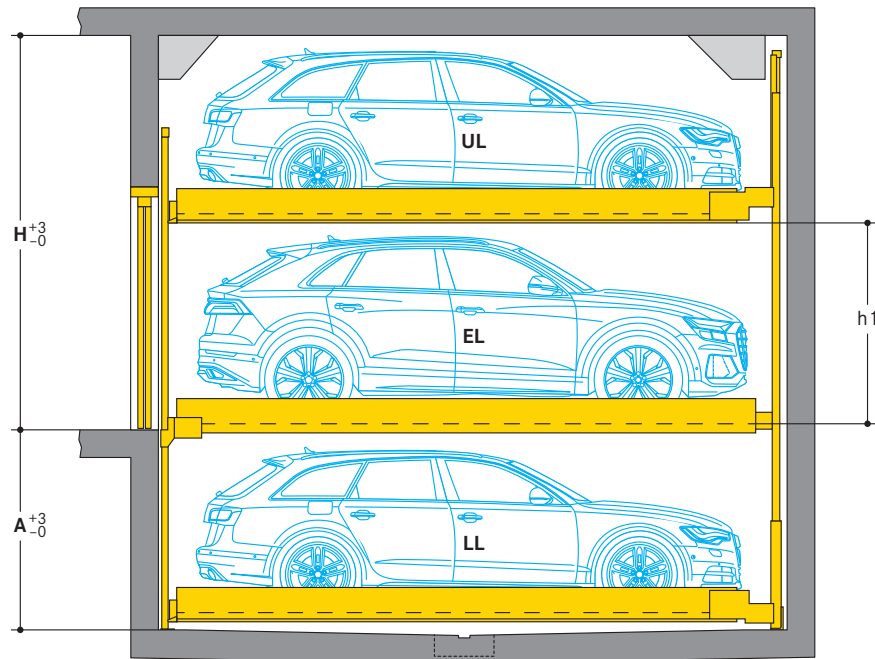


Height dimensions

Note: The vehicle height on the lower level must be equal or lower than the vehicle height on the entrance level!



Type	Height H	Pit depth A	Vehicle height			Platform distance h 1
			UL (upper level)	EL (entrance level)	LL (lower level)	
543-200	375	200	175	175	175	180
543-200	405	200	175	205	175	210
543-230	435	230	205	205	205	210
543-175	345	175	150	170	150	175
543-175	405	175	175	205	150	210
543-200	350	200	150	175	175	180
543-200	380	200	180	175	175	180
543-200	410	200	180	205	175	210
543-210	405	210	175	205	185	210

Passenger car registrations in Germany*

Orientation aid for height dimensions: With a system type from the table above, which for example covers cars up to 175 cm in height, 92.81 % of all cars registered new in 2022 in Germany can be parked.

Height	Examples of models	Passenger car registrations	
143,5	Opel Corsa	up to 150 cm*	33,27 %
144,1	VW Passat		
148,0	Skoda Octavia		
162,1	BMW X4	up to 170 cm*	91,25 %
168,1	Skoda Kodiaq		
169,4	Peugeot 5008		
171,2	VW Touareg	up to 175 cm*	92,81 %
171,5	Audi Q8		
171,8	Mercedes Benz EQS SUV		
177,6	Volvo XC90	up to 180 cm*	93,76 %
177,8	Ford Explorer		
179,7	Mercedes Benz GLE		
193,8	VW ID.Buzz	up to 205 cm*	98,98 %
196,9	Mercedes Benz G		
199,4	VW Caravelle		

* Due to different equipment, vehicles of the same design may have different heights. The maximum heights have been taken into account.

Source: German Federal Motor Transport Authority, 2022 (evaluation for motor vehicles registered in Germany for passenger transport with up to 9 seats).

Decision support for the vehicle height

Choosing the right vehicle height for your project is essentially based on any building regulations, user expectations and building specifications. Criteria can include:

Residential buildings:

Different parking space heights are conceivable and can affect the sales price. For example, lower parking spaces could be provided for higher vehicles. This results in more convenient access to the vehicle. Less high vehicles in the upper parking spaces and thus reduced building height and less enclosed space. The ramp to the underground car park will be less steep or less long. To make it easier to sell and use parking spaces, we recommend that the vehicle heights be the same.

