WATERPROOFING
SIKA SOLUTIONS FOR POTABLE WATER

WITH SIKA WATERPROOFING SYSTEMS

BUILDING TRUST

ADVANTAGES OF OUR SOLUTION

Potable water is an essential foodstuff. That request absolute clean and watertight facilities to process and store it. Waterproofing of reservoirs and tanks containing potable waters must not only be watertight over long periods, but shall also be easy maintainable, food safe, and harmless to health. Sika waterproofing products used in potable water reservoirs and tanks comply with the strict regulations of public water authorities. Food and beverage industry rely on high performance of Sika waterproofing systems in their process water tanks.As the global leader in providing structural waterproofing solutions, Sika has the most complete and comprehensive range of products and systems, that are designed and can be adapted to meet the specific needs and requirements of owners of water reservoirs, architects, engineers and contractors on site.

CONTENT

WATERPROOFING SOLUTIONS FOR POTABLE WATER RESERVOIRS

VARIOUS INTERNAL WATERPROOFING SYSTEMS that are in direct contact with potable water must fulfill stringent requirements regarding hygiene, durability, exposure and stress conditions, construction method and sequence, ease of application and total cost management. This is required as potable water out of natural resources is our most essential foodstuff. Potable water, stored in reservoirs need to be protected to keep it clean. Water reservoirs or tanks in any form to store potable water must be watertight. The waterproofing of reservoirs and tanks must fulfill demands of long service life.

Sika's expertise is combined with more than 100 years of experience from all around the world in the successful waterproofing of water retaining structures. Sika waterproofing experts are able to support our customers throughout their projects, from initially determining the best waterproofing concept, through the detailed design and detailing to site support for successful installation and completion on site, including remedial solutions for any existing structures.

TYPES OF WATER RESERVOIRS

ABOVE GROUND

Tanks

Towers

BELOW GROUND

Tanks

Caverns

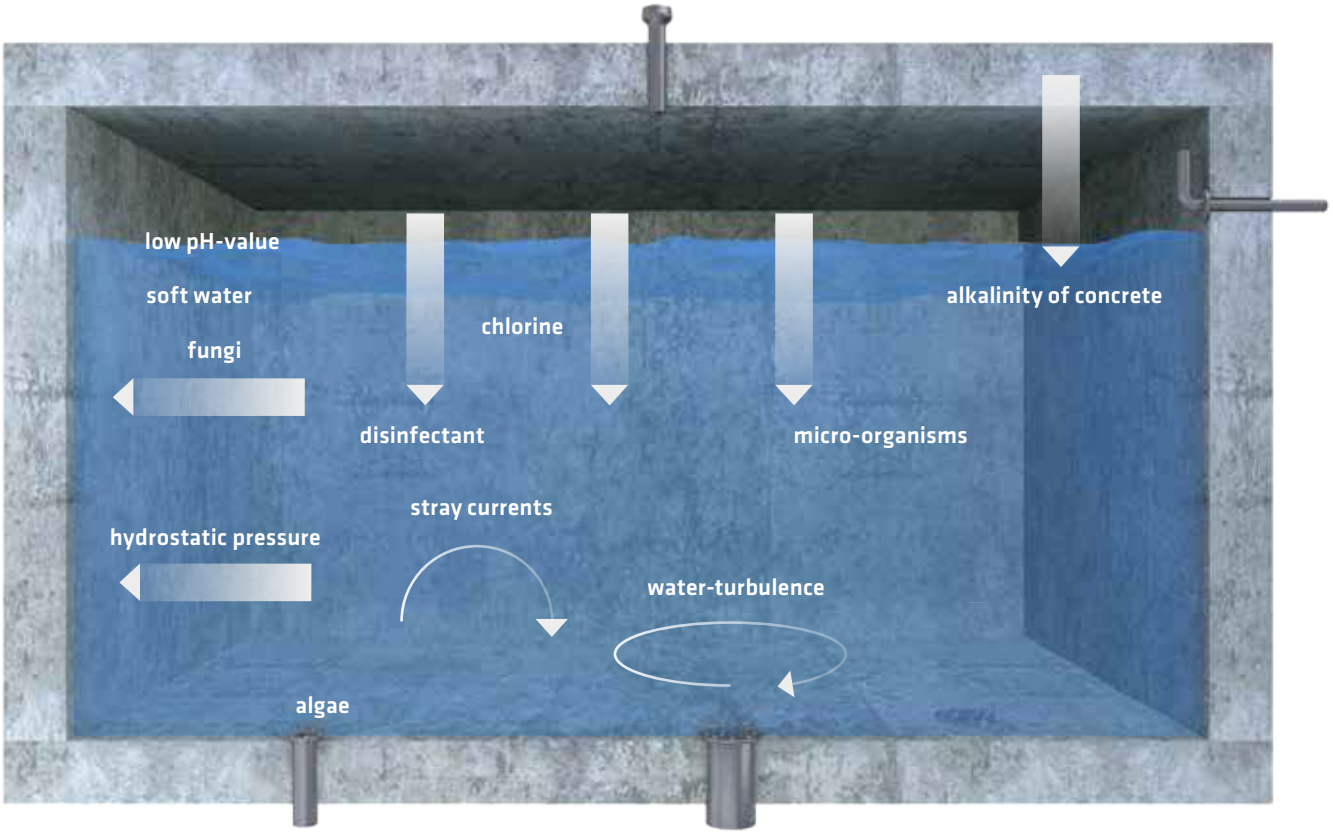
New or existing tanks and reservoirs to store potable waters are made of concrete or steel structures built above ground or below ground. Water towers in flat country sides or caverns in mountainous area at elevated level secure hydraulic pressure in water supply pipe network.

Depending to local requirements for water-holding structures and local water quality conditions, the type of waterproofing for reservoirs can be rigid by cementitious products like structural concrete or mortar layers, or flexible by liquid applied layers of reactive resins combined with joint sealing systems, also on steel substrates, or at least linings with loose laid waterproofing sheet membranes. Surface applied waterproofing systems are useable either in new, and existing structures in case of waterproofing refurbishments.

All these solutions are designed to meet the specific needs and requirements of owners, engineers and contractors on site.

