Barrier-Free Planning and Construction in Berlin

Principles and Examples
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PUBLIC BUILDINGS
Principles and Examples
Preface ........................................................................................................ 4

CHAPTER I  General principles

1.  General information .................................................................................. 6

2.  Anthropometric principles ......................................................................... 8

2.1. Requirements and potentials of users in the public realm ........................... 8

2.1.1. Motor function ...................................................................................... 8

2.1.2. Sensory function .................................................................................. 8

2.1.3. Cognition .............................................................................................. 11

3.  Legal framework ..................................................................................... 12

3.1. Disability legislation .............................................................................. 12

3.2. Building regulations ............................................................................. 12

3.3. DIN standards ....................................................................................... 15

3.4. Other legislation .................................................................................... 15

3.5. Overview of laws and regulations .......................................................... 16

CHAPTER II  Public Buildings

1.  General requirements for barrier-free access ......................................... 17

1.1. Orientation and information .................................................................. 18

1.2. Areas for movement ............................................................................... 23

1.3. Exposure to light and lighting ................................................................ 25

1.4. Acoustic requirements .......................................................................... 25

2.  Accessibility ............................................................................................. 27

2.1. Integration with public transport ............................................................ 27

2.2. Integration with individual transport ..................................................... 27

2.3. Barrier-free design of properties ............................................................ 27

3.  Functional areas in buildings .................................................................. 28

3.1. Entrance .................................................................................................. 28

3.2. Foyers and corridors .............................................................................. 29

3.3. Escape routes ......................................................................................... 29

3.4. Meeting rooms in public buildings .......................................................... 30

3.5. Office spaces in administrative buildings ............................................. 30

3.6. Showrooms ............................................................................................. 30

3.7. Rooms used for gastronomic purposes ................................................. 31

3.8. Sanitary facilities ................................................................................... 32

3.8.1. Lavatories ............................................................................................ 32

3.8.2. Bathtubs and showers ....................................................................... 35

3.8.3. Changing rooms ................................................................................ 35

3.9. Therapy and treatment rooms ............................................................... 36

4.  Functional elements in construction ....................................................... 37

4.1. Sidewalks ............................................................................................... 37

4.2. Parking spaces ....................................................................................... 39

4.3. Ramps .................................................................................................... 41

4.4. Stairs ..................................................................................................... 44

4.5. Doors .................................................................................................... 46
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6. Windows</td>
<td>48</td>
</tr>
<tr>
<td>4.7. Lifts</td>
<td>48</td>
</tr>
<tr>
<td>4.8. Surfaces</td>
<td>53</td>
</tr>
<tr>
<td>4.8.1. Floor coverings</td>
<td>53</td>
</tr>
<tr>
<td>4.8.2. Walls and ceilings</td>
<td>53</td>
</tr>
<tr>
<td>5. Selected facilities for general use</td>
<td>54</td>
</tr>
<tr>
<td>5.1. Meeting places (leisure venues, theaters, cinemas, concert halls)</td>
<td>54</td>
</tr>
<tr>
<td>5.2. Exhibitions and museums</td>
<td>56</td>
</tr>
<tr>
<td>5.3. Hotels</td>
<td>58</td>
</tr>
<tr>
<td>5.4. Public swimming pools</td>
<td>62</td>
</tr>
<tr>
<td>Bibliography</td>
<td>64</td>
</tr>
<tr>
<td>Credits</td>
<td>66</td>
</tr>
</tbody>
</table>
’No barriers’ is a challenge to the planning and construction process. This challenge has been unfairly overlooked for too long. Changes in our society, not least of a demographic nature, have made the call for barrier-free construction a central consideration for public rooms and buildings. Barrier-free access is associated all too frequently only with disabilities, especially walking disabilities. However, today we are well aware that barriers of different kinds affect virtually all of us – from colors or fonts that are more easily perceived than others to floor coverings that offer more or less support and acoustic conditions that facilitate or hinder our orientation.

Berlin is committed to a barrier-free construction policy. The state’s anti-discrimination law came into force into 1999, creating a legal framework for providing equal living conditions for people with and without disabilities and excluding all discrimination. People’s mobility and freedom to meet one another in public places is the aim, and nothing should stand in the way of this, also in the literal sense. The city must be accessible in all its variety without restrictions. People must be able to move and meet freely according to their own individual potential. This does not mean that respect for construction and design qualities must take a back seat in the specially designed public arena.

This publication is designed to heighten planners’ and decision-makers’ awareness and understanding on the one hand and to offer concrete advice in addition to existing rules, regulations, and building standards on the other.

Working with associations and specialists who deal with disabilities played a large part in defining different user profiles. Specialists, the state and borough commissioners for people with disabilities, the state advisory board for the disabled, and other expert and specialist groups were instrumental in creating the working group “Barrier-Free Construction and Transportation” as an expert network in the Senate Department for Urban Development in 2002. By publishing this brochure, Berlin would like to summarize and make available the practical requirements for and experience with public construction in recent years. Local laws, regulations, administrative guidelines, and other policies are also considered here. Several examples are used to show a wide range of practical options.

Ingeborg Junge-Reyer
Senator for Urban Development
1. General information

Barrier-free planning and construction means building for everybody. The aim is to design the public realm and its buildings to be safe and pleasant for all, including those with disabilities. Along with the special requirements of those with fewer motor skills, the blind and visually impaired, the hearing impaired and the deaf, those of short stature, and the psychologically challenged, we also need to consider general requirements from cradle to grave. Where only yesterday we spoke of “disabled-friendly,” today “barrier-free” has become the common term. The aim of future efforts will be described as “design for all” or “universal design.” Berlin is part of European developments moving towards an environment of “universal design.”

This approach requires a new awareness on the part of everyone involved in planning and construction, based on the following principles:

- Respecting the differences in people
- Ensuring safety
- Creating easy functionality
- Design that is clear and easy to understand

These should be coupled with great aesthetic demands on planning and realization. Legal requirements alone are unable to fulfill these principles. Developers must design buildings in such a way that they are useable by all.

The proportion of older people in Germany is increasing. Today about 16% of all citizens are over 65. This proportion will increase in the next 30 years to about 30%. In 2005, 543,487 disabled or severely disabled people lived in Berlin, according to the “2006 Disability Report” by the Senate Department for Integration, Labour and Social Services. In other words, one in six Berliners is directly affected. As many types of illness or disability occur only at an advanced age, the number of people with disabilities looks likely to increase proportionally with the increase in age in the population. This means that here, too, preparations must be made to allow people to function actively in society and to maintain their independence for as long as possible. Barrier-free design has long been standard in new public buildings. Where changes are made to existing structures, the many different interests are often difficult to reconcile – a great challenge that demands creativity and commitment. The protection of historical buildings and monuments must also be considered.

The recommendations in this manual are based on DIN Standard 18024, part 1 and part 2. Work on the former draft standard DIN 18030 was halted in February 2007. Regulations for the planning of barrier-free public buildings and apartments are currently being compiled under a new DIN number. The manual exceeds the DIN requirements in some selected areas and falls short of it in one or two others. Experience from everyday practice was taken especially into account. Barrier-free access is one target for the design of our environment, and the standards for this are continually evolving. Due to the complexity of aspects for the barrier-free design of public areas, practical recommendations for the planning, building, and operating stages are essential.

The illustrations, pictures, and sketches displayed in the manual are not intended as concrete guidelines. They are meant to offer some orientation and inspiration in the planning process.

This manual is designed along these lines for public construction work in Berlin. It is no substitute for timely discussions of building projects with citizens and groups of experts, such as the state and borough commissioners for people with disabilities, the working group “Barrier-Free Construction and Transportation,” or the coordinating office for barrier-free construction at the Senate Department for Urban Development. In practice, it has been proven over and over that early cooperation can ensure a comprehensive barrier-free design that works in every detail. Existing publications like “Technische Grundsätze zum barrierefreien Bauen” (Technical principles for barrier-free construction) by the Federal Office for Building and Regional Planning (BBR) or those by other institutions and other federal states and communities vary in their objectives. While the BBR addresses the different requirements of the various federal states, other publications are particularly helpful with the planning stages by means of checklists. Reference is also made to the specialist literature that has already been published. A small selection is listed in the appendix.
Working with partners like Technical University Berlin, which promotes this topic in interdisciplinary teaching and research, joint initiatives supporting a barrier-free environment have been developed. The coordinating office for barrier-free construction at the Senate Department for Urban Development analyzes the experience gained from these contacts, among others, or forwards the information to the relevant departments.

Cubit = From the elbow to the tip of the middle finger
Foot = From heel to toe
Span = Distance between the tip of the thumb and the tip of the middle finger

Based on Leonardo da Vinci’s drawing of the “Proportions of Man”
Body measurements + metric system
Idealized proportions assuming a height of 183 cm
2. Anthropometric principles

2.1. Requirements and potentials of users in the public realm

Planning processes in the public realm are subject to technical and financial parameters, defined by rational arguments. "Design for all" is aimed at making human beings more the "yardstick" of construction. Public use of buildings should be barrier-free and thus available equally to all users. At the same time, the human "yardstick" should not be used simply as a model for potential movement but also as a standard for use and perception. Architecture needs to be self-explanatory for the user and to provide clear orientation and function. Human beings are not to be subordinate to the ideas of planners; rather, the planner needs to be constantly aware of and attentive to the requirements and potentials of a great variety of users. We distinguish here between three basic requirements.

- Requirements of the motor variety
- Requirements of the sensory variety
- Requirements of the cognitive variety

2.1.1. Motor function

A basic consideration for the designing of rooms should be the human being with his or her movement potential and action radii. Original units of measurement (foot, cubit, pace) were directly connected to the human body (based on Leonardo da Vinci's study of human proportion). It is relatively easy today to compensate for restrictions of human actions with technical aids, expanding and contracting the assumed range of movement that has evolved from idealized anatomy. Movement area needs to be calculated in such a way that people are able to act freely and without restrictions within their personal circumstances. In order to ensure functionality, measurements must be adjusted to accommodate, for example, both people of short stature and very tall people.

2.1.2. Sensory function

The environment is generally perceived by a combination of different senses. Compensating for restrictions or lack requires at least two senses simultaneously translating the necessary information (multiple or two senses principle).

The sense of sight

From a biological point of view, requirement profiles are distinguished according to varying restrictions and diseases of the eye. Differentiation is based mainly on:

- Reduction in visual acuity
- Severe impairment of vision
- Early blindness
- Late blindness

Visual perception of the world depends not only on the capacity of a given organ, but also on external conditions, ranging from natural light and shadows and artificial lighting to the color, shape, and structure of surfaces. Conscious use of such design elements can contribute to a definite improvement in perception of the world, helping to improve mobility in public spaces or even make it possible. The "Manual for the Improvement of Visual Information in the Public Realm" published by the Federal Ministry of Health in 1996 sets these out. While impaired vision requires specific visual support, blind users need to compensate for the missing sense by using the other senses (hearing, touch, smell/taste). The explanations of some of the technical terms below are intended to offer some inspiration for discussion and integration into designs (see also DIN 32975).

People with impaired vision need strong contrasts between darkness and light to be able to make out visual information. We distinguish here between light density contrast and color contrast. Light density contrast describes the difference in brightness between an object and its background. Color contrast uses color to distinguish objects from their background. Those with an impaired sense of color receive the visual information they need from light density contrast.