Office buildings:

For this parking concept, we recommend the same vehicle height for all parking spaces. If permanently assigned parking spaces are preferred for parking permittees, different parking space heights could be provided.

Hotels:

Whether city hotel, vacation hotel or vacation apartments: With changing occupancy, all parking spaces should have the same vehicle height. Maximum parking space heights should be selected to allow parking for vehicles with roof-mounted structures, if necessary.

Example residential buildings

Vehicle height UL	175 cm
Vehicle height EL	205 cm
Vehicle height LL	175 cm

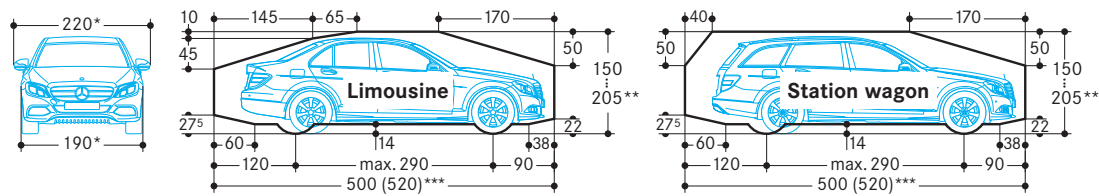
Type	Height H	Pit depth A	Vehicle height			Platform distance h 1
			UL (upper level)	EL (entrance level)	LL (lower level)	
543-200	405	200	175	205	175	210

Example office building and hotels

Vehicle height UL	205 cm
Vehicle height EL	205 cm
Vehicle height LL	205 cm

Type	Height H	Pit depth A	Vehicle height			Platform distance h 1
			UL (upper level)	EL (entrance level)	LL (lower level)	
543-230	435	230	205	205	205	210

■ Clearance profile (for standard vehicles)



* for a 250 cm platform width
 ** The overall vehicle height including roof luggage rails and antenna mounts must not exceed the max. vehicle height dimensions specified
 *** see page 1

■ Width dimensions

Platform widths:

250 cm:

– for 190 cm vehicle width (without outside mirror)

260–300 cm:

– for vehicles wider than 190 cm (without outside mirror)

270–300 cm:

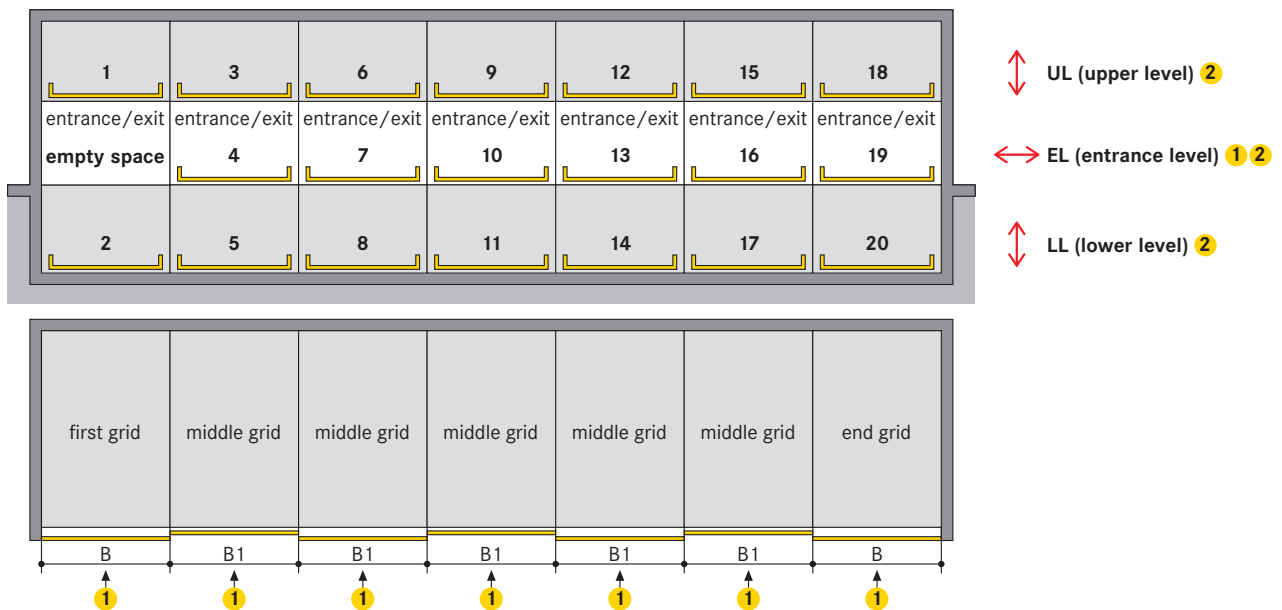
– for units at the end of the driving aisle

