

Well-being in the Office

Health and Safety at Work in the Office



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Well-being in the office!

Office work and health

Well-being in the office? Is that not expecting too much? Isn't it sufficient just to be healthy? Well, yes if you understand health as the mere absence of illness. People who for instance work constantly under stress or feel undervalued at work will feel low and dissatisfied, but are not ill in the medical sense. But on the other hand, neither are they really healthy. To feel truly healthy something more is needed, something which is not necessarily identifiable by medical science. Complete health incorporates both physical and mental health and psychological well-being. Health as an holistic concept is also the view supported by the World Health Organisation (WHO):

“Health is the state of complete physical, mental and social well-being and not the absence of illnesses and ailments”

How can such a state of health be attained? Certainly not with sporadic fits of physical exercise at the weekend. Success is far more likely to be achieved by dealing with peoples' health at the place where they spend a large part of their day or life: the workplace. More recent Workplace Health Promotion concepts consider the workplace as more than just a place where accidents and illness should be prevented. Well organised work and a satisfying job are equally important and can contribute towards promoting health and personal development.

In this brochure some suggestions are put forward on how work can be organised and how the necessary conditions can be created for people to develop their potential and to promote their health. You may well ask: why a brochure on office work? The reason is simple: the office is where 17 million people in Germany spend their working day. And because contrary to common opinion, office work is not entirely harmless.

At present, the highest rates of absenteeism due to sickness are recorded in the clerical and administrative sectors. The most common complaints reported are headaches, pain in the back, neck and shoulders and inflammation of hand joints etc. Since the wide-scale introduction of computer-aided information and communications technology, these problems have increased and further problems have developed such as psychological stress and eye strain. In the face of these problems, individual solutions such as providing ergonomically designed office chairs or providing good lighting are very often insufficient; questions concerning work organisation and working practice



should also be addressed.

Concepts are therefore required that encompass computer workstations as a whole system and analyse all aspects of the working environment including the equipment, the work organisation, the working practice as well as the individual tasks and to improve them to suit peoples' requirements. A well planned working environment which promotes health and encourages personal development is vital to human well-being and can in turn improve productivity.

As well as addressing the methods, it is important also to examine the working environment. Over recent years, reports have increased on so-called "sick buildings" (sick building syndrome / SBS). The term refers to a group of general ailments spanning from headaches, eye strain and skin problems to feelings of discomfort and even depression. The causes are believed to be attributable to the increasing use of artificial materials and the vapours they produce, as well as to the air conditioning systems found in many offices. Coun-

ter measures should be undertaken here too, taking peoples' natural requirements into consideration.

New arguments have been put forward over the last few years which support the trend towards a more "natural" environment at the workplace in order to promote health. Evidence has emerged from numerous studies that plants in offices have a highly positive effect on a working persons' psychological well-being. In this brochure you will find maybe unusual sounding, but actually rather effective measures to promote workplace health.



All-round organisation of work is essential to promote lasting physical and mental well-being.

A change is as good as a rest!

Badly organised work causes illness!

Work should entail more than merely earning a living. People who dread rather than welcome a new day maybe feel under-motivated or over-taxed at work, find their job boring or feel isolated because their job provides insufficient social contact. In brief: the reason may be badly organised work, a not unusual condition at many computer work stations. Badly planned work that ignores peoples' needs not only diminishes their enjoyment and quality of life it is also a cause of stress at the workplace and can jeopardise their well-being and health. Dissatisfied employees are naturally less motivated and therefore more reluctant and less able to work productively. Research has shown that absence rates due to musculo- skeletal disorders, gastrointestinal infections, disturbances to the circulatory system and even to mental problems resulting from depression and burn-out syndrome, increase proportionally when the work is monotonous, badly planned and lacks any individual freedom.

Designing work for people!

The increase in psychological stress in the office is thought by many to be caused by the widespread use of computers. Computers play the main role on about 90% of all office desks; but unfortunately not always to the benefit of human beings. And although it has a multitude of uses, operating a p.c.



is often a fairly mundane job even though there are no set rules on how the technology should be used. There are many guidelines available on how to design humane working practices that are based on sound scientific evidence. In principle a job should comply with the following criteria:

- **is it practical?** (the job is humanly possible)
- **is it damaging to health?** (there are no health hazards)
- **is the employees' life affected?** (psychosocial stress factors do not emerge)
- **does it encourage personal development?** (work is experienced positively)

Ergonomically designed work equipment, a well designed workplace and pleasant working environment can help towards creating a “practical” and “hazard-free” workplace – more on this later. The

Work should...

be user-orientated: a job of work should take the employee's abilities into consideration;

provide variety: the task requires more than just a "flick of the hand". It enables a person to develop several skills and abilities;

be integrated: the job incorporates several elements such as planning, managing, controlling and monitoring;

be meaningful: the job is an important part of a whole process and is understood as such by the employee;

allow some individual freedom: the job allows a reasonable amount of freedom in respect of the sequence, speed and procedure;

provide feedback: the employee receives feedback on the quality of his work, and support from his superiors and colleagues;

provide potential for personal development: the task provides potential for learning more, to acquire new and to develop existing knowledge.

question of whether it affects the employees' life is a more complex issue. If for example a job is excessively difficult or even boring, or if family life suffers as a result of shift work, it is more than a question of ergonomics. The question of personal development is on a more elevated level and concerns the "soft factors" of work, namely the work organisation and the job content. When does a person find his job satisfying? What sort of work can promote well-being? Which criteria must a job fulfil to promote personal development?

Variety is the spice of life!

Entering data for hours on end does not offer much opportunity for mental and physical activity. How can office work at a computer workstation be organised to promote employee health and even to promote personal development? The keyword is work mix, which involves consolidating a number of activities to create a new working arrangement. Whether this "merely" helps to relieve the physical or mental stress or if it goes some way towards fulfilling the criteria necessary to create the good work organisation mentioned above, depends on the scope of the concept chosen:

1. **Workplace rotation:** several em-



ployees rotate between several workplaces with different responsibilities, each requiring similar qualifications. The physical and mental stress factors are balanced and monotony is prevented, but the opportunities for personal development and social contact with colleagues are limited.

2. **Work expansion:** several qualitatively similar activities are combined and carried out at one workplace. This again leads to changes taking place between the physical and mental stress factors but the opportunities for personal development and social contact are also limited.
3. **Combining tasks:** activities requiring different qualifications are combined and incorporate planning, controlling and monitoring. In addition to balancing physical



and mental stress factors, opportunities exist here for personal development but the social interaction aspect is again neglected.

