PARKLIFT 450

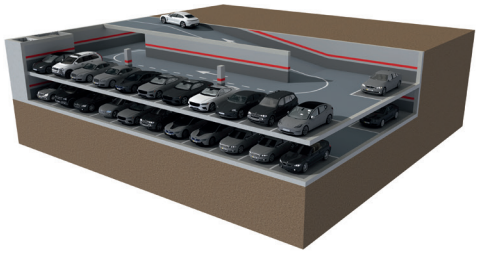
Sustainability: Conventional car parks versus WÖHR car parking systems

The Parklift 450 parking system is designed for independent parking of two cars one above the other. To enable independent parking, the Parklift 450 requires space for three levels, as the platforms need to move up and down.

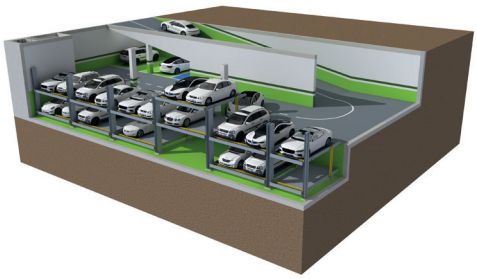
Area: Width 19.05 m x length 33.70 m = approx. 642 m²
Underground levels: 2
Number of parking spaces in Parklift: 24
Number of parking spaces in conventional underground car park: 27

Parking space in parking system:
Length 5.50 m, width 2.70 m, height 2.05 m
Parking space in conventional underground car park:
Length 5.20 m, width 2.65 m

*However, part of the pit needs to be dug deeper (4.2 m). This deeper section extends over the entire length of 33 m and is approx. 6 m wide and 7 m deep to accommodate the Parklift 450. A total of 24 car parking spaces are located in this area.

