

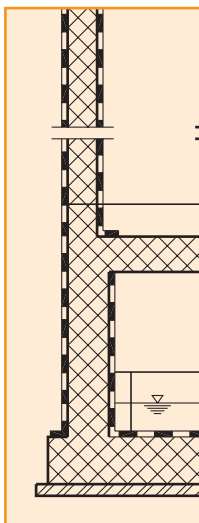


# VANDEX SUPER FOR TOKYO'S FIRST CONVENTION AND ART CENTRE

*Tokyo has rapidly developed into one of the world's major business centres. Now this prominent city has an appealing new venue – the magnificent Tokyo International Forum, a location where culture and information can be exchanged at an international level.*



VANDEX SUPER application





**T**he Forum is the first major convention and art centre of its kind in Tokyo.

It houses four halls, numerous conference rooms, an exhibition hall and an information centre. It is a superb venue for music and theatre and dancing performances, cinema, art exhibitions, commercial events and international conferences. The vision for this plaza is one of a unique location that fosters exciting new cultural trends and brings people together on an impressive scale. The Forum is a new source of cultural trends in Marunouchi, the heart of Tokyo's business centre.

The Tokyo International Forum includes a variety of cultural, educational and service facilities in the following main buildings:

**Glass Hall:** 3 floors below ground level, 7 floors above ground level

**Hall buildings:** 3 floors below ground level, 11 floors above ground level

**Total building area:** 20,951 m<sup>2</sup>

**Total floor space:** 145,076 m<sup>2</sup>

**Structure:** steel frame above ground level, reinforced concrete below ground level

PHOTO: TOKYO INTERNATIONAL FORUM

## THE VANDEX WATERPROOFING SOLUTION

After detailed investigation, the consultant responsible for the project decided, in close cooperation with the contractor, to use Vandex products as a surface waterproofing slurry for the inside and outside of the concrete structure. The Vandex Waterproofing System was used partly for external walls of the structures below ground level, as well as for floors and walls of the various water tanks and pits at basement level, underneath the exhibition rooms, parking areas, etc. VANDEX SUPER and VANDEX PREMIX were easily applied to damp concrete surfaces with a brush. Because they are cementitious products, they can be applied safely in confined spaces. This aspect made a considerable contribution to the reduction in construction time.

### TECHNICAL INFORMATION

Products used: VANDEX SUPER, VANDEX PREMIX

Areas treated: internal and external concrete surfaces below ground level and water tanks

Total area treated: 9,000 m<sup>2</sup>

Application method: brush applied

**Project name:** Tokyo International Forum

**Country:** Japan

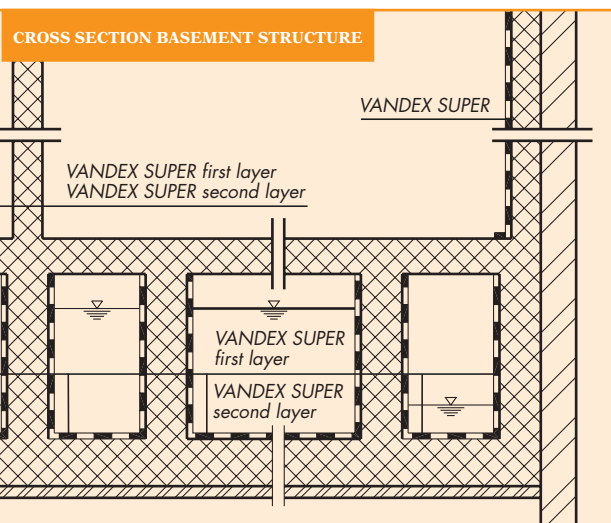
**Owner:** City of Tokyo

**Architects:** Rafael Vinoly Architects

**Main Contractor:** Obayashi, Taisei

**Vandex Applicator:** Mitsugashi

Waterproofing Co. Ltd



# VANDEX SPECIALISED PRODUCTS FOR REINSTATING DRINKING WATER TANK

**T**he redevelopment of the Liebewil reservoir, supplying water for Köniz, commissioned in 1979, was ordered by the food inspectorate in 1999. The inner surface areas of both chambers, each with a water storage capacity of approx. 3,900 m<sup>3</sup>, were originally covered with ceramic tiles. As later became apparent, these were not laid free from hollow cavities.

An important objective of water supply operators is having durable, cleaning-friendly inner surfaces of the reservoir. The hygienic requirements of the food laws must be adhered to in full. As a result of the untightness of the tile joints used for the facing of the interior of the reservoir, an ideal breeding ground was created for bacterial growth. In addition, individual tiles were constantly becoming detached as a result of the insufficient adhesion. In close collaboration with an engineering office and following intensive studies of different alternatives, the owners of the

construction decided in favour of redevelopment of the surfaces with water contact by means of a new cementitious coating.

## SYSTEM SOLUTION FOR THE NEW INNER COATING

For the reprofiling of surfaces with insufficient concrete cover, the purely mineral, high-density VANDEX CEMLINE MORTAR was used. This special product for drinking water reservoirs can be processed mechanically or manually in single layers with a layer thickness of 5 to 30 mm. This mortar was used for the entire floor area where the quality of the concrete slab turned out to be highly defective, for which reason it had to be removed and built up again. The high-density slurry VANDEX CEMLINE TOP GREY, with an overall thickness of 3–4 mm (corresponds to 6–8 kg/m<sup>2</sup>), was used as final coating.

The material was spray applied in an “orange peel” finish. This

leads to a closed, pore and cavity free surface. In addition, VANDEX MINERALIT was applied as surface hardening.

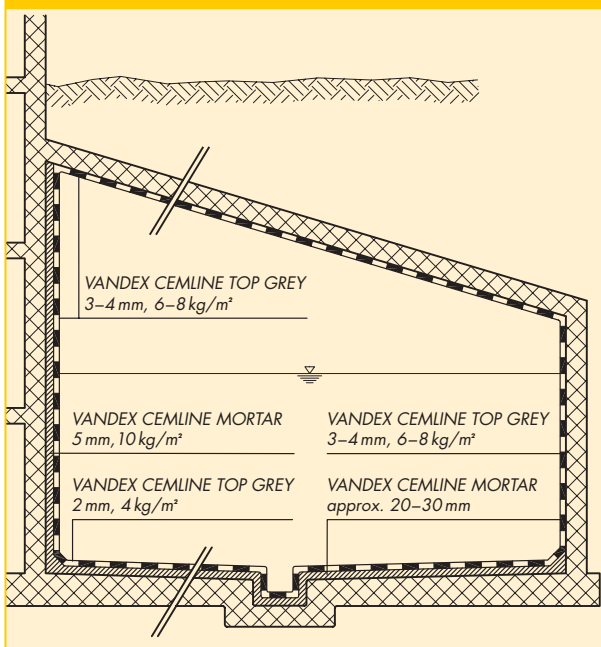
## HIGH IMPORTANCE OF QUALITY ASSURANCE

During the entire redevelopment work, high importance is attached to quality assurance. If possible, the requirements on quality are to be determined in measurable criteria. The following points require intensive monitoring:

- Preparation of substrates (stability, cleanliness, surface roughness) for ensuring the mechanical bond of the newly applied material
- Moisture of the prepared underground at the time of application for optimum adhesion
- Amount of mixing water for the cementitious materials, as low a water-cement ratio as possible
- Climatic conditions during the hardening phase for ensuring undisturbed hydration of the coating



#### DRINKING WATER TANK LIEBEWIL, SWITZERLAND



#### TECHNICAL INFORMATION

Year of construction:	1979
Capacity:	7,800 m <sup>3</sup> (2 chambers)
Total area floor:	1,400 m <sup>2</sup>
Total area wall:	1,800 m <sup>2</sup>
Total area ceiling:	1,400 m <sup>2</sup>



**Owner:** Community of Köniz, Berne, **Site Management:** Ryser Engineering AG, Berne,  
**Planning:** Weber + Brönnimann AG, Civil Engineers SIA/USIC, **Vandex Applicator:**  
 Marti AG Berne, Renesco Bautenschutz

# OCEANOGRÀFIC – ELDORADO FOR ALL UNDERWATER FANS

**R**ecently, Valencia has become the home to the largest sea aquarium in Europe. The “Oceanogràfic”, embedded in the “Ciutat de las arts y de les ciències”, awaits visitors with unique attractions; the dimensions alone are spectacular: The park covers an area of 80,000 m<sup>2</sup>, and 500 animal species live in the basins containing a total of 42 million litres of water. The various marine ecological systems of our planet are presented in 12 pavilions. The oceans and seas differ greatly in terms of temperature, salt content, flora, rock and, naturally, in terms of their inhabitants: sharks, whales, dolphins, sea lions, penguins, star fish, sea urchins, crustaceans and countless fish.

The fascinating undersea world can be admired through gigantic Plexiglas panels that are in part 24 metres long, without visible supports. An 80 metre long transparent underwater tunnel makes it possible to walk face-to-face with the sharks. However, the visitor can also drink a coffee or go shopping under the watchful eye of the sea inhabitants.

The Oceanogràfic also includes an auditorium with a seating capacity of 350 for all types of conference and event. It is a place where research, science, culture, leisure time and relaxation all have their own place.

## A LARGE VANDEX JOB

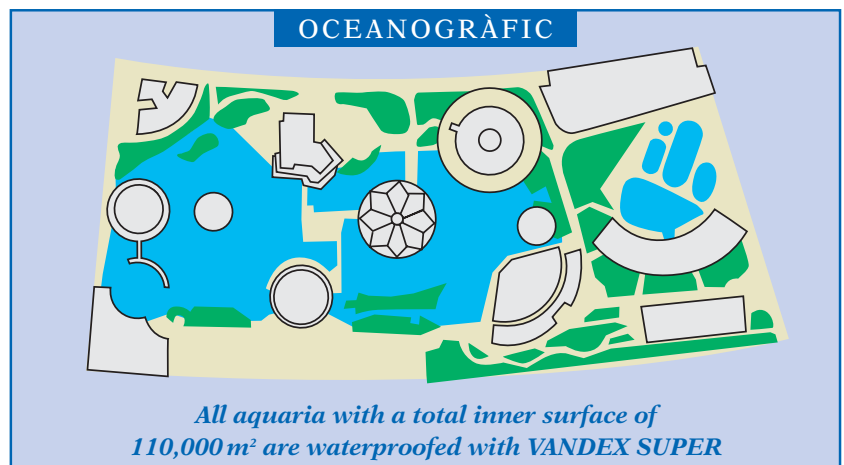
The draft design for the Oceanogràfic originates from the architect Félix Candela, who died prior to the opening. Above all, he used three materials: concrete, steel and Plexiglass. In this respect, sealing and protection of the aquaria, which have three main requirements to fulfil, played an important role: the animals and

plants should live in perfect sea water, the sea water containers should be waterproof and reliably protected against attack by the salt water, and the operating safety of the aquarium should be ensured on a lasting basis. Overall, 110,000 m<sup>2</sup> of reinforced concrete surface areas of the structure, with contact to the sea water, and 8,500 m<sup>2</sup> of construction joints were coated with VANDEX SUPER. The dosage corresponds to the Vandex standards: horizontal surface areas: 1.2 kg/m<sup>2</sup>, vertical surface areas: 1.5 kg/m<sup>2</sup>, construction joints: 1.5 kg/m<sup>2</sup>.

VANDEX SUPER is continuously tested for water tightness, suitability for drinking water, microbiological and physical characteristics and resistance to salt, in accordance with international standards.

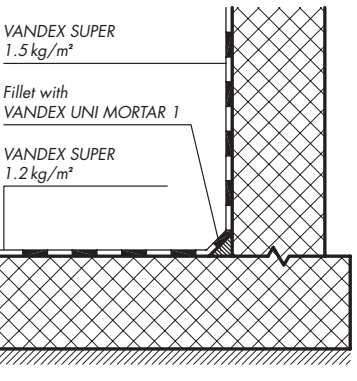
VANDEX SUPER has been in use throughout the world for 20 years in numerous large sea water aquaria. Once again, Vandex has proven itself as the optimum coating.

**Project name:** Oceanogràfic, Valencia, Spain, **Owner:** Ciutat de les arts y de les ciències, Valencia, Spain, **Architect:** Félix Candela, **Vandex Applicator:** Katorce Engineering SA, Impermeabilizaciones especiales, Barcelona





**CROSS SECTION AQUARIUM WATERPROOFING DETAIL**



*VANDEX SUPER application on walls and base slabs*

## DRINKING WATER SUPPLY SYSTEM, MOSCOW, RUSSIA

# 17 MAJOR RESERVOIRS IN MOSCOW REFURBISHED WITH VANDEX PRODUCTS



Water treatment plant at the Kurjanovo Aeration Station, the largest in Europe, in the process of refurbishment.



**S**ince mid-nineties, *Mosvodokanal, the water supplies and sewage systems authority of the City of Moscow, carries out a comprehensive maintenance program on drinking water facilities.*

Seventeen major drinking water reservoirs in Moscow, with a vast total capacity of 700 million litres, were completely refurbished on the inside with Vandex specialised products, so as to ensure the quality of the water.

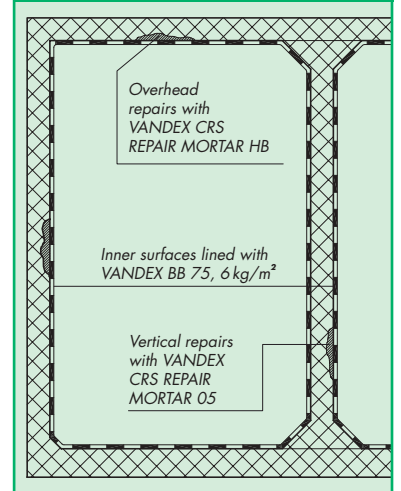
The reinforced concrete structures and their inner surfaces to be renovated, required a varying degree of concrete repair work, as well as a new lining and protection system for floor, walls, columns and ceiling surfaces that is approved for use in drinking water. The program also includes refurbishment of water treatment plants where large volumes of Vandex system products are being applied.

### THE VANDEX SOLUTION

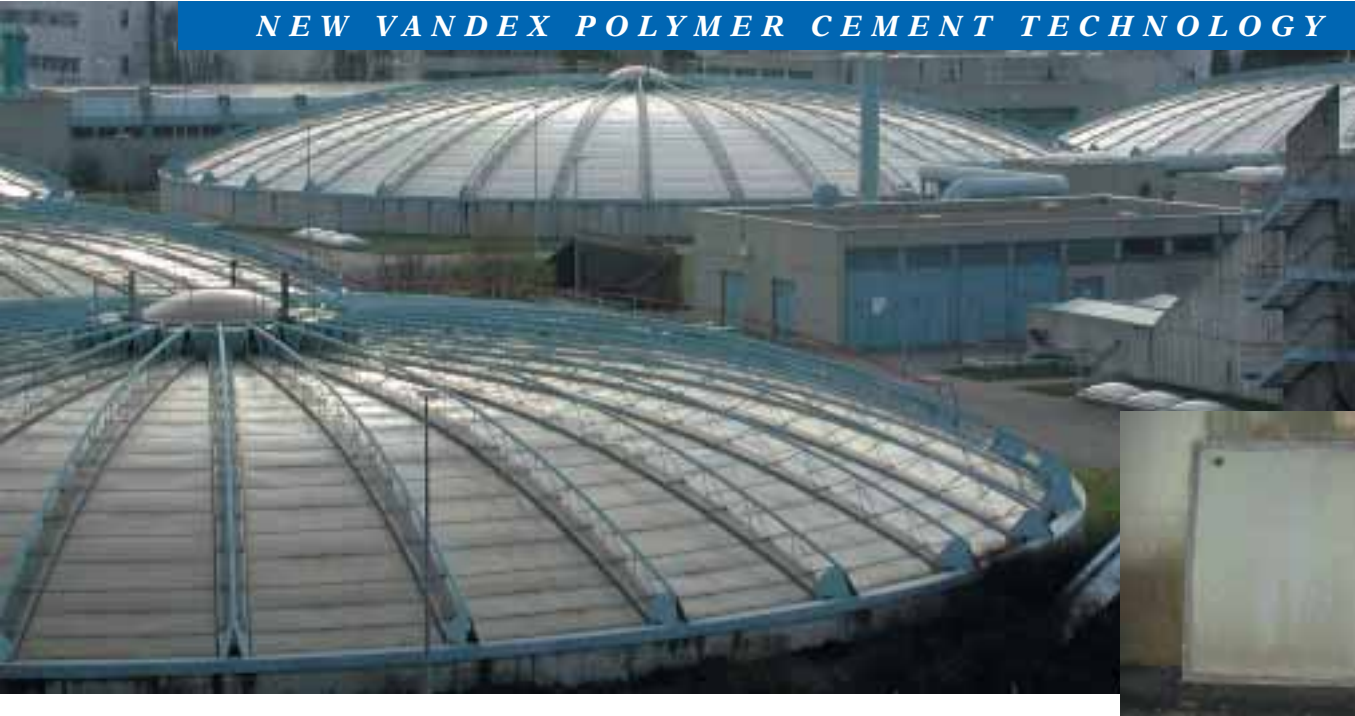
*The concrete repair and lining work at the various reservoirs is carried out in stages in accordance with the following concept.*

- All structural damage needed to be repaired prior to the application of the waterproofing and protective lining.
- Ceiling: Overhead concrete repair using VANDEX CRS REPAIR MORTAR HB with a layer thickness of up to 50 mm in one application.
- Walls, columns, floor: Concrete repair using VANDEX REPAIR MORTAR 05 with a layer thickness of up to 50 mm in one application.
- Lining of the entire inner reservoir surfaces of ceiling, walls, columns and floor with VANDEX BB 75, applied at a rate of 6 kg/m<sup>2</sup> in 2 layers in an easy-clean finish.

### CROSS SECTION OF DRINKING WATER TANK



**Owner:** Mosvodokanal, City of Moscow, Russia  
**Engineer:** Triada Holding, Moscow, Russia  
**Main Contractor and Vandex Applicator:** Triada Holding, Moscow, Russia



## POLYMER CEMENT TECHNOLOGY AGAINST AGGRESSIVE SEWAGE

The treatment and processing of sewage is an undisputed necessity throughout the world. Due to the inconvenience caused by the smell of the sewage, the trend in design is towards closed facilities. This results in a new stress situation for the structures. In closed sewage tanks, an  $H_2S$  contaminated atmosphere develops.  $H_2S$  is generated by the bacteria "Thio Concretivorus", which feeds on the sewage sludge. The  $H_2S$  gas oxidises under the influence of oxygen to form sulphur trioxide ( $SO_3$ ). This combines with condensed water on the concrete surface to form sulphuric acid ( $H_2SO_4$ ) that attacks concrete. The bacteria that form the acid, survive in an environment with low pH-values. The acid attack and the low pH-value of the condensed water, seriously damage concrete structures over the years. Protective coatings can effectively improve the situation.

Latest research in the field of polymer-modified, cementitious coatings has resulted in products that are able to withstand the attack and that can be applied easily to concrete in a damp

environment. They can be considered for the refurbishment of old structures, as well as for preventive treatment for new structures.

### TESTING

In addition to the internal testing with sulphuric acid and pH-values of 0 to 1, the resistance of the recently developed VANDEX POLYCEM Z coating has been evaluated through exposure to the ProReno sewage treatment plant in Basle, Switzerland, which processes industrial and domestic sewage. Concrete specimens that have been coated with VANDEX POLYCEM Z have been exposed for 6 and 12 months to the tidal and gas zone of the final sedimentation tank. Measurements on the specimen are compared to reference specimens that have been stored in a climatic room at 25 °C/50% r. h.

### HIGH RESISTANCE OF VANDEX POLYCEM Z

In the following the assessment of the accredited Swiss testing institute BBL: The tensile adhesive strength does not differ from the reference specimens. The water

absorption is not higher than that of the reference specimens. There is a slight increase in the sulphate content on the surface. Inside the specimens, no increase in the sulphate content is however detectable.

A visual inspection of the specimens does not reveal any cracks, blisters or discolouration. Micro-organisms cannot be detected. "The VANDEX POLYCEM Z coating shows a very high resistance against sulphur-containing compounds in water, and against sulphur containing gas compounds. Thus it is suitable for protective use in an environment with biogenic sulphuric acid attack."

SEWAGE		
Data	Unit	Content
Temperature	°C	22–35
pH-value	pH-value	4.0–5.5
$NH_4^+$	mg/l	25–65
$Mg^{2+}$	mg/l	220–450
$SO_4^{2-}$	mg/l	500–1250
$Cl^-$	mg/l	150–250

GAS ZONE		
Data	Unit	Content
Air humidity	Vol. %	78–92
Temperature	°C	22–35
$H_2S$ concentration	mg/m <sup>3</sup>	5–25
$SO_2$ content	µg/m <sup>3</sup>	440–890
$CO_2$ content	µg/m <sup>3</sup>	0.1–0.2
$NO_2$ content	µg/m <sup>3</sup>	25–125
pH-value condensation water	pH-value	4.5–5.1



## NEW LIBRARY ALEXANDRIA – A CENTRE OF CULTURE AND KNOWLEDGE

With its approximately 700,000 Papyrus rolls, the Old Alexandria Library was the centre of knowledge and cultural exchange between Orient and Occident. It was founded by the Hellenics in the year 288 B.C. and fell victim to fire during the Roman period. Science and culture have never been able to recover from this major loss and so it was that, in the 1970's, the idea of rebuilding the library took shape. Thanks to the support of many nations and private persons, as well as Unesco, the New Alexandria Library was opened in 2002. In order to preserve the valuable treasures for future generations, great importance was attached to the sealing of the building.

### THE VANDEX SOLUTION

After detailed investigation, the engineering consultant responsible for the project decided, in close cooperation with the main contractor, to use Vandex products to waterproof the structure against hydrostatic pressure from the inside of the concrete. After local waterproofing pretreatment of the diaphragm wall, the external below ground walls and floors of the Planetarium were waterproofed with VANDEX SUPER at the rate of 1.5 kg/m<sup>2</sup>, brush applied in two layers. Construction joints were chiselled out and waterproofed with VANDEX UNI MORTAR 1.



Mixing of VANDEX SUPER



VANDEX SUPER brush application to inner concrete wall surfaces

### TECHNICAL INFORMATION

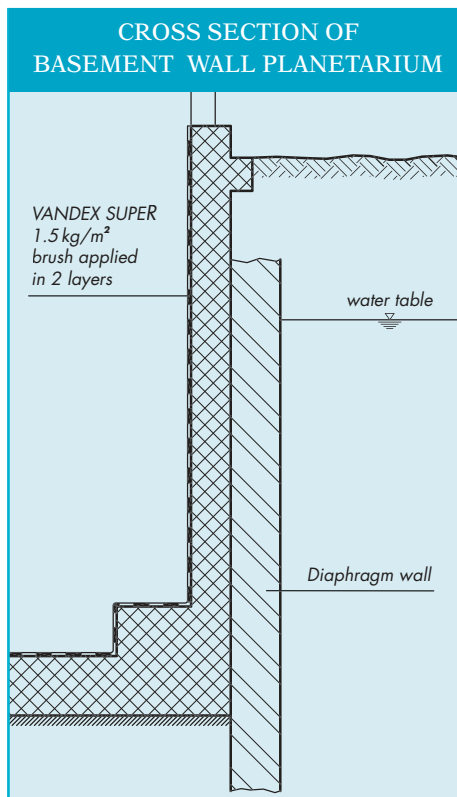
**Products used:** VANDEX SUPER, VANDEX UNI MORTAR 1  
**Areas treated:** internal basement concrete surfaces  
**Total treated area:** 15,000 m<sup>2</sup>  
**Application method:** brush



## HIGH PERFORMANCE SEALING TAPE FOR MOVEMENT AND CONSTRUCTION JOINTS

- permanent flexible seal against waterpressure
- high elasticity
- thermal welding secures tape joints
- Epoxy glue matched to praxis
- no primer required

VANDEX FLEXTAPE is a thermoplastic elastomer. Extremely durable, it has excellent resistance to weathering and is UV and chemically stable. The bond to the substrate is achieved using VANDER FLEXTAPE ADHESIVE, an Epoxy resin. No primer or activator is required.

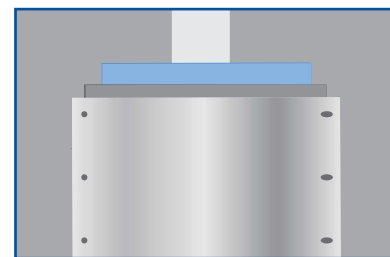


**Owner:** Arab Republic of Egypt,  
**Architect/Engineer:** Snøhetta/Hamza Consortium  
**Main Contractor:** Arab Contractors/Balfour Beatty  
**Vandex Applicator:** Sodeco Specialities S.A.E.

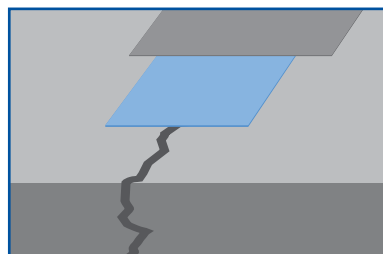
*The state of the art joint waterproofing solution for many applications:*



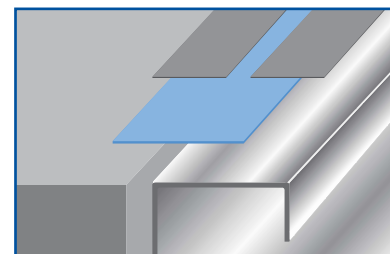
*Horizontal or vertical construction or movement joints*



*Application on passive side with counterpressure structure*



*Cracks in concrete structure*



*Seal over different types of materials or structures*

**For more information visit our website [www.vandex.com](http://www.vandex.com).**