4. **Group work:** a “loner” becomes a team player.

A group is formed with several employees and assigned with a specific task. The group is responsible within this framework for the implementation, allocation of tasks and time scheduling etc. Group work provides the employees with excellent opportunities for personal development and plenty of scope for co-operation and communication.

A work mixture should always be given preference to working exclusively on a computer. The screen work directive also supports this theory by requiring the employer to ensure that regular breaks are taken and that other activities are carried out to interrupt routine computer work, although break regulations are ranked as slightly less effective in reducing stress than a work mix.

Less is sometimes more!

Implementing such ambitious concepts as the so-

called “qualified work mix”, combining tasks or group work is not always practical. But it should be possible in most workplaces to combine computer work with such activities as telephoning (standing!), drafting letters, taking minutes, taking part in meetings, filing etc. Even simple measures such as these can benefit both the employees and the company, because work mix

- encourages physical and mental activity,
- reduces sickness rates,
- reduces stress,
- increases job satisfaction,
- promotes well-being and health.

Room to move in the office ...

Physical and mental activity will be almost impossible if the employee lacks sufficient space to move around freely. Every workplace should be planned to provide enough room for people to be able to change position and move as necessary while they are working. If you have ever swivelled around in your office chair, stood up and knocked your head you will realise that savings somewhere have been

Brief checklist “room and space”

- Is the minimum square metre requirement observed?
- Is there unhindered access to the xxxxx and window?
- Are the access routes at least 80 cm, the through routes at least 60 cm wide?
- Is the room at least 2.50 metres high?
- Is the prescribed minimum 12 to 18 m² per workplace observed?
- Is there sufficient leg room the desk?
- Is the area available for movement at the workplace at least 1.5 sqm?
- Is there approx. 1 metre space to swivel back the chair?

made in the wrong place ...

The size of the area required for computer work stations depends not only on the type of work and on the number of workplaces in the room but also on the amount of equipment to be accommodated. Depending on the type of office, each worker requires a minimum area of between 10 and 15 sqm including furniture and access routes, but of course there are no limits if the employer is able and willing to provide more. Sufficient room would then be available to accommodate foliage plants to improve the office climate, a high table or an area to hold a short meeting. The expenditure involved is worthwhile to the employer as well; research has shown that many jobs can be done better on the move than

while sitting down. Seen from this perspective, investing in more space can be an investment in better productivity.

Rules and regulations

Standards/Regulations¹:

DIN EN ISO 9241-2

Germany:

Arbeitsschutzgesetz (Occupational Safety and Health Act) § 4,5

Arbeitsstättenverordnung (Workplace Regulations)

Arbeitsstättenrichtlinie 17/1.2 (in the future ASR A 1.8) DIN 4543 Teil 1

Bildschirmarbeitsverordnung (Display Screen Regulations) 4, Anhang Nr. 14

Verwaltungs-Berufsgenossenschaft SP 2.6/2

DIN 4543 Teil 1

Literature:

Hahn, H.: 'Mischarbeit in Büro und Verwaltung', published by Bundesanstalt für Arbeitsschutz, Forschungsanwendung Fa 26, (Research Application) Dortmund 1992

Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (Publisher): Arbeitswissenschaftliche Erkenntnisse (Industrial Scientific findings) No. 92, 93, 94, Mischarbeit in Büro und Verwaltung, Dortmund 1992

¹ DIN: German regulations, EN: European regulations; ISO: International Regulations

Avoid a painful desk job!

Moving around in the office

Keep moving ...

You have just been reading that a work mix encourages activity. This is absolutely essential. For one thing is certain: we all sit too much. Some figures demonstrate that in Germany the average person spends two hours daily in front of the television and before beginning this shift around 17 million people have spent eight hours sitting in an office. You will spend some 80,000 hours of your working life sitting if you work in an office. Sitting is not the low-stress occupation and good for your health as many may think.

Human beings are meant to move, to walk, stand, lie down and sit. If they sit day-in, day-out for prolonged periods at a desk they will probably in the long term develop cardiovascular diseases and spinal disorders. Eighty per cent of the population complain of back pain, which incidentally is the most common reason for visiting a doctor. His warnings will be justified because in Germany 30% of all reported illnesses are attributed to posture and musculo-skeletal complaints and 14% of the working days lost due to illness are a result of back pain.

The daily sit-in ...

One of the main reasons for the increasingly common complaint of back pain is the one-sided strain placed on the musculo-skeletal apparatus caused by hours of sitting. Working in a forced posture in offices has become more common over the past few years. Today, the average German office worker spends over 80% of his working day hunched over his desk. Whereas the trip to the filing cabinet or a visit to a colleague with a file used to provide some movement, an office worker in the digital era needs move little more than his index finger: a mouse click to obtain the data required, processed and passed on. Fast, practical, easy, but not exactly designed to encourage movement...

The increasing bond to being bound to the workplace cannot be blamed. It is not entirely due to



technological developments. It often was and still is a welcome arrangement that workers remain at their workplace. In this way even working processes in offices could be intensified and streamlined and “unproductive” activity was eliminated. The trend was for “minimising handling movements” and “ideal layout of working equipment” and although such organisation may at first appear efficient, it neither encourages movement nor is it healthy.

Taking care of your back ...

Back pain resulting from working in an office can be avoided. A successful strategy for preventing back pain consists of several measures that take all aspects of office work into account, from the work equipment to the work organisation.

Suitable programmes in and outside the company can promote long-term changes in the way people move and exercise.

To maintain a healthy posture whilst sitting in the office, a chair is required that provides effective all round support for its occupant. A desk with adjustable height is equally important. So is good lighting and a monitor that can be tilted to suit individual requirements. The workplace is now ready for use, but not for long! Sitting in any static position for long periods will eventually become uncomfortable. Some “dynamics” are called for, namely sitting upright, sitting forward and reclining back. The movement stimulates the circulation, provides the intervertebral discs with blood and reduces the strain on the muscles.

But in the long run even these measures will prove inadequate. Sooner or later some “real dynamics” are called for, i.e. standing up! Work should therefore be organised to incorporate several changes of posture to balance the strain during the working process.