For comfortable parking, entry and exit conditions platform widths upon 270 cm are recommended.

Reduced platform width means reduced parking comfort depending on the vehicle width, vehicle type, individual driving style, access situation of the (underground) garage.

With a 90° arrangement of the parking places, we recommend widening the driving aisle to at least 700 cm or a wall recess (see below).

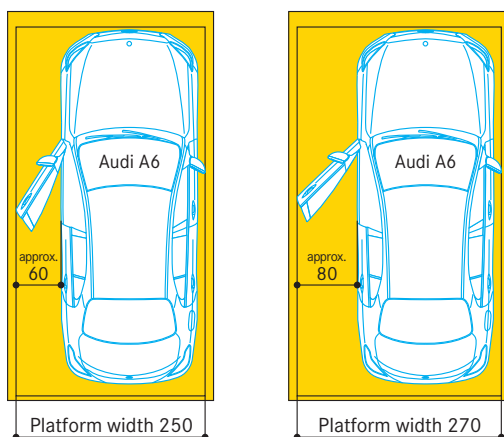
■ Width dimensions (underground car park)



Space requirements		clear platform width
B	B1	
280	270	250
290	280	260
300	290	270
310	300	280
320	310	290
330	320	300

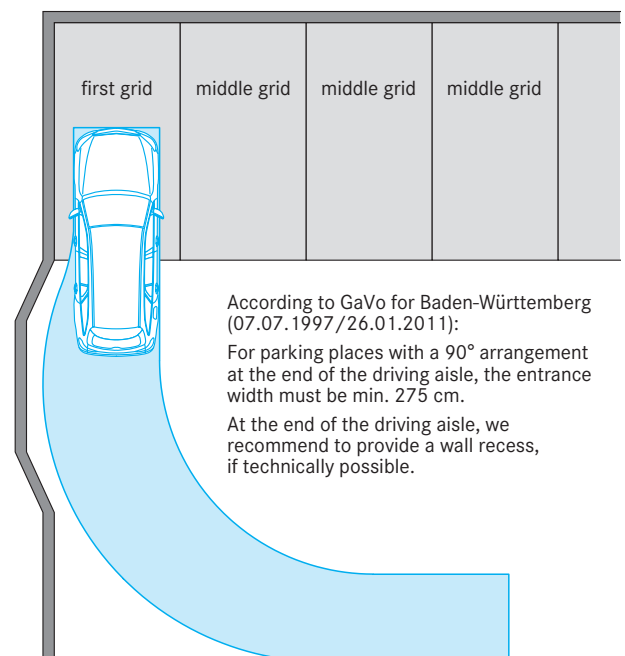
- 1 One entry/exit is required on entrance level (EL) for each grid
- 2 For a comfortable parking process and comfortable conditions for getting in and out of the car, we recommend platform widths of at least 270 cm. Smaller platform widths are possible but not recommended (please contact WÖHR).
- 3 It is not possible to combine different platform widths

■ Door opening dimensions



Depending on the vehicle model and the parking position of the vehicle on the platform, the space for opening the door varies. For comfortable conditions for getting in and out of the car, we recommend platform widths of at least 270 cm.

■ Wall recess



According to GaVo for Baden-Württemberg (07.07.1997/26.01.2011):

For parking places with a 90° arrangement at the end of the driving aisle, the entrance width must be min. 275 cm.

At the end of the driving aisle, we recommend to provide a wall recess, if technically possible.

