



FLOORING  
SUSTAINABLE SOLUTIONS  
MORE VALUE LESS IMPACT

# RESPONSIBLE FOR THE FUTURE SIKA FLOORING SOLUTIONS

“Sika is committed to pioneering sustainable solutions to address global challenges, and to achieve this safely at the lowest impact on resources”.

Sika is dedicated to sustainable development, assuming responsibility to provide sustainable solutions in order to improve material, water and energy efficiency in construction and transportation. Sika strives to create value for all its stakeholders with its products, systems, and solutions along the whole value chain and throughout the entire life span of its products. The value created by far outweighs the impacts associated with production, distribution and use. Sika is committed to measure, improve and communicate sustainable value creation: “More value, less impact” refers to the company’s commitment to maximize the value of its solutions to all stakeholders while reducing resource consumption and impacts on the environment.



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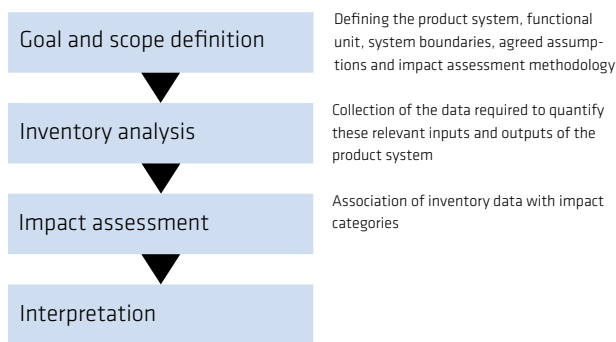
**34** Sika Sustainable Solutions

# MEASURING MORE VALUE LESS IMPACT

## WHAT IS LIFE CYCLE ASSESSMENT (LCA) AND WHY IS IT RELEVANT?

Life Cycle Assessment (LCA) is a standardized method to assess and compare the inputs, outputs and potential environmental impacts of products and services over their life cycle. LCA's are increasingly recognised as the best way to evaluate the sustainability of products and systems.

## WHAT ARE THE STEPS TO PREPARE AN LCA?



## WHAT IMPACT CATEGORIES AND RESOURCE INDICATORS ARE INCLUDED IN AN LCA?

There are several different impact categories and resource indicators which can be assessed with different methods. The impact categories and resource indicators to be presented according to the Standard EN 15804 Sustainability of construction works – Environmental product declarations – “Core rules for the product category of construction products”, include the following:

### Cumulative Energy Demand (CED)

Cumulative Energy Demand (CED) accounts for the consumption of energy resources, namely the total amount of primary energy from renewable and non-renewable resources.

### Global Warming Potential (GWP)

Global Warming Potential (GWP) measures the potential contribution to climate change, focusing on emissions of greenhouse gases, such as carbon dioxide (CO<sub>2</sub>), which enhance the heat radiation absorption of the atmosphere, causing the temperature at the earth's surface to rise.

### Photochemical Ozone Creation Potential (POCP)

Photochemical Ozone Creation Potential (POCP), or summer smog, is the formation of reactive chemical compounds, e.g., ozone, by the action of sunlight on volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>). It is common in large cities, where high amounts of VOC and NO<sub>x</sub> are released (e.g., industrial and automotive emissions), especially during summer when there is more sunlight. Summer Smog can be particularly harmful to human health and ecosystems.

### Use of Net Fresh Water

The use of net fresh water accounts for the consumption of fresh water (e.g., feed water, ground water, lake water, river water, surface water, water with river silt).

### Eutrophication Potential (EP)

Eutrophication is the excessive enrichment of aquatic or terrestrial ecosystems with nutrients (nitrogen and phosphorus being the most important) which may cause an adverse shift in species composition and biomass production.

### Acidification Potential (AP)

The acidification potential describes the conversion of air pollutants, such as sulphur dioxide (SO<sub>2</sub>), into acids, which have a wide variety of impacts (e.g., in the form of acid rain) on soil, water, organisms and materials.

### Ozone Depletion Potential (ODP)

Ozone depletion refers to the degradation of the ozone layer due to anthropogenic emissions such as chlorofluorocarbons (CFCs). This allows a greater fraction of UV-B radiation to reach the earth's surface, with potentially harmful impacts on human health, other organisms and materials.

### Abiotic Depletion Potential (ADP elementary and ADP fossil)

Abiotic resources are natural resources such as minerals, iron ore, crude oil and wind energy. The ADP elementary impact category includes all non-renewable, material resources, while the ADP fossil category includes all fossil material resources.

## ARE “CARBON FOOTPRINT” AND GLOBAL WARMING POTENTIAL (GWP) THE SAME?

Yes, the Carbon Footprint is the sum of the total greenhouse gases emitted (directly and indirectly) expressed in kg CO<sub>2</sub>-equivalents. GWP is the corresponding impact category of an LCA.



# THE SIKA LIFE CYCLE APPROACH

## ON WHAT STANDARDS ARE SIKA LCA'S BASED?

Sika carries out LCA's according to the ISO 14040 series and the Standard EN 15804. The impact assessment methodology used is CML 2001.

## WHERE DOES THE SIKA LCA DATA COME FROM?

The data for the Sika LCA is based on public databases, such as those from Ecoinvent, the European Reference Life Cycle Database (ELCD) and PE-GaBi, plus the specific data from Sika production plants and products.

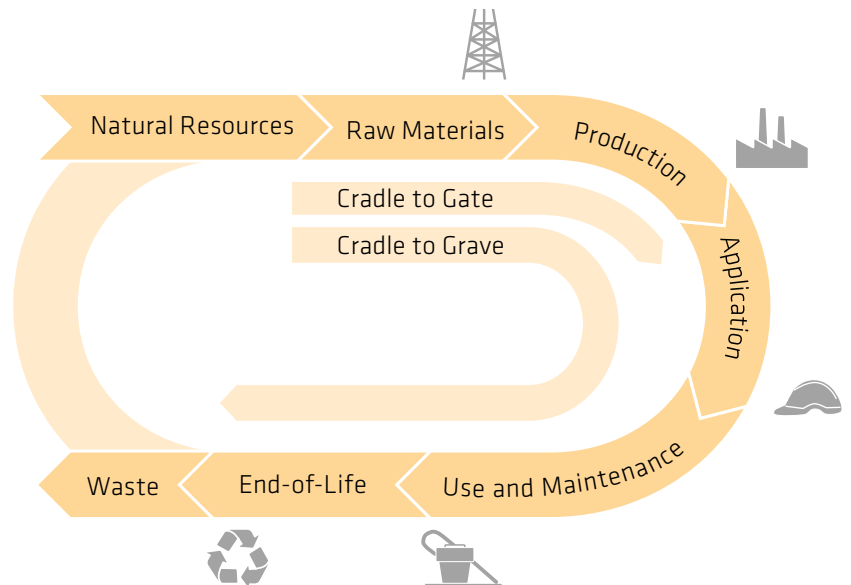
## WHAT DOES 'CRADLE TO GATE' MEAN?

In a 'Cradle to Gate' approach, the LCA investigates the potential environmental impact of a product from raw material extraction to finished production.

## WHAT DOES 'CRADLE TO GRAVE' MEAN?

In a 'Cradle to Grave' approach, the LCA investigates the potential environmental impact of a product from raw material extraction, production, application and use to final disposal at the end-of-life.

## WHICH LIFE CYCLE PHASES ARE INCLUDED IN THESE SIKA LCA'S?



# THE SIKA CONTRIBUTION TO SUSTAINABLE CONSTRUCTION

## HOW CAN THE SIKA LCA DATA BE USED / INTERPRETED?

The LCA can greatly assist our customers in evaluating Sika's products and systems namely by providing quantitative data on their environmental profile. This enables the differentiation of products that may have similar performance, but greater differences concerning their environmental impact – where obviously the lower, the better.

## HOW CAN SIKA CONTRIBUTE TO SUSTAINABLE CONSTRUCTION?

Sika evaluates its products systematically with regard to all of the major challenges and based on regular and fully comprehensive Life Cycle Assessments.

## WHAT ARE THE SIKA SUSTAINABLE SOLUTIONS



### Energy efficiency

Sika products and systems which contribute to reducing the energy demand over the entire life cycle.



### Resource efficiency

Sika products and systems which contribute to reducing the resource demand over the entire life cycle.



### Climate protection

Sika products and systems which contribute to reducing the carbon emissions over the entire life cycle.



### Water efficiency

Sika products and systems which contribute to reducing the water demand over the entire life cycle.



### Air quality

Sika products and systems which contribute to reducing summer smog and the emission of air pollutants and hence improve the well-being of people and ecosystems over the entire life cycle.



# THE SIKA LIFE CYCLE APPROACH FOR FLOORING SYSTEMS

## FLOORING SYSTEMS – THE SIKA LIFE CYCLE APPROACH



### WHICH IMPACT CATEGORIES AND RESOURCE INDICATORS ARE MOST RELEVANT FOR FLOORING?

As a standard approach, Sika evaluates all impact categories and resource indicators deemed as important according to the relevant standards. For flooring, categories considered to be most relevant include: Cumulative Energy Demand (CED), the Global Warming Potential (GWP), and the Photochemical Ozone Creation Potential (POCP). Others, such as Use of Net Fresh Water are less significant for Flooring and hence not included in this publication.

### WHICH LIFE CYCLE PHASES ARE MOST RELEVANT FOR FLOORING?

From a Cradle to Gate perspective, the majority of the potential impacts are connected to the raw materials (A), which are used to produce the products (B), that are used to build up the flooring systems; including primers, wearing coats and sealers.

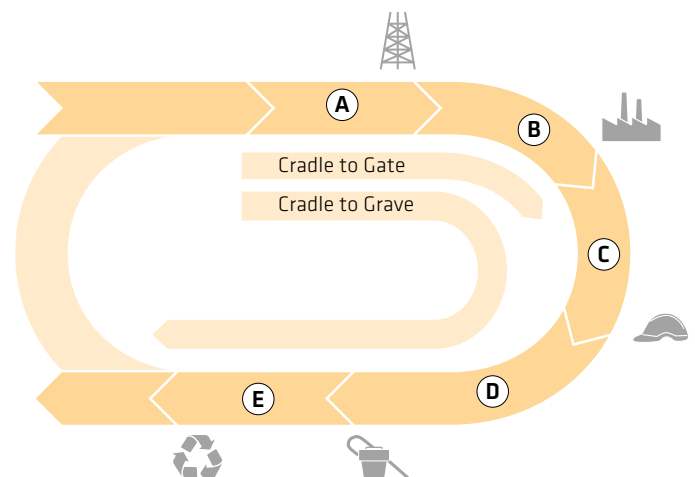
From a Cradle to Grave perspective, beside the raw materials, the 'Use' phase (D) and the End-of-Life phase (E) have the most significant influence on the overall sustainability performance of flooring systems. This is due to the different future maintenance and refurbishment requirements of different flooring systems, which are highly dependent on the intended use, exposure and durability of the floor.

