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Federal Department of Home Affairs FDHA
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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.

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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 Exposure to low-frequency magnetic fields

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.

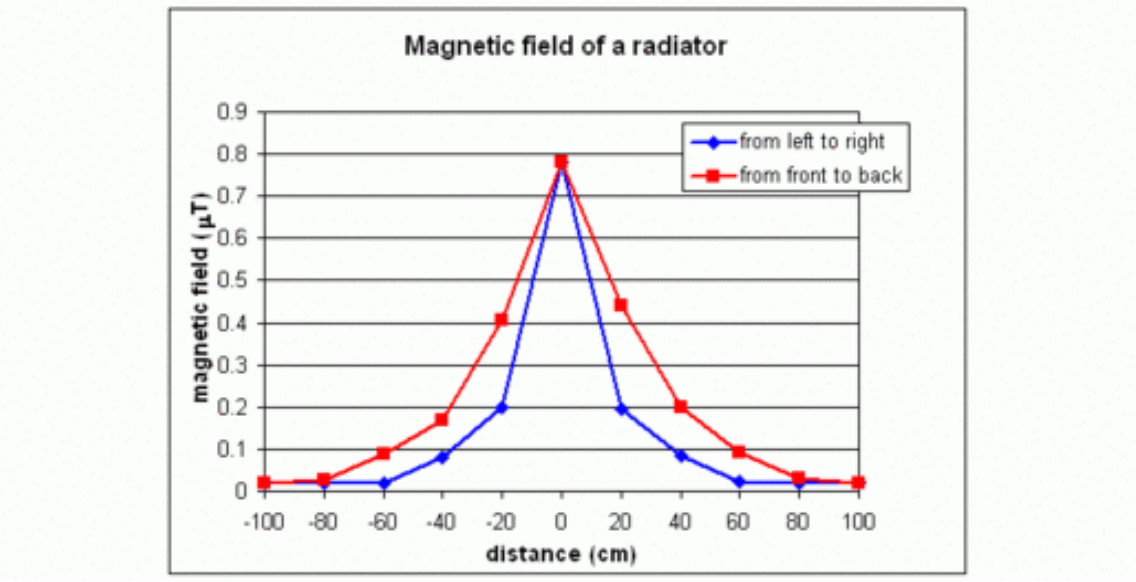

Figure 1: Low frequency magnetic fields as a function of distance to the sides, front and back of radiators, measurements done 50 cm above the floor.

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 µT) 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 Regulation in law

Electric radiators are low-voltage appliances which are regulated in Switzerland by the Ordinance on electrical low-voltage equipment (SR 734.26 - Ordinance of 25 November 2015 on electrical low-voltage equipment | Fedlex). It stipulates that low-voltage appliances may only be marketed if they comply with the safety objectives of Annex I of the European (EC) Low Voltage Directive (Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast) Text with EEA relevance). The European directive states that low-voltage appliances must be designed and created in such a manner that protection against hazards is guaranteed when they are used as intended and adequately maintained. To this end, technical measures, among other things, must be defined to ensure that no hazardous radiation is emitted. Manufacturers of low-voltage appliances must obtain a Declaration of Conformity for a product from the time at which it is brought onto the market; this declaration states that the product complies with these requirements. The requirements for individual products are specified in the technical standards.

The conformity criteria for compliance with the requirements correspond to the limit recommended by the EU (1999/519/EC: Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) - Publications Office of the EU). Manufacturers are responsible for ensuring that their appliances comply with the conformity criteria. In Switzerland, no authority checks whether electric radiators meet these standards (23.4244 | Mobile phones emit more radiation than permitted. The time has come to check the NIR limits in Switzerland too! | Item of business | The Swiss Parliament – available in German, French and Italian).

5 Literature

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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
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