Doors

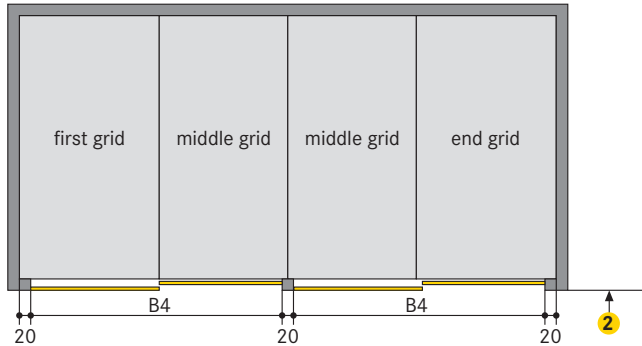
According to DIN EN 14010 doors are required.

Automatic sliding doors:

- electrical drive
- controls are integrated in the overall system
- electro-mechanically interlocked
- can only be opened when the selected parking place has reached the entry/exit position
- any crash openings are closed in the entrance area

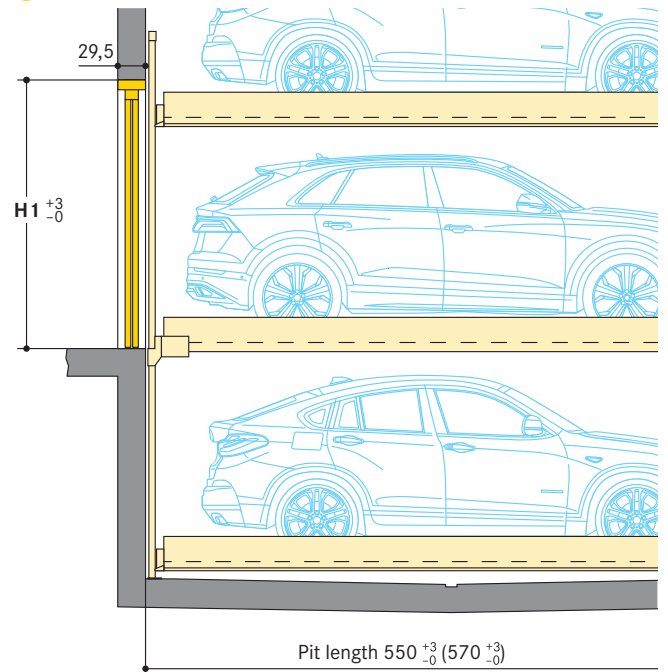
Local requirements for electrical doors regarding the technology, maintenance and revision are not subject of our delivery. These matters have to be observed and carried out by the customer, according to the local regulations.

Sliding doors below the lintel between the building pillars ①



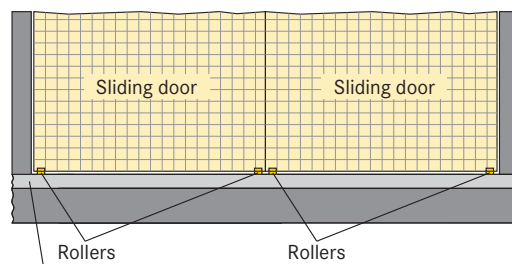
Space requirements B4	clear platform width
520	250
540	260
560	270
580	280
600	290
620	300

- Doors that are directly attached to the steel structure are possible (please contact WÖHR)
- The driving aisle width must comply with local regulations



	Vehicle height EL (entrance level)		
	170	175	205
H1	220	220	220

Sliding door floor guides

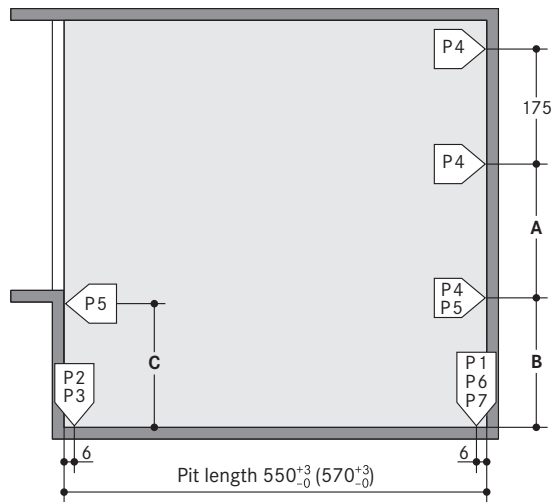


Finished floor ①

- Finished floor:
 - compliant to DIN 18353,
 - floor evenness compliant to DIN 18202, table 3, line 3
- Floor guide section:
 - base plate with plastic rollers
 - fixed on the floor with adhesive anchor (M8 internal screw thread)
 - borehole depth approx. 9 cm
 - in the event that floor filling needs to be laid into the door section to the purpose of reaching the required floor evenness, the borehole depth needs to be increased by the thickness of the floor fill (max. 4 cm)
- If the driving aisle is made of concrete blocks, asphalt etc., the concrete slab of the pit edge in the door area must be min. 29,5 cm wide

