



Waterproofing of Structures with Sika[®] Technologies



Innovation & since
Consistency | 1910



About Us

Sika is a world leader in the manufacture of specialist products for construction and industry. Founded in Switzerland in 1910, today Sika is a global company with more than 100 production and marketing companies operating in over 70 countries worldwide.

With a commitment to innovation, Sika are constantly striving for new levels of excellence through a large scale, on-going research and development programme, Sika continues to be at the forefront of product development.

Supporting these product developments are a market leading range of services. These include:

- A technical advisory department, on-site support and after sales service
- Detailed assessment of project and performance criteria
- NBS specification clauses
- A registered contractor scheme
- Comprehensive training, material data sheets, installation guidelines, health & safety information and, where appropriate, maintenance schedules
- The Sika Training Academy, to ensure internal staff, contractors, clients and specifiers have a full understanding of systems

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Keeping Water OUT

Keeping Water IN



Museum basement



Basement car park



Nightclub basement



Effluent tanks



Clean water reservoir



Swimming pools

Waterproof Facilities

Basements and underground structures are being made watertight to maximise the usable footprint of a building or to facilitate infrastructure. With over 100 years of experience in the waterproofing sector, Sika offer long-term solutions that can optimise space whilst giving peace of mind for the following applications:

- Basements
- Car parking
- Underground stations
- Subways
- Pavement vaults
- Cellars
- Tunnels

For Water Retaining Structures

With our resources becoming more precious and the increase of environmental legislation, the need to retain water within structures is just as important as keeping water out. Sika Limited have developed a full range of products to facilitate the refurbishment or construction of such structures including:

- Reservoirs
- Waste water treatment plants
- Containment bunds
- Swimming pools
- Sewers and pipes
- Ponds



BS 8102 Standards and Test Methods

Code of Practice for the Protection of Below Ground Structures Against Water from the Ground



Grade 1-3 of Waterproofing protection as described in BS8102:2009

Grade 1	<p>Basic Utility Performance Some seepage and damp patches tolerable</p>	<p>Typical usage</p> <ul style="list-style-type: none"> ■ Basic storage ■ Underground parking garages ■ Plant rooms (excluding electrical equipment)
Grade 2	<p>Better Utility Performance No water penetration but moisture vapour tolerable</p>	<p>Typical usage</p> <ul style="list-style-type: none"> ■ Retail storage areas ■ Plant rooms and workshops requiring drier environment with electrical equipment in the area
Grade 3	<p>Habitable Performance Dry environment – ventilated</p>	<p>Typical usage</p> <ul style="list-style-type: none"> ■ Residential and commercial areas, offices, restaurants ■ Leisure centres, gymnasiums

Typical additional Performance Requirements

- Chemically resistant surfaces
- Freeze/thaw/de-icing salt resistant surfaces
- Waste water resistant surfaces
- Hygienic and easy to clean surfaces
- Approved for contact with drinking water
- Crack-bridging capabilities

Sika® Systems

Waterproofing of below ground structures and water retaining structures can only be achieved by careful design, the right choice of waterproofing materials plus professional workmanship with quality control on site. Sika Limited have a comprehensive range of solutions to meet the different waterproofing types detailed in BS 8102 - 2009, these include:

		Description
Renders	Sika®-1 Pre-bagged Waterproofing System	Pre-bagged mortars to which is added the Sika®-1 guaging solution. BBA approved - cert no 00/3761.
Slurry	Sika® Damp-proofing Slurry	2-component polymer modified waterproofing slurry.
Water Management	Sika® Cavity Drainage Systems	A range of membranes for managing and controlling water ingress within the structure. BBA approved.
Admixture	Sika® Watertight Concrete	BBA approved - cert no 08/4606
Joint Sealing	Sikadur®-Combiflex®	Elastic jointing systems for sealing movement and construction joints.
	SikaSwell®-S	Hydrophilic swelling joint profiles.
Injection	Sika® Injection range	Solution for remedial waterproofing of leaning structures.
Water plugs	Sika®-4a	Admixture to cement to form fast curing water plugs.



Waterproofing System - Sika®-1 Pre-bagged



Introduction

The Sika®-1 Pre-Bagged Waterproofing System fully protects above and below ground structures from water ingress, eliminating the need for the maintenance of any internal drainage or pumping system associated with some other solutions.

Suitable for virtually any application, the system provides an effective water-tight seal for structures that must keep water out (basements, underground car parks, etc) and structures that must retain liquid (swimming pools, water tanks, etc.)