The sense of hearing

In addition to visual signals, acoustic signals and verbal communication make up a significant part of orientation in public spaces. Requirements vary in the case of:

- Partial deafness
- Deafness in advanced years
- Deafness

2. Anthropometric principles
General Principles

Range of vision

A. Optimal range of vision
B. Maximum range of vision

Field of vision

C. Maximum field of vision
D. Extended field of vision
In addition to keeping background noises and echo effects to a minimum, cases of mild or moderate hearing loss require effective public address systems and excellent reproduction of acoustic information. Severe hearing loss (people with implants or hearing aids) requires induction loop systems, superior lighting for the speaker, and other visual aids. People who have become deaf late in life particularly need visualized information. Deafness requires solely visualized information and sign language interpreters.

Hearing impairment often goes unnoticed by society until closer communication takes place, which means that there is little awareness of the problem. There is clearly room for improvement here.

“He who cannot see loses things. He who cannot hear loses people.”

Technical requirements are further elaborated in Chapter II, 1.4. “Acoustic requirements.”

The sense of touch

The sense of touch is particularly well developed in those with impaired vision or blindness. They use tactile or haptic surface structures specifically for orientation and information. Here the different levels of information include the shape and surface of the material used, as well as its structure and temperature and the contrast between these parameters or with their environment. Examples of specific elements include

- Tactile maps (floor plans, city maps, public transport route maps)
- Figurative representations (models)
- Floor indicators in guidance systems (grooved or pimpled plates, metal grooves)
Graphic characters (raised letters, braille, haptic pictograms).

The sense of smell/taste

These elements play a very minor role in the building planning process and yet are of great importance to individuals. One example of a specific application would be a scented garden.

2.1.3. Cognition

A user’s ability to find his or her way around a public space depends to a great extent on his or her personal abilities and knowledge. That is why our aim should be to design the built environment to be easily grasped, clear, and meaningful. Function and design that are in harmony make it easier to use physical structures. Prime aspects here are simplicity in designing floor plans and the use of clear terminology for signs or guidance systems, for example, or when using computers or machines. Along with the necessity of using simple representations especially for orientation systems, barrier-free information technology is becoming a more and more pressing issue.

Legal regulations on this subject have been in place nationwide since 2002 – “Barrier-Free Internet Regulations” (BITV) – and locally for Berlin since 22 October 2005 (Official Gazette 2005, p. 4020) – “Administrative Regulations for the Creation of Barrier-Free Information Technology” (VVBIT). In addition to accommodating users with sensory restrictions, special consideration is to be given here to those with learning disabilities or those unable to read well, to those with other mother tongues, and to children and the elderly.
3. Legal framework

3.1. Disability legislation

In October 1994, the German Bundestag adopted a change in the Basic Law by adding the following phrase to Article 3, para 3: “No one shall be disadvantaged on account of his or her disability.” German legislators here clearly expressed their view that “regulations that discriminate and alienate, as well as discriminating conditions in the everyday life of the disabled, are not acceptable to society as a whole.” This constitutional provision is not only declamatory in character, it also creates an obligation for legislators, the administration, and the judiciary. General clauses of this kind require elaboration in the form of concrete regulations. Berlin was the first federal state to ban discrimination and to pass a law on equal rights (LBGB of 17.05.1999; Article 11 of the Berlin Constitution). Federal legislators later followed suit with Article 1 – the Equal Opportunity for People with Disabilities Act (BGG) – of the law giving equal rights to disabled persons and changing other laws along these lines (27 April 2002). Initial basic goals for a barrier-free city were compiled in 1992 in the “Guidelines for the Transformation of Berlin to Meet the Needs of Its Disabled” and added to in 1996. The aim of the LBGB is to achieve equal living conditions for those with and without disabilities. Important in this context was the introduction of the extraordinary right of action in accordance with the code of administrative procedure by the LGBG. The non-profit organizations with legal status that are represented on the state’s advisory board for the disabled are able to enforce barrier-free access through objections or legal redress. The BGG, which came into force on 1 May 2002, has given clear and consistent expression to the nationwide change in the paradigms of disability policy. Barrier-free access was defined here for the first time. The guiding principle has now become “self-determination instead of assistance.”

3.2. Building regulations

Building regulations for Berlin

Ensuring that public buildings provide barrier-free access is primarily the responsibility of municipal authorities. The legal

BGG § 3 Disability

The term disability is used for those whose physical function or mental health is, for a period longer than 6 months, very likely to be different from what is considered normal for a particular age and whose participation in life in society is therefore impaired.

General Principles
framework for buildings can be found in § 51 “Barrier-Free Construction” of the Building Regulations for Berlin (BauO Bln).

The amended Building Regulations for Berlin (BauO Bln) came into force on 1 February 2006. § 51 BauO Bln is based on the regulations of the Model Building Regulations (MBO) of November 2002, while also taking the state regulations of the LGBG into consideration. It sets minimum building regulation requirements for publicly accessible physical structures, which must be met in order to enable barrier-free access and its intended use. The BauO Bln’s specific regulations on barrier-free access are:

§ 51 Barrier-free construction

Physical structures that are accessible to the public must be constructed and maintained in such a way that they can be accessed without barriers by people with disabilities, elderly people, and people with small children via the main entrance and enjoyed in line with their designated use without any help from third parties. Apart from the escape and emergency routes required by § 33, structural measures enabling wheelchair-bound visitors to escape on their own are required only if the structure or parts of it are used by an above-average number of disabled people relative to the disabled population as a whole. Otherwise standard measures ensuring rescue employing the help of third parties will be sufficient.

(3) Physical structures in line with paragraph 2 must be accessible by a main entrance without steps and with a clear width of at least 0.9 m. There must be sufficient area for movement in front of any door. Ramps must not slant more than 6%; they must be at least 1.20 m wide and have solid and easy-to-grip handrails at both sides. There must be a landing at the beginning and end of each ramp and interim landings every 6 m. The landings must be at least 1.50 m long. Stairs must be equipped with handrails at both sides, which must continue across landings and window openings right to the end of the stairs. Stairs must have solid risers. Corridors must be at least 1.50 m wide. Toilets must include at least one cubicle for the disabled, which must be accessible and usable without any barriers; this must be marked appropriately. § 39 para 4 also applies to buildings with fewer than five

BGG § 4 Barrier-free

Physical structures and other installations, means of transport, technical objects, information processing systems, acoustic and visual sources of information, communication devices, and other specially designed areas may be called barrier-free if they are accessible and usable by disabled persons in the usual way without any added difficulty and without help from others.
Floors above ground, where floors must be accessible by wheelchairs, without steps.

“(4) Where existing physical structures are altered according to para 2 in their use or essential structure, the requirements listed in para 2 apply accordingly; where essential structural alterations are made, the conditions listed in § 85 para 3 apply.

“(5) Deviations from para 1 – 4 according to § 68 para 1 are permissible where requirements can be fulfilled only by considerable additional effort and cost, due to

1. the adverse condition of the terrain,
2. the installation of a lift that would not otherwise be required, or
3. adverse conditions created by existing development.

The most important minimum measurements are set out in § 51 para 3 BauO Bln in order to clarify that these must as a rule be observed, regardless of the DIN 18024 regulations. In addition, special arrangements for the visually or hearing impaired in keeping with DIN 18024 regulations must be demonstrated.”

§ 39 Lifts

“(4) Buildings with more than four above-ground floors must have sufficient lifts. At least one of these lifts must be designed for the use of baby carriages, wheelchairs, stretchers, and freight and must have stops on all floors. This lift must be accessible without steps from the public entrance and from all floors with communal areas. The top floor may be disregarded if its use does not require a lift or if it is converted into living quarters in existing buildings. Where upper floors must be accessible without steps by disabled persons in wheelchairs, clauses 1 – 4 apply also to buildings with fewer than five above-ground floors.

“(5) Lift cubicles designed to transport stretchers must have a useable area of at least 1.10 x 2.10 m and those designed for wheelchairs at least 1.10 x 1.40 m, while doors must have a clear passage of at least 0.90 m. In a lift for wheelchairs and stretchers, the part not required for wheelchairs may be separated off by a lockable door. In front of the lifts there must be an area for movement measuring at least 1.50 x 1.50 m.”

§ 50 Parking spaces, spaces for bicycles

“(1) When constructing public buildings, sufficient parking spaces must be provided for those who are severely mobility impaired and for wheelchair users. These must be close to public roads and safe from traffic. When constructing buildings or other structures expected to draw traffic, sufficient parking spaces for bicycles must be provided. If structures are altered in line with clauses 1 and 3 or if their use is changed, parking spaces for cars and bicycles according to clauses 1 and 3 must be created in such number and size that they are able to absorb any additional vehicles.

“(2) The parking spaces according to para 1 clause 1 may be created on the building lot itself or on a suitable lot within acceptable distance if its use for this purpose has been approved under public law. Parking spaces for bicycles according to para 1 clause 3 must be created on the building lot or on publicly owned space in front of it or removed according to para 3.”

Regulations on the evacuation of wheelchair users

Requiring in-house measures for the rescue of those with impaired mobility are part of the regulations for the evacuation of wheelchair users (EvakVO) dated 15 June 2000 (GVBl. p. 361). This regulation opens up the possibility of using rescue measures for people in wheelchairs rather than requiring additional structural measures. This is an option where public buildings are not used by wheelchair users to an above average degree, i.e., by fewer than 1% of visitors. If this is the case, the rescue of wheelchair users in the event of danger may be organized using the help of third parties. Such measures are sufficient for the rescue of up to three wheelchair users, even if above average use has been calculated.

Regulations on the operation of special buildings (SoBeVO)

This regulation dated 18 April 2005 (GVBl. p. 230) includes requirements for stores, lodgings, garages, and meeting places. Parking places for the disabled must be marked accordingly in garages and access to these must be easy to negotiate and well-supervised. It is also stipu-
lated that 1% of the seating in meeting places, or a minimum of two spaces, be designated for wheelchair users. Companion seating is to be provided for each space. The aim is to integrate the two regulations mentioned above into a new set of Operational Regulations.

3.3. DIN standards

Essential details of the requirements for public buildings are contained in DIN Standard 18024, part 1 and part 2. This standard has been implemented as a Technical Building Regulation under building law and is legally binding (Table 3.5). A list of DIN standards and guidelines for the public sector can be found in the appendix.

3.4. Other legislation

Berlin Road Act (BerlStrG) dated 13 July 1999

The design of streets and elements of street furniture are subject to the Berlin Road Act and its supplementary regulations. The standard Berlin sidewalk structure (mosaic or unsurfaced strips along the housefronts and along the curb and a central walkway made of artificial stone or granite slabs) generally creates good visual and tactile landmarks for the blind and visually impaired. Since 1999, Berlin’s streets have been equipped at crossing points with clearly contrasting, tactile ground indicators, as well as lowered curbs. This, in connection with traffic light systems fitted with additional acoustic and tactile features, helps to make street crossings safe also for visually impaired and blind road users. Public furniture elements like displays, ramps, traffic signs, bicycle racks, trash cans, telephone booths, and similar items must be positioned to prevent disorientation and ensuing accidents involving visually impaired people. Any street furniture should be placed only outside the central walkway. In order for blind people using a cane to be able to feel this furniture, it must reach right to floor level or be marked accordingly. Bollards on the pavement should be avoided. If this is not possible, they must be placed only in the strips along the housefronts and the curb and marked by a sharply contrasting design. The pavement provides room for private furniture like freestanding seats, displays, and awnings.

