

## **Guideline**

Quality Criteria for  
Office Workplaces

**L-Q 2010**

Requirements for products

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## Preface

Over the last decades, a process of change has taken place in the industrialized nations that has changed the basic structure of society. The industrial society with its large proportion of productive workers has been transformed into a service society, which is now heading to become an information society. In Germany, nearly every second employee works at an office workplace today.

### **The strains caused are low but not zero**

In comparison with many industrial workplaces, office jobs are considered to be significantly less straining. This is due to the fact that impairments such as caused by dirt, moisture, noise in excess of 80 dB(A) or vibrations, to mention but a few, are problems not regularly found in offices. Nonetheless, even office work can be hazardous to the health and well-being of the people concerned. In particular, the high proportion of work with visual display units brings in very specific strains that are typical for office work.

Common phenomena are for example insufficient physical activity, tense postures or too few changes of posture during the office work. And all of this even though we know today, that lack of exercise is liable to not only cause permanent back problems but also to affect the cardiovascular system. In addition there are mental-health problems which are nowadays responsible for at least ten percent of the sick certificates and represent, according to the World Health Organization (WHO), one of the greatest challenges for the western advanced-economy nations. Even possible visual impairment and stress caused by permanent acoustic diversions remain to be a problem. Consequently, the good standard achieved notwithstanding, there are numerous starting-points for improving the quality of office work.

### **The many factors influencing office work**

In the context of the 2006 Labour Force Survey of the Federal Institute for Occupational Safety and Health (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, BAuA) and the Federal Institute for Vocational Education and Training (Bundesinstitut für Berufsbildung, BiBB), 34,3 % of all the employees of administrative occupations in Germany queried, declared to be suffering from pains in the lower back at least occasionally. 47,8 % of the employees stated to suffer from pains in the neck and shoulder region and still 7,3 % about burnout symptoms – with tangible results. In 2009, 22 % of the retirees and pensionaries, who had worked in office or organizational occupations before, had to retire early for health reasons according to the Federal Bureau of Statistics.

In any case, there are many different causes. Among other things backache can be caused by bad chairs, tables with unsuitable working heights, visual displays set wrongly, bad illumination, glare, excessively high work intensity, overtaxing as regards content, or by a lack of breaks. Even noise can cause the people affected to move considerably less, thus, indirectly leading to backache. However, in general it is not just one single cause that leads to physical disorders but a bundle of factors amplifying each other. The greatest challenge when designing good working conditions lies in the interplay of multi-factor influences within the office.

Measures for health prevention should therefore always use both, the design of the working conditions (situational prevention) and the behavior of the affected people themselves and their managers and executives (behavioural prevention), as starting points.

### **Assured knowledge and individual freedom of design**

Worldwide, the question of how to organize work so it can be considered to be healthy and economically effective is discussed and investigated. The results of these examinations have been incorporated in the development of modern office furniture as well as into the practices of consultation and office design. Combined with the expert knowledge and experience of the editors they form the basis of the "Guideline Quality Criteria for Office Workplaces – L-Q 2010".

The requirements for office furniture described in the guideline are intended to assist the companies when selecting and evaluating office workplaces. In addition to requirements for products, the guideline specifies corresponding services. These services help to include the generally valid provisions of good office work into an individual design and to conjoin the individual ergonomic components so as to form a functional system of work.

### **Preparing for the future by prevention**

Prevention, as in preserving and promoting the physical and emotional well-being of the employees, is a central task for companies and entrepreneurs. Amplified by the altered contents and requirements of work, by the effects of demographic change, by the prolongation of the working life, and by the foreseeable lack of qualified employees, the success of preventive measures will also become a crucial success factor for the economic development of many companies.

In this respect, the editors consider the guideline "Quality Criteria for Office Workplaces – L-Q 2010" also to be an investment in the future of office work.



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# Explanations

The first version of the guideline "Quality Criteria for Office Workplaces" was published in 2006 under the designation "L-Q 01-06" and provided a comprehensive means of orientation for the selection of products and services for furnishing office workplaces. From the outset, the guideline contained criteria for ergonomic aspects, safety features, sustainability criteria, and function-related properties of office furniture. In addition, each of the requirements was provided with an explanation of the benefits. The present updated version of the guideline also follows this principle. Moreover, it now contains supplementary criteria intended to further increase its usability as means for selection and orientation.

## Weighting of the requirements

In principle, the quality criteria stipulated here apply to all types of office workplaces. However, some of the criteria can change their meaning in the context of application and when different workplace elements are combined (system ergonomics). The guideline therefore contains different groups of requirements.

- Criteria formulated as "shall" phrases are important to all office workplaces, irrespective of the application context and the surroundings of the furniture concerned.
- Criteria given as "should" phrases are also of significance for all application cases. However, in context with other furnishing aspects or with certain product characteristics, it is possible for conflicting requirements to be applicable. In these cases, consideration shall be given to which priority is to be assigned to the individual design aspects in the overall context of the respective workplaces.
- Criteria preceded by the word "optional" are recommendations that are in many application cases suitable to further increase the beneficial effect of products and furnishing.

## From guideline to quality sign




Based on the guideline "Quality Criteria for Office Workplaces" the QUALITY OFFICE sign is awarded. This certification is open to all companies whose services and products meet the quality requirements of the guideline L-Q 2010.

For further information, go to [www.quality-office.org](http://www.quality-office.org).

## Part I Product related recommendations

### 1 Quality requirements for the basic conception of products and sales services

also see the "survey of relevant sets of rules" given in the appendix

	Quality Criteria	Benefits
<b>11</b>	<b>Requirements for the basic conception of products</b> The superior quality criteria stipulated here are requirements that all of the products listed in the guideline have to fulfil. They are intended to ensure occupational safety and general product quality.	
<b>11.1</b>	<b>Requirements for the product standard</b>	
11.1.1	 <p>All products shall be marked with the GS mark.</p>	The GS mark (= "Tested for safety") guarantees minimum standards for safety and ergonomics as well as longevity for the product.
11.1.2	 <p>All products equipped with parts to be adjusted by electromotive means shall be marked with the CE symbol.</p>	The CE symbol (= "Communauté Européenne") documents conformity with the European Machinery Directive 2006/42/EC.
11.1.3	 <p>The criteria stipulated in this guideline serve as a basis for awarding the QUALITY OFFICE label.</p>	The QUALITY OFFICE certificate guarantees a holistic product quality with regard to the following aspects: <ul style="list-style-type: none"> <li>• functioning and technology;</li> <li>• ergonomics and safety;</li> <li>• ecology and cost-effectiveness.</li> </ul>
<b>11.2</b>	<b>Requirements for the product conception</b>	
11.2.1	All products shall be series-produced products.	Series-produced products ensure the follow-up delivery of individual parts and system parts over a manageable period of time.
11.2.2	Products shall be expandable or convertible by means of add-ons and/or constructional elements or mounting parts, respectively, as relevant for their functioning and in correspondence with the user requirements.	The workplaces can be adapted to operation specific and individual requirements <ul style="list-style-type: none"> <li>• at any time, also retroactively;</li> <li>• at minimised costs.</li> </ul>
11.2.3	All products should formally and functionally be matched to one another (compatibility of dimensions, shapes, colours and materials).	Dimensional and design related compatibility of the office furniture ensures a harmonious and cost-effective combination of all functional elements in different types of office spaces and for different office processes.

	Quality Criteria	Benefits
<b>11.3</b>	<b>Requirements for the production management</b>	
11.3.1	The manufacturer shall have a professional quality management system installed officially and integrated structurally, e.g. in accordance with ISO 9001.	The on-going quality control and quality assurance <ul style="list-style-type: none"> <li>• ensure high quality and longevity of the products;</li> <li>• are prerequisites for the expandability and convertibility of the functional elements by means of modular components.</li> </ul>
<b>11.4</b>	<b>Requirements for the ecological quality</b>	
11.4.1	The manufacturer shall have installed a structured environmental management system, e.g. in accordance with ISO 14001 or EMAS II.	A professional environmental management avoids or minimises ecological impacts in the product concept – during manufacturing, use, and disposal of products.
11.4.2	The product design conception shall take into account from the start that <ul style="list-style-type: none"> <li>• materials can be separated by type; and</li> <li>• varnishes, coatings, and adhesive bonds cause only a minimum of inevitable emissions.</li> </ul>	Thus, ecological impacts during manufacturing, use, and disposal are reduced or avoided.
11.4.3	Optional: Upon completion of their useful life, the manufacturer should take back his products, if and as agreed.	The products are disposed of in an environmentally friendly way and the components are returned to the raw materials cycle.
<b>11.5</b>	<b>Requirements for the information management</b>	
11.5.1	The manufacturer shall provide his customers with comprehensive application information exceeding mere product information, particularly with regard to the safe installation and use of electronic equipment.	Meaningful information helps when operating and using the product as well as when developing the functional design of workplaces and work spaces.
11.5.2	The application information should include recommendations for an ergonomically beneficial usage.	
11.5.3	Instructions, manuals or labels shall be available in the official language of the country of destination and/or be clarified by means of comprehensible pictograms.	Comprehensible product and application information is a prerequisite for proper use of the products and for safety at work.