### WHAT IS INCLUDED IN THE SIKA FLOORING LCA?

The LCA data in this brochure refers to 1 m<sup>2</sup> of the flooring system and is either based on a Cradle to Gate or a Cradle to Grave approach.<sup>1</sup>

### WHO PERFORMED AND REVIEWED THE SIKA FLOORING LCA?

The Sika flooring LCA's have been performed internally by the Sika Corporate Product Sustainability Group, using the 'state-of-the-art' GaBi software from PE International. These have then been reviewed by the leading Swiss research institute, the Swiss Federal Laboratories for Materials Science and Technology (EMPA).



<sup>1</sup> In the LCA's, neither the subfloor construction (concrete deck) nor capital goods (e.g. machinery) were considered, as these are additional variables and apart from the actual flooring system.

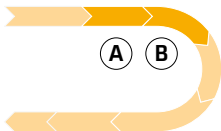


# SUSTAINABLE SOLUTIONS MORE VALUE LESS IMPACT

HOW CAN SIKA FLOORING SYSTEMS CONTRIBUTE TO SUSTAINABLE CONSTRUCTION?



## RAW MATERIALS AND PRODUCTION



**Energy and resource efficiency:** Sika provides flooring systems that use less energy and resources by comparison with other technologies and systems.

**Climate protection:** Sika provides flooring systems with a low Global Warming Potential, which means a reduced Carbon Footprint.

## APPLICATION



**Air quality flooring solutions:** Sika provides low Volatile Organic Compound (VOC) and VOC-free flooring solutions, which help to avoid summer smog and improve health and safety conditions during the floor installation process.

## USE AND MAINTENANCE

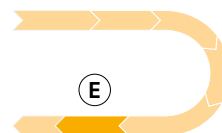


**Air quality:** Sika provides low emission flooring solutions, which fulfill all of the demanding requirements for indoor Air quality in both public and private Buildings. Specific Sika flooring solutions are also produced for Clean Room facilities that have the lowest level of emissions.

**Maintenance:** Sika seamless flooring systems allow better and easier cleaning over time when compared to other flooring materials with grouted joints or with welds.

**Refurbishment:** Sika flooring systems can easily be refurbished to extend their service life, thereby reducing costs, energy and resources compared with other flooring technologies.

## END-OF-LIFE



High performance Sika flooring solutions provide comparatively thin flooring systems, which means that there is less material to be disposed of at the end of life.

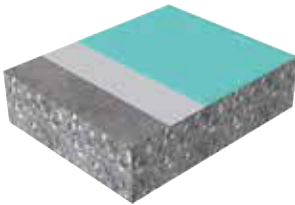
# FLOORING SYSTEMS EVALUATED WITH LCA



## FOR GENERAL MANUFACTURING INDUSTRY

### DESIGN / BUILD-UP

Sikafloor® MultiDur ES-14

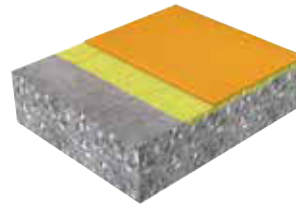


### SYSTEM

Thickness: 0.6 – 0.8 mm  
2 layers  
Products: Sikafloor®-264

### DESIGN / BUILD-UP

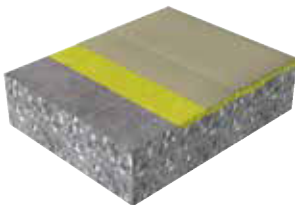
Sikafloor® MultiFlex PS-27



### SYSTEM

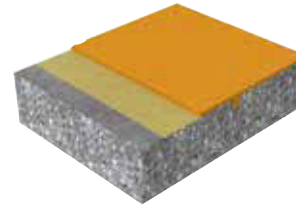
Thickness: 2 mm  
2 layers  
Products:  
Sikafloor®-161  
Sikafloor®-326 + Filler

Sikafloor® MultiDur EB-14



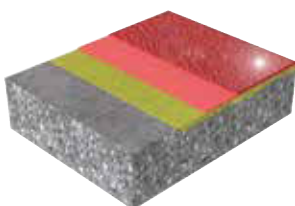
Thickness: 0.6 – 0.8 mm  
3 layers  
Products:  
Sikafloor®-161  
Sikafloor®-264  
with broadcast

Sikafloor® PurCem® HS-24



Thickness: 2 – 4 mm  
2 layers  
Products:  
Sikafloor®-161 with broadcast  
Sikafloor® 24 PurCem®

Sikafloor® MultiDur EB-24



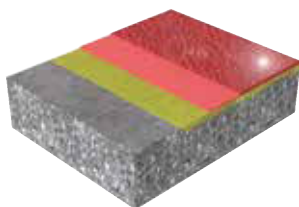
Thickness: 2 – 4 mm  
3 layers  
Products:  
Sikafloor®-161  
Sikafloor®-263 + Filler with  
broadcast  
Sikafloor®-264



## FOR FOOD INDUSTRY: PRODUCTION AND PROCESSING AREAS

### DESIGN / BUILD-UP (DRY AREAS)

Sikafloor® MultiDur EB-24

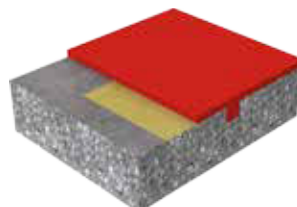


### SYSTEM

Thickness: 2-4 mm  
3 layers  
Products:  
Sikafloor®-161  
Sikafloor®-263 + Filler with  
broadcast  
Sikafloor®-264

### DESIGN / BUILD-UP (DRY AND WET AREAS)

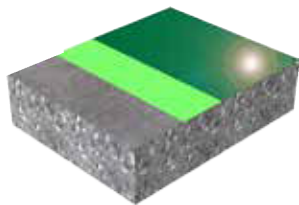
Sikafloor® PurCem® HM-20



### SYSTEM

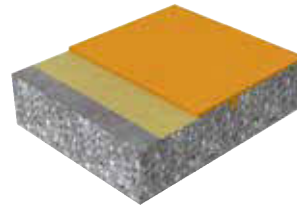
Thickness: 6 mm  
2 layers  
Products:  
Sikafloor®-161 with broadcast  
Sikafloor®-20 PurCem®

Sikafloor® PurCem® HS-26  
Gloss



Thickness: 1.5 mm  
2 layers  
Products:  
Sikafloor®-210  
Sikafloor®-260 PurCem®

Sikafloor® PurCem® HS-21



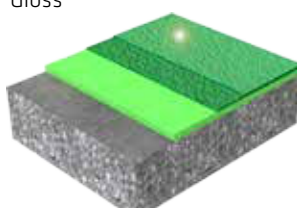
Thickness: 4.5 mm  
2 layers  
Products:  
Sikafloor®-161 with broadcast  
Sikafloor®-21 PurCem®

Heavy duty ceramic tile\*



Thickness: 22 mm  
Products:  
Adhesive: Cement based  
Ceramic tiles, 10 x 15 cm,  
Jointing: epoxy mortar

Sikafloor® PurCem® HB-21  
Gloss



Thickness: 3.5 mm  
3 layers  
Products:  
Sikafloor®-260 PurCem®  
Sikafloor®-260 PurCem®  
with broadcast  
Sikafloor®-310 PurCem®

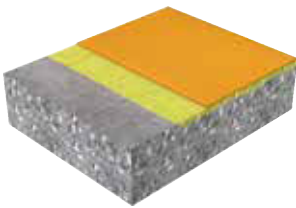
\*Competitor system



## FOR PHARMACEUTICAL INDUSTRY: PRODUCTION AND PROCESSING AREAS

### DESIGN / BUILD-UP

Sikafloor® MultiDur ES-28 EQ

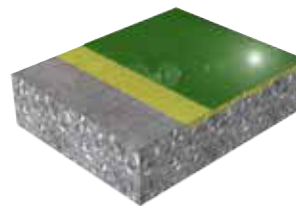


### SYSTEM

Thickness: 2 – 3 mm  
2 layers  
Products:  
Sikafloor®-161  
Sikafloor®-269 CR

### DESIGN / BUILD-UP

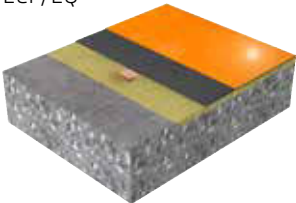
Sikafloor® MultiDur ES-24



### SYSTEM

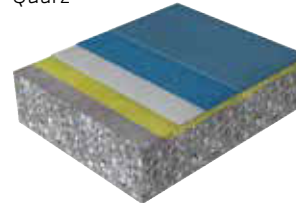
Thickness: 2 – 3 mm  
2 layers  
Products:  
Sikafloor®-161  
Sikafloor®-263 SL + Filler

Sikafloor® MultiDur ES-28 ECF/EQ



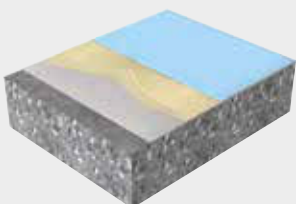
Thickness: 2 mm  
3 layers  
Products:  
Sikafloor®-161  
Sikafloor®-220 W Conductive  
Sikafloor®-269 ECF CR + Filler

Sikafloor® DecoDur EB-26 Quarz



Thickness: 2 – 3 mm  
4 layers  
Products:  
Sikafloor®-161  
Sikafloor®-263 + Filler with broadcast  
Sikafloor®-169  
Sikafloor®-169

Safety PVC (EN 13845)\*



Thickness: 4 – 5 mm  
Products:  
Underlayment:  
cementitious compound 3 mm  
Adhesive: acrylic binder  
Floor covering: Safety PVC (EN 13845)

