

A HEALTHIER HOME – BUT HOW?

Practical Everyday Tips

This brochure is a contribution to the "Action Programme on the Environment and Health" (APUG) and to its public relations activities. The Federal Environment Agency and the Federal Office for Radiation Protection funded the costs of printing and photographic material.

Internet: www.umweltbundesamt.de

Published by

Bundesamt für Strahlenschutz
Federal Office for Radiation Protection
Postfach 10 01 49
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Internet: www.bfs.de

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Wörlitzer Platz 1
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Publication went to press: March 2005 (Original German version)

Design and printing

KOMAG mbH, Berlin

This brochure is available free of charge

from the publishers or from the office of the "Action Programme on the Environment and Health" (APUG) at the Federal Environment Agency, Corrensplatz 1, 14195 Berlin. It can also be read and downloaded from the Internet as a pdf file at www.apug.de.

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FOREWORD

Dear readers,

We have compiled this consumer-oriented publication in response to the huge demand for brochures and pamphlets on the subjects “A healthy home” and “Indoor Air Quality.”

It is not surprising that there is such great interest in this topic: after all, in this part of the world we spend somewhere between 80 and 90 percent of the day indoors – most of that at home! Healthy living conditions in the home thus have a great impact on our health and wellbeing.

A number of old familiar problems, such as mould infestation, are more relevant than ever today. The levels of different chemicals, noise, radon or electromagnetic fields we are exposed to are also burning issues. A great deal of effort is being invested in dealing with them – not only in Germany but also by the European Union and the World Health Organization’s European Regional Office.

Without making any claim to be exhaustive, this brochure describes common problems connected with hygiene in the home and gives tips on how to prevent or remedy them.

A number of readers may have experienced in their own home some of the cases we describe and would have appreciated help. What can be done in cases like this? The general recommendations in this brochure may provide the help you need. If not, you should contact the local authorities relevant to the particular issue. Chapter 12 contains a list of authorities you can contact.

In Chapter 13 we have also listed a number of brochures and pamphlets published by the Federal Office for Radiation Protection, the Federal Institute for Risk Assessment and the Federal Environment Agency, which contain more detailed recommendations. This information material can be obtained free of charge from the federal agencies named.

We hope you will find this brochure interesting and that it will provide you with some valuable tips.

The editors, March 2005

Note to readers outside Germany: This brochure is a translation of the German text which refers to the situation in Germany. Therefore, not all parts of the text and not all tips may be applicable in other countries.

1 COMFORT IS PARAMOUNT

Whether we have a sense of comfort and well-being within our own four walls is affected not only by the furniture and fittings, but also by the indoor climate. The air temperature, temperature of radiant surfaces (for example “cold walls”, “hot stove”), humidity and air speed (draughts, for example) are important factors here.



Please refer to Box 1 below for the generally recommended ranges for room air temperature. The comfort zone for relative humidity is somewhere between 30 and 65 percent. You can use a hygrometer (device for measuring humidity) to check humidity levels. It should be placed in your living areas and not in the bathroom or kitchen. Simple hair hygrometers do not cost very much and are available in DIY stores or department stores. Although these devices will not give you an exact reading, you will at least get an idea of the relative humidity in your home. Humidifiers are not usually necessary to raise humidity levels. If they are not cleaned regularly they may even contribute to the spread of pathogens. The water in the humidifier also has to be changed regularly.

Box 1

Recommended temperature ranges in the home	
Living room	20–23 °C
Bedroom	17–20 °C
Kitchen	18–20 °C
Bathroom	20–23 °C
WC	16–19 °C
Hallway	15–18 °C

There is no such thing as a climate that is right for all the people in a room, because thermal comfort is influenced by factors such as clothing, physical activity and individual sensitivity. It is important to find a compromise that works for all the family or all the people sharing a home.

The following chapters look at a number of different hy-

giene problems that can occur in the home and that may seriously impair our comfort or, in some cases, even damage our health. But read for yourself the tips we have compiled: they will help you to prevent problems or, if they do occur, show you how you can eliminate them for yourself or with outside help.

2 SOMETHING IN THE AIR?

Clean air is one of the factors in our well-being. Unfortunately, clean air is not something we can take for granted because many harmful substances can pollute the air in our homes. They are formed when we use open flames to heat our homes or cook with – that includes stoves, open fires, gas cookers etc. They are also released from building materials, carpets or furniture, household chemicals and smoking tobacco or during decorating. We must also remember, of course, the air in our neighbourhood that gets into our homes when we open the windows. It may well be polluted, particularly in built-up areas and near roads with heavy traffic. However, we shall not go into further detail here about the health effects of the outdoor air.

If there are several **people** in a room the air will quite soon be “stale”. No wonder: each person uses up oxygen and gives off carbon dioxide, water vapour, excess heat and individual body odours.



When there are several people in a room, the air very quickly becomes stale

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At rest or during light physical exercise, the heat we give off is approximately 100 watts. That means that the heat emitted by three people could easily replace that of a bathroom radiator measuring 70 x 50 centime-

tres. In addition to that, humans lose 40 to 300 grams of water per hour – similarly depending on the extent of their physical activity – by breathing out and sweating. That can cause humidity levels to rise quite quickly. The combination of high humidity and heat causes discomfort and we experience that kind of atmosphere as “close” – just imagine what it feels like being in a greenhouse or hothouse. But apart from that it also encourages the growth of mould in the home (for more detail see *Chapter 5 Mould in the home*). But that is not all: we also exhale carbon dioxide – between 10 and 80 litres per hour in fact, depending on our physical activity levels. In-

creased carbon dioxide concentrations lead to tiredness and difficulty concentrating.

In Germany over 40 percent of households use gas for **heating and cooking**. Under ideal conditions only carbon dioxide and water vapour are formed during its combustion. In practice, it is different: As a result of nitrogen reacting with the air, nitrogen oxides – amongst other things – are formed. These gases, which are harmful to health (see below), must not be allowed to accumulate in the indoor air. In the case of boilers, the exhaust gases are emitted through flues. In cooking they get into the indoor air and have to be vented outside by some form of extractor, such as a cooker hood. Extractor hoods that recirculate the air are insufficient to fulfil this function!



It is a good idea to install a cooker hood to extract vapours and vent them outside

Nitrogen dioxide is an irritant gas and can aggravate the symptoms of people who suffer from respiratory diseases. Carbon monoxide is formed particularly from tobacco smoking or when coal or wood is used to heat stoves – something which is becoming popular again – and especially if the stoves do not

have a good draught. Carbon monoxide is toxic: it stops the blood from transporting oxygen.

Volatile organic compounds, commonly known as **VOCs**, are now amongst the air pollutants found in every home. The term covers a large number of synthetic and natural substances that even at room temperature seep out of different materials and products used in home furnishings as well as everyday articles. They include, for example:

- ▶ Chain-structured hydrocarbons, such as alkanes or alkenes, which are used as degreasers and are found in some household chemicals.

- ▶ Aromatic ring-structured hydrocarbons, such as toluene, which are present as a solvent in some adhesives and paints and also in freshly printed matter.
- ▶ Terpenes, which are natural components of some types of wood and are now also added to many products as fragrances. A well-known example is limonene, which gives the citrus smell to many household products.

SVOCs (short for semi-volatile organic compounds) outgas over a longer period of time and, due to their physico-chemical properties, are deposited on dust and also on other surfaces.

The use of new materials and products in the household means that the range of air impurities is also constantly changing. It is often not so easy to determine whether they are associated with a risk to health or the environment.

In cases where individual volatile or semi-volatile organic compounds (and the many and various mixtures that are made from them) are present in low concentrations, their effect on our health is largely unknown. Some compounds smell even at low concentration, others when present in higher concentrations, irritate the conjunctiva and the mucous membrane of the respiratory tract. But they can also cause headaches, dizziness or tiredness. It makes no difference whether they are synthetic or natural substances.



Tobacco smoke is one of the air impurities you can do something about within your own four walls!

Some people are more and more under the impression that they are more or less helplessly exposed to a greater or lesser degree to an untold number of impurities in their own home. Often they feel that their health problems are caused by this situation. There is currently controversy over whether there is a link

to a syndrome called “Multiple Chemical Sensitivity” or MCS.

Tobacco smoke is one of the most dangerous air impurities. It contains many carcinogenic substances (substances which cause cancer). About 90 percent of lung cancer in men and 66 percent in women are related to smoking. Passive smoking, i.e. breathing in air that is contaminated by tobacco smoke, also increases the risk of lung cancer.

Tobacco smoke is still a serious indoor air problem in Germany and one that also affects children. Passive smoking in children increases their susceptibility to bronchitis and pneumonia, infections of the middle ear and allergies. In cases where mothers smoked actively or passively during pregnancy, the child may suffer impaired development.

Our tips

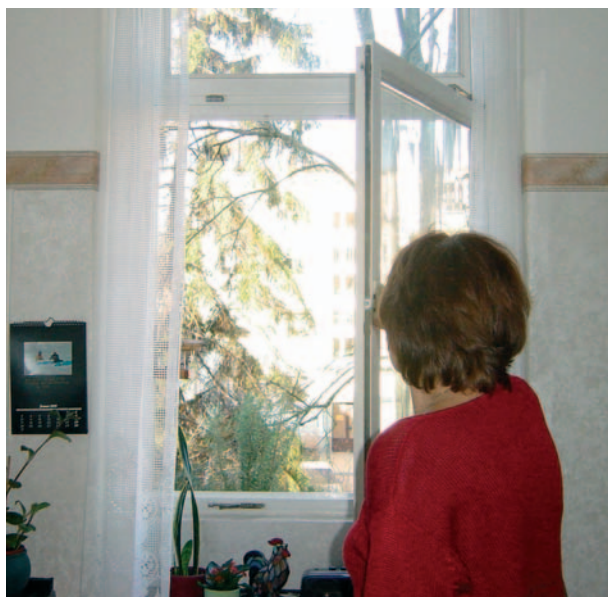
- ▶ Excessively high room air temperatures – above the recommended ranges (see Box 1) – are not only unnecessary and increase the risk of colds, they also cost money and energy. Lowering the room temperature by one degree centigrade reduces heating costs by around six percent. You can make even more savings if you turn the temperature down at night. However, do not let the rooms get so cold that condensation forms on the walls encouraging the growth of mould (see *Chapter 5 Mould in the home*).