The necessary regulations must be adhered to and monitored.

Regulations regarding the number of barrier-free rooms in lodgings

In line with the Berlin Restaurant Regulations, 10% of the bedrooms and additional rooms in newly constructed hotels or guesthouses were previously required to offer barrier-free access. The Restaurant Act that came into force on 1 July 2005 no longer includes lodgings in this area of regulation. This means that operating a guesthouse or hotel is notifiable only within the framework of commercial laws. The legal basis for the number of barrier-free rooms no longer exists. It made it possible to create a large number of barrier-free hotel rooms in Berlin between 2000 and 2005.

The aim is to include these regulations in the new set of Operational Regulations. Until such time it is necessary, according to § 51 para 2 BauO Bln, to ensure in each individual case that facilities can be used as intended without help from third parties.
### OVERVIEW OF THE LEGAL FRAMEWORK IN BERLIN

<table>
<thead>
<tr>
<th>Social laws</th>
<th>Building regulations</th>
<th>Other codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LAW ON ARTICLE 11 OF THE BERLIN CONSTITUTION EQUAL RIGHTS ACT (LGBG)</strong>&lt;br&gt;1999&lt;br&gt;(Provision of equal living conditions for people with and without disabilities)&lt;br&gt;1999, GVBl. p. 178 and amendments</td>
<td><strong>EVACUATION REGULATIONS (EvakVO)</strong>&lt;br&gt;Dated 15.06.2000&lt;br&gt;2000, GVBl. p. 361</td>
<td><strong>RESIDENTIAL CONSTRUCTION</strong>&lt;br&gt;DIN 18025, part 1, 1992&lt;br&gt;DIN 18025, part 2, 1992</td>
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<td><strong>RESTAURANT REGULATIONS (GastV)</strong>&lt;br&gt;Last amended on 25.12.2005&lt;br&gt;(GVBC p. 754) Barrier-free access in restaurants (Rundschreiben Il E Nr. 4 /2006 [Circular II E No. 4 /2006]) (PDF, 46 KB)</td>
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<td><strong>REGULATIONS ON THE USE OF PHYSICAL STRUCTURES</strong>&lt;br&gt;(Operating Regulations – BetrVO)&lt;br&gt;Dated 10 October 2007&lt;br&gt;<a href="http://www.stadtentwicklung.berlin.de/service/gesetzestexte/de/bauen.shtml">http://www.stadtentwicklung.berlin.de/service/gesetzestexte/de/bauen.shtml</a></td>
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<td><strong>PARKING SPACES IMPLEMENTING REGULATIONS – § 50 OF BUILDING REGULATIONS FOR BERLIN</strong>&lt;br&gt;(BauO Bln) on the provision of parking spaces for vehicles for the severely mobility impaired and for wheelchair users, as well as for bicycles&lt;br&gt;Dated 11 December 2007</td>
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<td><strong>IMPLEMENTING REGULATIONS – § 7 OF THE BERLIN ROAD ACT ON PEDESTRIAN AND BICYCLE PATHS (AV Geh- and Radwege)</strong>&lt;br&gt;Dated 13 March 2008</td>
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</tbody>
</table>
1. General requirements for barrier-free access

“Physical structures are described as public when their purpose is such that they in principle can be entered and used by all. It is immaterial whether the service supplied is of a public or private nature or whether it is free or subject to payment. These buildings are in particular large cultural or educational facilities, sport or leisure centers, medical facilities, administration or court buildings, shops, restaurants, parking lots, garages, and public toilets. This list provides only a few examples. Medical facilities also include doctors’ and physiotherapists’ offices, among other things.” (Excerpt from parliamentary paper no. 15/3926 of the Berlin House of Representatives: a bill submitted to the House of Representatives for a vote, dated 03.05.2005; explanation of § 51 para 2 BauO Bln)

Based on the differences in people’s abilities with regard to perception and movement in the public sphere, this section describes requirements for barrier-free access to public buildings and structures. The problems are listed under important functional areas found in most buildings. The diagram below gives an overview of this approach.
1.1. Orientation and information

Negotiating a highly structured building and technical environment requires clear and comprehensible communication. Information and orientation systems must be structured according to the “multiple senses principle” (Chapter I, 2.1.2.). This means, for example, that visual signals must also be perceptible to the ear and to touch. This applies both to publicly accessible properties and to the buildings on them.

Guidance systems for the blind

Concrete orientation aids or guidance systems for the blind should be used only where there is a high need for safety, the layout is unclear, or targeted guidance is required. Blind users are generally guided by, for example, the junction between floors and permanent fixtures like baseboards. The general design should be organized with the idea of facilitating orientation or providing intermittent markers. Skillfully alternating materials or using acoustic elements like sound units, running water, or artistic components can set accents that help with orientation.

Floor information

Floor information is given via floor indicators (see DIN 32984). In general, these use combinations of material high in both visual and tactile contrast, such as concrete, gravel, small paving stones, etc. They serve blind people with canes, as well as those with impaired vision via foot contact and visual contrast to their surroundings. Special elements like ribbed or blistered surfaces or metal plates can perform a warning or guiding function.

We distinguish between: Warning and danger (e.g., tripping), a decision-making function (e.g., description of destination), a guiding function (general information, continuous guiding features).

Signage

Signs should have high optical contrast and may also be tactile. Surface and background of the sign, as well as placement, are of paramount importance. Reflection or glare from sunlight or artificial light must be avoided. The writing should follow DIN 1450 (“Legibility”).

Special requirements:
- Choose fonts with upper and lowercase letters and without serifs
- Choice of font size depends on the distance to readers (more information available from the “Handbuch 20 mm 35 mm

Guidance system for the blind,
Tactile floor indicators
The pyramid font (also called prism writing) and braille are specifically tactile. The pyramid font is characterized by raised letters, capitals, and special symbols, while braille uses dots.

Descriptions or pictograms on doors, for example, should be easily readable, contrasting, tactile, and placed at an appropriate height (approx. 1.40 to 1.50 m).

**Haptic floor plans or tactile models**

Location maps or floor plans created on this principle give blind and visually impaired users a general overview and an idea of physical spaces.

Information pillars and computerized stations

Controls or other devices, such as computerized information units, must also be easy to use for people with restricted ability to grip objects. They must be accessible from a wheelchair and not embedded in walls or other elements or have sharp edges. The blind and visually impaired must be able to find them easily and to use them via contrasting and tactile elements (e.g., foot markers on the floor). The software must also be designed for barrier-free access.

(LGBG, section IV “Barrier-Free Notices and Information Technology,” and BGG section 2, § 11, VVBIT and BiTV; see Chapter I, 2.1.3.)
Braille alphabet (named after Louis Braille)

Public Buildings
Relief map with braille: Information Center of the Memorial to the Murdered Jews of Europe
Made by: Technical University Berlin; subject: Model+Design
Public Buildings

Measurements of a sitting and standing figure
1.2. Areas for movement

When speaking generally of “barrier-free areas for movement,” we should differentiate as follows:

- Areas for meeting other people
- Room for movement
- Height accessibility
- Wheelchair accessible furniture

Posture and measurements determine the dimensions of a space and its furnishings. Different body sizes limit clarity and orientation (different eye levels).

Areas for movement should take not only physical measurements into account, but also technical equipment such as walking aids or wheelchairs. Wheelchair users require the most room.

Planning should include as many user groups as possible. The basic principle is not to restrict the required areas and spaces for movement. They may, however, overlap for functional and economic reasons.

The following recommendations should be applied as approximate values:

**Width**

- General traffic areas (corridors) 1.50 m
- Secondary traffic areas 1.30 m
- Passages/doors (clear passage) 0.90 m

**Area**

- For turning a wheelchair 1.50 x 1.50 m
- In front of side-hung doors 1.50 x 1.50 m

**Height accessibility**

- From a sitting position 0.85 m up to max. 1.05 m
- In special cases also to 1.20 m and max. 1.40 m

**Knee clearance** (e.g., under a sink)

- Height: ca. 0.70 m, width: min. 0.80 m
- Approx. 60-82 cm
- Approx. 120 cm
- Knee height approx. 67-70 cm
- Lower reach approx. 40 cm
- Max. working height approx. 85 cm

The many different movement areas and their uses are elaborated further in DIN 18024, part 1, and DIN 18024, part 2.
Reachability of storage space

Public Buildings

Approx. 85 cm
Max. 60 cm
Approx. 140 cm

140 cm
120 cm
80 - 85 cm
40/60 cm
30 cm
40 cm
1.3. Exposure to light and lighting

Light as an invisible material almost always has an impact. It brings out objects on the one hand and produces shadows on the other. Human beings need light for orientation, work, and well-being. If light inside rooms is insufficient, targeted artificial light must compensate for the lack. Experts distinguish between ergonomic factors (ELI), ability to see, outward appearance, emotionality, and individuality, as well as energy efficiency factors (LENI), when evaluating light qualities. Wherever possible, a lighting design concept should consider all these factors. The general intention is usually to reproduce daylight by lighting the entire room evenly (indirect lighting). Often architecture or objects need to be ‘presented in the right light,’ which is achieved via direct or spot lighting. The lighting of functional spaces using artificial light needs to be adapted to the spectral colors of natural daylight. Lights need to be used in such a way as to allow structures of color and contrast to be easily perceptible and to light up the room as a whole (not just walls or floors). Strong shadows or glare should be avoided.

No. 18 of DIN 18024, part 2, points out a general increase in lighting strength compared to standard guidelines in DIN 5035-2. For example, older or visually impaired people require roughly 10 times the lighting strength needed by young people. If reduced lighting is desirable in certain functional rooms, reflection marks or additional spotlights can be used to compensate, but should not produce glare. Glittery or flashing light installations are to be reduced to a minimum and should never be installed in orientation areas (Chapter I, 2.1.2). Degrees of reflection emanating from material surfaces should not be underestimated (Chapter II, 4.8) and must be taken into consideration in lighting design. In transition areas between outdoors and indoors and vice versa, lighting or natural light should be used effectively as a connecting element aimed at improving the ability to see or speeding up the eyes’ adjustment to new light conditions.

Light as a guiding function

Light elements can be used for orientation or to indicate dangerous situations. However, they will only rarely be able to replace the use of contrast under daylight conditions. LED technology in conjunction with fiber optics is providing some innovative options. Examples:

- Marking the edge of steps
- Path markings inside and outside with, for example, insets in the floor or at plinth height (although floor spotlights should not be installed in the central walkway, since there is some risk of glare)
- Selective use of lights (e.g., for control elements)

Light as a warning function

Along with contrast and warning colors, additional lighting effects are required in order to warn against dangerous situations (e.g., blinking or flashing lights used to mark off construction sites). They should be directed downward to avoid glare.

Light to set a mood (color)

Depending on the aim, a dynamic, inspiring atmosphere or an atmosphere of relaxed calm can be created. Emotional factors like these can be helpful for specific groups of people.