EXPOSURES AND STRESS

EXPOSURES IN POTABLE WATER RESERVOIRS



Depending to water source, potable waters in various regions differs in quality referring content of minerals, pH value, water temperature conditions and treatment of waters with chemicals by local reservoir holders. Water-holding structures, such as water reservoirs and water treatment facilities, mainly made of reinforced concrete- or steel structures, are exposed to various influences:

- Low pH value as well as soft water attacks cementitious substrates
- Temperature variations may cause cracks in concrete
- Stray currents may accelerate hydrolytic corrosion
- Chlorine treatment and disinfectants of water to keep the water clean
- Alkalinity of concrete may influence the pH value of water
- Micro-organisms, algae and fungi may influence the water hygiene
- Water turbulences request solutions to prevent washing out effects

IMPACTS ON VARIOUS SUBSTRATES

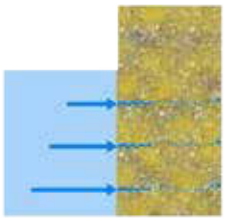
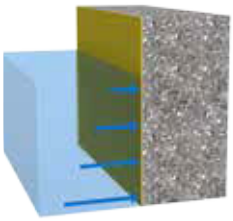
Exposure	Substrate				
	Concrete	Mortar	Coating	Membrane	Steel
					
Alcalinity of concrete	–	–	–	–	–
Disinfectants	–	–	–	–	+
Chlorine treatment	–	–	–	–	–
Ozone treatment	–	–	–	–	–
Soft water	+	+	–	–	–
Low pH-value	+	+	–	–	+
Micro-organisms	–	–	+	+	–
Fungicide	–	–	+	+	–
Stray currents	–	–	–	–	+
Hydraulic pressure	–	–	–	–	–
Water turbulences	–	–	–	+	–
Algae	+	+	–	–	–

– no influence, + with influence

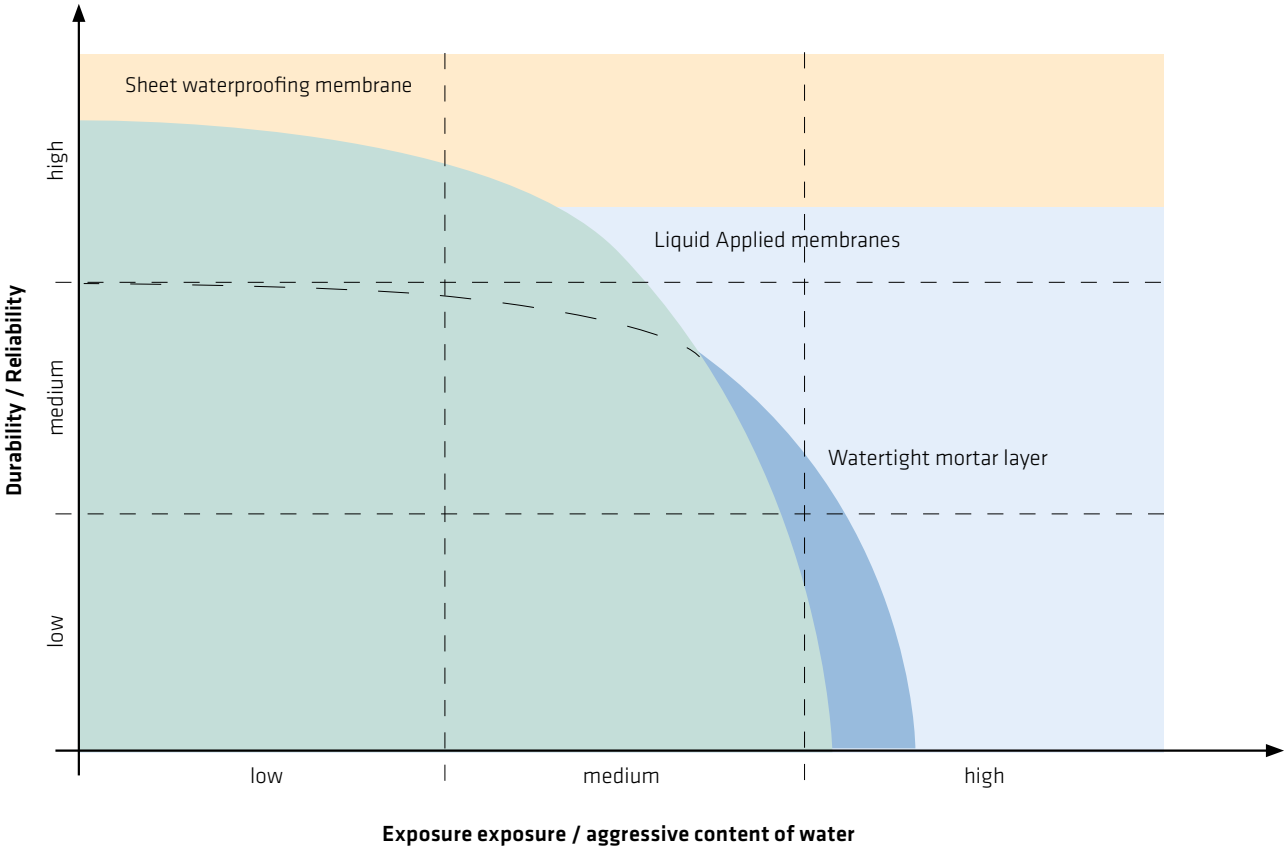
PROJECT REQUIREMENTS AND USE OF WATERPROOFING SYSTEM

Depending on the specific exposures, the waterproofing system must fulfill the folowing requirements:

- Resistance to cleaning agents
- Resistance to chlorine and ozone
- Resistance to algae and micro-organisms
- Resistance to hydrostatic pressure
- Smooth appearance of surface for easy cleaning
- No leaching from surface applied waterproofing into water
- No affect on drinking water quality
- Easy and reliable to apply and install of surface applied system
- Long service life expectancy of waterproofing
- Resistance against soft water