Box 2

What is the adequate way to ensure my home is well ventilated?

- ▶ Air out your home briefly but intensively for 5 to 10 minutes several times a day, if possible by opening windows opposite each other (“cross ventilation”)
- ▶ Always air out rooms when water vapour is formed (during cooking, after taking a shower etc.)
- ▶ Always ensure good ventilation when working with strong-smelling substances, solvents etc.
- ▶ If you heat your house or cook with coal or gas make sure there is a continual exchange of air
- ▶ Do not forget to regularly air out rooms that are seldom used

- ▶ Air out your home several times a day briefly and thoroughly. Then close the windows again (see Box 2).



Air out your home several times a day with the windows open wide

Airing out not only maintains the temperature balance, but also eliminates airborne dust, pollutants and humidity from your home. Humidity is far more easily eliminated in winter than in summer. The cold dry air that flows in warms up gradually and absorbs the humidity, which is released outside next time you open the windows.

- ▶ It can be useful to switch from gas to electric for cooking if any members of your household suffer from respiratory problems.
- ▶ Open fires in the home are currently fashionable. Burn only dry and untreated wood in your open fires and stoves – the installation of which must be notified to your local building control department and approved by the *Schornsteinfegermeister* (official heating inspector) in charge. Do not burn packaging; it can lead to the formation of toxic substances such as dioxins.
- ▶ If you are planning to decorate your home or buy new furniture there are a number of products now available in the shops that are labelled with the “Blue Angel” ecolabel – because they are low in pollutants or emissions. They are therefore well suited for indoor use.
- ▶ Use water-based adhesives and wallpaper paste. That is particularly important for children and adolescents doing handicrafts. But be careful

with superglues! Make sure children do not get hold of them. They harden in seconds: fingers or eyelids can stick together so firmly that a doctor will be needed to separate them again.

- ▶ Clothing that has been dry-cleaned should always be aired outdoors, in the garden or on the balcony for example, before you hang it up in the wardrobe.
- ▶ The best way to deal with tobacco smoke is to stop smoking. If you find that too difficult, then at least smoke at an open window in a room where there are no people or go outside to smoke. If there are children in the house that should give you additional motivation to give up smoking completely. “Air fresheners” are no help. On the contrary: if

they emit chemicals (fragrances) they can be irritating or, in the case of sensitive people, even make them feel unwell.



Solid fuel heating (here a stove) with sealed systems emits scarcely any exhaust gases into the indoor air

You will find further information in *Chapter 10 The “Blue Angel” sets standards*, *Chapter 11 Is there regulation for indoor air quality?* and *Chapter 13 Brochures and pamphlets*.

3 HOUSE DUST “REMEMBERS”

House dust consists of particles carried indoors from the outdoor air via ventilation or when people walk into the house (resulting from abrasion, combustion processes from motor vehicles, heating, industry) and others that originate in the home (particles of natural and artificial fibres, hair, skin debris, residues from combustion processes). A variety of undesirable components have been detected in house dust, including, for example, heavy metals, pesticides, volatile organic compounds, fungal or mould spores, pollen and the excreta of house dust mites.



House dust mites live mostly in mattresses, pillows, upholstered furniture, carpets and soft toys (natural size: 0.1–0.5 mm). It is their excrement that is harmful to health and can cause respiratory allergies.

Very fine particles are formed during combustion processes, such as heating, cooking or smoking cigarettes (see *Chapter 2 Something in the air?*) and also burning candles and oil lamps, particularly if they are sooting. These particles rise with the hot air and are major components of what is known as **airborne particulate matter**.

It is mainly those particles that are smaller than 10 micrometres (μm) that are particularly significant for our health – one μm is one thousandth of a millimetre. When we breathe in particles of this size they can get into our respiratory tract and even into

the bronchial tubes. They can cause bronchitis. The smallest particles penetrate into the pulmonary alveoli and may – directly or indirectly – not only act as an irritant to the respiratory tract but also have a detrimental effect on the cardiovascular system.

Fine dust can aggravate symptoms and decrease life expectancy, particularly in elderly people or people suffering from respiratory and cardiovascular diseases. A number of different impurities mentioned above that are on or in the dust particles may be inhaled with the dust. They can intensify the dust's detrimental effect on health.



When someone blows their nose, the somewhat larger dust particles that were trapped on the mucous membrane of the nose, are eliminated from the body.

Particles are deposited on the floor and other surfaces – the larger they are the faster they are deposited. This **settled dust** can be easily removed with a vacuum cleaner. Studies on house dust are mostly carried out using samples from vacuum cleaner bags. This is the best way to examine house dust. It is this house dust we are referring to below.

House dust has something akin to a “memory” for different pollutants that have been set free in the home. This is because over time these impurities attach

themselves to the house dust, so that an examination of house dust that has been deposited for some time can give information about any substances that might have been used in the past for pest control in houseplants, upholstered furniture, carpets or to preserve wood.



Wooden floors and carpets can be kept clean using a vacuum cleaner. The house dust collected in a vacuum cleaner is useful for examining the many different substances contained in house dust.

Chemical pest control products belong to the group of biocides. When it comes to products designed to preserve wood and other materials a long-lasting effect is desirable. The biocides used in the past, such as PCP (pentachlorophenol) or DDT (dichloro-diphenyl-trichloro-ethane) and lindane, are very persistent, in other words “long-living”, substances, which still outgas today from materials that were previously treated with them. They are still found in house dust samples. Over recent decades these substances have been replaced by less persistent biocides, such as pyrethroids.

Since 2002, biocides have been regulated in the Biocide Products Act, which translates the European Community's Biocide Directive (98/8/EC) into German law. The main intake pathway for biocides is food. If approved plant protection products and wood preservatives are used properly we can assume that no health problems will ensue.

House dust studies carried out by the Federal Environment Agency show that levels of **PCP** – an active ingredient in wood preservatives – have dropped. PCP was used in homes as a wood preservative until 1978; it has been completely banned in Germany since 1989 (Ordinance on the ban of PCP). It is not clear whether the so-called “wood preservative syndrome” is really connected with PCP or with contamination by dioxins and furans related to the manufacturing process. Levels of **lindane** in house dust are also dropping, since lindane has been used very little as a wood preservative in Germany since the mid-1980s due to its detrimental effect on health.

Pyrethroids, the most well known of which is permethrin, are used as insecticides for houseplants or to prevent wool carpets from being eaten by moths. Permethrin can therefore also be detected in house dust today.



Spider mites (on the right, natural size 0.5 mm) are house-plant pests.

The photograph shows a spider mite (on the right) approaching a predatory mite (links). Predatory mites are beneficial arachnids and can be used - instead of chemicals - for biological pest control of spider mites.

PCBs (polychlorinated biphenyls), which have been banned in Germany since 1989, were used for a long time as plasticizers in joint sealants. However, they were rarely detected in house dust. That is not surprising since these joint sealants were mainly used in public buildings and scarcely in living spaces. PCBs are fat-soluble; they are mainly taken in via food of animal origin. They accumulate in fatty tissue, can damage the immune system and thus increase susceptibility to infection. The health impact of PCBs at the low concentrations occurring indoors is currently the subject of controversial debate.

Plasticizers, such as DEHP (diethyl hexyl phthalate), are used in many products and are present in house dust in relatively high concentrations. Plasti-

cizers are suspected of being one of the factors responsible for the “black dust” phenomenon (see *Chapter 6*). Animal tests using rats have shown that DEHP impairs fertility. At present it cannot be said with any certainty whether plasticizers have detrimental effects on human health. Therefore it is necessary in the interests of preventive health care to reduce the amount of DEHP and other compounds used as plasticizers in consumer products to the minimum that is technically necessary.

Our tips

- ▶ Keep dust concentrations in living rooms and bedrooms as low as possible. You can achieve that by regular cleaning. The best method is to clean smooth surfaces by damp mopping and textile floor coverings or carpets with a vacuum cleaner – if possible a model that has a fine dust filter. Furniture should also be regularly dusted. Take care that you do not create clouds of dust in the cleaning process.
- ▶ Do not immediately reach for chemicals to deal with pests in the house or garden. Biological methods, such as predatory mites, are often better in dealing with the origin of the problem. Various products are on sale, such as flycatchers or insect nets (carrying the “Blue Angel” eco-label) or so-called pheromone traps. They consist of sticky boards containing harmless mating scents of insects, which attract males of the same species.



The yellow boards are covered in glue and will catch whitefly, leaf miner, sciarid fly (fungus gnat) and winged aphids (greenfly). The boards are insecticide-free; the insects are attracted by the colour yellow.

- ▶ If there is no alternative to using chemical pesticides on pets or houseplants, be sure to follow the manufacturer's instructions. Carry out the treatment outdoors if at all possible. Children must be kept well away from where the treatment is being administered.
- ▶ If it is not possible to treat the infested plant outdoors the alternative is to place it in a plastic bin bag, spray it and then tie up the bag.

That will give the product longer to work. Be careful when removing the bag and be sure to do it near an open window.

- ▶ If you have an infestation of cockroaches seek help from an approved pest control company. To get rid of cockroaches properly they must be dealt with by professionals over an extended period of time.

You can find more information in *Chapter 6 The “black dust” phenomenon*, *Chapter 10 The “Blue Angel” sets standards*, *Chapter 11 Is there regulation for indoor air quality?* and *Chapter 13 Brochures and pamphlets*.

4 LIVING WITH A COCKTAIL OF CHEMICALS

If we take a look around our own home we will discover a whole arsenal of different cleaning products and other “household chemicals”, that are intended to be labour-saving. But if we look more closely we find that “strong stuff” is usually not necessary. Even if you have to tackle heavy dirt, you can often manage with a scrubbing brush or scouring pad.