1.4. Acoustic requirements

General requirements for the hearing impaired have been set out in Chapter I, 2.1.2. DIN 18041 on “Audibility” sets out special technical requirement parameters. People with impaired hearing or sight need specially designed equipment to be able to understand acoustic broadcasts in large rooms, in halls, or out of doors.

Sound systems

Requirements for sound systems:

- Clarity of speech
- Volume spread
- Sound quality
- Location (visual and acoustic source in one place)
- Ease of use
- Resistance to external influences
- Adaptation to the surrounding architecture

Alarm systems

Alarm systems need to be coupled with visual signals.
Hearing systems

Hearing systems provide direct broadcast of sound without background noise for users of:
• Headphones
• Hearing aids
• Ear implants (Cochlear implant)

It is important to distinguish between:
• Induction loop systems
• Infrared devices (IR)
• Radio devices (FM)

Properly installed induction loop systems in the floor, wall, or ceiling of larger meeting halls may be planned economically and provide hearing aid wearers with the best possible “reception.” Additional devices like headphones or audio-cables with European plugs will improve the situation for those without hearing aids. Users are able to move freely within the induction loops.

When installing hearing systems, it is important to work closely with specialists to achieve the right interaction between the room’s use, its acoustics, and the electroacoustics (carrying out computer simulation or room acoustic measurements before the completion of construction work is recommended). The way in which induction loops are installed (e.g., simple loops in small rooms, 8-loops in large rooms) determines the level of quality.

The international pictogram (DIN 66079-4) indicates that hearing systems have been installed.

Infrared and radio transmission equipment

Speech transmitted via a microphone is broadcast without cables via infrared rays or radio waves to a small receiver carried by the visitor.

Mobile hearing systems

Mobile devices may be able to improve adverse listening situations. However, they may be detrimental to room design or create obstacles due to extensive cabling.

Mobile radio transmission devices

These have the advantage of being able to be transported easily and used without cables just about anywhere. The acoustic transmission quality is excellent.

A building’s acoustics can often provide good conditions for trouble-free communication in closed rooms.

The following rules of thumb apply:
• Low volume of background noises
• Strong and early noise reflection
• Little late room reflection, short echo

Buildings or rooms designed for a specific use, such as auditoriums, multipurpose halls, churches, or classrooms, require specific planning.

2. Accessibility

2.1. Integration with public transport

The routes from public transport stops to public buildings need to be checked for their level of barrier-free access. The following criteria need to be observed:
• Pathway surfaces
• Visual or tactile floor indicators
• Lowered curbs
• No steps
• Presence of ramps
• Guiding systems and signage
• Construction sites

Public transport companies can help by providing information on stops. This information must consider all the different groups of disabled users. Mention must also be made of temporary restrictions due to construction work or route changes.

2.2. Integration with individual transport

Barrier-free pathways must link parking lots and the main entrances of buildings as directly as possible. Driveways with crossing barriers must allow clear passage of at least 0.9 m for wheelchair users. This passage must be marked with visual and tactile floor indicators for the visually impaired.

In order to ensure smooth passage for wheelchairs, the path must have an appropriate surface and include floor indicators of the same width as the passage.

2.3. Barrier-free design of properties

Stepless access from the streetside edge of the property to the building must be ensured (Chapter II, 4.1.).

Along with the requirements for buildings themselves (Chapter II, 3.1.), barrier-free access to buildings must also be considered. In the case of a building complex, this also includes plans for the pathways between individual buildings and functions.
“Escape routes”

“Mobility impaired”

“Disabled”

“Wheelchair user”

“Lavatory for the disabled”

“Blind”

“Hearing impaired”
3. Functional areas in buildings

3.1. Entrance

Entrances are of prime importance. They provide the interface between the world inside and outside and are instrumental in making up the visitor’s mind in terms of the building’s general impression, acceptability, and quality of use. They are responsible for two aspects: to be inviting and at the same time to provide boundaries, protection, and control.

Barrier-free access is promoted by:
- Transparency
- Openings
- Uniformity of levels

Opposing this are the following elements:
- Sets of stairs
- Heavy doors
- Vestibules
- Monitoring systems (e.g., gatekeepers, crossing barriers, turnstiles, codes, or revolving doors) whose function creates barriers

As a result, planning is particularly difficult in existing buildings and in buildings classified as historical monuments. The following aspects are important for those with **restricted motor skills**:
- Stepless entrance options
- Passage width of at least 0.90 m
- Door opening variants:
  a) controlled manually, in the case of easily opened doors
  b) controlled by an electric motor with push plates
  c) automatic doors with sensors
  d) personal service
  e) entrance speaker system (bell and microphone must be within easy reach; visual contact with staff would be ideal)

For those with **impaired sensory/cognitive skills**, the following aspects are important:
- Clarity of directions to and classification of buildings through signage or guiding or design elements (Chapter II, 1.1.)
- Focus on main entrance using proportions, color, material, and contrast
- Contrasting and tactile design of signs, enhanced by, for instance, acoustic and/or visual signals
3.2. Foyers and Corridors

There is often a vestibule in front of the foyer. Depth should not be less than 1.50 m when the doors are open. All passages must be designed to be at least 0.90 m wide. The user will expect clear information in the foyer. Persons with impaired cognitive skills should also be kept in mind with the following:

• Guiding and orientation systems (see Chapter II., 1.1.) with signs
• Design to include suggestive guiding elements, such as:
  a) Clear layout of floor plan
  b) Choice of colors
  c) Choice of material
  d) Lighting
• Floor plan or model representations of building
• Computer stations or other technical devices, such as sound carriers, telephones, automated devices
• Additional personal assistance (gatekeeper)

All information must be barrier-free accessible. Different movement ranges and sizes of users (wheelchair accessibility of tables and counters) must be observed (Chapter II, 1.2.). Applying the “multiple senses principle” (Chapter I, 2.1.2), acoustic, visual, and tactile elements should also be used.

Decorative elements or information carriers must not be placed within traffic areas or extend into them.

As fire compartments, foyer areas that connect to staircases/lifts need to be separated from other corridors by appropriate doors. Solutions for independent use must be found at these intersections. This set of problems is often made more complicated by transport requirements for mail, luggage, deliveries by the catering industry, etc. Solutions can, for example, utilize:

• Open doors with smoke detectors
• Automatic door openers (Chapter II, 4.5.)
• Easy-to-open doors

A targeted design of traffic routes within a building can contribute to easier orientation:

• Change of floor material (e.g., to emphasize important functions)
• Baseboards that contrast to walls and floors
• Intermittent or linear use of light elements
• Art objects (Chapter II, 1.1.)

Naturally, personal service provided by trained staff is of fundamental importance and can compensate for or complement the situation in question.

3.3. Escape routes

Escape routes in a public building and on the premises outside must be designed in such a way that they can be used without barriers. Reduced sensory, cognitive, and motor skills of those with disabilities must be taken into account. Two separate escape routes are required.

Those responsible for the facility and individual sections used by an average number of wheelchair users (e.g., up to 1% of the total visitors) must work with the Berlin Fire Department to develop in-house procedures for rescuing this group of people with organized help from third parties. These procedures will be included in the facility’s fire protection policy and publicly displayed in a central place. Staff must be trained regularly on what to do in the event of danger – especially with regard to providing help for wheelchair users. The regulations for the evacuation of wheelchair users (EvakVO) provide the legal basis for this.

Additional structural measures enabling wheelchair users to escape on their own are required if the facility or parts thereof are used by an above-average number of disabled people relative to the disabled population as a whole (legal basis: § 51 para 2 clause 2 BauO Bln). These measures must be individually set down and include:

• Installation of fire-proof waiting areas or fire compartments for people with reduced mobility, from which they can be rescued by third parties
• Provision of visual information via light signals inside and outside of rooms and corridors used by the deaf or partially deaf
• Provision of acoustic information for the blind or visually impaired
• An individually designed information system for the blind and visually impaired using tactile models of the escape route
• Contrasting, tactile maps of the escape route (e.g., raised relief maps)

Safety can also be improved by:

• Marking escape routes near the floor, as areas near the ceiling are often the
first to be obscured by smoke, concealing information (e.g., contrasting baseboards, floor markings)
• Safety lighting
• Smoke detectors

3.4. Meeting Rooms in Public Buildings

The operation of meeting places in Berlin is subject to the regulations on the operation of special buildings (SoBeVO) that have been in effect since May 2005.

§ 15 (4) of SoBeVO requires that 1% of all seating, or a minimum of two spaces, have a level width of 0.90 m and depth of 1.50 m. For detailed information please see Chapter II, 5.1, 5.2., and 5.3.

It is important to note that meeting rooms must have barrier-free first-aid rooms allocated to them, even where parts of the building are separate. Appropriate signage is required.

3.5. Office Spaces in Administrative Buildings

Even where office spaces are not regarded as public areas of a building, there are some criteria which will have to be considered for their barrier-free use in individual cases. If an employer employs disabled persons, he or she must ensure barrier-free use of rooms and work stations according to the Regulations for Work Places (ArbStättV 53 (2) BGB Part I No. 44 dated 12.08.2004). This usually applies to office spaces in administrative buildings. The criteria are:
• Doors (Chapter II, 4.5.) (passage width 0.90 m, labelling, marking of glass panels)
• Area for movement in the room (Chapter II 1.2.)
• Furniture, wheelchair accessible desks which may be height adjustable
• Windows (Chapter II, 4.6. windows) Controls for opening or handling blinds at a height of max. 1.20 m
• Contrasting design, colour, lighting
• Special individual appliances
• Location of washrooms.

3.6. Showrooms

Showrooms within the trade and services industry generally need to be designed barrier-free. Significant consideration must be given to appropriate furnishings and operational organisation in addition to the structural requirements for public facilities. Sufficient areas for movement are required (1.50 x 1.50 m (potentially 1.20 m)) e.g. in front of shelving units and tables, displays, counters, check-out points or vending machines. Passage widths (minimum 0.90 m), height accessibility and visual accessibility e.g. as described in Chapter II, must be taken into consideration. Where necessary, partial areas must be designed appropriately, e.g. counter elements which need to be lowered to 0.85 m and measure approx. 1 m across. Visual information, sometimes applying tactile elements, will ease or even allow self-sufficiency of affected persons in many areas of trade facilities. For example, a visually and tactile designed floor plan or layout of goods on offer in a supermarket will make it easier or even allow a visually impaired person to make their daily shopping trip independently and experience ‘shopping’ as a positive event.

Smaller trade units which have a split level layout should organise their supplies in such a way that all goods are available barrier-free on one level.

Shopping centres or department stores usually provide a high level of barrier-free use. It is important to ensure that functional areas are linked barrier-free with one another. Parking spaces e.g. in multi-storey carparks or underground carparks should be close to entrances and exits. Traffic routes must be kept clear from advertising media. Glass doors must be visually marked. It is helpful to have announcements in lifts not only giving details of location but also of the range of goods available on any given floor. Barrier-free washrooms may be allocated to a central place where several functional areas can share them.

Changing rooms (deviating from Chapter II 3.8.3.) should be supplied with an area for movement measuring 1.50 m x 1.50 m, and possibly using a variable design with mobile walls).

