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DGUV Regel 115-401

Office businesses sector

May 2018

komm mit mensch
Sicher. Gesund. Miteinander.

kommmitmensch is the national campaign of the German Social Accident Insurance (DGUV). Its purpose is to support companies in developing a culture of prevention in which all action is underpinned by safety and health. Further information at **www.kommmitmensch.de**

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Glinkastraße 40
10117 Berlin
Germany
Fon: +49 30 13001-0 (switchboard)
Fax: +49 30 13001-6132
E-Mail: info@dguv.de
Internet: www.dguv.de

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Office businesses sector

DGUV Regel 115-401 May 2018

Contents

1 What is the purpose of this rule?

What is a DGUV Rule?
This DGUV Rule supports you by describing occupational safety and health measures tailored to your sector. For this reason, it is also termed a "sectoral rule". DGUV Rules are drawn up by experts at the German Social Accident Insurance and further OSH experts. These experts are familiar with the day-to-day conditions in companies within your sector, and know where hazards exist to the safety and health of these companies' employees.

DGUV Rules assist you in applying German state OSH regulations, DGUV accident prevention regulations, standards and numerous statutory requirements in practice. They also contain a wealth of practical tips and information on implementing occupational safety and health effectively in your company. As an employer, you are at liberty to select alternative solutions; they must however assure at least the same level of safety.

For whom is this DGUV Rule intended?
This DGUV Rule addresses you in the first instance in your capacity as an employer, since you bear responsibility for the safety and health of your employees. Owing to its high practical relevance however, the DGUV Rule is also very useful to all other parties involved in your company in occupational safety and health, such as your staff/works council, OSH professionals, company physicians and safety delegates.

This DGUV Rule provides specific assistance with occupational safety and health measures relating to tasks in companies involving offices and VDU work. It covers the most important prevention measures by which the statutory safety objectives can be met in your company and for your workforce.

The Confederation of German Employers' Associations (BDA), the German United Services Trade Union (ver.di) and the Interior Business Association (IBA) were instrumental in the production of DGUV Rule 115-401, Office businesses sector.

2 Principles of occupational safety and health

2.1 Principles applicable to all sectors

Whether by the provision of supervision through OSH professionals and company physicians, the delivery of instruction and performance of risk assessments, or the assurance of first aid: any employer taking the safety and health of his or her employees into account – systematically, in all processes, and with the employees' participation – creates a sound basis for well organized occupational safety and health.

Statutory references

- German occupational health and safety act (ArbSchG)
- German occupational safety act (ASiG)
- German Ordinance on Workplaces (ArbStättV)
- German ordinance on industrial safety and health (BetrSichV)
- German ordinance on hazardous substances (GefStoffV)
- German ordinance on the use of personal protective equipment (PSA-BV)
- German Ordinance on Occupational Health Care (ArbMedVV)
- DGUV Regulation 1, Principles of Prevention
- DGUV Regulation 2, Occupational physicians and OSH professionals
- TRBS 1201, Testing of work equipment and equipment requiring supervision
- TRBS 1203 technical rules governing competent persons
- ASR V3 a.2 technical rules for workplaces
- governing barrier-free design of workplaces
- ASR A1.3 governing safety and health signage
- ASR A2.2 governing fire prevention measures
- ASR A2.3 governing escape routes and emergency exits, escape and rescue plans
- ASR A4.3 governing first-aid areas, equipment and facilities

Further information

- DGUV Informative publication 204-022 governing first aid in companies
- DGUV Informative publication 205-023 governing fire safety assistants
- DGUV Informative publication 250-010 governing aptitude tests in plant practice

As an employer in Germany, you bear responsibility under the occupational health and safety act for the safety and health of your company's employees. There are numerous other good reasons however for devoting attention to occupational safety and health in your business. Employees who work in a safe and healthy environment are for example not only less frequently ill, but also work with greater commitment and motivation. Investments in occupational safety and health have also been shown to yield a financial return for companies.

The German Social Accident Insurance supports you in implementing occupational safety and health in your company. The first step is to implement basic prevention measures. These are described on the following pages. They constitute a sound foundation for well-organized occupational safety and health and set the course for further important prevention measures in your company.

Responsibility and assignment of tasks

Responsibility for your employees' safety and health lies with you, the employer. You must therefore organize work in your company in such a way that hazards to life and health are avoided wherever possible and the stress upon your employees does not exceed the limits of their personal performance.

You may assign this task in writing to other reliable and skilled persons within your company; you are however obliged to check regularly that these persons are performing their duties satisfactorily. If necessary, set out measures for improvement. Following an occupational accident or the incidence of an occupational disease, in particular, the causes must be determined and the occupational safety and health measures adapted.

Supervision by occupational physicians and OSH professionals

You are supported in the creation of safe and healthy workplaces by the OSH professionals and occupational physicians, and by your accident insurance institution. DGUV Regulation 2 sets out the scope of supervision by OSH professionals and occupational physicians that you are required to implement.

Safety delegates

Should your company employ over 20 people, you must also appoint safety delegates. Safety delegates are employees of your company who support you in improving occupational safety and health in your company. They volunteer for this task and complete it parallel to their main functions within the company. Their function involves, for example, ensuring that safeguards and protective equipment are in place, and drawing their colleagues' attention to behaviour that is dangerous or presents a health risk. In the process, they provide you with reliable information on how you can improve occupational safety and health.

Skills in occupational safety and health

For occupational safety and health measures to be effective, sound knowledge is required. Ensure therefore that all persons in your company who are entrusted with OSH tasks are adequately skilled. Provide these individuals with the opportunity to attend initial and further training measures. The German Social Accident Insurance Institutions and their umbrella association, the DGUV, provide a wide range of suitable seminars and initial and further training courses.

Assessment and documentation of work conditions (risk assessment)

In order for people to be protected against hazards to safety and health at the workplace, the hazards actually arising must be identified. One of the most important tasks of occupational safety is therefore assessment of the working conditions, or "risk assessment". The purpose of a risk assessment is to determine possible hazards to the safety and health of your employees at each workplace within your company, and to set out measures for eliminating these hazards. At the same time, assess both the physical and mental stresses upon your employees. Observe statutory constraints and prohibitions upon employment, such as those applicable to young people and pregnant and nursing women, particularly with regard to heavy physical work and work involving hazardous substances. Hazards must in the first instance be eliminated or reduced at source. Where this is not (entirely) possible, you must take protective measures in accordance with the T-O-P principle. This means that you must first determine and implement technical (T), then organizational (O), and only then personal (P) measures. By documenting the risk assessment you have performed, you not only meet your statutory obligation to do so, but also create an overview of occupational safety and health measures taken in your company. This enables developments to be understood and the efficacy of measures to be demonstrated.

Occupational medical measures

Occupational medical prevention activity is an indispensable component of occupational safety and health within your company. It includes involving the occupational physician in the risk assessment, general consulting on occupational medicine, and the conducting of preventive occupational medical care including the provision of occupational medical advice to employees on a one-to-one basis. Should preventive medical care reveal a need for specific measures to be taken in the interests of occupational safety and health, you must initiate these measures for the employees concerned.

Instruction

Your employees are able to work safely and without risk to their health only when they are familiar with the hazards at their workplaces, their duties with regard to occupational safety and health, the measures to be taken and the company rules. These rules include company procedures. It is therefore important that your employees receive instruction, ideally directly at their workplaces. You may provide instruction yourself, or assign the task to a reliable and skilled person. Should you employ personnel from temporary employment agencies, you must provide them with the same instruction you provide to your own staff. The occupational physician and/or OSH professional can support you in this task. Instruction must be provided at least once a year, and must be documented. Young people must receive instruction at

intervals of six months. You must also ensure that your employees receive instruction:

- Before beginning a task
- When they are assigned to a different task
- In the event of changes in their area of activity and changes in the working processes.

Access to rules and regulations

Make all relevant state rules and regulations and DGUV accident prevention regulations available at a suitable location to all persons in your company. By doing so, you not only ensure that your employees are informed of the necessary prevention measures, but also demonstrate that you take occupational safety and health seriously. Your accident insurance institution is available to answer any questions you may have concerning the rules and regulations.

Fire safety and emergency measures

You and your employees must be able to act quickly and purposefully in the event of an emergency. Organization of company fire safety and preparation for other emergency measures, such as orderly evacuation of your workplace, therefore also form part of the safety and health of workers at work. For this reason, train as many employees as possible as fire safety assistants. A recommended figure is at least five percent of your workforce. Appointment of an employee as a fire safety officer is also advisable. This pays off in the event of an emergency. In order for fires to be fought effectively when they arise, you must install suitable fire extinguishing equipment on your premises such as portable fire extinguishers, and familiarize all employees with its use by providing regular instruction.

First aid

Organization of first aid in your company is one of your basic duties. "First aid" covers all measures required in the event of accidents, acute illnesses, poisoning and other emergencies before the arrival of the emergency services or a doctor. Examples of these measures are: safeguarding the accident location, taking accident victims out of acute danger, alerting emergency services, taking immediate lifesaving measures, and providing support for affected individuals. The basic requirement for first-aid materials is covered by the "small" and "large" first-aid boxes to DIN 13157 and DIN 13169 respectively. Hazards specific to the company may necessitate supplementary materials.

Your company must have a sufficient number of first-aiders. The required number depends upon the number of employees in your company. Any employee may assume this task. A requirement is successful completion of further training in first-aid and regular refresher courses every two years. The course fees are paid by the German Social Accident Insurance Institutions. You must also ensure that sufficient first-aiders are also present during shifts and holiday periods.

How many first-aiders?

When between 2 and 20 insured individuals are present	One first-aider
When over 20 insured individuals are present	
a) In administration and trade businesses	5 %
b) In other businesses	10 %
c) In children's day-care facilities	One first-aider per children's group
d) In institutes of higher education	10 % of the insured individuals in accordance with Section 2 (1) No 1 of the German Social Code, Volume VII

Regular checks of work equipment

Damaged work equipment may cause accidents. The work equipment used in your company must therefore be inspected regularly, and depending upon the type, also tested. Before an item of work equipment is used, it must be inspected visually and checked, if necessary by a function check, for evident faults that can be determined swiftly in this way. Besides these checks, you must ensure that regular tests are performed at appropriate intervals. How these checks and tests are to be performed, by whom and at what intervals is described in the TRBS 1201 and TRBS 1203 technical rules (refer to the information box, "Statutory references"). In a company working only a single shift, a test interval of one year has proved effective for many items of work equipment. The results of the tests must be retained at least until the following test.

Planning and procurement

Considering the topic of safety and health in all company processes from the outset is a strategy that pays off. Giving consideration to your employees' safety and health even as you are planning workplaces and installations and when procuring work equipment and materials saves you from having to make improvements, which may be expensive, at a later stage.

Accessibility

Design your company's work rooms such that they are accessible to disabled persons. Accessibility benefits not only your employees with disabilities, but the entire workforce. Adequately wide walking areas, sanitary fittings, light switches and handles that are within easy reach, and non-slip floor coverings for example can reduce the risk of accidents and considerably reduce stress and strain.

Workplace health

Health is the most important precondition for your employees to remain fit for and capable of work through to the statutory retirement age. Measures taken at an early stage to reduce work-related physical and mental stresses have a double dividend – for the employees themselves, and for the company. These measures include the design of safe and healthy workplaces, and corporate integration management. The enhancing of health-conscious behaviour among your employees and the creation of working conditions conducive to good health also have a positive impact. Consider that your employees themselves often know best what affects them adversely at work. For this reason, involve them when considering measures for improvement. This also motivates them.

External companies, suppliers, and assignment of your employees to work at the sites of other companies

Do personnel from external companies and suppliers access your company premises? This could also be a source of hazard. Make the necessary arrangements and ensure that these persons are also familiar with and observe your company's workplace safety measures.

Should you or your employees work at the premises of other companies, the same applies in reverse: agree aspects of occupational safety and health with the companies on whose sites your employees are working.

Integration of employees with temporary work contracts

The OSH requirements in your company apply to all employees, including those working there only temporarily, such as temping and work experience personnel. Ensure that these persons are also covered by your workplace safety and health measures.

General information

- Database of regulations, rules, and informative publications of the German Social Accident Insurance:
  ▸ www.dguv.de/publikationen
- DGUV Prevention Competence Network:
  ▸ www.dguv.de (Webcode: d36139)
- Biological and hazardous substances database of the German Social Accident Insurance (GESTIS):
  ▸ www.dguv.de (Webcode: d3380)
- German occupational health and safety act and ordinances:
  ▸ www.gesetze-im-internet.de
- Technical rules pursuant to the occupational health and safety ordinances:
  ▸ www.baua.de

2.2 Principles applicable to the office businesses sector

§ Statutory references

Rights to co-determination
- German works council constitution act (BetrVG)
- German federal personnel representation act (BPersVG)
- Personnel representation acts of the German regional governments
- Section 176 of the German Social Code, Volume 9 (SGB IX), reintegration and participation of persons with disabilities

Cleaning and hygiene
- Section 4 of the German occupational health and safety act (ArbSchG)
- Sections 4 to 8 and 14 of the German ordinance on hazardous substances (GefStoffV)
- Section 2 of DGUV Regulation 1, Principles of Prevention

Preventive occupational medical care
- Section 6 of the German working hours act (ArbZG)
- Section 3 of the Ordinance on Occupational Health Care (ArbMedVV) in conjunction with the annex governing mandatory and on-request preventive occupational medical care, Part 4 (2)
- Notification of recommendations of occupational medical rules (AMRs) No 2.1, intervals for the instigation/offer of preventive occupational medical care
- Notification of recommendations of occupational medical rules (AMRs) No 5.1, requirements governing the offer of preventive occupational medical care
- Notification of recommendations of occupational medical rules (AMRs) No 14.1, appropriate examination of the eyes and vision

Breaks from VDU work
- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) No 6.1

Accessible work equipment
- Section 4 of the German disability discrimination and general equal treatment act (BGG)
- Section 4 of the German accessible information technology ordinance (BITV 2.0)

Employee representative body

Should your company have a works or staff council, you are obliged to involve it in many issues relating to occupational safety and health. The general tasks of the works or staff council include monitoring observance of the regulations in force for the protection of employees, and also the promotion of occupational safety and health measures. All occupational safety and health measures are covered by the rights of participation and co-determination.

It may be constructive for the works or staff council, employee representatives and/or the severely disabled employees' representative to be informed of and involved in many occupational safety and health issues at an early stage.

Cleaning

Regular cleaning work is doubtless a given in your company. Are you aware that cleaning agents may also contain hazardous substances? Cleaning agents frequently contain solvents, acids or alkalis. Ensure therefore that wherever possible, cleaning agents are used that do not contain hazardous substances. Should you outsource cleaning work, agree this requirement with the service provider.

Important information on the ingredients of cleaning agents and the hazards that they may present can be found in the safety data sheets of the products concerned. The products' manufacturers are required to make these safety data sheets available. The safety data sheets contain information on use of the cleaning agents and contact with them, and on measures to be taken to prevent hazards. They serve as an important resource for the generation of plant procedures and the provision of instruction to employees.

Note: Many safety data sheets and further resources (including for cleaning agents) are available in the Wingis online database.

▸ www.wingis-online.de

Ensure that cleaning agents are not stored together with foods (for example the descaler on the shelf next to the sugar and coffee in the break room). Cleaning agents must be stored such that only the persons tasked with cleaning work have access to them. They must be stored in closed containers. If at all possible, the original containers or original packaging should be used. Containers must not be used that could be confused with those for other substances or products owing to their shape or marking.

Have the electrical equipment used for cleaning work (e.g. vacuum cleaners) checked regularly to ensure its safe condition and electrical safety.

Cleaning of work equipment, hygiene

All work equipment should be cleaned regularly. Observe the manufacturer's cleaning instructions and ensure that the cleaning agents used are not harmful to the skin.

The sharing of keyboards, mice or headsets by several persons may cause pathogens to be transmitted between them.

Wherever possible, provide individual employees with work equipment for their use alone. If workstations are used by several persons, the workstation must enable a different keyboard, mouse and headset to be substituted quickly. Alternatively, ensure that the work equipment is cleaned more frequently, ideally at the beginning or end of the working shift.

Preventive occupational medical care

Office workers typically work at VDU workstations. You must offer these employees optional preventive occupational medical care at regular intervals. This care always includes a consultation with a physician and, if desired by the employee, an eye test.

You must also enable your employees to request preventive medical consultations in the event that they suspect a connection between health complaints and their work. You must comply with such requests, unless evaluation of the working conditions and the protective measures in place enable the risk of harm to health to be ruled out.

The results of the occupational medical consultations are made available only to the employee. The employee in turn decides whether this information is made available to other parties.