Household chemicals – sometimes a potent cocktail of chemicals that is often easily accessible for children!

Liquid products are often coloured and can therefore easily be mistaken for drinks or syrups – especially by children. For that reason they should be stored separately from food and be properly labelled. Accidentally drinking these products may cause acute poisoning.

Since 1990, the Chemicals Act stipulates that cases of poisoning – or even suspected poisoning – by household chemicals (including by handcraft or DIY products) have to be reported by the doctor treating them to the Federal Institute for Risk Assessment, which will evaluate them. This Federal institution uses this information as a basis for recommendations on how to prevent poisoning. That includes, for example, suggestions for manufactures about product composition, warnings, or the use of childproof lids. Fortunately, manufacturers try to make cleaning products less and less toxic and therefore safer. Nevertheless, it is important to take care when using cleaners for dishwashers, ovens and grills or drains, and also lamp oils containing paraffin and petroleum.

Especially coloured lamp oils tempt children to try them. Since lamp oil when swallowed – even in minute quantities – can get into the respiratory system, it can cause serious pneumonia that can prove fatal. Between 1990 and 2003, 570 cases of children being poisoned by lamp oils were notified to the Federal Institute for Risk Assessment. Of those cases, 400 involved



Never leave children alone with oil lamps or burners, even when they are not lit!

lamp oils containing paraffin or petroleum. Between 1990, when notification became obligatory, and autumn 2004, five children died of poisoning of this kind.

Apart from the fact that improper use can be harmful to health, cleaning products and detergents pose a general problem to the environment. They are discharged with household effluent into water bodies via the out-

lets from sewage treatment plants that do not always retain substances of that kind. Almost all of these products contain surfactants, which can be toxic to water organisms and are classified as “hazardous to water”. A number of other components, such as dyes and fragrances, have not yet been adequately tested to establish whether they are safe (more on this can be found at: www.umweltbundesamt.de/uba-info-daten/daten/wasch/nachhalt.htm).

Some detergents are labelled with the European ecolabel, the “Flower” (s. *chapter 10*). Mechanical methods for unblocking drains that bear the “Blue Angel” (drain augers, plungers) help to replace caustic chemical drain cleaners.

Our tips

- ▶ Always keep household chemicals under lock and key, especially if there are children in the house. To prevent household chemicals from being mistaken for something else never pour them into containers that are normally used for other purposes.
- ▶ It is better to prevent heavy soiling by regular mechanical cleaning methods using brooms, vacuum cleaners, clear water, cloths, brushes and scouring cream – depending on the surface.

- ▶ Only use chemical cleaning products if it proves impossible to get something clean using mechanical methods. This will reduce environmental pollution.
- ▶ Go back to the old-fashioned household product vinegar to deal with limescale. But be careful when using vinegar essence or when heating vinegar: acetic acid vapours, which are caustic, can be formed. Citric acid is an effective alternative.
- ▶ To remove limescale from coffee machines and similar appliances follow the manufacturer's recommendations.
- ▶ Always use measuring caps or scoops and refillable packs, wherever possible, because economical use of detergents and cleaning products protects our environment.
- ▶ Use concentrated detergents instead of jumbo packs because they contain smaller amounts of fillers. That reduces both the amount of packaging and the amount of detergent needed. This also helps to reduce the pollution levels of your household sewage.
- ▶ To avoid wasting detergent, water and energy, try to run your washing machine and dishwasher only when you have a full load.
- ▶ Check the temperature your laundry needs to be washed at. Whites and coloureds do not need to be washed at temperatures higher than 60 degrees Celsius. Only wash loads at 90 degrees in the home in exceptional cases, such as contagious diseases. This will help the environment by saving energy.
- ▶ Reduce your use of fabric conditioners or stop using them completely. They are not actually necessary to the washing process. They do make fabrics soft and fluffy, but they may also make towels less absorbent.
- ▶ The use of so-called antibacterial cleaning products in the home is completely superfluous. Antibacterial products pollute the environment unnecessarily. These cleaning products do nothing to prevent food poisoning or diarrhoea which have quite different causes. To avoid illnesses of that kind it is far more important to always remember to wash your hands after every visit to the toilet and before every meal. Also be sure to keep work surfaces used to prepare food scrupulously clean.



Use measuring caps and spoons to ensure economical use of detergents and cleaning products.

You will find further information in *Chapter 10 The “Blue Angel” sets standards*, *Chapter 11 Is there regulation for indoor air quality?* *Chapter 12 Who is in charge locally for any problems that arise?* and *Chapter 13 Brochures and pamphlets.*

5 MOULD IN THE HOME

Mould fungi, of which there are countless different types, are found everywhere in the environment. They grow on dead organic matter and are widespread in the soil. They colonise new habitats by releasing spores into the air. Mould spores are therefore always present in the outdoor air. They also make their way into our homes.



Mould infestation after water damage. Mould fungi are not only an aesthetic problem but also a health risk!

If they find favourable conditions mould fungi grow in the home and are then visible with the naked eye as coloured stains. Best of all they like high levels of **humidity** in the air and in materials or on their surfaces. In the home the **food supply** for mould fungi is plentiful anyway: there is no shortage of wood and cardboard and they don't turn their noses up at carpets, wallpaper and wallpaper paste. Fungi can also live on plaster or in the masonry. Often colonies of fungi develop in secret: underneath the wallpaper or behind cupboards. A mouldy, musty smell or the appearance of patches on the walls or furniture are the first signs of the problem.

Mould fungi do not just cause material damage. Their effect on health is far more important. Even if they are dead, their spores can trigger asthma attacks, irritation of the skin and mu-

cous membranes or flu-like symptoms for the inhabitants. Infections are possible only via fungal or mould spores that are able to multiply. These occur very rarely and only in particularly susceptible people with weakened immune system.

What are the possible reasons for high levels of humidity?

- Moving into a new building before the normal drying-out process is completed.

- ▶ Flooding or burst pipes (or drilling into water pipes without realising it) can cause massive dampness in the walls and furniture of a home. Even after the cause has been dealt with, the drying-out process can take a long time.
- ▶ Defects in the building (leaking roof, cracks in the brickwork) or in its structure enable damp to penetrate into the walls, floors and ceilings.
- ▶ Thermal bridges or inadequate heat insulation can make the exterior walls cold on the inside, which increases the relative humidity. This often causes condensation.
- ▶ Incorrect ventilation and heating by residents can also contribute to higher humidity levels (see also *Chapter 2 Something in the air?*).



Growing a culture of mould fungi from an indoor air sample

Did you know that in a three-person household six to eight litres of water on average are released each day in the form of water vapour from the people themselves and their activities – such as showering, washing, drying laundry, cooking – and from plants, aquariums and other sources of humidity?

Our tips

- ▶ Humidity is of central importance. Correct heating and ventilation are therefore the absolute key to lowering relative humidity and thus avoiding mould infestation (see also Box 2).
- ▶ You will see a sign that the humidity is too high if the windows mist up on the inside. However, this “warning system” often does not

work with modern, well-insulated double-glazing. Various hygrometers are on sale in the shops which you can use to check relative humidity. However, these appliances are often not calibrated and the readings they give are not always correct. But you will at least get an idea about whether you have ventilated and eliminated the damp sufficiently.

- ▶ If a house does not have sufficient heat insulation, make sure that cupboards or other compact pieces of furniture are placed five to ten centimetres away from any outside walls and ensure that there is sufficient air intake. It is important that air can circulate vertically behind furniture.
- ▶ If the mould infestation is visible it is not usually necessary to undertake any further microbiological tests; the causes of the infestation should be sought and dealt with immediately.
- ▶ If there is a musty or mouldy smell but no mould infestation is visible, there might be a hidden infestation. Microbiological tests performed by specialist laboratories can help to localise the source of the mould fungi.
- ▶ If you are healthy, you can carry out small scale remediation work yourself, provided the infested area is smaller than 0.5 square metres. You should take precautionary measures and wear gloves, a mask and protective goggles or spectacles. First wipe the superficially affected areas with a damp cloth and then with 70 to 80 % ethyl alcohol. That will kill the fungi. But be careful: alcohol is flammable, so ensure there is good ventilation during and after use and do not smoke! Remove the infested wallpaper or silicon joint sealants and place them in plastic bags before disposing of them with your household refuse. Then clean the affected patches and surrounding areas thoroughly.
- ▶ If the mould infestation is more extensive, it will be necessary to have the remediation carried out professionally. You can get help in finding a suitable company from your local public health office, environment department or consumer protection organisation.
- ▶ In rented accommodation, mould infestation is classed as a *Mietmangel*, a defect that may entitle you to reduced rent. You should therefore inform the owner of the property. The mould infestation is – like the “black dust phenomenon” (see Chapter 6) – a problem of



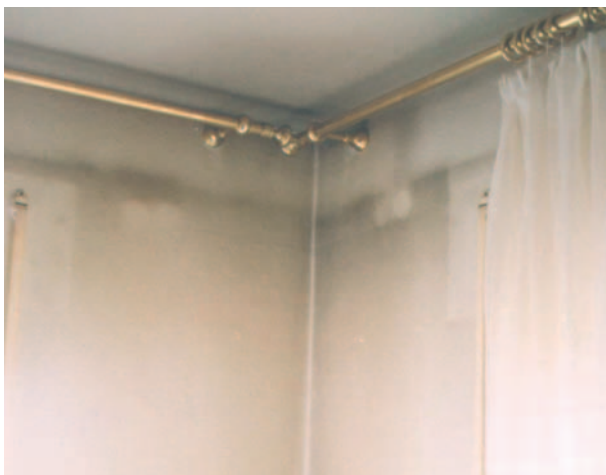
Mould infestation behind wallpaper

home hygiene that often leads to legal disputes between landlords and tenants.

