

# Construction



**Complete Solutions for  
Multi-Storey and Underground  
Car Parks**



Innovation & Consistency | since 1910

# Multi-Storey and Underground Car Parks

Sika® – Complete solutions for new build and refurbishment of car park structures

Are you looking for a partner who can offer complete solutions for the new build and refurbishment of your car park structures? With its extensive project portfolio and technical experience Sika has proven over many years that it can be the right partner for you. Whether you need to select the right admixtures for your concrete, choose the correct waterproofing solutions for the basement, identify the ideal waterproofing decking systems, install the perfect joint sealants or repair and protect your concrete or steel structure Sika has the solution.

Sikafloor car park deck systems are suitable for a wide range of applications for multi-storey and underground car parks. The systems are designed to meet the needs of both new build and refurbishment projects. These include: Top decks and exposed areas; Intermediate decks; Ground bearing slabs; Ramps. The Sikafloor product range comprises a number of components to provide a complete car park decking solution. This includes primers, base coats and seal coats.

The systems are so versatile that they can be designed to suit most applications providing the specifier with solutions including monolithic finishes for concrete slabs, elastomeric crack bridging car park deck systems, rigid ultra durable coloured deck systems and fast curing deck systems which can be applied in lower temperatures.

Available in a range of colours, the system offers a variety of qualities such as slip resistance, impact resistance, abrasion resistance and elastomeric waterproofing qualities to cope with the daily rigours of constant traffic.

Sika is a global company with more than 100 production and marketing companies in over 70 countries. With its Construction Division, Sika is the most complete and competent partner for the new construction, protection and refurbishment and we are sure this brochure will give you a good overview of Sika's solutions. For further support and information, please contact 01707 394444, email, [technical@uk.sika.com](mailto:technical@uk.sika.com) or visit, [www.sika.co.uk](http://www.sika.co.uk)

## Content

Parking Structures Today	4-5
Sika Complete Solutions for New Build and Refurbishment Parking Structures	6-7
Standards and Test Methods	8-11
Car Park Flooring and Coating Solutions	12-18
Car Park Maintenance Instruction for Flooring	19
Watertight Concrete for Basement Car Parks	20
Car Park Joint Sealing Solutions for Facades and Precast Concrete Elements	21
Car Park Concrete Refurbishment Solutions	22-25
Car Park Case Studies	26-27



# Parking Structures Today



## Introduction

Parking has become a vital part of today's mobile community, especially in metropolitan areas including airports, all of which are growing at an ever faster rate. This means continually providing more parking spaces by building new car parks and frequently extending and refurbishing existing ones.

### Given the choice – Where would you park?

Successful parking structures are designed to meet the users demands, which usually include feeling safe and welcome, plus knowing that their cars are in a secure environment. Given the choice, people always park in light and bright car parks where they feel their car and its contents will be safe and secure.

## New Build

Modern parking structures are essential and integrated into Cities' architecture. They are frequently built by using "fast-track" construction techniques, with as much off-site construction as possible, to reduce the disruption in these areas. Therefore precast and prefabricated sections of steel frames and concrete decks and stairways are usually combined in composite structures for new car parks. The adequate protection of new build car parks will prevent a cost intensive refurbishment in the future.

## Refurbishment

Most of existing multi-storey car parks have been built since 1940 and they are predominantly of reinforced concrete construction, many also have a history of early deterioration, structural defects and shortcomings in safety. This is due to poor design, poor construction, low standards of maintenance and repair, or a combination of all three.

The exposure is more similar to that of bridges and as a result, deterioration, particularly reinforcement corrosion due to the effects of de-icing salts, has had a major impact on their durability. The closure of many areas and even whole car parks for costly repair or replacement has been necessary. These bad experiences have served to emphasize the need for improved performance in design, workmanship and the materials selection, to ensure the performance and safety of new and existing car parking structures.

## Investigation and Survey of Existing Parking Structures

In order to discover the root causes of distress and deterioration, it is therefore essential to carry out a professional Condition Survey and Assessment. It is obviously important to balance the cost of the investigative work with the benefits that the information derived will provide; but an appropriate survey and assessment is often key to the process of successfully maintaining and extending the service life of a parking structure.

## Typical Exposure of Parking Structures

Multi-storey and underground car parks are both subject to many different stresses, such as:

- Thermal variations
- Rainwater
- Atmospheric carbonation
- De-icing salts
- Automotive fluids
- Pedestrian and vehicular traffic
- Movement
- Groundwater



# Sika Complete Solutions for New Build and Refurbishment of Parking Structures



Flooring and Coating Solutions  
Page 8



Joint Sealing Solutions  
for Facades and Precast Concrete Elements  
Page 21



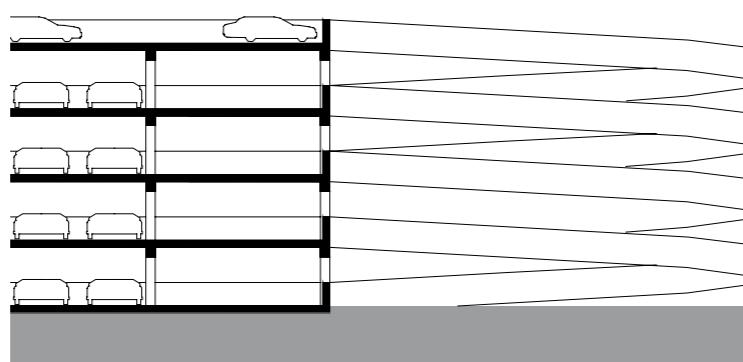
Detailing and Joint Solutions  
Page 18



Watertight Concrete for Basement Car Parks  
Page 20



Concrete Refurbishment Solutions  
Page 24



# BS/EN Standards and Test Methods



The European standard for repair mortars, protective coatings and waterproofing membranes is BS EN 1504. This standard is based on the German equivalent Rili-DAfStb. The reason for following the German standard was because it was the most complete and complex standard for such applications; in fact it was the only standard that tested and categorised car park decking membranes. Therefore, this standard has had a significant influence on the development of the European standard (most of the test procedures within the German Standard have an EN number already).

Sika repair mortars, protective coatings and decking membranes for car parks have been tested in accordance with the German Rili-DAfStb and now the new European standard.