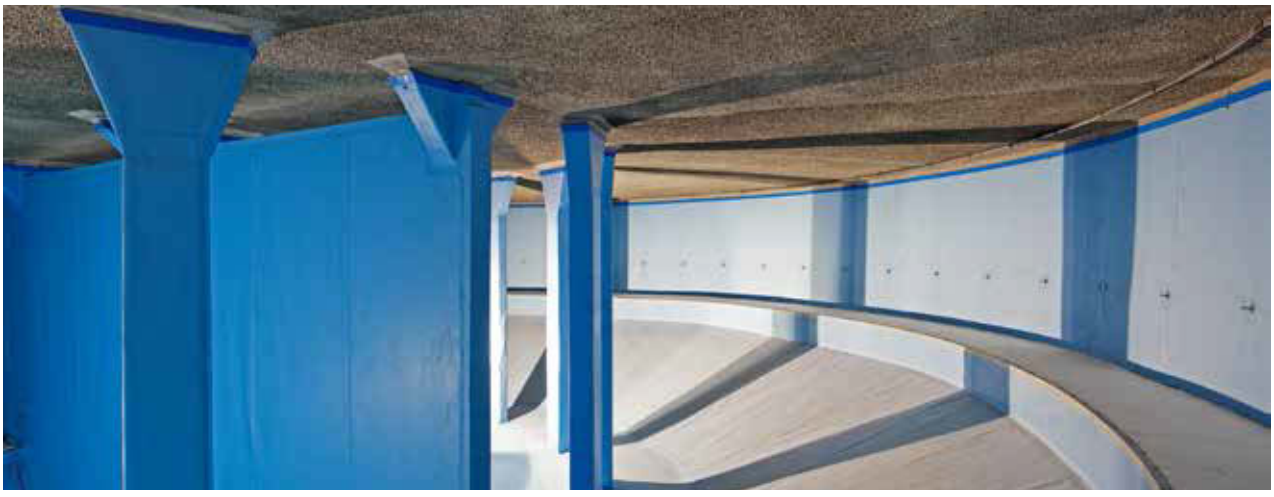
	Rigid Waterproofing		**Flexible Waterproofing**	
System	Watertight concrete	Watertight mortar layer	Sheet waterproofing membrane	Waterproof coating
				
Hygiene conditions of systems	Microorganism in pores and capillaries of concrete surface		Chlorine demand, Turbidity, Odour/Flavour, Organic carbon limit	
Water tightness of systems	Absorbtion due to porosity of concrete surface	No absorbtion (no water permeability into mortar	No absorbtion (no water permeability into membrane	No absorbtion (no water permeability into coating)
Standard requirements to water hygiene	EN 1508: systems and components for the storage of water (general requirements) EN – 805 requirement for water reservoirs in service			
Standard requirements	EN-206 Specification, performance, production and conformity of concrete		EN 13361 characteristics for geosynthetic barriers for reservoir structuress	

PERFORMANCE OF DIFFERENT WATERPROOFING TECHNOLOGIES:



Durability
low: 10 – 15 years
medium: 10 – 20 years
high: > 20 years/refurbisment required

Exposure exposure / aggressive content of water
low: water turbulences only
medium: low pH-value, algae, no temperature variations
high: soft water, low pH-value, high temperatures



SIKA SOLUTIONS FOR THE WATERPROOFING OF RESERVOIRS

SIKA PROVIDES A WIDE RANGE of different waterproofing systems and solutions. The selection of the best system for a specific project depends on many factors, incl. the local water condition. The choose of most suitable waterproofing system depends on nature of reservoir structure and water quality.

RIGID WATERPROOFING SYSTEMS

WATERTIGHT CONCRETE

Waterproofing with concrete admixtures, combined with joint sealing products

Concrete admixtures	Joint sealing products
■ Sika® ViscoCrete® ■ SikaPlast® ■ Sikament® ■ Sika® WT	■ Sika Waterbar® ■ SikaFuko® Injection hose ■ Sikadur-Combiflex® Bonded tape

WATERTIGHT MORTAR LININGS

Waterproofing with waterproofing mortars, combined with joint sealing products

Mortar lining	Joint sealing products
■ Sika®-110 HD ■ SikaTop® Seal-107	■ Sika Waterbar® ■ SikaFuko® Injection hose ■ Sikadur-Combiflex® Bonded tape

FLEXIBLE WATERPROOFING SYSTEMS

WATERTIGHT COATING

Waterproofing lining with liquid applied reactive resins, combined with joint sealing products

Coating	Joint sealing products
■ Sika® Permacor®-136 TW	■ Sika Waterbar® ■ SikaFuko® Injection hose ■ Sikadur-Combiflex® Bonded tape