3.7. Rooms used for gastronomic purposes

The Restaurant Licensing Act (GastG) was changed on 1 July 2005. Barrier-free access to restaurants and rooms available
to guests was achieved with the Second Act on the Simplification of Laws and the Reduction of Bureaucracy (Article VII amending the Restaurant Regulations [GastV]) dated 14 December 2005.

The general requirements for public buildings (Chapter II, 1 – 4) also apply to restaurants and cafeterias.

These requirements relate to:
- Sufficient area for movement in front of and behind the entrance area (Chapter II, 1.2.)
- Non-reflective, non-slip floor coverings
- Sufficient and glare-free lighting
- Unrestricted width of 0.90 m must be observed in traffic areas in restaurants. This applies also to passages designed to channel guests in a particular direction. If the latter is not possible, other solutions (e.g., removing the channeling element or setting up a detour) must be found.
- Contrasting design of objects
- Free choice of seats at tables
- Tables with moveable chairs
- Tables must be wheelchair accessible (knee height 0.70 m)
- Furnishings should not consist solely of bar stools or bar tables
- Height of tray runners 0.85 m
- Bar elements and glass covers to be lowered (height 0.85 m)
- Glass display cabinets with glass shelves for food and cake to be arranged at eye level height for wheelchair users (max. height 1.40 m)
- Reduced height of about 0.85 m (max. 1.20 m) for the service elements of vending machines
- Posting of notices and instructions in contrasting design in easily accessible locations
- Menus to be printed in large serif-free font and made available in braille where possible
- Location of barrier-free lavatories as close as possible to the dining room
- Level accessibility to any outside area
- No gravel
- Training for staff
3.8. Sanitary facilities

Lavatories in public areas require a high level of planning detail as the layout must be appropriate for a wide range of users. The requirements are listed in greater detail in DIN 18024, part 2, under Number 11. A differentiated approach to the requirements is absolutely essential, depending on the use, frequency of use, and range of services of a particular building.

3.8.1. Lavatories

Publicly accessible facilities should have at least one barrier-free toilet. (This especially needs to be observed when parts of the building complex have been separated from one another.) The layout of the room may vary depending on floor plan and conditions of use.

a) Room layout with barrier-free cubicle integrated into women's and men's lavatories

b) Room layout with barrier-free cubicle shared by women and men

(e.g., suitable for use by auxiliary staff or during breaks in play areas, presence of diaper-changing facilities). If there is no anteroom for this cubicle, the entrance should be concealed from direct view in heavily frequented areas.

c) Room layout in individual cases

Only in individual cases and in existing situations may a women's cubicle be provided for the use of both genders.
Toilet cubicles – Planning Scenario 1

Meets comprehensive requirements according to DIN 18024, part 2, with generous space (2.20 x 2.30m) including
• Area for movement in the room measuring 1.50 x 1.50 m
• Dual access to the toilet bowl

Use:
• New building
• High degree of public use
• Special facility for the disabled

Deviations from Planning Scenario 1 may be necessary in existing buildings and must be justified.

Toilet cubicles – Planning Scenario 2

May be used in exceptional cases; deviates from DIN 18024, part 2. Prerequisites are:
• Less area but still appropriate for use (2.20 x 1.65 m)
• Area for movement 1.50 x 1.50 m
• Access to toilet bowl from only one side

Possible use:
• Existing buildings
• Buildings classified as historical monuments
• Low frequency of use.

Equipment

Cubicle doors (see also Chapter II, 4.5.)
Toilet doors should open outwards. It is also possible to have them open inward if this does not reduce the necessary area for movement. Clear passage should be 0.90 m.

• The door should open outwards, unless movement radius inside the cubicle remains unaffected.
• Manual doors must have a horizontal bar attached at a height of about 0.70 m.
• Door (frame or leaf), doorknob, and any labels must be designed to contrast with their surroundings.
• Any labeling must also be put up in a tactile version at a height of between 1.40 m to 1.50 m.

Installation of sliding doors requires about 0.10 m more width compared to side-hung doors in order to maintain the space needed for clear passage. In variations of Planning Scenario 2, clear passage may be reduced to a minimum of 0.80 m.
The following measurements usually need to be observed for toilet bowls:
- Depth 0.70 m
- Height 0.45 to 0.48 m including seat
- Back support 0.45 to 0.55 m from front edge of bowl. This is absolutely essential for Planning Scenario 1.

Grab bars need to be installed
- At a height of 0.70 to 0.80 m
- At a distance of approx. 0.15 m to the edge of the bowl

In Planning Scenario 1 (dual access to toilet bowl), fold-down grab bars need to be attached on both sides.

In Planning Scenario 2 (access to toilet bowl on one side), a fold-down grab bar needs to be attached to the accessible side and a fixed grab bar to the wall side (e.g., L-shaped).

Flush controls need to be simple to use (e.g., large pressure plate, wall switch on one side or integrated into handle).

Barrier-free use of the washbasin requires:
- Installation height of 0.80 to 0.85 m from the finished surface of the floor
- Knee clearance with a height of 0.67 to 0.70 m (no warm water heaters below basin)
- Toilet tank to be installed in or on the wall where possible
- Single-handle faucets

There are no special requirements for the shape of washstands.

Additional furnishings could include:
- Easy-to-use soap and hand towel dispensers at a maximum height of 0.85 m
- Mirror flush with wall (adjustable mirror not required)
- Shelves at a maximum height of 0.85 m
- Clothes hooks at a maximum height of 1.20 m
- Non-slip flooring (Chapter II, 4.8.2.)
- Emergency pull cord or switch up to a maximum height of 0.20 m above the finished surface of the floor
- Toilet seat riser
- Back support
- Bathroom equipment and control devices designed to contrast with wall and floor areas
- Unit for people of short stature and children in larger restroom facilities
3.8.2. Bathtubs and showers

Quality expectations for these areas have greatly increased. The market has responded to this and offers a great variety of facilities that are also barrier-free. Here, too, contrast is very important.

**Planning Scenario 1**

Fulfills comprehensive wheelchair requirements, including turning movements of the wheelchair, while at the same time providing very good features for parents with children. The following are required:
- Shower area level with floor and measuring 1.50 x 1.50 m
- Fold-down shower seat, shower stool, shower chair; seat measuring at least 0.50 m x 0.50 m
- Horizontal grab bars at a height of 0.70 m; vertical bars up to 1.50 m
- Control devices (taps, shower hose, soap) within reach at about 0.85 m
- Storage shelf or rolling shelf at approx. 0.85 m height
- Non-slip tiles (Chapter II, 4.8.1.)

**Planning Scenario 2**

Meets requirements of those with reduced mobility, including limited use of wheelchair. Requires floor-level shower area at least 1.20 m deep and 1 m wide. This variation results in multiple overlap of areas for movement within the bathroom. Furnishings are the same as in Planning Scenario 1.

**Bathtubs**

It is important to ensure an area for movement of 1.50 m x 1.50 m in front of the bathtub. Horizontal and vertical grab bars must be installed along the long wall. Paneling on the front of the bathtub should not prevent mobile lifting devices from being inserted underneath the tub. (See also Chapter II, 5.3. for more examples.)

3.8.3. Changing rooms

Changing rooms, especially in public baths and large medical or spa facilities, require the following:
- Cubicle with area for movement measuring 1.50 x 1.50 m
- Cubicle with a cot at a height of 0.50 m
- Use of lockers and hairdryers made possible with appropriate devices
Public Buildings

• Bench with seat depth of at least 0.50 m
• Option of changing to a shower wheelchair, availability of shower wheelchair
• Communal changing rooms with tactile and visual markings on lockers
• Key ring with tactile markings

3.9. Therapy and treatment rooms

Therapy and treatment rooms in medical facilities like doctors’ offices and physiotherapy clinics, as well as in spa or general fitness facilities, must be designed for barrier-free access in line with the general requirements for public buildings. Pathways and functional areas, such as reception areas, waiting rooms, and examination rooms (reception area counters/X-ray area), must be barrier-free. Bathrooms, changing rooms, and other facilities must also be barrier-free. Alternative solutions are possible in smaller institutions. Mobile examination equipment may be used, for example, or changing rooms can be designed without special furnishings (deviating from Chapter II, 3.8.3.) or offered in another form (mobile walls).
4. Functional elements in construction

Several of the following elements are key to barrier-free construction and deserve closer inspection for this reason.

4.1. Sidewalks (on the property)

Sidewalk width

Sidewalks should be wide enough to allow a pedestrian and a wheelchair user to pass at the same time. Usually 1.50 m is sufficient. The minimum width of 1.20 m may be justified where the sidewalk is no longer than 10.0 m. Beyond that length, wider passing points will have to be provided.

Slope

The maximum slope of the sidewalk should generally not exceed 4%. Wheelchair users and people with reduced mobility can deal with slope of up to approx. 3% without any particular restrictions.

If greater slope cannot be avoided due to topographic conditions, alternative solutions, detours, or ramps (see Chapter II, 4.3.) should be considered. Providing information on the slope of both the direct route and the detour is recommended.

Transverse gradient

For drainage reasons, a transverse gradient of up to 2% must be maintained depending on surface structure and traction. A greater gradient will cause problems for the wheelchair user as he or she will need to steer against it.

Change of direction

Experience has shown that unclear or confusing terrain detracts from a sense of safety. When creating pathways, sharp corners should be softened with rounded or slanted routes. The minimum width of the path should be increased to 1.50 m in places where there is a change of direction.

Structuring the surface

The surface should provide good traction and a smooth ride, as well as being slip-resistant, level, non-reflective, and with few gaps. Non-slip surfaces are those that provide a good grip for shoes, mobility aids, and the wheels of a wheelchair, even when dirty, wet, or covered in snow. The following have proven effective:

- Concrete blocks
- Concrete surface
- Fired, level clinker bricks
- Poured asphalt with added crushed gravel
- Washed concrete slabs with added gravel

Surfaces that are too coarsely structured, however, are also unsuitable as they increase the frictional resistance of the wheels.

Sidewalk borders

Sidewalk borders should be designed in such a way that the layout of the path is clear, especially for the blind or visually impaired. Grass or edging stones, for instance, can set clear borders that give blind people additional tactile and orientation help.

Grooves

Grooves or drainage channels running along the path can be an additional help for the blind or visually impaired. However, grooves running across the path or along it may pose problems for wheelchair users or people using walking aids. Covering these with a fine-meshed grating can prevent tipping and similar problems.

Orientation aids

Information for the blind or visually impaired, for example, can be provided on handrails or the surface of the pathway (Chapter II, 1.1.). Signs or other visual information must be set up to be freely accessible but not right on the track.

It is important to ensure a short reading distance for the visually impaired. Glare and reflection can be avoided by choosing the right material.

Lighting

Lighting should be even. Cones of light should overlap to avoid areas of shadow. Lighting fixtures should be installed at a height of at least 2.10 m to avoid glare. Floor lights or lights integrated into railings are popular, but may impede safe passage if installed incorrectly. Lights integrated into railings, for instance, should always be directed downward.
Furnishings

The clear width of a walkway should not be obstructed by objects like poles, benches, or signs. Street furniture should, where possible, be placed along an additional, separate strip. Benches should have a space for wheelchairs to one side.