A question often asked is, 'Why is the German standard of importance to the New European standard?':

- It defines surface preparation, for all concrete repair systems, injection resins and protective coatings – *therefore, it is easy to compare different systems and their capabilities in order to choose the best and most appropriate ones*
  - It is the only standard that includes decking membranes especially for car parks – *therefore, the tested systems will provide a high level of certainty for the end user*
  - It is approved by the German government (independent non-profitable organisation) – *independent results to make an objective decision*
  - It defines standardised testing methods – *comparison of different systems and materials is easily possible*
- The tests within it reflect every possible exposure – *to guarantee the applicability of systems*

For example, the test method for the resin based decking systems, reflects every possible exposure on car parks, such as:

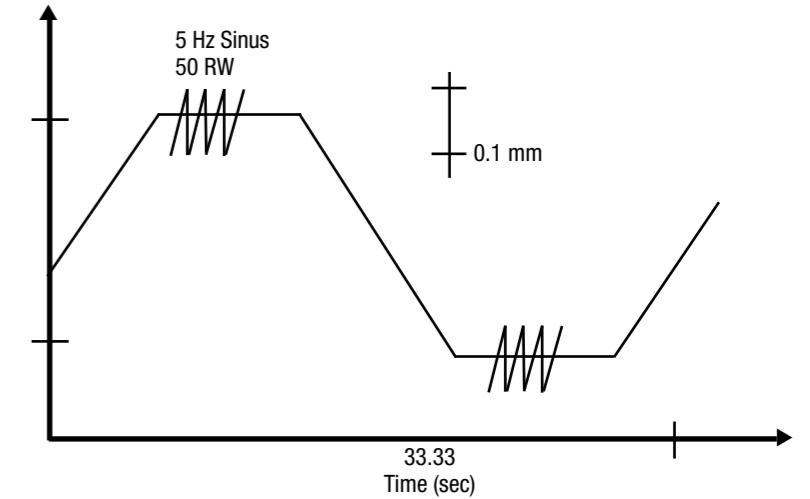
- Artificial weathering (DIN 53384 – EN 1062-11)
- Pull off tests in line with EN 13687
- Abrasion/wear resistance test SRT (61) to DIN 51 963
- Slip resistance test to ( DIN 51130 or EN 660)
- Skid resistance test SRT (62) to BS 812
- Artificial ageing for 7 days @ 70°C (EN 660)
- Chemical resistance test (EN 660)
- Impact resistance test (EN ISO 6272)
- Test to determine crack bridging properties of decking system (EN1062- 7)
  - Dynamic and static of 0.3mm @ - 20°C
  - Static of 0.1mm @ -10°C

## German Standards Definitions

OS 8:	Rigid, broadcasted, coloured, high wear resistant surface protection system for concrete according to DIN EN 1504-2 in consideration of DIN V 18026 for OS 8.
OS 11 a/b:	Flexible, broadcasted, dynamic crack-bridging, coloured, wear resistant surface protection system for concrete according to DIN EN 1504-2 in consideration of DIN V 18026 for OS 11 a/b.
OS 13:	Flexible, broadcasted, static crack-bridging, coloured, wear resistant surface protection system for concrete according to DIN EN 1504-2 in consideration of DIN V 18026 for OS 13.

## Example of test method used to determine crack bridging properties: (EN 1062)

System:  
Classification:  
W T, O = 0.30mm  
W T, U = 0.10mm  
 $\Delta$  W V = 0.10mm  
Crack width



# BS/EN Standards and Test Methods continued/...



When selecting a waterproof decking system(s) for New Build and Refurbishment of car parks, a suitably qualified and experienced Architect/Engineer should always consider the following factors in order to select the most appropriate system to meet their requirement based on the construction of the structure, i.e in-situ concrete, steel framed, composite decks or precast units.

#### Movement

- Ground movement or movement of the structure or of individual components, eg at construction joints, expansion joints is usually visible
- Parking structures in use are always subject to dynamic loading

#### Thermal Variations

- Sunlight causes thermal expansion and stress cracking
- Frost causes thermal contraction and freeze / thaw damage
- Ultraviolet light causes degradation of organic materials, ie waterproofing membranes, resin and coatings

#### Atmospheric Carbonation

- Atmospheric carbon dioxide gradually and progressively reduces the protective alkaline layer around the reinforcement, which will allow the steel to corrode

#### Rainwater

- With water filling the pores and capillaries, concrete becomes susceptible to freeze/thaw damage
- In carbonated concrete water ingress will allow steel reinforcement to corrode

#### De-icing Salts

- De-icing salts are based on chlorides. The penetration of water contaminated by de-icing salt into concrete cause corrosion of embedded steel reinforcement and often cracking, spalling and delamination of concrete cover

#### Aggressive Pollutants

- Acidic oxide gases of sulphur and nitrogen from exhausts diffuse into the condensation and attack and corrode the concrete surface, which reduces the strength and increases the porosity

#### Automotive Fluids

- Some liquids, such as hydraulic brake fluid, are very aggressive and will attack concrete and steel surfaces

#### Mechanical Exposure

- The decks of parking structures are exposed to different levels of mechanical stress, according to their location and function, ie:
  - Pedestrian levels: walkways
  - Standard levels: in primary parking bays
  - Heavy levels: entrance and exit areas, ramps and turning cycles



# Car Park Flooring and Coating Solutions

# Systems for Above Occupied Premises



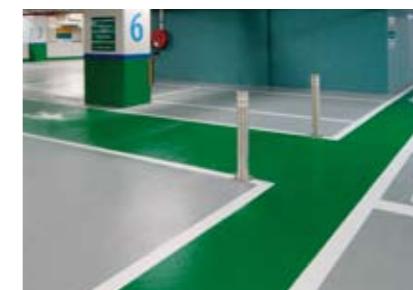
## Introduction

Car Park Decking Systems have many functions ranging from waterproofing properties to design possibilities. Sika offers a wide portfolio of car park decking systems for various applications and structures. From a technical point of view, the main objective for car park decking systems is to protect the reinforced concrete structure in order to avoid the ingress of water and corrosive de-icing salts. Therefore, crack-bridging properties are essential to accommodate the movement of the parking structure, especially with steel frame composite structures and exposed areas. Ramps for example need a higher degree of slip resistance and are much more exposed to mechanical stress, which the systems have to withstand.

Sika's car park decking systems can also be designed to the desired colour scheme of your choice. A bright and light car park also helps to improve the safety and security of your car park in order for visitors to feel more comfortable.