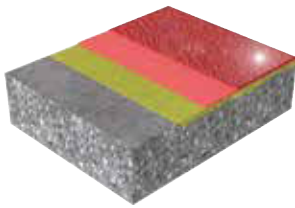
\*Competitor system



## FOR CAR PARK AREAS

### DESIGN / BUILD-UP

Sikafloor® MultiDur EB-24

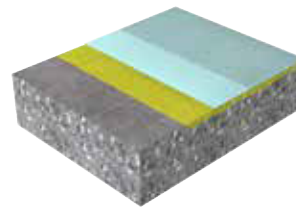


### SYSTEM

Thickness: 2 – 4 mm  
3 layers  
Products:  
Sikafloor®-161  
Sikafloor®-263 SL  
Sikafloor®-264

### DESIGN / BUILD-UP

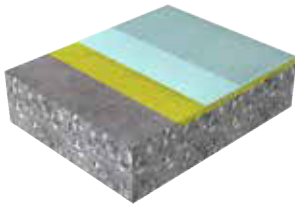
Sikafloor® MultiFlex PB 51 UV



### SYSTEM

Thickness: 3 – 4 mm  
3 layers  
Products:  
Sikafloor®-161  
Sikafloor®-350 N Elastic +  
Filler with broadcast  
Sikafloor®-359 N

Sikafloor® MultiFlex PB-27



Thickness: 2.5 mm  
3 layers  
Products:  
Sikafloor®-161  
Sikafloor®-326  
Seal coat:  
Sikafloor®-357

Asphalt\*



Thickness: ca. 63 – 65 mm  
Products:  
One layer of bitumen sheet  
Two layer of 30 mm bitumen  
asphalt

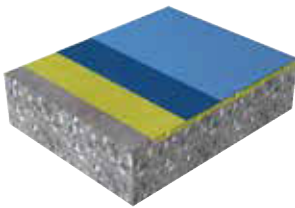
\*Competitor system



## FOR COMMERCIAL AND PUBLIC BUILDINGS

### DESIGN / BUILD-UP

Sika ComfortFloor® PS-23

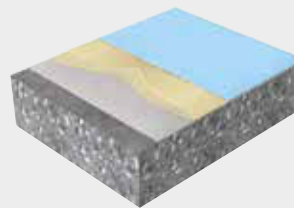


### SYSTEM

Thickness: 2 – 3 mm  
 3 layers  
 Products:  
 Sikafloor®-144/-161  
 Sikafloor®-330  
 Sikafloor®-305 W

### DESIGN / BUILD-UP

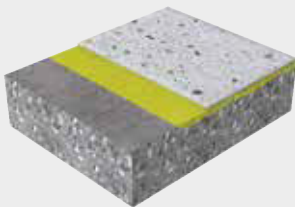
Heterogeneous PVC\*



### SYSTEM

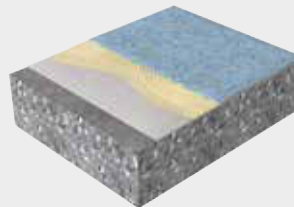
Thickness: 4 – 5 mm  
 Underlayment:  
 cementitious levelling  
 compound 3 mm  
 Adhesive: acrylic binder  
 Floor covering:  
 Heterogeneous PVC  
 (EN 649)

Terrazzo\*



Thickness: 8 – 10 mm  
 Primer: Epoxy  
 Mortar: Epoxy binder 15% +  
 marble aggregate  
 Top sealer: Waterborne PU  
 grouting and pore filler

Linoleum\*



Thickness: 4 – 5 mm  
 Underlayment:  
 cementitious levelling  
 compound 3 mm  
 Adhesive: acrylic binder  
 Floor covering:  
 Linoleum  
 (EN ISO 24011)

\*Competitor system

# LCA RESULTS FOR ENERGY DEMAND

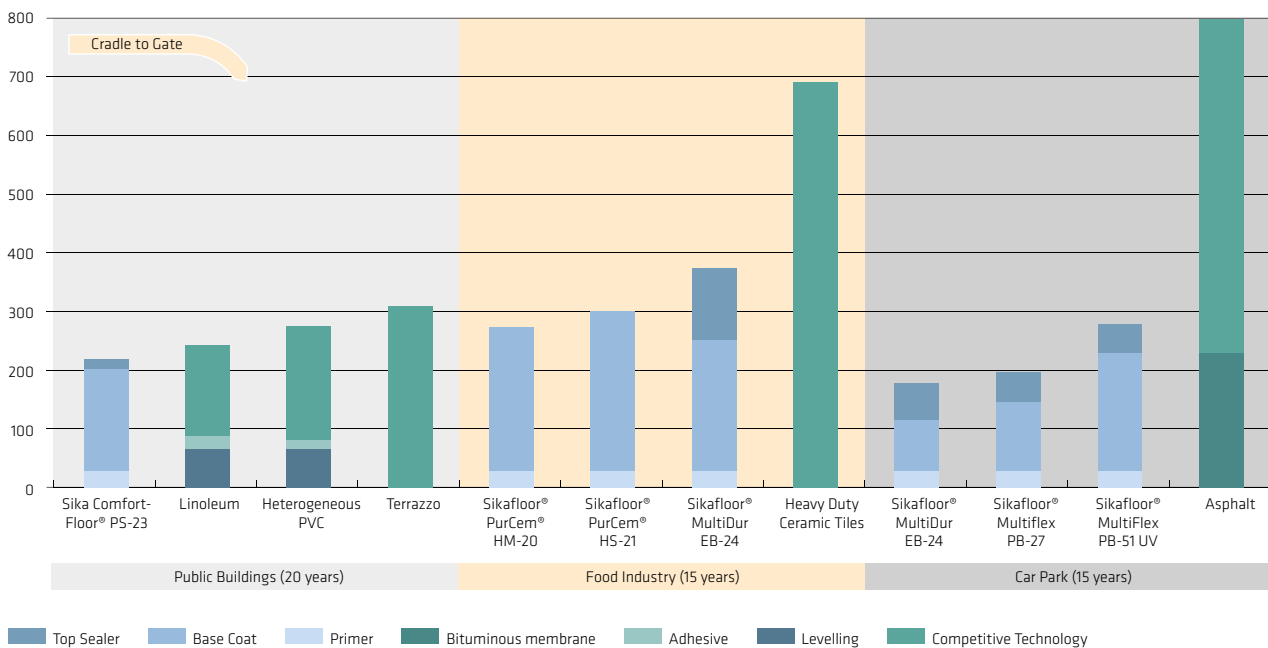
## THE CHALLENGE

### The demand for limited natural resources is increasing.

Worldwide the demand for limited natural resources including oil, coal, natural gas, iron ore and copper is increasing, driven by a growing population and higher spending and purchasing powers. On the other hand, these resources are limited, or their extraction is getting more and more costly. Efficient and intelligent use of limited natural resources is one of the main challenges for future growth.

## LCA RESULTS FOR POPULAR FLOORING SYSTEMS

Cumulative Energy Demand (CED) for 1 m<sup>2</sup> flooring system [MJ/m<sup>2</sup>]



**Note:** Materials for repairs are included where they are required to provide the defined life expectancy (Sika ComfortFloor® PS-23, Sikafloor® MultiDur EB-24)

## SUSTAINABLE SOLUTIONS

You can contribute to saving energy and natural resources by choosing Sika flooring solutions:

### More Value

- Include a wide range of cost effective sustainable flooring systems to match your requirements

### Less impact

- Have the lowest CED of all of the flooring systems compared (energy & resource efficiency solutions).

# LCA RESULTS FOR GLOBAL WARMING POTENTIAL

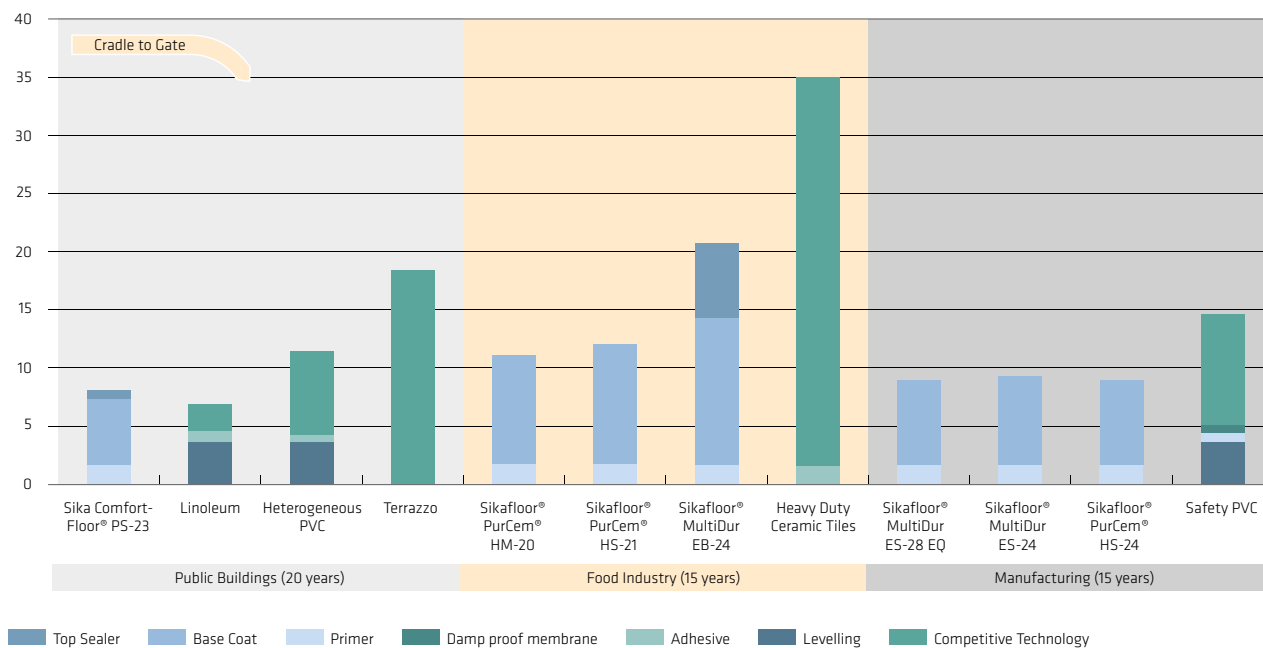
## THE CHALLENGE

### The climate is changing faster than ever before.

The earth's climate is now changing faster than ever before. The consequences are manyfold and affect us all. Climate protection is one of the most important tasks for the future. By 2050 the world will have to reduce its greenhouse gas emissions by 80%. To act now is crucial, because a complete overhaul of currently used energy systems needs to be financed and realized within less than two generations. Decisive action is needed urgently.