4.2. Parking spaces for cars

§ 50 of the BauOBln deals with vehicle parking spaces for wheelchair users and people with severe mobility disabilities. A “sufficient number” of such parking spaces must be created, and these should be in line with the basic principle that wheelchair users and those with walking disabilities require a parking space close to their destination.
In order to provide enough space for people to get in and out of the car, an additional 1.50 m needs to be added adjacent to the 2.00 m required for the car itself. In the case of parallel parking spaces, an additional area for movement at the back must be provided for special transport services and cars to load and unload.

Parking spaces may be just 2.00 m wide if there is an area parallel to them (e.g., a sidewalk) measuring 1.50 x 1.50 m that can be used to get in and out of the car. Signs are required here to indicate the space's special status.

Uncovered parking spaces present a disadvantage for mobility restricted persons in inclement weather conditions. Because of the additional time needed to get in and out of the car, these disadvantages should not be underestimated.

If a very large number of special parking spaces need to be provided, additional regulation may be a good idea. This can consist, for example, of signs allowing temporary use by other vehicles.

Underground parking

Special parking spaces identified by signs must be connected by lift to the street or to building levels overhead. These special parking places should be placed close to the lift.

Where special parking spaces are side by side, the adjacent area for movement can be shared with the car next to it for a more economical use of the overall space available. Direct and sufficient lighting must be provided. If this is controlled by a timer, it must be set to allow for the additional time needed to get in and out of the car.

Sufficient depth within the safety zone between opened doors (at least 1.50 m) must be observed, as well as the automatic functioning of doors, most of which are for fire protection.

Multi-level parking garages

Special parking spaces in multi-level parking garages should be situated on the ground floor to aid escape in the event of danger.

Car parking systems

Car parking systems are aimed at making optimum use of the parking space available. They are useful for wheelchair users only if the car is guided automatically to the right parking zone and can later be sent for from there. Parking systems that require drivers to drive onto a mobile platform are not suitable for wheelchair users, due to the necessary substructure at a height of up to approx. 0.10 m. If such a system is used, additional static parking spaces need to be provided.
Public Buildings

Ramp in front of a historical building
4.3. Ramps

Special attention must be given to the design of ramps. Ramps need to be 6 or 7 times as long as a corresponding flight of stairs would be, for example, to accommodate a 6% rise. As ramps are often installed after the fact to overcome existing height differences, their acceptance and comfort depends heavily on the construction and design elements used.

Artistic elements should also be included to reduce the psychological barrier a ramp can cause. Overcoming height differences on a large scale entails problems that must be taken seriously, since especially people with impaired mobility or with manual wheelchairs can experience general insecurity here. Such solutions must be marked accordingly and have intermittent landings.

At a building entrance, ramps should be used to compensate for a difference in height of between 0.80 and 1.00 m at most; otherwise, technical lifting devices would be the preferred option. This also applies to building interiors.

Ramp width

Berlin’s construction regulations require ramps to be 1.20 m wide, which would in general be suitable for a building entrance. Where space is restricted a short, clear ramp, used in connection with stairs, may also be functional at a width of 1.00 m.

Ramps that include a change in direction or are used by many people should definitely be widened to 1.50 to 1.80 m because their route is unclear.

Ramp slope

Slope of up to 4%
An incline of up to 4% is considered a sloped path, which does not necessarily have to comply with the standard construction details mandated by BauO Bln, such as flared curbs to the side or handrails. However, it is important to ensure a non-slip surface and adequate lighting, as well as accents on the sides demarcating the ramp from its surroundings.

Slope of 4 to 6%
Ramps with this slope are the most suitable, since they can be easily used by both pedestrians and wheelchair users.

Slope of 6 to 8%
Ramps with this slope pose greater challenges for users. Subjective physical and psychological factors set boundaries here, as do certain types of wheelchairs and weather conditions. Floor indicators in line with DIN 32984 can be used to indicate changes in height.

In exceptional cases, it is possible to increase ramp slope in existing buildings to a maximum of 10%. Signs should indicate the exact gradient. An incline of more than 10% does not feel comfortable to pedestrians and can be dangerous for many wheelchair models (risk of tipping). They should be constructed only to cover very short sections (e.g., one step) and be accompanied by personal assistance. A mobile ramp could be used as an alternative.

Transverse gradient

A transverse gradient must be avoided. A maximum of 2% for drainage purposes is acceptable.

Ramp surface

The surface of a ramp should be neither too smooth nor too uneven or reflective. The choice of material will significantly affect the ramp’s external appearance and functionality. The appearance of very long ramps can be improved by using different materials. Clever design details may encourage a feeling of psychological security.

The beginning, end, or change of the slope should be indicated using a change of material, contrast, or color.

Very steep ramps exposed to the weather may increase the danger of slipping. Diagonal grooves (perhaps of rubber) or stone laid in a scale pattern can partially improve the situation. Clinker brick or concrete surfaces have proven effective. Natural stones should be used only if their surface has been cut.

Metal constructions and surfaces can often be adapted very well to existing conditions but will become slippery when wet. They should have a suitable profile (max. mesh width 12 x 12 mm). Where necessary mats should be kept ready at hand during the winter.
Public Buildings

Ramp meeting contrast and measurement standards

42
**Public Buildings**

**Railings, barrier rails, bollards, landings**

Especially outdoors, railings are very important in the case of ramps designed without accompanying stairs. They should have a non-slip surface and continue up to 0.30 m past the ramp (e.g., wood and metal in a rounded form). See Chapter II, 4.4. for details on installation height. Bollards as curbs to the side should be 0.10 m high. Landings should be included at sensible intervals, ideally after 6.00 m of ramp and with a depth of 1.50 m. If space is limited, they may be omitted to reduce the gradient of the ramp.

**Lighting**

Ramps must be lit – avoiding any glare – especially at the beginning and the end of the slope, where special accents may also be placed.
4.4. Stairs

Stairs are physical constructions for overcoming vertical distances. They not only meet functional and technical needs, but also have significant communicative, social, space-creating, and aesthetic qualities. Staircases are often designed in a sober and functional way and serve merely as escape routes in the event of danger (skyscrapers). However, if designed creatively, they are also able to greatly reduce psychological barriers and so facilitate their physical use. Technical principles are set out in DIN 18065.

Special attention should be paid to designing the entrance to and exit from the staircase with visual and perhaps tactile floor indicators. Mock steps are to be avoided.

Geometry and measurements

Straight stair runs are preferable. Spiraled runs should be avoided. A staircase requires an optimum gradient. The maximum gradients set out by DIN 18065 should not be exceeded, and tread depths should not fall below the minimum.

A step recognized too late, a sudden change in step height, indistinct edges, or inappropriate landing measurements can all disturb the rhythm of movement up and down stairs. Suitable floor indicators must point out such disruptions. Depending on the construction of the stairs, edges should be marked. Standard measurements (depth of markings): treads 3 to 6 cm; risers 2 to 3 cm.

Risers

Risers offer more safety, especially if they contrast to treads. They are legally required by § 51 (3) BauOBln.

Treads

Treads should be slip-resistant and have a contrasting front edge. Additional slip-reducing profiles on the edges of the steps will increase safety. Undercut risers must be avoided or should be slight and used only to provide additional profile. Translucent step materials should be avoided, especially if steps are used frequently. If compensatory steps cannot be avoided, they must be clearly marked.
Landings

Landings make a break in the climbing motion of the stair user by providing a few steps on level ground. This reduces the physical strain of climbing stairs. It is important to ensure an undisturbed walking rhythm by adjusting the depth of the landing. The depth of the landing should allow for a certain number of standard steps to be taken.

Differences in material, color, and contrast between landings and steps can be helpful to users. Visual and tactile floor indicators should be employed for stairs that are frequently used. It is important to avoid the appearance of mock steps.

Stringboards and wall surfaces

These can enhance orientation or visual perception of the staircase through contrasting design.

Hand railings and barrier rails

Hand railings must be applied to both sides of the stairs. They should extend by 0.30 cm into the entrance and exit level and also include landings and shafts.

DIN 81065 “Staircases in Buildings” Number 6.10.1. sets out the height. Hand railings must be designed ergonomically (rounded profile).

The following are suitable:

- Round and elliptic profiles with a diameter of 30 to 45 mm, made of material that is pleasant to the grip, such as wood
- Distance from the wall should be at least 50 mm
- Light or color contrast to the wall or room will improve quality for users
- Tactile information in braille or prism writing, for example, can be attached to the hand railing to provide focus points for orientation
- Decorative railings or balustrades should be complemented by contrasting hand railings for safety reasons

Barrier rails are required for protection on the open side of stairs and landings. The height is stipulated by § 36(5) BauO Bln; where necessary, additional hand rails must be provided for people of short stature and children.

Lighting

Natural light is the preferred option. Artificial light to illuminate steps should be used from above in order to avoid any shadows. Side lights or step lights may cause glare and should only be used with low lux and directed downwards. Closely bunched light rays can also sometimes cause harsh shadows.
4.5. Doors

Doors are an important and frequently used construction element for opening up functional rooms. Attention must be given to visual and functional features, as well as to providing sufficient room for movement. It is important to allow enough time for mobility-impaired users to pass through the door.

Types of doors according to their uses:
- **Gates** (garage, premises) can only be made barrier-free if power-operated.
- **Doors leading into buildings** usually require power operation.
- **Fire doors** usually require power operation (Chapter II, 3.3.).
- **Smoke doors** can be set to stay open (Chapter II, 3.3.).
- **Lavatory doors** should usually open outwards.
- **Sound-insulated doors** – It is important to bear in mind that the thickness of the door will affect the width of passage.

Types of doors according to construction principles:
- **Side-hung doors** – Required areas for movement must be adhered to (see below).
- **Sliding doors** offer good solutions in restricted spaces.
- **Revolving doors** must be accompanied by side-hung doors or have a sufficient diameter (4.20 m for the three-wing design).
- **Swinging doors** are unsuitable. For the purpose of barrier-free use, they must be fitted with locking devices that prevent them from swinging through.

**Folding doors** and **space-saving doors** should not be used in public buildings.

**Door width**

The clear passage width must not be reduced by, for example, the door itself. It is usually set at 0.90 m, but in existing buildings may on occasion pass as functional with a minimum width of 0.80 m (internal doors).

**Areas for movement**

In general, area for movement of 1.50 x 1.50 m must be provided in front of doors; in exceptional cases a minimum of 1.20 x 1.30 m is sufficient. This also applies to the area in front of a side-hung door. Where the door opens there
must be a minimum gap next to the
door handle of at least 0.50 m from the
side wall. Insufficient area for movement
must be compensated for with auto-
matic controls.

**Door locks and door handles / Opening and closing systems**

All opening and closing systems within
the manual operating range must be
designed for a height of 0.95 m to max.
1.05 m. They must be rich in contrast.
Any triggers, such as buttons to open
a door automatically, must be suitably
placed, where possible on the opening
side (door handle) at least 0.50 m in front
of the door to be opened (see also Chap-
ter II, 1.2., on areas for movement).

Wheelchair users will be better able to
pull the door shut if a handle is installed
horizontally on the door at a height of
0.85 m.

Olive-shaped handles set into the door,
as is frequently the case with sliding
doors, should be avoided and replaced
by handles.

**Design**

Either the door itself or the door-
frame must stand out clearly from the
walls. Contrast should be light-dark or
achieved with color.