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>12</b>	<b>Requirements for product related sales services</b>	
	The design of office furniture and seminar facilities shall take into account the requirements of the company, the given functional and spatial conditions, and the users' needs. Therefore, the purchaser has a right to a comprehensive and individual sales advisory service which can be used both before the decision and during use.	
<b>12.1</b>	<b>Requirements for the local sales services</b>	
12.1.1	The sales organisation shall have trained sales and advisory personnel available "on site".	This ensures fast and professional consultation or problem solution.
12.1.2	In all sales regions, showrooms shall be available in which the essential variants of products or services can be inspected and tested.	Quality and performance of the products can be judged on the original, thus avoiding decisions to be made solely based on the catalogue.
12.1.3	The sales organisation shall be able to provide the potential customer with original samples for the purpose of testing them on site.	Only prolonged testing of the seating allows for the functioning, ergonomics, and quality of office chairs to be evaluated objectively (and in their subjective effect).
<b>12.2</b>	<b>Requirements for delivery and assembly</b>	
12.2.1	The sales organisation shall have trained technical customer service staff available "on site".	This ensures that both new furnishings and changes to existing furniture are executed timely, professionally, and costeffectively.
12.2.2	The employees of the sales organisation shall be able to perform delivery and installation at the respective future workplace in accordance with the layout planning.	
<b>12.3</b>	<b>Requirements for after-sales services</b>	
12.3.1	Upon delivery and installation, an individual introduction into how to use the piece(s) of furniture concerned shall be offered together with a check for optimal functioning.	This ensures that the furniture is used correctly and that its benefits take effect.
12.3.2	Suppliers of furnishings for offices and seminar rooms should be able to offer their customers regular checks for optimal functioning.	These measures give the customer assurance that the convenience of his furniture is maintained over a long period of time.
12.3.3	Optional: Suppliers of furnishings for offices and seminar rooms should be able to offer their customers contracts for maintenance measures to be performed in fixed service intervals.	
12.3.4	The supplier should offer a spare part catalogue.	
12.3.5	Spare part and supplementary deliveries of standard items shall be carried out within only a few days.	Thus, waiting times are avoided during which products, furnishings, and spaces can be used only partially or not at all.

## 2 Quality requirements for office chairs

also see the requirements for the basic conception in chapter 1 as well as the dimensions and the "survey of relevant sets of rules" given in the appendix.

Office chairs include regular office chairs, visitors' chairs and conference chairs used in office areas. They are part of the work equipment, of which its function and formal design have a causal effect on the well-being and the performance of the people concerned. Therefore, they are required to be of high quality with regard to safety, functioning, and ergonomics.

Quality Criteria	Benefits
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### 20 Requirements for the basic conception of office chairs

#### 20.1 Requirements for the formal design

20.1.1	Optional: Office chairs, visitors' chairs and, if necessary, conference chairs should, by their fundamental design concept, be easily recognisable as belonging to a harmonised product "family".	The use of a consistent language of forms and materials for the entire furniture is a prerequisite for it to be used flexibly. In addition to that, CI or CD strategies, respectively, are supported.
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#### 20.2 Requirements for the materials to be used

20.2.1	All visible steel and aluminium parts of the seating shall be available in several resistant surface finishes.	Thus, the surfaces concerned are largely protected against damage, which is a prerequisite for an aesthetically pleasing and representative design and for longevity.
20.2.2	All synthetic parts used in visible areas shall be resistant against scratching and UV radiation.	Thus, synthetic materials are protected against "optical ageing".
20.2.3	All textile fabrics used shall be UV resistant.	Thus, the upholstery is protected against early "fading".
20.2.4	For the upholstery, a choice of colour and design collections should be available.	This allows for a differentiated interior design. If required, chairs with different seat covers can be combined.
20.2.5	Upholstery foams shall be CFC-free and recyclable.	Thus, harmful emissions cannot occur and it is ensured that the material concerned will be disposed of in an environmentally friendly manner.

#### 20.3 Requirements for the upholstery

20.3.1	The upholstery of all office chairs shall permanently provide for an ergonomically beneficial pressure distribution.	Thereby, pressure peaks in the areas of the upper thighs, buttocks, and ischial tuberosity are avoided thus reducing possible discomfort when sitting.
20.3.2	Seat and backrest upholsteries should be replaceable.	The longevity of the products increases.
20.3.3	The fabrics used for coverings should not be glued.	This facilitates material separation at the end of the product's useful life.

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>20.4</b>	<b>Requirements for chair castors</b>	
20.4.1	Braking of the chair castors shall be load-controlled.	Load-controlled castors prevent the chair from rolling away when the seat is unoccupied, i.e. unloaded, which helps to ensure occupational safety. When loaded, they make it easier to move the chair.
20.4.2	Office chairs shall allow for being fitted with hard castors (for use on soft floors) and soft castors (for use on hard floors).	Soft castors increase the rolling resistance whereas hard castors reduce it (occupational safety). Castors used correctly minimise the wear on the flooring materials.
<b>20.5</b>	<b>Requirements with regard to ease of servicing</b>	
20.5.1	Chair castors shall be interchangeable without using a tool.	Replacing hard castors by soft castors and vice versa is facilitated (see 20.4.2). Flexibility of use is increased.
20.5.2	It shall be possible for all office chairs to be easily and quickly assembled and disassembled by (trained) in-house personnel. If possible, use of special tools should not be required. (Works on the mechanics are to be performed by specialist staff only!)	Thus, any changes necessary can be implemented quickly and cost-efficiently.

Quality Criteria	Benefits
<b>21</b>	<p><b>Requirements for office chairs</b> also see the requirements for the basic conception in chapters 1 and 2, section 20 as well as the dimensions and the “survey of relevant sets of rules” given in the appendix.</p> <p>People working in offices spend the largest part of their working time in a sitting position, i.e. a posture causing considerable strain (due to the static work required to hold up head and spine). Therefore, “dynamic” sitting in correspondingly suited office work chairs is of the essence for their health, well-being, and labour efficiency.</p>
<b>21.1</b>	<p><b>Requirements for the dynamics of sitting</b></p>
21.1.1	<p>To allow for dynamic sitting, seat and back rest shall move synchronously, i.e. maintaining a matched ratio.</p> <p>Thereby, they support the movements of the spinal column and avoid static postures. Sitting dynamically has a positive effect on the blood flow (and, as a consequence, the oxygen supply), maintains the efficiency of the muscles and reduces the strain on the intervertebral discs.</p>
21.1.2	<p>The backrest shall form a sufficiently large opening angle with the seat (see “Dimensions, office chairs, I”).</p> <p>This is a prerequisite for the space available for movement to be sufficient.</p>
21.1.3	<p>It shall be possible for the backrest resistance (resilience when leaned against) to be adapted to the weight of the user. This can be achieved either by using a mechanical system that can be operated in a sitting position or by using an automatic weight adjustment system with supplementary fine adjustment.</p> <p>This adjustment ensures the individually correct backrest contact to be maintained.</p>
<b>21.2</b>	<p><b>Requirements for the seat</b></p>
21.2.1	<p>The seat shall be height adjustable (see “Dimensions, office chairs, I”).</p> <p>To have the height of the seat adjusted to the respective user’s height is a prerequisite for ergonomic seating.</p>
21.2.2	<p>The seat shall be formed anatomically in case the depth of the seat surface is non-adjustable.</p> <p>Anatomically formed seats prevent the pelvis from tilting backwards.</p>
21.2.3	<p>Even if the working posture is inclined backwards, a rise of the leading edge of the seat shall occur to only an imperceptible degree or not at all.</p> <p>Thus, the upholstery cannot press against the upper thigh(s) and circulatory problems are avoided.</p>
21.2.4	<p>The seat’s suspension should remain active even with the seat in its lowest position.</p> <p>This mechanism prevents the spine from being jolted when sitting down.</p>
21.2.5	<p>Optional: It should be possible for the depth of the seat surface to be adapted to the user’s physical dimensions taking into consideration that the contours of the seat upholstery near the back shall be such that no pressure points can occur.</p> <p>By means of adjustable seat surfaces the supporting area for the upper thighs and seat area can be adapted to the user’s individual physical dimensions.</p>
21.2.6	<p>Optional: The seat surface should allow for being tilted forward as a whole.</p> <p>For the seat surface to be tilted forward is sensible for activities, which require sitting upright for longer periods of time. With simultaneous adjustment of the height of the desk it brings the spinal column into its natural double-S shape.</p>

	Quality Criteria	Benefits
<b>21.3</b>	<b>Requirements for the backrest</b>	
21.3.1	The backrest shall be formed anatomically and shall fully support the user's back. When sitting upright, the lumbar vertebral region (lordosis) shall rest against a lumbar support.	In conjunction with an individually adapted lumbar support, the anatomical form reduces the static strain on the back muscles required to hold up the spine.
21.3.2	The lumbar support shall be formed and positioned so that it supports the user at optimum height, irrespective of his or her body height. This is achieved by adjusting the lumbar support itself, its height or the entire backrest, respectively.	
21.3.3	Optional: The depth of the lumbar support should be adaptable to any individual back contours.	Thus, the supporting effect of the backrest is improved.
21.3.4	The backrest shall be sufficiently high and is to reach the user's shoulder region (see "Dimensions, office chairs, I").	Support of the neck/shoulder region helps to relieve the spinal column and related muscles.
21.3.5	Optional: The office work chair should be equipped with an adjustable headrest/neck support.	For backward inclined sitting positions, this minimises, e.g. the static strain on the neck muscles required to hold up the head.
<b>21.4</b>	<b>Requirements for the armrests</b>	
21.4.1	The armrests of an office work chair shall be adjustable in height (see "Dimensions, office chairs, I").	Individually adjusted armrests relieve the shoulder girdle and protect from irritation of tendons and tendon sheaths. In addition, they facilitate getting up and sitting down.
21.4.2	The clear width of the armrests shall be adjustable (see "Dimensions, office chairs, I").	This provides all users with sufficient room to move and support and is therefore a prerequisite for an ergonomically optimised sitting position.
21.4.3	Optional: The armrests should be adjustable in depth and/or be hinged.	This allows for adjustment to different users and tasks as well as for setting the distance between the table's edge and the backrest of the chair.
21.4.4	The armrests shall have a soft surface for the arms to rest upon.	This prevents pressure points in the area of the forearms.
21.4.5	The armrests shall be replaceable and shall allow for retrofitting if required.	This service friendly technology increases the long-term product benefits (by fast adjustment to changed requirements), facilitates stock keeping and avoids high costs for assembly, rebuilding, and procurement of new furniture.

