



Electric radiators

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Mobile electric radiators consist of a hollow metal case containing the heating elements and water or oil to store the heat. Heat is released mainly by radiation. The heating turns on when the temperature of the heat store falls below a preset value.



Low frequency magnetic fields can be produced in the immediate vicinity of electric radiators during the heating phase. The reason for this is the current that flows through the heater. These fields rapidly fall to low levels at a small distance from the appliance.

It is not known whether the long-term impact of low-frequency magnetic fields presents a health risk. No effects are expected from short-term exposure to low-frequency emissions from electric radiators.

Nevertheless, the following precautions will help to minimise exposure to the magnetic fields generated by radiators:

- A minimum distance of 30 cm should be maintained between the individual storage heater and work places, sleeping places or spaces occupied for longer periods.



1 Technical data

Voltage: 230 V / 400 V
Power: 1000 - 2000 W
Frequency: 50 Hz

Radiators are made of sheet metal parts with good heat conduction properties. They are constructed in such a way that there is a large surface area to radiate heat. The heater is shaped like a rod, and contains a heating wire, which heats up as a result of its resistance to the flow of an electric current. The water or oil in the radiator stores the heat that has been produced.

The low frequency magnetic fields produced by radiators result from the current flowing through the heating wire.

2 Esposizione a campi magnetici a bassa frequenza

The low frequency magnetic fields around two radiators were assessed in a study financed by the FOPH. Measurements were done 50 cm above the floor, at 20 to 100 cm from the appliance.

Figure 1 shows the magnetic field around one these radiators as a function of distance. The magnetic field rapidly drops off at all sides of the appliance, becoming negligible at a distance of 30-50 cm.

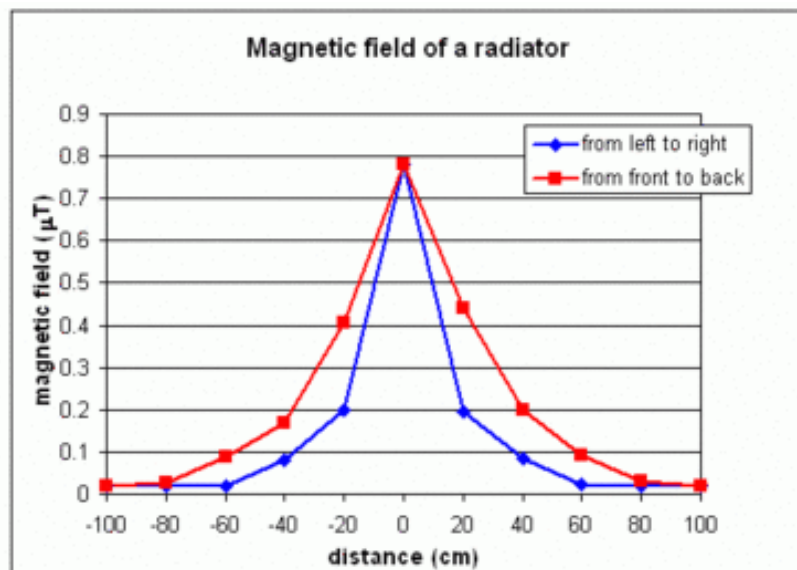


Figure 1: Low frequency magnetic fields as a function of distance to the sides, front and back of radiators, measurements done 50 cm above the floor.



3 Effects on health

Low-frequency magnetic fields can pass through the human body and produce electric currents in the body. If these currents exceed a certain value, there can be immediate excitation of the central nervous system. Therefore, the European threshold values for magnetic fields are specified such that the current is at least 50 fold below this value [1]. The magnetic fields generated by electrical radiators are at most 0.8 μT , which is much lower than the threshold value of 100 μT .

In 2002 the International Agency for Research on Cancer (IARC) classified static and low-frequency magnetic fields as possible causes of cancer (Group 2B) [2]. This was based on epidemiological studies that suggest that long-term and durable exposure to magnetic fields in the low-dosage range of 1 μT or even lower ($< 0.4 \mu\text{T}$) could increase the risk of Alzheimer's disease [3,4] or of childhood leukaemia [5,6]. Magnetic fields above 0.4 μT occur at a distance of up to 30 cm around electric radiators. The possible risk can be eliminated by keeping this distance away from the appliance.

4 Regulations in law

Electrical radiators are classed as low-voltage products and governed, in Switzerland, by the Ordinance on Low-Voltage Electrical Products [7]. This ordinance requires that low-voltage products - both when used properly and, wherever possible, in predictable cases of misuse or in the event of foreseeable malfunctions - pose no danger to either persons or property. Only low-voltage products that meet the essential health and safety requirements specified by the European Low-Voltage Directive (2006/95/EC) may be brought into circulation.

At the time any such a product is brought into circulation, the relevant manufacturer is required to issue a Declaration of Conformity confirming that the product complies with the essential requirements. The essential requirements for specific products are detailed in technical standards; electromagnetic fields produced by household appliances are covered by standard SN EN 62233 [8]. The conformity criteria set out here reflect the thresholds recommended by the EU [1].

The manufacturers themselves are responsible for ensuring that their products comply with the conformity criteria. While Switzerland has no comprehensive system of market controls, the Swiss Inspectorate for High Current Installations (www.esti.admin.ch) carries out random conformity checks on marketed products.



5 Literature

1. RECOMMENDATION OF THE COUNCIL of 12 July 1999 on limiting the exposure of the population to electromagnetic fields (0 Hz - 300 GHz) (1999/519/EC)
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3. Huss et al. Residence near power lines and mortality from neurodegenerative diseases: longitudinal study of the Swiss population. *American Journal of Epidemiology*. 169(2):167-75. 2009
4. Kheifets et al. Future needs of occupational epidemiology of extremely low frequency electric and magnetic fields: review and recommendations. *Occupational and Environmental Medicine*. 66(2):72-80. 2009
5. Kheifets et al. Pooled analysis of recent studies on magnetic fields and childhood leukaemia. *British Journal of Cancer*. 103(7):1128-35. 2010
6. Ahlbom et al. Review of the epidemiologic literature on EMF and Health; ICNIRP (International Commission for Non-Ionizing Radiation Protection) Standing Committee on Epidemiology. *Environment Health Perspectives*. 109 Suppl 6:911-33. Review. 2001
7. SR 734.26. Ordinance of 9 April 1997 on low-voltage electrical equipment (LVEO).
8. EN SN 62233 Household and similar electrical appliances - Electromagnetic fields - Methods for evaluation and measurement

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