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Individual heat storage units

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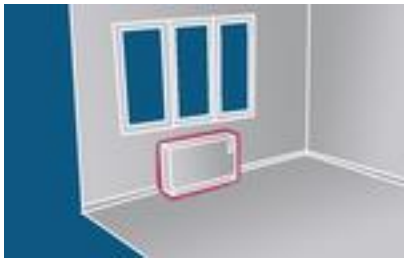

Individual or off-peak heat storage units are fixed heating units appropriate to heat one room. The appliance has a heat storage unit, which absorbs the heat produced off peak during the night. Heat is given up throughout the day, both from warm air and by radiation. In appliances with a fan, it is possible to regulate the release of heat.

Low-frequency magnetic fields are produced in the vicinity of individual heat storage units. This is due to the electric currents that flow through the heating elements during the heating phase and through the motor of the fan during the release of heat. The magnetic fields quickly fall off with increasing 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 individual heat storage units.

Nevertheless, the following measures will enable you to reduce exposure to magnetic fields generated by individual heat storage units:

- Keep a distance of 80 cm between the individual heat storage unit and places where people stay for a long time to work, relax or sleep.
- Electrical cables leading to the individual heat storage unit should be kept away from relaxation areas, where people stay for longer periods.

NB

- To avoid burns and fires it is important to observe the safety instructions.
- Old individual storage heaters must be dismantled and disposed of professionally, as they may have parts containing asbestos. For further information see the FOPH fact sheet
- A built-in dust filter or air filter reduces the smell made by dust burning in the heat storage unit.
- Particular cantonal specifications may exist for electric heaters. Before installing a new individual heat storage unit enquire about them with the cantonal energy departments

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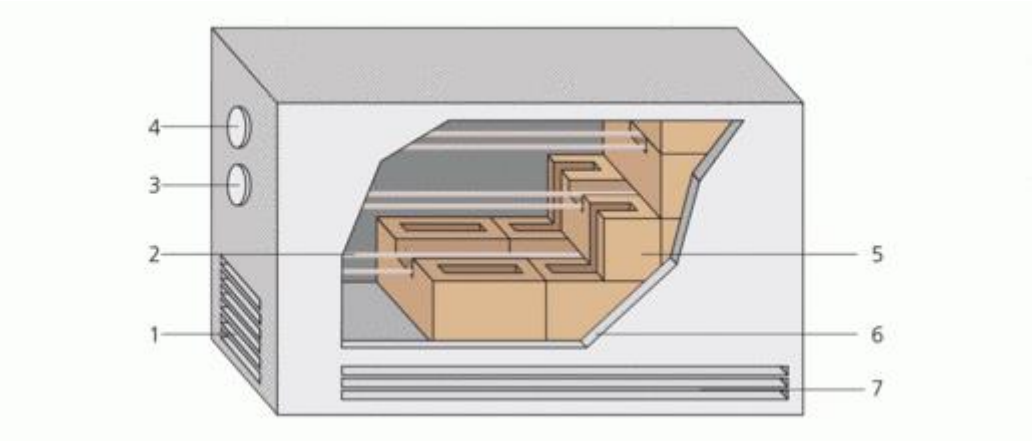
1 Detailed information

Voltage: 400 V
Power: 750 - 7500 W
Frequency: 50 Hz

Individual storage heaters contain a heat storage unit made of shaped bricks. The embedded tubular or helicoidal heating elements generate the required heat during the night, when electricity is cheaper. The heating elements warm up because of their resistance to the electric current.

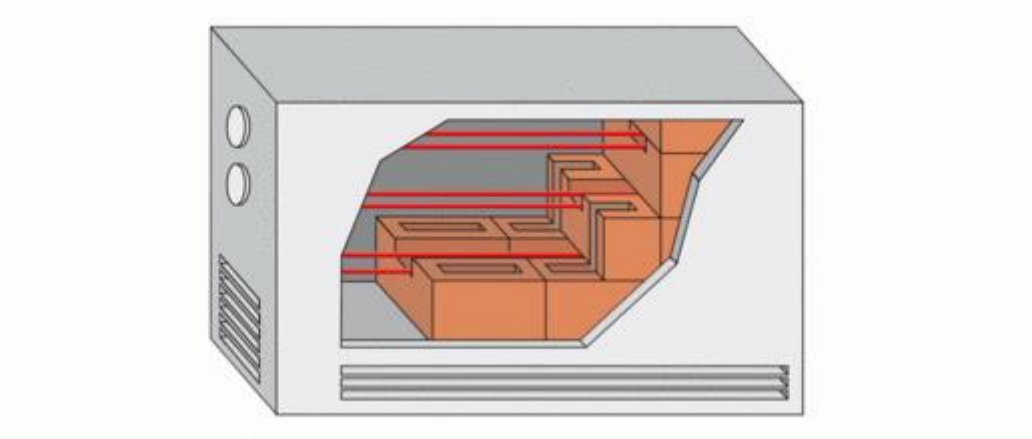
The heat storage unit contains a network of air ducts. In appliances where the release of heat can be regulated, a fan draws in cool air from the room and draws it through the air ducts, where it is heated up. In appliances without a fan, the air flows through the air ducts by convection. A flap automatically mixes the hot and cool air, so that air of the right temperature comes out through the air outlet grating.