Thresholds must be avoided or limited
to a maximum height of 20 mm (DIN
18024, part 2, 2.7.2.). Grates in front of
doors should not exceed a mesh width
of 12 x 12 mm.

Any writing must be placed at a height
of 1.40 to 1.50 m, contrast well, and per-
haps be tactile. Font type and size should
be in line with DIN 1450 ("Legibility") or
DIN 32975 ("Outline of visual contrasts")
(Chapter II, 1.1.).

**Communication elements**

Address and nameplates, mailboxes,
bells, and intercom systems must all be
placed bearing in mind the speaking
height and eye level of a wheelchair
user. Control elements should contrast
with the surroundings and be positioned
at a height of 0.85 m. Acoustic signals
(acknowledgments) should also be given
visually, and vice versa, to ensure that
two senses are always addressed at the
same time.
4.6. Windows

Windows must be barrier-free only in functional areas that have specific uses. This applies, for example, to barrier-free office areas or barrier-free rooms in lodgings. A wheelchair user must be able to operate such windows and be able to adjust blinds, etc. easily. They must be designed to be contrasting. The ideal measurements are between 0.85 m and approx. 1.05 m. If these cannot be achieved for structural reasons, a tolerance of up to 1.20 m can be justified.

If that, too, is impossible, appropriate aids must be installed (e.g., levers, extended handles).

The eye level of someone who is seated is between 1.05 m and 1.20 m. This range ensures an unrestricted view for all (e.g., hotel rooms). A minimum area (1.50 m x 1.50 m) for movement in front of the window must be maintained. The types of opening mechanisms used and the direction the window opens are very important.

Casement windows provide wheelchair users and people of short stature the best solution as long as the window handle is within reach. Windows with tilt-turn fittings are of only limited use to wheelchair users.

Side-hung pivot windows have the advantage of easy handling as the handle is fitted to the lower cross beam. The possibility that they might swing is a disadvantage.

Top-hung pivot windows can be easily used by a wheelchair user. When opened, however, they impinge on the space inside the room and will restrict the area for movement.

Horizontally arranged sliding windows are well suited especially to wheelchair users. The area for movement is not affected.

Additional devices, such as a lever or crank, may help a person sitting in a wheelchair to operate a skylight. The control device should be fitted immediately above the window sill. Additional fittings include roller shutters, shutters, and blinds. Operating roller shutters manually will be difficult for those with reduced grip strength and from a wheelchair. As a result, installing electric driving devices – or at least including electric connections for later installation – is a good idea. Since opening and closing shutters installed on the building facade will be difficult for the disabled in any event, these should not be used. A crank may make this operation easier.

Blinds intended to protect from sunlight or direct view are easy to operate. Blinds installed on the outside are usually fitted with a crank. Electric driving devices can be a great help with these.

4.7. Lifts

In order to ensure unrestricted vertical use of buildings, barrier-free lifts must take into consideration the needs of all users. In principle, § 39 BauO Bln in connection with DIN 18024, part 2, apply. Deviations according to § 68 BauO Bln are possible within the framework of EN 81-70. This standard includes very detailed information.

In general, the following requirements need to be considered:

**Measurements**
- Area for movement in front of lift: 1.50 x 1.50 m
- Useable area of lift: at least 1.10 x 1.40 m
- Clear door width: 0.90 m
- Call button to be placed at least 0.50 m from construction elements

**Contrasting design**

The door to the lift shaft or the frame, as well as the call button and key pad, should contrast from their background, where possible light on dark.

**Control elements**

**Call button on any floor:** The call button should ideally be placed at a height of 0.85 m and on the right. Call buttons should be at least 50 x 50 mm in size. A tactile and visual signal must be given by the call button once activated. Letters and numbers should be 20 to 30 mm in size and be clearly self-explanatory, as well as contrasting and tactile (prism writing).

**Call pad inside lift:** The pad must be placed at a height of approx. 0.85 m (lower edge) to 1.05 m (upper edge) and at least 0.50 m from the corner. In larger lifts, it should be positioned in the middle of a side wall. In exceptional cases, it can be as high as 1.20 m. There
Interior of a lift with contrasting controls at accessible height
should be a gap of at least 10 to 15 mm between the individual buttons. The pad should be designed as a table rather than vertically. Duplicate pads are unnecessary. Light displays must be accompanied by acoustic signals and vice versa.

Additional fittings

- Standard lifts (1.40 x 1.10 m) require a mirror opposite the door to help with orientation to the rear. Polished stainless steel is one alternative to a mirror.
- A hand rail must be installed on the side walls at approx. 0.85 m.
- Language elements should be included.
- The cabin must be illuminated without glare.
- A fold-down seat may be added.

Other lifts and lifting devices

can be used in special cases. They are operated without a lift shaft and with a loading ramp. The choice of the technical device used depends heavily on the building’s function and the structural conditions. Load carrying capacity for public use should be at least 300 to 350 kg. The following criteria can help determine the choice:

- Difference in height
- Authorized group of users
- User frequency
- Operating staff
- Load carrying capacity

Lifting devices without a lift shaft

Load carrying capacity of 300 to 350 kg possible
Maximum lifting height approx. 4.0 m

Lifting platforms

Clear platform measurements: at least 0.90 x 1.30 m
Maximum lifting height: 1.80 m

Mobile lifting platform

Suitable for temporary use
Maximum lifting height: approx. 1.00 m

Convertible stairs/lifting platform

Particularly suitable for historical buildings and monuments as the building’s overall appearance is maintained.

Stairlift (platform lift going up the side of stairs)

- Sufficient size of platform
- Sufficient width of stairs
- Sufficient loading space

Tracked vehicle for stairs with platform only in exceptional circumstances

Tracked vehicle for stairs only in exceptional circumstances
Load carrying capability is restricted.

Tracked vehicle for evacuation
Evacuation chair

Horizontal transporter
“People mover”
Convertible stairs/lifting platform
Illustration based on Bode Museum
Museum Island in Berlin
Illustration based on Hochschule für Musik "Hanns Eisler"
Color contrast used on a series of doors
4.8. Surfaces

4.8.1. Floor coverings

Outside

Floor covering surfaces must be level, as well as smooth when driven or walked on. They must maintain their grip even when wet. In addition:

- Edges should be rounded off
- Minimize joints (joint width max. 10 mm)
- Minimize lengthwise and sideways gradients

When surfaces include special elements to aid orientation, contrast must be both tactile and visual.

Possible materials

- Natural stone has good features when the surface is cut.
- Concrete and clinker bricks usually have good surface structures. They maintain their grip even when wet and are available in many colors, contrasts, and brick sizes.
- Porous surfaces like grass pavers, grass-joints, or loose surfaces made up of broken natural stones require additional measures for wheelchair users, such as level, driveable tracks.
- A mix of materials provides good design options.

Inside

Floor surfaces inside must be level, non-reflective, and slip-resistant. High-pile floor coverings must be avoided. Thresholds should be no higher than 20 mm.

Different materials or material structures should be used inside to aid orientation, perhaps even with specific guiding functions.

Tactile and visual contrasts can be complemented by the different sounds of textures (wood-stone-carpet-metal).

4.8.2. Walls and ceilings

A combination of materials like glass, concrete, natural stone, textile surfaces, metal, and wallpaper provides additional information especially for the visually impaired.

Different surface structures (including differentiation within the same kind of material) can improve orientation in a room.

Different types of lighting, such as the position of the sun or artificial light with automatic controls, should be taken into account at the design stage. Color contrasts enhance light-dark contrasts and improve or facilitate general orientation.
5. 4. Selected facilities for general use

5.1. Meeting places (leisure venues, theaters, cinemas, concert halls)

“Meeting places are constructions or parts of constructions designed for the simultaneous presence of many people at events of various types, such as educational, economic, social, cultural, political, sports, or entertainment events, as well as places for eating and drinking.” Quote from the Model Regulations for Meeting Places (MVStättV dated June 2005).

Basically, the general requirements for public buildings as listed in Chapter II, 1-4, must be observed. In meeting places with stationary seats or tiered seating, at least 1% of visitors’ seats or a minimum of 2 seats must be designated for wheelchair users on level ground.

In the case of new buildings, these arrangements can be included early on in the planning and allow qualitative aspects to be considered. Restrictions in existing buildings, on the other hand, can sometimes only be solved using alternatives.

Limited seating often leads to justified criticism and then to public debates.

The following criteria should be taken into account:
Seats must not be allocated exclusively in the front or the back row but include different visual and auditory qualities, as well as different price ranges. Where rows of seats are tiered, seats bordering on passageways would seem to be most suitable. Removable seating inserted into the floor can also help to vary seating options.

Pathways to seats and the seats themselves should be visually marked. Passage widths of 0.90 m should generally be observed. Marking the steps is important where rows of seats are tiered; an additional handrail (e.g., for steep or very wide steps) provides additional safety (Chapter II, 4.4.).

Balustrades in front of seats should not restrict the view. Companion seating must be provided next to specially marked seats. Unavoidable barriers (e.g., turnstiles) must be opened when required.

Access to stage

The stage must be accessible without steps; if necessary, this can be achieved using mobile ramps or lifting tables.

Equipment

The following aspects are important:
- Wheelchair accessible tables with knee clearance up to a height of 0.67 to 0.70 m and a width of at least 0.80 m
- Room acoustics, amplifying equipment, sound-absorbing measures, and induction devices (Chapter II, 1.4.)
- Speaker area designed with sufficient lighting and microphone
- Space for a sign language interpreter with sufficient lighting
- Audio transcription equipment

Sports halls

The “Planning Manual for Sports Halls” published in 1999 by the Senate Department for Education, Youth and Sport must be consulted when planning sports halls.
Scene: Stadium with rows of seats, contrast used for different levels, railings, etc., and seats for wheelchair users and visitors who are visually or hearing impaired.
5.2. Exhibitions and museums

The term “exhibitions” includes museums, memorials, and archives or other collections accessible to the public.

Great demands are made on buildings that house permanent exhibitions. Individual solutions may be offered for temporary or changing exhibitions; these may be able to integrate things like alternative service options. The issue of barrier-free access is generally divided into three main areas:

- Requirements for the building
- Requirements for the exhibition concept (exhibition architecture)
- Requirements for the museum’s educational program

Buildings

The general requirements for public buildings apply:

- Connection to local public transportation and parking spaces
- External space including pathways and seating
- Entrance to building (ramps, doors, communications technology)
- Foyers/corridors/reception area (book shop, ticket office, models [where applicable], communication devices, cloakroom, lifts, stairs, doors, toilets)
- Circuits (doors/door opening systems)
- Film and lecture rooms (available seats, acoustic measures), catering areas (seating, self-service areas, toilets)

Exhibition concept

Exhibitions should be accessible to all visitors. All levels and installations should be accessible. Visitors perceive exhibits using motor, sensory, and cognitive abilities. Since the impairment of individual senses can often be compensated by other senses, exhibitions should be designed to address several different senses. The following criteria need to be observed in order to realize this principle:

Information and guiding system

(Chapter II, 1.1.)

Information and guiding systems should include essential information. Visual
aspects play a role in most cases, including:
• Contrasting design supported by, for instance, color and light, different floor coverings
• Tactile fonts (prism, braille)
  Guiding systems cannot be installed in areas where traffic/movement takes place.