This can be achieved by:

- encouraging “break jobs” i.e. non-computer related tasks that can be performed away from the computer such as telephoning, taking part in



Brief checklist “The ergonomics of sitting”

- Do the seat and back of your office chair support your body? Is the height adjustable? Does it feature a tilting device and a reclining mechanism?
- Have you fixed the height correctly? If you can place your feet flat on the floor and your legs are bent at a right angle, you have the correct position. You should sit supported against the back of the chair!
- Do your upper and lower arm form a right angle when you place your fingers on the keyboard? Is there sufficient space between the table edge and the keyboard to rest your wrists?
- Are the chair, desk and monitor positioned to enable you sit with a relaxed posture? Can you look at the monitor without twisting your neck or body? Is the distance between eye and screen correct? It should be at least 50 centimetres for a 15" monitor and correspondingly greater for larger screens!
- Are you able to look at the screen without tilting you head back? If not your monitor is too high. The top line of your text should be below or at eye level.
- Have you enough space at your workplace? Can you move around easily without constantly bumping into something? And most importantly, do you have sufficient leg room?



- a meeting, copying, taking messages etc.
- placing an elevated desk next to the workplace to take telephone calls and hold a short meeting;
- removing working equipment that is used frequently from reach.

Evidence has shown that even two to four changes of posture can benefit health by stimulating the circulation and reducing tension. A frequent change of posture is more beneficial than long periods of either sitting or standing.

Create awareness – change your habits!

Ergonomic and work organisational measures to encourage physical activity are an opportunity for employees to adopt more health-conscious behavioural patterns at work. Whether or not the opportunity is taken depends on whether the employees are aware that a problem exists. They will only be willing to examine their habits and change their behaviour if they possess adequate information and if they see any reason to make changes.

Organisational measures should be backed up by exercise programmes, courses to strengthen the back, suggestions for activities during breaks and advice on issues of health protection and workplace health promotion. The relationship between the working conditions and behavioural prevention must be established before the discomfort caused by sitting can be eliminated.

Rules and regulations

Standards/ Regulations¹

DIN EN 527
DIN EN 1335

Germany:

Bildschirmarbeitsverordnung (Display Screen Regulations) § 4, Anhang Nr.10, 11
DIN 4543 Teil 1

Literature:

Krüger D. et al: Bewegungsergonomie bei Arbeitsplätzen mit informationsverarbeitenden Dienstleistungen, published by Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Forschungsanwendung (Research Applications) Fa 37, Dortmund/Berlin 1997
Windel, A.; Ferreira, Y.: Steh-Sitzdynamik. In: Medizinisches Lexikon der beruflichen Belastungen und Gefährdungen, Darmstadt 2004

Eye care!

Look after your eyes in the office



Can you see?

It's difficult to believe, but even today around 80% of workplaces in Germany have insufficient lighting. Particularly in offices with computer workstation, bad lighting can have a detrimental effect on the employees' well-being and their health and their efficiency will suffer. If the screen shows too much reflection, the room is too dark, the artificial or natural light is dazzling or if the light contrast is too stark, they will become irritated and tired quickly. They will make more mistakes and may suffer from headaches and eye strain, which is one of the most common complaints among about 30% of German screen workers. Some studies put the figure much higher, at 50%. High time therefore to see things in the right light...

How much light?

The quality of the lighting is not a matter of chance, but is determined by a number of specific features.

- **The strength of light:** At least 500 lux is recommended for monitor workplaces. In open-plan offices the light intensity should lie between 750 and 1000 lux. A combination of general overhead lighting and task lighting at workplaces has proved to be the ergonomically best solution.
- **The distribution of light:** the light should be distributed evenly throughout the whole room so the eyes are not strained by having to adapt from light to dark. The ratio of contrast between the brightest and darkest surfaces in the immediate vicinity of the working area (e.g. screen/work surface) should be 3:1, and not more than 10:1



between the workplace and the wider environment.

- **Reflection and glare:** should be avoided by taking a number of measures even in natural daylight:
 - e.g. placing anti-reflection prism lights that should be placed parallel to the window and focused in the viewing direction;
 - individual adjustable shades that do not impair the view outside;
 - using matt and light sheen paint on walls, ceilings, work surfaces and furniture to prevent too much reflection
 - positioning screens to avoid glare and reflection.

Eye relaxation ...

Screen work is hard on the eyes! They have to adapt constantly to looking at different distances. Depending on the job, the eyes move some 12,000 to 33,000 times to and fro between the screen and the text. And the contrast between different lighting provokes between 4,000 and 17,000 pupil reactions every day. Staring fixedly at the same object from the same angle, at the same distance for a lengthy period of time makes matter worse. Not a very relaxing exercise ...

No wonder the eyes become exhausted. They are really meant to roam around constantly to balance and minimise the strain. Different types of movement are necessary and neither good lighting nor ergonomically designed screens are

Brief monitor checklist

- Do not place the monitor directly next to the window! (distance: > 60 cm)
- Direction of vision should be parallel to the window!
- The uppermost line of text on the screen should be below eye level!
- Use screens with distinctive displays (dark characters, light background)
- Keep sufficient distance between the eyes and screen (>50 cm for 15 inch monitors, proportionally more for larger screens)
- Avoid flicker by using screens with high image regeneration frequency (over 15 inch screen diagonal >85 Hz) or use LCD-screens.
- Use sufficiently large characters on the screen (at 50 cm distance between eye and monitor, the character size should not be smaller than 4 mm)

a substitute. The best thing for the eyes is to organise work in a way that allows for frequent interruptions from screen work to carry out other activities. The key word again is work mix!

Several changes of activity are necessary to relieve the strain placed on the eyes. Use the recommended short breaks to let your eyes roam around, or even better, do some eye exercises ...

The green light for full spectrum fluorescent lighting?

Light is not only essential to be able to see. Natural light also controls many human processes. It stimulates the metabolism, controls the hormonal balance and the immune system and promotes cell

replenishment etc. And it plays an important role in making us feel good! As we all know everything feels better when the sun shines. But it isn't the brightness of the light that produces feelings of well-being, but the composition. An aspect that the DIN standards applying to artificial lighting have so far failed to consider. Normal lighting generates only a limited light spectrum, whereas full spectrum fluorescent light represents 96% of the spectrum of sunlight. This includes the small proportion of UV rays that are responsible for the feel-good effects. Surveys carried out in the USA have shown that the effects of full spectrum fluorescent light reduced the number of colds, the levels of absenteeism due to sickness and improved efficiency significantly.