LINING WITH SHEET WATERPROOFING MEMBRANES

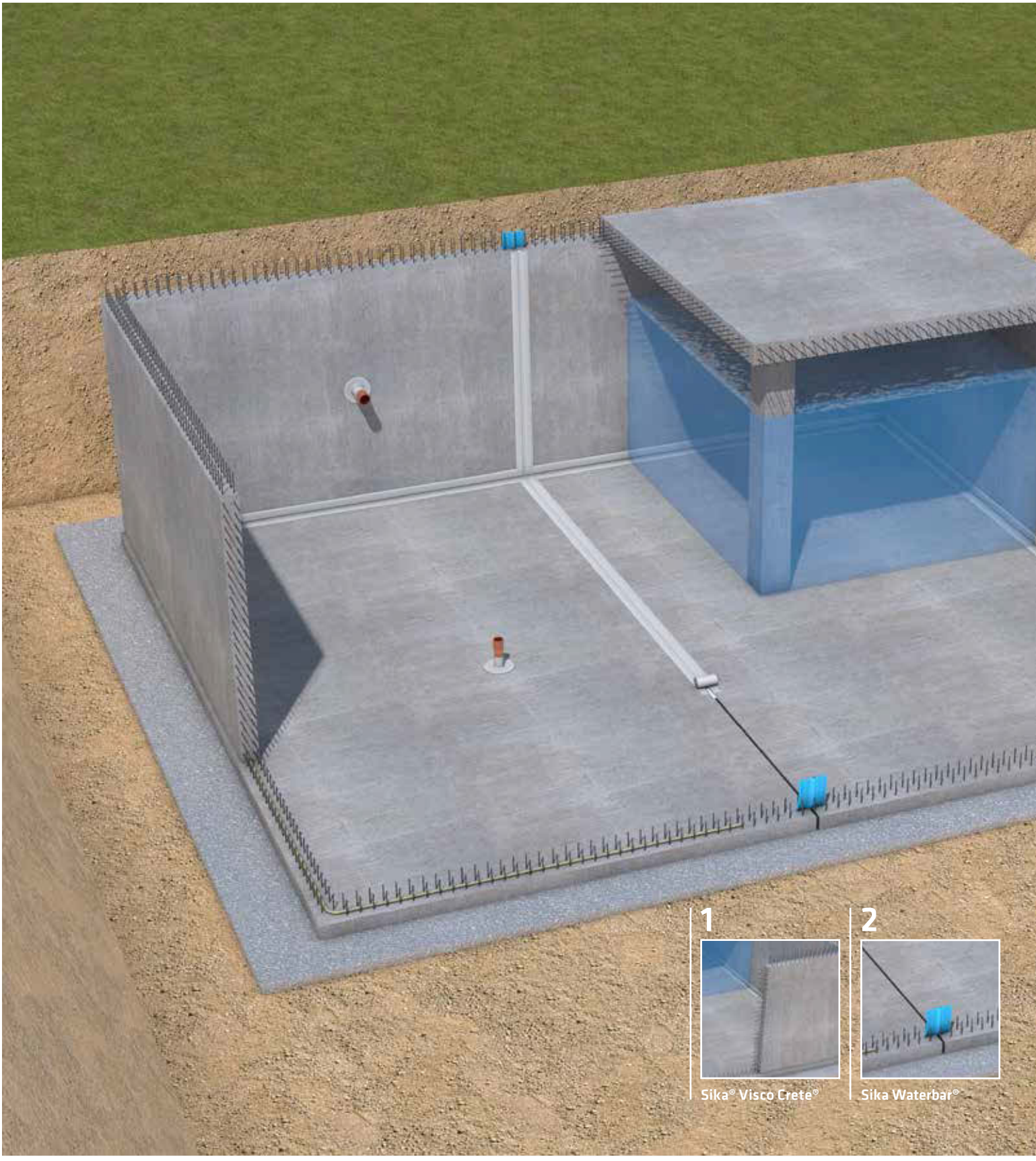
Waterproofing lining with loose laid sheet membranes, combined with joint sealing products

Sheet membrane lining	Joint sealing products
■ Sikaplane® WT 4220-15 C	■ Sika Waterbar® ■ SikaFuko® Injection hose

DEPENDING TO PROJECT SPECIFICATION for lining of potable water reservoirs, most cost optimized solution is considered in order to fulfill requirements of reservoirs structure and estimated exposure to local water quality.

WATERPROOFING SYSTEMS	SIKA SOLUTIONS	PERFORMANCE
Watertight concrete for white box system	Sika® ViscoCrete® -103 TW	Conventional superplasticizer; concrete admixture product.
Watertight mortars for post applied rigid waterproofing layers	Sika®-110 HD SikaTop® Seal-107	Mortar layer, based on cementitious mortar and polymer-modified mortar.
Waterproofing of joints	Sika Waterbar®	Joint profiles on base of thermoplastic PVC and FPO for waterproofing of construction and expansion joints.
	SikaFuko® Injection hose	Ready to use and re-injectable injection hose, cast in concrete. with, or without reverse flow and hydroswelling properties for the waterproofing of construction joints.
	Sikadur-Combiflex® tape	Ready to use joint sealing tapes for surface applied joint sealing, adhered with Sikadur®-31 adhesives.
Flexible sheet membrane waterproofing	Sikaplan® WT 4220-15 C Sikaplan® WT 4220-15 C Felt Sikaplan® WT 4220-18 H	Hygiene approved sheet membranes on base of thermoplastic FPO for loose laid lining of water reservoirs and tanks.
Liquid applied waterproofing coatings	Sika® Permacor®-136 TW	Two-component coating on base of epoxy resin.
Injection systems for repair	Sika® InjectoCem®-190	One-component injection grout on base of microcement-suspension for concrete repair and crack-sealing by injection method into structural concrete.
	Sika® Injection-306	Two-component injection resins on base of Acrylate for waterproofing of cracks and joints into structural concrete.

SIKA WATERTIGHT CONCRETE



INTEGRAL, RIGID AND COST EFFICIENT SYSTEM

The concept of watertight concrete involves optimum structural design and reinforcement together with an integral rigid waterproofing solution. This consists of a waterproof concrete, combined with appropriate joint sealing system for any necessary construction- and movement joints. To produce watertight concrete requests admixtures including superplasticisers and pore-blocking or active crystallization agents, in order to ensure optimum consistence, flow and ease compaction in a dense matrix of minimal voids. In addition, there are Sika joint sealing systems in use for watertight concrete, such as FPO-based waterstops, hydrophilic gaskets and sealants to seal construction- and expansion joints.

USE

- Local water authority specify concrete-structure
- Water quality allows concrete surfaces
- No additional linings required
- No structural settlements

MAIN ADVANTAGE

- Cost effective solution concerning material and construction works
- Reduced working procedures on site
- Long lasting waterproofing solution