## Sika's Support and Service

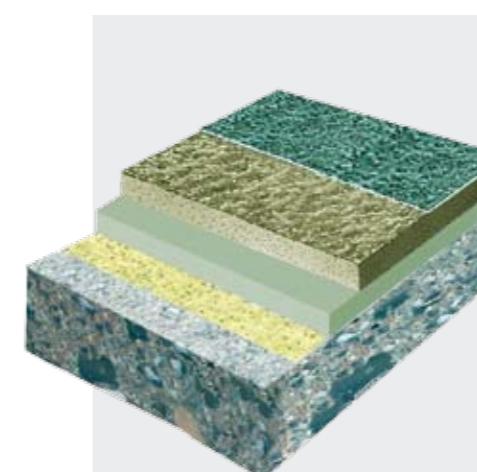
The global presence of Sika means, that we are able to support you in your country in order to assist with the correct selection of the protective system needed. Furthermore, our technical teams are more than happy in helping you to decide on the right solutions for your car park by offering the necessary tests reports, specifications and trial areas.



The requirements for waterproofing and wearing surfaces over occupied premises are especially demanding. They must not only prevent the ingress of water but also withstand the mechanical exposure caused by the traffic.

### Broadcast highly crack-bridging deck system

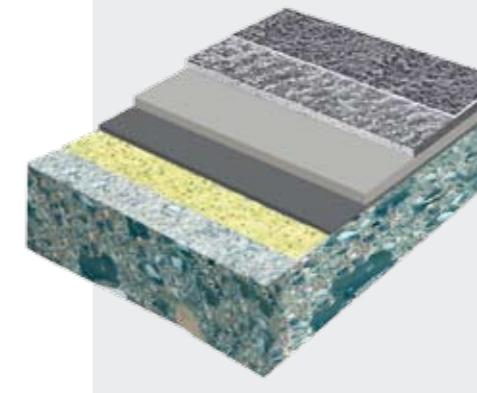
- Dynamic and static crack-bridging properties up to -20°C
- Waterproof
- Abrasion resistant
- German standard (OS-11 a)
- UV-stable
- Conforms to BS EN 1504



Primer: **Sikafloor®-161**  
Membrane: **Sikafloor®-350 N Elastic**  
Wearing course: **Sikafloor®-375/355N**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-359 N**  
A total solid, coloured, highly crack-bridging, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **ca. 4 – 5 mm**

### Broadcast fast curing reinforced crack-bridging deck system

- Crack-bridging properties
- Reinforced
- Waterproof
- Fast curing
- Abrasion resistant
- UV stable
- Conforms to BS EN 1504



Primer: **Sikafloor®-10/-13 Pronto**  
Base coat: **Sikafloor®-15 Pronto**  
Fleece: **Sikalastic® Fleece**  
Encapsulation layer: **Sikafloor®-15 Pronto**  
Wearing course: **Sikafloor®-15 Pronto**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-18 Pronto**  
A fast curing, coloured, crack-bridging, reinforced, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **ca. 4 – 6 mm**



# Systems for Top Decks and Exposed Areas



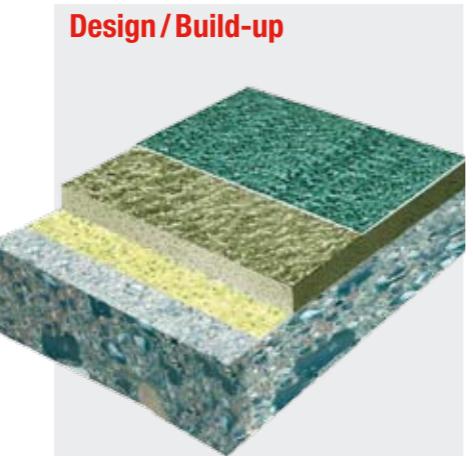
The requirements for waterproofing and wearing surfaces for exposed areas are to prevent the ingress of water and chlorides and offer a long term solution for refurbishment and new build structures. Therefore, crack-bridging properties are necessary to deal with the thermal variation.

## Requirements

### Broadcast Crack-Bridging deck system

- Dynamic and static crack-bridging properties up to -20 °C
- Coloured
- Waterproof
- Abrasion resistant
- Meets German Standard (OS-11b)
- UV stable
- Conforms to BS EN 1504

## Design / Build-up

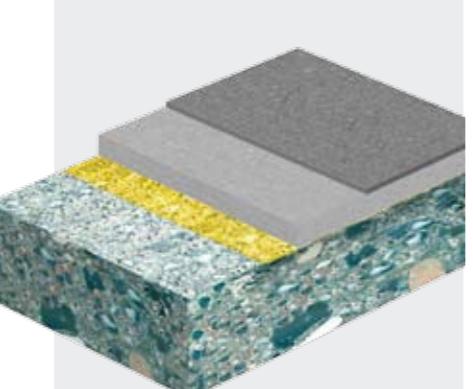


## Sika System / Performance

Primer: **Sikafloor®-161**  
Wearing course: **Sikafloor®-350 N Elastic**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-359 N**  
A total solid, elastomeric, protective waterproofing and wearing surface for car park decks.  
Total system thickness: min 4 mm

### Broadcast Fast Curing Crack-Bridging deck system

- Crack-bridging properties
- Coloured
- Waterproof
- Abrasion resistant
- Fast cure
- UV stable
- Conforms to BS EN 1504



Primer: **Sikafloor®-10/13 Pronto**  
Base coat: **Sikafloor®-15 Pronto**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-18 Pronto**  
A total solid, coloured, fast curing, elastomeric, protective waterproofing and wearing surface for car park decks.  
Total system thickness: min 3 – 4 mm

# Systems for Intermediate Decks



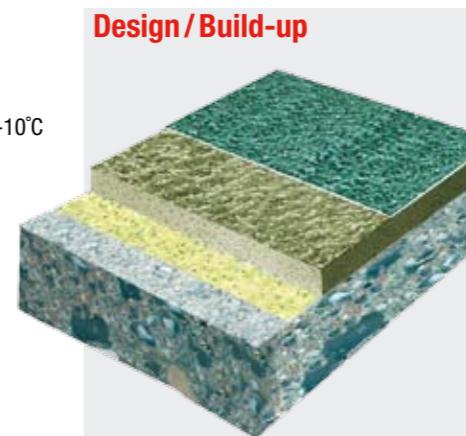
For intermediate decks of steel frame structures, it may be necessary to use a highly crack-bridging system (please refer to systems for Top Decks and Exposed Areas on the previous pages).