You can find further information in *Chapter 10 The “Blue Angel” sets standards*, *Chapter 12 Who is in charge locally for any problems that arise?* and *Chapter 13 Brochures and pamphlets*.

6 THE BLACK DUST PHENOMENON

The phenomenon of “black dust” in homes has become more prevalent since the mid-1990s. It occurs after people have redecorated their homes and also when they first move in: sometimes intense black greasy films appear on the walls and ceilings within a short space of time – in particular at times of year when the heating is on (see photograph). These films are sometimes so extensive that it looks as if there had been a smouldering fire.



The black film appeared in this room six months after it had been decorated.

The Federal Environment Agency has investigated this problem in extensive questionnaire-based surveys and studies: the formation of these black films is encouraged by certain factors (see Box 3), which do not, however, all have to be present at the same time.

After painting and decorating work, semi-volatile organic com-

pounds (often referred to by the abbreviation SVOCs) outgas (see also *Chapter 2 Something in the air?*). Semi-volatile organic compounds do not escape into the indoor air easily: they are released more slowly but over a longer period of time. Of greatest significance here are plasticisers used in paints and varnishes, PVC floor coverings and floor adhesives, as well as foamed vinyl wallpaper or other plastics. Cleaning and homecare products, such as furniture polish, may also contain SVOCs. SVOCs adhere to existing airborne dust particles in the indoor air and contribute to smaller dust particles “sticking” to larger ones. These are then carried on currents of air and are most likely to settle on cold surfaces as greasy black films. It appears that several factors must interact for the films to be formed (see Box 3).

Factors that encourage the formation of black films

- ▶ Painting and decorating work in which semi-volatile organic compounds are released into the indoor air
- ▶ Furnishings and fittings: PVC floor coverings and decor panels containing PVC, plastic panels etc., as well as other products containing plasticisers
- ▶ Use of the room: sooting candles, oil lamps
- ▶ Building design factors: thermal bridges, airtight building with reduced air exchange
- ▶ Influence of indoor climate and weather: higher electrostatic charge, low level of humidity etc.

The black deposits are primarily an aesthetic problem. Current knowledge does not suggest there is any acute health risk connected with them. The SVOC concentrations found in the deposits and the indoor air are too low for that. However, if the black films are a result of combustion processes, they contain soot, to which products of combustion are attached that are harmful to health. It is therefore essential that the soot films be removed.

Our tips

- ▶ The formation of the black films is a complicated process. You can deal with this phenomenon by preventing the individual contributory factors.
- ▶ When painting and decorating your home always use wall paint that does not contain solvents or plasticisers. After the work is completed, ventilate the area intensively over a longer period of time (see Box 2) and do not use candles or oil lamps – at least temporarily.
- ▶ The black films should be removed in order to rule out any health risk. Simply painting over them does not usually help. Often they have to be thoroughly cleaned with detergent containing water. If it is not possible to clean the surface, anything affected such as wallpaper must be removed. Foamed vinyl wallpapers should be removed since they contain plasticisers.

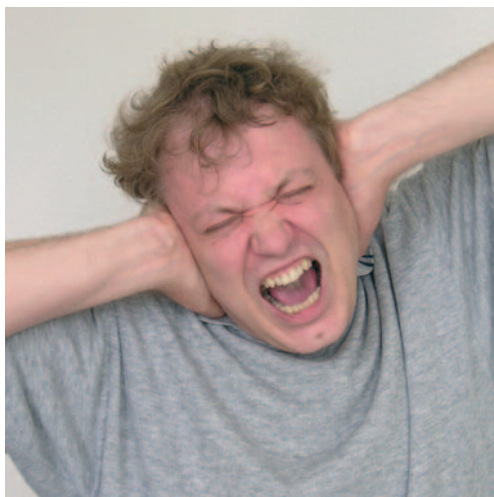
- ▶ Before redecorating you should try to identify the factors that encourage the formation of these black films and eliminate them. Building defects may also be a contributory factor (see Box 3).
- ▶ You can contact your local public health or building department for assistance in clarifying the technical aspects of the problem. They will help you to find a suitable company that identifies the building defects and looks for remediation.
- ▶ Like mould infestation (see *Chapter 5 Mould in the home*), the phenomenon of “black dust” is classed as a *Mietmangel*, a defect which may entitle you to a rent reduction. You should therefore inform your landlord of the problem. It will then have to be clarified whether it has been caused by the occupants’ activities or by building defects. That will decide who is liable to pay the costs. Unfortunately, this often leads to legal disputes between tenants and landlords.

You can find further information in *Chapter 10 The “Blue Angel” sets standards*, *Chapter 12 Who is in charge locally for any problems that arise?* and *Chapter 13 Brochures and pamphlets*.

7 NOISE IS A NUISANCE!

When sounds are undesirable we call them noise. Making a noise is therefore usually something that other people do. Especially at night when everything is quiet, we hear sounds that we do not notice during the day – or at least not so clearly.

The impact of the sounds depends not only on their pitch (frequency) and volume, but also on factors such as the individual's sensitivity to noise or the activity he or she is engaged in at the time. A **sound** is usually perceived as being less of a nuisance if we have some direct benefit from the source of the noise – the washing machine, for example, or an electric drill. Anyone not involved in the activity can feel very disturbed by the sound. Thus the individual annoyance thresholds experienced by different people exposed to the same volume may be very different.



Noise gets on your nerves!

But noise can not only be a nuisance or disturb communication and mental work, it can also have a negative effect on our health as a result of permanent sleep loss or impairment of relaxation and recreation. Studies have shown that the risk of cardiovascular diseases caused by noise stress rises when the mean assessment level (see Box 4) caused by traffic noise outdoors exceeds 65 decibels (A) in the daytime and 55 decibels (A) at night.

We shall not go into any further detail about that at this point.

We are concerned here with “home-grown” noise, caused by the residents of a flat or house. According to a recent survey, 43 percent of Germans feel annoyed or disturbed by their neighbours. We would therefore like to explain just how much you yourself can contribute to noise protection within your own four walls.

Box 4

As an important yardstick for assessing noise, the sound pressure level is measured with microphones. The result is expressed in dB(A). dB stands for decibels, and (A) indicates a weighting of the different pitches (frequencies) designed to reflect the response of the human ear to noise. When volumes vary a mean assessment level is calculated as an average value over time.

The examples show that it is not always the typical environmental noise sources – such as traffic or industry and commerce – that generate noise. Every individual can contribute to reducing or avoid causing noise nuisance for him or herself and for other people. We should all look at our own conduct in the light of whether it might disturb other people. Consideration promotes peaceful coexistence.

Different sounds we hear in everyday life have been listed in Box 5 to give you a rough idea of what different decibel levels really sound like.

Box 5

What do decibels levels really sound like?	
Leaves in the breeze	10 dB(A)
A watch ticking	20 dB(A)
Whispering	30 dB(A)
Normal conversation	55 dB(A)
Car in urban traffic	75 dB(A)
Lorry in urban traffic	85 dB(A)

Considerate behaviour towards other people can solve a host of problems, or maybe even prevent them. That begins with respecting the statutory **quiet and night-time hours** during which excessive noise is not allowed. The period classified as “night-time hours” is normally considered to be be-

tween 10 o’clock at night and 6 o’clock in the morning. Quiet hours are often additionally stipulated as six o’clock to seven, eight or nine o’clock in the morning and between eight and ten o’clock in the evening. At these times, specific statutory requirements regarding low noise behaviour, operating appliances outdoors and operating leisure facilities are applicable. Sundays and public holidays enjoy special protection. You will find more details on this in local authority noise control regulations, state-level noise legislation and the Federal Immission Control Act. It is also usual to respect midday quiet hours; “house rules”, attached as an annex to tenancy agreements, often make specific reference to this.

Our tips

- ▶ Respect the night-time and quiet hours. If you are going to be noisy on occasion during a party or as a result of DIY work in your home, take the trouble to warn your neighbours. Experience has shown that you will usually meet with understanding. It is also useful to tell the neighbours what time you expect the activities to end.
- ▶ You should in any event respect the different needs of other people and respect the fact that a neighbour does not want to put up with noise. Bear in mind that different people have different daily routines and may respond to noise very differently. We would like to point out that there is no excuse for noise-intensive behaviour and that noise legislation must be adhered to.
- ▶ Wilhelm Busch, a German humorist of the 19th century, said it! “Music cannot be enjoyed by those for whom it is just noise”. Avoid getting on the nerves of your closest neighbours by closing the window before playing music in your home.
- ▶ Some buildings are poorly soundproofed. You can follow exactly what the neighbours are doing: hear their every step, their every word. Carpets or other textile floor coverings can help to muffle footfall noise. You should use them particularly in the children’s rooms because when several children are in there “having a high old time”, toys can easily go crashing to the floor. When choosing suitable textile floor coverings, make sure that they are not only easy-care but also low in pollutants.
- ▶ As well as furnishings, curtains also swallow noise and muffle the babel of voices and noisy activities.
- ▶ Around the house, wear shoes that have quiet soles so that the family in the flat below yours won’t be able to hear every time you move. But remember: walking barefoot can also be noisy if you bang your heels hard on the floor.
- ▶ If possible avoid placing the washing machine directly on the floor tiles; stand it instead on suitable materials (rubber cups or insulating mats), which will not transmit vibrations to the foundations or will at least lessen them. Materials of that kind are on sale in DIY stores. That way the machine’s spin cycle will not make such a clattering noise that can drive people mad in neighbouring flats.