## LCA RESULTS FOR POPULAR FLOORING SYSTEMS

Global Warming Potential (GWP) for 1 m<sup>2</sup> flooring system [kg CO<sub>2</sub>-eq./m<sup>2</sup>]



**Note:** Materials for repairs are included where they are required to provide the defined life expectancy (Sika ComfortFloor®, Sikafloor® PS-23 MultiDur EB-24)

## SUSTAINABLE SOLUTIONS

You can contribute to protecting our climate by choosing Sika flooring solutions:

### More Value

- Include a wide range of cost effective sustainable flooring systems to match your requirements
- Provide superior durability, together with additional benefits in the 'Use' phase

### Less impact

- Have a lower GWP when compared with most of the flooring systems compared (Climate protection solutions)



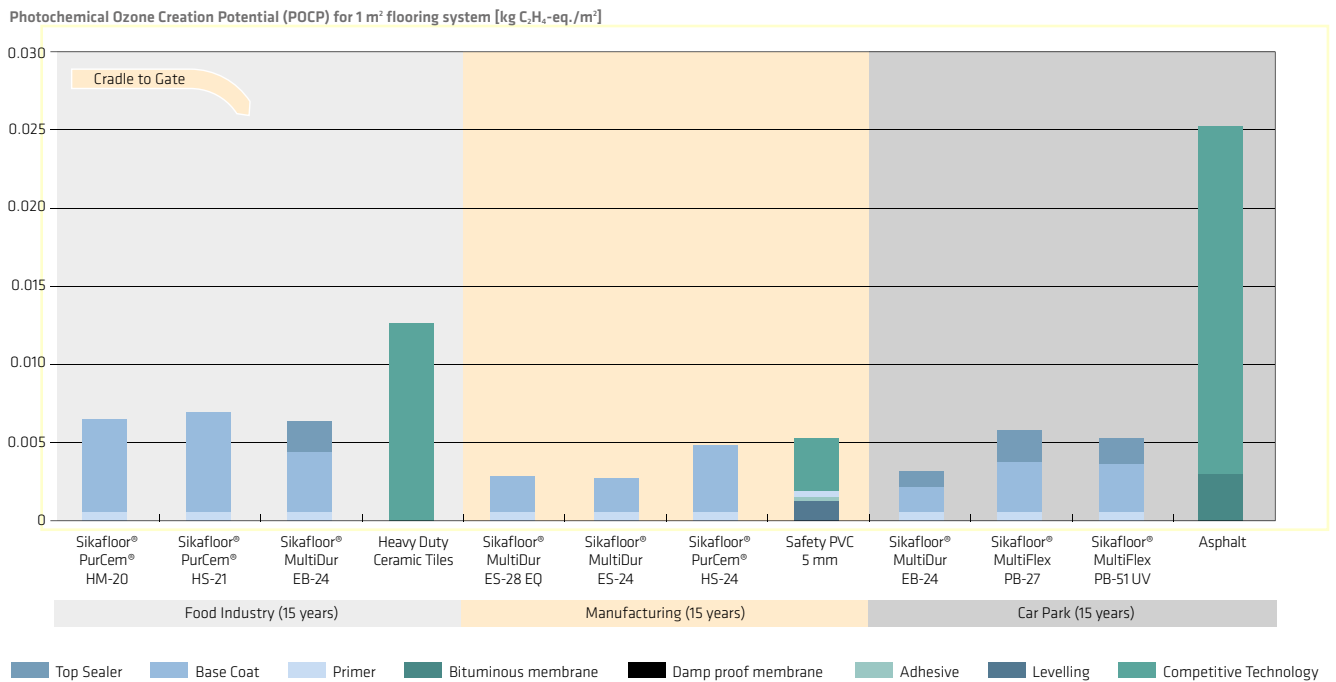
# LCA RESULTS FOR SUMMER SMOG

## THE CHALLENGE

### Improve air quality and maintain a safe environment.

Photochemical Ozone Creation Potential (POCP), or Summer Smog, is the formation of reactive chemical compounds, e.g., ozone, by the action of sunlight on volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>). It is common in large cities, where high amounts of VOC and NO<sub>x</sub> are released (e.g., industrial and automotive emissions), especially during summer when there is more sunlight. Summer Smog may be harmful to human health and ecosystems. The well-being of people and ecosystems needs to be ensured.

## LCA RESULTS FOR POPULAR FLOORING SYSTEMS



**Note:** Materials for repairs are included where they are required to provide the defined life expectancy (Sikafloor® MultiDur EB-24)

## SUSTAINABLE SOLUTIONS

You can contribute to saving energy and natural resources by choosing Sika flooring solutions:

### More Value

- Use VOC free or Low VOC products (e.g. Sikafloor® PurCem®, Sikafloor® MultiDur ES-28 EQ, Sikafloor®-326)

### Less Impact

- Have the lowest POCP of all of the flooring systems compared (Air quality solutions)

# FINDINGS OF EVALUATED FLOORING SYSTEMS

## MORE VALUE LESS IMPACT FROM SIKA FLOORING SYSTEMS



### CLIMATE PROTECTION

Sika flooring systems have a lower Global Warming Potential (GWP) compared to other flooring technologies, for instance:

- For Public Buildings:  
Sika ComfortFloor® systems
- For the Food Industry:  
Sikafloor® PurCem® systems
- For General Manufacturing Industries:  
Sikafloor® MultiDur systems.



### AIR QUALITY

In all markets and applications, Sikafloor® solutions have the lowest Photochemical Ozone Creation Potential than the other flooring technologies available.

You can contribute to preventing Summer Smog by choosing these high performance and low environmental impact Sika flooring systems.



### ENERGY EFFICIENCY

The Sikafloor® systems have a lower Cumulative Energy Demand (CED) than other flooring technologies, for instance:

- For Public Buildings:  
Sika ComfortFloor® systems
- For the Food Industry:  
Sikafloor® PurCem® systems
- For Car Park Decks:  
Liquid applied Sikafloor® systems

You can contribute to saving energy by choosing these high performance and low environmental impact Sika flooring systems.



### RESOURCE EFFICIENCY

- The Sikafloor® solutions for Car Park Decks provide the lowest demand solution in terms of resources, when compared to the traditional thicker deck waterproofing and wearing surface solutions on the market.
- Sikafloor® PurCem® technology provides the optimum solution for high performance in the food industry and many other demanding chemical and heavy mechanical industries.

# SUSTAINABLE SOLUTIONS FOR ALL APPLICATIONS

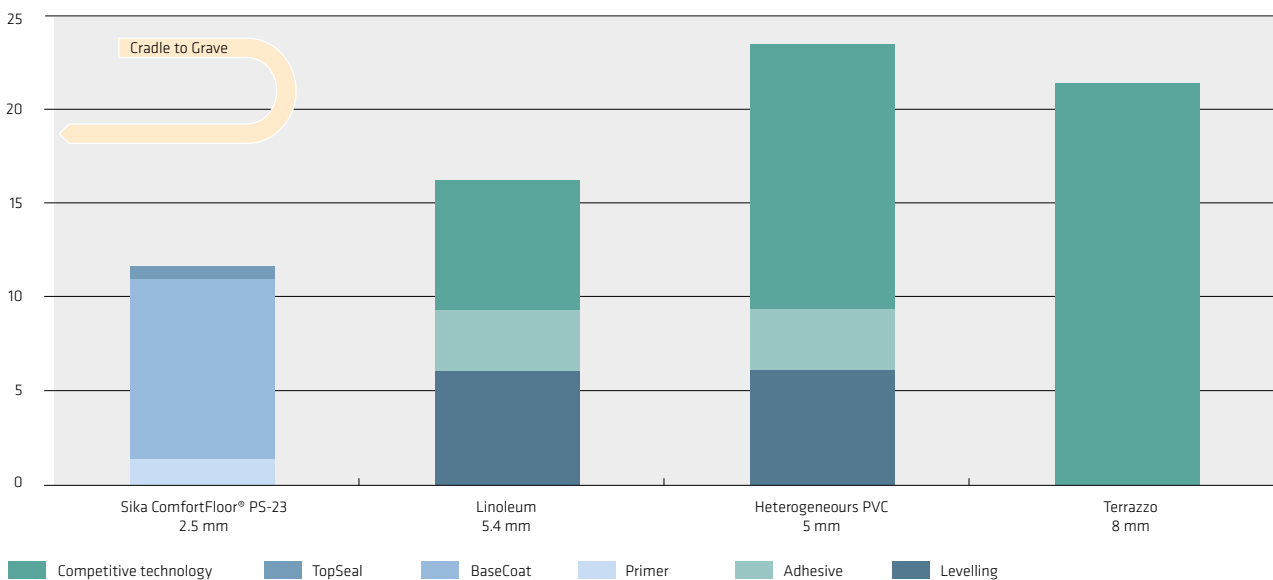


# IMPROVING PUBLIC BUILDINGS CARBON FOOTPRINT

## Sika ComfortFloor® Systems AS SUSTAINABLE ALTERNATIVES

Sika ComfortFloor® systems provide a wide range of solutions that can meet all of your technical requirements. Furthermore Sika ComfortFloor® systems are also a good investment in the long run, due to their ease of maintenance without the need to completely reinstall a new flooring system. The LCA shows that Sika ComfortFloor® systems have a low Carbon Footprint because they do not require any cementitious underlayments nor additional adhesives, they are fully monolithic with the concrete or screed of the building structure.

Global Warming Potential (GWP) [kg CO<sub>2</sub>-eq./m<sup>2</sup>] - Lifespan 20 years



## SUSTAINABLE SOLUTIONS

### More Value

Case study: the Flevomeer Library in the city of Leylstad (The Netherlands) had to be refurbished and upgraded. The choice of a Sika ComfortFloor® such as the Sika ComfortFloor® PS-23 provides an excellent technical and aesthetic solution with a seamless surface that is fully bonded to the substrate. The Sika ComfortFloor® Carbon Footprint is lower than competitive solutions that can also require a damp proof membrane, plus additional levelling compounds and adhesives. The Sika ComfortFloor® systems also eliminate the need for welding.