Quality Criteria	Benefits
<b>22</b>	<p><b>Requirements for visitors' chairs</b> also see the requirements for the basic conception in chapters 1 and 2, section 20 as well as the dimensions and the "survey of relevant sets of rules" given in the appendix.</p> <p>The quality criteria for visitors' and conference chairs are determined, on the one hand, by their service life as expected based on the intended use and, on the other hand, by provisions applicable within the company concerned (such as representation, hierarchy, flexibility of use, etc.).</p> <p>Visitors' chairs are generally used for short periods of time. The models used for this purpose are normally built with a four-legged, cantilever or similar frame. As far as the fundamental design concept is concerned, these chairs are subject to the same requirements as regular office chairs (see chapter 20).</p>
<b>22.1</b>	<b>Requirements for seat and backrest</b>
22.1.1	<p>The seat and backrest of visitors' chairs shall provide for a high degree of sitting comfort. At this, the upholstery and its design and composition are factors of importance.</p> <p>This ensures an adequate sitting comfort for the users helping them to maintain their concentration.</p>
22.1.2	<p>The seat shall be formed anatomically.</p> <p>Anatomically formed seats prevent the pelvis from tilting backwards.</p>
22.1.3	<p>The seat shall be of sufficient width and depth (see "Dimensions, office chairs, II").</p> <p>This is a prerequisite for users of different physical dimensions to be able to sit comfortably.</p>
22.1.4	<p>The backrest shall be formed anatomically and shall specifically support the lumbar vertebral region (lumbar support).</p> <p>The anatomical form reduces the static strain on the back muscles required to hold up the spine.</p>
22.1.5	<p>The backrest shall be of sufficient height (see "Dimensions, office chairs, II").</p> <p>Supporting the back over the greatest possible area helps to relieve the spinal column and related muscles.</p>
<b>22.2</b>	<b>Requirements for the armrests</b>
22.2.1	<p>Visitors' chairs should be offered with armrests. Their height shall be ergonomically beneficial to the largest possible number of users (see "Dimensions, office chairs, II").</p> <p>Armrests relieve the shoulder girdle. In addition, they facilitate getting up and sitting down.</p>
22.2.2	<p>The clear width between the armrests shall be dimensioned so that it is ergonomically beneficial to the largest possible number of users (see "Dimensions, office chairs, II").</p> <p>This provides all users with sufficient room to move and support and is therefore a favourable condition for an ergonomic sitting position.</p>
<b>22.3</b>	<b>Requirements for the technical concept</b>
22.3.1	<p>Optional: Chairs with a four-legged or cantilever frame should be stackable and of the lowest possible weight.</p> <p>This allows for space- and cost-saving stock keeping and facilitates temporary provision of stowed seats.</p>
22.3.2	<p>For visitors' chairs that are stackable, fitting transportation devices should be offered.</p> <p>This facilitates handling and ensures occupational safety when rearranging or refurbishing.</p>

	Quality Criteria	Benefits
<b>23</b>	<p><b>Requirements for conference chairs</b> also see the requirements for the basic conception in chapters 1 and 2, section 20 as well as the dimensions and the “survey of relevant sets of rules” given in the appendix.</p> <p>The quality criteria for conference chairs are determined, on the one hand, by the length of time they are sat upon as expected based on the intended use and, on the other hand, by provisions applicable within the company concerned (such as representation, hierarchy, flexibility of use, etc.). Thus, using conference chairs with a star base as well as models with a four-legged or cantilever frame may be considered. Due to the fact that conference chairs are generally sat upon for long periods of time, great store should be set on maximum sitting comfort. Therefore, in many cases, the use of regular office chairs is sensible as an alternative to conference chairs.</p>	
<b>23.1</b>	<b>Requirements for the seat and backrest</b>	
23.1.1	The seat and backrest of conference chairs shall provide for maximum sitting comfort. At this, the upholstery and its design and composition are factors of importance.	This ensures adequate sitting comfort for the users helping them to maintain their concentration.
23.1.2	The seat shall be formed anatomically.	Anatomically formed seats prevent the pelvis from tilting backwards.
23.1.3	The seat shall be of sufficient width and depth (see “Dimensions, office chairs, III”).	This is a prerequisite for users of different physical dimensions to be able to sit comfortably.
23.1.4	The backrest shall be formed anatomically and shall specifically support the lumbar vertebral region (lumbar support).	The anatomical form reduces the static strain on the back muscles required to hold up the spine.
23.1.5	The backrest shall be of sufficient height and is to reach the user’s shoulder region (see “Dimensions, office chairs, III”).	Support of the shoulder/neck region helps to relieve the spinal column and related muscles.
<b>23.2</b>	<b>Requirements for the armrests</b>	
23.2.1	Conference chairs should be offered with armrests. Their height shall be ergonomically beneficial to the largest possible number of users (see “Dimensions, office chairs, III”).	Armrests relieve the shoulder girdle. In addition, they facilitate getting up and sitting down.
23.2.2	The clear width between the armrests shall be dimensioned so that it is ergonomically beneficial to the largest possible number of users (see “Dimensions, office chairs, III”).	This provides all users with sufficient room to move and support and is, therefore, a favourable condition for an ergonomic sitting position.
<b>23.3</b>	<b>Requirements for the technical concept</b>	
23.3.1	Optional: Conference chairs with a four-legged or cantilever frame should be stackable.	This allows for the chairs to be stowed efficiently and for the conference facilities to be adapted to changing numbers of users.
23.3.2	Conference chairs with a swivel-star base should be provided with seat height adjustment.	By this means, any user can achieve his or her optimal sitting height.
23.3.3	Conference chairs with a star base should swivel back into their initial position after use, e.g. by means of a recuperating spring.	Given this, conference rooms always look tidy.

### 3 Quality requirements for office furniture

also see the requirements for the basic conception in chapter 1 as well as the dimensions and the "survey of relevant sets of rules" given in the appendix.

Office furniture includes office desks, visitors' and conference tables used in office areas as well as office containers, office cabinets and partitions in the office. They are part of the work equipment having an effect on the well-being and health as well as on the performance of the people concerned. Therefore, they are required to be of high quality with regard to safety, functioning, and ergonomics.

Quality Criteria	Benefits
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#### 30 Requirements for the basic conception of office furniture

##### 30.1 Requirements for the formal design

30.1.1	Optional: Office workplaces, visitors' and conference tables, office containers, office cabinets and partitions should, by their basic design concept be easily recognisable as belonging to a harmonised product "family".	The use of a consistent language of forms and materials for the entire furniture is a prerequisite for it to be used flexibly. In addition to that, CI or CD strategies, respectively, are supported.
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##### 30.2 Requirements for the materials to be used

30.2.1	Particle boards and fibreboards with veneer or melamine resin coating in accordance with DIN EN 14322 shall be used for all constructive wood elements. Where constructively practical, blockboards, laminated sheets or solid core panels can be used as an alternative.	The high quality of these materials provides for a high degree of stability for all constructive elements.
30.2.2	Particle boards shall meet the emission requirements of at least class E1 and be veneered or coated all over. All exposed surfaces shall be covered.	Coated and sealed particle boards of that class do not release any harmful substances.
30.2.3	All boards made from wood shall be veneered or melamine resin coated on both sides.  Wood veneers shall be coated with a resistant lacquer or varnish.	The all over coating prevents the base material from emitting any harmful substances.
30.2.4	All visible steel and/or aluminium parts shall be available in several resistant surface finishes.	Thus, the surfaces concerned are largely protected against damage, which is a prerequisite for an aesthetically pleasing and representative design and for longevity.
30.2.5	All synthetic parts used in visible areas shall be resistant against scratching and UV radiation.	Thus, synthetic materials are protected against "optical ageing".
30.2.6	All textile fabrics used shall be UV resistant.	Thus, e.g., the coverings of partitions or cabinets are protected against early "fading".

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>30.3</b>	<b>Requirements for the ease of servicing and quality of use</b>	
30.3.1	It shall be possible for all office furniture to be easily and quickly assembled and disassembled by (trained) in-house personnel. If possible, use of special tools should not be required. (Works on the mechanics are to be performed by specialist staff only!)	Thus, any changes necessary can be implemented quickly and cost-efficiently.
30.3.2	Drawers, intermediate shelves for cupboards and similar mounting parts shall allow for replacement without requiring a tool.	Changes can thus be implemented quickly and cost-efficiently.
30.3.3	Assembly should largely be by means of plain fit and bolted connections.	Any adjustments required can be made quickly and cost-efficiently.
30.3.4	Office furniture made of steel shall not produce any disturbing noises in the event of an impact or when the drawers are operated (sound deadening or anti-drum, respectively).	Noise pollution is excluded.
<b>30.4</b>	<b>Requirements for electrical installations and integrated technology</b>	
	For detailed requirements for electrical installations and integrated technology see chapter 4.	