- ▶ Placing speakers on hard surfaces such as floors and walls can also cause sound vibrations to be transmitted to the entire structure of the building. When that happens the deep notes, in particular, spread throughout the entire building and are perceived in other flats as an unpleasant dull noise.
- ▶ Leave a small gap between appliances that have a motor (such as refrigerators) and the wall to stop vibrations from being transmitted. Even the spacers (for the refrigeration system) should not be in direct contact with the wall, if at all possible.
- ▶ There is no need to slam doors and windows – especially during the statutory quiet and night-time hours. Pulling up roller blinds quickly in the morning or letting them down noisily in the evening may startle your neighbours. You can also do it slowly and make a lot less noise.
- ▶ Teenagers in particular like to listen to very loud music and turn the volume on their appliances up to the maximum: not exactly a source of pleasure for other members of the family or the neighbours. You will therefore often hear people recommend that they use headphones. But if they do make sure, that they don't have the headphones turned up full blast. Over an extended period of time that can cause hearing problems. Noise-related damage to the inner ear is irreversible – even in children and adolescents.



Headphones that are too loud can damage your hearing

- ▶ For the same reason – not just because of the neighbours – you should not give your child loud, noise-intensive toys such as rattles and toy guns. Even one-off noise events with a high sound intensity can be the direct cause of permanent hearing problems.
- ▶ If you intend undertaking work on your building to provide sound in-

sulation or soundproofing, seek advice from an acoustics expert. Before you make the changes, inform your landlord, even if you intend to pay for the work yourself. You should also investigate whether any government grants might be available (for installing sound-insulated windows, for example).

- ▶ You can find useful information on noise on the website of the Federal Environment Agency (www.umweltbundesamt.de/laermprobleme/themensuche/liste.html).

You can find further information in *Chapter 11 Is there regulation for indoor air quality?* and *Chapter 13 Brochures and pamphlets*.

8 RADON – NOT JUST AN INVISIBLE EARTH SPIRIT!

Radon is a naturally occurring **radioactive noble gas**, which is formed in the earth when uranium decays. It is present virtually everywhere and is the main source of the natural radioactivity that we are all exposed to. All rocks and soils contain uranium and radium in varying concentrations and chemical forms and are therefore sources of radon. In Germany radon is a particular issue in some of the low mountain areas, such as the Erzgebirge or Bayerischer Wald.

Radon seeps out of the soil and into buildings through cracks and holes in foundation slabs and walls or through cable and pipe conduit. If buildings are not sufficiently ventilated the radon can accumulate. It is mostly found in basements and in decreasing concentrations in subsequent storeys. Due to differences in building design radon concentrations may fluctuate from house to house. Unlike most chemical pollutants (see also *Chapter 2 Something in the air?*) it is not possible to smell or taste radon. Therefore the only way to know whether there is radon in a building and, if so, how much is to measure it.



A radon detector that will measure radon concentrations for up to a year. It can also be placed on an open bookcase.

Radon causes lung cancer. Smokers are at particular risk, because the carcinogenic properties of tobacco smoke and radon intensify each other. To reduce the health risk to an acceptable level, the Federal Office for Radiation Protection recommends taking precautionary measures if radon concentrations in rooms that are permanently occu-

pied (such as living rooms and bedrooms) exceed 100 becquerels per cubic metre (Bq/m³).

You can find out from your local public health office or environment department whether you live in a region in which that kind of radon concen-

tration occurs. If you have Internet access a map of radon concentration in the soil air (Der **Radonatlas** Deutschland) at www.bfs.de/ion/radon will give you a rough idea.

Our tips

- ▶ House owners who have reason to suspect high radon concentrations in their houses should take measurements to clarify the situation. If you live in a rented house or flat and have this suspicion you should contact the owner of the property so that he or she can take the necessary steps.
- ▶ If radon measurements are necessary, contact the local public health office, environment department or building control office as soon as possible so that they can help you to select a suitable laboratory.
- ▶ Ensure that readings are taken in at least two rooms, if possible in a bedroom and in one of the rooms you use the most, such as the living room. It is also important to take into account that the radon concentration in the air is subject to great fluctuations throughout the course of a day or year. Measurements should therefore be taken over a year; shorter-term measurements can only serve as a guide. Passive collectors will be set up to take the samples (see photograph), which will later be analysed in the lab.

Box 6

Simple measures

- ▶ Brief and intensive airing out for five to ten minutes several times a day by opening windows opposite each other in your house or flat and also in the basement
- ▶ Seal all supply and sewage lines, small cracks and doors between the basement and your living area
- ▶ Install a ventilator, in the basement for example in order to create a slight vacuum or overpressure, or vent air through an unused flue

Box 7

More extensive building work

- ▶ Ensure the basement is well sealed off from the living area, by fitting particularly airtight doors for example
- ▶ Seal floors/walls/ceilings using foil or other materials that are impervious to radon
- ▶ Install ventilation systems to increase the air exchange rate
- ▶ Install radon wells or lay drainage beneath the foundations to draw off the air containing radon (see photo)

- ▶ If the radon concentration in the living areas exceeds 100 Bq/m^3 , remediation measures should be carried out. The extent of these measures depends on the extent to which this value is exceeded. Simple and inexpensive measures are listed in Box 6. They should be tried first for concentrations above 100 Bq/m^3 .



Installation of a drainage system beneath the foundations (here during the construction of the building) with the aim of extracting soil air containing radon and venting it out of the building.

- ▶ If these measures do not achieve the desired aim, more complicated procedures will need to be used. They include changes to the building, some of which are listed in Box 7. These remediation methods should be planned and carried out by experienced specialists.

You can find further information in *Chapter 11 Is there regulation for indoor air quality?* and *Chapter 13 Brochures and pamphlets*.

9 ELECTROSMOG

Electrosmog is a term that was coined in the 1980s by the mass media. It covers all the electrical, magnetic and electromagnetic fields that the public believes might have (undesirable) biological effects. The word “smog” was borrowed from the field of air hygiene. It is a combination of the words “smoke” and “fog” and originally characterised certain situations connected with pollution of the outdoor air (winter smog, see also www.umweltbundesamt.de).

The effects of low-frequency electric and magnetic fields and high-frequency electromagnetic fields are different. For example, at very high intensity, low-frequency electric fields cause the skin to tingle, whereas low-frequency magnetic fields penetrate the body and, given sufficient intensity, can stimulate nerves and muscle cells. Depending on their frequency, high-frequency electromagnetic fields penetrate into the body to different depths. The absorption of the radiation has a heating effect. The lower the so-called “specific absorption rate” (SAR) (see also *Chapter 10 The “Blue Angel” sets standards*), the less the rise in temperature.

To ensure protection from any possible damaging effects of low- and high-frequency fields, limit values for fixed installations were laid down in the Ordinance on Electromagnetic Fields (26th Ordinance for the Implementation of the Federal Immission Control Act). These limit values are far lower than the so-called threshold values for biological effects, so that according to the current state of knowledge there will be no health risks if the limit value is adhered to. There are, however, indications of possible effects that cannot yet be definitively classified. The intensity of low- and high-frequency fields should therefore be kept to a minimum on precautionary grounds.

Basically all **electrical installations** and the operation of **household appliances** generate low-frequency electric and magnetic fields. The fields of most household appliances are weak, if people remain at the distance that is normal when using them. The strength of the magnetic field is then significantly lower than the limit value of 100 microtesla for outdoor installations, which is used as a guide value in the living area. The intensity of the magnetic fields (expressed in microtesla as a unit of measurement for flux density) is listed for a selection of common household appliances in Box 8.

When using a hairdryer or electric shaver, the intensity of the magnetic field is relatively high. However, given the short time they are used for we nevertheless do not have to worry about negative effects on health.

Box 8

Intensity of magnetic fields for a selection of household appliances, measured in microtesla (mT) at different distances			
Appliance	3 cm	30 cm	1 m
Radio (portable)	16 – 56	1	< 0.01
Television set	2.5 – 50	0.04 – 2	0.01 – 0.15
Computer	0.5 – 30	< 0.01	
Microwave	73 – 200	4 – 8	0.25 – 0.6
Cooker	1 – 50	0.15 – 0.5	0.01 – 0.04
Dishwasher	3.5 – 20	0.6 – 3	0.07 – 0.3
Refrigerator	0.5 – 1.7	0.01 – 0.25	< 0.01
Iron	8 – 30	0.12 – 0.3	0.01 – 0.03
Washing machine	0.8 – 50	0.15 – 3	0.01 – 0.15
Vacuum cleaner	200 – 800	2 – 20	0.13 – 2
Hairdryer	6 – 2000	0.01 – 7	0.01 – 0.3
Electric shaver	15 – 1500	0.08 – 9	0.01 – 0.3
Fluorescent lamp	40 – 400	0.5 – 2	0.02 – 0.25
Electric drill	400 – 800	2 – 3.5	0.08 – 0.2
<i>The intensity of magnetic fields is measured as the flux density; the unit of measurement is microtesla (μT). Normal distances from the appliance are in bold print</i>			

Source: Commission on Radiological Protection (SSK), 1997

“**Microwaves**” are household appliances that work on the basis of high-frequency electromagnetic radiation, used here to rapidly heat up food. In appliances that are technically sound, the so-called “stray radiation”, which occurs despite good shielding around the door and screen, is so low that it does not pose any health risk, not even for people in need of special protection.

The true domain of high-frequency electromagnetic fields is, however, the **wireless transmission of information** by radios, of mobile phones and tel-

evision as well as devices that are connoted to a PC using wireless and mobile technology (see below).

In the case of **cordless telephones** that are currently in common use and that work to what is known as the DECT standard (Digital Enhanced Cordless Telecommunications), the base station emits high-frequency electromagnetic fields continually, but the handset emits them only during a call.



The radiation from a cordless telephone is not as intensive as that from a mobile

Baby monitors are useful for keeping a check on babies or toddlers asleep in another room. Crying, screaming or other sounds are picked up by a transmitter in the baby's room and sent to a receiver. In terms of health precautions, both the low-frequency and high-frequency fields must be taken into consideration for baby monitors (see Tips).

Bluetooth technology enables wireless connection between different communication de-

vices over short distances, such as a desktop computer, notebook, laptop and palmtop computer, personal organisers, printer, scanner. The intensities of the fields are very low and precautionary measures are not necessary. **WLANs** (Wireless Local Area Networks) are used to connect devices over greater distances. They can be used, for example, to gain wireless Internet access.