Static calculations and construction works requirement

Section



Type	A	B	C
543-175	141	168	135
543-200	166	193	160
543-210	166	203	170
543-230	196	223	190

Fixing of the system frames to the floor slab:

- using base plates (approx. 350 cm²)
- using adhesive anchor bolts
- hole depth to 12–14 cm
- bottom plate in concrete
- thickness of bottom plate min. 18 cm

Fixing of the system frames to the walls:

- with walls plates (approx. 30 cm²)
- using adhesive anchor bolts
- hole depth to 12–14 cm
- front drive-in wall and rear wall in concrete
- perfectly flat wall surfaces
- without protruding sections such as border edgings, pipes and tubes, etc.
- thickness of walls min. 18 cm

Concrete quality grade:

- compliant to the static requirements of the construction
- min. C20/25 grade (for dowel fastening)

Frame bearing points:

- the specified lengths are expressed as mean value
- for the exact data, specific TÜV-tested data sheets are available

Door widths/widths of columns:

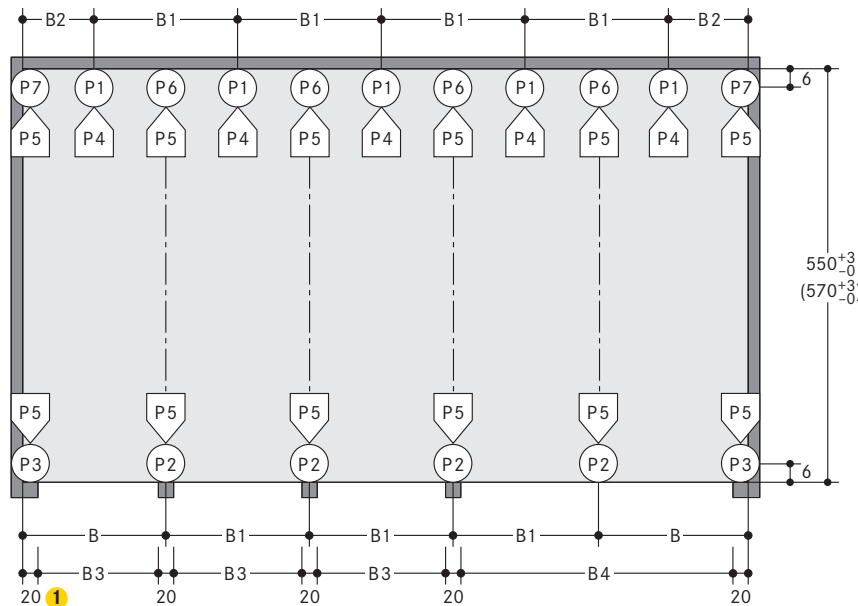
- please contact WÖHR
- grid width (270/280/290/300/310/320) must be observed

543 (2000 kg)
P1 + 70,0 kN*
P2 + 49,0 kN
P3 + 25,0 kN
P4 ± 5,0 kN
P5 ± 2,5 kN
P6 ± 30,0 kN
P7 ± 15,0 kN

543 (2600 kg)
P1 + 80,0 kN*
P2 + 70,0 kN
P3 + 35,0 kN
P4 ± 5,0 kN
P5 ± 2,5 kN
P6 ± 30,0 kN
P7 ± 15,0 kN