Quality Criteria	Benefits
<p><b>31</b>                    <b>Requirements for office desks</b>  also see the requirements for the basic conception in chapters 1 and 3, section 30 as well as the dimensions and the "survey of relevant sets of rules" given in the appendix.</p>	
<p>The office desk is an essential element to be considered when designing workplaces for offices. It shall allow for individual designs and flexible adaptation to differing conditions at any time: With regard to its functional design, it shall correspond to the tasks to be performed. Based on an optimal ergonomic design concept, it shall be adaptable to the physical conditions of every user.</p>	
<p><b>31.1</b>                    <b>Requirements with regard to the variety of uses</b></p>	
<p>31.1.1                Office desks shall be suitable for all office tasks.</p>	<p>This allows for the design to be flexibly adapted to different purposes of use.</p>
<p>31.1.2                Desktops should be available in different sizes (widths, depths and, if applicable, also shapes).</p>	
<p><b>31.2</b>                    <b>Requirements for the functional concept</b></p>	
<p>31.2.1                Office desks shall allow  <ul style="list-style-type: none"> <li>• for being set up as individual desks, and</li> <li>• for linear or angular interlinking so as to be used as multi-area workplaces.</li> </ul> </p>	<p>This allows for adaptation to different functional and spatial conditions.</p>
<p>31.2.2                Individual and multi-area workplaces should allow for the continuous installation of electric cables and data lines (also see chapter 4). It should also be possible for them to be installed retroactively.</p>	<p>By this means, workplaces are enabled to meet the increasing technological requirements. Technical office equipment can be installed individually and so as to be easily accessible.</p>
<p>31.2.3                The working area shall allow for expanding upwards into the so-called "third level", e.g., by means of  <ul style="list-style-type: none"> <li>• organisation panels with appended paper management elements,</li> <li>• screens helping to shield from view,</li> <li>• elements for acoustic shielding,</li> <li>• additions for folder shelves, pin boards and the like,</li> <li>• shelf boards for technical equipment, workplace illumination, etc.</li> </ul> </p>	<p>The "third level" allows for all work equipment required to be at the workplace to be arranged so as to be easily accessible, clearly structured and efficiently.</p> <p>As a view screen, it shields from other workplaces and helps the user to concentrate. Acoustics elements reduce acoustic disturbances.</p>
<p>31.2.4                Office workplaces should allow for expanding the work-ing surface in width and depth and, possibly, for its subsequent return to the original state by means of, e.g.  <ul style="list-style-type: none"> <li>• unit elements (such as conference desks for sedentary use, communication boards for use in standing positions, shelves, etc.),</li> <li>• suspension elements for office and communication technology (PC shelf, printer trolleys, etc.).</li> </ul> </p>	<p>The workplaces can dynamically be expanded in width and depth at any time.</p>

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>31.3</b>	<b>Requirements for the ergonomic concept</b>	
31.3.1	The working surface of workplaces intended for activities solely to be performed in sitting or standing positions shall be adaptable in height, e.g. by means of <ul style="list-style-type: none"> <li>• a height setting system (which usually requires using a tool),</li> <li>• or a (tool free) comfort height adjustment. (See "Dimensions, office desks, I + II".)</li> </ul>	This allows for the working height to be adjusted to the height of the user. Postural deformities are avoided.
31.3.2	The working surface of workplaces intended for activities alternating between sitting and standing positions (sit/stand work-table) shall be comfortably adjustable in height. (See "Dimensions, office desks, III")	Sitting/standing workplaces promote dynamic changing of postures, thus helping to preserve the users' health.
31.3.3	It shall be possible for the height adjustment of working surfaces to be done quickly, using only a few simple hand moves and without requiring the surface to be cleared for the purpose.	Thus, the working height can be changed quickly.
31.3.4	It should be possible for the height adaption of working surfaces to be done gradually or at least with short distances between serrations. (See "Dimensions, office desks, I + II")	Thus, the workplace can be adapted in small steps to the individual user's height.
31.3.5	Desktops shall be of sufficient depth. (See "Dimensions, office desks, I–III")	For screen work, a viewing distance of at least 500 mm shall be maintained between user and screen, subject to the size of the screen.
31.3.6	The free space underneath the desk shall be of sufficient, height, width and depth. (See "Dimensions, office desks, I–III")	For the free space underneath the desk to be as large as possible provides for room to move and is a prerequisite for an ergonomically beneficial sitting position.
<b>31.4</b>	<b>Safety Requirements</b>	
31.4.1	Irrespective of their type of construction, desks shall be stable.	The stability of the desk shall be ensured even in the event of people leaning on or against its edge.
31.4.2	Impacts acting on the desktop shall not cause it to vibrate considerably.	This is important for using the desks without disturbances.
31.4.3	If desks are equipped with castors, then at least two of them shall be fixable. The fixing function shall be easily recognisable and fixing and releasing shall be possible without having to bend down.	These functions are to ensure safety.
<b>31.5</b>	<b>Requirements for electrical equipment and integrated technology</b>	
	For detailed requirements on electrical equipment and integrated technology, see chapter 4, sections 40 and 41.1.	

Quality Criteria	Benefits
<b>32</b>	<p><b>Requirements for visitors' and conference tables in office areas</b>  also see the requirements for the basic conception in chapters 1 and 3, section 30 as well as the "survey of relevant sets of rules" given in the appendix.</p> <p>The quality requirements specified in the following refer primarily to individual tables intended to be used flexibly. This also includes tables equipped with castors or with folding or collapsing mechanisms allowing for easy transportation or storage at another place, respectively.</p>
<b>32.1</b>	<p><b>Requirements with regard to the variety of uses</b></p>
32.1.1	<p>Table frames and legs shall be fitted so that sitting is possible on all sides of the table. <span style="float: right;">This allows for flexible use.</span></p>
32.1.2	<p>Tabletops should be available in different sizes (widths, depths and, if applicable, also shapes). <span style="float: right;">This allows for the design to be flexibly adapted to different purposes of use.</span></p>
<b>32.2</b>	<p><b>Requirements for the functional concept</b></p>
32.2.1	<p>The edges of tabletops should be protected by suitable bandings, edge veneers or comparable solutions. <span style="float: right;">By this means, tabletops are protected for setting up side by side, whereas doors and doorframes are protected when transporting the tables.</span></p>
32.2.2	<p>Visitors' and conference tables shall be equipped with a levelling device (height compensating means). <span style="float: right;">This enables to compensate for any unevenness of the floor – in particular for table combinations.</span></p>
32.2.3	<p>Optional: Table-to-table connectors should be available. <span style="float: right;">Thus, firmly connected temporary table arrangements can be formed.</span></p>
32.2.4	<p>Optional: Easily mountable table screens should be offered. <span style="float: right;">For larger, e.g. U-shaped, conference arrangements, the users are given the chance for more privacy and discretion.</span></p>
32.2.5	<p>Optional: In addition to tables for a sedentary use, models should be available that allow for adjustment of the working height from a sitting to a standing position. <span style="float: right;">The flexibility of use is increased. The tables concerned can also be used for short stand-up meetings.</span></p>

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>32.3</b>	<b>Safety requirements</b>	
32.3.1	Irrespective of their type of construction, tables shall be stable.	The stability of the table shall be ensured even in the event of people leaning on or against its edge.
32.3.2	Impacts acting on the tabletop shall not cause it to vibrate considerably.	This is important for using the tables without disturbances.
32.3.3	If tables are equipped with castors, then at least two of them shall be fixable. The fixing function shall be easily recognisable and fixing and releasing shall be possible without having to bend down.	These functions are to ensure safety.
32.3.4	Folding and collapsible tables shall be designed so that neither set-up nor take-down can cause any injuries.	A corresponding design ensures the safety of the installation personnel.
32.3.5	Fitting transportation or storage devices (e.g. transport trolleys) should be offered for folding and collapsible tables.	This facilitates handling and ensures occupational safety when remodelling or rearranging.

	Quality Criteria	Benefits
<b>33</b>	<p><b>Requirements for office containers</b> also see the requirements for the basic conception in chapters 1 and 3, section 30 as well as the “survey of relevant sets of rules” given in the appendix.</p>	
<b>33.1</b>	<p><b>Requirements for the design</b></p>	
33.1.1	The container sidewalls shall be connected torsion-free to the topside and bottom.	This provides for high stability and longevity.
33.1.2	Office containers shall be available for delivery mounted on a base, on height adjustable stands, and on castors.	This allows for the containers to be used in a various ways next to or underneath the workplace.
<b>33.2</b>	<p><b>Requirements for the functional concept</b></p>	
33.2.1	<p>Office containers shall allow for organising the contents by means of drawers of different heights that can be subdivided as required.</p> <p>The drawers’ heights as determined by the organisational means used (such as forms inserts, separating webs, hanging filing systems, etc.) shall be subdivided in a system of modules (height parts).</p>	The work equipment required at the workplace is always easily accessible and well organised.
33.2.2	The effective height of the containers shall correspond to the multiple of the system of drawer modules and accommodate drawers of different useful heights.	Thanks to such systems of modules, drawers of different useful heights can be positioned within the container so as to be easily visible and accessible.
33.2.3	Optional: The drawers the container is equipped with should, at any time, be easy to change and adapt within the system of modules.	Thus, the container’s equipment can always be adapted to new needs.
33.2.4	Office containers should have a separate pull-out material shell (for writing utensils, paper clips, ruler and the like) positioned outside the system of height modules.	Such a shell allows for direct access to utensils that are often or continuously in use.
33.2.5	All drawers shall be available for delivery with full extension or over extension (e.g. for card files, hanging filing systems).	Drawers with full extension or over extension allow for unhindered access to all documents and utensil drawers.
33.2.6	Drawers for hanging filing systems shall, as a rule, be equipped with full extension or over extension.	This allows for unhindered access also to the documents in the back row of the hanging frame.