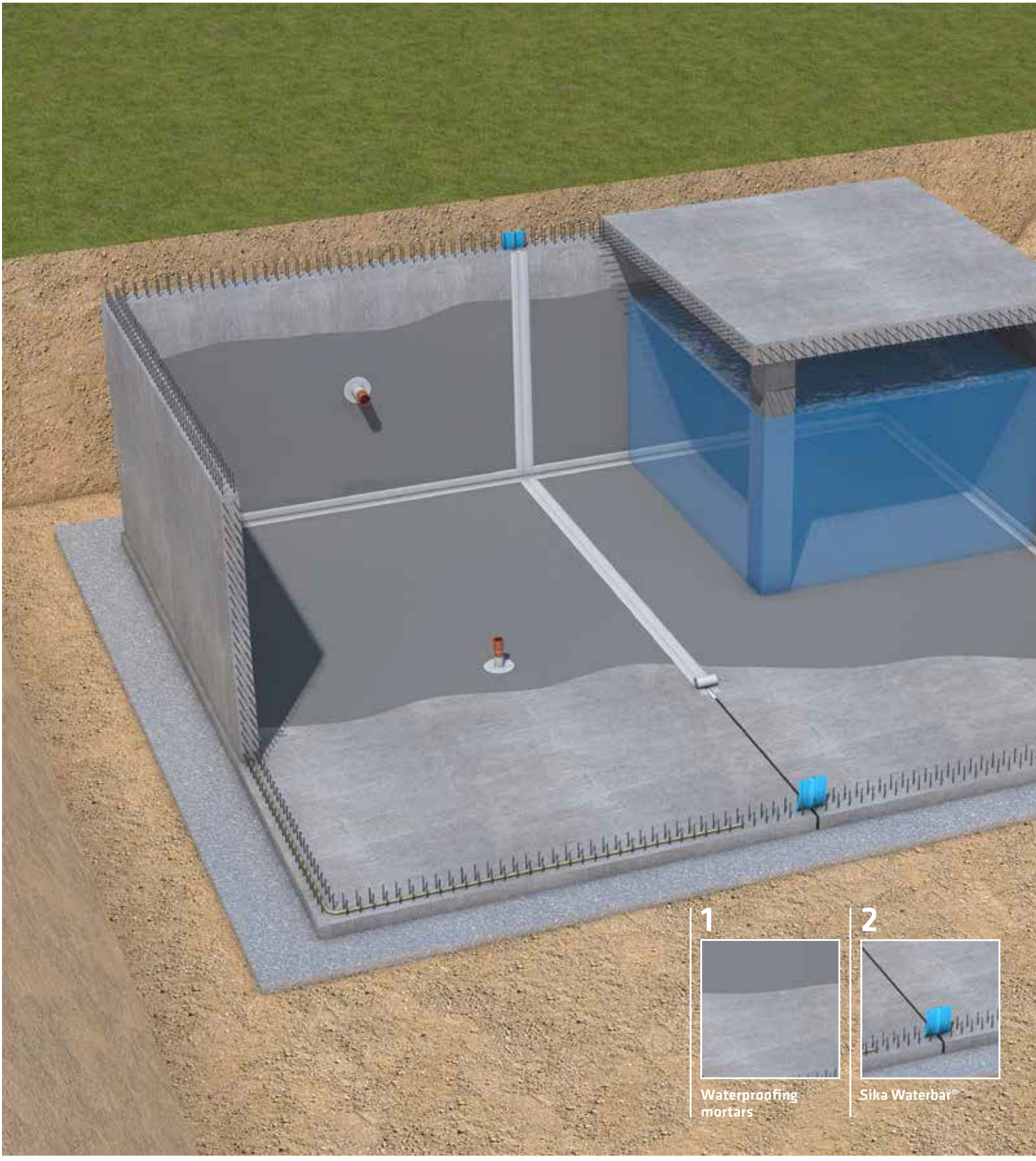
TYPICAL PROJECTS

- Above ground reservoirs
- Below ground reservoirs
- Water towers

SIKA PRODUCTS AND SYSTEM SOLUTIONS

Concrete admixtures	
Sika® ViscoCrete® **Sika® Plastiment**	Mid and High Range Water Reducing admixtures for reducing pore volumes and improving rheology for consistence.
Sika® WT **Sika® Control** **SikaFume®**	Pore-blocking and active crystalline admixtures to block pores against water penetration. Shrinkage reducing admixture to limit crack formation throughout the hardening phase. Additives based on pozzolanic silica fume that can be used to reduce the hardened pore volume of the concrete.
Joint sealing products	
Sika Waterbar®s	Cast in place and internal waterstops on base of hygiene approved FPO, cast in concrete for the waterproofing of joints.
Sikadur-Combiflex® SG	Adhesive sealing tape on base of FPO, bonded with Sikadur®-31 EP adhesive for post applied joint sealing system.
SikaFuko® Injection hoses	Ready to use and re-injectable injection hose with, or without reverse flow and hydro-swelling properties for the waterproofing of construction joints.

SIKA WATERPROOFING MORTARS



RIGID MORTAR SYSTEM

Sika waterproof mortars and mortar admixtures for rigid waterproofing lining in potable water tanks have excellent technical properties to seal against damp soil, seepage and percolating water. These materals are applied on prepared, internal concrete surfaces by manual application, or by spray to provide excellent solutions for complicated detailings. The post applied waterproofing mortar is used in combination with joint sealing products. Applied Sika waterproofing mortar linings have long lasting service life.

USE

- Suitable for refurbishment of reservoirs
- No cracks of substrate to expect
- No structural settlements

MAIN ADVANTAGE

- Chemical and abrasion resistant
- Easy applicable on complex details
- Can be combined with Sika joint sealing systems
- Long lasting waterproofing solution
- Hygienic shape