The heat storage unit is well insulated as it can reach a temperature of 700°C.
As the heat storage unit warms up, the electric current flowing through the heating elements generates a low-frequency magnetic field around the appliance. When heat is released, in an appliance with a fan, a magnetic field is generated by the flow of electricity through the motor that turns the fan.



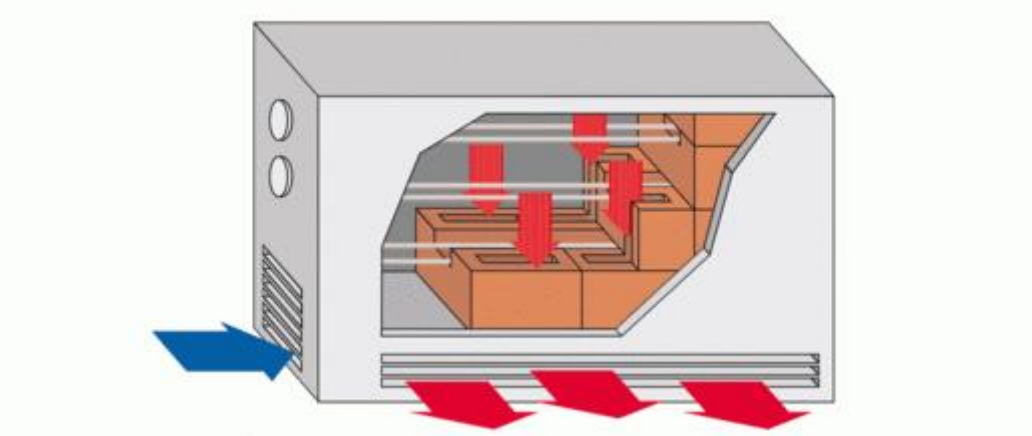
The appliance

1 Air inlet	5 Storage bricks
2 Heating elements	6 Thermal insulation
3 Temperature regulator	7 Air outlet grid
4 Charge controller	



Night-time operation

During the night, the storage bricks are heated by the heating elements using low-cost electricity. The heat requirement is adjusted using the charge controller. Thermal insulation prevents unregulated heat loss.



Daytime operation

During the day, air that is taken in is warmed up in the channels in the storage bricks and is blown into the room at the desired temperature, through the outlet grid.

2 Exposure to low frequency magnetic fields

A study financed by the FOPH assessed the low frequency magnetic fields around individual heat storage units. The measurements were made 50 cm above the floor, at distances ranging from 20 cm to 160 cm from the appliance. Figure 1 shows the magnetic fields produced by nine individual heat storage units without fans. The magnetic fields are localised around the appliance and drop off rapidly with distance on all sides of the appliance, reaching low values as of 80 cm. The magnetic field tends to be stronger in front of the heater than to the sides.