Breaks – interruption of VDU work

FIn order for office work to be productive and healthy, tasks at a VDU station should ideally be organized such that they are regularly punctuated by other tasks or by rest breaks. The requirement for VDU work to be interrupted regularly by discrete tasks that do not need to be performed at the screen is met by the concept of mixed work. In this concept, different tasks with different requirements are combined, as a result of which imbalanced stresses are avoided. This particularly concerns stresses upon the locomotor apparatus, the eyes and the mind.

During office work, attention should be paid to varying the body posture.

Should alternation between discrete tasks associated with different stresses not be possible, the employees should be able to punctuate their daily work at the VDU station with regular, brief breaks.

Several shorter rest breaks are more conducive to recuperation than fewer, longer rest breaks of the same total duration. Merging of the rest breaks or saving them up in order to shorten the working day negates the recuperative effect and must therefore be avoided. It is advantageous for exercise to be performed within the rest periods.

Rest periods of at least 5 minutes per hour have proved effective in practice.

Accessible work equipment

Facilities, products and software must be accessible if they are also to be used independently by persons with disabilities. "Accessible" in this context also has the meaning of "universally usable". In other words, accessible solutions are not dedicated solutions for persons with disabilities, but an extended usage concept that wherever possible includes all target groups. For example, the software used in your office should permit adaptation to the needs (e.g. contrast, display size, form of information display) of the broadest possible potential user group.

Information processing systems, acoustic and visual sources of information and communications facilities are accessible when they can be reached, accessed and used by persons with disabilities in the normal way, without particular difficulty, and without requiring assistance from other parties.

Definition of accessibility (paraphrased) in accordance with the German disability discrimination and general equal treatment act (BGG), Section 4

The GS mark demonstrates compliance with the minimum safety and ergonomics requirements and serves as a reference during procurement. Always procure work equipment bearing the GS mark and obtain the associated certificate.

Monitors, keyboards, mice, and also office furniture and lights are examples of work equipment in this context.

Protection of non-smokers

Tobacco smoke contains a numerous substances many of which are classified unequivocally as carcinogenic. As an employer, you therefore have a duty to protect your non-smoking employees effectively at workplaces against the health hazards of tobacco smoke. You can meet your duty of protection by means of structural, technical or organizational measures. Smokers and non-smokers may for example be separated, smoking zones created, or ventilation measures implemented. You can also impose a general smoking ban. Observe the workers' representation's right of co-determination where applicable. No obligation exists to ensure that smokers may smoke unhindered. It is advantageous for such measures to be combined with campaigns to encourage giving up smoking.

Consider fire safety when setting up a smoking zone. Provide suitable, fireproof and ideally self-extinguishing ashtrays. Ensure that ashtrays are emptied into suitable receptacles. Smoking zones must be kept free of any flammable materials.

3 Workplaces and tasks: hazards and measures

3.1 Work organization and management

By organizing work carefully, you create the conditions for smooth and effective interaction between human beings, technology, information flows and organizational units within your company. During the design of work and performance of the risk assessment, pay particular attention to work content, work procedures, and social interaction.

Statutory references

- Section 5 of the German occupational health and safety act (ArbSchG)
- Sections 3 to 7 of the German working hours act (ArbZG)
- Section 3 of the German Ordinance on Workplaces (ArbStättV)
- Sections 3 and 4 of DGUV Regulation 1, Principles of Prevention

Hazards

Hazards to your employees arise primarily through:

- Unfavourable design of psychosocial working conditions
- Unclear or contradictory requirements, particularly when tasks, responsibilities and the scope of authority are not clearly defined (e.g. unjust distribution of tasks, opaque evaluation criteria)
- Work procedures that are highly labour-intensive and allow employees little control over timing and content
- Incomplete work tasks and lack of variation between tasks
- Overload and underload, unsuitable skills
- Inadequate working time arrangements or cover arrangements for absent employees
- Poor communication and cooperation (e.g. a lack of discussion and poor social support between employees, lack of trust, competition pressure, conflicts)
- Poor appreciation of employees and absence of feedback
- Limited opportunities for career progression, development and change, leading to demotivation, absenteeism and high staff turnover

These phenomena may increase the risk to employees of the following effects of strain and health impairments:

- A sense of monotony and satiation
- Stress and mental fatigue

- Workplaces and tasks: hazards and measures
- Forms of mental disorder (depressive disorders, anxiety disorders)
- Disorders of the locomotor apparatus
- Cardiovascular disorders

Measures

Measures relating to the work task and work content

- Ensure clarity by setting out and describing tasks, functions and responsibilities for your employees unambiguously in the form of job and function descriptions and organizational charts. Give consideration to cover arrangements for absent employees.
- Grant your employees freedom to manage tasks in their own time by promoting an independent and forward-thinking approach to work, for example by allowing them to plan processes themselves. Grant your employees freedom to define the content of their work.
- Ensure that work tasks are assigned integrally, i.e. that employees are able to prepare, organize and monitor entire tasks themselves.
- Aim to reduce the proportion of time spent on monotonous tasks, for example by diversifying tasks.
- Where employees hold substantial responsibility, ensure that they enjoy appropriate social and organizational support. Where work entails little responsibility, consider transferring tasks and responsibility to the employees.
- Provide your employees with the information they need in good time, and involve them in the process of work organization.
- Organize work such that your employees are able to complete the specified volume of work within their normal working hours. In this context, take account of delays caused for example by failures or technical outages.
- Involve your employees in determining the arrangements for working hours, and ensure that both company and private interests are considered.

Measures relating to communication, cooperation and social interaction

- Put clear rules and structures in place for communication.
- Conduct regular group and team discussions. Address the subject of cooperation and the background to procedures and processes within your company.
- Promote an atmosphere of mutual esteem among your employees by addressing conflicts swiftly, offering training, and if appropriate drawing up guidelines for good cooperation.
- Facilitate discussion and mutual support between employees.
- Create clear arrangements for the handling of situations that lead to emotional stress, for example contact with difficult customers.
- Facilitate discussion between departments. An understanding of the tasks and functions of upstream and downstream company units can assist in reducing misunderstandings and enhancing efficiency.
- Ensure that your employees receive regular constructive feedback from their superiors over and beyond mere discussions.
- Determine your employees' need for training and organize suitable training measures.

Health-conscious behaviour begins with your own.

- Be aware: give conscious consideration to your own health and risks to it.
- Acquaint yourself with behaviour conducive to good health, and adopt it.
- Apply your knowledge to the employees in your company.

Further information

- GDA-Arbeitsprogramm Psyche (eds.): Arbeitsschutz in der Praxis. Empfehlungen zur Umsetzung der Gefährdungsbeurteilung psychischer Belastung (recommendations for assessment of mental stress). Berlin, 2016
- VBG (eds.): Gesund und erfolgreich führen.
- Informationen für Führungskräfte (= VBG-Fachwissen, Version 1.0/2013-04, healthy and successful management). Hamburg
- DGUV (eds.): Fachkonzept: Führung und psychische Gesundheit (management and mental health). Berlin, 2014
- VBG (eds.): Gefährdungsbeurteilung psychischer Belastung. Handlungshilfe für die betriebliche Praxis (= VBG-Fachwissen, Version 1.0/2015-05; risk assessment of mental stress). Hamburg.
- EN 614, Safety of machinery – Ergonomic design principles – Part 2, Interactions between the design of machinery and work tasks, date of publication: 2008-12

3.2 Workplaces

How do your employees reach their workplaces safely? What happens when a fire breaks out or some other emergency situation arises? How is the building evacuated? This chapter provides you with general information on the workplace at which the offices of your company are located.

Statutory references

- Sections 3, 6 and 15 to 17 of the German ordinance on industrial safety and health (BetrSichV) in conjunction with Annex 1 concerning special regulations for particular items of work equipment and Annex 2 concerning test regulations for installations requiring regular inspection, Section 2, elevator installations
- Sections 3 to 4 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 1 to 3
- TRBS 3121 technical rules for industrial safety and health, operation of elevator installations
- ASR A1.5/1,2 technical rules for workplaces, floors
- ASR A1.6 technical rules for workplaces, windows, skylights, translucent walls
- ASR A1.7 technical rules for workplaces, doors and gates
- ASR A1.8 technical rules for workplaces, circulation routes
- ASR A2.1 technical rules for workplaces, protection against falls from a height and from falling objects, entry to hazard areas
- ASR A2.2 technical rules for workplaces, measures to prevent fire
- ASR A2.3 technical rules for workplaces, escape routes and emergency exits, escape and rescue plans
- ASR V3 a.2 technical rules for workplaces, accessible design of workplaces

Hazards

Your employees may be exposed to a variety of hazards:

- Falling, tripping and slipping, for example on steps, damaged or constrained circulation routes, and smooth or damp floors
- Pinch hazards on power doors and gates, such as entrance or elevator doors
- Entrapment in elevators
- Burns or suffocation in the event of a fire
- Falls, for example from (half-)landings and balconies
- Bumping into glazed areas
- Cutting on glass after glazing breakage

Measures

- Ensure that space is not constrained in circulation routes in the building, for example by chairs or works of art.
- Check for visible damage to floor coverings and steps (such as loose carpet tiles, broken-off edges of steps). Instruct your employees to report damage. Inform your landlord should you not be able to commission the repair yourself, and ensure that the repairs are actually carried out.
- Check that the floor coverings in the building exhibit adequate slip resistance. Request the corresponding documentation (Table 1).
- Prevent moisture from entering the building, for example by means of an adequately dimensioned floor mat in the entrance area.

Table 1 Slip resistance and displacement volume of floor coverings (excerpt from ASR A1.5/1,2 Annex 2)

Work rooms and areas and circulation routes in work premises	Slipping risk assessment group (R group)	Displacement volume with code for the minimum volume
Entrance areas, indoor	R 9	
Entrance areas, outdoor	R 11 oder R 10	V 4
Steps, indoor	R 9	
Steps, outdoor	R 11 oder R 10	V 4
Ramps, indoor (e.g. wheelchair ramps, gradients between differing floor heights, transport routes)	One R group higher than that required for the entrance floor covering	V (volume) value of the entrance floor covering, if applicable
Toilets	R 9	
Changing rooms and washrooms	R 10	
Break rooms (e.g. staff rooms, staff canteens)	R 9	
First-aid areas and similar facilities (see ASR A4.3)	R 9	
Office kitchens	R 10	
Paths	R 11 oder R 10	V 4
Ramps (e.g. for wheelchairs)	R 12 oder R 11	V 4
Garages, high-rise and underground car parks not exposed to the elements	R 10	
(pedestrian areas in which a risk of slipping, e.g. caused by moisture, does not arise)	R 11 oder R 10	V 4
Garages, high-rise and underground car parks exposed to the elements	R 11 oder R 10	V 4
Outdoor parking areas		

Note that floor coverings with substantial differences in their slip resistance can present a trip and slip hazard for your employees. For this reason, the slip resistance of the floor coverings of adjacent floors should not differ by more than one R group (Table 1).

- Inform your employees how the alarm will be raised in the event of a fire or other emergency situation. Use an escape and rescue plan should it exist.

Should the escape and rescue routes in your office areas or within the building be complex (for example via intermediate storeys, through larger rooms, involving changes in direction or routes deviating from the normal circulation routes) or people unfamiliar with the site (e.g. visitors, temporary employees) frequently be present in your office premises, an escape and rescue plan must be in place.

- Check that suitable railings or parapets are present at points where a risk of falling exists (e.g. on balconies, flights of stairs or landings) (Table 2). If necessary, have adaptation work carried out.

Table 2 Heights of railings and parapets

Fall height	Height of railing or parapet
From 1 m to 12 m	At least 1 m; parapets may be reduced to a height of 0.80 m when at least 0.20 m in depth
Over 12 m	At least 1.10 m

Elevators

- Ensure that elevators are inspected regularly. A notice stating when the next inspection of the elevator is to be performed and by whom it was last inspected must be posted inside the elevator (e.g. in the form of an inspection plate).

- Determine how persons trapped within an elevator can be rescued from it. An emergency call facility must be present in the elevator, and the name and telephone number of the service provider or person responsible for rescue from the elevator must be posted at least at the main access point to the elevator.

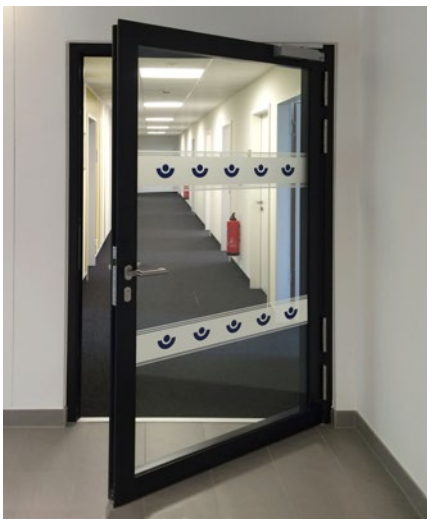


Figure 1
Glazed area with marking at eye level also suitable for disabled persons.

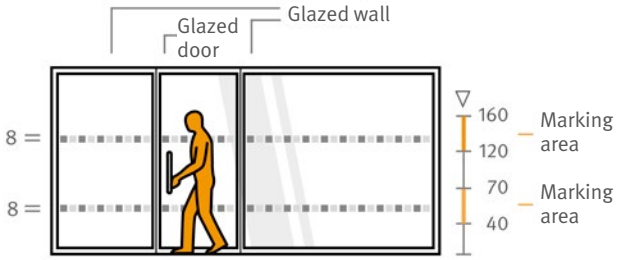


Figure 2 Markings on fully glazed areas

In the interests of accessible building design, doors and increasingly also windows are now being equipped with electric power drives. In order to protect employees against injury, these doors and windows are equipped with safety systems. Ensure that these systems are checked regularly in the interests of safe operation.

Glazed areas

- Where a risk exists of persons walking into transparent glass areas and doors, ensure that they are marked at eye level. Ensure that your employees cannot be injured by shattering of the glass areas. Measures to prevent this include shatterproof materials, suitable screening or shatter protection film.

Observe the additional requirements of persons with disabilities at your workplace, such as the raising of alarms for persons with impaired hearing.

Further information

- VBG (eds.): Arbeitsstätten sicher planen und gestalten (= VBG-Fachwissen; Version 3.1/2015-01; safe planning and design of workplaces), Hamburg.

3.2.1 Lighting

The lighting provided in offices must be suitable for the type of visual task performed and adapted to the vision of your employees. This is essential in order for work to be performed at VDU workstations without giving rise to disorders. The concentration and well being of employees is influenced substantially by the lighting and the incidence of daylight.

§ Statutory references

- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 3.4 and 6.1
- ASR A3.4 technical rules for workplaces, lighting
- ASR A3.4/3 technical rules for workplaces, safety lighting, visual emergency wayfinding systems

i Further information

- DGUV Informative publication 215-210, natural and artificial lighting of workplaces
- DGUV Informative publication 215-211, daylight at the workplace, performance-enhancing and healthy (formerly BGI/GUV-I 7007)
- DGUV Informative publication 215-442, lighting in offices, assistance in planning of artificial lighting in office areas (formerly BGI 856)
- DGUV Informative publication 215-444, protection against sunlight in offices (formerly BGI 827)
- DIN 5035, Artificial lighting – Part 8: Workplace luminaries – Requirements, recommendations and proofing, date of publication: 2007-07
- EN 12464, Light and lighting – Lighting of work places – Part 1: Indoor work places, date of publication: 2011-08

Hazards

Possible hazards are:
- Visual stress caused by inadequate illumination (for example owing to insufficient illuminance or to glare or reflection)
- Insufficient daylight
- Failure to recognize danger zones owing to poor lighting

The effects upon your employees may for example include:
- Headaches
- Burning and running eyes
- Visual snow
- Tension
- Premature fatigue
- Concentration and sleep disorders
- Injury caused by falls, slips or collision

Measures

Ergonomic office lighting enhances the performance and health of your employees.
- Ensure that wherever possible, work rooms have sufficient daylight and visual contact with the outdoor environment. Daylight has a positive influence upon human well being and performance.

Workplaces receive adequate daylight when for example the ratio of the translucent area of the room envelope to the room floor area is at least 1:10.
- Ensure adequate and homogeneous illumination without major differences between light and dark areas at the workplaces.
- Ensure that work surfaces, desks and screens are free of disturbing reflections and glare, for example by the use of suitable work equipment, organization of the workplaces with the line of sight parallel to glazed walls, and if applicable the use of sun blinds.
- Observe the minimum illuminance values and have the values checked if necessary (Table 3). Take account of the fact that demanding visual tasks and older employees both require more light (e.g. 750 lux rather than 500 lux).