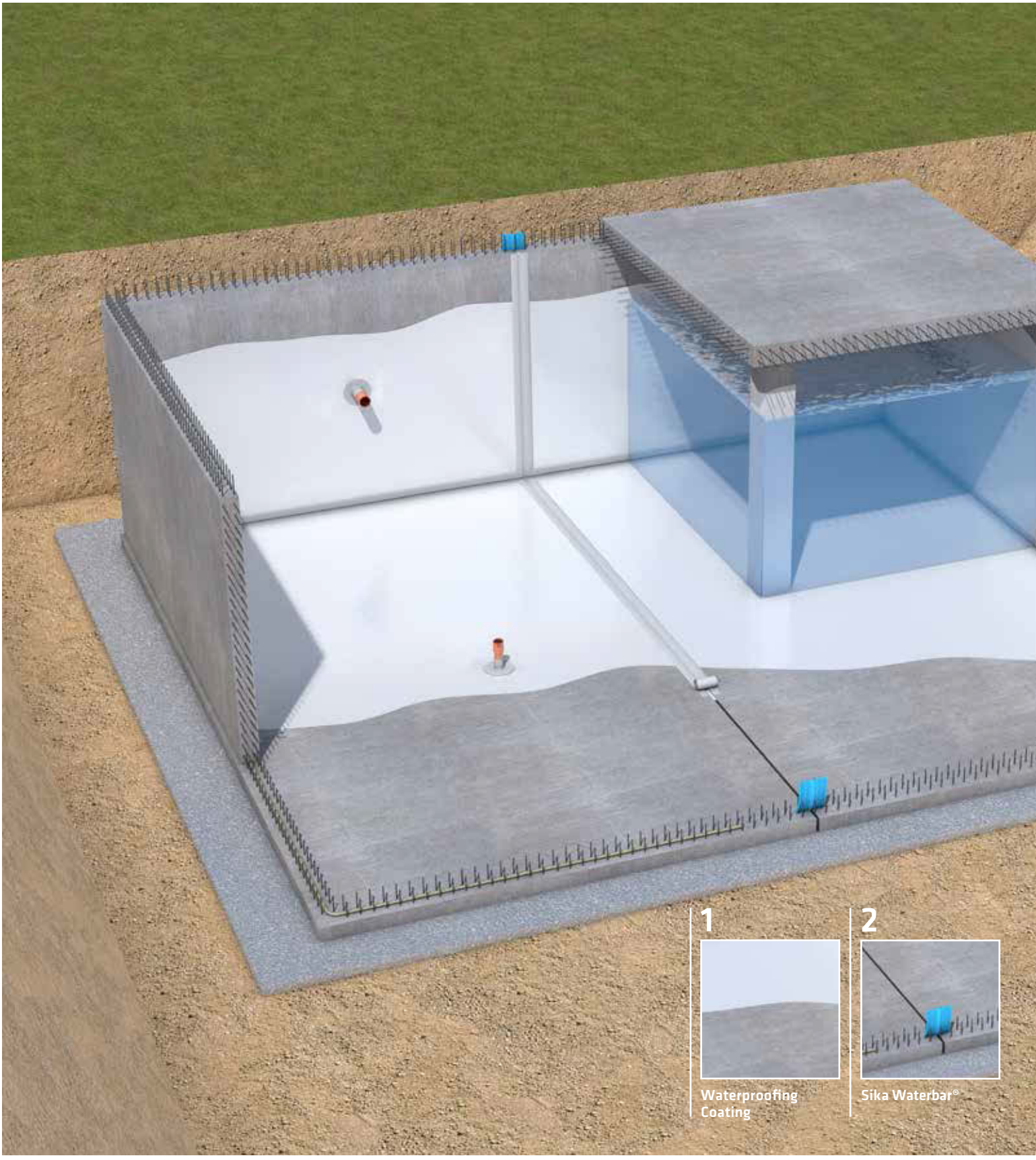
TYPICAL PROJECTS

- Above ground reservoirs
- Below ground reservoirs
- Water towers
- Caverns

SIKA PRODUCTS AND SYSTEM SOLUTIONS

Waterproofing mortars	
SikaTop® Seal-107 **Sika®-110 HD**	Two component, polymer modified cementitious waterproofing with slight flexibility for application for waterproofing internal, on concrete substrates.
Joint sealing products	
Sika Waterbar®s	Cast in place and internal waterstops on base of hygiene approved FPO, cast in concrete for the waterproofing of joints.
Sikadur-Combiflex® SG	Adhesive sealing tape on base of FPO, bonded with Sikadur®-31 EP adhesive for post applied joint sealing system.
SikaFuko® Injection hoses	Ready to use and re-injectable injection hose with, or without reverse flow and hydro-swelling properties for the waterproofing of construction joints.

Sika® Permacor – LIQUID APPLIED WATERPROOFING SYSTEM



FAST TO APPLY AND CRACK-BRIDGING SYSTEM

Sika liquid applied membranes (LAM) are highly elastic and flexible polymercic systems, based on epoxy resins. These materals are applied on prepared / primed internal concrete and steel surfaces by manual application, or by spray to provide excellent solutions for complicated detailings. Liquid applied membrane will also prevent underflow of any lateral water in the event of local damage and corrosion of steel substrates.

USE

- Suitable for refurbishment of reservoirs
- No cracks of substrate to expect
- No structural settlements

MAIN ADVANTAGE

- Chemical and abrasion resistant
- Easy applicable on complex details
- Can be combined with Sika joint sealing systems
- Long lasting waterproofing solution
- Corrosion protection of steel tanks

