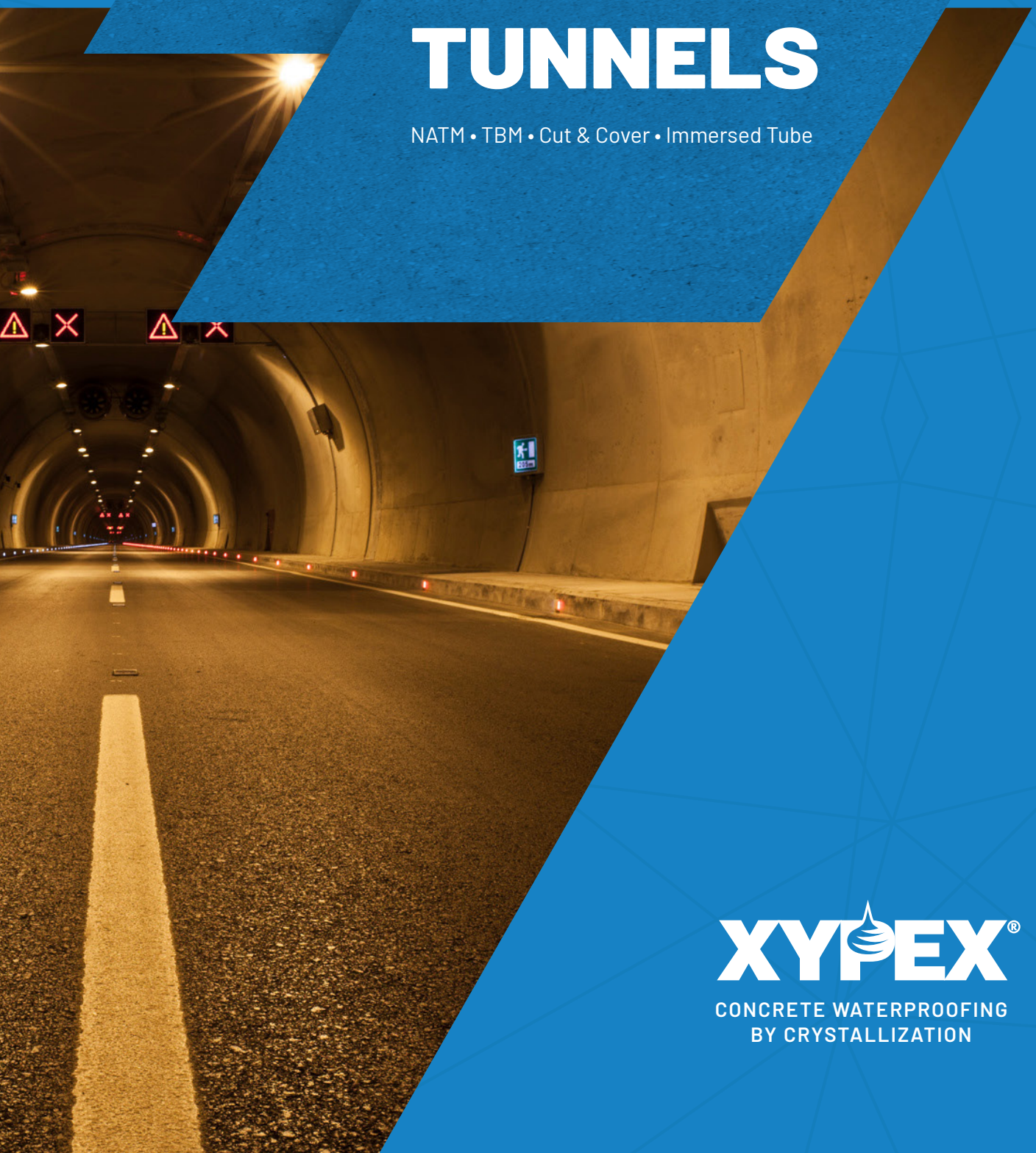
TUNNELS

NATM • TBM • Cut & Cover • Immersed Tube



XYPEX®

CONCRETE WATERPROOFING
BY CRYSTALLIZATION

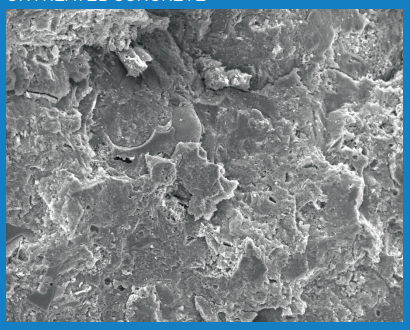
XYPEX

WATERPROOFING & ENHANCED DURABILITY FOR TUNNELS



Prague Sewer Tunnels, Ďáblice, Prague, Czech Republic

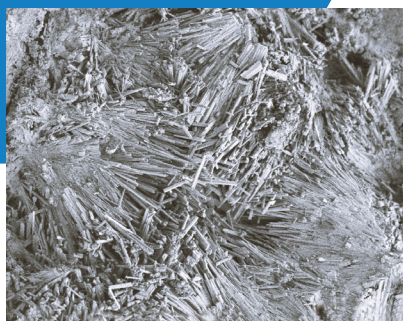
UNTREATED CONCRETE



CRYSTALLIZATION INITIATED



CRYSTALLIZATION MATURE



REACTIVATES AND SELF-HEALS CRACKS UP TO 0.5 mm WHEN WATER IS PRESENT

EXTENDED SERVICE LIFE

WATERPROOF UNDER EXTREME HYDROSTATIC PRESSURE

XYPEX CRYSTALLINE TECHNOLOGY

Xypex Crystalline Technology works inside the concrete. It waterproofs under extreme hydrostatic pressure, extends service life, and self-heals when water is present.

For engineers specifying underground infrastructure, integral waterproofing provides measurable, verifiable durability advantages over traditional tunnel waterproofing. Trusted in over 100 countries for more than 55 years, Xypex protects concrete from the inside out and extends the service life of tunnels.

INTEGRAL WATERPROOFING AND INCREASED SERVICE LIFE

Xypex reacts with the by-products of cement hydration and water to form a non-soluble crystalline structure deep within the concrete. In this condition, the concrete becomes impermeable for water, preventing the penetration of liquids from any direction, even under extreme hydrostatic pressure.