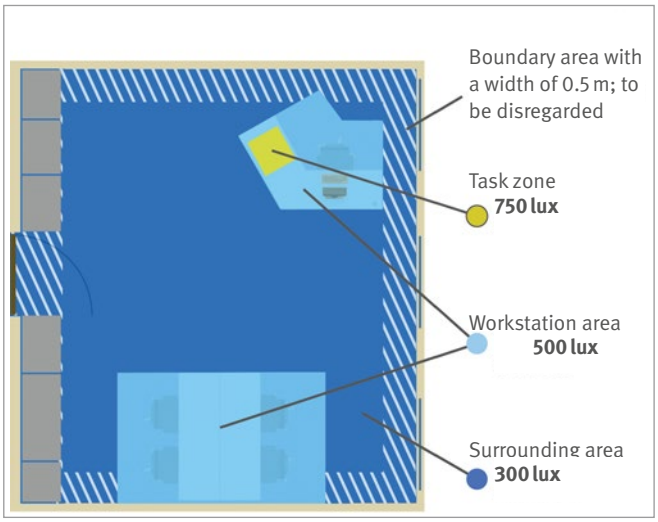


Figure 3 Task zone lighting

Table 3 Minimum illuminance values with reference to ASR 3.4, Annex 1

Writing, reading, VDU work, first-aid areas	500 lux
Technical drawing (drawing by hand)	750 lux
Area surrounding the VDU workplace, filing, copying, reception desk	300 lux
Circulation areas and corridors	50 lux
Circulation areas and corridors at landings and steps	100 lux
Filing rooms, break rooms, office kitchen, toilets	200 lux

- Use ceiling, hanging and if appropriate supplementary wall lamps to ensure glare-free background lighting. The use of desk or standing lamps alone is not sufficient.
- For particularly demanding visual tasks, increase the illuminance on a minimum area of 600 mm × 600 mm to at least 750 lux (Figure 3), for example by means of a suitable desk lamp.
- Avoid glare by the use of non-glare lamps with a UGR value no greater than 19.

- Wherever possible, ensure that the incidence of light upon the workstations is from the side and does not throw intrusive shadows upon the work surface.
- In particular, direct luminaires should not be located directly above employees' heads.

The best choice of artificial light source is ceiling lighting by means of fluorescent lamps or LEDs. LEDs have a lower power consumption, longer life, provide 100 % homogeneous lighting as soon as they are switched on, and do not require an electrical ballast or lamp starter.

- Observe the recommended brightness (reflectance) levels of the ceilings, walls and floors.
- Ensure that no sources of glare (e.g. windows, reflecting furniture surfaces) are present in the main direction of sight.
- Avoid major differences in brightness (maximum differences in luminance: 3:1 at the workstation, 10:1 in the surrounding area), which is a cause of eye stress.
- Only use lamps of the same colour temperature within a room. Colour temperatures of 3,300 K to 5,300 K are recommended for standard lighting in offices.
- Many work tasks, and your employees' well being, require good colour rendering by the lamps (colour rendering index Ra of at least 80). This also ensures that the colours of safety symbols are not distorted.
- Have your lighting system cleaned regularly and the lamps replaced if necessary. Avoid flickering and other faults caused for example by faulty lighting equipment. Always have the maintenance and repair of lighting equipment performed by skilled persons.
- Give consideration to the safety lighting on rescue routes and also have it checked regularly.

3.2.2 Climate

A comfortable room climate has a major influence upon the performance and well being of employees in your company. This section describes the values to be implemented for climatic factors such as atmospheric temperature, atmospheric humidity, air movement and thermal radiation in order for your employees to perceive the room climate as comfortable.

§ Statutory references

- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 3 and 6.1
- ASR A1.5/1,2 technical rules for workplaces, floors
- ASR A3.5 technical rules for workplaces, room temperature
- ASR A3.6 technical rules for workplaces, ventilation

i Further information

- DGUV Informative publication 215-510, evaluation of the room climate (formerly BGI/GUV-I 7003)
- DGUV Informative publication 215-520, climate in the office, frequently asked questions (formerly BGI/GUV-I 7004)
- DGUV Informative publication 215-444, protection against sunlight in offices (formerly BGI 827)

Hazards

Your employees face the following hazards:

- Excessively high or low atmospheric temperature in the room
- Disturbed well-being, deteriorating concentration and performance, for example owing to an uncomfortable room climate, high CO_2 concentration where ventilation is inadequate
- Local cooling of the body owing to draughts or cold surfaces (for example in the shoulder and neck region, back, feet)
- Exposure to mould and bacteria, for example owing to high atmospheric humidity in combination with inadequate ventilation, poor maintenance of HEVAC installations

Measures

Thermal insulation

- Ensure that floors, walls and ceilings are insulated against heat and cold, in order for your employees to be adequately protected against adverse heat sinking and input.

Ventilation

- Ensure that the rooms of your premises are primarily naturally ventilated through windows. Studies show that fewer complaints arise when natural ventilation is provided through open windows compared to air-conditioned rooms.
- Ventilate regularly (by briefly opening all windows wide). This prevents the carbon dioxide content of the room atmosphere from exceeding a value of 1,000 ppm.
- Ensure that HEVAC installations are properly cleaned, maintained and if necessary repaired at regular intervals.
- Measure the air velocity in the room: for a normal seated task and at an atmospheric temperature of 20 °C, the air velocity at the workplace should not exceed a value of 0.15 m/s. At higher atmospheric temperatures, your employees may find higher air velocities pleasant.

Atmospheric humidity

When rooms are ventilated through open windows, the relative atmospheric humidity is determined by the air replacement. Additional humidification of the room air is not recommended, for health-related reasons. It is important for your employees to consume sufficient fluids.
HEVAC installations employing humidifiers should be designed to produce a maximum relative atmospheric humidity of 50 %. Excessively high atmospheric humidity favours the formation of mould.

Atmospheric temperature in work rooms

- Ensure an appropriate atmospheric temperature in your work rooms. Where your employees are engaged in seated tasks (for example in offices), the atmospheric temperature should be at least 20 °C. An atmospheric temperature of up to 22 °C is recommended. Should your employees perform moderately strenuous work standing or walking (for example in stores and filing rooms), an atmospheric temperature of at least 17 °C should be attained.
- At outdoor temperatures of up to 26 °C, the atmospheric temperature in the office should also not exceed 26 °C. To ensure this, take suitable measures if necessary to reduce the atmospheric temperature (refer to Table 4).
- Fit suitable sun blinds (ideally externally) to windows, skylights and glazed walls in order to prevent solar radiation from heating the rooms excessively.
- Prevent intrusive solar radiation acting directly upon the workstations.

Subjective well being

Subjective well being may vary widely between individuals. It is dependent upon such factors as the sex of the individual, level of activity, age, clothing, and length of time spent in the room. It is subject to variation over the day and between the seasons.

Table 4 Measures appropriate to the atmospheric temperatures in the room (with reference to ASR A3.5, room temperatures)

Temperature range	Measures
Up to 26 °C	• No additional measures required
From 26 °C to 30 °C Measures are recommended	• Effective control of sun blinds • Effective control of the ventilation equipment • Ventilation in the early morning hours • Reduction of thermal loads • Use of flexitime arrangements to extend the working hours • Easing of the work dress code • Provision of suitable beverages
From 30 °C to 35 °C Measures are mandatory	
35 °C and above	• The work room is not usable as such without technical measures (such as air curtains) and organizational measures (such as a thermal acclimatization phase).

Figure 4 Overview of room climate factors in a work room

3.2.3 Noise and acoustics

Conversations between colleagues, telephone calls, or a meeting of a different working group in the same office: there are all scenarios that can create acoustic stress for the employees in your company. To these are added noise emanating for example from printers, air-conditioning equipment, or traffic noise. Good room acoustics reduce these disturbances.

§ Statutory references

- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) No 3.7
- Sections 3, 6 and 7 of the German noise and vibration ordinance (LärmVibrationsArbSchV)
- ASR A3.7 technical rules for workplaces, noise

i Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)
- DGUV Informative publication 215-443, acoustics in offices – assistance in the acoustic design of offices (formerly BGI 5141)
- DIN 45645, Determination of rating levels from measurement data – Part 2: Determination of the noise rating level for occupational activities at the work place for the level range underneath the given risk of hearing damage, date of publication: 2012-09
- DIN 18041, Acoustic quality in rooms – Specifications and instructions for the room acoustic design, date of publication: 2016-03

Hazards

Your employees face the following hazards:

- Physiological responses (e.g. elevated release of stress hormones, increase in blood pressure and heart rate)
- Mental responses (e.g. annoyance, impaired concentration)
- Permanent damage to hearing owing to high noise stress during telephone calls, in particular when a headset is used

Ensure that the sound assessment level is also kept as low as possible in the other rooms in consideration of the tasks performed. The values stated in Table 5 should not be exceeded.

Measures

Work equipment

- Select low-noise work equipment (e.g. shredders, vacuum cleaners, coffee makers) at the procurement stage.
- Prevent intrusive noise, for example from printers, photocopiers, shredders or fax machines, by locating these items of equipment in dedicated equipment rooms.
- Procure headsets with noise level limiters in order to prevent the daily noise exposure level from exceeding 80 dB(A).

Headsets should feature noise level limitation in order to limit the transmitted signals to a harmless noise level (peak level of 118 dB(A)). Your employees should be able to adjust the volume according to their own requirements and the situation (e.g. a bad telephone line, a person speaking loudly).

Influencing of the room acoustics

Lombard effect

A high background noise level leads to your employees speaking louder and louder and the noise level in the room increasing even further as a result (Lombard effect). The reverse effect also occurs: if background noise is reduced by room acoustic measures, your employees speak more softly and the noise exposure decreases further still.

Table 5 Sound assessment levels for various tasks

Sound assessment level	Characteristics of the task, e.g.:	Examples
≤ 55 dB(A)	• High concentration • Creative thinking • Decision-making • Problem-solving • High speech comprehensibility	• Scientific and creative work • Software development • Design, translation, dictation • Recording and correction of difficult texts • Call centre tasks
55 – 70 dB(A)	• Medium concentration • Similar, recurring tasks/work content • Easily completed tasks • Speech comprehensibility required for the purpose of communication	• Tasks involving contact with the public • Work in filing rooms, stores, equipment rooms
70 – 80 dB(A)	• Low concentration • High routine component • Low requirements concerning speech comprehensibility	• Cleaning work involving a vacuum cleaner or high-pressure cleaner • Janitor's work

Ensure that your employees do not disturb each other with their telephone calls and conversations. Ensure that at workplaces at which primarily mental tasks are performed, the sound assessment level does not exceed 55 dB(A) and the reverberation time does not exceed 0.6 seconds in shared and open-plan offices and 0.8 seconds in offices occupied by one or two people. Take the following measures for this purpose:

- Clad large sound-reflecting surfaces (ceilings, walls, floors) with materials with good sound-absorbing characteristics.
- Avoid using acoustically hard surfaces (e.g. concrete, tiles, natural stone, glass).
- Fit suitable materials to glazed walls (e.g. vertical slat blinds) (Figure 5).
- Select sound-absorbent facing panels for furniture (Figure 5).
- Use acoustic screens to absorb sound and shield against direct sound.
- Ensure adequate distance between workstations and interpersonal communication spaces.
- Use materials with high sound absorption coefficients in the speech frequency band (250 Hz to 2,000 Hz).

The higher and wider the acoustic screens, the better they screen out the sound. Screens with a solid core and absorbent surfacing on both sides are particularly effective.

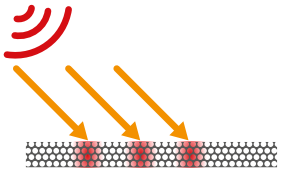
Sound absorption coefficient

The sound absorption coefficient is an important parameter for materials. It indicates how much sound is "swallowed" on the surface. A sound absorption coefficient of 1 indicates that the sound reaching the material is fully absorbed. A sound absorption coefficient of 0 indicates that the sound is fully reflected (see Figure 6).

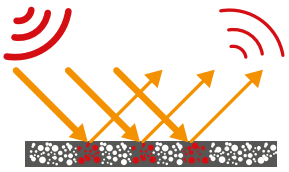
When planning new buildings or new rooms in existing buildings, ensure that the room acoustics are part of the planning process. Involve room acoustic experts when making changes to existing premises.

Figure 5 Means of improving room acoustics: Sound-absorbent vertical slat blinds, furniture with sound-absorbent surfaces, sound-absorbent carpets

a) Sound absorption coefficient $\alpha = 0$
No sound absorption
The sound is reflected in full



b) Sound absorption coefficient $\alpha = 1$
Complete sound absorption
The sound is completely "swallowed"



c) Sound absorption coefficient $0 < \alpha < 1$
Partial sound absorption
The sound is partly "swallowed" and partly reflected

Figure 6 Sound absorption and reflection

3.3 Office and VDU work

3.3.1 Room design

Do your employees frequently comment on a lack of space? Are the circulation and escape routes wide enough for escape to safety to be possible without difficulty in the event of a fire? Areas of sufficient size are essential in order for your employees to be able to work ergonomically and efficiently. This chapter provides information on the use of space.

Statutory references

- Sections 3 and 3 a of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 1, 2, 3 and 6.1
- ASR A1.2 technical rules for workplaces, room dimensions and free movement areas
- ASR A1.8 technical rules for workplaces, circulation routes
- ASR A2.3 technical rules for workplaces, escape routes and emergency exits, escape and rescue plan
- ASR V3 a.2 technical rules for workplaces, accessible design of workplaces

Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)
- DGUV Informative publication 215-441, office planning – assistance in the systematic planning and design of offices (formerly BGI 5050)

Hazards

Your employees face the following hazards in constrained spaces:

- Collision with furnishings
- Tripping and falling owing to constrained circulation routes and materials left in the areas

- Critical situations in an emergency owing to bottlenecks, obstructed circulation routes and unusable escape routes
- Health complaints owing to unergonomic workstation arrangements
- A sense of nuisance, harassment or intimidation owing to violation of the personal space

Measures

In order for the hazards described above to be avoided in your offices, the following guideline values have been laid down for VDU and office workplaces:

- 8 – 10 m² per person,
- 12 – 15 m² in large open-plan offices (i.e. with a floor area > 400 m²).

These surface areas comprise the following discrete areas (Figure 7):

- Work surface (desk surface) of at least 1,600 mm × 800 mm (width × depth) (where the need for work equipment is low, the width may be reduced to 1,200 mm; see Chapter 3.3.2)
- Free movement area at the workstation at least 1.5 m² (width and depth at least 1 m)
- Utility areas for further office furniture, office equipment (printers, photocopiers, fax machines) and for other materials needed (e.g. product samples)
- Functional areas for the moving parts of furniture, machinery, equipment and furnishings
- Free user areas for persons at furniture, machinery, equipment and furnishings: depth at least 800 mm; for functional areas on furniture, machinery, equipment and furnishings (e.g. cupboard with pull-out element), an additional safety clearance of 500 mm
- Adequately wide circulation routes (Table 6)

Plan additional areas for use as break and discussion areas. Pay attention to accessible design; this may necessitate larger areas.

- Functional areas with adequate dimensions must be provided for windows and doors. Ensure that during use, no pinch, shear or collision points arise in conjunction with other parts of the building or other furnishings (for example: safety clearance to the body of at least 500 mm).
- Ensure that free user areas at workstations are not obstructed or overlapped. The functional areas of cabinets used only at the workstation concerned may overlap its free user area.

When positioning desks, ensure that the user's line of sight is parallel to the glazed wall (Figure 9). This helps to prevent daylight from causing disturbing glare and reflections on the VDU (see Chapter 3.2.1).