## Requirements

### Broadcast tough elastic deck system

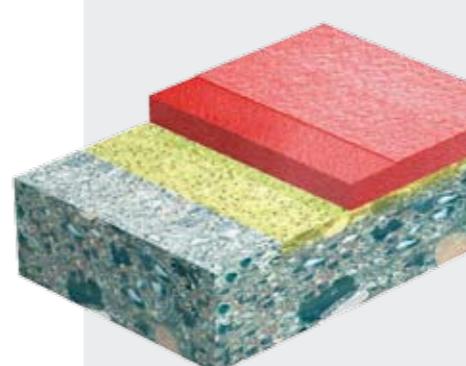
- Static crack-bridging properties up to -10°C
- Waterproof
- Abrasion resistant
- Impact resistant
- UV stable
- Meets German standard (OS-13)
- Conforms to BS EN 1504

## Design / Build-up



### Broadcast coloured deck system

- Waterproof
- Abrasion resistant
- Impact resistant
- Conforms to BS EN 1504



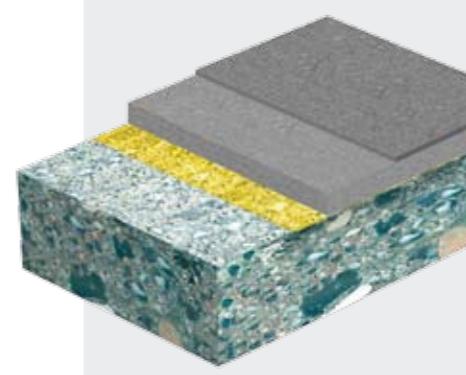
## Sika System / Performance

Primer: **Sikafloor®-161**  
Wearing course: **Sikafloor®-355N/375**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-359 N**  
A total solid, coloured, static crack-bridging, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **ca. 2 – 3 mm**

Primer: **Sikafloor®-161** (optional)  
Wearing course: **Sikafloor®-161 Filler**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-264**  
A total solid, coloured, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **ca. 2 – 4 mm**

### Broadcast fast curing deck system

- Waterproof
- Fast curing
- Abrasion resistant
- UV stable
- Conforms to BS EN 1504



Primer: **Sikafloor®-10/13 Pronto**  
Wearing course: **Sikafloor®-14 Pronto**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-18 Pronto**  
A fast curing, coloured, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **ca. 2 – 4 mm**



# Systems for Ground Bearing Slabs



Wearing surfaces for ground bearing slabs often have to deal with rising moisture due to a missing or damaged damp proof membrane. In this case, vapour permeable systems or the unique **Sikafloor®-EpoCem** Technology should be used.

## Requirements

### Monolithic Finish for Concrete

- Economic hardener
- Good abrasion resistance
- Good impact resistance
- Colours available

### Broadcast ECC system

- Medium wear resistance
- Medium thermal shock resistance
- Slip resistance
- Coloured
- Conforms to BS EN 1504

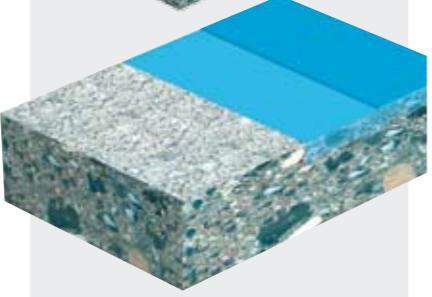
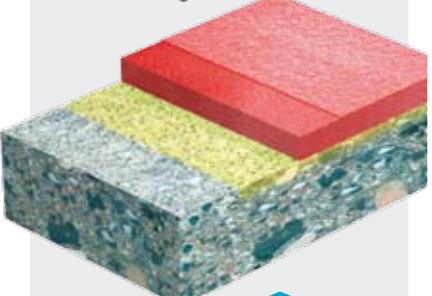
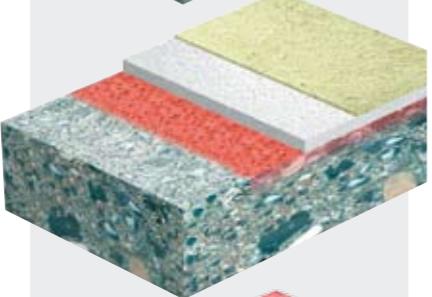
### Broadcast coloured deck system

- Waterproof
- Abrasion resistant
- Impact resistant
- Conforms to BS EN 1504

### Water dispersed coloured roller coating

- Light to medium wear resistance
- Surface stabilisation
- Prevent concrete dusting
- Coloured
- Conforms to BS EN 1504

## Design / Build-up



## Sika System / Performance

Monolithic concrete slab using **Sikament®** or **Sika® ViscoCrete®** SCC Technology. Dry shake floor hardener **Sikafloor®-Fibreshield** applied to the fresh concrete slab before the powerfloat finish, surface cured and sealed with **Sikafloor®-Proseal W** or **Sikafloor®-Proseal**.

Primer: **Sikafloor®-155 WN**  
ECC screed: **Sikafloor®-81 EpoCem**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-264**  
A total solid, coloured, ECC-binder for levelling and broadcast systems for ground bearing slabs with a high moisture content.  
Total system thickness: **ca. 2 – 3 mm**

Primer: **Sikafloor®-161** (optional)  
Wearing course: **Sikafloor®-161 Filler**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-264**  
A total solid, coloured, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **ca. 2 – 4 mm**

Coating: 2 x **Sikafloor®-2530 W**  
A two part, water dispersed, coloured, epoxy resin based coating.  
Total system thickness: **0.5 – 1.0 cm**

# Systems for Ramps



Waterproofing and wearing surfaces for ramps are especially exposed to mechanical impact and abrasion. They should offer a hard wearing surface in order to deal with the traffic not only on the ramps but at the turning circles as well. For exposed areas, it may be necessary to use a highly crack-bridging system (please refer to systems for Top Decks and Exposed Areas on the previous pages).

