

Selected parameters for designing of accessible public areas incl. public transport

The following text provides an overview of the basic parameters important for designing an accessible environment for all. This is only a selection, not a complete list. However, the different values in individual countries are caused by national customs, historical contexts during the designing of standards and other specific conditions of individual countries as well.

Czechia – basic parameters of accessible public areas

There are defined 9 basic parameters and properties of an accessible environment. Most of them is listed in the Czech Regulation No. 398/2009 Sb.

1. **Slip** (shear friction coefficient) of walkable area – must be min. **0.5** at and **0.5+tg α** at ramp or communications in slope. This parameter occurs at surface sidewalks, ramps, internal communications, at walkable areas railway platforms or PT stops.
2. **Longitudinal slope** of walkable – max. **1:12** (8.33 %). This parameter is important e.g. at sidewalks with gradient. The ramp shorter than 3 m can have max. longitudinal slope 1:8 (12.5 %).
3. **Cross slope** – max. **1:50** (2 %). This parameter is important for people in wheelchair and other persons with walking disability (with crutches etc.), mainly in winter period.
4. **Clear / passing width**: min. **1.5 m**; at technical equipment ground communications (poles of public lighting, traffic sign etc.) or railway platform can this value reduce until on **0.9 m**. Clear width 1.5 m gives optimally conditions for passing pedestrian and wheelchair people, for movement blind people with white stick. Reduction this width can be permitted only in exceptional cases and only "locally".
5. **Clear walking height**: must be **min. 2.1 m** in interiors (corridors, underpasses, halls) and **2.2 m** in exterior (platforms, stops etc.). This parameter provides free space along walls of home or other structures, which have function of guiding line for blind people. It describes the fact that for safe movement of blind persons along mentioned objects / elements cannot stand more than about 100 mm, and it in height 0.25 - 2.2, resp. 2.1 m on levels walkable areas.
6. **Clear wheelchair area**: free area for maneuvering with wheelchair – dimensions **1.5 × 1.5 m** or circle about average 1.5 m (exceptionally 1.2 × 1.5 m). Free area for maneuvering with wheelchair allows turn wheelchair e.g. at information counters or on toilets). Dimension 1.2 x 1.5 m uses when turning about 180°, circle about average 1.5 m when turning about 360.
7. **High-rise difference**: maximum high-rise difference which can overcome on vehicle independently and safely them set on **2 cm**. It applied e.g. about height reduced curb at crossing for pedestrians, height thresholds doors.
Note: Max. permissible horizontal difference, e.g. gap between boarding edge and PT vehicle not in Czech regulations or standards defined yet.
8. **Tactile contrast**: used material tactile elements – must fulfill requirements of Czech regulation and standard (Government law No. 163/2002 Sb., Technical manuals TZÚS 12.3- 04, -05, -06). Tactile contrast must be applied in neighborhood tactile elements for guiding / warning of blind persons. Only material with an approved surface structure can be used for tactile surface walking indicators for visually impaired persons (VIP), e.g. on pedestrian crossing, PT stops, rail platforms etc.
9. **Colored contrast**: especially at elements for persons with lighter vision disabilities (partially sighted) is this contrast (values of contrast brightness) of high importance; e.g. colors marking some elements (large glass area, narrow walking profile etc.).

Note: Requirements for information (written text, dynamic information) are not given in the Czech standards. Some values from international standards e.g. TSI PRM for railways are used.

USA – basic parameters of access to transport facilities

The following text gives a list of basic parameters and requirements for selected parts of the public transport environment, i.e. access route, ramp, curb, PT stops etc. This list includes, among other, clear (passing) width, gradients, curb height and width. Here are also mentioned some other facilities – stairs, lift or information systems for passengers. All parameters and values follow Americans standards and guidelines, especially [ADA](#). As you can see, here are some one similar but also different parameters like these Czech.

Access route / footpath:

1. min. **clear width** of 915 mm (desirable 1525 mm)
2. min. **passing space** of 1525 mm × 1525 mm for every 61 m
3. max. **change in level** of 13 mm

Ramp

1. min. clear width of 915 mm
2. min. clear distance of 1525 mm for landing of ramp
3. max. **gradient** of 1:12 (desirable 1:20)
4. rise of 760 mm for each flight
5. curb height of 50 mm above ramp level on both sides of ramp for protection

Dropped curb / crossing

1. min. width of 915 mm
2. max. gradient of 1:10 for dropped curb with detectable warnings
3. tactile warning surface be provided

Bus - Bus stop platform

1. min. clear length of 2438 mm
2. min. **clear width** of 1525 mm

Rail

1. **difference** in vehicle and platform **vertical level** be less than 16–76 mm (for rail transit)
2. platform edge not protected by platform screens or guard rail be provided detectable warnings

Signage / information

1. width-to-height ratio of letter between 3:5 and 1:1
2. min. character (letter) height of 75 mm
3. height of sign above ground of 1525 mm
4. assistive listening system be provided

Stair

1. min. tread depth of 280 mm
2. min. clear width of 1219 mm between handrails

Lift

1. min. internal dimension of 1730 mm × 1291 mm
2. min. clear entrance width of 915 mm
3. visible and audible signal provided at lift entrance, with specific signals for up and down directions respectively
4. visual and audible signal be provided

United Kingdom - basic parameters of access to transport facilities

Some parameters of accessible public transport and public areas are given in following overview. Values are based on [Equality Act 2010](#) and related British standards and guidelines (e.g. [this guideline](#)). Also, in UK are some parameters different from both of above mentioned.