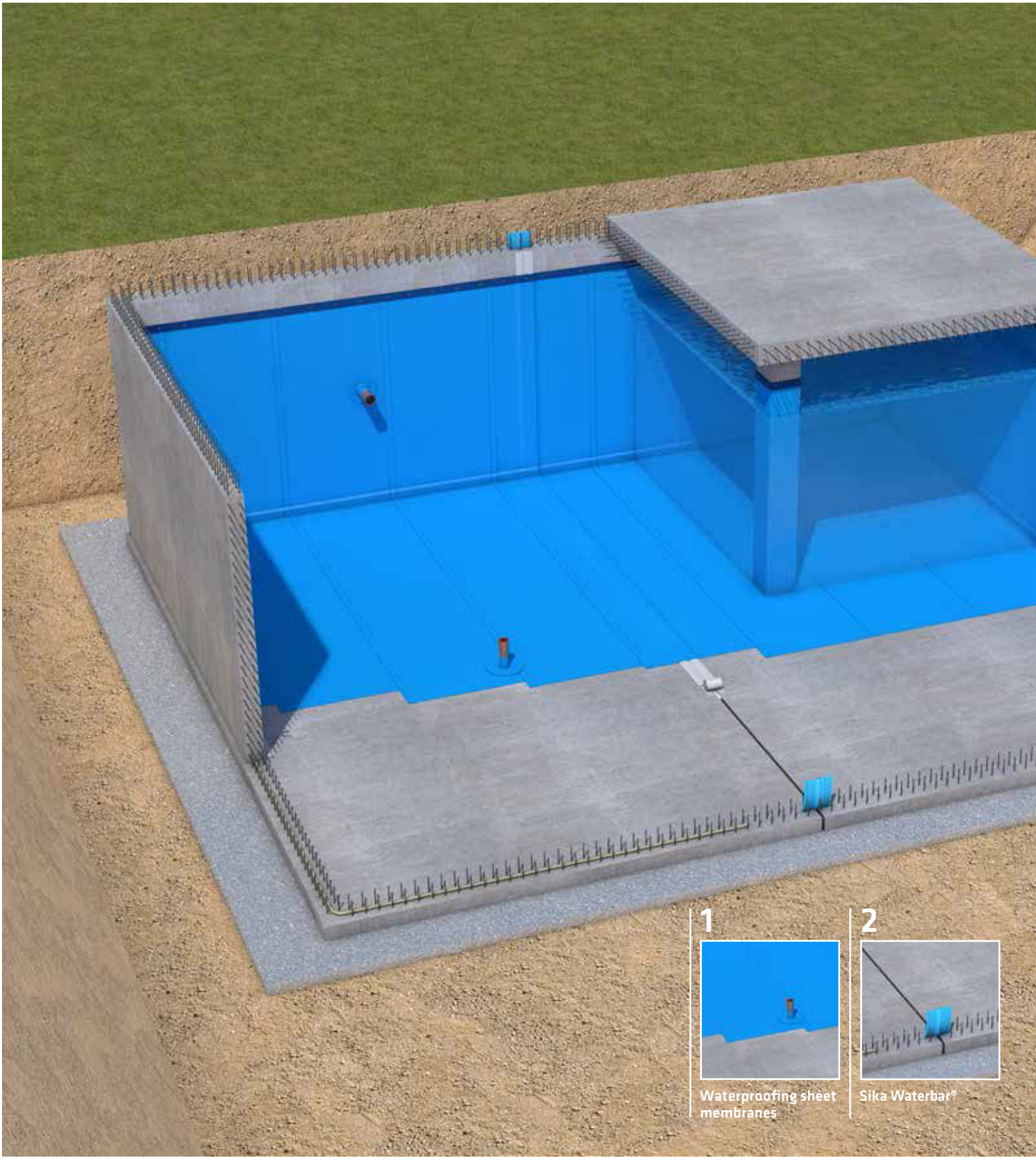
TYPICAL PROJECTS

- Above ground reservoirs
- Below ground reservoirs
- Water towers
- Steel tanks

SIKA PRODUCTS AND SYSTEM SOLUTIONS

Waterproofing coating	
Sika® Permacor®-136 TW	Two-component coating on base of EP-resin
Joint sealing products	
Sika Waterbar®s	Cast in place and internal waterstops on base of hygiene approved FPO, cast in concrete for the waterproofing of joints.
Sikadur-Combiflex® SG	Adhesive sealing tape on base of FPO, bonded with Sikadur®-31 EP adhesive for post applied joint sealing system.
SikaFuko® Injection hoses	Ready to use and re-injectable injection hose with, or without reverse flow and hydro-swelling properties for the waterproofing of construction joints.

LINING WITH Sikaplan® SHEET MEMBRANE WATERPROOFING SYSTEM



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Sikadur-Combiflex® SG

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SikaFuko®

HIGH PERFORMANCE, CRACK-BRIDGING, FAST TO INSTALL

High flexible waterproofing system, using Sikaplan FPO-based, hygiene approved sheet waterproofing membrane liner, installed on concrete structure of potable water reservoirs. The installed waterproofing sheet membrane can be used in combination with joint sealing products. Installed Sikaplan waterproofing sheet membrane linings have long lasting service life.

USE

- Suitable for new and refurbishment of reservoirs

MAIN ADVANTAGE

- Chemical resistant
- Easy applicable on complex details
- Can be combined with Sika joint sealing systems
- Long lasting waterproofing solution
- No substrate preparation required

TYPICAL PROJECTS

- Above ground reservoirs
- Below ground reservoirs
- Water towers
- Steel tanks
- Caverns

SIKA PRODUCTS AND SYSTEM SOLUTIONS

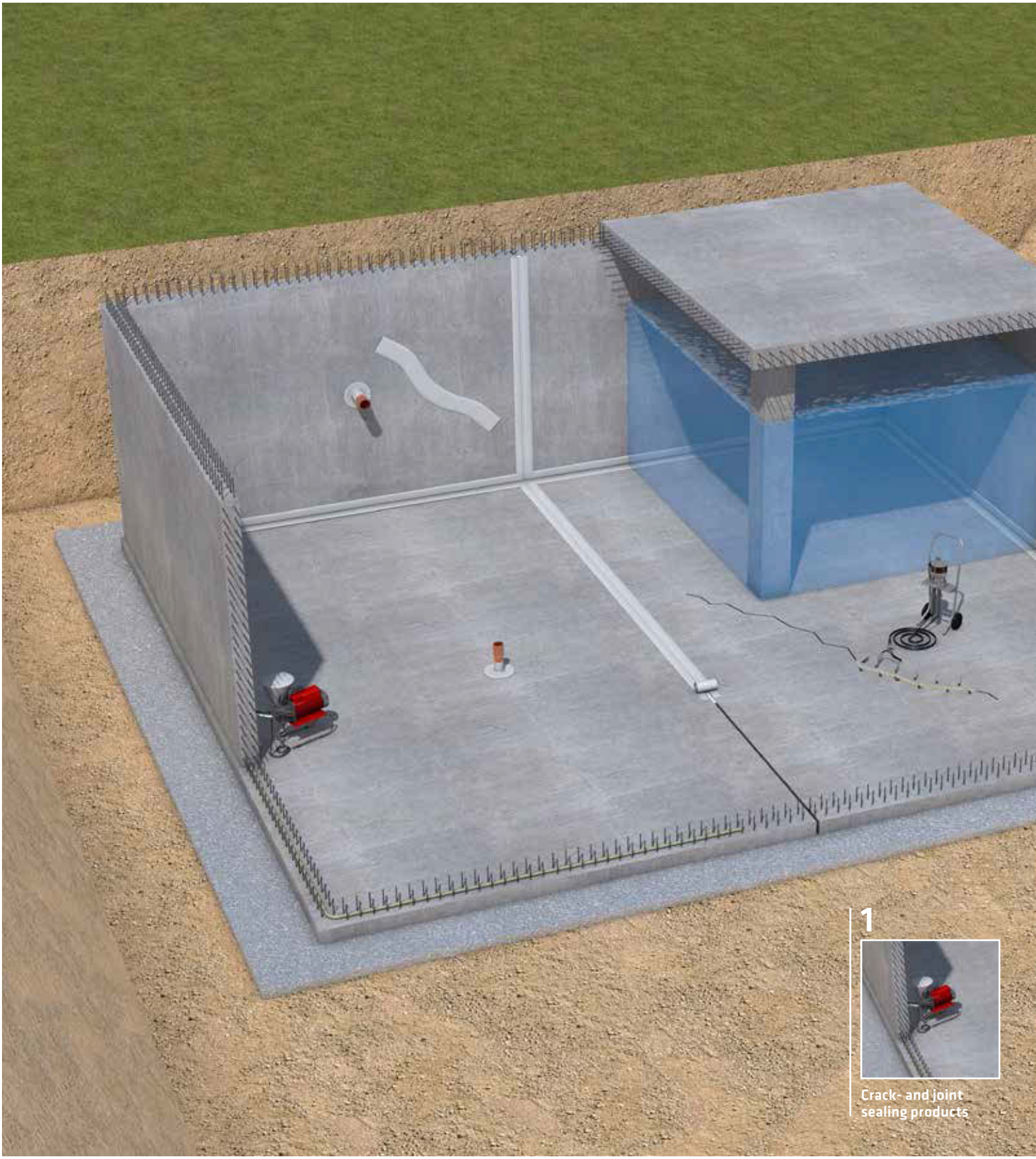
Waterproofing sheet membranes	
Sikaplan® WT 4220-15 C **Sikaplan® WT 1200-16C**	FPO sheet waterproofing membranes, for the purpose of waterproofing in potable water tanks and reservoirs, unrolled, mechanically fixed at walls, at least membrane overlaps sealed by heat welding.
Joint sealing products	
Sika Waterbar®s	Cast in place and internal waterstops on base of hygiene approved FPO, cast in concrete for the waterproofing of joints.
Sikadur-Combiflex® SG	Adhesive sealing tape on base of FPO, bonded with Sikadur®-31 EP adhesive for post applied joint sealing system.
SikaFuko® Injection hoses	Ready to use and re-injectable injection hose with, or without reverse flow and hydro-swelling properties for the waterproofing of construction joints.