The key ingredient is the Sika®-1 admixture. Mixed with pre-bagged mortars, this colloidal silicate liquid reacts to moisture and turns to a jelly-like substance – blocking all gaps and capillaries for an impenetrable seal that lasts the structure's lifetime.



Sika®-1

Sika®-1 Pre-Bagged Waterproofing System can be combined with a range of complementary products for a comprehensive watertight solution. Sika®-1 Pre-bagged waterproofing range consists of a render system for use on walls and overhead and a screed system for use on the floor. This requires the bagged mortars to be mixed with a gauging liquid of Sika®-1 Liquid Admixture. The Sika®-1 admixture is colloidal silicate based and reacts with moisture, turning to a jelly-like substance. Thus, blocking all gaps and capillaries for an impenetrable seal that lasts the structures lifetime.

Render system consists of a minimum three coats each 6mm thick comprising
Sika 1 Spritz Mortar
Sika 1 Render Mortar
Sika 1 Finish Mortar

Screed system consists of three coats to a minimum build up of 30mm comprising of
2 coats Sika 1 Spritz Mortar
1 coat Sika 1 Screed Mortar

The finish Sika 1 Pre-bagged waterproofing system gives a hard durable finish to which the additional finishes may be applied.

Sikadur®-Combiflex® SG jointing system should be used when treating joints and cracks subject to movement.



Sika®-1 Pre-bagged Advantages Table

Suitable for:	Internal water barrier systems for new and refurbishment projects for keeping water out or keeping water in.
Types of Application:	Keeping water out of basements, cellars, tunnels, vaults. Keeping water in swimming pools, containment bunds, reservoirs, water tanks.
Advantages	Withstand high water pressures. Bonds to the substrate. Hard wearing surface. No ongoing maintenance. Follow contours of structures. 100 year track record. Can be used to achieve Grades 1-3 according BS 8102- 2009. Suitable for high water table according to BS8102-2009.
Approvals	Meets requirements of a Type A – Barrier waterproofing according to BS 8102 2009. Certified by the BBA for the life of the building. BBA approved - certificate no 08/4606.

Registered Waterproofing Contractor Scheme

The Registered Waterproofing Contractors Scheme has been introduced for use in conjunction with the Sika®-1 Pre-bagged waterproofing system. The need to reduce the risk to both specifier and client has given rise to this scheme, which is designed to facilitate the selection of assessed contractors. It allows total quality control – from product to service to installation, granting clients complete peace of mind with a wholly professional service nationwide. The main benefit of the Registered Contractor Scheme is to help minimise risk. Not only can clients be sure

of excellent standards of materials and workmanship, both can be guaranteed for a period of ten years.

The criteria includes:

- Stable trading history
- Satisfactory project references
- Proven commitment to safety, health and environment
- Compliance with all relevant British Standards
- Appropriate insurance cover
- VAT Registered

BBA Certification

Sika®-1 Waterproofing system has been BBA certified (certificate no: 00/3761).





Introduction

Cavity drainage membranes are water management systems which work on the principle of allowing water to continue to penetrate the structure and then managing the water and diverting it to a suitable drainage point.

The membranes are loose laid on floors and fixed to walls using special plugs and sealing materials with limited preparation required to the substrate. Once the membrane has been fitted, wall surfaces can be dry lined or plastered directly and floors can be screeded or a floating dry board system installed.

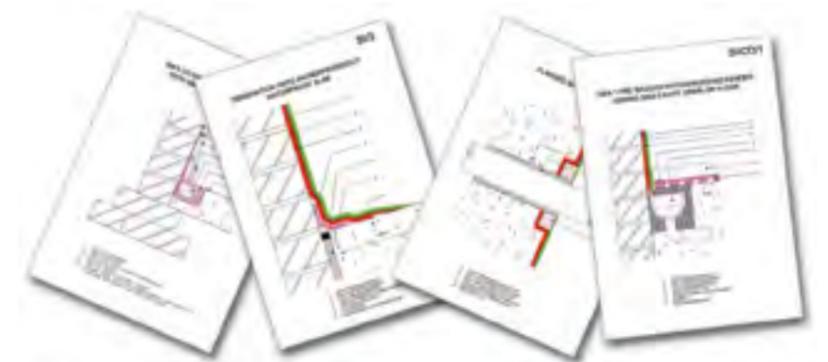
Sika® Cavity Drainage Advantages Table

Suitable for:	Internal water management of new and refurbishment projects.
Types of Application:	Walls and floors of basement, cellars, tunnels.
Advantages:	Can be used where the substrate does not have the strength to resist stresses caused by water pressure. Can accommodate minor movement within the structure. Limited surface preparation required. Acts as a vapour barrier. Can be used to achieve Grades 1-3 according to BS 8102:2009. Suitable for high water table according to BS 8102:2009.
Approvals:	Meets requirements of a Type C waterproofing according to BS 8102 - 2009. Certified by the BBA (certificate no: 05/4260).

