

Electromagnetic Fields of Energy Saving Lamps

Factsheet



The electromagnetic fields of energy saving lamps (ESL) do not differ considerably from the fields of common light bulbs. The fields of lamps are comparable to the fields of other household and office appliances.

- ① *The strengths of the magnetic fields (50Hz) of ESL are in the same order of magnitude as the strengths of the fields of comparable light bulbs.*
- ② *The strengths of the electric fields (50Hz) of ESL are slightly higher than the strengths of the fields of light bulbs.*
- ③ *The high-frequency fields of the operating frequencies (30-60kHz) are clearly below exposure limits and maximum exposure recommendations.*

Electromagnetic Fields

As soon as a household appliance is plugged into a power socket it is under voltage and thus generates an electric field. The field exists even when the appliance is switched off.

In addition to the electric field, a magnetic field can be measured when the appliance is switched on. Magnetic fields are generated as soon as (and only when) current circulates.

Low-frequency electric fields can easily be shielded with grounded, electrically conductive material. In contrast, the shielding of magnetic fields is difficult and costly.

Which Lamps - which Fields?

Common light bulbs produce alternating electric and magnetic fields. Due to the frequency of the electric power (50Hz; Hz=Hertz), the field intensities are alternating at 50Hz.

Energy saving lamps produce – in addition to the above mentioned AC-fields – so-called high-frequency fields at about 30-60kHz (kHz=Kilo-hertz; 1kHz= 1000Hz). These operating frequencies vary slightly between lamp types. The fields are generated in the sockets of energy saving lamps. They assure low energy consumption and ensure a jitter-free lighting.

This factsheet will present results from a measurement campaign of a representative sample of energy saving lamps and comparable light bulbs. All in all 13 types of lamps (2 specimens per type) were tested.

Compliance and Regulation

No technical standards or health oriented reference levels exist for electromagnetic emissions from lamps. The Swiss regulation (NISV) does not

cover immissions and emissions of household appliances, including lamps.

For reasons of comparison: the field strengths of the electromagnetic fields from lamps – measurement distance to the source: 30cm – meet all Swiss precautionary levels by far, and mostly also the strict Swedish TCO-recommendations developed for VDUs. For other household appliances than VDUs, however, the TCO-recommendations are not straightforwardly applicable (see below).

Magnetic Fields of Lamps

Low-frequency magnetic fields

The 50Hz magnetic fields of lamps are extremely weak already at a distance of 30cm. Their field strengths are even lower than the field strengths of light bulbs. The values are magnitudes below all limits and recommendations, including the TCO-recommendations (Fig. 1).

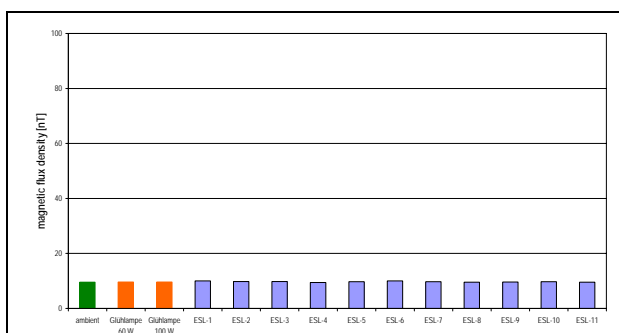


Fig. 1 Magnetic field (50Hz), in nT, 30cm distance

High-frequency magnetic fields

Energy saving lamps generate also high-frequency magnetic fields (see paragraph „Which lamps – which fields?“). Again, at a distance of 30cm, the field-strengths are far below the Swiss precautionary limit and – with the exception of one

tested specimen – even below the TCO-recommendations (Fig. 2).