End-of-Life scenario: Sika ComfortFloor® systems go to landfill at end-of-life, the same as the levelling and adhesive residues from Linoleum and PVC sheets and Terrazzo Systems. The Linoleum and PVC sheets themselves go 20% to landfill and 80% to incineration at their end-of-life (reference: ERFMI).

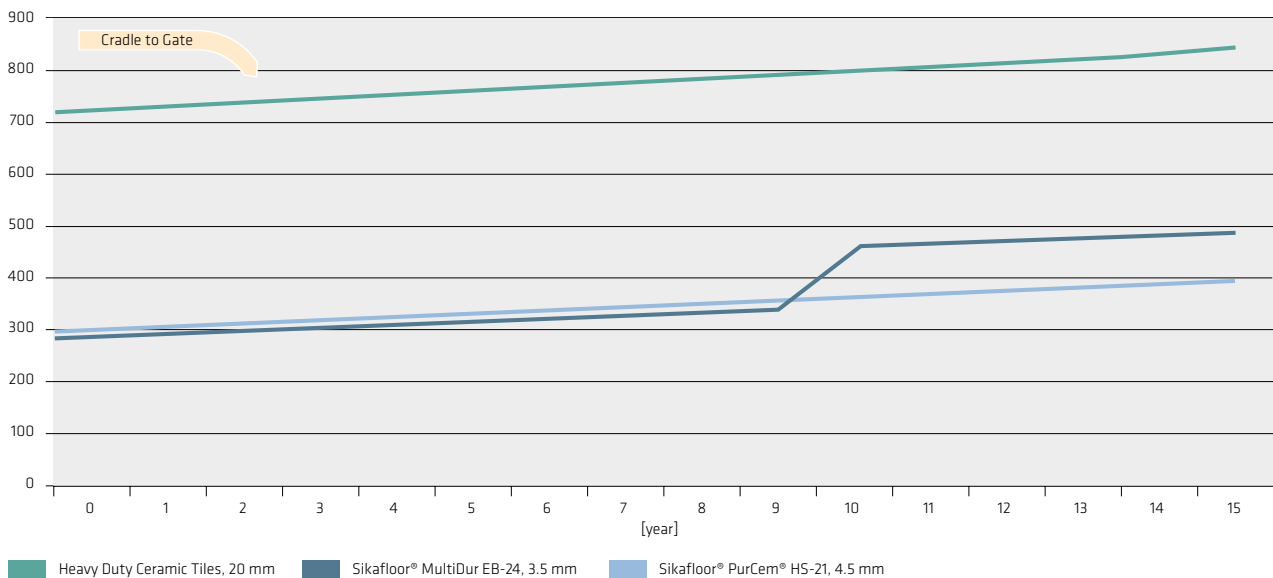


# INVESTING IN A SUSTAINABLE FOOD INDUSTRY FLOOR

## HEAVY DUTY SOLUTIONS FOR THE HIGHEST REQUIREMENTS

The Food and Beverage Industries are amongst the most demanding in terms of the mechanical performance of the floors, plus they require extreme high and low temperature performance with resistance to thermal shock. The durability of a flooring system is a key driver for the performance of a manufacturing plant. Sikafloor® PurCem® solution have been successfully installed around the world for decades and continue to give high performance and seamless surfaces, providing an advantageous solution compared to other flooring solutions such as heavy duty ceramic tiles. With Sikafloor® PurCem®, you get a seamless surface and avoid all joint that may be source of degradation or hygiene risk.

Cumulative Energy Demand (CED) [MJ/m<sup>2</sup>] Lifespan 15 years



## SUSTAINABLE SOLUTIONS

### More Value

Sikafloor® PurCem® has a lower Cumulative Energy Demand (CED) in a life time of 15 years compared to other flooring technologies. For the Sikafloor® PurCem® no refurbishment is needed to prolong its durability in a life time of 15 years, plus it is a solvent-free solution that allows application close to on-going production process areas, enabling the repair and renovation of existing floors without shutting down the plant or production lines. In addition, Sikafloor® PurCem® is an AgBB approved system due to its very low VOC emissions in accordance with ISO standards.

End-of-life scenario: landfill disposal for all systems at end of life. However with tiled floors, there is also an additional 10% volume due to the bedding and jointing material.

Maintenance scenario: cleaning 6 times per week for all systems; water, soap and energy are considered.

Refurbishment scenario with Sikafloor®-263 a retopping with (with shot blasting and recoating) is considered after 10 years.

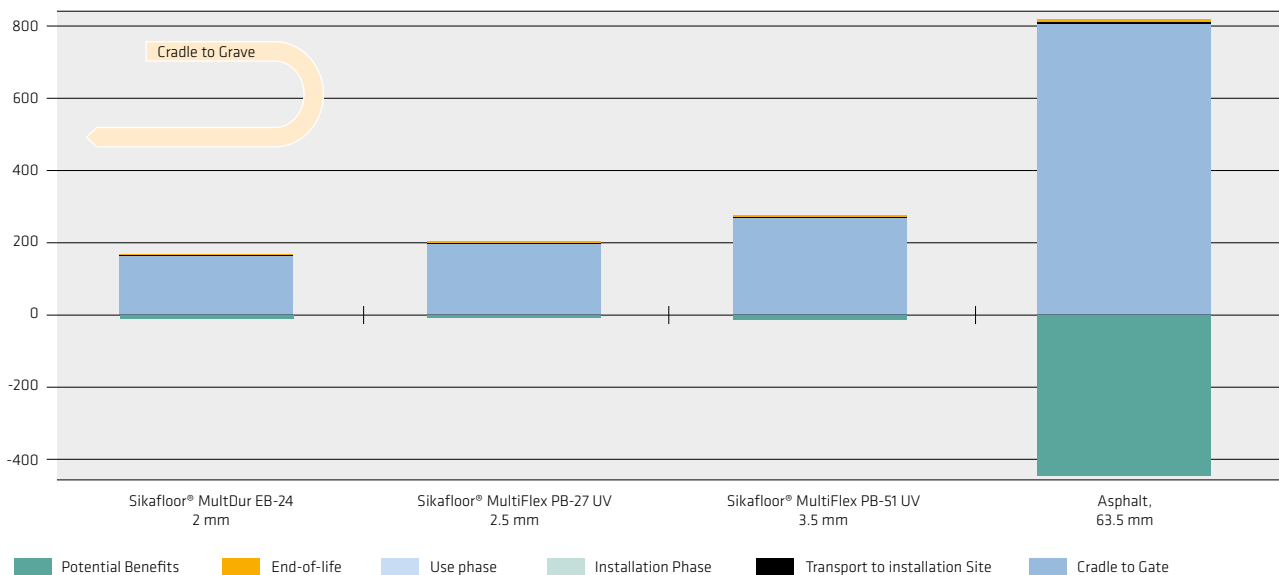


# REDUCING THE ENERGY FOOTPRINT OF CAR PARKING AREAS

## HIGH PERFORMANCE WITH LESS WEIGHT

Sika solutions for car park decks prevent or accommodate all of the various stresses and exposures including thermal variations, atmospheric carbonation, de-icing salts, traffic impact and abrasion, plus deck movement, together with the waterproofing requirements. These solutions with thicknesses of up to only 5 mm of the liquid applied Sikafloor® products, can provide the equivalent performance of traditional solutions, such as asphalt, with a much lower thickness. This means much lower quantities of natural resources and more efficient dimensioning.

Global Warming Potential (GWP) [kg CO<sub>2</sub>-eq./m<sup>2</sup>] - Lifespan 20 years



## SUSTAINABLE SOLUTIONS

### More Value

Case study: given a choice, people always prefer to park in light and bright car parks where they feel that themselves, their car and its contents, will all be safe and secure. Sika's car park decking systems can be designed in any color scheme. For example at Zurich Airport, not only do Sikafloor® systems offer a wider range of color choices, they also have a much lower weight compared to the equivalent black asphalt system, which ultimately has a much lower impact on natural resources. Sikafloor® systems weigh in at a mere 5-9 kg/m<sup>2</sup>, compared to a hefty 150 kg/m<sup>2</sup> of the black asphalt system.

End-of-life scenario: landfill disposal for all systems at end of life. However with tiled floors, there is also an additional 10% volume due to the bedding and jointing material.

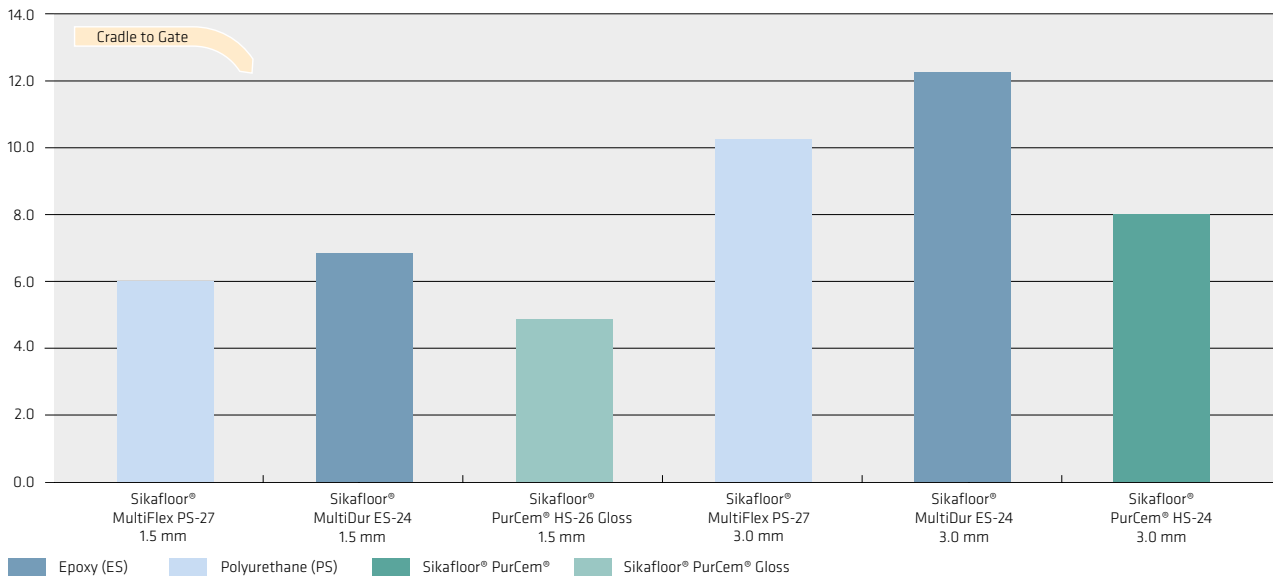


# OPTIMISING THE CARBON FOOT-PRINT OF INDUSTRIAL FLOORS

## INNOVATIVE PURCEM GLOSS TECHNOLOGY FOR A VARIETY OF REQUIREMENTS AND APPLICATIONS

A new series of hybrid flooring systems has been developed, HyCem® PU systems. Within these systems there is the PurCem® Glossy range. This is a family of flooring systems made of polyurethane cement hybrid technology and is part of the Sikafloor® HyCem® PU system range. The main characteristics of the products are moisture tolerance, toughness, wear resistance, glossy appearance, very low VOC emissions (no taint), low “reaction to fire”, and chemical resistance. Application fields for PurCem Glossy systems are: food and beverage industry (dry and wet areas), car parks (ground floor and intermediate decks), industry and logistics (warehouses, chemical plants, machinery), residential and commercial buildings (basements, storages).