## Requirements

### Broadcast tough elastic deck system

- Static crack-bridging properties
- Waterproof
- Abrasion resistant
- Impact resistant
- UV stable
- Conforms to BS EN 1504

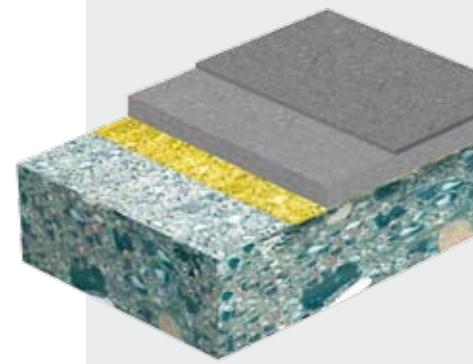
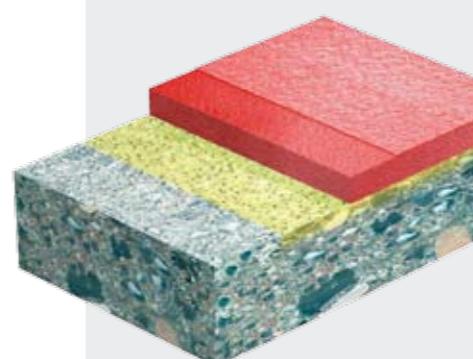
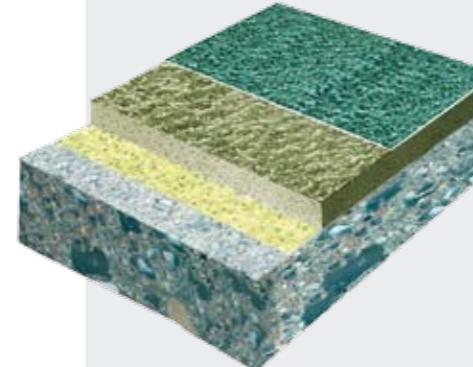
### Broadcast coloured deck system

- Waterproof
- Abrasion resistant
- Impact resistant
- Conforms to BS EN 1504

### Broadcast fast curing deck system

- Waterproof
- Fast curing
- Abrasion resistant
- Conforms to BS EN 1504

## Design / Build-up



## Sika System / Performance

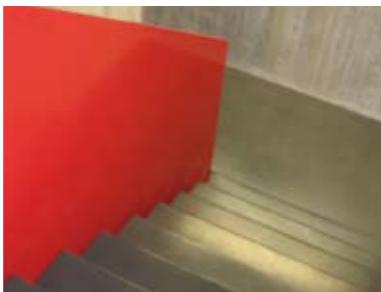
Primer: **Sikafloor®-161**  
Wearing course: **Sikafloor®-325**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-359 N**  
A total solid, coloured, static crack-bridging, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **3 – 5 mm**

Primer: **Sikafloor®-161** (optional)  
Wearing course: **Sikafloor®-161 Filler**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-264**  
A total solid, coloured, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **3 – 5 mm**

Primer: **Sikafloor®-10-13 Pronto**  
Wearing course: **Sikafloor®-14 Pronto**  
Broadcast: quartz sand  
Seal coat: **Sikafloor®-18 Pronto**  
A fast curing, coloured, protective waterproofing and wearing surface for car parking structures.  
Total system thickness: **3 – 5 mm**



# Systems for Entrance Areas, Walkways and Staircases



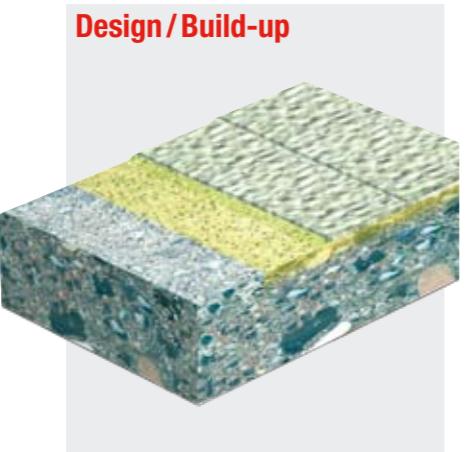
The entrance area, walkways and staircases are the business card of a car park. Floor and wall coatings not only have to fulfil all technical requirements but also be aesthetically pleasing. **Sikafloor®-264 Thixo** offers the right balance between cleanability and slip resistance, so that the floor of your entrance area of your car park always looks inviting.

## Requirements

### Textured, coloured rigid coating

- Good wear and abrasion resistance
- Good chemical resistance
- Slip resistance
- Easy cleaning
- Coloured
- Conforms to BS EN 1504

## Design/Build-up



## Sika System / Performance

Primer: **Sikafloor®-161**  
Coating: **Sikafloor®-264 Thixo**  
A total solid, coloured, epoxy binder  
for textured coating systems.  
Total layer thickness: approx.  
**0.6 – 1.0 cm**

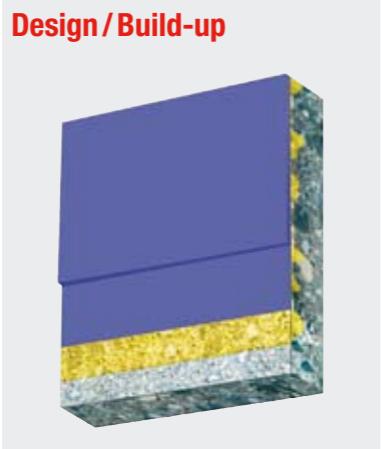
**Sikagard®-Wallcoat N** offers an easy-to-clean, mechanical and chemical resistant solution for walls and soffits. Therefore, it is especially suitable for the use in staircases and for parapet walls in order to remove easily the exhaust marks of cars. Furthermore, a wide portfolio of wall and soffit coatings is available from Sika, ranging from hydrophobic impregnations to elastic protective coatings, which are described on page 24.

## Requirements

### Water dispersed coloured wall coating

- Good chemical and mechanical resistance
- Good opacity
- Water vapour permeable
- Easy to clean
- Odourless
- Coloured

## Design/Build-up



## Sika System / Performance

Primer: **Sikagard®-Wallcoat N +5 % water**  
Coating: **Sikagard®-Wallcoat N**  
A coloured water dispersed epoxy resin  
based coating for walls.  
Total layer thickness: approx. **0.2 – 0.4 mm**

# Car Park Maintenance Instruction for Flooring



Coatings for multi-storey car parks are exposed to different types of loads such as thermal, mechanical and chemical stresses. The concrete surface must be protected not only from damaging media such as water, chloride, fuels, oils or battery acids, but also the coating of the floors must bear strong mechanically and abrasive loads when driven over. At the same time high requirements in terms of aesthetics and durability have to be fulfilled. An optimal and regular care of the coating supports their preservation of value and thus ensures long protective function. Especially in the cold and wet season the slip resistance for the floor of the car park becomes very important.