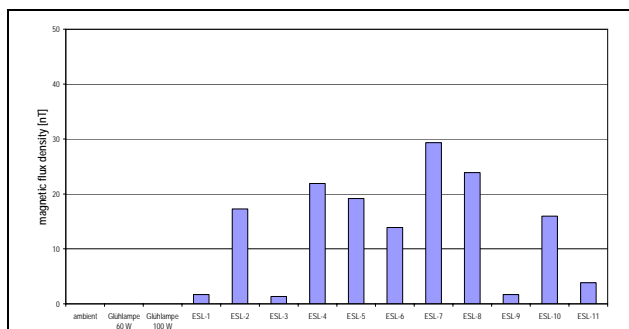


Fig. 2 Magnetic field (30-60kHz), in nT, 30cm distance

Electric Fields of Lamps

Low-frequency electric fields

The electric 50Hz-fields of energy saving lamps are a slightly stronger than the fields of comparable light bulbs (Fig. 3). However the fields are weak and in the order of magnitude of most electric appliances used in homes and offices.

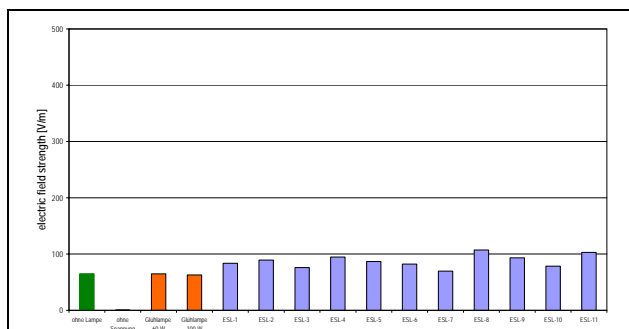


Fig. 3 Electric field (50Hz), in V/m, 30cm distance

The TCO-recommendation is not applicable for lamps. It was developed for VDUs that allow for an effective shielding of electric fields. In the case of lamps, such shielding is rarely possible. Please note: a power outlet or a lamp holder with impressed voltage already exceeds the TCO-value by far.

For lamps with metallic lamp shades the electric fields of the lamps can be reduced significantly if the shade is grounded. For personal safety reasons, however, we strongly advise you not to ground shades by yourself!

High-frequency electric fields

The RF electric fields of energy saving lamps (30-60kHz) are very weak. In a distance of 30cm the values are even below the TCO-limits (Fig. 4). Light bulbs do not generate high-frequency fields because light bulbs are not self-ballasted lamps.

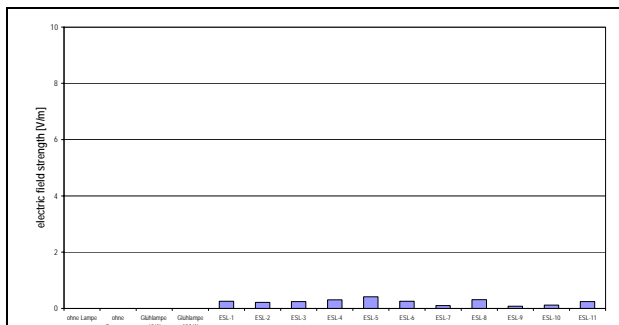


Fig. 4 Electric field (30-60kHz), in V/m, 30cm distance

Conclusions and recommendations

Concerning electromagnetic radiation, energy saving lamps are not inferior to light bulbs and comparable to other household appliances. You can use and continue to use energy saving lamps instead of light bulbs without concerns and thus contribute to energy saving and environment protection.

In case you are sensitive to the electric fields of energy saving lamps, you best buy a lamp with a grounded metallic shade or you replace the ESLs with light bulbs. Furthermore, we advice you to consequently switch-off the electric appliances you do not work with (not just „stand-by“-mode!) and/or you install a central switch which disconnects the house-wiring from the incoming power lines during the night.

To find out more...

- Detailed measurement report:
www.electricity-research.ch

- Information about electromagnetic fields in everyday life : www.emf-info.ch

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Prepared by Dr. Gregor Dürrenberger
(Swiss Research Foundation on Mobile Communication)

Dr. Georg Klaus
(Maxwave AG)