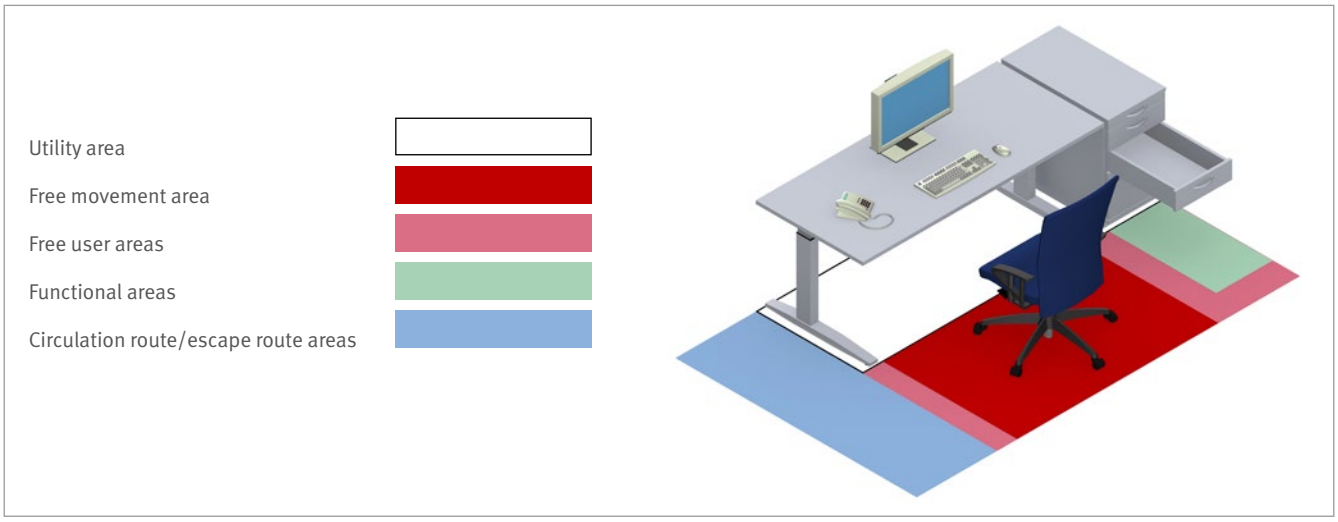


Figure 7 Areas at an office workstation

Figure 8 Example of permissible overlap of areas

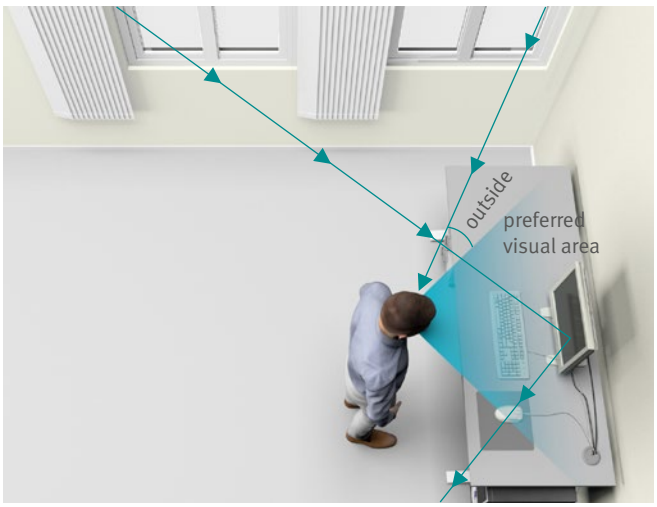


Figure 9 VDU arrangement

Circulation and escape routes

- Ensure that circulation routes are sufficiently wide (see Table 6) and that they are not constrained by the moving parts of work equipment.
- Ensure that escape routes are kept clear at all times.

Table 6 Minimum width of circulation and escape routes

Minimum width of circulation and escape routes* (determined as a function of the number of users)		
Number of users*	**Clear width**	**Possible constraints upon the clear width only at doors in corridors**
to 5	875 mm At no point less than 800 mm	By no more than 75 mm, i.e. minimum width 800 mm
to 20	1000 mm	By no more than 150 mm
to 200	1200 mm	
to 300	1800 mm	
to 400	2400 mm	

*) When determining the number, also consider persons who may access the workstation for brief discussions or meetings.

- Ensure that the access to a workstation assigned to a specific individual is at least 600 mm in width and that routes to facilities used occasionally (e.g. thermostats, windows) are at least 500 mm in width.
- Pay attention to accessible design; this may necessitate wider circulation routes.

Ceiling height

- Ensure that the room is of adequate height. The required ceiling height of a work room is a function of its floor area (see Table 7).
- During the risk assessment, you can check whether the dimension for the ceiling height can be lowered by 0.25 m if this can be considered to have no adverse effect upon your employees' health. A minimum ceiling height from the floor of 2.50 m must however be assured. In work rooms with a floor area of up to 50 m^2, the ceiling height can be reduced to the dimension permitted by the regional construction legislation, provided this can be reconciled with the usage of the work rooms.

Table 7 Minimum ceiling heights

Floor area	Ceiling height of offices above floor level
< 50 m^2	At least 2,50 m
> 50 m^2	At least 2,75 m
> 100 m^2	At least 3,00 m
> 2000 m^2	At least 3,25 m

3.3.2 Furniture

Office furniture such as tables, chairs, cabinets and shelves constitutes important work equipment within your company. These items must be safe and functional. At the same time, they should counteract inactivity. Suitable office chairs support the natural human seating posture.

Statutory references

- Sections 3 to 11 of the German ordinance on industrial safety and health (BetrSichV)
- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) No 6.1
- DGUV Rule 108-007, storage facilities and equipment (formerly BGR 234)

Hazards

Your employees face the following hazards:

- Injuries caused by tipping or falling of furniture, pinch and shear points on moving parts, or sharp corners and edges
- Electrical hazards on relevant fixtures (e.g. cabling)
- Falls resulting from the office chair inadvertently rolling away
- Constrained or incorrect posture resulting from ergonomically unfavourable design and adjustment of the furniture

Measures

- Design your company's workplaces to be safe and ergonomic.
- Take account of the personal needs of your employees.
- Ensure that electrical equipment on your furniture is installed and regularly checked by skilled personnel.
- Avoid high-gloss surfaces and pay attention to an acceptable reflectance (see Chapter 3.2.1).

Office desks

Procure desks that permit a flexible arrangement of the VDU monitor, keyboard, paper documents and other work items (adequately large work surface).

- The work surface of the desk should be at least 1,600 mm wide and 800 mm deep. In exceptional cases, the width can be reduced to 1,200 mm when the

workstation is equipped with only a single VDU monitor, few paper documents are used, and alternating tasks are not performed. Refer to Figure 10 for the requirements concerning height-adjustable desks.

- Ensure that sufficient unobstructed legroom with a width of at least 850 mm (recommended: 1,200 mm or more) is available below the work surface.

Alternation between seated and standing tasks provides additional opportunity for movement. It is therefore advisable to use seated/standing desks that permit this alternation (adjustment range from 650 mm to 1,250 mm, Figure 10).

Office chairs

- Ensure that the seat and backrest are height-adjustable and can be rotated as a single unit.
- Ensure that the chair has braked castors (preventing the chair from rolling unchecked when not under load) and that the castors are suitable for the type of floor covering (Figure 11).
- The majority of office chairs are designed for eight hours' use per day and a body weight of 110 kg. Use suitable chairs for heavier persons or multi-shift use.
- Whenever possible, select chairs with armrests, since these are ergonomically advantageous for your employees. Armrests adjustable within a height range from 180 mm to 290 mm above the seat surface are recommended.

Figure 11 Left: castor for hard floor coverings (two-colour); right: castor for soft floor coverings (single-colour)

Table 8 Guide to the selection of ergonomically designed office chairs

Dimension	Dimension range
Seat height	< 400 to 530 mm
Seat height adjustment range	> 120 mm
Seat depth	370 to 470 mm
Seat width	> 450 mm
Lumbar support	Support point adjustable in the range from 170 to 230 mm above the seat surface
Upper edge of the backrest above the seat surface	> 450 mm
Backrest width	> 400 mm
Backrest angle	Adjustable, at least 15°

Not a permanent solution.
Ensure that alternative seating furniture (e.g. balance ball chairs, motion stools) are used by your employees only as temporary training and exercise furniture. Owing to the elevated risk of accident, rapid muscle fatigue and absence of adjustments, these items of furniture are not suitable for use as office chairs.

From 650 mm ... ... infinitely adjustable ... ... to 1,250 mm
Seated tasks: 650 mm – 850 mm | Standing tasks: 950 mm – 1,250 mm

Figure 10 Fully height-adjustable office desks

Figure 12 Adjustments on an office chair

Cabinets, shelves and other storage facilities

- Ensure that cupboards, shelves, filing cabinets and room dividers (screens) are stable.
- Where items are stored at a height of 1.80 m or greater, provide your employees with suitable climbing aids (e.g. steps, rolling step stool, ladder).

The following are generally stable:

- Furniture with a high dead weight and low centre of gravity
- Furniture secured to ceilings, walls or other furniture to prevent it from falling
- Cupboards and filing cabinets with additional weights, additional anchoring or anti-tipping interlocks
- Cupboards and shelves in compliance with the recommendations stated in Figure 13

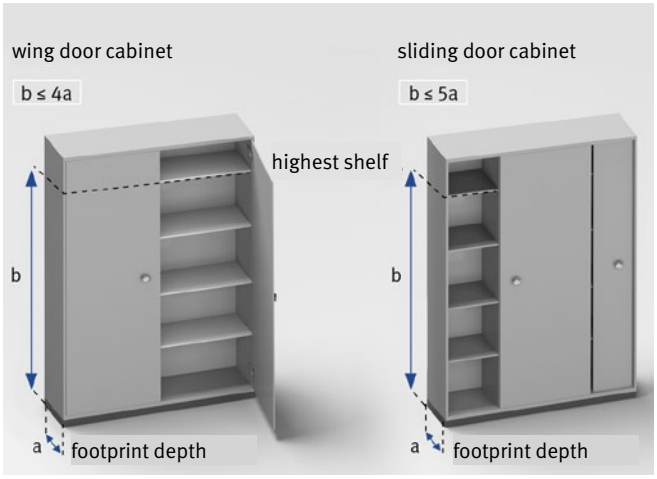


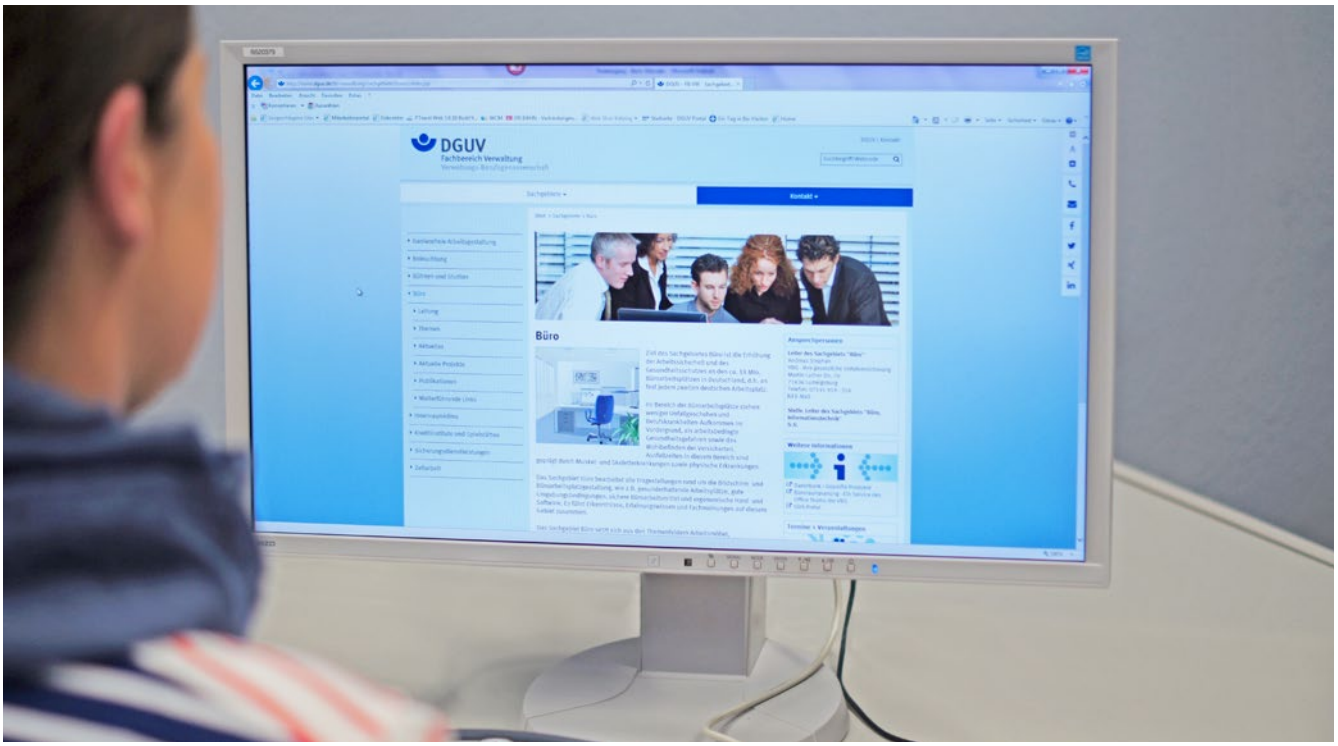
Figure 13 Ratio of the footprint depth to the height of the highest shelf

Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)
- VBG (eds.): Die Qual der Wahl – wie beschaffe ich den passenden Stuhl? (= VBG-Praxis-Kompakt, Version 1.2/2015-03, advice on chair selection), Hamburg.
- EN 527 series of standards, Office furniture – Work tables and desks
- EN 1023 series of standards, Office furniture – Screens
- EN 14073, Office furniture – Storage furniture
- EN 1335 series of standards, Office furniture – Office work chair

3.3.3 VDUs

One of the most important items of work equipment at an office workplace is the VDU. The quality of the screen and its settings determine to a considerable degree whether your employees are able to work free of health complaints. Incorrect height adjustment for example may lead to postural complaints, excessive screen brightness to eye problems.



Statutory references

- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 6.1 to 6.5

Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)

Hazards

At a VDU workstation, unergonomic VDU design or unfavourable screen settings may present hazards for the eyes or the locomotor apparatus, particularly tension caused by constrained posture.

Possible hazards are:

- Constrained or incorrect posture caused by excessively high VDUs, excessively small fonts or unfavourable arrangement of multiple screens
- Stress upon the eyes caused by overly reflective VDUs, blurred or excessively small fonts or an imbalanced brightness ratio in the field of vision
- Mental fatigue caused by a need for elevated attention and concentration

Measures

Reduce these hazards by implementing the measures below.

- Procure VDUs that can be lowered to just above the surface on which they stand. Ideally, your employees should view the screen by looking downwards at an angle of approximately 30° to 35° below the horizontal.
- Ensure that the screen is angled backwards such that your employees view it perpendicular to the surface.
- Give preference if possible to anti-reflective screens (matt screen display), in order to avoid disturbing reflections; these are detrimental to character contrast and make characters harder to recognize.

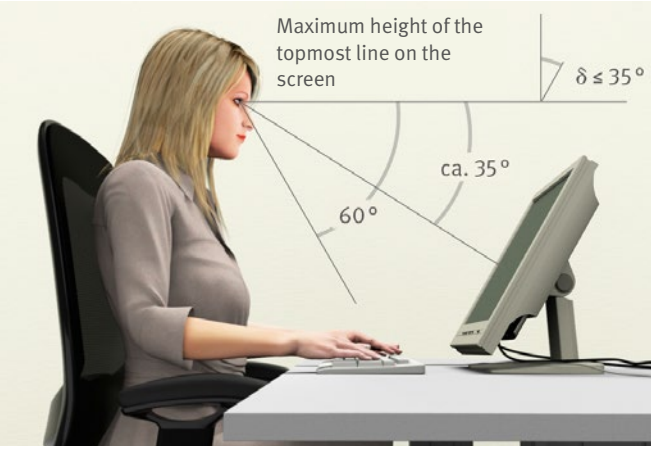


Figure 14 VDU arrangement

Figure 15 Disturbing reflections

VDUs are divided into three reflection classes according to their reflection properties.

The reflection classes commonly used in the past are no longer stated. Instead, the conditions are stated under which the reflections on the screen are measured (first column of the table below). The statement " $L_{REF,EXT}$ = 200 cd/m² and $L_{REF,SML}$ = 2000 cd/m²" on the GS certificate corresponds to the former Reflection Class I. A screen with these properties can be used in all office environments.

Table 9: Assignment of VDUs to reflection classes

Components of illumination (cd/m²)	Suitable environment	Former reflection classes to EN ISO 13406-2
$L_{REF,EXT}$ = 200 and $L_{REF,SML}$ = 2000	Suitable for general office use *	I
$L_{REF,EXT}$ = 200 or $L_{REF,SML}$ = 2000	Suitable for most, but not all, office environments **	II
$L_{REF,EXT}$ = 125 or $L_{REF,SML}$ = 200	Requires a specially controlled luminous environment ***	III

REF,EXT = luminance of the large aperture source; REF,SML = luminance of the small aperture source

* VDUs of this type can be used in any office environment.

** On these VDUs, disturbing reflections on the screen must be anticipated under sub-ideal lighting conditions or when the equipment is situated close to a window.

*** On these VDUs, disturbing reflections are generally so strong that the screens cannot be considered for office work in normal office environments. These disturbances can be avoided only by the use of fully diffuse illumination, which for technical reasons is virtually unachievable, and at same time measures to prevent bright surfaces (walls, windows) from reflecting on the screen.

Note that your employees will be less well able to distinguish colours on the screen with rising illuminance, particularly on anti-reflective screens.

