficulties, as they do with most

electrical equipment. In this case you might get an ASDL phone line filter from your local computer or phone shop. The filter plugs into your ordinary phone socket and the phone is then plugged into the filter. Sometimes people choose a 'loud-speaker phone'. These are not always earthed. If you are unsure, you may want to put the speaker phone into an earthed headnet, which removes radiofrequency and electric fields coming from it.

Answerphones do not usually give off high EMFs, but most are supplied with a plug-mounted power supply transformer which does give off high magnetic fields, and should be situated at least a metre away from chairs and beds.

Car Phone

see our article on "Cars".

Cordless phones

see separate article on "DECT cordless phones".

Mobile Phones

See "Mobile Phones" and "Children and mobile phones".

Televisions

See separate article on "Televisions and TV transmitters".

TV Hearing Aids

see "Hearing Aid" Section 2 D-H

TV /Radio transmitter

See separate article on "Televisions and TV transmitters".

TENS unit

A **TENS unit**, (Transcutaneous Electrical Nerve Stimulator unit), can help to exercise and relax muscles, using electrical stimulation to give rise to natural endorphins which can give pain relief. We do not consider these to be hazardous from an EMF point of view. See also the article on 'The positive effects of EMFs'.

Toaster

Toasters are used only briefly. They give off low EMFs. Switch off at the wall immediately when finished. For many models this is the only option to being fully on, as they do not have an off switch on the machine.

Transformers

Transformers are used whenever the mains electricity has to be stepped down to operate a piece of equipment. They are used for children's games, fish tank pumps, battery chargers, etc. They can give off very high levels of magnetic fields. Do NOT leave plugged in next to beds, especially children's beds, as it is very important not to expose children to high levels of magnetic fields while they sleep. Tomitsch ([2009](#)) found the highest magnetic field levels in houses were from transformers of appliances which could exceed 1 microtesla.

Tomitsch J et al 2009 – *Survey of electromagnetic field exposure in bedrooms of residences in lower Austria* Bioelectromagnetics 31(3):200-8 PMID: 19780092

Trouser press / electric mangle

Trouser presses and electric mangles give off low EMFs and are not a problem over half a metre away.

Tumble drier

Motors give off high fields of several microtesla. Do not work close by these appliances and do not let children play in front of them, whilst they are in operation. Always keep the filter clean to improve efficiency.

Typewriters

This is becoming less of a problem as people use computers for their main source of writing. Electric typewriters give off high magnetic fields (due to cheap transformers), and, if unearthed, the keyboards can give off high electric fields. Switch it off at the socket when it is not being used.

Underfloor heating

see separate article on “Underfloor heating”.

Vacuum Cleaners

Motors produce high magnetic fields; up to 2 μT at 30 cm. and up to 0.8 μT at half a metre. The type of vacuum cleaner that runs over the floor, with an attached suction hose is better with regard to EMFs than an upright cleaner, as the motor and wires are further away from your body. Hand-held cleaners, such as those used to vacuum furniture or cars, produce high fields right next to your body.

Washing Machines

Close to they give off high fields of several microtesla. Often pushed under work surfaces, the machines can expose vulnerable areas of the body to these high fields. We recommend you do not work close by these appliances, especially when pregnant and do not let children play in front of them, whilst they are in operation. Install a timer, so the machine can run at night on cheaper-rate electricity, when no-one is around.

Washer / dryer

A combined **washer / dryer** is similar to the two separate appliances for generating power frequency magnetic field levels. Again keep a reasonable distance from the motor while they are working.

Waste disposal unit

The **waste disposal unit** is likely to have quite a high-powered motor, which will give off high EMFs when in operation. The more organic waste that is put into the waste water system, the more expensive the water is to re-purify at sewage works.

Water beds

See Section 1 Introduction and A-C under Beds.

Water filters

Jug-type water filters remove many harmful chemicals and minerals. They do not produce the subtle molecular changes that magnetic fields do. If you live in areas that are affected by the accumulated effects of years of crop spraying, with chemicals that get into the water table and then the water supply, you might use bottled water, especially for people with compromised immune systems. Many bottled waters are quite contaminated with microbes and bacteria, and can be sold quite legally, so do your research.

Some reverse osmosis filters require a pump for the membrane that separates the water molecules from other molecules. Flow rates may be slow and, along with harmful chemicals, beneficial particles including calcium and zinc salts, that people require for optimal health, can also be removed. It offers some protection against accidental pollution of the water supply by water authorities.

Other in-line filters which store filtered water temporarily require an electric pump to release the water through the tap. These pumps give off EMFs which are unlikely to be a problem, but may affect the molecular structure of the water. Some people will be sensitive to this. It may have long-term subtle health effects on the general population.

Water heater

The heater will give off EMFs similar to an electric kettle. Height and distance from the body will vary. Minimise evening exposure time when it is dark and your pineal gland is susceptible to being deactivated.

Water softener

Some in-line water softeners use magnetism to change the molecular structure of the mineral impurities in the water which create the scale that blocks pipes and causes 'scum' in the washing. Some scientists believe that these molecular structural changes can cause biological reactions and long-term health problems, if ingested. Keep drinking water separate from the water softening system, if magnets are used. All types of water filter will effectively soften water, and prevent limescale forming in kettles and steam irons.