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>33.3</b>	<b>Requirements for the ergonomic concept</b>	
33.3.1	The drawers shall glide smoothly and noiselessly.	This helps to reduce disturbances.
33.3.2	Optional: The stop noise of the drawer front made when closing the drawer should be muffled.	
<b>33.4</b>	<b>Safety requirements</b>	
33.4.1	The drawer guide rails shall be laterally hidden.	Laterally hidden guide rails avoid staining or damaging of the clothes and prevent injuries.
33.4.2	Office containers shall be stable. Tipping over shall be excluded by means of extension locks for the drawers, counterbalances built-in inside the container or other technical solutions.	This ensures occupational safety.
33.4.3	Container castors shall (at least partly) be fixable.	Roller containers are prevented from rolling away inadvertently.
33.4.4	Drawers shall be securely fastened inside the office containers so that they cannot fall out accidentally.	This ensures occupational safety.
33.4.5	Optional: The drawers should be equipped with self-closing system that respond when the drawer reaches a point a few centimetres away from the stop.	Closed drawers are flush with the front (increased safety, reduced risk of injury).
33.4.6	Optional: Instead of normal (protruding) keys, folding keys or other non-protruding lock systems should be available.	This eliminates potential points of impact and eliminates the risk of injury.
<b>33.5</b>	<b>Requirements for the electrical equipment and integrated technology</b>	
	For detailed requirements for electrical equipment and integrated technology see chapter 4, sections 40 and 41.2.	

	Quality Criteria	Benefits
<b>34</b>	<b>Quality requirements for office cabinets</b> also see the requirements for the basic conception in chapters 1 and 3, section 30 as well as the "survey of relevant sets of rules" given in the appendix.	
<b>34.1</b>	<b>Requirements for product range planning and design</b>	
34.1.1	Office cabinets should be available for delivery in different front panel designs, e.g. <ul style="list-style-type: none"> <li>• wing doors,</li> <li>• horizontal shutters,</li> <li>• vertical shutters,</li> <li>• sliding doors,</li> <li>• drawer fronts.</li> </ul>	This expands the variety of uses, the access options are improved and the space required is reduced.
34.1.2	Cabinet combinations should form a formal unit and allow for free combination, irrespective of the chosen front panel design and of the type of installation.	Cabinets can be installed freestanding and/or in combination "in alternating order" (of the front and back panels).
34.1.3	Optional: Cabinet back panels should allow for amending and formal adaptation by means of linings or veneers in different materials.	This allows for the design of the cabinet and the interior design to be changed and adapted at any time.
34.1.4	By design, the sidewalls, back panel, top, and bottom of the cabinet shall be torsion-free connected with one another.	High stability even in intensive use provides for durability and longevity.
34.1.5	A system of height modules shall include all cabinet variants and systems.	A system of modules common to all variants of the cabinet concerned increases its variety of uses. Combinations – even set on top of or next to each other – will lead, thanks to the module kit, to the same external heights and, thus, to a great design variety.
34.1.6	The interior of office cabinets shall allow for utilisation of the full width and shall not present any obstacles when putting in or taking out folders and pulling or pushing drawers or hanging frames.	Office cabinets with a freely accessible interior enable optimum use.
34.1.7	Open wing doors shall not hinder direct access to folders.	
<b>34.2</b>	<b>Requirements for the shelves and topsides</b>	
34.2.1	Deflexion and deformation of the shelves shall be prevented.	Deformed shelves affect the usability of interior equipment fitted underneath.
34.2.2	Office cabinets with shutter fronts rolling sideways shall be specifically safeguarded against deflection of the top (e.g. when putting a top cabinet on top).	This is to ensure that the roller shutter can still glide smoothly.

	Quality Criteria	Benefits
<b>34.3</b>	<b>Requirements for the internal organisation</b>	
34.3.1	Shelf carriers, frames for hanging filing systems and other organisational elements shall be suspended by simple and sound means of fastening. The interior fitting shall remain organisable and changeable.	Office cabinets can be fitted optimally and changed and adapted at any time in accordance with their intended use.
34.3.2	Wing door and roller shutter cabinets shall allow also for the installation of frames or drawers for hanging filing systems in combination with folder shelves or lateral files.	Different office filings can be accommodated in combination with each other in the very same cabinet.
34.3.3	The internal height of hanging filing cabinets shall be subdivided in a system of modules (height parts) corresponding to the drawer modules' heights.	This allows for fitting the cabinets with drawers (of different heights) and, possibly later on, for adaptation to changing requirements.
<b>34.4</b>	<b>Requirements for bases and pedestal frames</b>	
34.4.1	Office cabinets should allow for being mounted on either a circumferential and fully load-bearing base (of wood or steel) or on a pedestal (steel).	Pedestals are advisable for air conditioning and floor cleaning, whereas closed bases allow for a better use of the available height and for point loads acting on the floor to be reduced.
34.4.2	Bases or pedestals shall be provided with levelling screws.	This enables to compensate for any unevenness of the floor and to ensure the smooth operation of roller shutters or pull-out elements.
34.4.3	For cabinets on bases, the means for height levelling shall be accessible from the front or interior of the cabinet.	Even in a fully equipped and loaded state, cabinets shall allow for subsequent adjustment at any time.
34.4.4	The levelling screws of pedestals and bases should be made from synthetic materials or from steel with a plastic coating enabling them to glide.	Plastic coated regulating screws are protected from moisture whereas the office floor is protected against damage.
<b>34.5</b>	<b>Requirements for the ergonomic concept</b>	
34.5.1	All extendible elements (pull-out frames, shelves or drawers) shall glide smoothly and noiselessly.	Noise pollutions are reduced.
34.5.2	Optional: The impact noise caused when closing doors and drawers should be muffled by buffers.	Thus, disturbances are reduced.
34.5.3	Optional: Back and front sides of office cabinets should allow for being provided with sound absorbing panels.	Freestanding office cabinets with acoustically improved back and front sides help to create agreeable room acoustics.

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>34.6</b>	<b>Safety requirements</b>	
34.6.1	All extendible elements (pull-out frames, shelves or drawers) shall have laterally hidden guide rails.	Laterally hidden guide rails avoid the risks of staining clothes and of injury to the user.
34.6.2	All extendible elements (pull-out frames, shelves or drawers) shall be secured so that they cannot unintentionally disengage of the guide rails.	This ensures occupational safety.
34.6.3	Shelves shall be secured against slipping out or tilting unintentionally.	Thus, the risk of injury by unsecured shelves is eliminated.
34.6.4	Optional: Instead of normal (protruding) keys, folding keys or other non-protruding lock systems should be available.	Thereby, another chance for people to hurt themselves is eliminated and the risk of injury nearly excluded.
<b>34.7</b>	<b>Requirements for the electrical equipment and integrated technology</b>	
	For detailed requirements for electrical equipment and integrated technology, see chapter 4, sections 40 and 41.3.	

Quality Criteria	Benefits
<p><b>35</b>                    <b>Requirements for partitions</b>  also see the requirements for the basic conception in chapters 1 and 3, section 30 as well as the “survey of relevant sets of rules” given in the appendix.</p> <p>Partitions are intended both to shield individual workplaces and working groups from one another and to form “islands” or flexible structures in rooms of greater dimensions. Partitions include visual and acoustic screens that can be used as organisational means and interior design elements at the same time.</p>	
<b>35.1</b> <b>Requirements for the product range planning</b>	
35.1.1                  Partitions shall be available in different heights <ul style="list-style-type: none"> <li>• for freestanding workplaces (e.g. reception workplaces) at approximately the height of a counter;</li> <li>• as screens between workplaces;</li> <li>• as acoustic (and visual) separation between workplaces (then their height shall exceed the working height by at least 700 mm);</li> <li>• as separation of workplaces and working groups from busy areas (e.g. traffic routes, public zones, etc.).</li> </ul>	The variety of heights available for dividing a room provides for protection from visual and acoustic disturbances without interrupting the individual communication relations.
35.1.2                  Partitions shall be of modular construction and shall be available in different widths. Their dimensions shall be determined by the standard measures of other office furniture (such as desks, counter cabinets, regular cabinets, etc.).	The variety of elements allows for the layout of the room to be designed freely and to use the available space efficiently so as to accommodate workplaces and working groups even for unfavourable spatial structures or different pieces of office furniture, respectively.
35.1.3                  Textile coverings of partitions shall be fixed with solvent free adhesives or no adhesives at all.	This helps to create a low-pollution office environment.
35.1.4                  System elements shall be available for purchase in different materials, colours, and textile fabrics as well as in different decors and etched or transparent glazings.	This allows for the greatest possible freedom when designing the interior.
<b>35.2</b> <b>Requirements for the functional concept</b>	
35.2.1                  Partitions shall allow for being set up both as stand-alone elements and as variously combined interconnected units.	This allows for both individual workplaces and working groups to be screened optimally and in variously sized and shaped compartments.
35.2.2                  Partitions shall be mobile.	Mobile partitions enable workplaces and compartments or partitions to be adjusted quickly.
35.2.3                  It should be possible for partitions to be combined with cabinet elements, counter cabinets or shelf systems in different heights, widths, and front designs.	Thus, additional organisational equipment can be incorporated into the room structure and be arranged so as for work and use of space to be efficient.

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>35.3</b>	<b>Requirements for the acoustic effectiveness</b>	
35.3.1	Partitions should also allow for being provided with sound absorbent surfaces.	This allows for the sound insulating effect to be combined with sound absorption close to the respective source.
35.3.2	It should be possible for partitions to be arranged in different angular positions.	When arranged in angular positions, their sound insulating effect is increased.
<b>35.4</b>	<b>Requirements for the arrangement</b>	
35.4.1	Partitions shall allow for being rigged with different organisational elements and working aids (such as pin boards, storage trays, small shelves, magnet rails etc.).	This allows for important work equipment to be clearly arranged.
35.4.2	Partitions should allow for being supplemented by communication elements (such as flip charts, pin boards, tablets/whiteboards, projection surfaces, etc.).	This allows for partitions to be useful in various fields of application.
<b>35.5</b>	<b>Safety Requirements and fire protection</b>	
35.5.1	Partitions shall be stable, whether arranged as individual elements or in combinations.	This helps to ensure occupational safety and to avoid accidents.
35.5.2	Foot brackets, foot plates or similar devices shall be designed to be flat and shall not present a risk of tripping.	
35.5.3	Optional: Room dividing walls should also be available for purchase with flame-retardant materials (textile fabrics and foams).	Hazards can be reduced by lowering the fire load and insurance premiums may be reduced, if applicable.
<b>35.6</b>	<b>Requirements for the electrical equipment and integrated technology</b>	
	For detailed requirements for electrical equipment and integrated technology, see chapter 4, sections 40 and 41.4.	