The intensity and the frequency of the cleaning intervals depend strongly on the frequency of the use, weather conditions and the situation of the surfaces in the multi-storey car park. The decision of whether an individual multi-storey car park must be cleaned daily, weekly, monthly or annually, can be specified only in accordance with the individual local conditions. Therefore, an optimal cleaning plan will be set up only after a certain trial period.

For the different requirements and conditions in different individual projects, individual investigation of the assigned machines, procedures and chemicals is recommended. The selection of the machines depends strongly on the size of the surfaces which have to be maintained and the spatial conditions (e.g. passage heights, downward gradients). Therefore please always seek advice from your local cleaning company or the manufacturer of cleaning agents or/and equipment.



# Watertight Concrete for Basement Car Parks



## Introduction

Sika is a global leader in supplying technical solutions and products to the concrete producing industry and its customers. Our experience in concrete and mortar technology dates back to 1910.

### Concrete quality is important for your car park

Concrete is the base of the load bearing structure and forms the foundation for a functioning, durable and low-maintenance building. Many factors influence the final quality of the concrete structure: good workability speeds up the construction process and reduces mistake during concrete placing; Sika superplasticisers allow significant reduction of the water/cement ratio, which improves strength, durability and water tightness as well as workability; Increased early strength can reduce the demoulding time; Controlled air entrainment improves the frost/thaw resistance while proper curing of the concrete after placing helps to avoid damages by early dehydration. There are many other possibilities to improve your concrete, talk to us about it!

## Sika Concrete Solutions

### Requirements

#### Increase of concrete durability and strength

- Increase of concrete density
- Reduction of porosity
- Reduced ingress of harmful substances

#### Improvement of workability and W/C reduction

- Very high reduction of water/cement ratio
- Excellent workability of fresh concrete
- Extended slump keeping possible without strength retardation
- Reduced porosity

#### Increased early strength development in first hours/days

- Earlier stripping of formwork
- Accelerated construction process

#### Waterproofing concrete

- Reduction of concrete porosity
- Blocking of concrete capillaries
- Excellent product portfolio in watertight concrete structures

#### Set retardation of concrete

- Set retardation extends the workability time of concrete
- Reduction of optimum concrete temperature while curing

#### Frost resistance

- For areas with cold winters

### Sika System / Performance

Newest generation of mid range water adverse superplastifiers:

#### SikaPlast® / Sika® ViscoCrete®

Silicafume based concrete additives:

#### SikaFume® / Sikacrete®

Increase physical and chemical resistance.

Newest generation superplastifiers:

#### Sika® ViscoCrete®

Note: Self compacting concrete is only one example. The cost performance and technical possibilities created benchmarks in the global market.

Hardening/set accelerators:

#### SikaRapid®

Allows placing concrete at lower temperatures and enables early load bearing capabilities

Capillary blocking agent:

#### Sika®-1+

#### Sika® Watertight Concrete Powder

Set retarder:

#### Sika Retarder®

Controls the set of concrete

Air entraining agent:

#### Sika® Aer®

Controlled entrainment of tiny air bubbles increases the frost and freeze/thaw resistance of concrete.

# Car Park Joint Sealing Solutions for Facades and Precast Concrete Elements



## Introduction

## Sika Joint Sealing Solutions for Façade and Precast Concrete Elements

### Requirements

#### Joints for precast elements

- Elastic sealing of joints between precast concrete elements
- External and internal application



Large scale use of polyurethane based joint sealants in the construction industry is a Sika innovation, which gives us more than 30 years experience for this application. Now Sika is a global leader in supplying performance sealants for concrete elements.

#### Joints for façades

- Joint sealing for concrete facades
- UV exposed areas

### Sika System / Performance

#### Sikaflex® Construction

Universal PU based joint sealant for connection joints.

Very economical, easy application.

#### Sikaflex® PRO-3 WF

Well proven PU-based joint sealant for movement joints. Excellent durability.

#### Sikaflex® PRO-2 HP

PU based joint sealant, well proven for façade joints.

#### Sikaflex® AT-Façade

Based on Sika AT Technology, combining advantages of PU on one side and silane terminated polymers on the other hand.



# Car Park Concrete Refurbishment Solutions



## Waterproofing

The basis of every car park flooring system is a solid and sound concrete structure. Therefore, proper maintenance of the reinforced concrete structure is essential in order to guarantee a prolonged design life. This includes:

- Protection of the steel reinforcement
- Repair of damaged and deteriorated concrete
- Protection of exposed concrete surfaces against mechanical, chemical and physical attacks
- Strengthening of reinforced concrete structures which are too weak to carry the required load

Successful concrete refurbishment starts with a detailed condition survey to identify the root causes of degradation. After the assessment, the appropriate repair and protection strategy and repair works can be defined according to local standards and manufactured and tested in compliance with European Standard BS EN 1504.

## Sika Solutions for Refurbishment of Parking Structures

Sika offers a full range of well introduced and innovative solutions for concrete refurbishment, for example:

- High performance repair mortars
- Full range of high performance hydrophobic impregnations
- Various types of protective, decorative surface coatings
- Unique corrosion inhibitors
- Proven strengthening systems

In addition Sika can provide innovative proven solutions for certain conditions, e.g. repair mortars which can be applied to soffits while the car deck above is in use (application under dynamic loading).

# Systems for Concrete Repair



Sika produces a full range of products and systems for structural and non-structural concrete repair, such as reinforcement corrosion protection, bonding primers for difficult substrates, repair mortars with special properties and smoothing and levelling mortars for special site conditions on job site.