The specification detailing and product selection is critical to ensure the long-term success of the project. Sika therefore provide a range of support services to assist the specifiers, contractors and architects in line with BS 8102 -2009 recommendations.

These services include:

- A technical advisory department, on-site support and after sales service
- Detailed assessment of project and performance criteria
- NBS specification clauses
- Complete material data, installation guidelines, health and safety information and where appropriate maintenance schedules
- Specification service
- The Training Academy, to ensure internal staff, contractors, clients and specifiers have a full understanding of systems



Solutions for Leaks and Construction Damage



Sealing and Waterproofing of Cracks and Voids

Closing, sealing and flexible bridging of leaking cracks and honeycombing or voids in new and existing structures:

- Sika® Injection-101**
Fast-foaming, low-viscous polyurethane injection foam for temporary water-stopping
- Sika® Injection-201**
Low-viscous, flexible polyurethane injection resin for permanent waterproof sealing
- Sika® InjectoCem-190**
Two-component injection grout based on microfine cement



Waterproofing of Construction Joints

For sealing construction joints in a watertight structure, Sika provides a full range of products and systems:

- Sika® Injection-29**
Low-viscous, flexible polyacrylate injection resin with a high solids content
- Sika® Injection-201**
Low-viscous, flexible polyurethane injection resin for permanent watertight sealing even in wet conditions
- Sika® InjectoCem-190**
Two-component injection grout based on microfine cement for waterproof sealing of voids and non-moving cracks in the structure



Surface Sealing and Waterproofing of Concrete Structures

Remedial surface sealing by curtain injection of surface defects in below ground concrete structures:

- Sika® Injection-304**
Flexible, very low-viscous and very quick-gelling polyacrylate injection gel for permanent watertight sealing. The material reacts to form a waterproof, flexible but solid gel with good adhesion to both dry and wet substrates.

Leaking Structures

Water can leak into and out of structures. Reasons for this are cracks, failed joints and even through permeable substrates. Once identified, if not treated, further problems can occur including the corrosion of reinforcements and thus resulting in the consequential loss of a usable area within the structure.

Sika produce a range of resin injection systems designed to stop water ingress through leaks.

Concrete Damage

Damage can occur to the concrete in many ways but primarily through difficulties in interpreting design aspects, inadequate or untimely compaction, or by accident. Sika produces a full range of concrete repair systems, which are compatible with all Sika waterproofing systems.

Cracks/Honeycombing

The terms "watertight" and "vapourtight" do not mean "crack-free". Cracking can always occur in concrete in its plastic or in its hardened state, due to the stresses imposed. These include the internal forces caused by temperature and water content changes. Sika has a complete range of products and systems for the repair of "cracks" and "honeycombing" in watertight concrete structures.



Sealing of Movement and Construction Joints with the Sikadur®-Combiflex® System



A high performance joint sealing system consisting of the Sikadur®-Combiflex® SG sealing strips and Sikadur® epoxy adhesive. This system is renowned worldwide for proven performance in sealing difficult joints and/or cracks in all types of watertight and retaining structures. It is particularly useful in watertight basement construction and can be applied both internally and externally to meet the specific project's requirements.

Advantages

- Easily adaptable to the construction programme.
- Easy to adapt to complicated construction details.
- Simultaneous additional crack repairs are possible.
- Damage or leaks can be repaired externally or internally.
- Easy to control the application because it is visible.
- Can be used on various substrates including concrete, brick and steel.

The Sika Systems

The selection of the appropriate width and thickness of the Combiflex membrane strip is dependent on the joint requirements and exposure:

- **Sikadur®-Combiflex® SG-10** strip thickness of 1 mm for low mechanical stress.
- **Sikadur®-Combiflex® SG-20** strip thickness of 2 mm for higher mechanical stress.
- The **Sikadur®-31** adhesive is available in both normal and rapid hardening grades and also a grade approved for contact with drinking water.



Concrete Repair and Protection Solutions



Waterproofing

The basis of every concrete basement 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 and to ensure the longevity of any waterproofing system. 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 Concrete Repair

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).