*specified load bearing data includes the vehicle weight

Ground plan

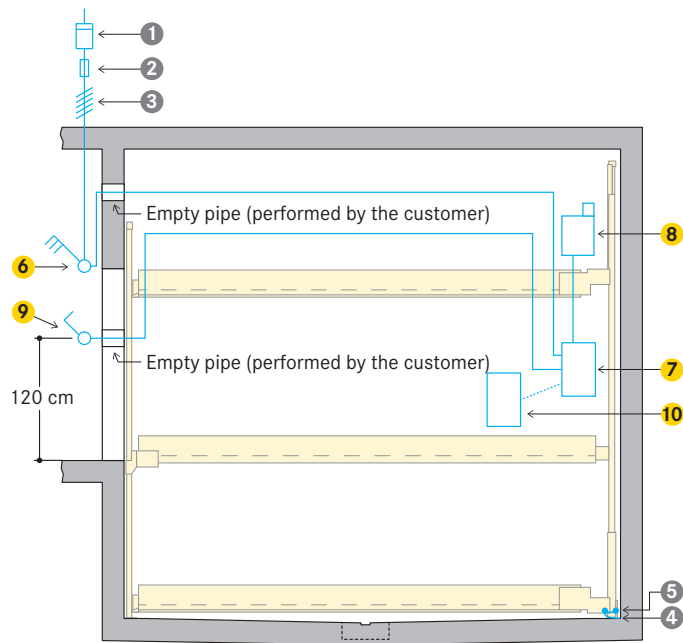


Space requirements					clear platform width
B	B1	B2	B3	B4	
280	270	145	250	520	250
290	280	150	260	540	260
300	290	155	270	560	270
310	300	160	280	580	280
320	310	165	290	600	290
330	320	170	300	620	300

- 1 If the width of the pillars is more than 20 cm, than the width of the drive through will be reduced accordingly to the above mentioned width dimensions (B and B1). In order to avoid this, we recommend to extend the measures between the pillars (B3 and B4) accordingly. Please contact WÖHR.

Electrical specifications

Installation diagram



- Cabling preparation to be performed by the customer:**
- up to the main switch to be in place prior to starting the installation operations
 - connection to the main switch during installation
 - clockwise rotating field must be applied
 - system functional check testing can be performed by WÖHR together with the electrician provided by the customer
 - if requested at a later date, functional check testing can be performed by WÖHR at extra-cost

- Grounding and potential equalisation (to be performed by the customer):
- compliant to DIN EN 60204
 - connections required every 10 metres

To be performed by the customer

Item	Quantity	Description				Position	Recurrence
①	1 piece	Power meter				In the feed cable	
②	1 piece	Fuse protection or automatic circuit breaker:*				In the feed cable	1 x per system
		Motor	Starting current	Fuse protection	Platform load		
		3,0 kW	24 A	3 x 16 A (11 kW)	2000 kg/2600 kg		
③	Based on site conditions	Compliant to local power supply regulations 3 phases + N + PE* 230/400 V, 50 Hz				Feed cables to main switch including connection	1 x per system
④	Every 10 m	Grounding and potential equalisation lead-out connection				Along pit floor edges/rear wall	
⑤	1 piece	Grounding and potential equalisation compliant to DIN EN 60204				From lead-out connection to system	1 x per system

* Compliant to DIN VDE 0100 sections 410 and 430 (no permanent load) 3 phases + N+ PE (three phase current)

Scope of delivery by WÖHR (unless otherwise specified in the order)

Item	Description
6	Lockable main switch
7	Main switch cabinet for grid 1–4
8	Hydraulic power pack 3.0 kW with three-phase motor. Ready-wired switching cabinet with motor safety contactor
9	Operating device
10	Extra switch cabinet for grid 5–8

Notes and directions

Scope of application

- suitable for residential buildings, office buildings and business premises, hotels
- only for long-term users that have been instructed on how to use the system
- for frequently changing users (e.g. for office, hotel and business premises or similar):
 - performance of technical system adjustments is necessary
 - please consult with WÖHR

Function

- one empty space per unit on entrance level
- platforms on entrance level are moved sideways
- platforms on the upper and lower levels are lifted or lowered to the empty space on the entrance level

Numbering of the parking places

- empty space on the entrance level on the left
- numbering:

1	3	6
-	4	7
2	5	8

- the numbering for each unit starts with 1
- different numbering of parking places is possible at extra cost (software changes are necessary)

Hydraulic power pack

Arrangement of the hydraulic power pack:
- within the unit

Noise protection

Basis is the German DIN 4109 "Noise protection in buildings".
With the following conditions required 30 dB (A) in rooms can be provided:

- noise protection package from our accessory
- insulation figure of the construction of min. $R'_w = 57$ dB
- walls which are bordering the parking systems must be done as single wall and deflection resistant with min. $m' = 300$ kg/m²
- solid ceiling above the parking systems with min. $m' = 400$ kg/m²

At differing constructional conditions additional sound absorbing measures are to be provided by the customer.