It does however, take time to become accustomed to full spectrum fluorescent light. It is perceived by some as being too bright and too cold. Office plants are the answer here! They not only create a better working environment and a comfortable room climate that contribute towards feelings of well-being, they also absorb the cold colour components.

Or to look at it from another angle; if you want to decorate your office with plants other than ivy, you will not be able to avoid using full spectrum fluorescent lighting and the UV light it produces.

Rules and regulations

Standards/ Regulations¹

DIN EN ISO 9241, 300 Series

DIN EN 12464, DIN EN 12665

Germany:

Bildschirmarbeitsverordnung §4 (Display Screen Regulations), Anhang Nr.1-5, 15, 16

Arbeitsstättenverordnung (Workplace Regulations)

Arbeitsstättenrichtlinie 7/1, 7/3 (in the future

A 3.4), DIN 5035, DIN 5034

Verwaltungs-BG/Bundesanstalt für Arbeitsschutz und Arbeitsmedizin SP 2.1. (BGI 650)

BGR 131-1,2 (update 2008)

Literature:

Lange, W.; Windel, A.: Kleine Ergonomische Datensammlung, TÜV-Verlag 2009

Länderausschuss für Arbeitsschutz und Sicherheitstechnik:

Handlungsanleitung zur Beleuchtung von Arbeitsstätten. LASI LV 41, Mai 2005

Quiet please! Concentrating in the office

Conditions for well-being!

Satisfied staff and good work are not just a matter of luck, but are the result of good and healthy working conditions. And they are really not difficult to achieve! The office is unfortunately too often a place where little attention is paid to psychological stress factors such as noise, heat, cold and draughts. Even the low noise produced by a printer for instance, can have a disturbing effect on the train of thought. Or a stuffy climate in the office can influence feelings of well-being and consequently reduce the powers of concentration ...

A series of such unwelcome interruptions at work can be stressful to those concerned. As a permanent feature they can cause permanent stress – hardly conducive to well-being or to efficiency. And yet it is relatively simple to create a quiet and

peaceful atmosphere and a pleasant climate in the office ...

Quiet and productive!

The official noise level in offices should not exceed 55 dB (A). This corresponds roughly to the volume of normal conversation. Lower levels of 35-45 dB (A) should be aimed for where higher levels of concentration are required, for example when working on the computer. Quieter EDP equipment would help. State of the art computers and printers produce noise levels of maximum 48 dB (A). Higher levels are unacceptable for new equipment. The VDI-ETS directives listing almost all models with details of their noise levels can be consulted before choosing new equipment. As evidence from research has shown, the effort is certainly worth-



How to create peace and quiet ...

- Buy quiet equipment!
- Ban noisy machines to a separate room!
- Use acoustic hoods on noisy equipment!
- Use sound-absorbing underlays on the desk!
- Sound-proof ceilings and floors are important!
- Set the air conditioning, heating and ventilation systems correctly!
- Keep quiet workplaces apart from the loud ones!
- Check the doors and windows for soundproofing!
- Use office plants to absorb noise!

Keeping the climate right:

- check the room insulation and improve if necessary!
- make sure there is sufficient space and if necessary reduce the number of workplaces per room!
- place equipment that produces too much “hot air” in a separate room!
- employees should be able to open and shut the windows!
- each person should be protected from the sun!
- air conditioning and ventilation systems should be adjustable at each workplace and should be serviced at least twice a year!
- plants in the office improve the climate, especially the humidity!

while; every saved decibel increases the feeling of well-being and productivity. This also applies to the “noise” coming from the boss ...

Comfort in small spaces ...

A comfortable climate in the office is just as important as peace and quiet for workers to feel well and to be able to concentrate. Statistics on what constitutes a “good office climate” can be found in the workplace ordinance:

- A temperature of between 20 and 24 degrees;
- Relative humidity between 30% and 70%;
- Maximum air movement of 0.1 metre per second.

There is no need for “climate summit meeting” to ensure that these figures are observed. But it would be advisable to give some thought to the factors influencing the climate in the office.

For example:

- the number of people working in the room,
- the heat emitted by the electronic equipment,
- sunlight,
- the ventilation and air conditioning system and the heating,
- the quality of the external air.

It often needs only minor changes to turn an office climate from comfortable to uncomfortable. Did you know for instance, that just one laser printer produces as much heat as 8 to 10 people?

Gasping for breath!

The quality of the air plays an equally important role as the air temperature and the humidity in determining how well people feel in the office. In offices particularly, the air is often not as it should be! Pollution is caused by cigarettes, photocopiers, laser printers (ozone), correction fluid and felt-tip

pens (solvent), poorly serviced air conditioning systems, building materials and office furniture (formaldehyde). Although research has shown that the concentration levels of these materials are usually below the existing limits, they nevertheless do not contribute to feelings of well-being! The following guidelines should be observed:

- keep your distance from copiers and laser printers!
- use low-polluting office materials when possible!
- make sure there is sufficient circulation of air!
- ban smoking or introduce rules on smoking!
- bring in some plants which can to some extent filter the air of pollution!

Sick people in sick buildings ...

An increasing occurrence of complaints such as nasal congestion and constipation, itching and smarting eyes, hoarseness, skin irritation and general complaints such as headaches, tiredness and lack of concentration, could be an indication of the so-called Sick Building Syndrome (SBS). The causes of SBS are as numerous as the complaints themselves. A combination of several factors is thought to be responsible, such as an unfavourable air temperature, bad lighting, chemical and biological air pollution and even psychological factors such as stress or lack of appreciation at the workplace. SBS is a phenomenon of the last 10 to 15 years and is linked to the increasing use of artificial materials and the vapours they produce (carpets, office furniture) and of course to the more frequent use of air-conditioning systems.



Rules and regulations

Standards/ Regulations'

DIN EN ISO 4871

Germany:

DIN 4109, DIN 1946

Lärm- und Vibrationsarbeitsschutzverordnung
(Noise and Vibration Regulations)

Bildschirmarbeitsverordnung (Display Screen
Regulations) § 4, Anhang Nr. 17, Nr. 18

Arbeitsstättenverordnung (Workplace
Regulations) §§ 5, 6, 9, 16

Arbeitsstättenrichtlinien (Workplace
Regulations) § 5, § 6/1,3 (in the future ASR A 3,6
for ASR 5 and ASR A 3,5 for ASR 6)

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Clean versus Blue Air – Protecting the health of non-smokers at the workplace

More people die from cigarette smoke than from traffic accidents. According to the WHO (2002), four million people die world-wide every year as a consequence of their smoking habits. That is the equivalent of more than 100,000 people annually in Germany alone, or 300 deaths every day.