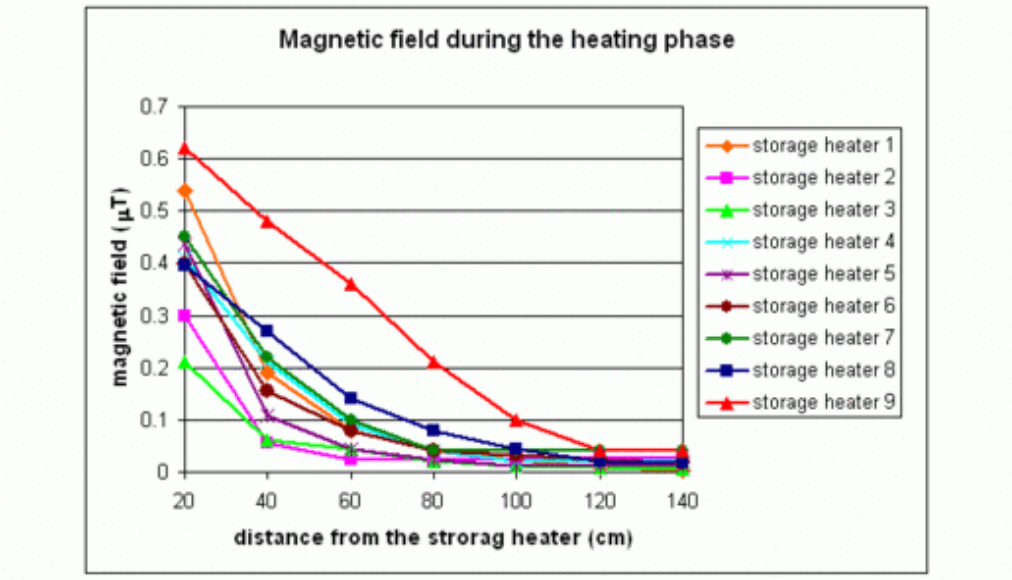


Figure 1 Low frequency magnetic fields in front of nine individual storage heaters during the warming up phase, measurements 50 cm above the floor. Appliances without in-built fans.

Figure 2 shows the magnetic fields for two individual storage heaters with in-built fans. The strongest magnetic fields are generated during the release of heat, because the fan is running. They drop off quickly with distance, and are very weak at 80 cm. The magnetic fields generated during the heating-up phase are much weaker.

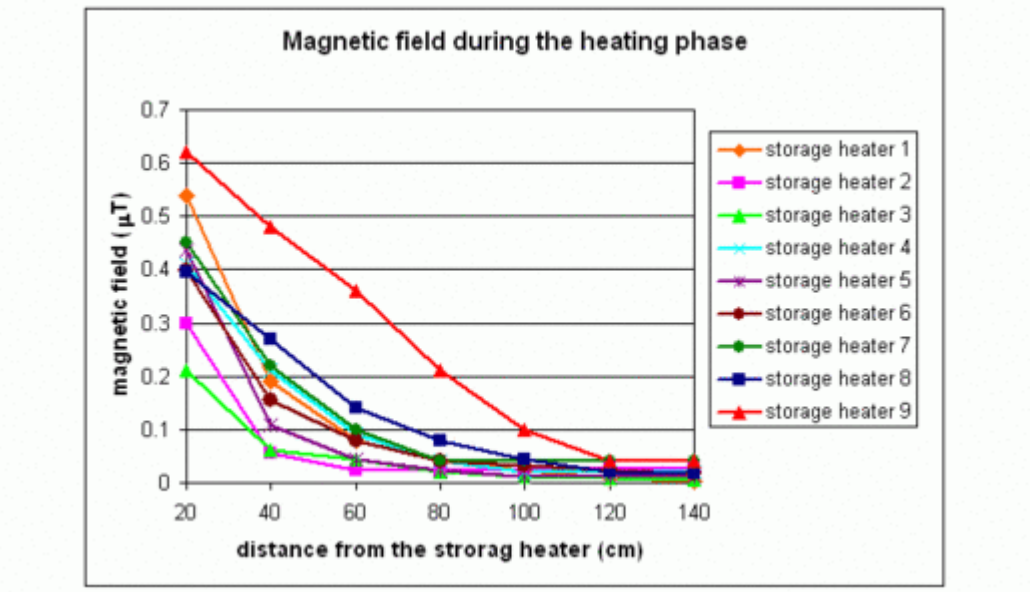


Figure 2 Low frequency magnetic fields in front of individual storage heaters with in-built fans, during the heating phase (without use of fan) and during the release of heat (with fan running). Measurements 50 cm above the floor.

3 Effects on health

Low frequency magnetic fields can pass through the human body and generate electric currents in the body. If these currents exceed a certain value, there can be immediate excitation of the central nervous system. Accordingly, the European threshold values for magnetic fields have been set such that the current is at least 50 fold below this value [1]. The magnetic fields generated by storage heaters are at most 1.6 µT, which is much lower than the threshold value of 100 µT. No effects are expected from short-term exposure as the present threshold values preclude acute damage.

In 2002 the International Agency for Research on Cancer (IARC) classified static and low-frequency magnetic fields as possibly carcinogenic (Group 2B) [2]. This was based on epidemiological studies that suggest that long-term and durable exposure to magnetic fields in the low-dosage area 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 of 0.4 µT occur at a distance of up to 80 cm around individual storage heaters. The possible risk can be eliminated by keeping 80 cm away from the appliance.of carcinogenic risks to humans, Volume 80. Lyon, France: International Agency for Research on Cancer.

4 Legal framework

Individual heat storage units 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 (EU)-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 [[]. 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). See "Further information"
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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
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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. Environ Health Perspect. 109 Suppl 6:911-33. Review. 2001
7. SR 734.26. Ordinance of 9 April 1997 on low-voltage electrical equipment (LVEO).
8. SN EN 62233 Household and similar electrical appliances - Electromagnetic Fields - Methods for evaluation and measurement

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