Watertight Concrete



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

Wherever a building or civil engineering structure is being constructed with concrete, Sika has a well proven track record. With innovative admixtures and additives to improve cement or concrete quality and workability, Sika has an extensive product range for reliable and cost effective solutions. Sika is also a reliable supplier for the readymix industry, precast manufacturers and site-batched concrete.

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



Waterproofing Case Studies



Ashmolean Museum

Project Description

Built in the 1670's and the world's first university museum, the Ashmolean Museum, part of Oxford University, recently underwent redevelopment to make it suitable for modern visitors. **Sika®-1**, from renowned manufacturer of building materials Sika, was chosen to provide superior waterproofing to basement areas and protect the priceless artefacts they contain.

Requirement

All but the original, Grade 1 listed elements of the structure needed to be demolished and replaced with a stylishly designed and fit for purpose new building. The redevelopment doubled the gallery space of the museum and created dedicated conservation and education facilities. Given the Ashmolean's collection of rare objects, it provides excellent environmental control.

Sika Solution

Famed architect Rick Mather designed the structure, including its 4000m² basement. To provide the exacting standards environmental control that the curators and managers of the museum required, consulting structural engineers Dewhurst MacFarlane and Partners specified Sika, safe in the knowledge its waterproofing system certified full protection.

The basement's vast size meant the system required a total of 250 tonnes of Sika pre-bagged mortar, combined with 27,500 litres of **Sika®-1**. The provision of materials had to fit in with tight site deadlines, to which Sika demonstrated its ability to supply large specifications under pressure.

Over the reinforced concrete structure a layer of **Sika®-1 Spritz Mortar** was applied. This was followed by a second and third layer of **Sika®-1 Render and Finishing Mortar** to the walls and, equally, a second and third layer of **Sika®-1 Screed Mortar** to the floor – creating a three layer system of protection.

To ensure no moisture permeated that structure, the specialist contractor applied **Sika® EpoCem®**, an epoxy cementitious combination material, which acts as a surface mounted DPM when used in combination with **Sikadur® 32**. This was essential to maintain the integrity of the artefacts held within the basement. The product also heavily reduced time on the project. Once applied on top of the mortar, it sped up drying times, allowing work to proceed ahead of schedule.

The waterproofing was specified to BS8102: 1990 Grade 4 – the highest recognised standard of waterproofing protection. This required a high level of technical ability to apply the Sika system. To ensure these requirements were met Sika provided the contractor with comprehensive technical and practical training for several of its staff members.

The main contractor and client stipulated that as many sustainable products should be used on the project as was possible. Sika packaging complied with this policy, as it is all sustainably sourced.



Liverpool One

Project Description

Liverpool ONE, a £1 billion regeneration programme, comprises 42 acres of open-air shopping and leisure facilities and involves the careful restoration of several historic buildings. These include the Russell Building, Compton House, the Stanley Building and County Palatine, which were built between the 1860s-80s.

Requirement

These buildings have a maze of basements that equated to approximately 50,000 sq ft of potential commercial rental space. The basements had deteriorated with age and started to let in water making them unlettable. However, each basement has now been transformed into extensive profitable space. For example, in the Palatine and Stanley buildings, they will be used for additional retail space, whilst in the Russell Building, the basements can now be used as service areas.

Sika Solution

The conversion of these basements to useable space is thanks to the first class **Sika®-1 Pre-bagged Waterproofing System** which has provided total protection from water ingress, allowing the basements to be used by the new tenants with peace of mind.

Highly versatile and capable of tackling the most challenging of projects, it was the ideal system to provide protection at the four ageing buildings at Liverpool ONE.

A layer of **Sika®-1 Spritz Mortar** was cast over the basement walls. This was followed by a layer of **Sika®-1 Render Mortar** and **Sika®-1 Finishing Mortar**. **Sika®-1 Spritz Mortar** was applied to the floor, followed by a third layer of **Sika®-1 Screed Mortar**.

To ensure a complete seal, **Sikadur®-Combiflex®** was applied to all joints and cracks. Easy to install, it provides a reliable method of sealing cracks whilst allowing for movement in the building. Suitable for both internal and external use on new build and refurbishment projects, it can accommodate movement in more than one dimension as well as variations in joint width. This, combined with the **Sika®-1 Pre-bagged Waterproofing System**, created a complete package that provided the basement with a completely dry environment.

Without a certified and proven system such as **Sika®-1 Pre-bagged Waterproofing System** protecting the basements of these buildings, the future occupiers could have experienced significant problems were water to intrude. However, fully protected, they can now look forward to a dry and prosperous future.