Medical experts world-wide now agree that passive smoking causes acute and chronic damage to health. The risk of chronic bronchitis, infectious lung disease and contracting an asthmatic disease increases by 50%. According to experts, airborne tobacco smoke is classified as one of the most highly dangerous carcinogenic substances at the workplace. Nevertheless, more than three million employees work in rooms where people regularly smoke. This means that far more employees are exposed to cancerous tobacco smoke than to all other carcinogenic substances together. Passive smoking is therefore not just a subjective nuisance, but a substantial health hazard. Every year in Germany, 400 people die from lung cancer caused by passive smoking.

What is passive smoking?

“Passive smoking” is the involuntary inhalation of airborne tobacco smoke. A large proportion of this smoke consists of side-stream smoke, i.e. gases and particles that are produced from the burning tip of the cigarette. These components of the tobacco smoke remain for a long time in the air of a room.

In an unventilated room the air still contains 50% of the initial concentration of nitrogen oxides and smoke particles for two hours after someone has smoked in it.

The compounds of side-stream smoke are qualitatively the same as the compounds of main-stream smoke which the smoker inhales. However, the concentration of the substances in side-stream smoke is generally higher than in the main stream smoke. The concentration of the strong carcinogen (cancer causing substance), nitrosodimethylamin in the side-stream smoke is many times higher than in the mainstream smoke. Even when the air has been diluted with fresh air, (by ventilation) the concentration of smoke is still high enough for a passive smoker to inhale the same amount of cancerous substances during the course of a day as if he had actively smoked several cigarettes. There are no safe levels in the exposure to cancerous chemicals, they are always toxic.

A third of non-smokers feel bothered by smoking. The potential for conflict caused by passive smoking at workplaces is accordingly high. Surveys have found that “smoking at workplaces” is a subject of discussion on the agendas at company and personnel meetings in at least one in three firms who were questioned, and in half of the larger companies with more than 500 employees.

The following arguments have prompted many employers and public authority managers to create



Vitamins, not nicotine!

Many companies ban smoking on company premises – often with a marked lack of success. At Siemens Information and Communications Mobile in Bocholt they adopt a different approach – that of gentle persuasion. For a number of years the Apple Corner Project has been running here. In separate areas of the office there are apples, water dispensers and the opportunity to switch off. Smokers are also welcome to switch from ciggies to vitamins. And many of them make use of this: The Apple Corner has developed into a communication centre within the office and is eagerly frequented. The project is so successful that it has even won an award: In 2003 Siemens' ›Apple Corner‹ was one of the five winners in a competition held by the Initiative Group for Smoke-free Workplaces (Initiativkreis für rauchfreie Arbeitsplätze - IKRA).

smoke-free workplaces:

- Absence rates due to respiratory diseases fall.
- Reduction in costs for cleaning and renovation.
- Clear policies prevent conflict between smokers and non-smokers.
- A smoke-free environment helps smokers who are willing to quit smoking and sets a good example to the younger employees.

A series of representative surveys carried out over the last few years has consistently shown that most people would like to see measures taken to protect non-smokers at workplaces. It was revealed that the majority of Germans would like to see statutory protection for non-smokers, in public places and in public transport as well as in workplaces. As a consequence, the workplaces directives were changed by law. Since 3rd October 2002, paragraph § 3a in the workplace directives applies to protect non-smokers:

(1) Employers must take the measures necessary to protect non-smokers effectively from the health hazards caused by tobacco smoke at the workplace.

(2) In workplaces dealing with the public, employers must apply the measures in paragraph (1) only to the extent to which the nature of the business and the type of employment allow.

This directive ensures that the protection of non-smokers' health clearly takes priority over the personal freedom of the smokers. Employers are required to take effective protective measures, regardless of whether or not the employees feel disturbed or negatively affected by their smoking colleagues. Where conflict arises, it is no longer sufficient to ask employees to show consideration or to provide guidelines for employees to regulate the matter among themselves.

Smoking bans at workplaces are generally accepted by smokers and non-smokers alike and usually result in a better working atmosphere. Where solutions have been reached in a consultation process, the levels of acceptance in the company and feelings of satisfaction are generally a lot higher.

Protecting the health of non-smokers in practice

Companies and public administrations use different methods for formalising their agreements:

- Employers and employees draw up agreements on non-smoking regulations in the terms of the employment contract.
- The employer has the power to regulate smoking habits in the company.
- Employers and works/staff councils agree on terms in company agreements for protecting non-smokers.

According to the industry constitutional act, the works council has the right to co-determine on health and safety regulations. Furthermore, it has a legal obligation to actively support the implementation of the industrial safety regulations – including the protection of non-smokers. Where a works or staff council exist, it should be the first point of contact if the regulations are not complied with.

Employees who feel that their right to a smoke-free environment is being ignored can approach the responsible safety and health authorities. They can order the employer to apply the regulations within a deadline. If he does not comply, he can be fined up to 25,000 Euro.

There are a number of instruments available which can be used by companies in applying the

these regulations:

- Work organisation measures, particularly the separation of smokers and non-smokers in offices, rest rooms and common rooms.
- Smoking bans in all areas where non-smokers need to be present to either work or take their breaks.
- A generally smoke free enterprise, where smoking zones can be arranged if necessary.
- Ventilation systems, which are however linked with high expenditure and therefore not always practicable or effective.