- Note from the manufacturer's information the illuminance for which the screen is suitable. In order for VDUs to deliver distinguishable colours even at workstations adjacent to windows, use screens with a designated screen illuminance illuminance of at least 1,500 to 2,000 lux.
- Procure VDUs with light-coloured, matt casings, since these are more suitable for use in bright environments and for true video (i.e. dark characters on a light background), which is the display form most commonly used on VDUs. This results in a balanced brightness distribution in the user's field of view. Your employees' eyes are not exposed to unnecessary brightness adjustment (adaptation).
- Operate LCD screens at the highest possible (physical) resolution, in order to attain the best character sharpness.
- Do not fit monitor filters to VDUs, since these are generally detrimental to the display quality of the screens.

Should your employees work with several windows open or with scanned documents, the choice between one large VDU (e.g. 22, 24 or 27 inch) or two small screens depends upon the work task. On a 19 inch screen in portrait orientation, DIN A4 documents can be displayed well and can also be enlarged easily for documents with small fonts.

In order for your employees to avoid excessive head and eye movements and the health complaints potentially resulting from them when working with large or multiple screens, you should use narrow and small screen combinations if possible. This applies in particular to employees whose field of vision is narrowed by the use of varifocal glasses. Where a multi-screen solution is used, the screens should have narrow casing frames and be located close together. Use screens with a low viewing angle dependence (i.e. do not use TN (twisted nematic) mode display).

Employees may require special VDU glasses in order to improve their visual function when working at VDUs. (This is not generally necessary before the age of 40.) Have your employees consult your occupational physician, and do so yourself.

3.3.4 Input devices

Keyboards and mice are generally used as the input devices at office workplaces. Here too, pay attention to ergonomic design. Unergonomic design or unsuitable settings or placement may lead to disorders in the musculoskeletal system and/or the eyes.

Statutory references

- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 6.3 and 6.4

Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)
- VBG (eds.): Alternative Eingabemittel an Bildschirmarbeitsplätzen. Informationen für Arbeitsmediziner und Betriebsärzte (= VBG-Fachwissen; Version 1.1/2013; information for occupational physicians on alternative input devices for use at VDU workplaces), Hamburg.
- EN ISO 9241, Ergonomics of human-system interaction – Part 410: Design criteria for physical input devices, date of publication: 2012-12

Hazards

Hazards exist for your employees with regard to:
- The locomotor apparatus
- The eyes

Risk factors for the incidence of such disorders are:
- Constrained or incorrect posture caused by excessively high keyboards and mice and by unfavourable location of these devices
- Eye stress caused by an excessively high brightness ratio in the field of vision, glossy surfaces (particularly keyboard keys), and keyboard markings that are too small

Measures

You can reduce the above hazards by means of the following measures:

Keyboard

- Procure keyboards that are as shallow as possible. The height of the keyboard (i.e. of the middle row of keys) must not exceed 30 mm. This can be attained only with the keyboard feet folded down. When the keyboard meets this requirement, your employees do not need a rest for the heel of the hand.
- Ensure that surface in front of the keyboard has a depth of 100 mm to 150 mm. This area is large enough for the hands to be rested upon it.

Where textual and numerical data are to be input or data edited, use full keyboards with alphanumeric, numeric, editing and function keys. When numeric input is required infrequently or the mouse is primarily used, select compact keyboards without a numeric key block. This results in a relaxed, neutral arm posture for your employees (Figure 17).

Figure 16 Arrangement of the keyboard on the work surface

Procure keyboards on which the key markings are easily legible.

To be easily legible, key markings should have an adequately large character height of at least 2.9 mm (preferably 3.2 mm) and dark characters on a light background with good contrast (see Figure 18).

① Full keyboard
② Compact keyboard
③ Area for use of the mouse with the right hand
④ Area for use of the mouse with the left hand

Figure 17 Position of a full keyboard (top) and a compact keyboard with easier access to the mouse area (bottom)

Benefits of light-coloured keyboards

Light keyboards with dark lettering are better suited to the use of true video on the VDU, i.e. dark characters on a light background. They avoid disturbing differences in brightness and thus save your employee's eyes unnecessary adaptation to these differences. The surfaces of keys become shiny after longer use, as a result of either wear or sweat from the fingers. This is less apparent on light keys than on dark keys.

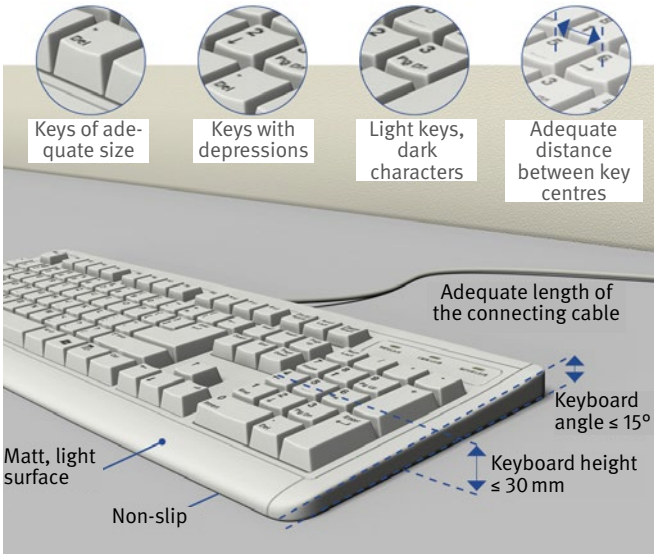


Figure 18 Requirements concerning keyboards

Mouse

Procure mice that are suitable for the size of the user's hand and enable the heel of the hand to rest upon the work surface. Symmetrical mice can be used by either hand. Mice are also available specifically for left-handed or right-handed users (see Figure 19).

- The mouse buttons should function reliably and be easy to use, and should provide feedback when operated. Your employees should be able to operate the mouse whilst adopting a normal body and hand posture, without their position changing inadvertently as a result.
- Ensure that the mouse has an adequate area of movement adjacent to the keyboard. A thin mouse pad is useful in this respect.

Figure 19 Sizes of mouse

Alternative input devices

For employees with chronic diseases or constraints upon their movement, special, alternative input devices (such as a vertical mouse or split keyboard) may have to be procured. Consult your occupational physician in this case.

3.3.5 Software ergonomics

Software influences performance and productivity in office work. Software with high usability also influences the quality of the work results. Software of good ergonomic design has a positive influence upon physical and mental stress and the satisfaction and motivation of your employees.

Figure 20 The software design influences performance of the tasks

Statutory references

- §Section 6 (1) of the German ordinance on industrial safety and health (BetrSichV)
- Section 3 of the German Ordinance on workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 6.2 and 6.5
- Sections 3 and 4 of DGUV Regulation 1, Principles of Prevention

Further information

- DGUV Informative publication 215-450, software ergonomics
- EN ISO 9241, Ergonomics of human-system interaction (several parts of this standard)

Hazards

Software of unergonomic design may give rise to physical and mental hazards:

- Elevated stress upon the eyes and vision
- Mental fatigue caused by high stress upon memory, high demands upon attention and concentration
- Monotony caused by repetitive work steps or tasks
- Mental satiation, caused for example by illogical and contradictory operation of the software
- Stress, caused for example by poor orientation where software is badly structured or fails to work correctly

Measures

General measures

- Ensure that the software is fit for purpose, i.e. that the users are able to use it to perform their tasks effectively, efficiently and satisfactorily. The employees must be capable of completing tasks for which software is used.
- Ensure that the software can be adapted to different VDUs, other hardware (e.g. different input and output devices) and different ambient conditions.
- Involve your employees in the selection and procurement of software.

Measures for interaction design

- Ensure that interaction with the software is appropriate for the task: all tools and information required for completion of the task must be provided in full by the software; unnecessary functions and information should be avoided.

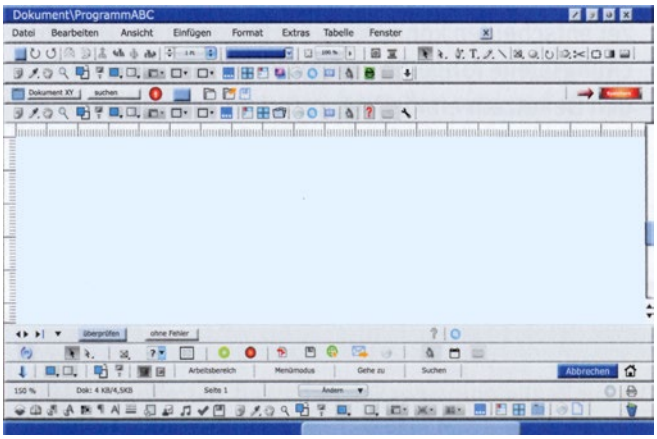


Figure 21 Application unsuitable for the task owing to the overload of tools

- Ensure that the software used is self-descriptive: software dialogs should be of comprehensible design and should provide appropriate explanations either by immediate feedback or on demand.
- Ensure that the software satisfies the expectations of users. It should be suitable for the context of use, the users' personal abilities and skills, the task in hand, and generally established conventions.
- Give preference to software that promotes learning, guides users during familiarization with its operation, supports them in its use, and promotes the generation of knowledge.
- Ensure that operation of the software is user-driven: it should be possible to launch the dialog process and to influence its course and pace through to completion of the work task with no loss of data.
- Ensure that the software used is tolerant of faults: should inputs be made that are evidently incorrect, the intended result of the work should be attainable with reasonable correction effort, if any. Constructive explanations should be provided in the event of errors.
- Ensure that the software used by your employees can be customized to their individual needs and skills by adjustment of the presentation of information and operation of the software.

Figure 22 Example of negative and positive fault tolerance

Measures for information design

- Ensure that the software provides the employees with information in an accessible, comprehensible and legible form.
- Ensure that text, symbols and other elements contrast well with the background. Contrast levels and the suitability of colour combinations can be determined for example by means of the contrast analyser (see Figure 23). A theoretically determined contrast for normal fonts should be at least 4.5:1; a contrast greater than 7:1 is recommended.

Note:
The contrast analyser and the measurement slide template for you to print out yourself can be found at: www.vbg.de/softwareergonomie.

Note that the contrast analyser determines the contrast from the programmed values; the actual contrast on the VDU may differ.

Figure 23 Information on the contrast analyser

- In order to improve the legibility and identifiability of characters and symbols, avoid unfavourable colour combinations.

Figure 24 Unfavourable colour combinations

- Colour coding can be useful for orientation. Information should be coded in an additional form, for example by a symbol, pattern or character (e.g ! ✔).
- Use sans-serif fonts such as Verdana, Arial, Calibri and Tahoma for reading on the screen.

Figure 25 Fonts

- Use a minimum character height to ensure reliable legibility.

Table 10 Character height for capital letters

Viewing distances	
Viewing distance	Recommended character height in mm
500	3.2 to 4.5
600	3.9 to 5.5
700	4.5 to 6.4
800	5.2 to 7.3

- Observe the organizational principles governing the arrangement of elements and information (for example by proximity, type, symmetry), in order to facilitate the perception, location and categorization of information (see Figure 26).
- Pay attention to the design of forms and their logical subdivision.

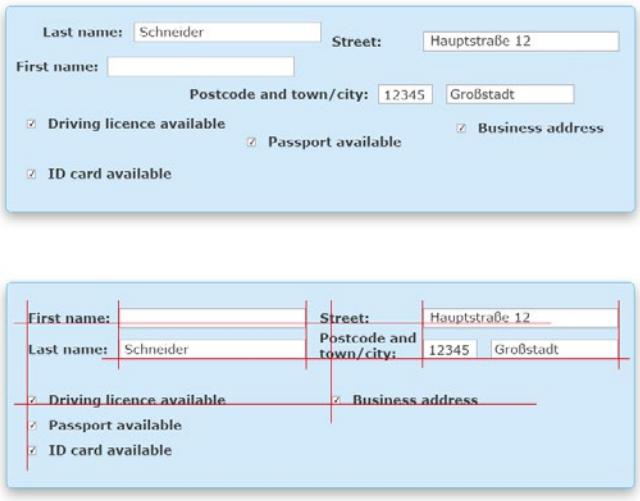


Figure 26 Example of application of the organizational principles

3.3.6 Health in offices

Long periods spent sitting, physical inactivity and particular demands upon eyesight may impair the health of your employees at office workplaces. Musculoskeletal and eye disorders are not uncommon. Mental impairments may also arise.

§ Statutory references

- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) No 6.1
- Section 3 of the German Ordinance on Occupational Health Care (ArbMedVV) in conjunction with the annex, Part 4 (2)
- AMR occupational medical rules No 2.1, intervals for the instigation/offer of preventive occupational medical care
- AMR occupational medical rules No 5.1, requirements concerning the offer of preventive occupational medical care
- AMR occupational medical rules No 14.1, appropriate eye and vision examinations

i Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)
- VBG (eds.): GMS – Gesundheit mit System; Leitfaden für ein betriebliches Gesundheitsmanagement (= VBG-Fachwissen; Version 2.0/2016-06; systematic health management; guidance for corporate health management), Hamburg
- VBG (eds.): Gesundheit im Büro (= VBG-Fachwissen; Version 5.1/2017-02; office health), Hamburg
- VBG (eds.): Gymnastik im Büro. Fit durch den Tag (= VBG-Info; Version 1.1/2010-12; exercise in the office), Hamburg.

Hazards

Your employees face hazards in particular as a result of:
- Poor workplace ergonomics
- Lack of movement
- Continual stress upon the eyes and vision
- Deficits in work organization, such as inappropriate management behaviour, overload and underload, frequent interruptions, time pressure

Diseases of the musculoskeletal system top the list of reasons for absences from work. Office workers also frequently complain of musculoskeletal disorders, particularly tension in the cervical spine with impact upon the shoulder-arm system, and in the lumbar spine. A lack of movement also increases the risk of obesity, cardiovascular disorders and diabetes. An eye defect that is not (adequately) corrected can give rise to eye fatigue.

Mental impairments influence employees' well being, and can contribute to the incidence of diseases.

Measures

The measures below assist you in designing your employees' workplaces to be conducive to their good health, which in turn supports their employability:
- Promote dynamic sitting (i.e. alternation between a forward, middle or rearward sitting posture) by procuring suitable office chairs.
- Avoid your employees being exposed to imbalanced physical work stresses by ensuring that the necessary free movement areas are not obstructed and that work processes involve alternating tasks.
- Locate printers, photocopiers and fax machines at a central point and not directly at the workstations.
- Provide your employees with standing-height or adjustable-height desks.
- Promote movement by conducting discussions with employees away from their workstations and occasionally also standing.
- Motivate your employees to exercise more, for example by: climbing stairs rather than taking the lift; using the walk to the printer, photocopier or fax machine as a form of exercise; exercising regularly at their workstations.

Alternation between sitting and standing is good; alternation between sitting, standing and walking is even better. This promotes movement of the spine, contributes to the intervertebral disks being supplied with oxygen and nutrients, releases tension, stimulates the cardiovascular system, and enhances concentration. Support your employees in this alternation.

- Check whether you are able to offer means of promoting regular exercise, for example as part of your workplace health management policy. Lifestyle changes are much easier to achieve in a group of like-minded colleagues.
- Ensure that arrangements for work organization and task completion are healthy, for example by avoiding overload and underload, ensuring a good workplace atmosphere and adopting a health-conscious management style (see Chapter 3.1).

Exercise or massage

Your company should preferably offer training measures to promote exercise, in order to reduce health complaints among your employees and to reduce the stresses to which they are exposed. Health deficits attributable to a lack of movement can thereby be avoided. Conversely, massages do not address the conditions that give rise to muscle tension, but merely alleviate the symptoms temporarily.

Provision of preventive occupational medical care by the occupational physician

As an employer, you are required to offer employees who work at VDU workstations preventive occupational medical care appropriate to these tasks at regular intervals. The preventive occupational medical care may reveal a requirement for you to provide special optical aids (VDU workstation glasses) to the employees concerned.

3.4 Reception areas

The reception area is the first point of contact with your company. It should make an attractive and inviting impression upon visitors. Your employees in this area are subject to particular stresses. For example, frequent opening and closing of the entrance door can give rise to draughts. This chapter contains information on setting up workplaces in your reception area.