RESERVOIR WATERPROOFING SOLUTION OVERVIEW

	RIGID WATERPROOFING	
		
Technology / Type of system	Watertight concrete	Waterproofing mortar coating
Nature of surface to potable water	Cement based	Cement based
Waterproofing concept	Integral waterproofing of reservoir structure, combined with joint sealing	Internal waterproofing lining of reservoir structure, combined with joint sealing
Substrate conditions	New structures	New and existing structures Reinforced concrete Brickwork
Performance characteristics	Crack-bridging: n.a. Water vapour tighness: n.a. Chemical resistance: + Durability: +++	Crack-bridging: n.a. Water vapour tighness: n.a. Chemical resistance: + Durability: +
Repairability of system	Crack and joint repair with Sikadur-Combiflex® system	Crack and joint repair with Sikadur-Combiflex® system
Substrate preparation requirements	Controlled conditions for concreting on site required (temperature)	Controlled conditions on site required (temperature, water, humidity) Substrate preparation required
Advantages	■ Very cost effective ■ No protection measurement required ■ Simple and fast construction	■ Very cost effective ■ Simple and fast to apply

SEMI RIGID WATERPROOFING	FLEXIBLE WATERPROOFING
	
Liquid applied coating Sikagard®	Loose laid and mechanicaly fixed membrane Sikaplan®
EP-resin based	Polyethylene based
Internal waterproofing lining of reservoir structure, combined with joint sealing for concrete structures Internal waterproofing lining of reservoir structure for steel structures	Internal waterproofing lining of reservoir structure
New and existing structures Reinforced concrete Steel	New and existing structures Reinforced concrete Brickwork Steel
Crack-bridging: ++ Water vapour tighness: ++ Chemical resistance: ++ Durability: +	Crack-bridging: +++ Water vapour tighness: n.a. Chemical resistance: ++ Durability: +++
Local refurbishment of coating	Local repair of leaks in membrane with welding of membrane patches
Controlled conditions on site required (temperature, dry substrate, low humidity) Substrate preparation required	Substrate cleaning required
■ Easy detailing solutions ■ Simple and fast to apply	■ Very cost effective ■ Fast installation procedure ■ Installation by trained personell required

REPAIRING OF LEAKS THROUGH RIGID WATERPROOFING SYSTEMS



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Crack- and joint sealing products

SIKA INJECTION SOLUTIONS FOR REPAIR AND REFURBISHMENT WORKS FOR RIGID WATERPROOFING SYSTEMS

In situations with loss of water due to localized damage of the rigid waterproofing system, appropriate repair works have to be undertaken. This can be done by injection to seal leaking areas in reservoirs and tanks, waterproofed either by watertigh concrete, or lined with waterproofing mortar layers. According to the type of leakage, if through joints, cracks in structural concrete, the most suitable material has to be injected.
The success factor of durable and tight injection work is a combination of Sika's materials and equipment selection, as well as application experience.

USE

- Suitable for new and refurbishment of existing reservoirs

MAIN ADVANTAGE

- Quick repair methods by injection of cracks and joints to be sealed in concrete
- Quick repair for sealing with waterproofing mortars and Sikadur®-Combiflex® system on concrete surface

TYPICAL PROJECTS

- Above ground reservoirs
- Below ground reservoirs
- Water towers
- Caverns

SIKA PRODUCTS AND SYSTEM SOLUTIONS

Crack- and joint sealing products	
Sika® Injection-300 series	Elastic, very low viscosity polyacrylic injection resin for permanent sealing of water-bearing cracks, voids and joints in concrete.
Sikadur-Combiflex® SG	Adhesive sealing tape on base of FPO, bonded with Sikadur-31 EP adhesive for post applied joint sealing system. Sealing around pipe penetrations and access door frames.
SikaTop® Seal-107 **Sika®-110 HD**	Two component and cementitious waterproofing mortars for repair and sealing of crack in concerete and repair of homeycombed concrete surfaces.

GLOBAL BUT LOCAL PARTNERSHIP

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.

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