## Sika Concrete Repair Solutions

### For localised, fast setting repair



Example of Sika repair system (R3)

- Reinforcement Corrosion Protection  
**Sika® MonoTop®-610**
- Bonding primer  
**Sika® MonoTop®-610**
- Repair mortar  
**Sika® MonoTop®-615**
- Smoothing mortar  
**Sika® MonoTop®-620**

### Characteristics

- Class R3 repair system according European Standard BS EN 1504-3
- One-component system
- Easy handling and application
- Accelerated setting for fast repair works

### For structural concrete repair



Example of Sika repair system (R4)

- Reinforcement Corrosion Protection  
**SikaTop® Armatec®-110 EpoCem**
- Bonding primer (if necessary)  
**Sika® MonoTop®-610**
- Repair mortar  
**Sika® MonoTop®-612**  
**Sika® Rapid Repair Mortar**
- Smoothing mortar  
**Sika® MonoTop®-620**

### Characteristics

- Class R4 repair system according European Standard BS EN 1504-3
- Easy handling and application
- Better yield
- Thick layer application
- Sulphate resistance
- Low shrinkage behaviour

### For structural concrete repair with increased requirements



Example of Sika repair system (R4)

- Reinforcement Corrosion Protection  
**SikaTop® Armatec®-110 EpoCem**
- Bonding primer (if necessary)  
**SikaTop®-Armatec®-110 EpoCem**
- Repair mortar  
**Sika® MonoTop®-612**  
**Sika® Rapid Repair Mortar**  
**Sika® Armorex®-Armorcrete**
- Smoothing mortar  
**Sikagard®-720 EpoCem®**

### Characteristics

- Class R4 repair system according European Standard BS EN 1504-3
- Designed for demanding concrete repairs
- For spray application
- Proved for repair work under dynamic loading
- Sulphate resistance
- Low shrinkage behaviour



# Systems for Concrete Protection



To prevent further damages on concrete structures due to water, carbon dioxide, chlorides or other ingresses, concrete structures have to be protected. Sika produces a full range of surface applied corrosion inhibitors, impregnations, hydrophobic impregnations and specialized colored coatings for use in protecting reinforced concrete facades, walls and soffits of park decks.

## Sika Concrete Protection Solutions

### Corrosion management system



#### Sika concrete protection system

- Surface applied corrosion inhibitor  
**Sika® FerroGard®-903**
- Embedment galvanic anode for corrosion protection  
**Galvanic Protection Systems**

### Rigid protective coating systems



#### Sika concrete protection system

- Solvent based solution for high performance requirements  
**Sikagard®-680S**
- Water based system for standard requirements  
**Sikagard®-675 W ElastoColor**
- Hydrophobic impregnations for high protection requirements  
**Sikagard®-706 Thixo**

### Elastic protective coating systems



#### Sika concrete protection system

- System for moderate crack-bridging requirements  
**Sikagard®-552 W Aquaprimer** plus  
**Sikagard®-550 W Elastic**
- System for high crack-bridging requirements  
**Sikagard®-552 W Aquaprimer** plus  
**Sikagard®-545 W Elastofill** plus  
**Sikagard®-550 W Elastic**

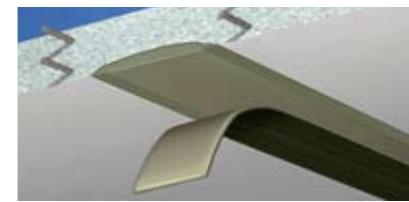
# Systems for Structural Strengthening



Sika systems for structural strengthening using fibre reinforced polymers are used for flexural strengthening of beams and slabs, shear strengthening of beams and to increase axial, shear and flexural capacity of columns as well as earthquake strengthening systems. Sika provides a full range of carbon fibre reinforced polymers (CFRP) systems, such as plates, fabrics or post-tensioning systems.

## Sika Structural Strengthening Solutions

### Flexural strengthening systems



#### Sika strengthening systems

- Carbon plate system  
**Sikadur®-30** epoxy adhesive plus  
**Sika® CarboDur®** carbon fibre reinforced plates (CFRP)
- Post-tensioning system  
**Sikadur®-30** epoxy adhesives plus  
**Sika® CarboStress®** post tensioning plates

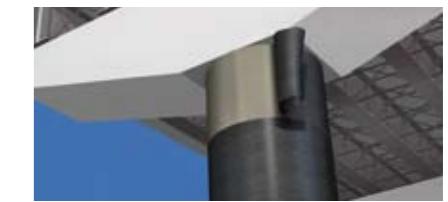
### Shear strengthening systems



#### Sika strengthening systems

- L-shape elements for beams  
**Sikadur®-30** epoxy adhesive plus  
**Sika® CarboShear®** prefabricated L-shape carbon fibre reinforced plates
- Fabric system  
**Sikadur®-330** epoxy adhesives plus  
**SikaWrap®** fabrics (carbon, glass or aramid)

### Axial strengthening systems



#### Sika strengthening systems

- High performance confinement system  
**Sikadur®-330** epoxy adhesives plus  
**SikaWrap®** fabrics (carbon, glass or aramid)

### Characteristics

- Unique, invisible protection system for steel bars and concrete surfaces
- High cost efficiency
- Easy to apply
- **Sika® FerroGard®-903** conforms to BS EN 1504

### Characteristics

- Conforms with BS EN 1504-2
- Easy to apply
- Highest protection characteristics  
**Sikagard®-550 W Elastic**
- Proven track record
- Conforms to BS EN 1504

### Characteristics

- Approved for low temperatures down to -20°C
- Environmentally friendly
- Good crack-bridging behaviour
- Durable
- Proven track record
- Conforms to BS EN 1504

### Characteristics

- High tensile strength
- Non-corroding
- Low weight
- Easy handling
- Limit deflection and cracks, increased fatigue resistance (post-tensioning system)

### Characteristics

- Adjustable shape
- Easy application
- Increase axial capacity and vehicle impact resistance
- Seismic strengthening
- Non corrodng



# Car Park Case Studies



## Moorfield Car Park Gets Full Sika Make-Over

### Project Description

A comprehensive package of Sika repair, coating and flooring systems has been used to completely rejuvenate the Moorfield multi-storey car park, which is located in the centre of Truro in Cornwall with spaces for 720 spaces.

### Requirement

The car park needed to be completely refurbished in order to extend the lifespan of the structure.

### Sika Solution

One of the key issues to address was the flexural cracking to the concrete decks, caused by the large span widths between support columns. This was solved with **Sikafloor®-350 N** car park deck membrane which has excellent dynamic and static crack-bridging properties, even at low temperatures (down to -20 degrees Celsius). This specialist car park decking system is extremely hard wearing, and has excellent abrasion, slip and chemical resistant properties.

There was also a requirement to re-profile one of the ramps to lower the gradient to prevent vehicles with low ground clearance from 'bottoming out'. This was achieved with **Sika®-Armorcrete** a flowable, cementitious, micro-concrete repair system.