Links and literature

If you need advice or assistance for the implementation of non-smoker protection in your enterprise, you can obtain information and support from:

Hotline »Rauchfrei am Arbeitsplatz«
Beratung für Arbeitnehmer, Arbeitgeber,
Betriebsärzte und Betriebsräte
Mo.–Fr. 14.00–18.00
Deutsches Krebsforschungszentrum
Im Neuenheimer Feld 280
69120 Heidelberg
Tel. 062 21.42-42 00
Fax 062 21.42-3020
www.tabakkontrolle.de

Initiativkreis Rauchfrei am Arbeitsplatz (IKRA)
BKK Bundesverband
Abteilung Gesundheit
Kronprinzenstr. 6
45128 Essen
Ansprechpartnerin: Margot Wehmhöner
Tel. 02 01.179 12-46
Fax 02 01.179 10-14

Bundeszentrale für gesundheitliche Aufklärung
Postfach 910152
51071 Köln
Tel. 02 21.89 92-0
Fax 02 21.89 92-300

Bundesvereinigung für Gesundheit e.V.
Heilsbachstr. 30
53123 Bonn
Tel. 02 28.987 27-13

Bundesärztekammer
Dezernat Fortbildung und Gesundheitsförderung
Herbert-Lewin-Str. 1
50931 Köln
Tel. 02 21.40 04-415
(Handbuch: Frei von Tabak)

Programmed to crash?

Computer work and software design

Frustrations of a modern office

The scene is set – a comfortable office. Everything arranged just as described on the preceding pages: ample space for moving around, for sitting and standing. The office chair fits its owner perfectly and the height of the desk is adjustable. The climate in the office is pleasant, humidity has been adequately countered by numerous plants. The colleagues are nice, and the work is interesting. The face of one colleague sitting at his desk in front of a computer screen begins to redden and pearls of sweat form on his forehead. He appears to be on the verge of a nervous breakdown despite the pleasant atmosphere. What's his problem? His computer has gone on strike! Quite a frequent problem in many offices with computer workstations. Sudden system crashes or disintegrated

files and incomprehensible programmes that stretch the nerves to breaking point are an equally common occurrence.

Situations such as these can dampen the enthusiasm for work and can in the long run be detrimental to the employee's health, let alone his feeling of well-being. An unreliable computer programme which is more of a hindrance than an asset to work can raise stress levels considerably. And try explaining to the boss that the software which has probably cost several thousand Euros does not work properly or requires complicated work processes!



Good work with good programmes ...

Working equipment should be adapted to suit peoples' needs and abilities. This basic ergonomic principle also applies to computer software. Software should therefore be designed bearing in mind the natural human prerequisites such as the ability to concentrate, to perceive colours and to their expectations regarding dialogue processes etc. Software design should also take into account human frailties such as fallibility and forgetfulness. And above all it should be able to carry out the task it was bought to do efficiently. However even the best software is no substitute for the user's expertise. And he can only work well if he has confidence in the programme.

It is therefore important for users to

- take part in further training courses
- to be shown how to use new programmes
- to have a well structured manual
- to obtain help in solving complex problems.

Finding information

It is no longer necessary to rely on intuition when designing programmes that conform to peoples' needs and abilities. Thanks to a special branch of ergonomics, namely software ergonomics, there is now extensive information available on how to create a successful partnership between people and computers. In the two most important sets of regulations on the subject of screen work, large sections are based on this information:

- the “Display Screen Regulations”
- the DIN EN ISO 9241 “Ergonomic Requirements applying to Display Screen Work in Offices”, Parts 10 and 11

Everything you need to know can be found here on the ergonomic design of monitor workplaces.

**Computer work is tiring.
Regular breaks are just as important as an ergonomically designed computer work station.**



Short software checklist

1. Is it suitable? Can the software perform the job adequately? Does it lead directly and simply towards the goal?
2. Is it logical? Is every stage of the dialogue comprehensible and logical? Is assistance given when problems arise?
3. Is it easy to control? Can you control it at all times? Can you determine the start, direction and speed until your objective is achieved?
4. Does it conform to expectation? Is the programme well structured, following a logical sequence as you would expect.
5. Does it allow for error? Are you spared drastic penalties if you make a false entry? Can errors be corrected with minimum or no effort?
6. Is it adaptable? Does it comply with your expectations? Can it be individually adapted to the requirements necessary for the job and to your personal preferences?
7. Can you learn from it? Does your software provide assistance in your dealings with it? Are tips and tricks shown on how to reach your objective more quickly?



For instance a large section is devoted to software ergonomics, the presentation of information and user guidance. Should anyone wish to find out whether his software conforms to the requirements, he or the employees can do so by filling in a questionnaire (ErgoNorm, see “Literature”).

It's worth a break ...

Working on a computer is tiring, even with the ideal software. Staring onto a screen for prolonged periods can bring on a headache and cause eye strain. As a consequence, legislation has been passed to make suitable provisions. According to the Display Screen Regulations, prolonged work on the computer should be broken at frequent intervals throughout the day to relieve the stress.

A short break can also delay tiredness, less errors are made and employee efficiency is sustained. Seen from this aspect, breaks are more than an unproductive interruption from work but are really worthwhile to everyone. For maximum benefit, some points should be observed:

- Several short breaks are more refreshing than a few longer breaks.
- The more difficult the job, the more frequent and longer the breaks should be. Five to fifteen minutes per hour are recommended.
- Each employee should be allowed to decide for himself when to take a break as efficiency fluctuates at individual levels throughout the day.

Rules and regulations

Software ergonomics:

DIN EN ISO 9241 parts 11 ff, especially part 110

Work processes and breaks:

DIN EN ISO 10075

DIN EN ISO 9241-2

Germany:

Software ergonomics:

Bildschirmarbeitsverordnung (Display Screen Regulations) §4, Anhänge Nr. 20-22

Verwaltungs-BG / Bundesanstalt für Arbeitsschutz und Arbeitsmedizin SP 2.1 (BGI 650)

Work processes and breaks:

Bildschirmarbeitsverordnung (Display Screen

Regulations) §5, §4, Anhänge Nr. 21.2-21.4
Arbeitsschutzgesetz §4, 5

Literature:

Dzida, W. et al: Gebrauchstauglichkeit von Software. ErgoNorm: Ein Verfahren zur Konformitätsprüfung von Software auf der Grundlage von DIN EN ISO 9241, Teile 10 ff, published by Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, FB 921, Dortmund 2001

Letting the energy flow ...

Feng Shui in the office

Eastern wisdom

Feng Shui isn't an Asian type of curry nor is it a new form of eastern martial art. Translated literally, Feng Shui means "wind and water" and is about the laws applying to the positive flow of energy. In this context, the word "energy" does not mean electricity that comes from a socket – ohms, volts and ampere have nothing to do with it. Rather, Feng Shui is that universal energy that governs the world. In ancient India this energy was called "Prana", the Japanese named it "AI" and in China the name was "Chi".