§ Statutory references

- Sections 3 to 4 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 1 to 3 and 6
- ASR V3 a.2 technical rules for workplaces, accessible design of workplaces
- ASR A1.2 technical rules for workplaces, room dimensions and free movement areas
- ASR A1.5/1,2 technical rules for workplaces, floors
- ASR A3.4 technical rules for workplaces, lighting
- ASR A3.5 technical rules for workplaces, room temperature
- ASR A3.6 technical rules for workplaces, ventilation

i Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)
- DGUV Informative publication 215-444, protection against sunlight in offices (formerly BGI 827)

Hazards

In the majority of cases, workplaces in a company's reception area are equipped with VDUs. You should therefore consider the hazards described in Chapter 3.3 and implement the measures described there at these workplaces. Employees in your company's reception area may be exposed to the following further hazards:

- Particular climatic conditions attributable to the design of the reception area (such as draughts through entrance doors; heat in the summer)
- Unfavourable ambient factors (such as noise, room acoustics and lighting)
- Slipping, falling and tripping, for example owing to damp or smooth floors
- Mental stress (for example owing to social interaction with customers, verbal attacks, threats, emotional labour)
- Physical stress caused by standing or sitting for long periods

Measures

- Set up your reception workplace such that office tasks can be performed sitting. Should your employees' tasks require them to spend longer periods in a standing position, provide them with suitable standing aids (standers).
- If necessary, provide employees with adequate surfaces and temporary storage facilities for post, parcels and consignments to prevent such items from obstructing the free movement areas and circulation routes. Provide sufficient areas for any office equipment required at this workplace (such as franking machines).
- When planning your reception area, ensure that it is also able to meet the climatic requirements for workplaces (for example: atmospheric temperature for seated tasks: 20-22 °C, maximum air velocity 0.15 m/s, see Chapter 3.2.2).

Erection of a windbreak at the entrance reduces the influence of draughts at the reception workplace. In particular, should a large part of your reception area's façade be glazed, you can limit the rise in temperature by means of sun blinds or similar suitable measures.

- Analyse the tasks performed by your employees in the reception area. These determine the permissible noise level. Should the tasks involve VDU work (primarily mental activity), the sound assessment level must not exceed 55 dB(A). During contact with customers, ensure that a value of 70 dB(A) is not exceeded (see Chapter 3.2.3).

Construction materials (such as glass, natural stone floors, decorative concrete) that have an unfavourable impact upon the room acoustics (a long reverberation time) are frequently employed in reception areas. Acoustic sails, sound absorber panels on walls and sound-absorbing furniture and furnishing elements can be used to create favourable room acoustics in your reception area. This will also be appreciated by your customers.

- Ensure that a minimum illuminance of 500 lux is attained during VDU work in the reception area (see Chapter 3.2.1).
- Have floor coverings with adequate slip resistance fitted in the reception area (see Chapter 3.2). Organize measures for the elimination of slipping hazards in the reception area caused for example by moisture or slush, and instruct your employees at reception in the measures you have put in place.
- Ensure that your reception personnel possess all the information they need (for example expected guests, telephone lists, absent personnel) in order to complete their tasks (such as responding to customer enquiries).
- Train your reception personnel in dealing with critical verbal scenarios.
- Set out rules for behaviour and concrete measures for threatening situations (such as barring of persons from the premises, raising of alarms) and provide your reception staff with instruction regarding these measures.

3.5 Interpersonal communication area

Efficient communication contributes substantially to the productivity of your company and to a good work climate. Face-to-face conversation is an important element in this communication, since despite considerable information now being communicated by e-mail or digital networks, it remains an important part of office work. Suitable areas must be available for this purpose.

§ Statutory references

- Sections 3, 3 a and 4 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 1 (1) Nos 1 and 3
- ASR A1.2 technical rules for workplaces, room dimensions and free movement areas
- ASR A1.8 technical rules for workplaces, circulation routes
- ASR A3.4 technical rules for workplaces, lighting
- ASR A3.5 technical rules for workplaces, room temperature
- ASR A3.6 technical rules for workplaces, ventilation
- ASR V3 a.2 technical rules for workplaces, accessible design of workplaces

i Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)
- DGUV Informative publication 215-441, office planning – assistance in the systematic planning and design of offices (formerly BGI 5050)
- DIN 18041, Acoustic quality in rooms – Specifications and instructions for the room acoustic design, date of publication: 2016-03

Hazards

- Tripping and falling hazards, for example owing to unsatisfactorily dimensioned circulation routes, obstructing items, or cables running loose over the floor
- Sitting in an unergonomic posture owing to insufficiently large free user areas or unsuitable chairs
- Glare and poor lighting
- Stress caused by noise, owing to poor construction or room acoustics, sources of noise in the room
- Inadequate visual display facilities (such as insufficiently bright overhead projectors; pillars or other elements obstructing the view in the room)

Measures

Interpersonal communication spaces are indispensable in a modern company, whether for discussions in a small group or large meetings with customers.

Room concept

- Locate conference rooms used by persons from outside the company close to the reception area and close to sanitary facilities and break areas.
- Provide cloakroom and luggage storage facilities.
- Where conference areas are integrated into larger rooms, ensure adequate visual and acoustic screening.

Standing tables, informal seating areas or a coffee bar are useful features for facilitating brief and spontaneous discussion between your employees. These facilities can also be used for breaks during longer meetings.

Conference rooms

- Observe the requirements concerning circulation routes (Chapter 3.3.1).
- Provide each person with a desk area at least 800 mm in width and 800 mm in depth. Where the required area of the work surface is low, you may in exceptional cases reduce this requirement to a width of 700 mm and a depth of 600 mm (with adequate legroom).
- Plan legroom below the desk with a width of at least 600 mm and a depth of at least 800 mm per person.
- The free user area must be at least 800 mm wide and 800 mm deep. The depth may be reduced to 600 mm when the individual workplaces are readily accessible from the rear and sufficient legroom is available beneath the desk.

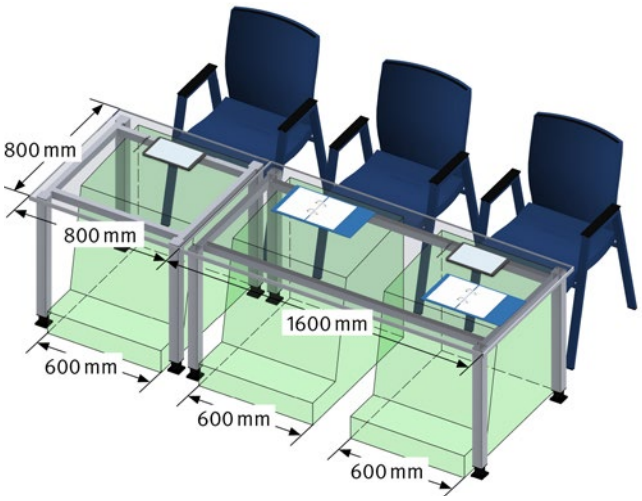


Figure 27 Work surfaces and legroom/footroom at places in communication areas

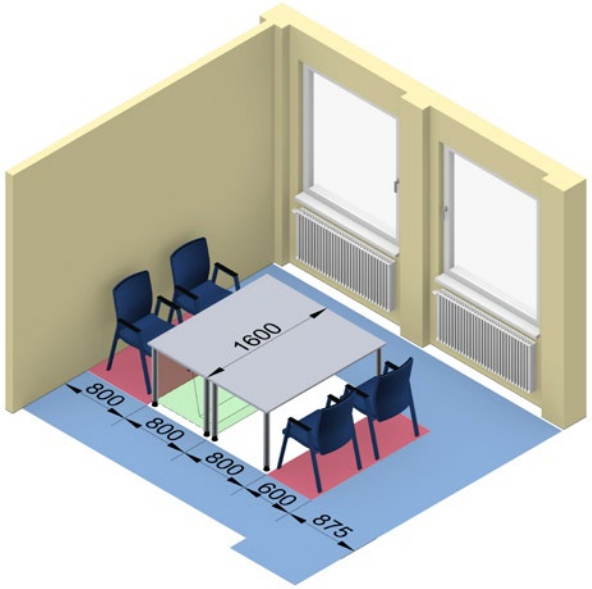


Figure 28 Free user areas at places in meeting areas

Note that wheelchair users require a clear width of 900 mm beneath the desk. You must provide a free user area with a depth of at least 1,200 mm and a turning area of 1,500 mm × 1,500 mm.

Select chairs and other furniture that are stable.

To enable these rooms and areas to be used for longer meetings, furnish them with office chairs. Where the number of persons changes frequently, the use of stackable chairs may be advantageous.

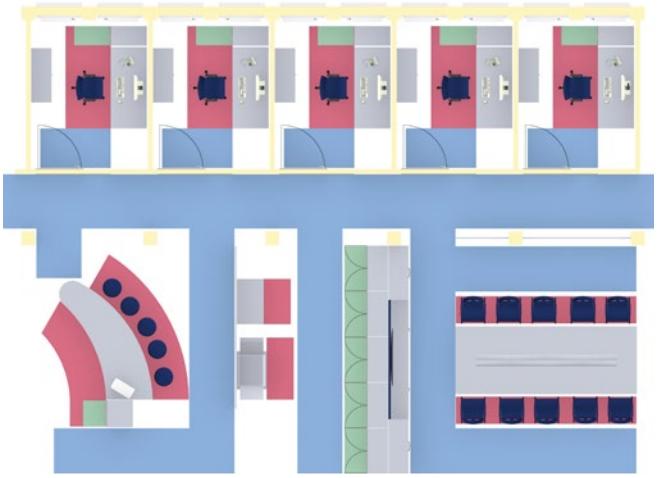


Figure 29 Combined office space featuring a meeting area and interpersonal communication island

Media technology

- Give consideration to the equipment used in conference and meeting rooms, for example overhead projectors, projection screens, large monitors, flip charts and pinboards. Make allowance for the required space, and select low-noise products at procurement.
- When procuring large screens, select products with non-reflecting surfaces and the largest possible viewing angle.
- Prevent power and data cables from causing a trip hazard, for example by using cable ducts or cable mats.
- During planning, consider that persons attending meetings may bring equipment with them that also requires cable connections. Furniture with integral sockets and data ports is an advantage in this respect.

Ambient factors

In addition to the general points in Chapters 3.2.1 to 3.2.3, consider the following aspects.

- Provide lighting that is homogeneous and free of flicker and glare. Lamps should be adjustable individually and enable only part of the room to be lit if desired.
- Provide facilities for shade (such as vertical slat blinds).
- Ensure good acoustic quality.
- Ensure cleanliness and tidiness.
- Ensure adequate ventilation.
- Ensure that the colour decor is balanced.

3.6 Equipment areas

In equipment areas, your employees come into direct contact with printers, photocopiers, fax machines, shredders, scanners and servers. These devices may present a range of hazards. This chapter describes the hazards and the measures to be taken for their avoidance.

§ Statutory references

- Sections 3 to 14 of the German ordinance on industrial safety and health (BetrSichV)
- Sections 3 to 4 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 1 to 3
- ASR A1.2 technical rules for workplaces, room dimensions and free movement areas
- ASR A1.8 technical rules for workplaces, circulation routes
- ASR A2.3 technical rules for workplaces, escape routes and emergency exits, escape and rescue plans
- DGUV Regulations 3 and 4, electrical installations and equipment (formerly BGV A3 and GUV-V A3)

i Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)

Hazards

Office equipment may present the following hazards to your employees:

- Electric shock caused for example by defective power cables or casings
- Falls and tripping caused for example by poor routing of cables
- Pinching and collision on furniture and equipment
- Tipping and falling of furniture and equipment
- Fire hazards caused by smouldering cables
- Noise caused by equipment
- Emissions from printers and photocopiers
- Rise in atmospheric temperature caused by office equipment

Measures

- Ensure that all electrical equipment is tested at the specified intervals by a skilled electrician or under the instruction and supervision of a skilled electrician. Instruct your employees to check the power leads and casings of the equipment visually at regular intervals for evident damage.
- Pay attention to proper arrangements for power cables (for example, do not daisy-chain multiple trailing sockets).
- Avoid tripping hazards (for example by using cable ramps).
- Keep circulation routes free of collision and tripping hazards. Provide circulation routes of adequate width (see Chapter 3.3.1) and ensure that materials (such as cardboard boxes) and work equipment are not left on circulation routes or encroaching into them.
- Remove legacy equipment and cables after they have been taken out of service, and dispose of them properly.
- Ensure free movement areas and functional areas of adequate dimensions (see Chapter 3.3.1) in order to ensure that the equipment can be operated safely and ergonomically.
- Provide storage space and work surfaces adjacent to photocopiers and printers.
- Ensure that office equipment and furniture are stable.
- Avoid placing office equipment on the edges of furniture such that the equipment projects over the edge of the furniture.
- Make suitable fire extinguishing equipment available and provide your employees with practical instruction in its use.

Note that the use of CO_2 fire extinguishers in constrained spaces may present a risk of suffocation for the employees.

Water and foam fire extinguishers to EN 3, Portable fire extinguishers, may be used on electrical equipment up to 1,000 V provided a safe distance of at least 1 m is observed.

- Procure low-noise office equipment products.
- Where possible, place this equipment in a dedicated equipment room in order to prevent intrusive noise and a rise in the atmospheric temperature in the areas in which your employees work.

Emissions from printers and photocopiers

Emissions from printers and photocopiers are frequently the subject of much discussion in the media. Printers and photocopiers may emit small quantities of dust, volatile organic compounds (VOCs) and ozone.

Owing to technical progress, many modern office equipment products now generate virtually no measurable ozone. The dust emissions may be both paper and house dust, and minute quantities of toner dust. The paper dust is by far the largest component of the dust. Various studies have shown the emissions from regularly maintained items of equipment to be in the uncritical range.

3.7 Communal rooms

Suitably designed break rooms and functionally furnished office kitchens reflect the esteem in which you hold your employees. They also facilitate communication. In order to prevent health hazards, such as scalding or infections, from arising in these areas, certain rules must be observed.

Statutory references

- Sections 3 to 4 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 1 to 4
- ASR V3 a.2 technical rules for workplaces, accessible design of workplaces
- ASR A1.5/1,2 technical rules for workplaces, floors
- ASR A4.1 technical rules for workplaces, sanitary areas
- ASR A4.2 technical rules for workplaces, break and stand-by rooms
- DGUV Regulations 3 and 4, electrical installations and equipment (formerly BGV A3 and GUV-V A3)

Hazards

The following hazards to your employees may exist in communal rooms:

- Electric shock, caused for example by defective power cables or casings, operation of electrical equipment in wet areas
- Slipping, tripping and falling, for example on wet floors
- Poor hygiene (for example in sanitary and kitchen areas)
- Scalding caused for example by tipping of or contact with coffee machines and kettles
- Fire hazards caused by electrical equipment (such as hotplates)

- Mental stress caused by noise (for example emanating from equipment and external ambient noise in break rooms)
- Unfavourable environmental factors (such as temperature, ventilation and lighting)

Measures

- Ensure that all electrical equipment is tested at the specified intervals by a skilled electrician or under the instruction and supervision of a skilled electrician. Instruct your employees to check the power leads and casings of the equipment visually at regular intervals for evident damage.

> **Note** that the electrical safety of mains equipment brought to work by the employees, such as coffee machines, fans and radios, must also be checked regularly.

- Ensure that socket circuits, particularly in kitchens and sanitary areas, are protected by a residual-current device (30 mA).
- Place coffee machines and kettles on a fireproof surface (e.g. tiles). Ensure that the equipment cannot tip over and is an adequate distance away from basins and sinks.

A separate circuit for electrical appliances posing a fire risk (such as cookers, coffee machines, kettles) enables them to be switched on and off separately from all other electrical appliances, for example by means of a timer. As the employer, you are responsible for having such a circuit installed by a skilled electrician.

- Keep circulation routes free of collision and tripping hazards. Provide circulation routes of adequate width (see Chapter 3.3.1) and ensure that materials (such as cleaning agents) or work equipment are not left on circulation routes.
- Have floors and walls in sanitary areas and kitchens finished in materials that can be wet wiped (such as ceramic tiles, plastics).
- Use floor coverings that are slip-resistant even when wet (slip resistance: R9 for toilet areas, R10 for sanitary areas and office kitchens).
- The cleaning work in the communal areas of your company should not be obstructed by furnishings if this can possibly be avoided.
- Ensure a rated illuminance of at least 200 lux in office kitchens, break rooms and sanitary areas.

Figure 30 Example signage of sanitary areas

Sanitary areas

- Provide separate toilet areas for men and women. Should your company have fewer than ten employees, separate toilet areas for men and women are not required provided it can be assured that the areas are not used by both sexes simultaneously.
- Provide an adequate number of toilets and washbasins for your employees and visitors (see Table 11).
- When planning office areas, ensure that toilets are in the same building and are not more than one storey removed from permanent workplaces.
- Ensure that facilities are provided for washing hands under running water. Provide suitable products in toilet areas for cleaning and drying hands (such as soap in soap dispensers, disposable towels or roller towel machines).
- Ensure that the toilet areas are properly ventilated.