The chemical-resistant crystalline matrix prevents chloride ingress and mitigates sulphate attack. It has also proven effective against carbonation and can self-heal static cracks up to 0.5 mm (0.02 in), ensuring long-term concrete performance even under harsh environmental conditions.

THE XYPEX ADVANTAGES

- Permanent increase in durability and extended service life
- Protects against chlorides, sulphate attack and carbonation
- Permanently seals concrete from water ingress
- Self-heals static cracks up to 0.5 mm
- Lower carbon footprint than other waterproofing technologies

WATERPROOFING IN TUNNELS
XYPEX VS TRADITIONAL

FEWER LAYERS, FEWER PROCESSES. LESS TIME, LESS RISK, LESS COST.

Traditional surface-applied waterproofing membranes provide a thin, impermeable barrier that can be punctured during construction, may delaminate, and can fail within the structure's service life. Xypex Crystalline Technology works differently. Integrated directly into the concrete mix or applied to the surface, it reacts with water and by-products of cement hydration to form a permanent, non-soluble crystalline structure deep within the pores and capillary tracts of the concrete matrix.

The resulting Xypex-treated concrete is waterproof, without the risk of damage during construction, and enhances durability, especially when exposed to aggressive soils and groundwater. Trusted in tunnel applications globally, Xypex delivers permanent, integral protection for all tunnelling construction methods.