According to this ancient theory which goes back several thousand years, it is not only the entire cosmos that consists of this substance. Chi also flows in humans and determines their mental development. Feng Shui is harmony with nature and its flowing movements. Like a meandering river, the movements within a building should flow gently and the rooms and furnishings should be arranged in a way that allows the Chi to spread evenly throughout the home or the office. Free circulation and a generous supply of good Chi in every room leads to health, wellbeing, and prosperity – at any rate that is the simple theory.

Those who think this is too unscientific or even too esoteric should remember the healing method that has now been accepted in conventional medicine: acupuncture. In the same way that acupuncture aims to influence and stimulate the flow

of energy in the human body by applying needles to specific points, Feng Shui practitioners use similar aids, i.e. objects, to get the Chi flowing.

Good location – good mood!

The most well known school of thought in Feng Shui in the western hemisphere is the "Form school". It says that the form and composition of the environment, shape and influence the people who live in it –positively and negatively. Choosing the ideal location to live or work and using the energy potential in the best way possible is therefore the most important task of the Feng Shui analysis. According to the principles of the Form school a good location is easy to recognise and even the sceptics would accept the criteria, as in the end they are very similar to those also used by estate agents to describe a "good to very good location". The ideal plot of land for building would have:

- An open, uninterrupted view to the front aspect, preferably facing south with a view of a lake,
- protection from behind, e.g. by hills or trees
- stabilising elements at the side, e.g. houses, trees, hills, which should not be higher than the own building.

In Feng Shui this is called the armchair principle: a sturdy backrest, two stable arm rests and open at the front.

More things to be considered

- Tidy up the desk before the end of the working day. Remove unnecessary clutter, it inhibits the flow of energy!
- 2 desks placed opposite each other cause stress for the people working there. Better to position the desks at least thirty centimetres sideways. This creates more free space – in the head as well!
- Offices should be rectangular. It encourages the unobstructed flow of the Chi!
- Round, oval, or semi-circular shaped tables are ideal for discussions, they encourage creativity and stimulate new ideas. However, practical subjects and contractual negotiations taking place at this shape of table tend to drag on endlessly!
- Rectangular and square tables tend to support activities carried out by the “left half of the brain”, i.e. analytical and mental processes.
- (Healthy!) plants increase the energy in the room (see last chapter), they are an integral part of Feng Shui teachings!



Steer the Chi!

In reality though, the world does not consist only of south-facing slopes with lake views – and the working environments even less so. Is Feng Shui therefore only for the wealthy? Not at all. It often calls for only a few small changes in the interior rooms of a building to create a peaceful or lively place by steering the life energy of Chi.

The following principles apply: Chi should be able to flow freely and unobstructed through the rooms. A cramped entrance area for instance hinders the flow of energy and the Chi is unable to enter the room. As a consequence people living and working in rooms cut off from the outside world will probably feel dull and sluggish. There are



other things too that can disturb the free flow of energy through the rooms: unnecessary clutter, dirty corners, things that don't work etc. They all waste energy and have a negative effect on the Chi.

Sharp edges and pointed articles are also bad for the Chi and should never point towards anyone sleeping or working because they cut off the flow of energy like a knife and have a weakening effect on human beings. Working beneath sloping ceilings and beams should also be avoided, as they are oppressive and paralyse creativity and efficiency – people find it difficult to work. Book shelves behind the back or overhead shelves close to the head have a similar effect: firstly they disturb the flow of energy and then the flow of thoughts!

The ideal workplace

On entering an empty café, a person will usually head for a seat that is placed diagonally opposite the entrance, with a wall behind. This is the best position from which to observe the approach of possible danger, and there is no threat from behind. This is very natural behaviour and has been observed in many psychological studies. In this respect the ancient Chinese were good psychologists in suggesting that the ideal place for a desk is exactly opposite and diagonally furthest away from the door. According to Feng Shui wisdom, people here are at ease and feel strong and safe. On the other hand, if there is a window or a door behind the desk it can lead to feelings of insecurity

and a lack of concentration – this is due to the danger of being attacked from behind.

Before spending your working life in fear and suspense, just move the desk – but not facing a wall! That cuts off the view and blocks the thinking process. Feng Shui teachings on the whole lay great emphasis on the view from the workplace – one is sitting in a figurative sense vis-à-vis one's own future. Ban the tea cups, ashtrays and the fax machine from view and replace them with something nice, such as a picture or a plant. Neither should the desk stand too close to the rear wall. It makes people feel hemmed in, unable to develop and their personality wastes away. Interestingly, Feng Shui and workplace regulations see eye to eye in this matter (see chapter “Changes are good! Varied work at the office”) – although the healthy and safety authorities would probably name different reasons for their regulations ...

Literature

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More green, less grey – Plants in the office

An old flame ...

For over 100,000 years homo sapiens have inhabited the earth, and for most of this time were outdoor creatures living as hunters and collectors. Plants played the major role in this world as an indication of water sources, building material, food and medicine.

Today, 200 years after the Industrial Revolution, the picture is somewhat different. Factories, cities, streets and a large amount of concrete have left their mark on the lives of many people. People today spend between 80 and 90% of their life in enclosed rooms, whether at home in the factory or in the office. And yet in spite of these developments, the inner affinity to “greenery” has remained. Why is this? Scientists believe that this relationship is a remnant from our evolutionary

history and that the love for plants is virtually a part of human genetic makeup. Would it be possible otherwise to distinguish between as many as 2,000 shades of green but only very few shades of red? We appear to be orientated towards green ...

Feeling good with plants

This psycho-biological identity is more than just a relict of our evolutionary history; it can be applied specifically to promote health at work. Science has proven what many people suspect, that the presence of plants can promote mental equilibrium and feelings of well-being.

This is true not only at home but especially where many people spend many hours in the office.

Many studies which show that plants can have a



positive effect on the spirit and on health and efficiency have been conducted in the Netherlands, Norway, the USA and in Germany. In one study commissioned by the Bavarian State Institute for Viticulture and Horticulture, all of the 139 participants recorded that the offices with plants were more pleasant, brighter and generally more interesting. The vast majority also felt that their “office biotope” was more refreshing, made them feel less stressed and enabled them to concentrate better. The conclusion of the Bavarian study was that such a positive working atmosphere was beneficial not only in improving people’s mood but also for their work. These findings were supported by a Dutch study which revealed that plants placed directly next to computer workplaces were especially effective in improving work efficiency and well-being for users spending more than four hours in front of the screen. By bringing some greenery into the office you will bring benefits to yourself your colleagues and to your company. They will not only improve the working atmosphere by creating a “natural” environment but will improve the climate too.