Table 11 Excerpt from ASR A4.1, sanitary areas

Male or female employees	Minimum number when rarely used at the same time		Minimum number when often used at the same time	
	Toilets/urinals	Washbasins	Toilets/urinals	Washbasins
to 5	1*)	1	2	1
6 to 10	1*)	1	3	1
11 to 25	2	1	4	2
26 to 50	3	1	6	2
51 to 75	5	2	7	3
76 to 100	6	2	9	3
101 to 130	7	3	11	4
131 to 160	8	3	13	4
161 to 190	9	3	15	5
191 to 220	10	4	17	6
221 to 250	11	4	19	7
	Per 30 further employees +1	Per 90 further employees +1	Per 30 further employees +2	Per 90 further employees +2

*) One urinal for male employees is recommended in addition

Break areas

A break room is required when your company employs more than ten persons. Break rooms are not required when the offices are free of work-related disturbances (such as the presence of members of the public; telephone calls). Break rooms must satisfy the following requirements:

- A floor area of at least 1.00 m² per employee. A break room must have a floor area of at least 6.00 m². Note that circulation routes and utility areas for further furnishings must be added to these figures.
- Ensure that tables and seats with backrests are available for your employees.
- Avoid nuisance caused for example by vibration, dust, vapours or odours.
- Ensure that during breaks, the average sound pressure level from the equipment and from outdoor ambient noise does not exceed 55 dB(A).
- Ensure sufficient daylight.

Should you employ pregnant or nursing women, facilities must be provided for them to be able to lie down, rest and nurse their babies at the workplace or in the immediate vicinity.

3.8 Storage areas

In the interests of smooth company operations, your employees must have the necessary work materials at their disposal at all times. For this reason, maintain a store of relevant work materials and an archive of documents on current and completed processes. Important information on safe operation of your stores and filing rooms is provided below.

§ Statutory references

- Sections 3 to 14 of the German Ordinance on industrial safety and health (BetrSichV)
- Sections 3 to 4 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) Nos 1 to 3
- ASR A1.2 technical rules for workplaces, room dimensions and free movement areas
- ASR A1.8 technical rules for workplaces, circulation routes
- ASR A2.2 technical rules for workplaces, measures to prevent fire
- ASR A2.3 technical rules for workplaces, escape routes and emergency exits, escape and rescue plan
- DGUV Rule 108-007, storage facilities and equipment (formerly BGR 234)

i Further information

- DGUV Informative publication 215-441, office planning – assistance in the systematic planning and design of offices (formerly BGI 5050)
- EN 349, Safety of machinery – Minimum gaps to avoid crushing of parts of the human body, date of publication: 2008-09

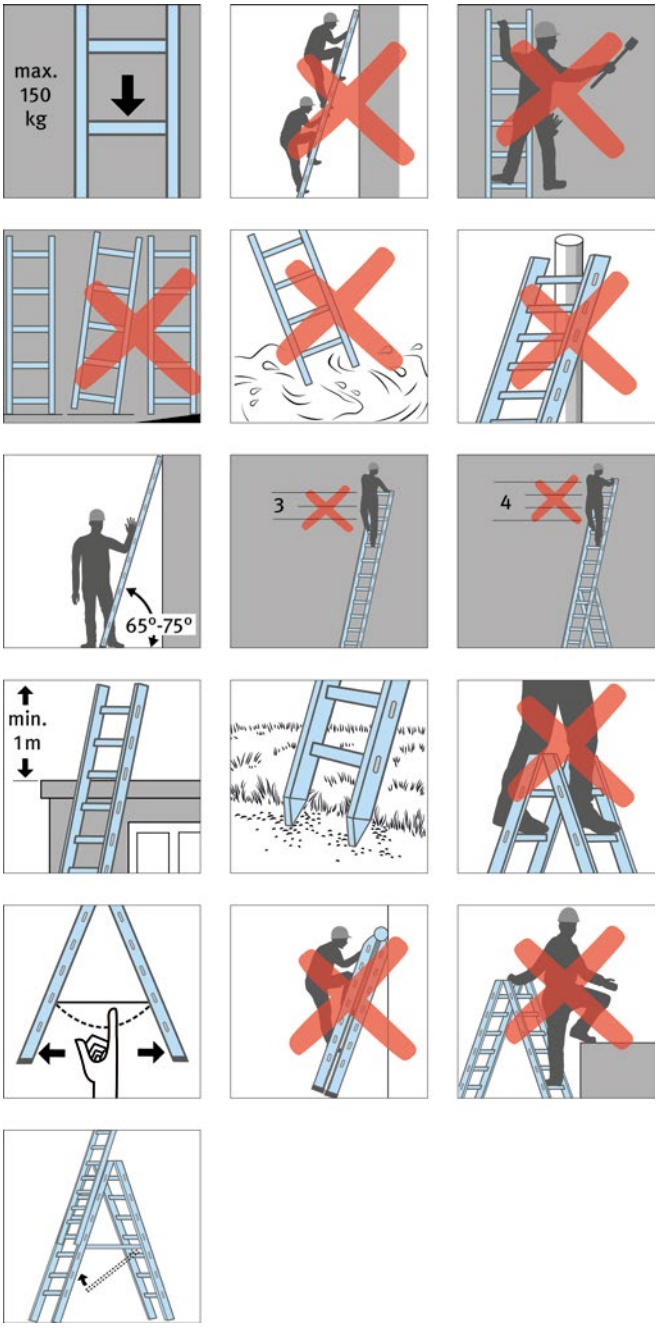


Figure 31 Example of a pictogram: ladder

Hazards

The following hazards to your employees may arise in storage areas:

- Tipping of shelves and transport equipment
- Collapse of shelves and transport equipment due to overloading
- Falling of materials and objects
- Falling from climbing aids (ladders, rolling step stools)
- Trips and falls on the level
- Pinch and collision hazards
- Cut and stab injuries caused by knives and scissors
- Fire hazards

Measures

- Ensure that your shelves are stable, for example by fixing them to the wall and ceiling or by connecting several shelves together in a suitable way. Instruct your employees to store heavy items on the lower shelves.
- Ensure that the anti-tip interlocks of filing cabinets are intact.
- Have transport equipment and shelves loaded such that the loads are distributed evenly.
- Inform your employees of the maximum loading capacity of the shelves and transport equipment, and the proper procedure for loading them.
- Protect integral lamps within reach (up to 2.50 m above floor level) in the storeroom against damage, for example by means of suitable shrouding.
- Provide suitable climbing aids (e.g. ladders) and have their safe condition checked at regular intervals. Instruct your employees in use of the climbing aids.
- Ensure that the circulation routes are clear and can be used safely. Provide circulation routes of adequate width (see Chapter 3.3.1) and ensure that materials (such as cardboard boxes) or work equipment are not left on circulation routes or where they encroach into them.
- Ensure that adequate lighting is provided (see Table 12). Your employees must be able to find their bearings in the event of an emergency.

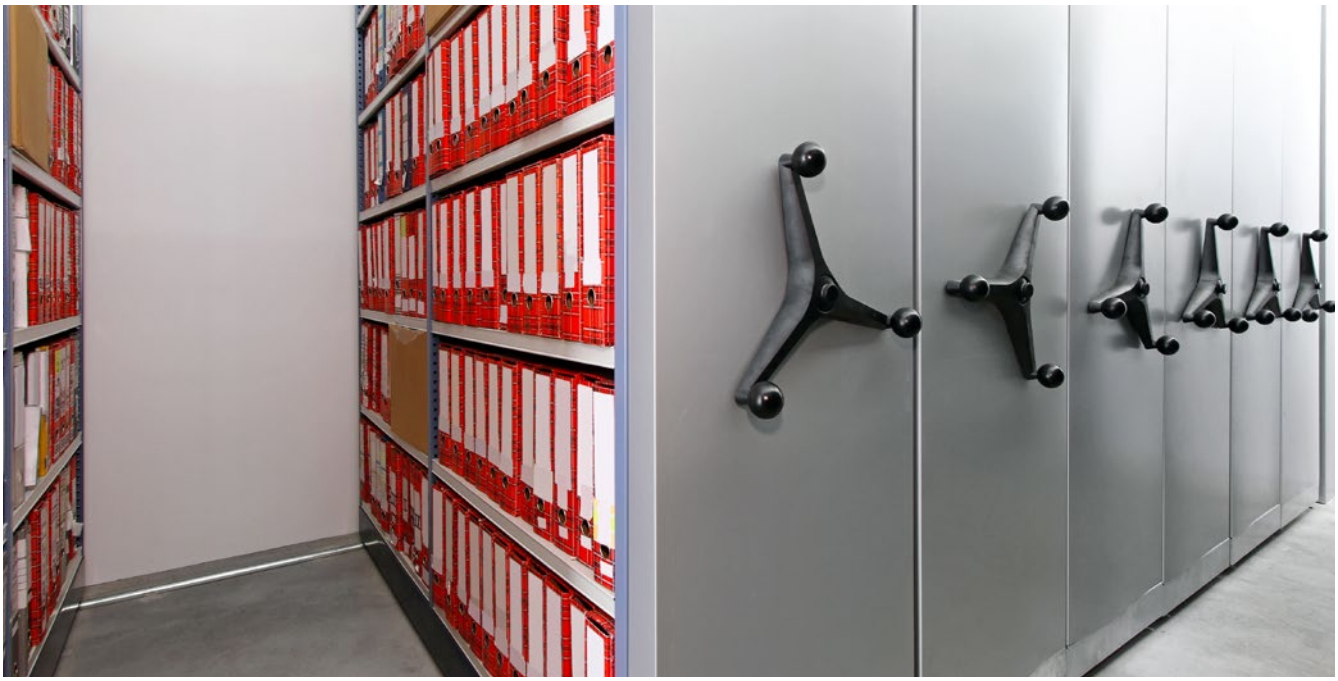


Figure 32 Model for shelving

Table 12 Minimum illuminance values with reference to ASR 3.4, Annex 1

Working area in stores/filing rooms	Minimum illuminance value
Retrieval tasks in storerooms	100 lx
Reading tasks in storerooms	200 lx
Shipping and packaging areas	300 lx

- Ensure that safety clearances are observed on moving shelving (e.g. finger pinch gap 25 mm). Instruct your employees on use of the shelving systems. Have the safety equipment (e.g. spacers) checked regularly.
- Provide your employees with suitable tools (e.g. safety cutters) for opening packaging and instruct them in practical use of these tools.
- Ensure that fires in your store or archive are detected quickly and the alarm for your employees raised without delay (for example by fire detectors).
- Make suitable fire extinguishing equipment (e.g. water or foam extinguishers) available and provide your employees with practical instruction in its use.

3.9 Road safety for field workers

Driving in traffic requires full concentration at all times. Safety systems fitted to vehicles can provide valuable assistance to your employees in this respect. All forms of distraction during use of a vehicle must be avoided. Even brief inattentiveness is frequently a cause of serious accidents.

Statutory references

- Sections 1 to 23 and 34 of the German road traffic ordinance (StVO)
- Sections 16, 19 and 29 to 67 of the German road traffic licensing ordinance (StVZO)
- Sections 1 to 6 of the German ordinance on industrial safety and health (BetrSichV)
- Sections 2 to 7 and 15 to 17 of DGUV Regulation 1, Principles of Prevention
- Sections 4 to 30 and 33ff of DGUV Regulations 70 and 71, vehicles (formerly BGV D29 and GUV-V D29)

Further information

- DGUV Informative publication 211-040, use of mobile information and communications technology at workplaces

Hazards

The work of field workers is generally characterized by heterogeneous working conditions and by deadline pressure during journeys. Hazards and stresses may arise as a result of:

- Distraction, communication, glare, obstructed visibility, and other road users
- Falling and tripping
- Pinch points on the vehicle
- Improperly secured loads
- Poor ergonomic posture
- Stress situations in the coordination of appointments, particular customer requirements, contact with base
- High pressure to perform
- Illnesses caused by assignments abroad

Measures

Your field employees carry out their work and take decisions highly autonomously. Determine the vehicles and equipment to be used, the transport of loads, the duration of journeys and the health aspects to be considered in advance.

The main causes of traffic accidents are excessive speed, failure to observe priority, insufficient distance from other vehicles, and carelessness. The roads are a dangerous workplace: according to the DGUV, 62 % of all fatal occupational and commuting accidents occur in road traffic.

Check your employees' suitability for driving tasks and that their driving licences are valid. Ensure that they receive instruction in the use of the specific vehicles. Driving safety training courses can support safe driving behaviour. If necessary, arrange for preventive occupational medical care including vaccinations before employees are posted abroad.

The quality of field service work is enhanced by a constructive corporate culture that promotes stable relationships between employees and with customers. Ensure that your company's field operations are well organized and are conducted in compliance with the applicable regulations governing working hours.

This includes:
- Stress and time management
- Complaints management
- Consideration for private life, work-life balance
- Cooperation between colleagues
- Inclusion in team meetings and further training measures

Stipulate the equipment of the vehicles, such as safety equipment, summer/winter tyres and ergonomic equipment. Provide suitable equipment for the securing of loads. Advanced driver assistance systems enhance safety and should be considered during the purchase of vehicles. Advanced driver assistance systems do not support users unless they are activated.

Mobile equipment attached to the windscreen may obstruct visibility during driving. At a viewing distance of 15 m, even a comparatively small, typical satnav causes a blind spot of 2 m × 3 m. Mobile devices, whether satnavs, smartphones, tablet PCs or laptops, constitute loads and must be secured.

Distractions of any kind during driving constitute a latent hazard. This is particularly relevant with regard to mobile information and communications technology. Instructions from satnavs, telephone calls and interaction with other multimedia applications are a source of distraction and may result for example in traffic situations not being properly judged or warning signals not being observed in time.

Ensure that your employees perform a vehicle check before setting off. This includes checking that all equipment, the seats and the mirrors are properly adjusted. Loose items should be stored in the luggage compartment, and any loads secured.

Preference should be given to the use of suitable mounts for devices with screens. The location of mobile devices must take account of the deployment area of airbags.

German law prohibits drivers from picking up or holding a mobile telephone in order to use it whilst the vehicle's engine is running.

Instruct your drivers:
- To operate navigation device or telephones only whilst the vehicle is stationary
- To keep the use of hands-free mobile telephone devices to a minimum, since any telephone call is by definition a distraction; telephone calls should preferably be conducted with the vehicle stationary and the engine switched off
- Not to play loud music
- To conduct emotional or complicated discussions before or after journeys
- To ignore distractions caused by accidents or advertising
- Where office tasks on tablet PCs or laptops are necessary, not to perform them in the vehicle, but at a table at a quiet location during a break
- To break the journey in order to eat, smoke or look for items in the vehicle
- To take regular breaks, and to perform complementary exercises during the breaks
- To snack regularly between meals

3.10 Mobile office work for field workers

Most office work is (still) performed at desks. The proportion of workers who must complete part of their office work whilst on the move is however increasing. Performing office work on the move is however not the best solution. Work requiring concentration can generally be performed more efficiently and more ergonomically at a well-equipped office workstation.

§ Statutory references

- Sections 3 to 5 of the German occupational health and safety act (ArbSchG)
- Sections 1 to 6 of the German ordinance on industrial safety and health (BetrSichV)
- Section 3 of the German Ordinance on Workplaces (ArbStättV) in conjunction with the Annex, Requirements and measures for workplaces in accordance with Section 3 (1) No 6.4

i Further information

- DGUV Informative publication 215-410, office and VDU workplaces – design guidance (formerly BGI 650)
- EN ISO 9241, Ergonomics of human-system interaction – Part 410: Design criteria for physical input devices, date of publication: 2012-12

Hazards

Your employees are exposed to the following hazards, for example as a result of unergonomic seating postures or poor screen and keyboard design:

- Constrained or poor ergonomic posture
- Stress upon the locomotor apparatus and the eyes
- Unlimited working hours, poor information flow, absence of a support network

Measures

- Ensure that your field workers observe the provisions of the German working hours act and the applicable labour agreements.
- Ensure that your employees also work under ergonomic conditions whilst at customers' premises.
- Ensure that field workers are included in the information flow within your company and are able to attend meetings and company events.

The work posture frequently observed with a laptop or tablet PC on the user's lap is not recommended for longer periods of work. This posture gives rise to shoulder and neck tension, and can cause headaches and other disorders. The underside of some laptops also becomes very hot – another reason why they should not be used in this way.

A teleworking workstation as described in the German Ordinance on Workplaces is a permanent workstation set up by you at an employee's home. You are responsible for equipping this workstation (furniture, work equipment, communications equipment). Observe Chapter 3, Office and VDU work, when setting up a teleworking workstation.

When assessing the working conditions, also take account of the mobile office work performed by your employees.

Small devices such as netbooks, sub-notebooks, ultra-mobile PCs or tablet PCs are very limited in their suitability for office work owing to their small and often reflective displays and small or virtual keyboards.

Laptops

When procuring laptop PCs, ensure that they bear the GS mark and also have:

- A display with good anti-reflective properties
- A very bright display that can also be read outdoors
- A stable, rigid casing
- A keyboard with light-coloured keys and dark lettering, since this can still be read under poor lighting conditions
- Adequate battery capacity

Should field work require several people to view the screen simultaneously, for example for presentations, laptops with a wide viewing angle should be used.