**Labeling for exhibits**

Labels must use a sufficiently large and contrasting font depending on the required distance from the observer (Chapter II, 1.1.). Reflections and glare should be avoided. Putting written information on reading stands, which may also be height-adjustable, helps to meet these requirements, especially when tactile elements are used. Additional lighting, such as spotlights, should be included.

**Accessibility of individual exhibits**

Basically, all levels should be accessible without barriers. If the installation of additional levels at different heights is, for example, an existing building cannot be avoided and these are not barrier-free, the inaccessible exhibits may be visualized on film or video as compensation. Where platforms cannot be avoided, they need to be visually marked. Clearance space around an exhibit should not result in restrictions for wheelchair users or blind or visually impaired visitors. Wheelchair accessibility, functional height, and handling must be ensured (e.g., in the case of technical equipment or installations intended for active use by the observer). Installations should address several senses as a matter of principle. The eye level of children and wheelchair users should also be taken into consideration.

**Tactile models**

• Tactile models can be used in many different ways and will allow blind and visually impaired visitors to use public facilities independently.
• Tactile models can enable visitors to grasp the shape of a building or/and of the surroundings.
• Tactile models can be made of exhibits

Photomontage of the Information Center using contrasting strips on the floor as a guidance system and lowered computer stations
(imitations, copies of exhibition content).
• Tactile models of floor plans in bold relief can aid orientation.

**Educational programs**

Audio tours have become the norm in most museums.

Audio description systems:
• Mobile amplifying equipment will allow the hard of hearing to take part in a guided tour.
• Many exhibits provide only limited tactile experience for the visually impaired. Certain transactions can transmit direct experience “in translation” (e.g., via replicas that can be touched).
• Acoustic information systems can automatically recognize exhibits.
• Regular guided tours can be provided with sign language interpreters.

Other attractions and programs must be designed to be barrier-free.

A barrier-free Web site and ticket ordering system, as well as barrier-free publications (e.g., audio books), round off the range of services on offer.

**5.3. Hotels**

Barrier-free hotel rooms were designed based on the Berlin Restaurant Regulations, which required barrier-free accessibility for 10% of the hotel rooms in new buildings. Since the Restaurant Licensing Act came into force on 1 July 2005, lodgings are no longer subject to this area of regulation and the rule no longer applies. The current goal is to include the 10% rule in the new Operating Regulations.

A hotel must be designed to be used by all guests. Integration is paramount, since no guest wants to stand out. The range of services on offer should be as normal as possible and usable by all.

Structural preconditions should be created especially in new buildings; corresponding services remain absolutely essential and must be taken into account in an appropriate way by the manager.

The increasing number of active older clients means that a well thought-out hotel concept with a barrier-free design is also a good idea in terms of market appeal.

Recommended measures: Areas in a hotel complex that are intended for guests must be designed to be barrier-free. They should be geared toward users with restricted motor skills and sensory or cognitive needs. All functional areas and elements should meet the same requirements as public buildings. This includes:
• Accessibility
• Parking
• Entrance, reception area
• Lobby
• Conference and restaurant areas, self-service areas
• Public lavatories
• Sports and spa areas
• Outdoor areas
• Horizontal/vertical access
• Orientation
• Lighting

Additional criteria specific to hotel complexes:

**Barrier-free rooms**

The variety of user requirements must be taken into consideration. Complex project conditions with regard to property outlines or the number of floors require modification of the planning. Variants are often needed as a result of different requirements. This affects the size of areas for movement or showers, for instance, or the layout of operating systems and furnishings. However, basic requirements of barrier-free access must be guaranteed.

Room design must include contrasting aspects that take visually impaired or blind guests into account. The design of doors and operating systems in particular must be carefully attended to. Lavatories should also be emphasized with this in mind. If furnishings extend into the area for movement and this cannot be avoided, they must be given visual and tactile markings.

Room layout solutions with interconnecting rooms are useful for families or guests who bring accompanying persons.

Special attention must also be paid to those with allergies, which applies in particular to the materials used, such as carpets and linens.

Special telephone accessories may be offered to the hearing impaired.
Television sets using videotext will allow the management to transmit all types of information both visually and acoustically to the guests (e.g., calendar of events, menus, special offers, evacuation instructions, etc.).

**Access to rooms** (for general information see Chapter II, 3.1.)

Operating systems for opening doors, such as chips or other control elements, must be positioned at a height of 0.85 to 1.05 m. They must be designed to be tactile and contrasting. If door peepholes are planned, a solution must also be provided for wheelchair users and people of short stature or children (height 1.20 m). Side-hung doors must have a clear space next to the door leaf (handle side) of at least 0.50 m from the wall or any furnishings (see Chapter II, 4.5.). It must be possible to open room doors from the outside in the event of danger.

Acoustic signals for emergencies must also be transmitted visually for guests with impaired hearing.

### Area for movement

The design of barrier-free rooms must be based on an area for movement of 1.50 m x 1.50 m (Chapter II, 3.2.). This area must be found in the entrance area, next to one bed, and in front of wardrobes and windows, as well as in the lavatory. Areas for movement may overlap to maximize floor space.

Different rooms may vary so that some barrier-free rooms may have only the minimum amount of space required. The basis remains the standardized area of a wheelchair and the room it requires to be functional.

### Furnishings

**Coatracks:**

- No restrictive furnishings
- Additional clothes hooks or rods within operating height and reach of wheelchair users, possibly a piece of mobile furniture
Operating systems:
• Air conditioning, coatracks, storage shelves, etc. at a height of 0.85 m and a distance of 0.50 m from the corner
• Tactile and contrasting visual features
• Automatic operation via remote control (contrasting and tactile)

Wardrobes should have toe clearance at least up to and including the footrests (height 0.30 m) or be accessible from the side and have functional parts that can be extended (alternative: open shelving, mobile bedside tables).

Sockets must be available at a height of at least 0.40 m up to a maximum of 0.85 m. Optimum height of hotel beds is 0.50 m. Even better are beds of adjustable height.

When designing work stations, kitchenettes, etc., these must be made wheelchair accessible (height 0.70 m; width 0.90 m).

Windows
See Chapter II, 4.6.

Emergencies
Emergency call systems should be available in the lavatory and near the bed (max. height 0.20 m above the finished surface of the floor), and should of course stand out visually. A mobile emergency call device is also a possibility.

Sanitary facilities (for general requirements see Chapter II, 3.8.)
The general ambience of the hotel should be maintained despite some of the concrete requirements. Special attention must be paid to the contrasting design of the lavatory (doors, furnishings, fittings, operating elements). It is usual for the lavatory door to open out to the entrance area; for functional reasons the door should open with the front door behind it and the door opening towards the room.

Shower / bathtub:
Along with a shower that is flush with the floor, the idea of a bathtub should not be totally neglected. A bathtub could also be installed, for example, in the case of interconnecting rooms.

Toilet bowl:
Access to both sides of the toilet bowl is desirable. One compromise would be to offer some rooms with right access and others with left access.
Washstand: Basins that are set onto, rather than into, the washstand are currently popular, but do not meet the requirements. With corner washstands the fittings may have to be installed to one side. Height-adjustable washstands are a good idea for families with children or people of short stature.

Taps must be single-lever mixer taps. Maximum temperatures should be automatically controlled.

Support grips can be applied on request if the necessary fittings are installed.

Escape routes (Chapter II, 3.3)

Both visual and acoustic information regarding rescue in the event of danger must be available in the rooms and at the reception desk (e.g., flashing smoke detectors, personal instructions). If barrier-free rooms are used exclusively by wheelchair users, special measures are required for evacuation. A vertical allocation of rooms for wheelchair users (above one another) will better ensure independent escape into protected areas (waiting areas). This also means providing enough space in protected areas, moving to another fire compartment, or similar technical solutions. Markings giving directions, signals, and special lighting should be used to design the escape route simply and clearly.

Service

Making the design of room interiors as individual as possible requires both certain services and construction aspects. Some mobile furnishings are useful and should be included accordingly. These include, for example:

- Shower stool / shower chair
- Removable supporting grips
- Toilet seat risers
- Lifting aids (e.g., lifting device for bed and bath)
- Telephone with a visual display or central orientation point on the “5” button; the receiver should have a telephone loop to allow hearing aid wearers to use their hearing aid’s induction loop
- Fax machine
- Remote controls with suitable keypads (contrasting, colorful, sufficiently large, and tactile)
- Optional storage space for extra wheelchairs, with a charging option for wheelchair batteries

Any instructions must be available in writing or via sound carriers. Examples:

- Explanations regarding operational areas or room layout
- Operating systems (technical equipment, devices, air conditioning, telephone, emergency call systems, etc.)
- Escape routes
- Range of food and drink available

Special note

In addition to technical aids, there are a variety of rules of conduct for hotel staff to deal easily and inconspicuously with guests whose motor skills or sensory or cognitive abilities are not fully developed. The relevant associations are happy to offer advice or training to enable barrier-free communication and ensure a pleasant sojourn in hotels. The following aspects require special attention:

- Planning the trip
- Barrier-free Web site including booking options (information available at http://www.dbsv.org/computer)
- Barrier-free electronic check-in
- Information regarding the location’s infrastructure
- Information on barrier-free paths in the surrounding countryside (footpaths) and on
  a) Local public transport, digitized city map including GPS system
  b) Available parking spaces
  c) Barrier-free cultural attractions
  d) Medical facilities

Public Buildings
Public Buildings

Scene: Swimming pool with aids for wheelchair users getting into the water, guidance system for the blind, contrasting design

5.4. Public swimming pools

In addition to the measures listed in Chapter II, 3. and 4., the following aspects are essential to the barrier-free design of public swimming pools.

Parking

Parking spaces should be available nearby for wheelchair users.

Access to building:
• Paved, level pathways designed to contrast with their surroundings
• Lowered curbs
• Ramps with a max. 6% incline

Entrance to building

• Door designed to stand out from the adjacent walls
• Option to open door independently and/or communication system (bell, intercom) at a height of 0.85 m
• Signage using contrasting and tactile font
• Visual and tactile contrast between the entrance and the guiding system that takes visitors to the various user areas or a consecutive arrangement (entrance – cashier – changing rooms – sanitary facilities – swimming pool – fitness and sauna area – restaurant or other functions)
• Use of general design elements (color, contrast, material), as well as complementary features in specific areas (e.g., floor indicators)
Cashier

- Alternatives to restricted entryways offering passage width of at least 0.90 m (in individual cases 0.80 m)
- Counter service provided also at a height of 0.85 m
- Staff assistance

Changing rooms (Chapter II, 3.8.3.)

Sanitary facilities

- WC units must always be equipped to offer dual access and fold-down support
- Lavatory components designed to contrast with floor and wall surfaces
- Shower units without steps, with area for movement measuring 1.50 x 1.50 m, and with a seat (fold-down seat or stool)
- Shower attachment able to be used at a height of 0.85 m.

Indoor swimming pools

The following must be observed:
- Pool borders must stand out visually and tactiley (e.g., metal overflow gutters, colored and/or tactile tiles)
- Pathway guiding system continuing right up to ladders into the water
- Suitable aids for getting in and out of the water, such as:
  a) Lifting device, anchored, with back support and moveable arms
  b) Slides
  c) Steps for sitting
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