Global Warming Potential (GWP) for 1 m<sup>2</sup> flooring system [kg CO<sub>2</sub>-eq./m<sup>2</sup>]



## SUSTAINABLE SOLUTIONS

### More Value

The wide brand of technologies offered by Sika allows you to choose the most suitable solution for specific needs. Sikafloor® ES and PS Systems provide functionality and aesthetic while the Sikafloor® PurCem® and Sikafloor® PurCem® Gloss provide robustness and thermal resistance. The new PurCem® HS-26 Gloss combines high performance and improved aesthetic.



# EXTENDING SERVICE-LIFE OF Sikafloor® SYSTEMS



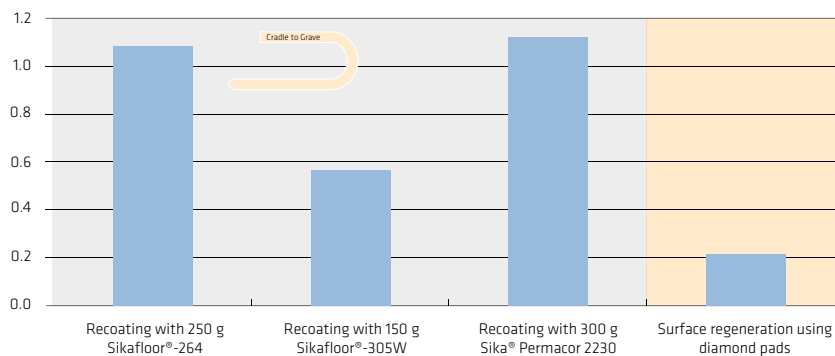
## REGENERATION OF Sikafloor® SOLUTIONS

Sikafloor® solutions have been used for many years in many different industries where high traffic, severe abrasion, impact and shock are daily stresses on the floor. Different techniques are available to regenerate Sikafloor® systems and extend the service-life of the whole floor. These techniques are:

- Recoating with a thin top coating compatible with the original system. This solution provides a brand new surface with the added option of changing the color.
- Refurbishment with diamond grinding pads: This technique is only possible with a thicker layer and smooth floor. The result is a regenerated floor with the removal of existing surface damage, and the floor retains its original color.



Global Warming Potential (GWP) [kg CO<sub>2</sub>-eq./m<sup>2</sup>] – one regeneration



## SUSTAINABLE SOLUTIONS

### More Value

Case study: an epoxy based Sikafloor® self-levelling system was applied in 2004 at a chemical plant in Stuttgart, Germany. The continuous activity of the work area prevented any cleaning of the floor. In 2011, regeneration of the floor surface was made using Diamond Grinding Pads, without detergents. As a result, the original Sikafloor® system was restored to the same glossy surface as a new system. A thin coating of Sikafloor®-305W would have given limited improvement, and alternatively again a new layer of Sikafloor®-264 would have been the solution of choice if aesthetics were the most important criteria.





# VOLATILE ORGANIC COMPOUNDS IN FLOORING



## SIKA'S RESPONSABILITY FOR HEALTH AND ENVIRONMENT

### WHAT ARE VOC'S

VOC is the standard abbreviation for 'Volatile Organic Compound', a chemical with a significant vapor pressure. VOC's can frequently have a potential long term health impact and may also have an adverse effect on the environment. Sika pursues continuous development to minimize the VOC content in Sikafloor® systems.

### VOC CONTENT

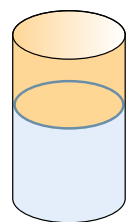
Legal regulations are used when setting the limit values of VOC content in products for reducing total emissions during the life-cycle of a product, and for minimizing any contribution to the generation of ground level ozone. Limit values are usually applied to paints, coatings, varnishes, adhesives and sealants. Regulations include:

- European Decopaint Directive (2004/42/EC)
- US Classifications (i.e. SCAQMD)
- German Standards (TRGS 613)

The VOC content is measured in the liquid material as supplied and is usually given as grams of VOC per liter of product. For example, the European Directive limits the VOC content to a maximum of 500g/l for several categories.

The quantity of defined VOC in the formulation of a flooring system is therefore another important selection criteria for many 'Green' building councils programs around the world, such as LEED in the USA and Green Star in Australia.

< 500 g/l



VOC Content

## SUSTAINABLE SOLUTIONS

### More Value

All Sikafloor® systems are developed in order to comply with the respective limits and typically to exceed the different local requirements. Additionally the European "Decopaint" Directive (2004/42/EC) also limits the total content of VOC's in Sikafloor® systems in order to reduce the generation of ground level ozone.

# INITIATIVES FOR GOOD INDOOR AIR QUALITY



## Sikafloor® SYSTEMS FULLFILL HIGH STANDARDS

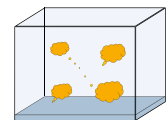
### VOC EMISSION

Almost any materials can emit VOC's. A well-known example is the VOC emission of resinous woods that consist mainly of aldehydes and terpenes, which also result in the classic wood odor. In order to provide a healthy environment and good indoor air quality, the VOC emissions of construction materials are strictly controlled. The limits are given as milligrams of VOC's per m<sup>3</sup>. For example, the German scheme AgBB, limits the total VOC emissions of a flooring system to less than 1 mg/m<sup>3</sup>.

Controlling the quality of indoor air has recently become a more major concern, as modern energy efficient buildings are characterized by increased insulation and reduced ventilation. Both of these measures combine to result in a decreased air exchange rate.

All Green Building Certification Programs (i.e. LEED, BREEAM, HQE, DGNB) now include Indoor Air Quality as a parameter for excellence in new building construction.

< 1 mg/m<sup>3</sup>



VOC Emission

### Governmental initiative to reduce VOC emission \*

Germany	DIBt/AgBB
France	Emission dans l'air interieur
EU	Future new CE
US	Formaldehyde (not applicable for Sikafloor®)
Japan	Guide Lines from the Ministry of Health and Welfare
Belgium	Regulation of VOC emission

\*Usually health and environment driven Governments and their agencies

### Voluntary initiatives from manufacturers associations and other organizations

Europe	United States of America
Emicode (Germany) *	California CDPH "Section 01350",
GUT (Germany) *	ANSI/BIFMA X7-1/M7.1/level
AFSSET (France)	Floorscore *, CRI Green Label Plus
M1 (Finland)	Indoor Advantage, Greenguard
Blue Angel (Germany) *	SCAQMD Rule 1113

\*not relevant for Sikafloor® products

## SUSTAINABLE SOLUTIONS

### More Value

Many Sikafloor® systems and products are fully tested and approved according to these different initiatives including: AgBB in Germany, mandatory labelling in France, plus the Japanese Ministry guidelines. Please contact your local Sika Technical Services Department for the relevant emission certificates. In addition Sikafloor® systems based on epoxy resins and polyurethane resins do not contain any formaldehyde and in many cases meet the highest standards in terms of very low emission flooring solutions.



## Sika ComfortFloor® SYSTEMS CREATE A GOOD INDOOR AIR QUALITY IN PUBLIC BUILDINGS

The different Sika ComfortFloor® systems passed the highly demanding emission tests to AgBB that follow the latest German requirements and limitations.

These systems:

- Sika ComfortFloor® PS-23 System
- Sika ComfortFloor® PS-24
- Sika ComfortFloor® PS-25
- Sika ComfortFloor® PS-26

are also certified to many other requirements including the French AFFSETT and the American California Department of Health Services 01350.

### AgBB certification

Requirements – limit emissions on samples stored in the test chamber for 3 & 28 days



3 day test representative of building renovation with early reoccupancy

- Prohibits high initial VOC emissions
- Absence of Carcinogens



28 day test representative of long term emissions

- Total volatile and semi volatile organic compounds (TVOC, SVOC) at 28 days
- Absence of carcinogens



Sika ComfortFloor® systems are AgBB approved

## SUSTAINABLE SOLUTIONS

### More Value

Case Study: most people spend more than 80% of their time in an indoor environment including: in their home, office, factory, in transport hubs such as airports, or in schools and hospitals etc. Therefore many people are now concerned about the indoor air quality in public buildings. When the choice of flooring for an indoor space is of such importance, Sika ComfortFloor® is the first choice for a flooring solution; as it is approved by AgBB, which is one of the most stringent initiatives in terms of indoor air quality today.



## SIKA HAS EXPERTISE IN LOW EMISSION Sikafloor® SYSTEMS GLOBALLY

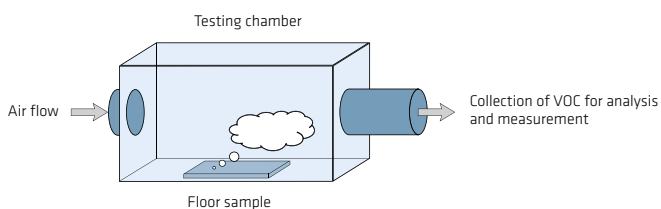
For the development of Low VOC and Ultra Low VOC emission flooring systems, Sika invested in an Emissions Technology Center within the Corporate Analytical Services section of our Research and Development Department. This is equipped to make emissions measurements using the latest techniques and equipment, including many different types of test chambers. The Emissions Technology Center is familiar with all of the main VOC assessment schemes and is also able to adapt or develop emissions measurements according to our customer's needs. All Sikafloor® systems have therefore been fully tested regarding their emission rates which are continuously observed and monitored.