THE XYPEX TUNNELLING ADVANTAGES

- Shortens construction time and saves money
- Permanent increase in durability and extends service life
- Designed for greater efficiency with nozzle-added accelerators
- Self-heals static cracks up to 0.5 mm
- Suitable for use in aggressive soils and groundwater
- Compatible with ground freezing methods
- Suitable for all types of tunnel construction
- Globally available

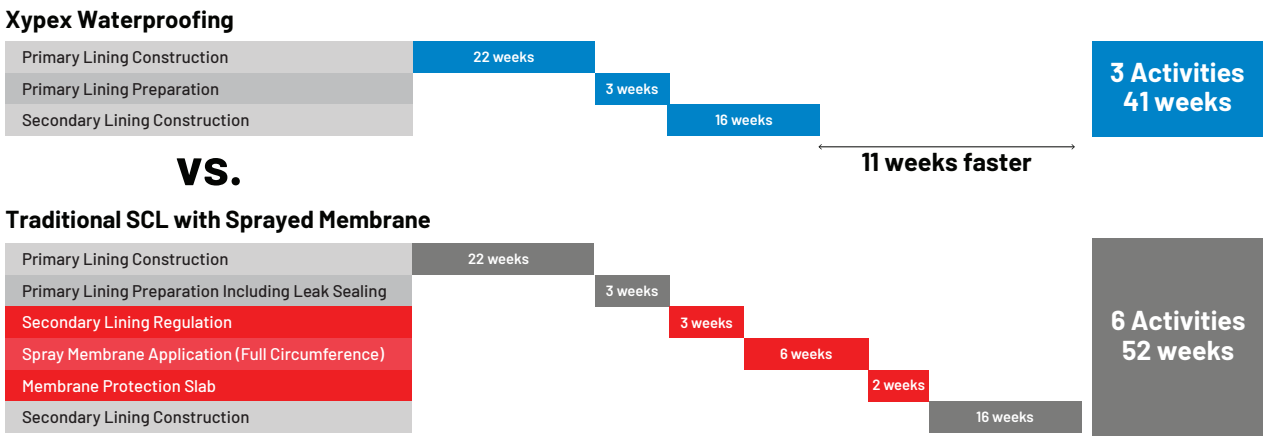


HAMMERSMITH CONNECTION TUNNEL

Thames Tideway, London, United Kingdom

Xypex was the sole waterproofing material for the Hammersmith Connection Tunnel. Xypex enabled 11 weeks reduction in schedule.

XYPEX REDUCES THE CONSTRUCTION SCHEDULE



XYPEX

EXTENDED SERVICE LIFE: ENGINEERED FOR SUPERIOR PERFORMANCE

Concrete permeability is the primary predictor of service life in concrete infrastructure. It is directly related to the rate of deterioration from chloride-induced corrosion, sulphate attack, and carbonation.

Xypex Crystalline Technology reduces concrete permeability within its microstructure. Global independent testing confirms consistent, measurable performance improvement.

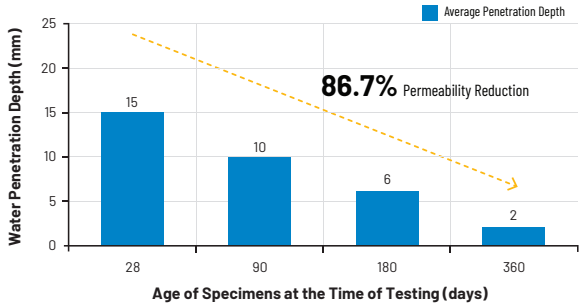


LIFECYCLE ADVANTAGE

Xypex's integral waterproofing extends the active service life of tunnel structures, increases the time to first repair, and lowers total lifecycle costs. These are critical factors for infrastructure requiring a service life of 100+ years.

For more information scan the QR code.

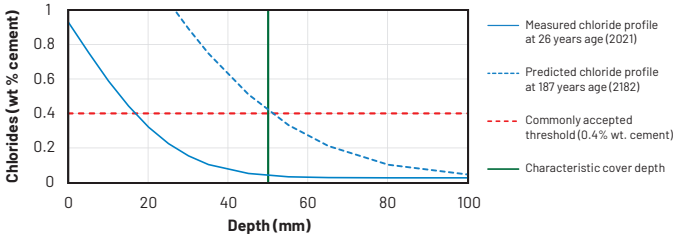
86.7% PERMEABILITY REDUCTION



Continued Reactivity
This 11-year study shows that the water permeability of Xypex-treated concrete continues to improve over time. While the average water penetration at 28 days was already low, the depth of penetration was further reduced by 86.7% at 360 days.