Remedial work on the parapet walls was also needed and

**Sikagard®-675 W** provided the perfect solution. This is a flexible anti carbonation coating which was available in a range of colours to match the existing finishes to the car park. To minimise downtime during the repair programme all the ramps and walkways were coated with **Sikafloor®-Pronto**. This is a fast cure system which can be trafficked within hours of application, even at low temperatures.

Steve Cocker of Sika commented, "Cornwall Council were very pleased with the end result as the project was completed to their exact specifications well within the timescale set. They now have a car park that has a much extended lifespan and is aesthetically an asset to the City."



## Northampton Car Park is Refurbished using Sika Repair Systems

### Project Description

Mayordom multi-storey car park situated in the centre of Northampton, with spaces for 880 cars, has recently been refurbished using Sika concrete repair and coating systems as well as waterproofing membranes. Testing of this five level car park, which was built in 1973, had shown increasing deterioration of the reinforced concrete decks, due to chloride attack of the reinforcing steel within the structure.

### Requirement

The car park needed to be completely refurbished in order to extend the lifespan of the structure.

### Sika Solution

Due to differing extents of corrosion activity within the steel reinforcement, a ribbon anode cathodic protection system together with the **Sika® FerroGard®-903** corrosion inhibitor was used. The combination of these corrosion control methods provides a cost efficient, technically driven solution. Following repairs and preparation, the tough elastic waterproofing system **Sikafloor®-350 N** was applied to the top deck including **Sikafloor®-359 N**, a very tough seal coat, flexible polyurethane seal coat, with a very good colour stability and resistance to weathering. The intermediate decks were coated with **Sikafloor®-261**, a durable, epoxy resin intermediate decking system.

Repairs to all decks were carried out using Sika® Rapid Repair Mortar, a cementitious, fast setting mortar with high early strength. Soffits and pillars were repaired using the **Sika® MonoTop®** concrete repair system, and **Sika® FerroGard®-903** corrosion inhibitor was applied. **SikaColor®-671 W**, an anti-carbonation decorative coating was applied to all surfaces. This environmentally friendly, water based, protective coating prevents water ingress, is vapour permeable and extremely durable.

The refurbishment works, together with the new upgraded lighting system won the International Concrete Repair Institute, Repair Project of the Year 2006 Award and has made Mayordom car park brighter and safer, with an assured future.



## Ealing Car Park is Safe with Sika

### Project Description

Sika materials are being used exclusively on the refurbishment of Spring Bridge Road multi-storey car park, a 30 years old structure, to extend the life of, and give a lighter and safer environment to users of the car park.

### Project Requirements

Cracks in the existing asphalt screed on the 3'000 m<sup>2</sup> top deck, had allowed water, contaminated with de-icing salts to penetrate both the concrete frame and the uncoated intermediate decks below. This had lead to corrosion of the reinforcing steel in the carbonated concrete and subsequent delamination.

### Sika Solutions

The asphalt screed from the top deck was removed, and **Sikafloor®-355**, a solvent free, elastic, polyurethane decking system was applied as a broadcast wearing layer. This was over coated with **Sikafloor®-354**, a flexible epoxy seal coat, to give a tough, waterproof, flexible surface with good colour stability and resistance to weathering. The three intermediate decks, each of 3'000 m<sup>2</sup>, were prepared and coated with **Sikafloor®-261**, a durable, solvent free, epoxy resin, decking system. Repairs to all decks were carried out using **Sika®-Rapid Repair mortar**, a cementitious, fast setting mortar with high early strength. The soffits and pillars were repaired using the **Sika® MonoTop®** concrete repair system, and **Sika® FerroGard®-903** corrosion inhibitor was applied. **Sika® FerroGard®-903** impregnates the reinforced concrete to arrest the rate of existing corrosion, and give long term protection to the structure. **Sikagard®-ElastoColor® W**, an anticarbonation decorative coating was finally applied. This water based, crack-bridging protective coating, prevents water ingress, is resistant to frost and salts and is vapour permeable and extremely durable. Construction joints were replaced with **Sikaflex®-PRO 3 WF**.



## Sika Helps Brighton See Car Parks in New Light

### Project Description

The typically shady and inhospitable environment of underground car parks has been radically transformed in Brighton, where the 350 space 'The Lanes' facility has received a welcoming and flawless finish thanks to the **Sikafloor® Ecoline System**.

### Requirement

The car park needed to be completely refurbished in order to extend the lifespan of the structure.

### Sika Solution

Developed by Sika, global leader in specialist construction materials, the **Sikafloor®** car park inter deck system was selected for its outstanding surface finish. Previously dark and cracked, the floor now presents visitors with an attractive coloured surface that shines under the lights. Complete with a unique silver and black parking finish, which eliminates the need for white lines and creates easy definable spaces, the car park now has a safer and more welcoming atmosphere.

In total, 10,000 m<sup>2</sup> of the **Sikafloor®** system was applied by specialist contractor Volker Laser to the car park decks. The Sikafloor® system is quick and easy to apply – vital as any closure of parking spaces results in lost revenue. The project was completed in four phases, one for each floor of the car park, helping to minimise disruption to the client.

Hard-wearing and economical, the **Sikafloor®** system was applied to the floor at a minimum thickness of 4 mm. This was important as the original concrete surface was uneven and cracked. The thickness of the Sika system enabled the creation of a smooth, level, finish.

With the work taking place underground, it was important to protect the public and the contractor's health and wellbeing. As **Sikafloor®** products are very low in odour, they offered the perfect decking solution that would provide workers and car park users alike with a comfortable and safe environment whilst the refurbishment works were being carried out.

Once finished, the system provided not only a stunning appearance, but also created a waterproof system that ensured protection to the concrete structure. The **Sikafloor®-263 SL** and **Sikafloor®-264** systems are part of Sika's Ecoline range of resin based flooring products. Produced from next generation low allergy resin, reducing the risk of applicator sensitivity, they are CE marked for performance. They are available in tins and economically and ecologically advantageous drums that help reduce the amount of packaging required.



# Sika Worldwide



Sika - Your Local Partner with a Global Presence

The information, and, in particular, the recommendations relating to the application and end use of Sika® products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users should always refer to the most recent issue of the Product Data Sheet for the product concerned, copies of which will be supplied on request.

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