## 4 Quality requirements for electrical equipment and integrated technology

also see the "survey of relevant sets of rules" given in the appendix.

The following requirements apply solely to pieces of office furniture that electric or electronic devices can be used with, on or close to and/or that are prepared for the installation of such equipment. In principle, these requirements are intended to ensure occupational safety.

The requirements given here apply neither to the electric equipment or devices themselves nor to the energy and data supply systems installed in the building for which the relevant sets of rules and standards shall be referred to.

Quality Criteria	Benefits
<b>40 Requirements for the basic conception of electrical equipment and integrated technology</b>	
<b>40.1 Requirements with regard to the electrification standard</b>	
40.1.1 All electrical installations in office furniture (office work tables, conference tables, office containers, office cabinets as well as partitions) shall meet the requirements of the "Guideline for electrical installations in office furniture – List of recognised rules of technology".	This ensures that all relevant regulations are complied with and that any electrical installation works are carried out professionally.
<b>40.2 Safety requirements concerning the wiring arrangement</b>	
40.2.1 Cable trunking and cable ducting systems (in the following referred to as cable ducts) shall meet the requirements of DIN EN 50085-1 and VDE 0604-1.	They help to ensure occupational safety.
40.2.2 Office furniture shall allow for electrification by means of cable ducts and, if possible, they shall be continuous (i.e. not interrupting the electrical path). If interruptions are necessary, then they shall not be larger than <ul style="list-style-type: none"> <li>• 150 mm within a piece of office furniture;</li> <li>• 300 mm between two elements of linked pieces of furniture.</li> </ul>	Thus, hazards caused by cables or lines hanging freely are avoided.
40.2.3 Energy and data lines shall be supplied to the office workplaces so as not to be hanging around freely.	The lines are safely supplied to the appliances. Risk of tripping is avoided.
40.2.4 Socket-outlets installed in cable ducts shall be reliably fastened and be arranged or covered so that liquids are prevented from entering the plugs. It shall be easy for the connectors to be plugged and unplugged.	Occupational safety is maintained, operation of the electrical lead-in is facilitated.
40.2.5 For plug-and-socket connections, only approved (latched) installation couplers in accordance with VDE 0606-200 may be used.	Wear through of current-carrying lines is avoided, occupational safety is ensured.

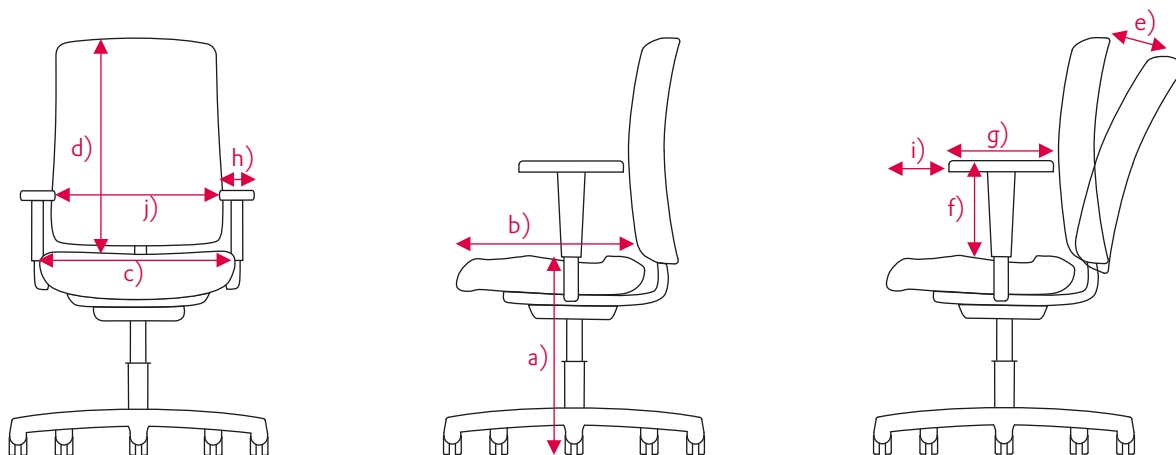
	<b>Quality Criteria</b>	<b>Benefits</b>
40.2.6	<p>The line paths inside the cable ducts shall be smooth and free of burrs and other sharp edges.</p> <p>Openings through which insulated lines are fed shall have a smooth and well rounded surface or, else, shall be insulated with boots of synthetic material.</p>	Occupational safety is ensured. Wear through of current-carrying lines is avoided.
40.2.7	Openings used for feeding cables in, out, and through shall be designed and dimensioned so as to allow for all connectors, transformers and such to be fed through without causing any problems even if firmly welded on.	This ensures that technical devices can properly be integrated into the workplace even if used for only short periods of time.
40.2.8	All lines that can be supplied or moved when using the respective piece of furniture as intended shall have a strain relief.	This prevents any tensile strain from acting directly on the junctions of current supply and prevents their interruption or direct contact with current-carrying lines, respectively.
40.2.9	Linked assemblies (e.g. of workplaces, containers or partitions) in which electrical cables firmly connected to each other are laid shall also be firmly connected by mechanical means.	Moving the furniture inadvertently is thus restricted. Current-carrying lines are safeguarded against tensile strain and squeezing or crushing.

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>41</b>	<b>Specific requirements for electrical installation and integrated technology</b>	
<b>41.1</b>	<b>Requirements for office work tables</b>	
41.1.1	Access to the installation shall be quick and easy without having to clear the working desk first.	Easy access to the installations is a prerequisite for safety to be ensured in use.
41.1.2	If workplaces are arranged in blocks, then the arrangement of the wiring shall be designed so that it cannot be crushed between adjacent working desks.	This helps to avoid damage to the lines and to ensure proper functioning of the appliances as well as occupational safety.
41.1.3	When changing the working height (e.g. of sitting/standing workplaces), excess lengths of wiring looped in and out shall be arranged so that no areas of crushing or shearing can develop and that no risk of tripping arises.	
<b>41.2</b>	<b>Requirements for office containers</b>	
41.2.1	Lead-in of energy and data lines into office containers (below-desk containers, desk-high office containers, standing containers) or their supply onto the respective covering plates shall be arranged so as not to be preferential to any one side.	This allows for office containers to be installed on the left- and on the right-hand side of the workplace.
41.2.2	Energy and data lines shall be supplied to the office containers so that technical equipment can be installed both inside the container and on its covering plate. Lines hanging freely shall be avoided.	This helps to avoid the risk of tripping.
41.2.3	Plug-boards positioned inside the container should e.g. be integrated into an insert fitted with a hinged lid accessible from the outside.	Easy access to the installations is a prerequisite for safety to be ensured in use. Covering the installation is to prevent liquids from entering.
41.2.4	The lead-in of lines shall be easily and directly accessible from the outside and without requiring any assembly work or the removal of technical equipment.	This facilitates proper integration of technical equipment and any service works required.
41.2.5	The proper winding and unwinding of any lines carried along when opening or closing drawers shall be ensured.	Crushing or shearing of lines, e.g. by contact with the drawer guide rails, is thereby excluded.
41.2.6	If technical appliances are placed inside a container, then sufficient air supply is to be provided for (if necessary by means of technical solutions).	This is to ensure sufficient heat removal and proper functioning of the appliances.

	<b>Quality Criteria</b>	<b>Benefits</b>
<b>41.3</b>	<b>Requirements for office cabinets</b>	
41.3.1	Energy and data lines shall be supplied to the cabinets so that technical equipment can be installed both inside the cabinet and on its covering plate. Lines hanging freely shall be avoided.	This helps to avoid the risk of tripping caused by lines hanging freely and to ensure occupational safety.
41.3.2	Plug-boards positioned inside the cabinets should e.g. be integrated into an insert in the covering plate fitted with a hinged lid.	Easy access to the installations is a prerequisite for safety to be ensured in use. Covering the installation is to prevent liquids from entering.
41.3.3	The lead-in of the lines or their continuation into other pieces of furniture, respectively, should be possible towards all sides.	Thus, flexibility is ensured for arranging the cabinets in different parts of the room.
41.3.4	The proper winding and unwinding of any lines carried along when opening or closing drawers shall be ensured.	Crushing or shearing of lines, e.g. by contact with the drawer guide rails, is thereby excluded.
41.3.5	The lead-in of lines shall be easily and directly accessible from the outside and without requiring any assembly work or the removal of technical equipment.	This facilitates any service works required and ensures proper integration of technical equipment.
41.3.6	If technical appliances are placed inside a cabinet, then sufficient air supply is to be provided for (if necessary by means of technical solutions).	This is to ensure sufficient heat removal and proper functioning of the appliances.
<b>41.4</b>	<b>Requirements for partitions</b>	
41.4.1	Partitions shall allow for being rigged for distributing energy and data lines within the room and for the supply of the workplaces.	This enables safe electrification of workplaces even without using any given floor installation systems.
41.4.2	Energy and data lines shall be laid in cable ducts leading all the way up to the technical office equipment set up on workplaces, tables or folder shelves or directly attached to the partitions.	Data lines and current conductions are led safely to the point where an appliance is to be connected.
41.4.3	Optional: In order to provide for subsequent rigging, horizontal cable ducts should also be available that can be externally fastened to the wall faces as independent elements.	This facilitates amendments and changes to be made to existing installations.