Crystal Palace Swimming Pool

Project Description

The swimming pool in Crystal Palace National Sports Centre needed to be extended to 50 metres. When it came to the internal waterproofing of the pool, plant rooms and ventilation tunnels, plus repairs to the diving boards, a repeat of the specification that has kept the pool watertight for over 50 years was the natural choice.

Requirement

Having kept the original pool watertight for over 50 years, **Sika®-1** from global building products manufacturer Sika, assured it would safeguard the centre's extension. A pre-bagged waterproofing system, it provides complete protection from water and vapour ingress.

Sika Solution

The **Sika®-1** pre-bagged waterproofing system was applied to the pool walls and floor and one end of the pool creating a permanently impregnable barrier. This is made possible thanks to the **Sika®-1 admixture** - a colloidal silicate liquid. Mixed in with pre-bagged renders and screeds, **Sika®-1** reacts upon contact with water by swelling and blocking all gaps and capillaries. The use of Sika pre-bagged mortars ensures the correct grading of aggregate and cement is used in every batch. Not only does this Construction Waterproofing help maintain the highest level of quality control on site, but it also reduces the risk of quality issues arising.

To complete the watertight solution, **Sikadur®-Combiflex®** was applied to all construction joints and junctions where the swimming pool wall met the floor. Comprising a highly elastic sealing sheet – **Combiflex® Hypalon Sheet** – and **Sikadur®** epoxy resin, it is an easily installed system that sealed and protected all joints subject to movement.

Once the swimming pool had been completed, the specialist contractor followed on to halt water ingress in the plant rooms and vast ventilation tunnels – an issue that posed the threat of the potentially fatal Legionnaires' disease.

Here, **Sika® Cavity Drainage System** was applied. Utilising a polypropylene internal drain membrane to cover the walls and floor, the system essentially forms a secondary wall within the structure. Ideal for structures that are too weak to utilise a waterproofing render product, the system allows water to still penetrate the structure, but not track past the membrane and into the building.

Due to this flexibility, the building is still capable of movement. Once water reaches the membrane, it is directed into a cavity drainage channel and into a sump and, from here, water is discharged from the building.

Using **Sika® MonoTop®** concrete repair system and **Sika® FerroGard®** corrosion inhibitor, The contractor also carried out repairs to the listed diving board.



Hugo Boss

Project Description

The 10,000sq ft building in Sloane Square was formerly a major WH Smith premises with the basement being used for storage. Following the acquisition by Hugo Boss, architects Paul Davis and Partners were tasked with converting part of the basement into retail space with the remainder being kept as storage, as part of a complete renovation of the building.

Requirement

Sika's revolutionary waterproofing system has provided the perfect seal for over 30 vaults situated around the basement of a new Hugo Boss flagship store in London, enabling the creation of an extra useable floor.

Sika Solution

To ensure the vaults – located directly under the pavement and running round the perimeter of the building - were completely protected from possible water ingress, Paul Davis and Partners specified **Sika®-1**, a well proven waterproofing system developed by Sika.

The project was one of several carried out in the Sloane Square area as part of a major renovation by Cadogan Estates working with Paul Davis and Partners. In each case, **Sika®-1** was specified and installed by the specialist contractors to ensure complete waterproofing to the building's basements.

The specialist contractor installed the **Sika®-1** system to the pavement vaults floors, all walls and soffits, ensuring the entire area is safe-guarded from potential moisture damage.

Sika®-1 is a complete pre-bagged waterproofing system of mortar, screeds and specially developed admixtures. A colloidal liquid, the **Sika®-1** admixture is mixed into the mortar and render and provides the vital ingredient to block water ingress.

It does this by reacting to water by turning into a jelly-like substance, blocking all gaps and capillaries, and providing an impregnable and invisible seal. Bonding monolithically with the basements substrates, it provided the ideal product for the project. Once applied to the walls, it essentially becomes one with the structure.

To complete the waterproofing solution, Sika's advanced jointing system, **Sikadur®-Combiflex®**, was also specified. A high performance joint sealing system, it provides proven protection from water ingress to all gaps between cracks, joints, panels and walls.

Certified by the British Board of Agrément (BBA), **Sika®-1** meets the requirements of BS 8102 Grades two, three and four, with Grade 3 used to seal the Hugo Boss store.

With work now complete, the new Hugo Boss flag-ship store can open its doors safe in the knowledge that its new basement level is protected by **Sika®-1**, guaranteeing water ingress will not be a threat.



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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Certificate No. EMS 45308



Certificate No. FM 12504