### PRINCIPLES OF EMISSION TESTING

Measuring VOC emissions is commonly undertaken using the chamber method. This method has 4 steps:

- Preparation of the sample
- Position the sample in a ventilated test chamber
- Collection of the VOC's in a specific tube
- Analysis and measurement of the type and quantity of the VOC's
- Assessment of the results according to the respective scheme.

The product can then be classified



### Different test methods around the world

	Part 3: Aldehydes
	Part 6: VOC and TVOC (Total VOC's)
ISO 16000*	Part 9: The chamber test
	Part 10: The FLEC test:
	Part 11: Test specimen
	Part 25: Micro chamber method

New CEN standard for CE marking

EN 717-1 for Formaldehydes \*

US California, CA section 01350 \*

Japanese JIS A 1901 \*

\*chamber test method

## SUSTAINABLE SOLUTIONS

### More Value

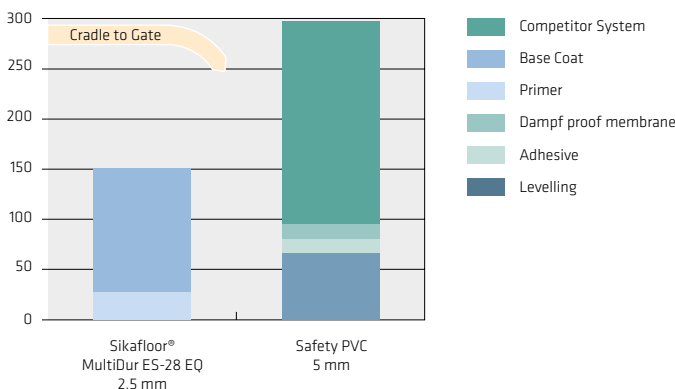
Sikafloor® solutions for Low VOC and Ultra Low VOC emissions have all been tested in the Emissions Technology Center prior to their introduction on the market. However the standards and regulations are continuously evolving, so please contact your local Sika Technical Services Department for the latest VOC emission test certificates for Sikafloor® systems.



## PROTECTING CRITICAL CLEANROOM ENVIRONMENTS WITH LOW EMISSION SYSTEMS

In recent years Sika has developed advanced new flooring, wall and joint sealing solutions specifically for cleanroom environments. Manufacturing under cleanroom conditions is becoming increasingly widespread and ever more demanding with regards to VOC emissions, plus limiting AMC's (Airborne Molecular Contaminants) and particle emissions. These seamless Sikafloor® solutions do not require welding or adhesives, which also results in a limited number of constituents. As a consequence, the Sikafloor® Clean Room Systems also limit the number of possible sources for emissions and particles. The latest list of Sika Cleanroom Suitable systems and products is available at <http://tested-device.com/>. At the date of publication these also include wall coating solutions: Sikafloor® MultiDur ES-28 EQ wall coating, Sikagard® Wall Coat N and the joint sealant Sikaflex® PRO-3 (using Sika's i-cure technology).

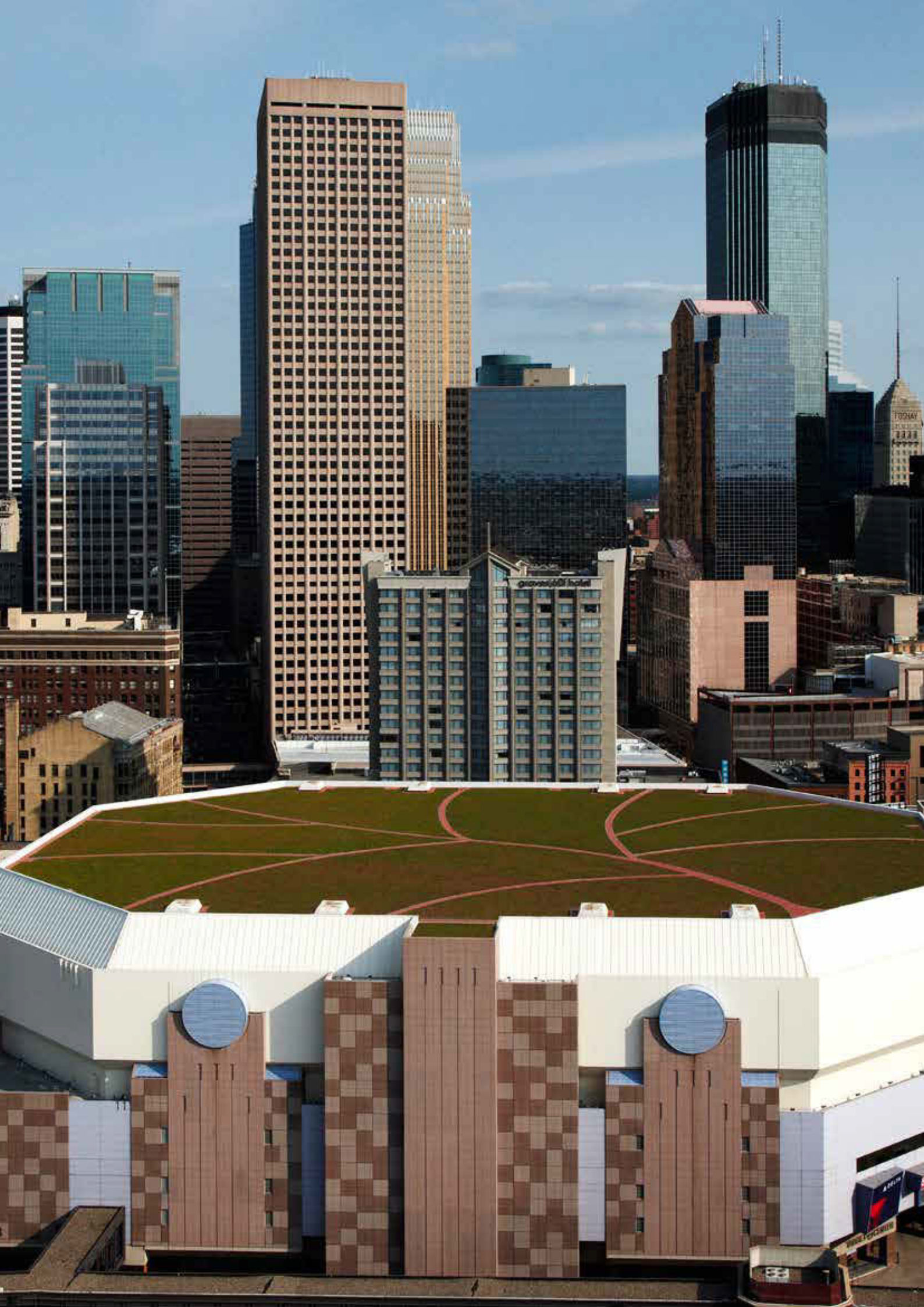
Cumulative Energy Demand (CED) [MJ/m<sup>2</sup>]



## SUSTAINABLE SOLUTIONS

### Less Impact

Case Study: Sikafloor® MultiDur ES-28 EQ is designed for high tech cleanroom environments. It has the lowest classification for emission of VOC's and can also be used in environments where Airborne Molecular Contamination (AMC) is a critical selection factor for the flooring system. In comparison with Safety PVC vinyl sheet flooring (to EN 13845), this Sikafloor® system does not require any adhesive or levelling compound. The Cumulative Energy Demand CED of the Sikafloor® MultiDur ES-28 EQ is therefore considerably reduced by comparison.



# MAIN GLOBAL 'GREEN BUILDING' CERTIFICATION PROGRAMS

**Over recent years**, several countries and organizations have developed environmental certification programs for buildings. Practical experiences together with their new findings have led to continuing adaptation and extensions of these programs. The criteria for the different programs are similar, whilst the evaluation can still differ substantially. Most Green Building Certification Programs focus on assessing whole buildings, rather than individual building systems or products. However requirements for individual product categories are included in several of the programs (e.g. VOC content, VC emissions, acoustic / noise reduction, visual aesthetics, etc.). LCA's can accurately characterize products and systems in terms of their sustainability performance. For specific information regarding these Certification Programs, please contact your local Sika Company.

## **LEED (Leadership in Energy and Environmental Design)**

[www.usgbc.org/LEED](http://www.usgbc.org/LEED)

LEED is now the world's best known and largest 'Green Building' certification system. It was developed in 2000 by the USGBC (US Green Building Council) and is most relevant for North America, but is also used in many other regions around the world, such as South America, Europe and Asia. It is based on a set of rating systems where specific topics are assessed, such as transportation, recycled content, etc., however the LEED program is not currently LCA based.

## **Green Globes**

[www.greenglobes.com](http://www.greenglobes.com)

The Green Globes system is based on BREEAM and was created in 1996. It is used in Canada, operated by the Building Owners and Managers Association of Canada (BOMA) and Energy and Environment Canada Ltd. (ECD), and also in the USA, where it is operated by the Green Building Initiative (GBI). In the Green Globes system for the Design of New Buildings, points are given in the resource section for conducting a LCA of building assemblies and materials.

## **BREEAM (BRE Environmental Assessment Method)**

[www.breeam.org](http://www.breeam.org)

BREEAM is an environmental assessment method and rating system for buildings, launched in 1990 by the UK organization BRE (Building Research Establishment). It is also used in other countries such as Netherlands and Spain. BREEAM assesses the overall performance of buildings using factors such as energy and water use, the internal environment (health and well-being), pollution, transport, materials etc., awarding credits in each area according to defined performance criteria. The environmental impact is determined using LCA's.

## **DGNB Certification System**

### **(Deutsches Gütesiegel für Nachhaltiges Bauen)**

[www.dgnb.de](http://www.dgnb.de)

The DGNB Certification System was developed by the German Sustainable Building Council (DGNB) and the German Government in 2009 and several country adaptations are currently in preparation. This is based on criteria for six areas, including Ecological Quality, Economical Quality and Technical Quality. For the Ecological Quality topic, LCA data is required. As a basis for data communication, Environmental Product Declarations (EPD's) are used.