All **mobile phones** currently on the market comply with the value recommended by the Commission on Radiological Protection (SSK) even when coverage is poor, so that basically no negative health effects are to be expected. Some mobile phones are classified under the criteria of the Federal Office for Radiation Protection as "low radiation". You should choose one of these when buying a mobile phone (see *Chapter 10 The "Blue Angel" sets standards*).

Sometimes you will see "**screening mats for protection against electrosmog**" or "screening" materials for canopies or partitions on sale in the shops. They are usually conductive textiles that can be earthed. In principle, these materials shield low-frequency electric fields, but not low-frequency magnetic fields. For high-frequency electromagnetic fields shield-



If you place your radio alarm at a distance of 30 centimetres there are no health concerns

ing is in principle only possible if the shielding material is located between the source of the field and the person. Since screening mats are usually placed under appliances they will only be able to partially shield any fields generated. The Federal Office for Radiation Protection does not recommend screening mats, since it believes their effectiveness as a precautionary measure is questionable. The same applies to canopies.

Our tips

- ▶ To keep the intensity of low-frequency electric and magnetic fields as low as possible, electrical installations should be well insulated and – wherever possible – laid under plaster.
- ▶ Switch off electrical appliances when they are not in use. Do not leave them on standby. This is particularly important in the case of televisions and hi-fi systems. Here too, current still flows and generates weak magnetic fields when the appliances are in standby mode.
- ▶ For precautionary reasons you should not spend a long time or stay repeatedly in the immediate vicinity of electrical appliances that are switched on. This is particularly true in your bedroom and especially for babies and toddlers. Mains-operated radio alarms should not be placed directly beside the top of the bed.
- ▶ Children should not stand immediately in front of or next to a microwave when food is being prepared.
- ▶ If you use a cordless phone at home, do not place the base station in your bedroom, child's room or anywhere you spend long periods of time, such as on your desk.

- ▶ The same applies to wireless computer networks (for example Bluetooth, WLAN, WIMAX). Here too, we recommend that you avoid placing the central access point directly beside the computer workstation.
- ▶ When choosing a baby monitor, avoid models that transmit signals continually. The mains supply unit should be installed (or placed) at a sufficient distance from the child's cot. If possible operate the transmitter with batteries, as they do not generate low-frequency fields.
- ▶ Do not use your mobile phone at home. Make calls on your landline instead. If you can't avoid using your mobile only do so when reception is good and keep calls brief. It is a good idea to wait for the connection to be made before placing the mobile phone to your ear. If possible use a headset. Sending a text is also better than a phone call.

You can find further information in *Chapter 10 The "Blue Angel" sets standards*, *Chapter 11 Is there regulation for indoor air quality?* and *Chapter 13 Brochures and pamphlets*.

10 THE “BLUE ANGEL” SETS STANDARDS

The “Blue Angel” is Germany’s ecolabel, launched in 1977 by the environment ministers of the Federal and State governments (for more details see www.blauer-engel.de). The award of this ecolabel promotes goods and services that are more environment-friendly than their conventional counterparts. If labelled products are used properly, they are either less harmful to health than non-labelled ones or not harmful at all.

The ecolabel jury, the Federal Environment Agency and the German Institute for Quality Assurance and Certification (RAL) are involved in the award procedure. This is a voluntary labelling scheme and manufacturers of a product may apply to take part. They are then contractually committed to adhere to the ecolabel requirements for as long as they continue to use it.



Ecolabel for low-emission wall paint
(RAL-UZ 102)

Since 2003, the ecolabel also carries the inscription “Der blaue Engel” (“The Blue Angel”) (see photo). However, for a transitional period the label on products will continue to say “Ecolabel because... (for example “low in pollutants” or “low in emissions”)”.

If you need to do some decorating in your home or you want to buy new furniture, the DIY fan has a whole range of gloss paint, wallpaper, emulsion, panels, flooring, floor adhesive and furniture to choose from that carry the “Blue Angel” ecolabel (see photo).

Below are a number of examples to illustrate the properties that products and processes have if they carry this label. The terms printed in blue or in bold are also keywords you can use if you want to search for products in the Internet list. To access this list go to www.blauer-engel.de/englisch/navigation/body_blauer_engel.htm and click on “Products & label users” and then on “search for products”.

Gloss paints that have been awarded the “Blue Angel” are low in pollutants, because they were manufactured without colour pigments that

contain heavy metals and with only small quantities of hazardous substances that are subject to labelling. The maximum solvent content is ten percent.

If low-emission **wall paints** have the “Blue Angel” label it means that they release scarcely any semi-volatile or volatile organic compounds into the indoor air either during or after use, they contain only small amounts of preservatives and no substances that are harmful to health or the environment. The label has also been awarded to water-soluble wall paints that are washable, and to silicate and silicate emulsion paints.

Flooring made of wood or wood materials that has a “Blue Angel” label includes ready-made parquet and laminate flooring. These products release scarcely any volatile organic compounds and have particularly low formaldehyde content.

To glue floorings low-emission **flooring adhesives** are now available. The “Blue Angel” label guarantees that these adhesives release hardly any volatile or semi-volatile organic compounds, that their preservative content is minimal and that they do not contain specific substances that are harmful to health.

Furniture with the “Blue Angel” is made mainly of wood and is low in both pollutants and emissions. It has to fulfil these conditions throughout all the phases of its lifecycle, i.e. from manufacture through to the day it is discarded. This is because halogenated organic compounds including halogenated flame retardants are not only undesirable on health grounds, but also cause problems for recycling or disposal.

For pest prevention and control there are a number of different non-toxic **pesticides** that carry the “Blue Angel” label. Sticky flycatcher strips and insect nets are currently available. Special fumigation procedures that use carbon dioxide or nitrogen that also have the ecolabel are available. However these fumigation procedures may only be carried out by professional pest control specialists.

Blocked drains can often be unblocked without **drain cleaners** containing caustic chemical ingredients. Drain augers that carry the “Blue Angel” label are available in the shops.

Computers and **printers** with the “Blue Angel” label are available for the home office. The housings of these appliances can be recycled because they

do not contain any hazardous substances, in particular halogenated organic compounds. They also run particularly quietly and are overall low-emission. The same is true of **multi-function appliances** (combinations of printers, photocopiers, scanners, fax machines etc.). These appliances also use toners and inks that are low in pollutants: they release only minimal amounts of volatile organic compounds when printing and only small amounts of ozone. Re-use of **toner units** also reduces waste; their cartridges can also be recycled. **Paper** is, of course, also an essential component of the home office. If it has a “Blue Angel” label it was manufactured in an environmentally friendly way from recycled paper and contains very little formaldehyde. In the case of coloured paper, no hazardous substances were used. Envelopes, writing paper, writing pads, folders and many more articles made from recycled paper are also available.



“The Flower” – the European ecolabel

In 2002 the ecolabel jury presented guidelines for awarding the “Blue Angel” for low-radiation **mobile phones**, which proposed that the value for the specific absorption rate (SAR value) should not exceed 0.6 watts per kilogramme of tissue. Limiting the absorption rate is a radiation protection criterion that is widely accepted internationally for high-frequency electromagnetic fields. Mobile phone manufacturers have to date (February 2005) been very reticent in applying for the “Blue Angel”. However, consumers can contact the Federal Office for Radiation Protection for information about the SAR values of models of mobile phone currently available on the German market. The results of surveys regularly carried out are available on the Internet at www.bfs.de/elektro/hff/oekolabel.html.

The “Blue Angel” also indicates that the appliances were produced in a way that is environment-friendly and recycling-friendly.

In future, the European ecolabel, the “Flower” will be an important factor on the German market (for more details: <http://europa.eu.int/ecolabel>). This ecolabel will also be awarded by impartial government bodies and will be based on clear scientifically backed criteria. The “Blue Angel” and “Flower”

ecolabels will thus give consumers the greatest possible certainty that they have chosen an environmentally sound product.

You can find further information in *Chapter 13 Brochures and pamphlets*.

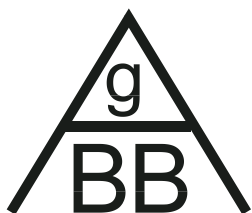
11 IS THERE REGULATION FOR INDOOR AIR QUALITY?

While there has been comprehensive legislation regulating the quality of outdoor air for many years now, there is no corresponding body of legislation on the quality of indoor air. The only exception is a statutory limit value for tetrachloroethene in the immediate vicinity of dry cleaning establishments that may not be exceeded. One of the main reasons why it is so difficult to regulate indoor air and why this has been yet done is that it also affects the **private sphere**. It is thus at odds with the idea that the private sphere should be subject to as little regulation as possible in the form of legal constraints or possibilities for intervention by the state.

There are guideline values for evaluating the quality of indoor air for a number of indoor air pollutants. One of the bodies that is concerned, amongst other things, with developing these guideline values is a working group made up of members of the Federal Environment Agency's **Commission on Indoor Air Quality** (IRK) and the working party of the supreme health authorities of the German States (for more details see: www.umweltbundesamt.de/uba-info-daten/daten/irk.htm). Although the guideline values are not legally binding they have achieved great significance in practice: if they are exceeded it is an indication that action must be taken.

The booklets “Guide for Indoor Air Quality in School Buildings” (Leitfaden für die Innenraumluftthygiene in Schulgebäuden), published by the IRK, which can also be applied to homes, and “Guide on Prevention, Investiga-

tion, Evaluation and Elimination of Mould Growth in Indoor Spaces” (Leitfaden zur Vorbeugung, Untersuchung, Bewertung und Sanierung von Schimmelpilzwachstum in Innenräumen) give tips on prevention and minimisation of pollutants indoors. The “Guide on Identifying the Cause of and Eliminating Mould Growth Indoors” (Leitfaden über die Ursachen-suche und Sanierung bei Schimmelpilzwachstum in Innenräumen) was published in September 2005. At present, however these guides are only available in German.