Nice atmosphere in the office

An office should be a pleasant place to be. Not too cold, not too warm. No draughts. The air should be neither too humid nor too dry. Such an ideal state of affairs is unfortunately not so simple to achieve, especially in winter with the heating turned on. Humidity represents a particular problem and it often sinks below 30% in many offices. The consequences for the office occupants are a dry mouth and mucus membrane of the nose, smarting eyes and skin problems. These not only reduce the feeling of well-being, but also jeopardise health. In the statistics produced by the administration trade association, flu and colds are the main reason for people reporting sick. The “wintry dryness” in offices is responsible. When the mucus membrane in the nose becomes too dry, the respiratory system is no longer able to filter the air as efficiently as usual and viruses and bacteria can penetrate the body more easily.

The incidence of eye complaints by office workers is statistically similar to colds. The dry air produced by the heating system tears the film of



moisture on the eyes and can lead to conjunctivitis. Feelings of well-being decline rapidly and the sickness rates increase. Having to blink frequently can even result in missing the right key on the keyboard or accidentally deleting an entire file.

Headaches, tiredness and dry skin are further symptoms of “the desert-like climate” that although not directly hazardous to health, does reduce the worker’s efficiency.

All sufficient reason for doing something about the humidity in the office. A possible solution would be to install an air conditioning system to maintain the air temperature and humidity at a steady level throughout the year. However, many people do not feel particularly comfortable in an artificially air-conditioned room. Even in offices with technically perfect air conditioning systems, the proportion of workers dissatisfied with the climate is quite large at over 25%. Plants in the office could offer an alternative to technical solutions, as more than 97% of the water used to feed them evaporates into the air through the leaves. Office workers surrounded by a forest of



A bundle of effects ...

If the overall effects of plants in the office was equivalent to 100%, divided into separate components they would appear as follows:

psychological effect (well-being, work satisfaction etc.)	55%
a healthy improvement to the working climate	30%
reduction in dust	8%
reduction in sound	6%
reduction of pollutants	1%

(Source: Kötter, Wellbeing)

Proven to be healthier ...

A scientific study conducted in Norway has looked at the effects of plants on the health of office workers. By adding plants the number of health complaints among the workers fell significantly:

- tiredness fell by 30%
- sore throats fell by 30%
- cough fell by 37%
- sore skin fell by 23%

(Source: Fjeld; “Reducing Health Complaints at Work”)

Short digression: on heat and humidity

The reason for the wintry “dry period” in enclosed, heated rooms is explained by the laws of physics: The more the air is heated, the more moisture it will absorb. If no additional moisture is added, the relative humidity drops. Depending on the temperature, air will absorb moisture until fully saturated. If no supplemental water is added it will use every source available to achieve saturation, including the moisture from the nasal mucus cavities and from human skin!

Useful foliage

Plants in the office

- create mental equilibrium
- create a “natural” environment
- improve work satisfaction
- boost performance
- reduce stress
- improve the office atmosphere considerably
- reduce noise levels
- filter dust from of the air
- help to eliminate pollutants from of the air
- promote feelings of well-being and health

foliage have more or less solved the problem of humidity.

The right choice of plants is important. Plants that do not grow in the winter months and require little water, or plants that never need much water at all are not really suitable. The cactus is therefore not much use in an office! On the other hand, foliage plants such as ferns, African hemp or cypress grass that need large amounts of water can raise the humidity levels as much as 10-15%, making the office atmosphere much more comfortable for its inhabitants. Studies have shown that in offices with plants, the number of days of sick absence falls by up to 3.5 days per worker. By introducing a combination of plants and artificial daylight in the radiology department at the Cancer Hospital in Oslo, absence from work dropped on average from 15% to 5,5% in short term sick leave. A study at the Nordea Bank demonstrated that office workers’ feelings of well-being increased even more significantly after plants were added to workplaces equipped with (full spectrum) fluorescent lighting, showing plants to be the decisive factor.

Literature:

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The “New Quality of Office Work” Initiative (INQA Office) was established at the ORGATEC 2002 trade fair as an independent contribution to the national INQA Initiative. The founding partners of the initiative were the Federal Association for Occupational Safety and Health (Basi), which is an amalgamation of the leading Labour and Safety and Health organisations in Germany, the Association of Office Furniture and Seating (BSO) for the manufacturing organisations, and the IG Metall in its role as social partner to the office furniture industry. www.inqa-buero.de



Federal Institute for Occupational Safety and Health is directly submitted to the Federal Ministry of Economics and Labour. The monitoring and analysis of working conditions in companies and administrations are part of this remit just as much as the development of practical solutions to problems by applying technical safety and ergonomic findings and medical methods. It is also tasked with informing the general public about topics concerning occupational safety and health and to contribute to a more heightened understanding of these topics in the perception of the general public. www.baua.de



Plants for People is an international initiative, spreading knowledge of the benefit of plants in a working environment. www.plants-for-people.org



The European Network Workplace Health Promotion (ENWHP) was established in 1996 under the strategic direction of the Federal Institute for Occupational Safety and Health with the task of disseminating and implementing the concept of Workplace Health Promotion throughout Europe. Operating under the slogan (healthy employees in healthy organisations) the ENWHP constitutes a forum to support the exchange of information and experiences of the different European participants. Over the past few years, examples of good practice have been gathered from the EU member countries and used to set up quality criteria that can be helpful when introducing workplace health promotion measures. www.enwhp.org



The Association of Office Furniture and Seating (BSO) in Düsseldorf, is an amalgamation of more than 60 enterprises which manufacture professional office furniture and office seating. It is the responsibility of the BSO Association to safeguard and promote the interests of its members regarding economic and technical matters and to provide advice and support to the members on professional issues. The BSO Association was involved in initiating and founding the “New Quality of Work” Initiative. www.buero-forum.de



The Federal Association of Office Industries represents the interests of specialist office stores and service companies ranging from stationers shops to specialists for ITK or office furnishings. www.buerowirtschaft.info

Well-being in the office? Is that not expecting too much? Isn't it sufficient just to be healthy? Well, yes if you understand health as the mere absence of illness. Complete health incorporates both physical and mental health and psychological well-being.