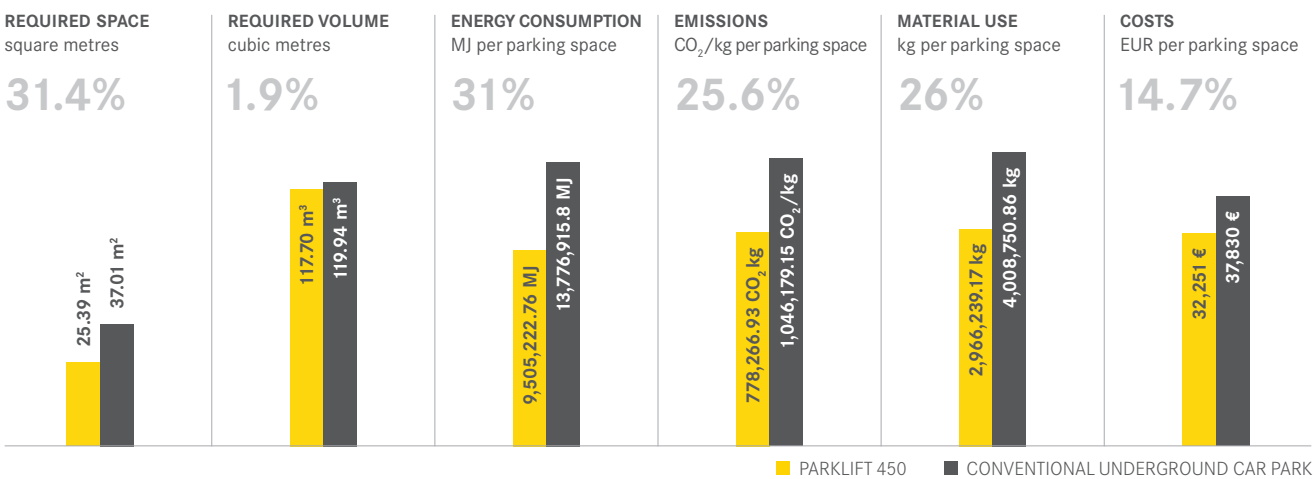


Conventional underground car park



Parklift 450

All information about the Parklift 450 can be found at **woehr.de**

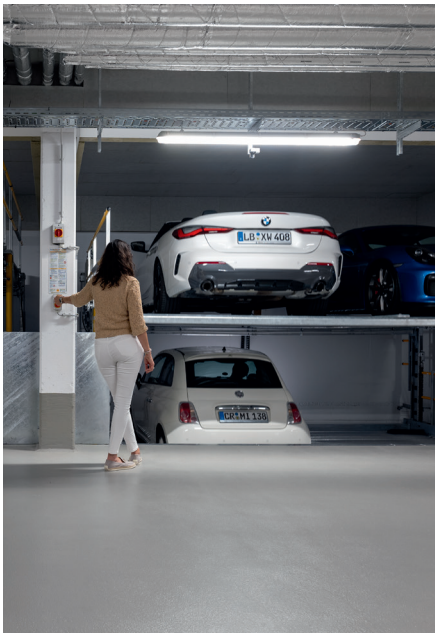


Sample calculation:
Maximising efficiency with parking systems

CALCULATION BREAKDOWN ILLUSTRATION	CONVENTIONAL UNDERGROUND CAR PARK	PARKING SYSTEM
Total costs	12 Mio. €	11.25 Mio. €
Average cost of borrowing (50%)	6 Mio. €	5.625 Mio. €
Construction period	16 Months	14 Months
Interest rate	4%	4%
Interest rate	Interest = 6,000,000 Euro * 0.04 * 1.33 ≈ 319,200 Euro	Interest = 5,625,000 Euro * 0.04 * 1.17 = 263,250.00 Euro
Difference	319,200 € - 263,250 € = 55,950 € → Interest ca. 17.53 %	

Opting for a parking system instead of a conventional underground car park brings significant material and labour savings, which, in turn, leads to a significant reduction in time and costs, as well as lower construction interest. The construction pit for a parking system can be completed more than thirty percent faster than for a conventional underground car park. This will bring forward the start of construction of the building above, allowing work to be done on the building while the parking system is being installed below. Working in parallel like this significantly reduces construction costs.

With a construction period that is approximately two months shorter than for a conventional car park, a parking system can save around EUR 55,950 in interest expenses. These savings are of particular interest to project developers as they significantly improve both the profitability and efficiency of a construction project.



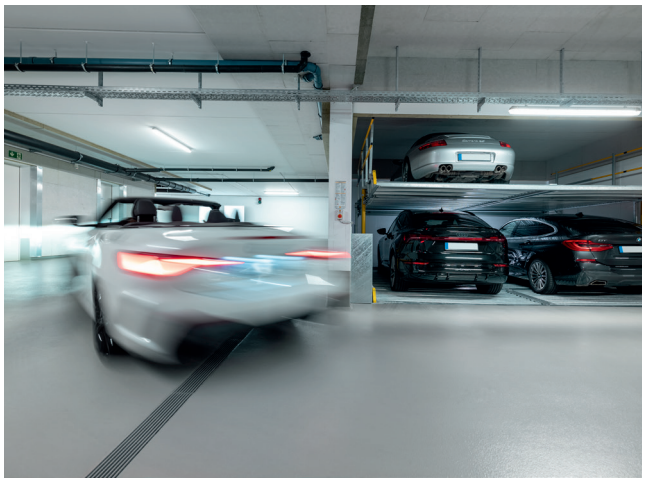
Conclusion

Car parking systems offer numerous impressive ecological and economic advantages over conventional underground car parks. Thanks to their space-saving construction, they significantly reduce land consumption, helping to preserve green spaces and minimise urban soil sealing. In addition, they are often cheaper to build due to their more efficient use of space.

Another significant environmental benefit is the reduction in CO_2 emissions. Car parking systems minimise the need for long access ramps and large driving surfaces, reducing the need for concrete and steel – materials that are very energy-intensive and polluting to produce. During the operational phase, CO_2 emissions are also reduced thanks to shorter parking search times, as the volume of traffic searching for parking spaces decreases significantly and traffic flow improves.

In financial terms, car parking systems offer potential savings thanks to their modular design, as some costly construction time can be saved. In addition, by compacting the parking space, almost the same number of vehicles can be parked on fewer levels – an important consideration since building downwards becomes more expensive with each additional level.