## Part II Dimensions, office chairs and office desks

### Dimensions, office chairs, I

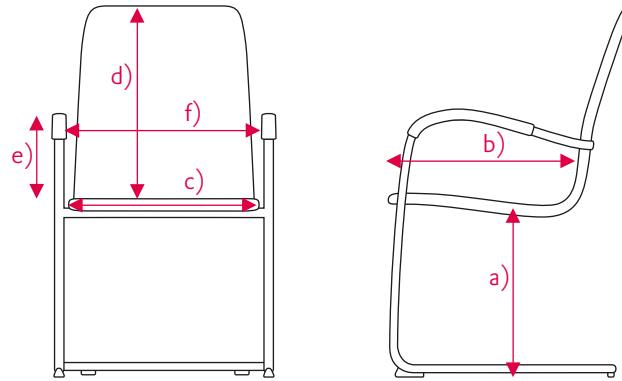


#### Office work chairs:

Dimension	Measuring points	Minimum requirements
a) Minimum adjustment range for seat height		min. 400 to 510 mm (permissible: min. 420 to 510 mm)*
b) Minimum adjustment range for the seat with adjustable seat depth	Leading edge of the seat to the leading edge of the backrest	min. 50 mm (The adjustment range shall include the measuring range of 400 to 420 mm.)
c) Width of the seat		≥ 450 mm
Inclination of the seat with non-adjustable seat inclination		between $-2^{\circ}$ and $-7^{\circ}$
d) Height of the upper backrest edge	Above the seat	≥ 480 mm
Minimum adjustment range for the height of the lumbar support	Above the seat	min. 170 to 230 mm
e) Minimum range for changing the backrest inclination		$> 15^{\circ}$
f) Minimum adjustment range for the armrest height	Above the seat	≥ 100 mm (permissible: ≥ 80 mm)*
g) Length of the arm support		≥ 200 mm
h) Width of the arm support		≥ 50 mm
i) Distance from the arm support to the seat's leading edge		≥ 100 mm
j) Minimum adjustment range of the clear width between the armrests		between 460 mm and 510 mm

\* Restriction of the adjustment range by at max. 20 mm is permissible by way of exception taking into consideration the partly conflicting requirements of anthropometry and mechanical design in conjunction with the ergonomic properties and features desired (e.g. adjustment of seat depth or seat inclination, depth suspension, shape of armrests) and subjective preferences.

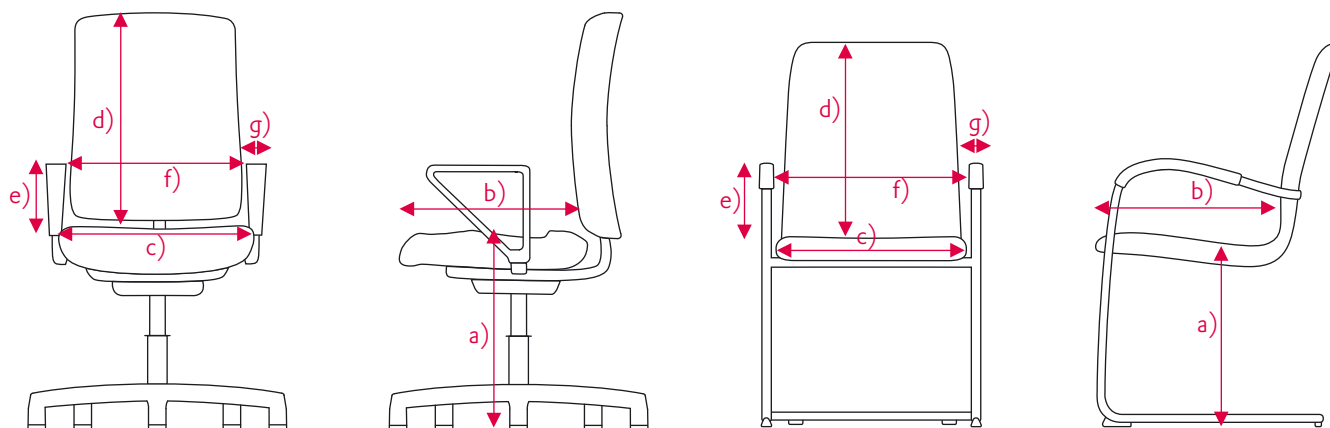
**Dimensions, office chairs, II**



**Visitors' chairs:**

Dimension	Measuring points	Minimum requirements
a) Seat height		between 400 mm and 500 mm
b) Depth of the seat (with non-adjustable seat depth)	Leading edge of the seat to the leading edge of the backrest	between 380 mm and 470 mm
c) Width of the seat		≥ 400 mm
d) Height of the upper backrest edge	Above the seat	≥ 360 mm
e) Armrest height	Above the seat	between 200 mm and 250 mm
f) Clear width between the armrests		≥ 460 mm

### Dimensions, office chairs, III

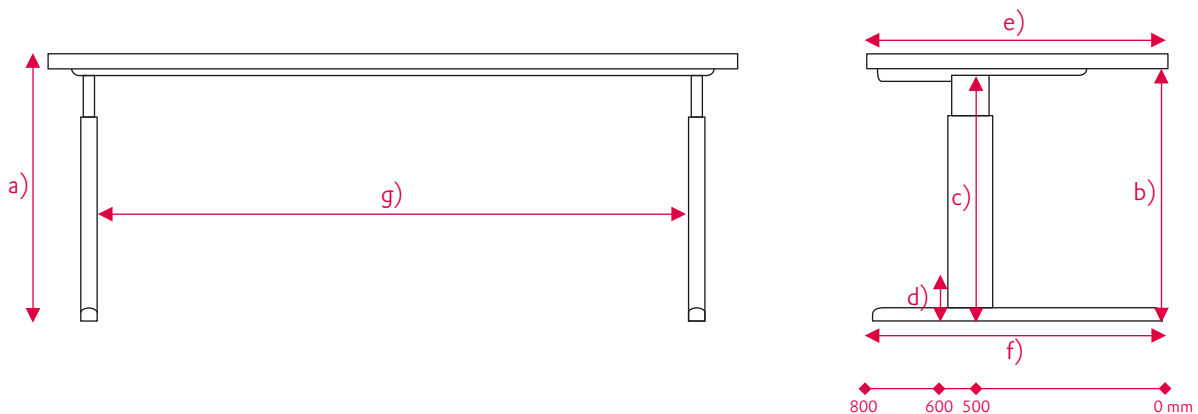


#### Conference chairs:

Dimension	Measuring points	Minimum requirements
a) Seat height with adjustable seat height		min. 400 to 510 mm (permissible: min. 420 to 510 mm)*
a) Seat height with non-adjustable seat height		between 400 mm and 500 mm
b) Depth of the seat (seat depth not adjustable)	Leading edge of the seat to the leading edge of the backrest	between 380 mm and 470 mm
b) Minimum adjustment range for the seat with adjustable seat depth	Leading edge of the seat to the leading edge of the backrest	≥ 50 mm (The adjustment range shall include the measuring range of 400 to 420 mm.)
c) Width of the seat		≥ 450 mm
d) Height of the upper backrest edge	Above the seat	≥ 450 mm
e) Armrest height	Above the seat	between 200 mm and 250 mm
f) Clear width between the armrests		≥ 460 mm
g) Width of the arm support		≥ 50 mm

\* Restriction of the adjustment range by at max. 20 mm is permissible by way of exception taking into consideration the partly conflicting requirements of anthropometry and mechanical design in conjunction with the ergonomic properties and features desired (e.g. adjustment of seat depth or seat inclination, depth suspension) and subjective preferences.

**Dimensions, office desks, I**

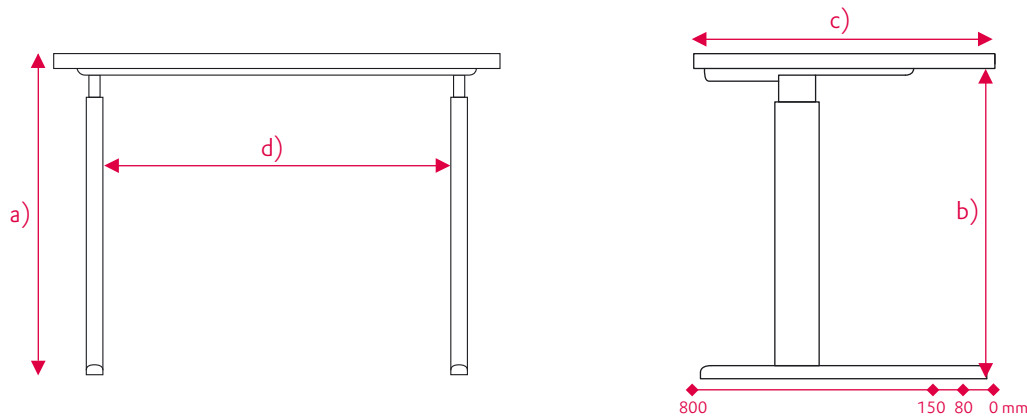


**Desks for sedentary activities:**

Dimension	Measuring points	Minimum requirements
a) Minimum adjustment or setting range of the table height (height of the working desk)		min. 650 to 850 mm
b) Height of the unobstructed legroom underneath the working desk – measured for a table height of 740 mm (720 mm)	At the table board’s leading edge	min. 685 (665) mm
c) Height of the unobstructed legroom underneath the working desk – measured for a table height of 740 mm (720 mm)	At a distance of 500 mm from the table board’s leading edge	min. 660 (640) mm (permissible: min. 650 (630) mm)*
d) Height of the unobstructed space for the feet above the floor	At a distance of 600 mm to 800 mm from the table board’s leading edge	min. 120 mm
e) Minimum depth of the tabletop		min. 800 mm
f) Minimum depth of the legroom underneath the table board		min. 800 mm
g) Clear width of the legroom underneath the working desk		min. 1000 mm
Maximum height of the individual serrations for height setting of tables or desks		max. 10 mm

\* Restriction of the legroom height by at max. 10 mm is permissible by way of exception taking into consideration the partly conflicting requirements of anthropometry and mechanical design in conjunction with the ergonomic properties desired (e.g. freedom from vibrations, stability) and fitness for use.