100+ YEARS SERVICE LIFE WITHOUT REPAIR

Verified Real-World Performance
Service life modeling is critical for infrastructure; however, real-world performance does not always align with predictive models. Independent service life assessments of two marine structures confirm that Xypex-treated concrete outperforms expectations. After 19 and 26 years in service, testing shows exceptionally low chloride concentrations, with a predicted service life exceeding 100 years without repair.



REDUCES CORROSION RATE

Measured Corrosion Rate (µm/yr)		
	Cracked Specimen	Uncracked Specimen
Control	20	10
Xypex-Treated	10	6
% Improvement with Xypex	**50%**	**40%**
Measured Corrosion Loss (µm)		
	Cracked Specimen	Uncracked Specimen
Control	18.6	11.9
Xypex-Treated	6.14	6.74
% Improvement with Xypex	**67%**	**43%**

Crack Healing and Reduced Rate of Corrosion
This long-term independent study provides substantial evidence supporting Xypex's efficacy. The results show that Xypex-treated concrete reduces rebar corrosion rates by 40% in uncracked concrete and by up to 50% in cracked concrete. The author theorized that Xypex's crack-healing capability reduced corrosion loss by up to 67% in the cracked specimens.

NATM & SHOTCRETE WATERPROOFING

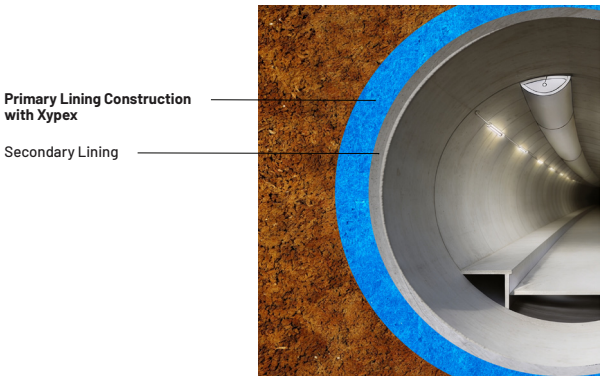
WATERTIGHT SHOTCRETE PRIMARY LINER WITH STRUCTURAL FIBRES



KEY BENEFITS OF XYPEX IN NATM & SHOTCRETE

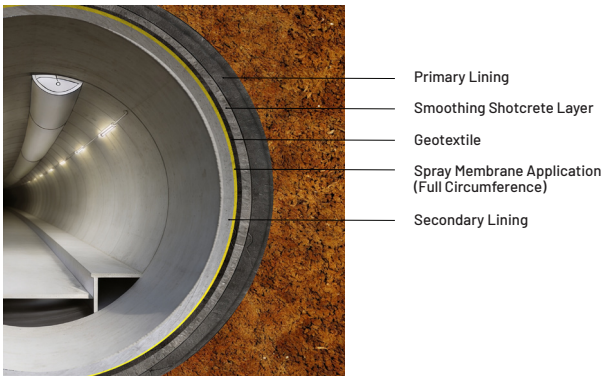
- Eliminates lining procedures and reduces construction schedule
- Cost saving from fewer lining processes
- Designed for use with shotcrete and to minimize the dosage rate of nozzle added accelerator
- Can heal static hairline cracks up to 0.5 mm
- Waterproof under extreme hydrostatic pressure
- No risk of puncture or damage during construction
- Permanent protection

Xypex Waterproofing



vs.

Traditional SCL with Sprayed Membrane





WESTCONNEX M4E TUNNEL

Sydney, New South Wales, Australia

The WestConnex M4E roadway tunnel project in New South Wales, Australia utilized a total of 5,578 m^3 of Xypex-treated shotcrete, which serves as both the secondary lining and the waterproofing for the tunnel.

TUNNEL BORING MACHINE



Delhi Metro Rail Corporation (DMRC)
Phase III & Phase IV, