

# WATERPROOFING SIKA SOLUTIONS FOR POTABLE WATER

WITH SIKA WATERPROOFING SYSTEMS



**BUILDING TRUST** 



## ADVANTAGES OF OUR SOLUTIONS

Potable water is an essential foodstuff. That requires absolute clean and watertight facilities to process and store it. Waterproofing of reservoirs and tanks containing potable water must not only be watertight over long periods, but shall also be easily 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.

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## 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 all natural resources, is our most essential foodstuff. Potable water, stored in reservoirs, needs to be protected to stay clean. Water reservoirs and tanks must therefore be watertight and 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, to the detailed design and 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



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 areas at elevated levels 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, including on steel substrates, or also linings with loose laid waterproofing sheet membranes. Surface applied waterproofing systems are useable either in new or existing structures in case of waterproofing refurbishment.

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 on water sources, potable waters in various regions differ in quality, referring to content of minerals, pH value, water temperature conditions and treatment of waters with chemicals. 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, attack 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 TECHNOLOGIES

Exposure	Technology				
	Concrete	Mortar	Epoxy Coating	Polyurea Coating	FPO Membrane
Substrate moisture					
Cracked substrate					
Alkalinity of concrete					
Disinfectants					
Fungicide					
Chlorine treatment					
Ozone treatment					
Soft (desalinated) water					
Low pH-value					
Sunlight					
Water temp. ≤ 60°C					
Negative water pressure					
Water turbulences					
Cleanability					

Not critical

Additional measures needed Critical



## PROJECT REQUIREMENTS AND USE OF WATERPROOFING SYSTEMS

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

- Resistance against cleaning agents
- Resistance against chlorine and ozone
- Resistance against algae and micro-organisms
- Resistance against 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 application and installation 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
Hygienic conditions of systems	Micro-organisms in pore and mortar surface	s and capillaries of concrete	Chlorine demand, turbidit organic carbon limit	y, odor/flavour,
Water tightness of systems	Absorbtion due to porosity of concrete surface	No absorbtion (no water permeability into mortar)	No absorbtion (no water permeability into mem- brane)	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		nts)	
Specific Standard requirements	EN-206 Specification, performance, produc- tion and conformity of concrete		EN 13361 characteristics for geosynthetic barriers for reservoir structures	





### PERFORMANCE OF DIFFERENT WATERPROOFING TECHNOLOGIES

Exposure / aggressive content of water

#### Durability

low: up to 10 years medium: 10 - 20 years high: > 20 years / refurbisment required

#### Exposure / aggressive content of water

low:water turbulences onlymedium:low pH-value, algae, no temperature variationshigh:soft water, 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, including the local water conditions. The selection of the most suitable waterproofing system depends on the nature of the reservoir structure and the water quality.

### RIGID WATERPROOFING SYSTEMS

#### WATERTIGHT CONCRETE

Waterproofing with concrete admixtures, combined with joint sealing products

Concrete admixtures	Joint sealing products		
■ Sika® ViscoCrete®	■ Sika Waterbar <sup>®</sup>		
■ SikaPlast <sup>®</sup>	<ul> <li>SikaFuko<sup>®</sup> injection hose</li> </ul>		
■ Sikament <sup>®</sup>	<ul> <li>Sikadur-Combiflex<sup>®</sup> adhered tape system</li> </ul>		
■ Sika® WT			
WATERTIGHT MORTAR LININGS Waterproofing with waterproofing mortar	s, combined with joint sealing products		
Waterproofing with waterproofing mortar			
Waterproofing with waterproofing mortar Mortar lining	Joint sealing products		
Waterproofing with waterproofing mortar Mortar lining SikaTop® Seal-107 (MY)	Joint sealing products ■ Sika Waterbar®		
Waterproofing with waterproofing mortar Mortar lining ■ SikaTop® Seal-107 (MY)	Joint sealing products		
	Joint sealing products ■ Sika Waterbar®		
Waterproofing with waterproofing mortar Mortar lining ■ SikaTop® Seal-107 (MY)	Joint sealing products       ■ Sika Waterbar®       ■ SikaFuko® injection hose		

Epoxy lining	Joint sealing products
■ Sikagard <sup>®</sup> -62	■ Sika Waterbar <sup>®</sup>
Sika <sup>®</sup> Glass Fabric	<ul> <li>Sikadur-Combiflex<sup>®</sup> adhered tape system</li> </ul>

## FLEXIBLE WATERPROOFING SYSTEMS

### LIQUID APPLIED MEMBRANES

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

■ Sika Waterbar®
■ SikaSwell®
Sikadur-Combiflex <sup>®</sup> adhered tape system

Sheet membrane lining	Joint sealing products
■ Sikaplan® WT 4220-15 C	■ Sika Waterbar <sup>®</sup>
■ Sikaplan® WT 4220-15 C Felt	■ SikaSwell <sup>®</sup>
■ Sikaplan® WT 4220-18 H	

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



WATERPROOFING SYSTEMS	SIKA SOLUTIONS	PERFORMANCE
Watertight concrete for white box system	Sika® ViscoCrete® Sika® WT-220 PMY	Conventional superplasticizer (concrete admixture product). Waterproofing admixture.
Waterproofing of joints	Sika Waterbar®	Joint profiles based on thermoplastic PVC and FPO for waterproof- ing construction and expansion joints.
	SikaFuko® injection hose	Ready to use and re-injectable injection hose, cast in concrete. with, or without reverse flow and hydro-swelling properties for wa- terproofing construction joints.
	Sikadur-Combiflex <sup>®</sup> system	Ready to use sealing tapes for waterproofing joints; adhered to the surfaces with specific Sikadur® adhesives.
Watertight mortars for post applied rigid waterproofing	Sikalastic®-1 KMY SikaTop® Seal-107 (MY)	Mortar layer, based on cementitious mortar and polymer-modified mortar.
Liquid applied waterproofing coatings	Sikagard®-62	Two-component coating based on epoxy resin.
Spray applied waterproofing membrane	Sikalastic®-871 JW	Two-part elastic, 100% solids, very fast curing polyurea spray applied membranes.
Flexible sheet membrane waterproofing	Sikaplan® WT 4220-15 C Sikaplan® WT 4220-15 C Felt Sikaplan® WT 4220-18 H	Hygiene approved sheet membranes based on thermoplastic FPO for loose laid lining of water reservoirs and tanks.
Injection systems for repair	Sika® Injection-201 CE	Two-component PU injection resin.
	Sika® Injection-306	Three-component injection resins based on Acrylate.

## 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 an appropriate joint sealing system for any necessary construction and movement joints. To produce watertight concrete requires admixtures including superplasticisers and pore-blocking or active crystallization agents, in order to ensure optimum consistence, flow and easy compaction in a dense matrix of minimal voids. In addition, Sika joint sealing systems are used in watertight concrete, such as FPO-based waterstops, hydrophilic sealants and gaskets to seal construction and expansion joints.

#### USE

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

#### MAIN ADVANTAGE

- Cost effective solution concerning material and construction work
- 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-220 PMY SikaControl® SikaFume®	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 hard- ened pore volume of the concrete.
Joint sealing products	
Sika Waterbar®	Internal and external waterstops based on hygiene approved FPO, cast in concrete for waterproofing joints.
Sikadur-Combiflex® system	Adhesive tape of FPO, bonded with approved Sikadur <sup>®</sup> adhe- sive for post applied joint sealing.
SikaFuko®	Ready-to-use and re-injectable injection hose with or with- out reverse flow and hydro-swelling properties for water- proofing construction joints.

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# 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 manually, 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 expected
- No structural settlements

#### MAIN ADVANTAGE

- Chemical and abrasion resistant
- Easy application on complex details
- Can be combined with Sika joint sealing systems

### **TYPICAL PROJECTS**

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

## SIKA PRODUCTS AND SYSTEM SOLUTIONS

Waterproofing mortars	
SikaTop® Seal-107 (MY)	Two-component, polymer modified rigid cementitious waterproofing
Sikalastic®-1 KMY	One-component, polymer modified cementitious waterproofing with crack-bridging ability
Joint sealing products	
Sika Waterbar®	Internal and external waterstops based on hygiene approved FPO, cast in concrete for waterproofing joints.
Sikadur-Combiflex® system	Adhesive tape of FPO, bonded with approved Sikadur® adhe- sive for post applied joint sealing.
SikaFuko®	Ready-to-use and re-injectable injection hose with or with- out reverse flow and hydro-swelling properties for water- proofing construction joints.

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## Sikagard<sup>®</sup> – LIQUID APPLIED WATERPROOFING SYSTEM





## ROLLER APPLIED AND CRACK-BRIDGING SYSTEM

Sika liquid applied membranes (LAM) are semi-rigid systems, based on epoxy resins. These materals are applied on prepared and primed internal concrete and steel surfaces by manual application or by spray to provide excellent solutions for complicated detailings. Reinforcements can be incorporated to achieve crack-bridging properties.

#### USE

- Suitable for new and refurbishment of reservoirs
- Limited cracks of substrate expected
   No structural settle-
- ments

#### MAIN ADVANTAGE

- Chemical and abrasion resistant
- Easy application 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	
Sikagard®-62	Two-component coating based on epoxy resin.
Sika® Reemat Sika® Glass Fabric	Optional reinforcement of the epoxy coating for crack- bridging ability
Joint sealing products	
Sika Waterbar®	Internal and external waterstops based on hygiene approved FPO, cast in concrete for waterproofing joints.
Sikadur-Combiflex® system	Adhesive tape of FPO, bonded with approved Sikadur® adhesive for post applied joint sealing.
SikaFuko®	Ready-to-use and re-injectable injection hose with or without reverse flow and hydro-swelling properties for waterproofing construction joints.

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## Sikalastic<sup>®</sup> – HOT SPRAY APPLIED WATERPROOFING SYSTEM





## FAST APPLICATION AND HIGHLY FLEXIBLE SYSTEM

Sika spray applied membranes (LAM) are highly elastic and flexible polymeric systems, based on polyurea. These materals are applied on prepared and primed internal concrete surfaces by hot spray application to provide excellent solutions for complicated detailings. Liquid applied membranes will also prevent underflow of any lateral water in the event of local damage.

### USE

ment of reservoirs

concrete structures

#### MAIN ADVANTAGE

- Suitable for refurbish-Chemical and abrasion resistant For new water retaining
  - Easy applicable on complex details
  - Can be combined with Sika joint sealing systems
  - Long lasting waterproofing solution

#### TYPICAL PROJECTS

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

## SIKA PRODUCTS AND SYSTEM SOLUTIONS

Waterproofing coating	
Sikalastic <sup>®</sup> -871 JW	Two-part elastic, 100% solids, very fast curing polyurea spray applied membranes, especially designed for the use in potable water installations, reservoirs and fish tanks. Sikalastic <sup>®</sup> -871 JW is for machine application only.
Joint sealing products	
Sika Waterbar®	Cast in place and internal waterstops based on PVC or FPO, cast in concrete for the waterproofing of joints.
Sikadur-Combiflex® system	Adhesive tape of FPO, bonded with approved Sikadur® adhe- sive for post applied joint sealing.
SikaSwell®	Range of hydrophillic profiles and gun applied sealants, designed for the sealing and waterproofing of construction joints and penetrations (e.g. pipe entries).

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## Sikaplan® – WATERPROOFING SHEET MEMBRANE LINING SYSTEM





## HIGH PERFORMANCE, CRACK-BRIDGING, FAST INSTALLATION

Sikaplan<sup>®</sup> FPO-based membrane is a high flexible waterproofing system, using hygiene approved sheet liner, installed on concrete structure of potable water reservoirs. The membrane can be used in combination with joint sealing products. Sikaplan<sup>®</sup> waterproofing sheet membrane linings have long lasting service life.

### USE

### MAIN ADVANTAGE

- Suitable for new and refurbishment of reservoirs
   Can be combined w
  - 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 4220-15 C Felt Sikaplan® WT 4220-18 H	FPO sheet waterproofing membranes, for waterproofing po- table water tanks and reservoirs, mechanically fixed at walls with membrane overlaps sealed by heat welding.
Joint sealing products	
Sika Waterbar®	Cast in place and internal waterstops based on PVC or FPO, cast in concrete for the waterproofing of joints.
Sikadur-Combiflex® system	Adhesive tape of FPO, bonded with approved Sikadur <sup>®</sup> adhe- sive for post applied joint sealing.
SikaFuko®	Ready-to-use and re-injectable injection hose with or with- out reverse flow and hydro-swelling properties for water- proofing construction joints.

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## **RESERVOIR WATERPROOFING** SOLUTIONS OVERVIEW

### **RIGID WATERPROOFING**

Very cost effective

No protection measures required

■ Simple and fast construction



### SEMI-RIGID WATERPROOFING

Very cost effective

Moisture tolerant

■ Simple and fast application



Advantages

### FLEXIBLE WATERPROOFING



## REPAIRING OF LEAKS OF RIGID WATERPROOFING SYSTEMS





### SIKA INJECTION SOLUTIONS FOR REPAIR AND REFURBISHMENT OF 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 in reservoirs and tanks, waterproofed either by watertigh concrete, or lined with waterproofing mortar layers. This can be done by injection or application of a waterproofing mortar.

The success of a 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 in concrete
- Quick repair for sealing with waterproofing mortars and Sikadur-Combiflex<sup>®</sup> system on concrete surface

### TYPICAL PROJECTS

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

### SIKA PRODUCTS AND SYSTEM SOLUTIONS

Crack and joint sealing pro	oducts
Sikadur-Combiflex® system	Adhesive tape of FPO, bonded with approved Sikadur <sup>®</sup> adhe- sive for post applied joint sealing; sealing around pipe pen- etrations and access door frames.
SikaTop® Seal-107 (MY) Sikalastic®-1 KMY	One- and two-component and cementitious waterproofing mortars for repair and sealing of crack in concerete and repair of homey-combed surfaces.
Injection systems for repa	ir
Sika® Injection-201 CE	Two-component PU injection resin.
Sika® Injection-306	Three-component injection resin based on Acrylate for water- proofing cracks and joints into structural concrete.

## PROJECT REFERENCES

### JOINT SEALING



Réservoir Dupail, France: 900 m of Sikadur-Combiflex® SG Tapes.

## MULTI-LAYER RESINS



Desalinated potable water storage tank, Al Khobar, Saudi Arabia: 90,000 m<sup>2</sup> of Sikafloor<sup> $\circ$ </sup>-161, Sikagard<sup> $\circ$ </sup> PW.

### WATERPROOFING MORTARS



**Rapid refinery Pengerang, Malaysia**: Tank refurbishment with Sikalastic<sup>®</sup>-1K (spray application), Sikadur-Combiflex<sup>®</sup> SG Tapes and Sikaflex<sup>®</sup> PRO-3.



**Drinking water tank, Oman**: Multi-layer: Sikafloor®-161, Sikagard® PW in blue color.

### HOT-SPRAY MEMBRANE



**Basin San Esteban, Spain:** 800  $m^2$  of Sikafloor®-161 and Sikalastic®-840 ES.

### SHEET MEMBRANE



Water tower Leon, Mexico: Sikaplan® WT-4220.



**Reservoir Santa Cruz del Valle, Spain:** 1,800 m<sup>2</sup> of Sikafloor®-161, Sikalastic®-840 ES.



Water tower Beersel, Belgium: Sikaplan® WT-4220.

## GLOBAL BUT LOCAL PARTNERSHIP



#### WHO WE ARE

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 Data Sheet prior to any use and processing. ca Kimia S dn Bhd / Waterproofing / Sika Solutions For Potable Wate



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