Ausschuss zur
gesundheitlichen
Bewertung von
Bauprodukten

The **Building Codes** of the States stipulate that building products may only be used if they comply with the stipulations of the **Building Products Act** (BauPG). This act, which in 1992 translated the European Building Products Directive (89/106/EEC) into German law, is of great practical significance: it states that building products must be assessed with regard to the health risks associated with any substances they contain that may be released indoors. The Committee for the health assessment of building products (Ag-BB), whose secretariat is run by the Federal Environment Agency, has developed a scheme for evaluating the off-gassing of volatile organic compounds (more details at: www.umweltbundesamt.de/uba-info-daten/daten/voc.htm). Gradually, only building products that meet the requirements set out in this evaluation scheme will be able to be placed on the market.

Under Article 16e of the **Chemicals Act** (ChemG), doctors are obliged to notify the Federal Institute for Risk Assessment of cases of poisoning and even suspected cases of poisoning caused by consumer products in the home (including hobby and DIY products). The aim of the legislator is to ensure that the constituents and packaging of products are such that there is no health risk associated with them. The related recommendations are being drafted by the Federal Institute for Risk Assessment.

The **Human Biomonitoring Commission** (HBM) of the Federal Environment Agency (more details at: <http://www.umweltbundesamt.de/uba-info-daten-e/daten-e/monitor/index.htm>) establishes reference values and what it calls HBM values for environmental chemicals in the blood and urine. The reference and HBM values can be used as comparative values when examining both individuals and population groups. The reference values describe what may be called “background body burden”. They give no information about the relevance of the chemicals to health. By contrast, HBM values are based on toxicological considerations. Particularly if the HBM-II value is exceeded it means that health problems cannot be ruled out (more details at: <http://www.umweltbundesamt.de/uba-info-daten-e/daten-e/monitor/def.htm>). When this happens, investigations have to be carried out to find out the reasons for the higher levels of pollutants. It is not usually possible to “see” through what route (inhalation, food/drinking water, skin contact) the pollutants or their metabolic products detected in the blood or urine have entered the human organism. It may be necessary to find out whether or not there is a relevant source of pollution in the home.

The Federal Immission Control Act (BImSchG) with its secondary legislation is also concerned with protection against harmful effects on the environment from noise, provided it originates outdoors, and from certain installa-

tions, machines or vehicles. Under Article 3 of the Federal Immission Control Act, harmful effects on the environment include serious detriment or nuisance for the general public or the neighbourhood. This, in conjunction with the “quiet hours” prescribed in Article 7 of the **Equipment and Machinery Noise Regulation** (32nd ordinance to implement the Federal Immission Control Act) can provide a guide for conduct within your own home.

Similar to the **Federal Office for Radiation Protection**, the **Commission on Radiological Protection (SSK)** of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety advises on all matters of protection against ionising and non-ionising radiation. Protecting the population from radon and electromagnetic fields was, for example, one of the areas dealt with in 2004 by the Commission on Radiological Protection (SSK) (more details at: www.ssk.de).

Currently the Federal Environment Ministry is preparing a **Protection against Radon Act** that will limit radon concentrations in the home. Based on the latest scientific knowledge, the Federal Office for Radiation Protection recommends a target value for radon of 100 becquerels per cubic metre of air for new and existing buildings. Remediation measures were formerly recommended at levels of 200 becquerels per cubic metre of air and above.



The **Ordinance on Electromagnetic Fields** (26th Ordinance under the Federal Immission Control Act) stipulates limit values for low-frequency and high-frequency fields that are applicable to certain transmitters and energy supply installations. These limit values may also be used as general reference values for other areas, but in this case they are not legally binding. The values stipulated in EC Council Recommendation of 1999 (Recommendation 1999/519/EC) can also be used for the home.

With its “Air Quality Guidelines” the **WHO** (World Health Organization) issues health-re-

lated guideline values, which legislation can be based on. The WHO European Regional Office in the “Environment and Health programme” has been addressing the theme of “Healthy Indoor Environment” for several years now. The activities aim at developing scientific foundations which can be translated into political action and recommending appropriate measures to the Member Countries of WHO’s European region. The topic is also dealt with in two projects, “Air Quality and Health” (more details at www.euro.who.int/air/Activities/20020627_2) and “Housing and Health” (more details at www.who.dk/Housing). The WHO Collaborating Centre for Air Quality Management and Air Pollution Control at the Federal Environment Agency provides backing for the two WHO projects (www.umweltbundesamt.de/whocc/titel/titel21.htm).

Last but not least, we must mention at this point the new European chemicals legislation that is currently being prepared, which is known as **REACH**. REACH stands for Registration, Evaluation and Authorisation of Chemicals. REACH will improve the level of knowledge about the properties that are harmful to health and the environment of those substances that are produced and placed on the market by a single manufacturer in quantities exceeding one metric ton per year. That will have a long-term positive effect on health and environmental protection in the field of consumer products.

You can find further information in *Chapter 13 Brochures and pamphlets*.

12 WHO IS IN CHARGE LOCALLY FOR ANY PROBLEMS THAT ARISE?

At various points throughout this brochure we have pointed out that, as supreme Federal authorities, we can only provide you with information material and recommendations of a general nature.

For specific problems and questions – for example, if it is a matter of assessing the hygiene situation of a particular place, you should contact the relevant authorities at local or state level. They base their decisions, amongst other things, on the recommendations issued by the Federal authorities and put them into practice in concrete cases.

If health issues arise in connection with possible pollutants, noise, radon or electrosmog in the home, your **contact partner** is the local public health office or an environmental health advice centre, whose address you can obtain from the local public health office or health and safety inspectorate. For questions and problems relating to electrosmog you can also contact the Federal Office for Radiation Protection. A database set up by the Post and Telecommunications Regulatory Authority at <http://emf.regtp.de> provides information about all the locations of mobile phone transmitters masts and their emission data, which the public often associates with electrosmog.

Often it is essential for an expert to look at your home. Depending on the circumstances, the local public health office will involve its environment or building control counterpart.

If **measurements** have to be taken in your home or in your blood or urine, you should not make the decision on your own but seek help from the contact partners mentioned above. That is the only way you can be sure to obtain meaningful analytical results. Take care in choosing a laboratory: measurements should be taken only by a lab that is known for its high quality. Relevant information about suitable institutes can be obtained from your local public health office, environment department, building control office and consumer advice centre. If it is a question of measuring electromagnetic fields, you can obtain information from the Chamber of Industry and Commerce (IHK).

If you live in rented accommodation you should inform your **landlord** in cases of mould infestation and the phenomenon of “black dust”. If tests or building measures are required, you should contact the landlord to establish

in advance who will pay for them. Generally speaking, the person appointing the contractor or commissioning the services normally pays. Past experience has shown that in some cases legal advice is necessary.

To ensure that any necessary **mitigation measures** are successful, seek expert advice before starting and/or hire suitable specialist companies. Here again your local public health office, environment department, building control office, consumer advice centre or Chamber of Industry and Commerce will certainly be able to give you useful information. If you are intending to carry out measures to provide sound insulation or soundproofing on your building, you should seek advice from an acoustics expert. If you are planning to install “sound-insulated windows”, find out whether you are entitled to government grants.

If you suspect someone has suffered acute poisoning through inadvertently drinking or inhaling liquid cleaning products, other household chemicals or DIY products, telephone a **Poison Information Centre** (GIZ) immediately. (There is a list of Poison Information Centres in the Annex to this brochure). They have medical and toxicological staff on hand around the clock to give advice. Past experience has shown that in cases of poisoning in the home, telephone advice is usually sufficient. If there are any life-threatening symptoms – such as unconsciousness or difficulty breathing – call the emergency doctor immediately. The emergency doctor can be contacted by dialling 112 anywhere in Germany.

Box 9

What details should you have at your fingertips in an emergency?

- ▶ **Who** has been poisoned? (baby, child, adolescent, adult)
- ▶ **What** caused the poisoning? (name of the product: label from the original bottle, manufacturer etc.)
- ▶ **How much** has the person swallowed, breathed in or got on their skin?
- ▶ **When** did it happen (date and time)?
- ▶ **What** are the symptoms?
- ▶ **What** action has already been taken?
- ▶ **How** can you be reached for any further questions?

Box 9 will tell you what details you need to have to hand in an emergency.

You can find further information in *Chapter 13 Brochures and pamphlets*.

13 BROCHURES AND PAMPHLETS

The following Federal authorities provide further information about the topics in this brochure, mainly in German.

From the Federal Office for Radiation Protection

Bundesamt für Strahlenschutz
Postfach 10 01 49
D-38201 Salzgitter
Tel.: 018 88 333-0
Fax: 018 88 333-1885
E-mail: info@bfs.de
Internet: www.bfs.de

Information on “electro smog”

Brochures

- ▶ Strahlung und Strahlenschutz
- ▶ Mobilfunk – wie funktioniert das eigentlich?

Pamphlets

- ▶ Magnetfelder im Alltag – wie hoch sind sie wirklich?
- ▶ Mobilfunk und Sendetürme
- ▶ Strahlenschutz bei Radio- und Mikrowellen
- ▶ Elektrische und magnetische Felder im Haushalt
- ▶ Elektrische und magnetische Felder der Stromversorgung

Information leaflets

- ▶ Krebs und Magnetfelder – Zusammenhang nicht erwiesen
- ▶ Gesundheitliche Risiken durch Mikrowellenkochgeräte
- ▶ Größen und Einheiten im Strahlenschutz – Nichtionisierende Strahlung – Elektromagnetische Felder
- ▶ Wie sind Störungen von Herzschrittmachern durch elektrische und magnetische Felder zu vermeiden?
- ▶ Informations- und Rechtsschutzmöglichkeiten bei Errichtung und Betrieb von Mobilfunkanlagen
- ▶ Tipps zum Strahlenschutz beim Telefonieren mit dem Handy

This material can be accessed and ordered online:
<http://www.bfs.de/bfs/druck>

Information on “Radon”

- ▶ Information leaflets on radon in the home can be obtained on the internet: www.bfs.de/bfs/druck/infoblatt
- ▶ Further, more detailed information on precautionary measures in cases of increased radon concentrations can be found in the book „Radon-Handbuch Deutschland“. It can be obtained at a price of 10 € from: Wirtschaftsverlag NW, Verlag für neue Wissenschaft, Postfach 101110, 27511 Bremerhaven (Fax: 047 945 44 88, E-mail: NW-Verlag@t-online.de).
- ▶ The leaflets on the reduction of radon concentrations in the home „Merkblätter zur Senkung der Radonkonzentration in Wohnhäusern“ are available free of charge from: Bundesumweltministerium, Referat RS II 2, Postfach 12 06 29, 53048 Bonn.