If laptops are also to be used in the office, ensure that they feature ports for an external keyboard, mouse and screen, or for a docking station.

Mouse

If your employees often work with a touchpad or trackpoint, procure additional mice. A suitable work surface, such as a table, is however required for their use. Ensure that only mice of ergonomic geometry adapted to the size of the hand are used, and not laptop mice.

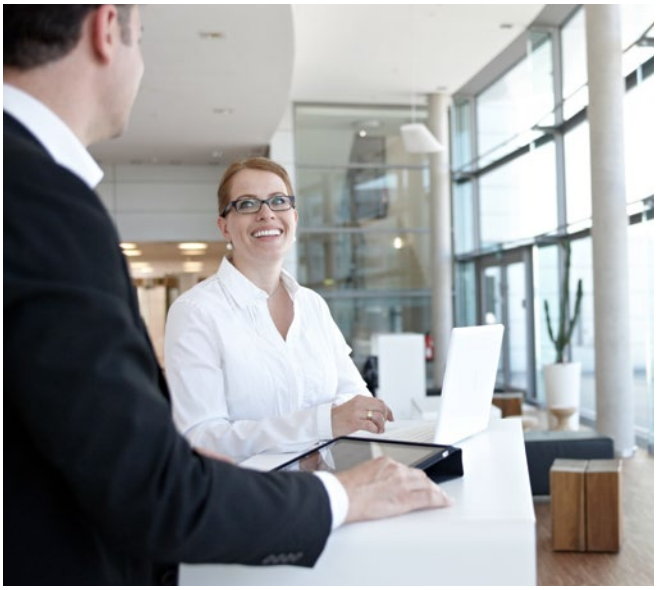
Printers

Procure mobile printers if documents must be printed out outside the office. The form of connection to the laptop (by cable, or wireless connection by means of WLAN and Bluetooth systems) is also important. Lightweight devices (less than 2 kg in weight) with high print quality are recommended.

Tablet PCs

Should you wish to use tablet PCs in field work, pay attention to the following properties at procurement:

- A bright, high-contrast and matt display
- A display largely independent of the viewing angle
- The right operating system: only for the installation of apps (e.g. Android, IOS), or also suitable for universal software (e.g. Windows 10, Linux)
- A screen size suitable for the work tasks (at least 10 inch)
- Battery capacity sufficient for a working shift



Should your field workers have to make comprehensive inputs on these devices, a virtual keyboard with small keys is not suitable, and should be supplemented by an external keyboard and a mouse. A laptop is then often the better option. Laptop PCs with removable, folding or self-flattening keyboards that can be used in the same way as a tablet PC are also possible alternatives.

A laptop or tablet PC without peripherals is not suitable for use at a fixed office workstation. In order to attain compliance with the German Ordinance on Workplaces and to permit ergonomic working, an external keyboard and mouse and a separate screen must be connected. This is particularly relevant for your field workers, who perform more extensive office tasks at home or at customers' premises.

Smartphones

- Smartphones are suitable devices for managing appointments, addresses and possibly brief notes. They can also be used to call up stored information. Ensure that when extensive editing work is performed, the data are transferred to a laptop or desktop PC.

4 Glossary

Acoustic quality

The acoustic quality of an office describes its suitability for various forms of communication.

Colour rendering index

The colour rendering index (Ra) is a dimensionless value expressing how colours in the light generated by a lamp are reproduced. The higher the value, the more faithful the colour reproduction.

Context of use

EN ISO 9241-11 employs the term "context of use" to describe the overall relationship between users, tasks and the associated equipment (hardware, software and materials). The context of use is also influenced by the physical and social environment in which equipment is used or tasks are performed.

Daily noise exposure level

The daily noise exposure level is the noise exposure level averaged over a day, an eight-hour shift. It encompasses all sound events occurring at the workplace.

Designated screen illuminance

The designated screen illuminance is a value defined by the German Social Accident Insurance for the maximum permissible illuminance on the screen caused by the ambient lighting.

Displacement volume

The displacement volume of a floor covering is the cavity beneath the walking plane and open to it that absorbs or dissipates slippery substances.

Emotional demands upon employees

Emotional demands are made upon employees when the work process generates an emotional response and the investment of effort and energy generates positive or negative feelings or moods (such as annoyance or gratification).

Emotional labour

Personal work with third parties (e.g. customers, clients, patients) may require employees to intensify, attenuate or modify their own emotions and those of third parties. The aim of emotional labour is for employees to communicate for example with angry or bad-tempered customers soberly and thereby (1) to suppress inappropriate emotions of their own as they arise, (2) to interact with third parties such that negative emotions do not arise in the first instance (for example "always smile", "de-escalate") and (3) to interact with third parties such that the latter's negative emotions (annoyance, anger, sadness) are not only attenuated, but converted into positive emotions (gratification, enthusiasm), for example in order to enhance customer loyalty. Emotional labour may lead to impairments (such as mental satiation, stress) that can be reduce by a change in task, additional breaks, training and supervision.

Free user area

Free user areas in offices are unobstructed floor areas at workstations and in meeting areas, or individual items of furniture. They constitute the minimum requirement for the user to perform the task concerned functionally and properly.

LED

LED stands for light-emitting diode. LEDs are semiconductor components that light up when current flows through them.

Legroom

Legroom is the unobstructed area beneath a desk that is available for the legs and feet.

Legibility

Legibility is a dimension for the recognizability of text and characters. A text with good legibility can be read quickly and without error. The legibility is related directly to the design of characters, lines, contrasts and surfaces.

Luminance L

Luminance is the luminous intensity per unit area. It can be stated in candelas per square metre (cd/m²).

Mental satiation

Mental satiation is a state of nervously unsettled, strongly emotional rejection of a repetitive task or situation in which the experience is of "marking time" or "not getting anywhere" (EN ISO 10075-1). When frequently repeated, a task initially experienced as pleasant or neutral loses its characteristic of being positively challenging for the person performing it. A pronounced aversion to this task then arises. In her study of mental satiation, the Finnish psychologist Anitra Karsten states that "the satiation is frequently so strong that in spite of the most rapt attention, good will, and effort the subject can no longer correctly perform the task".

Non-slip properties

The non-slip properties of a floor surface are those that effectively prevent a person from slipping on it.

Occupational medical care upon request

Under Section 11 of the German occupational health and safety act (ArbSchG) and Section 5 a of the German ordinance on preventive occupational medical care (ArbMedVV), the employer is obliged to provide the employee at the latter's request with regular occupational medical consultations and check-ups. A right to occupational medical care upon request does not exist when the risk assessment and the protective measures taken indicate that no harm to health need be anticipated.

Psychosocial (working) conditions

Psychosocial conditions refer to mental factors (perception, thinking, action, feelings) in a social context (i.e. fair distribution of tasks within a working group; expectations of work performance are governed by standards within working groups).

Reverberation time

The reverberation time is the time taken for the sound pressure level to fall by 60 dB, for example after a loud noise.

Sans-serif font

The font used here is a sans-serif font, since it lacks concluding strokes at the end of letters. Conversely, this sentence employs a serif font.

Skilled electrician

A person whose training, knowledge and experience and familiarity with the relevant regulations enable him or her to assess and perform electrical work to which he or she has been assigned.

Sound assessment level

The sound assessment level is the value of the sound pressure level of the sound events arising at a workplace or during a task, averaged over a specified period of time (such as an hour or a working day).

Translucent areas

Translucent areas are areas of windows, doors, walls or skylights made of glass, plastic or other materials through which light can pass.

UGR value

UGR stands for unified glare rating. The UGR value is an arithmetic dimensionless value that expresses the level of psychological glare caused by a lighting installation for a defined observer in an indoor space.

Workplace

Workplaces are:
1. Work rooms or other locations in buildings on a company's site.
2. Outdoor locations on a company's site.
3. Locations on construction sites, where intended for use as workplaces.

(2) Workplaces also particularly include:
1. Locations on a company's site or a construction site to which employees have access in the course of their work.
2. 2Circulation routes, escape routes, emergency exits, storerooms, machine rooms and ancillary rooms, sanitary areas, canteens, break and stand-by rooms, first-aid areas, living accommodation.
3. Facilities for operation of the workplace, particularly safety lighting, fire extinguishing equipment, utilities, lighting installations, HEVAC installations, signalling installations, power distribution installations, doors and gates, moving walkways, escalators, loading ramps and ladders.

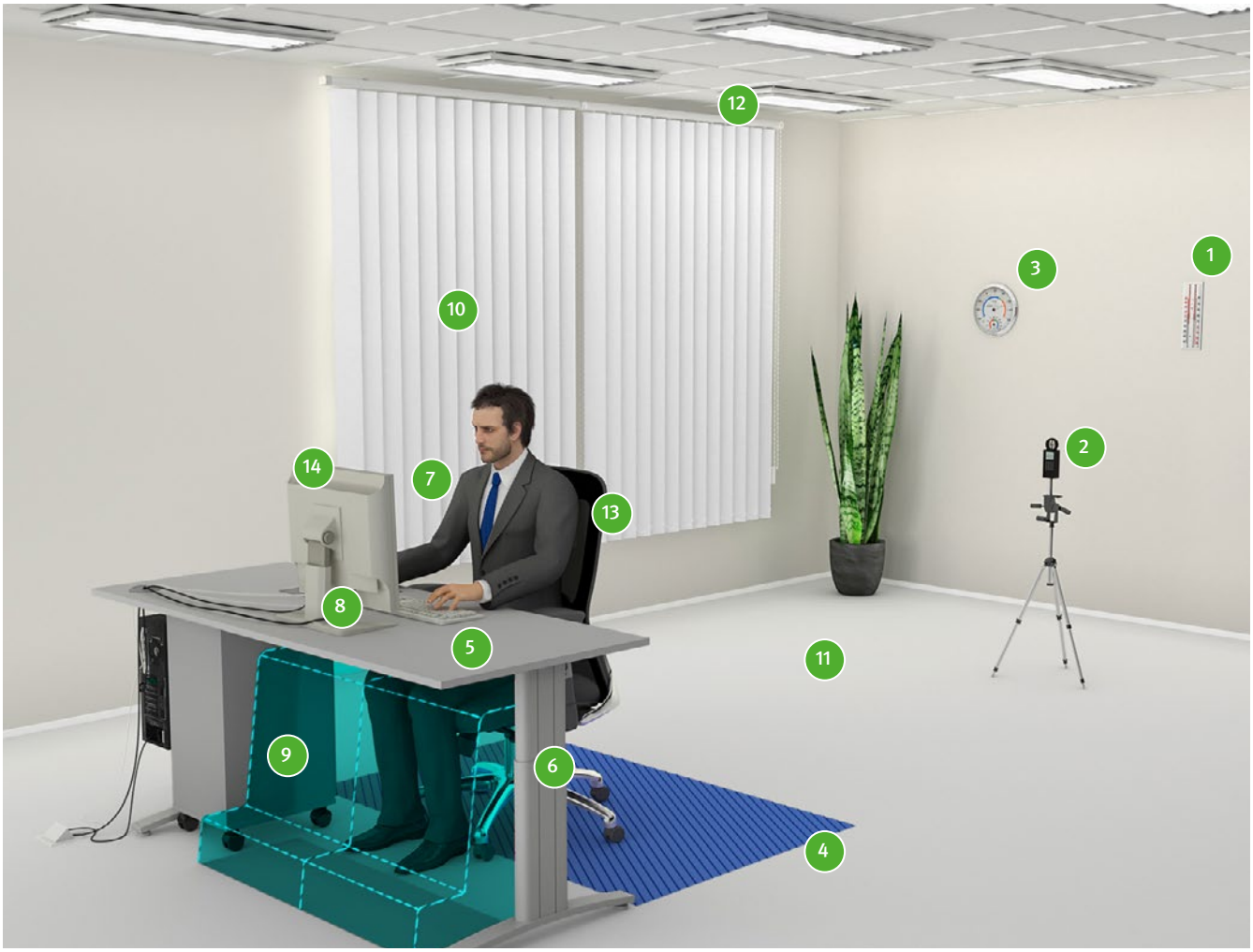
Workplace health management

Workplace health management encompasses the systematic development and control of company structures and processes with the objective of using the health-conscious design of work and organization and the equipping of individuals to behave in a health-conscious manner in order to retain and enhance employees' health and performance.

Workplace health promotion

Workplace health promotion encompasses all measures taken by a company for the purpose of enhancing health literacy and generating conditions and behaviour conducive to good health, in order to improve the employees' health and well being. These measures also include discrete measures of limited duration.

Minimum requirements for VDU workplaces (overview)



1. Temperature (20 °C -22 °C)
2. Air velocity (max. 0,15 m/s)
3. Relative atmospheric humidity (max. 50 %)
4. Free movement area (at least 1.5 m² and at least 1m deep and wide
5. Desk dimensions (at least 160 × 80 cm)
6. Desk height (at least 74 ± 2 cm; preferably fully height-adjustable)
7. Viewing distance (at least 50 cm)
8. Screen height (as low as possible; topmost line no higher than eye level)
9. Legroom (legroom as shown in the image at least 85 cm; preferably 120 cm or greater)
10. Position of the screen with respect to the glazed wall (direction of view parallel to the glazed wall)
11. Acoustics (55 dB(A) – 70 dB(A), reverberation time between 0.5 and 0.8 s)
12. Lighting (500 lux – 750 lux; colour reproduction)
13. Chair for office work
14. Suitable reflectance values (0.15 to 0.75)

Links and further literature

Risk assessment

Practical support and assistance in performance of a risk assessment in office companies can be found at www.gefaehrdungsbeurteilung.de (a resource of the Federal Institute for Occupational Safety and Health, BAuA)

Resources for instruction

All media presented here are available for download free of charge at www.vbg.de.

VBG (eds.): VBG-Fragebogen Büro-bereich, FB 6 (questionnaire for safety and health at work). Resources for the provision of instruction to office employees.

VBG (eds.): VBG-Info; Gesund arbeiten am PC. Testen Sie Ihren Arbeitsplatz (Version 2.1/2016-01), Hamburg. Leaflet for the provision of instruction at VDU workplaces; with information on the placement and arrangement of work equipment on the desk and correct adjustment of desk and chair.

VBG (eds.): VBG-Info; Gymnastik im Büro. Fit durch den Tag (Version 1.1/2010-12), Hamburg. Leaflet for promoting exercise in offices. With numerous instructions for exercises that can be performed on the chair at the workplace or in the break room.

Practical aids

VBG (eds.): VBG-Praxis-Kompakt; Die Qual der Wahl – wie beschaffe ich den passenden Stuhl? (Version 1.2/2015-03), Hamburg. Compact informative document providing assistance in selecting and purchasing suitable office chairs.

VBG (eds.): VBG-Praxis-Kompakt; Software nutzerfreundlich einstellen und gestalten (Version 2.4/2016-11), Hamburg. Informative document with practical tips on software ergonomics and advice on using and designing software

Links to further sector-specific information

- www.dgb.de

Website of the German Trade Union Federation (DGB)

- www.arbeitgeber.de

Website of the Confederation of German Employers' Associations

- www.baua.de

Website of the Federal institute for Occupational Safety and Health (BAuA)

- www.dguv.de

Website of the German Social Accident Insurance (DGUV)

- www.vbg.de

Website of the German Social Accident Insurance Institution for the administrative sector (VBG)

- www.verdi.de

Website of the German United Services Trade Union (ver.di)

Annex 1

Testing of work equipment, excerpt from the TRBS 1201 Technical Rules for industrial safety: testing of work equipment and installations requiring regular inspection

Table 13 Proven test intervals for repeat tests/checks

Work equipment	Test interval	Scope of testing
Electrical equipment (stationary)	Every four years	Testing in accordance with the applicable electrical rules
Electrical equipment (mobile, where used) Includes: power and extension leads	Every six months Where the fault rate is < 2%: at all work premises outside offices: once per year In offices: every two years	Testing in accordance with the applicable electrical rules If a fault rate of < 2% is attained, the test interval can be extended to the intervals stated in the "Test interval" column. Note that only items of equipment from the same or comparable areas are to be used for calculation of the fault rate (e.g. only from the workshop, only from manufacturing, only from the offices).
Shelving (including power shelving)	Once per year	Condition of the components and facilities, completeness and effectiveness of the control and safety facilities, signage

Table 14 Proven intervals for visual inspection prior to use and for function checks

Work equipment	Interval	Scope of visual inspection/function check
Ladders	Before each use	Visual inspection for damage and completeness

Deutsche Gesetzliche
Unfallversicherung e.V. (DGUV)

Glinkastraße 40
10117 Berlin
Germany
Tel.: 030 288763800
Fax: 030 288763808
E-Mail: info@dguv.de
Internet: www.dguv.de