## Dimensions, office desks, II

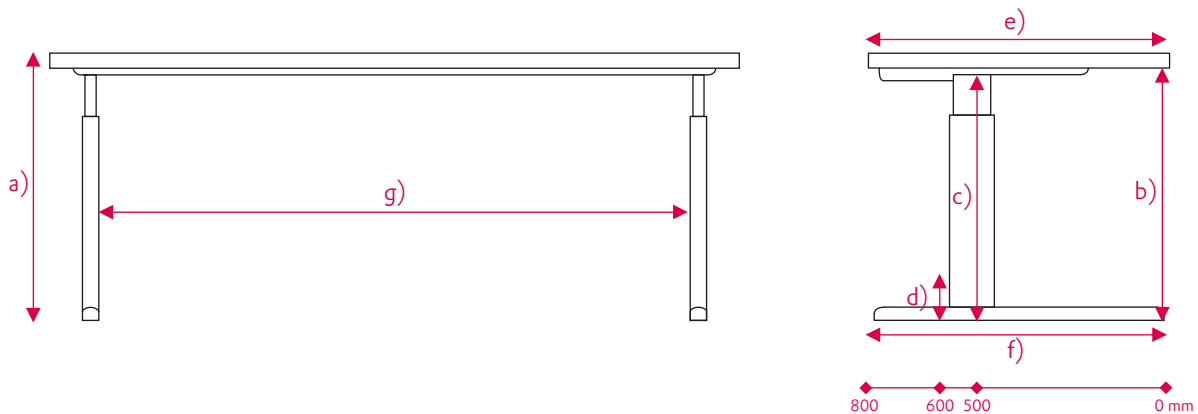


### Tables and desks for standing activities<sup>1)</sup>:

Dimension	Measuring points	Minimum requirements
a) Minimum adjustment range of the desk height (height of the working desk)		min. 950 to 1250 mm
b) Height of the unobstructed space for the legs/knees underneath the working desk, for all desk heights	At a distance of 80 mm from the table's leading edge	min. 700 mm
Height of the unobstructed space for the feet above the floor	At a distance of 150 mm from the table's leading edge	min. 120 mm
c) Minimum depth of the tabletop		min. 800 mm
d) Free width of the legroom underneath the working desk		min. 600 mm
Maximum height of the individual serrations for height setting of tables or desks		max. 10 mm

1) One-sided strains which can lead to early fatigue, such as caused by continuous standing work, are to be avoided. The objective is by work structuring and workplace design to allow people to alternate between sitting, standing, and walking activities. Two to four changes of posture per hour have been proven to be of positive effect. Therefore, standing work tables or high desks can be used as appropriate.

### Dimensions, office desks, III



#### Desks for sitting and standing activities (sitting/standing desks):

Dimension	Measuring points	Minimum requirements
a) Minimum adjustment range of the table height (height of the working desk)		min. 650 to 1250 mm
b) Height of the unobstructed legroom underneath the working desk – measured for a table height of 740 mm (720 mm)	At the table board's leading edge	min. 685 (665) mm
c) Height of the unobstructed legroom underneath the working desk – measured for a table height of 740 mm (720 mm)	At a distance of 500 mm from the table board's leading edge	min. 660 (640) mm (permissible: min. 650 (630) mm)*
d) Height of the unobstructed space for the feet above the floor	At a distance of 600 mm to 800 mm from the table board's leading edge	min. 120 mm
e) Minimum depth of the tabletop		min. 800 mm
f) Minimum depth of the legroom underneath the working desk		min. 800 mm
g) Clear width of the legroom underneath the working desk		min. 1000 mm

\* Restriction of the legroom height by at max. 10 mm is permissible by way of exception taking into consideration the partly conflicting requirements of anthropometry and mechanical design in conjunction with the ergonomic properties desired (e.g. freedom from vibrations, stability) and fitness for use.

## Part III Appendix: Survey of relevant sets of rules

### 1.1 EU laws, regulations, directives, accident prevention regulations

- European framework directive on industrial safety: "Council Directive on the introduction of measures to encourage improvements in the safety and health of workers at work" of 12 June 1989 (89/391/EEC)
- Occupational Health and Safety Act (ArbSchG): "Law concerning the implementation of occupational safety measures for the improvement of safety and health of employees during work" (Article 1 of the law concerning the implementation of the EC framework directive on occupational safety and further occupational safety directives) of 7 August 1996 (BGBl. I p. 1246)
- European directive on display screen equipment: "Council Directive on the minimum safety and health requirements for work with display screen equipment" of 29 May 1990 (90/270 EEC)
- Ordinance for work with visual display units (BildscharbV): "Ordinance on safety and health protection in relation to work carried out using display screens" of 4 December 1996 (BGBl. I p. 1843)
- Workplaces ordinance (ArbStättV): "Ordinance on Workplaces" of 12 August 2004 (BGBl. I p. 2179)
- European safety and health ordinance: "Council Directive concerning the minimum safety and health requirements for the use of work equipment by workers at work" of 30 November 1989 (89/655/EEC)
- Ordinance on industrial safety and health (BetrSichV): "Ordinance on safety and health protection during the provision and use of working tools, safety during the operation of facilities requiring surveillance, and the organisation of occupational safety and health" of 27 September 2002 (BGBl. I p. 3777)
- German Equipment and Product Safety Law (GPSG) of 6 January 2004 (BGBl. 2004)
- BGV A1 Prevention principles – 01.2009
- European Machinery Directive: Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery and amending Directive 95/16/EC (recast)

### 1.2 Technical Rules for Workplaces

- ASR A1.8 Verkehrswege (Traffic routes)
- ASR A1.2 Raumabmessungen und Bewegungsflächen (Space dimensions and movement areas)
- ASR A2.3 Fluchtwege, Notausgänge, Flucht- und Rettungsplan (Escape routes, emergency exits, escape and rescue plan)
- ASR A3.4 Beleuchtung (Lighting)
- ASR A3.5 Raumtemperatur (Room temperature)

### 1.3 Fundamental standard specifications not related to a specific product

- DIN EN ISO 9241-5 – Ergonomic requirements for office work with visual display terminals (VDTs) – Part 5: Workstation layout and postural requirements
- DIN EN ISO 10075-1 – Ergonomic principles related to mental work-load – Part 1: General terms and definitions
- DIN 33402-2 – Ergonomics – Human body dimensions – Part 2: Values
- DIN 4543-1 – Office work place – Part 1: Space for the arrangement and use of office furniture – Safety requirements, testing
- DIN 16555 – Office work place – Space for communication work places in office buildings – Requirements, testing

### 1.4 Fundamental standard specifications related to a specific product

- Standards series DIN EN 1335 – Office furniture – Office work chair
- DIN EN 13761 – Office furniture – Visitors chairs (will be replaced by DIN EN 16139)
- DIN EN 15373 – Furniture – Strength, durability and safety – Requirements for non-domestic seating (will be replaced by DIN EN 16139)
- Standards series DIN EN 527 – Office furniture – Work tables and desks
- Standards series DIN EN 14073 – Office furniture – Storage furniture
- DIN EN 14074 – Office furniture – Tables and desks and storage furniture – Test methods for the determination of strength and durability of moving parts
- DIN-Fachbericht 147, Requirements and tests of office furniture – Guideline for the security requirements on work tables and storage furniture

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**2 Acoustics**

- DIN 18041 – Acoustic quality in small to medium-sized rooms
- DIN EN ISO 11690-1 – Acoustics – Recommended practice for the design of low-noise workplaces containing machinery – Part 1: Noise control strategies
- DIN EN ISO 11690-2 – Acoustics – Recommended practice for the design of low-noise workplaces containing machinery – Part 2: Noise control measures
- VDI 2569 – Sound protection and acoustical design in offices
- “Arbeitswissenschaftliche Erkenntnisse” Report No. 123 – Assessment and minimisation of noise at visual display terminals in small offices, published by: Federal Institute for Occupational Safety and Health, Dortmund, 2003
- “Arbeitswissenschaftliche Erkenntnisse” Report No. 124 – Assessment and minimisation of noise at visual display terminals in offices with several workers, published by: Federal Institute for Occupational Safety and Health, Dortmund, 2003

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**3 Lighting**

- DIN EN 12464-1 – Light and lighting – Lighting of workplaces – Part 1: Indoor workplaces
- Standards series DIN 5035 – Artificial lighting

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**4 Ecology**

- VDI 2243 – Recycling-oriented product development

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**5 Information from the German statutory accident insurance**

- BGI 650 “Bildschirm- und Büroarbeitsplätze” (Visual displays work stations and office work places)
- BGI 827 “Sonnenschutz im Büro” (Sun protection in the office)
- BGI 856 “Beleuchtung im Büro” (Lighting in the office)
- BGI 5001 “Büroarbeit – sicher, gesund und erfolgreich – Praxishilfen für die Gestaltung” (Office work – Safe, healthy and successful – Practical aids for the design)
- BGI 5018 “Gesundheit im Büro” (Health in the office)
- BGI 5050 “Bürraumplanung” (Office space planning)

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