The best results are reached by separated sole plates from the construction.

Increased sound insulation (separate agreement):

It is based on VDI 4100 „Sound insulation in building construction“ Assessment and proposals for increased sound insulation.

Under the following conditions, 25 dB (A) can be complied with in living spaces and bedrooms:

- sound insulation package according to offer/order
- Sound insulation value of the building structure of min. $R'_w = 62$ dB (to be performed by the customer)

Note:

User noises are not subject to the requirements (see VDI 4100, Scope - Notes). User noises are basically noises that can be individually influenced by the user of the parking systems (e.g. driving on the platform, closing of vehicle doors, engine and brake noises).

Drainage

Water leaks into the pit:

- in the winter, up to 40 litres of snow water can possibly come with the wheel housings in just one parking process

Drainage channels:

- along the middle section of the pit
- connecting to a floor drain or drainage pit (50 x 50 x 20 cm)
- with manual emptying out of the drainage pit
- alternatively installation of a pump or drainage channel into the sewerage system, to be performed by the customer

Sideways slope drainage:

- only into a gutter
- not possible in the remaining pit section

Lengthways slope drainage:

- provided according to specified construction dimensions

Environmental safety:

- coating of the pit flooring is recommended
- installation of an oil and/or petrol separator unit between the drainage connection and the main sewerage system is recommended

Conformity examination (TÜV)



- voluntary conformity assessment by the TÜV SÜD
- The parking systems are compliant to:
 - EC Machinery Directive 2006/42/EC
 - DIN EN 14010
 - Specification VDMA 15423

Switch cabinet

Arrangement of the switch cabinet:
- within the unit

Temperature

- system operating range: +5° bis +40°C (with unloaded platforms and low temperatures, a reduced lowering speed is to be expected)
- humidity: 50 % at +40° C
- if use in deviating temperature ranges is planned, constructive adjustments may be necessary (please consult with WÖHR)

Lighting

- sufficient lighting of the driving aisle and of the parking places must be performed by the customer

Fire safety

- all fire safety requirements and all mandatory equipment (fire extinguisher and fire alarm systems, etc.) must be performed by the customer
- WÖHR will provide documents on attachment points and clearances for sprinklers on request

Railings

If walkways are arranged directly to the side or behind the systems, railings have to be provided by the customer acc. to local requirements, height min. 200 cm – this is applicable during the construction phase too.

Maintenance

- WÖHR and all the WÖHR partners abroad provide an installation and customer service network
- regular, annual maintenance is provided subject to the stipulation of a maintenance agreement
- local requirements for electrical doors regarding the technology, maintenance and revision are not subject of our delivery. These matters have to be observed and carried out by the customer, according to the local regulations.

Prevention of corrosion damage

- all operations listed in the WÖHR Cleaning and Maintenance Instructions are to be performed regularly (independently of maintenance operations)
- zinc-plated parts, components and platforms are to be kept clean of dirt, road-salt and any other debris (due to corrosion hazards)
- always keep the garage well ventilated and deaerated

Surface protection

- please consider the information on surface protection!

Tender specification

- please consider the specifications!

Parking Place-Profile

- please consider the product information Parking Place-Profile!

Electromobility

- please consider the product information power supply!
- depending on the position of the charging point on the electric vehicle, collision points with protruding plugs and charging cables can occur

Sliding doors and Operating concepts

- please consider the product information Sliding doors and Operating concepts!

Construction formalities

- the documentation necessary for construction permit applications is provided by WÖHR on demand

Construction alterations and/or modifications

- the right to construction or model modifications and/or variations is hereby reserved
- the right to any subsequent part modification and/or variation and amendments in procedures and standards due to technical and engineering progresses or due to environmental regulation changes is also hereby reserved