Overall, it is clear that car parking systems are not only a more sustainable alternative, but also more economically advantageous.



*Information about the individual parameters that were included in the calculation

Energy consumption
- Excavator (EURO6) for excavation: 0.00062 MJ/kg
- Reinforced concrete (concrete foundation, concrete surface, concrete ceiling, ramp, masonry): 2.48 MJ/kg
- Wall cladding: 7.98 MJ/kg
- Waterproofing: 97.00 MJ/kg
- Car park ventilation: 71.89 MJ/kg
- Fire safety systems: 41.49 MJ/kg
- Electrical installations: 75.30 MJ/kg
- Parking system: 25.42 MJ/kg

Material use
- Excavator for excavation
- Reinforced concrete (concrete foundation, concrete surface, concrete ceiling, ramp, masonry)
- Wall cladding
- Waterproofing
- Underground car park installations
- Parking system including assembly

Emissionen Baugrube
- Excavation/excavator: 0.00005 kg CO_2/kg
- Reinforced concrete (concrete foundation, concrete surface, concrete ceiling, ramp, masonry): 0.23 kg CO_2/kg
- Wall cladding: 0.37 kg CO_2/kg
- Waterproofing: 3.00 kg CO_2/kg
- Car park ventilation: 2.45 kg CO_2/kg
- Fire safety systems: 4.71 kg CO_2/kg
- Electrical installations: 2.43 kg CO_2/kg
- Parking system: 1.72 kg CO_2/kg

Costs
Approx. costs per m^2 for conventional car park
1st level = EUR 800 per m^2
2nd level = EUR 1,000 per m^2
3rd level = EUR 1,200 per m^2

Note: The comparison is based on the costs in the Munich area.

DETAILED COMPARISON REPORT FOR TWO CONSTRUCTION PITS

1. Introduction
This report aims to make a detailed comparison between two construction pits, analysing the excavation and transport processes. While the first case involves a construction pit with a volume of 3,605 m^3, the second case involves a construction pit with a volume of 4,379 m^3. The aim is to work out the differences in excavation time, transport time, CO_2 emissions and savings between the two scenarios.

2. Methodology
The data for this report comes from a variety of sources, including industry standards, manufacturer information and real-world experience. The calculations are based on this data plus standardised formulas and assumptions that are widely used in the construction industry.

3. Excavation process
The construction pit is dug out using an excavator. The excavator has a bucket capacity of 2 m^3. The excavation time is determined by the number of bucket passes required.

Advantages of WÖHR car parking systems

Economic advantages
Long-term economic advantages include lower construction and operating costs and higher returns on real estate thanks to efficient use of space.

Environmental credentials
Sustainable parking solutions boost the environmental credentials of projects and companies.

Cost efficiency
They reduce construction costs through shorter construction times and material savings, and in the long term through optimal use of space and low energy consumption.

Flexibility and innovation
Customised systems can be adapted to projects and enable innovative, future-oriented solutions.

Attractiveness for users
WÖHR parking systems offer a modern solution for urban parking problems and enhance the desirability of construction projects.

Sustainability certifications
WÖHR car park systems can help to obtain sustainability certifications such as LEED or BREEAM and facilitate marketing.

Future viability
Car parking systems are a sustainable solution, and early adopters of this technology are establishing themselves as pioneers with lasting success.

EPD product certificate

Our Parklift 450 was the first parking system to obtain the EPD (Environmental Product Declaration) certificate.

As part of the certification process, the entire life cycle was analysed. The analysis identified high sustainability potential, primarily due to the long service life and high recyclability of the materials used (95% recycling rate).

Projects with environmental certificates
Some outstanding projects implemented with WÖHR parking systems have also received high LEED and BREEAM ratings.

EPD®

Conclusion

The integration of car parking systems from WÖHR into construction projects offers a wide range of advantages in terms of sustainability, efficiency and long-term viability. This innovative technology enables project developers to make urban spaces more liveable and environmentally friendly by providing a sustainable solution to the problem of car parking in urban areas.

With their space efficiency, energy efficiency, resource savings and promotion of electromobility, WÖHR's car parking systems actively contribute to promoting sustainability.