Access route / footpath:

1. min. clear width of 1500 mm (desirable 2000 mm)
2. min. clear width of 1000 mm when there is obstacle with max. length of 6 m
3. max. cross-slope gradient of 1:40
4. turning space: 1500 × 1500 mm; 2420 × 2420 mm (outdoor electric wheelchair)

Ramp

1. min. clear width of 1200 mm (desirable 2000 mm)
2. min. clear landing space length of 1200 mm (desirable length of 1500 mm)
3. max. gradient of 1:12 (desirable 1:20)
4. min. curb height of 100 mm above ramp level on both sides of ramp for protection

Dropped curb / crossing

1. min. width of 1000 mm (desirable of 1200 mm)
2. min. clearance of 900 mm for level area beyond dropped curb
3. max. gradient of 1:12
4. be provided at all controlled crossing and every 100 m
5. tactile surface be provided for individual with visual impairment

Bus - Bus stop platform

1. raised bus boarding area of width of 500-1500 mm (desirable 1800 mm); length of 3000 mm (desirable 9000 mm)
2. raised curb height of 125-140 mm (desirable 160 mm)
3. min. clear width of 3000 mm at bus stop
4. max. gradient from bus step (250 mm) to reference curb height (125 mm) of 1:8
5. min. ramp length of 1000 mm
6. min. size of bus stop sign of 300 mm wide by 250 mm high
7. min. height of bus stop sign bottom of 2500 mm above ground
8. timetable information located between 900 mm and 1800 mm in height
9. max. walking distance from all buildings of 400 m
10. bus stops in opposing directions on single carriageway be staggered with a minimum distance of 40 m
11. use of low-floor wheelchair accessible vehicles

Rail

1. min. clear space of 2000 mm, excluding safety zone, for platform
2. white line of 100 mm wide for platform edge of off-street rail service for individuals with visual impairment
3. use of low-floor light rail transit vehicles with maximum required platform height of 350 mm
4. tactile warning surface be provided for platform edge
5. slip-resistant platform surface

Signage / information

1. width to height ratio between 3:5 and 1:1
2. min. character size: reading distance ratio of 1:27
3. wall-mounted signs be centered at 1400 mm from the ground
4. audible alarm system be operated of 15 dB over prevailing sound level

Stair

1. min. tread depth of 250 mm (desirable 300 mm)
2. max. tread height of 170 mm (desirable 150 mm), min. tread height of 100 mm
3. min. clear width of 1000 mm between handrails (desirable 1200 mm)
4. maximum of 12 steps in one flight; minimum of 3 steps in one flight
5. tactile warning surfaces be provided at both ends of stair
6. color contrast be provided for nosing.

Lift

1. min. internal dimension of 1250 mm × 1000 mm
2. min. clear entrance width of 900 mm
3. min. clear entrance height of 2100 mm
4. height of handrail between 900 mm and 1000 mm
5. visual and audible announcement be provided both in and outside.

Tab. 1: Comparison of selected parameters

Parameters	CZ	CH	DE	EU	UK	USA
clear width (mm)	1500 (900)	1200	1800 (900)	1500-1800	1500 (2000)	915 (1525)
cross-slope	1:50	1:50	1:40	1:50	1:40	1:50
longitudinal slope	1:12 (1:8)		1:16	1:8 (1:20)	1:12	1:12 (1:20)
dropped curb (mm)	20	30	20	25	25	13
turning space (mm)	1200×1500	1400×1700	∅ 1500	∅ 1500	∅ 1500	1525×1525
ramp slope	1:16	1:12-1:16	1:16	1:12-1:20	1:12 (1:20)	1:12 (1:20)
ramp width (mm)	1500	1200	1200	1200	1200 (2000)	915
elements height (mm)	600-1200	800-1100	850	700-1200	750-1200	380-1220
lift dimensions (mm)	1100×1400	1100×1400	1000×1300		1000×1250	1730×1291
<i>Norm, standard</i>	<i>398/2009 Sb.</i>	<i>SN 521500, SIA 500</i>	<i>DIN 18024-1, DIN 18024-2</i>	<i>TSI PRM, ISO 21542</i>	<i>EA 2010</i>	<i>ADA</i>

Note: All dimensions, values are limit (maximum, minimum); clear width, slopes e.g. for pedestrian ways; turning space for wheelchair persons; elements height – self-service elements e.g. plugs, buttons; lift dimensions – according to type, here the smallest internal dimensions.

Task for students: you can check and add value for Swiss. What longitudinal slope of pedestrian ways is in this land allow? The same for lift cabin dimensions according the EU regulation.

More information for Swiss: [there](#).

More information for Germany: [there](#).