Water supply

Electricity substations can be interconnected in a way that generates 'net' currents, see article "Powerlines, substations, underground cables and net currents". When electricity cables and mains water pipes share the same trenches in the street distribution system, the water supply pipe can enter a house carrying an EMF 'charge'. This causes a current to flow when the pipe is connected to the electricity earth inside the house as required by regulations. This current then flows around the house through the water pipes, central heating radiators, bathroom showers, etc., causing high levels of magnetic field.

Wheelchairs

Motors and heavy-duty battery wires give off high EMFs when a motorised wheelchair is in use, especially starting and stopping. Short periods of time are likely to give few EMF problems. If you use your wheelchair all the time it may be worthwhile taking extra precautions. The longer the time you spend in an electrically active wheelchair the more you will be exposed to high fields. You could place a steel sheet underneath the wheelchair seat and also down behind your legs. Put an extra cushion on top of the seat.

Wristwatches

All watches with batteries give off significant magnetic field pulse levels every time the mechanism is activated (0.33, 0.5 or 1 second).

The Earthing of electrical appliances with two-wire mains leads

Many electrical appliances now come with two-wire mains leads or adapters and are often described as being double-insulated. This is done for a variety of reasons, including protecting against electric shock. It is cheaper to cover metal objects in plastic than it is to ensure good electrical earthing of exposed metal parts. Also, if you are holding a plastic object it doesn't provide an electrical return path to earth in the most unlikely event of your also happening to touch a 240v live electrical conductor, so you will not get a severe electrical shock.

The downside is that the 'workings' of all these appliances tend to 'float' to half the electrical supply voltage (i.e. to about 120 volts) and this causes them to radiate very high electric fields (often several hundreds of volts per metre nearby).

The worst offenders that we have found are televisions, electronic organs, some Hi-Fi units, laptop computers when run off their mains adapter / charger units, and battery chargers.

Most of these can be cured of giving off high electric fields by taking an 'earthing' wire from their mains plug to an exposed screw or piece of metal on the appliance.

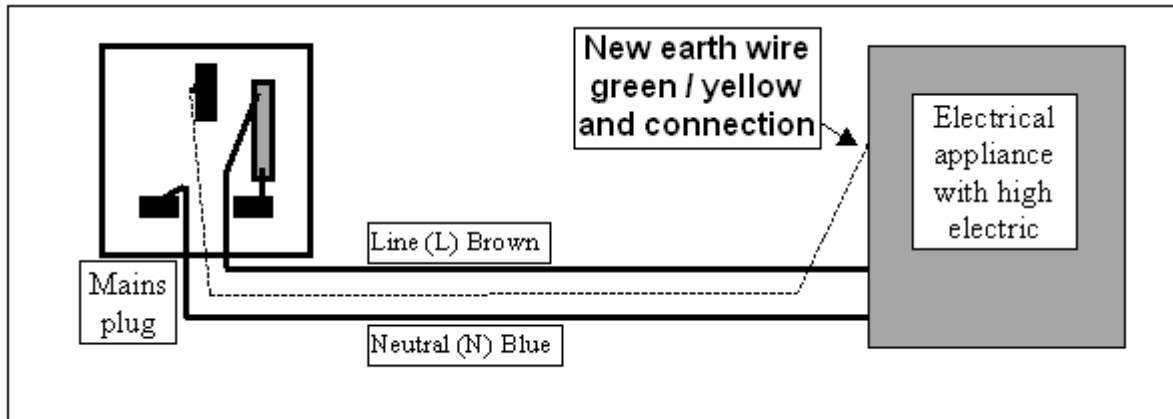
In the case of an organ, or Hi-Fi unit, the braid screen of one of the audio cables is normally suitable as this is connected to the '0 volt' rail inside the unit.

In the case of a television, the braid (or outside of the co-ax connector) of the aerial lead usually makes a suitable connection point. As the television and DVD player are usually connected together it is not necessary to earth both units.

In the case of the laptop computer, any metal connector shell on the back of the computer will do. It is often convenient to use a 'crocodile' clip on the earth lead so that it is easy to attach and

detach when you need to move the computer. EMFields can supply an [earthing lead](#) that will reduce the electric fields from a laptop computer. For those laptops with no metal connector, EMFields can supply a [USB cable](#) that together with the earthing lead will reduce the electric fields. If you have an internet connection through a dLAN (through the house wiring, rather than a telephone or wireless system), it is important to earth the laptop even if you run it off batteries, as it will pick up and re-radiate electric fields from the house wiring through the dLAN connection. We have measured 400 V/m at the keyboard of one model.

It is also possible for a qualified electronics engineer to modify the mains charger unit so that it has a three-wire mains lead and the internal 'zero volt' power supply line is connected to the electrical mains safety earth.



Fields from transformers and motors etc., fall off approximately with the cube of the distance, i.e. the field at twice the distance should be about one eighth of the value. There is little you can do to reduce these other than use low-field designs (e.g. toroidal transformers) or increase the distance between you and the source. Steel magnetic screening can be used at the equipment but is rarely economic to do this other than at the time of the manufacture of the appliance.