From the Federal Institute for Risk Assessment

Thielallee 88-92
14195 Berlin
Tel.: 018 88 412-0
Fax: 018 88 412-4741
E-mail: pressestelle@bfr.bund.de
Internet: www.bfr.bund.de

Brochures

- ▶ Bundesinstitut für gesundheitlichen Verbraucherschutz und Veterinärmedizin, Pressestelle (Hrsg.): Vom Umgang mit chemischen Schädlingsbekämpfungsmitteln. Eine Informationsschrift. Berlin 1996
- ▶ Bundesinstitut für gesundheitlichen Verbraucherschutz und Veterinärmedizin, Pressestelle (Hrsg.): Vom Umgang mit Holzschutzmitteln. Eine Informationsschrift. Berlin 1996
- ▶ Bundesinstitut für gesundheitlichen Verbraucherschutz und Veterinärmedizin (Hrsg.): Verbrauchertipps zu Lebensmittelhygiene, Reinigung und Desinfektion. Berlin 2002
- ▶ Bundesinstitut für gesundheitlichen Verbraucherschutz und Veterinärmedizin (Hrsg.): Hinweise für Reinigungskräfte. Berlin 2002
- ▶ Bundesinstitut für Risikobewertung, Pressestelle (Hrsg.): Ärztliche Mitteilungen bei Vergiftungen 2003. Berlin 2004

From the Federal Environment Agency

Umweltbundesamt
Zentraler Antwortdienst ZAD
Wörlitzer Platz 1
06844 Dessau
Internet: www.umweltbundesamt.de
E-mail: info@umweltbundesamt.de

Brochures and leaflets

- ▶ Bundesamt für Strahlenschutz, Bundesinstitut für Risikobewertung, Robert Koch-Institut, Umweltbundesamt (Hrsg.): **Environmental Health** in Germany; Everyday Examples. 1. Auflage, Berlin 2004
- ▶ Innenraumhygiene-Kommission des Umweltbundesamtes (Hrsg.): Leitfaden zur Vorbeugung, Untersuchung, Bewertung und Sanierung von **Schimmelpilzwachstum in Innenräumen**. Berlin 2002
- ▶ Innenraumhygiene-Kommission des Umweltbundesamtes (Hrsg.): Leitfaden für die **Innenraumlufthygiene** in Schulgebäuden. Berlin 2000
- ▶ Umweltbundesamt (Hrsg.): **Klebstoffe**. Tips und Informationen zum richtigen Umgang mit Klebstoffen. Berlin
- ▶ Umweltbundesamt, Fachgebiet „Spezielle wirkungsbezogene Luftanalytik“ (Hrsg.): **Dicke Luft** im Haus? Verbrennungsprozesse als Schadstoffquelle in Wohnräumen. Berlin
- ▶ Umweltbundesamt Fachgebiet „Wasserversorgung“ (Hrsg.): Logo? Ökologisch ausgerichtete **Kennzeichen** für Produkte und Dienstleistungen. Berlin
- ▶ Umweltbundesamt (Hrsg.): Umweltbewusst leben. Handbuch für den **umweltbewussten Haushalt**. Berlin, 1998, 2. Auflage
- ▶ Umweltbundesamt (Hrsg.): Farben und Lacke. Tipps und Informationen zum Umgang mit **Anstrichstoffen**. Berlin 2001
- ▶ Umweltbundesamt, Fachgebiet „Stoffbezogene Produktfragen“ (Hrsg.): Möbel für **gesundes Wohnen**? Wie denn? – Wo denn? – Was denn? Berlin 2002
- ▶ Umweltbundesamt (Hrsg.): Der **Blaue Engel** hat viele Gesichter. Die Jury Umweltzeichen. Berlin, 2003
- ▶ Umweltbundesamt (Hrsg.): Ratgeber Blauer Engel – **Umweltfreundlich bauen**. Stand März 2003
- ▶ Umweltbundesamt und RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (Hrsg.): Ratgeber Blauer Engel – **Gesund wohnen**. Stand März 2003
- ▶ Umweltbundesamt und RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (Hrsg.): Ratgeber Blauer Engel – **Umweltbewusster Haushalt**. Stand März 2003

- ▶ Umweltbundesamt und RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (Hrsg.): Ratgeber Blauer Engel – **Umweltfreundliches Büro**. Stand März 2003
- ▶ Umweltbundesamt, Fachgebiet „Rationelle Energieerzeugung und -nutzung“ (Hrsg.): **Energiesparen** im Haushalt. Tipps und Informationen zum richtigen Umgang mit Energie. Berlin 2004
- ▶ Umweltbundesamt (Hrsg.): Attacke des schwarzen Staubes. Das Phänomen **„Schwarze Wohnungen“** Ursachen – Wirkungen – Abhilfe. Einschließlich Broschüre Hilfe! **Schimmel im Haus**. Ursachen – Wirkungen – Abhilfe. Berlin, 2004
- ▶ Umweltbundesamt, Fachgebiet „Umweltprüfung Arzneimittel, Wasch- und Reinigungsmittel“ (Hrsg.): **Umweltbewusst waschen** – Umwelt weniger belasten. Berlin, 2004

On legal questions

The book on pollutants in the home by Moriske, Heinz-Jörn, Beuermann, Rudolf: „Schadstoffe in Wohnungen: Hygienische Bedeutung und rechtliche Konsequenzen. Ein Leitfaden für Bewohner, Wohnungsunternehmen, Bauplaner, Rechtsanwälte und Richter“, published by Grundeigentum-Verlag Berlin 2004, is available in bookshops and costs 19.80 €.

The following Federal ministries can supply further information material

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Bonn Office

Address for visitors: Robert-Schumann-Platz 3, 53175 Bonn
Postal address: Postfach 12 06 29, 53048 Bonn

Berlin office

Address for visitors : Alexanderplatz 6, 10178 Berlin
Postal Address: 11055 Berlin
Tel.: 018 88-305-0
Fax: 018 88-305-3225/-4375
E-mail: Maileingang@bmu.bund.de

Ordering publications

Internet: www.bmu.de/Publikationen

E-mail: bmu@broschürenversand.de
service@bmu.bund.de

Fax: 018 88-305-3356/-2044

Tel.: 018 88-305-2158

Federal Ministry of Food, Agriculture and Consumer Protection

Bonn office

Besucheranschrift: Rochusstr. 1, 53123 Bonn

Postanschrift: Postfach 14 02 70, 53107 Bonn

Berlin office

Address for visitors: Wilhelmstr. 54, 10117 Berlin

Postal address: 11055 Berlin.

Tel. : 018 88-529-0

Fax: 018 88-529-4262

E-mail: poststelle@bmelv.bund.de

Ordering publications

Internet: www.verbraucherministerium.de – Service – online – Bestellschein

E-mail: publikationen@bundesregierung.de

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15 PHOTO CREDITS

The following individuals and organisations kindly made photographs available to illustrate the brochure:

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Boehme, Nele, Federal Environment Agency: *page 10*

Federal Office for Radiation Protection: *page 38*

Buscha, Uwe, Berlin: *pages 13, 16 top and bottom, 23*

Däumling, Christine, Federal Environment Agency: *cover, page 7*

Franz, Jörg-Thomas, www.milbenforschung.de: *page 15*

Hahn, Axel, Federal Institute for Risk Assessment: *pages 20, 21*

Heger, Wolfgang, Federal Environment Agency: *page 24*

Moriske, Heinz-Jörn, Federal Environment Agency: *pages 25, 27, 28*

KOMAG mbH, Berlin: *page 31*

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Trampe-Hauff, Klaus-Thilo, Federal Environment Agency: *page 18*

Voigt, Heike, Berlin: *page 34*

Wort & Bild Verlag: *page 11*

List of Poison Information Centres in Germany

Place	Organisation	Dialling code	Telephone No.
Berlin	Giftnotruf Berlin Beratungsstelle für Vergiftungserscheinungen	030	1 92 40
Berlin	Station 43 des Universitätsklinikums Rudolf Virchow (Behandlungszentrum)	030	4 50 55 35 55
Bonn	Informationszentrale gegen Vergiftungen Zentrum für Kinderheilkunde	0228	1 92 40
Erfurt	Gemeinsames Giftinformationszentrum Mecklenburg-Vorpommern, Sachsen, Sachsen-Anhalt, Thüringen	0361	73 07 30
Freiburg	Informationszentrale für Vergiftungsfälle Universitätskinderklinik	0761	1 92 40
Göttingen	Giftinformationszentrum Nord Bremen, Hamburg, Niedersachsen, Schleswig-Holstein Zentrum für Toxikologie	0551	1 92 40
Homburg/Saar	Informations- und Beratungszentrum für Vergiftungsfälle	06841	1 92 40
Mainz	Beratungsstelle bei Vergiftungen Universität Mainz	06131	1 92 40
Munich	Giftnotruf München Toxikologische Abt. der II. Med. Klinik	089	1 92 40
Nürnberg	Toxikologische Intensivstation II. Med. Klinik des Städtischen Krankenhauses	0911	3 98 24 51

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Printed on 100 % recycled paper

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This brochure is a contribution to the “Action Programme on the Environment and Health” (APUG) and to its public relations activities. It is available free of charge.



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Umwelt und Gesundheit
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