## **HQE (Haute Qualité Environnementale)**

[www.assohqe.org](http://www.assohqe.org)

The HQE is the French environmental quality management approach for construction, developed in 1994 and controlled by the Association for High Environmental Quality (ASSOHQE). The HQE certification is based on 14 target areas grouped in four themes: environmental construction, environmental management, comfort and health. The choice of construction products and materials is based on Environmental Product Declaration (EPD's) that include LCA data.

## **CASBEE (Comprehensive Assessment System for Building Environmental Efficiency)**

[www.ibec.or.jp/CASBEE/english](http://www.ibec.or.jp/CASBEE/english)

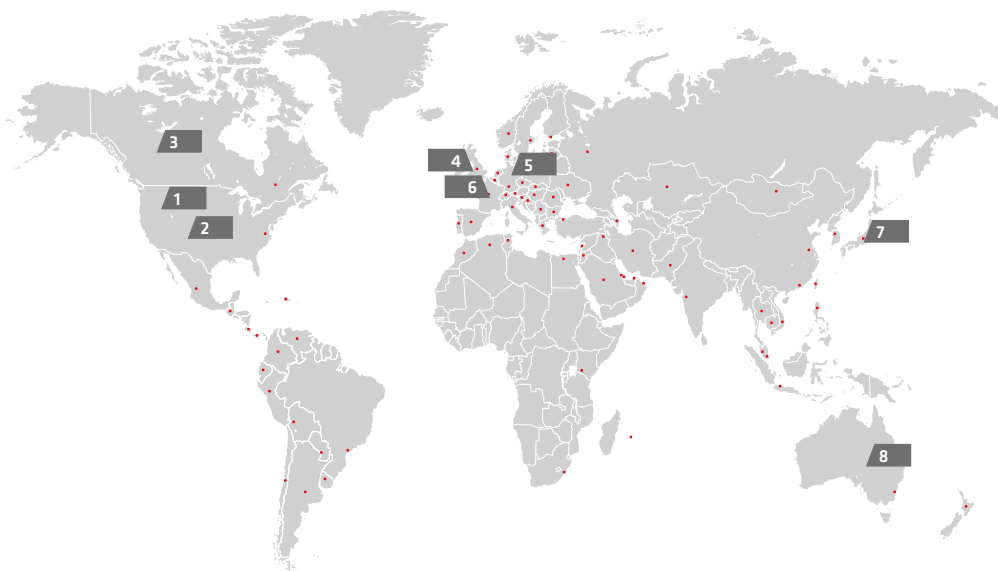
The CASBEE is the Japanese tool for assessing and rating the environmental performance of buildings. It was created in 2001 by the Japan Sustainable Building Consortium (JSBC) and measures the ratio between the Building Environmental Quality & Performance (e.g., thermal comfort) and the Building Environmental Loads (e.g. energy efficiency, global warming). LCA are used to determine quantitative assessment indicators for typical building and environmental loads.

## **Green Star**

[www.gbca.org.au/green-star](http://www.gbca.org.au/green-star)

The Green Star environmental rating system for buildings was developed in 2003 by the Green Building Council of Australia (GBCA), based on LEED and BREEAM. It is the leading system in Australia, South Africa and New Zealand. Green Star assesses a project's environmental performance against nine environmental impact categories. It encourages the use of materials that fulfill environmental best practice, but does not have a real inclusion of LCA's.





- 1 LEED, USA
- 2 Green Globes, USA
- 3 Green Globes, Canada
- 4 BREEAM, UK
- 5 DGNB, Germany
- 6 HQE, France
- 7 CASBEE, Japan
- 8 Green Star, Australia

#### How can Sika Flooring Systems contribute towards your Green Building Certification rating?

Sika flooring solutions contribute to multiple points in most Green Building Certification programs. This is done by: choosing Sikafloor® solutions that comply with indoor air quality standards, controlling the emission of VOC's with Sika solutions for public buildings and industry using Sika ComfortFloor® solutions that reduce noise impact in the building, and enhancing the aesthetics of a building with decorative and colored Sikafloor® systems for buildings and Sikafloor® car park deck solutions.

#### How can Sika Flooring Systems contribute to your LEED 2009 Certification?

Sika ComfortFloor® systems can contribute to credit points in LEED program.

Sika ComfortFloor® Systems have passed the California Department of Health Services 01350 Small Chamber Emission Test, one of the most stringent emissions tests in the US market. Passing this test is considered an acceptable fulfilment of the requirement of LEED Low Emitting Material IEQ 4.3.(Low Emission material in the Flooring systems category).

- Indoor Environmental Quality Credit 4.1: adhesives - 1 point
  - Indoor Environmental Quality Credit 4.2: coatings - 1 point
- For further information, please visit: <http://usa.sika.com>

#### How can Sika Flooring Systems contribute to your BREEAM 2011 Certification?

Materials Credit 01: EPD - 1 point

Health and Wellbeing (Hea 02): adhesives - 1 point

For further information, please visit: <http://www.sika.co.uk>

#### How can Sika Flooring Systems contribute to your DGNB Certification?

For further details, please contact Sika Germany or visit: [www.sika.de](http://www.sika.de)

#### How can Sika Flooring Systems contribute to your CASBEE rating?

For further details, please contact Sika Japan or visit:

<http://jpn.sika.com>

Sika ComfortFloor® systems can assist HQE certification in the different target areas:

- Visual comfort, because of the Aesthetic possibilities of Sika ComfortFloor®
- Acoustic Comfort with Sika ComfortFloor® Pro and Sika ComfortFloor® Decorative Pro
- Air quality control for all 4 systems

All certified Sikafloor systems with low VOC emissions can assist the HQE certification for air quality control.

For further details, please contact Sika France or visit:

[www.sika.fr](http://www.sika.fr)

#### How can Sika Flooring Systems contribute to your Green Globes rating?

For further details, please contact Sika Inc. or visit:

<http://usa.sika.com>

#### How can Sika Flooring Systems contribute to your Green Star rating?

Sikafloor® systems can assist in the Green Star program category for flooring in office Interiors, education and healthcare buildings and multi-unit residential developments. The assessment is project based with relevant materials calculations.

For further details, please contact Sika Australia or visit:

[www.sika.com.au](http://www.sika.com.au)

# SIKA SUSTAINABLE SOLUTIONS

Flooring systems contribute to sustainable construction

## PUBLIC BUILDINGS

**INSTALL SikaFloor® SYSTEMS THAT MEET YOUR AESTHETIC AND TECHNICAL REQUIREMENTS**



### More Value

- Sika ComfortFloor® provides high quality of life with an excellent acoustic performance and freedom of design.
- Sika ComfortFloor® is robust and fully bonded to the concrete creating a monolithic floor.
- Sika ComfortFloor® is biologically resistant and withstands the impacts of cleaning and use of detergents and disinfectants.
- Sika ComfortFloor® contributes to points in various green building programs.

### Less Impact

- Sika ComfortFloor® has a lower carbon footprint since it does not need any cementitious underlayment.
- Sika ComfortFloor® does not need any adhesive.
- Sika ComfortFloor® is easy to clean as it is seamless.

## FOOD INDUSTRY

**DESIGN AN INDUSTRIAL FLOOR THAT WILL LAST**



### More Value

- SikaFloor® PurCem® has a high resistance against chemical, mechanical and thermal attack.
- SikaFloor® PurCem® contributes to points in various green building programs.

### Less Impact

- SikaFloor® PurCem® installed in thickness above 6 mm has superior thermal resistance.
- SikaFloor® PurCem® has a seamless surface that requires less cleaning and maintenance which therefore requires less energy and less cleaning materials.
- The new Sika® PurCem® Gloss has a lower carbon footprint compared to other thin competitive technologies.

## CLEANROOM ENVIRONMENTS

**SELECT AN APPROVED Sikafloor®  
“CLEANROOM SUITABLE MATERIAL”**



### More Value

- With the Sikafloor® CR (cleanroom) there is no need for additional adhesive, underlayment, or damp-proof membranes.
- Sikafloor® CR is seamless - with no joints and no welding.
- The Sikafloor CR contributes to various green building programs.
- Sika offers a full range of flooring, coatings and sealants solutions for clean rooms: Sikafloor®, Sikagard® and Sikaflex®.

### Less Impact

- Sikafloor®, Sikagard® and Sikaflex® CSM (clean room suitable material) systems are very low in airborne molecular contamination to provide the cleanest air quality for clean rooms.
- Sikafloor® CR has a lower energy demand compared to competitive safety PVC solutions.

## CAR PARKING AREAS

**SELECT LIGHTWEIGHT MATERIALS FOR YOUR BUILDING**



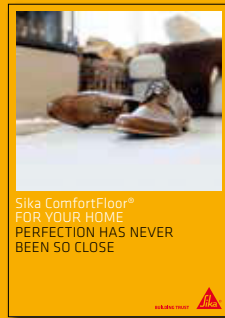
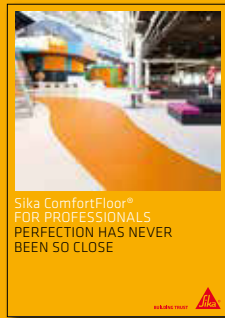
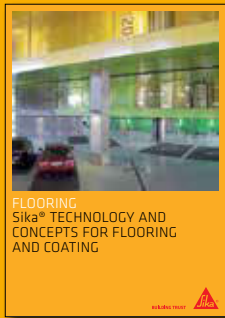
### More Value

- Sikafloor® has an excellent aesthetic appearance.
- Sikafloor® is easier to clean and maintain compared with asphalt.
- Sikafloor® provides protection for the concrete and prevents the ingress of water and chloride.
- Sikafloor® contributes to points in various green building programs.

### Less Impact

- Sikafloor® contributes with lower weight to the structure compared with asphalt.
- Sikafloor® has lower energy and resource demand during the installation phase compared with asphalt.

# ALSO AVAILABLE FROM SIKA



## FOR MORE INFORMATION:



### WE ARE SIKA

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry. Sika's product lines feature concrete admixtures, mortars, sealants and adhesives, structural strengthening systems, flooring as well as roofing and waterproofing systems.

Our most current General Sales Conditions shall apply. Please consult the most current local Product Data Sheet prior to any use.



**SIKA SERVICES AG**  
Tüfenwies 16  
CH-8048 Zürich  
Switzerland

**Contact**  
Phone +41 58 436 40 40  
Fax +41 58 436 41 50  
www.sika.com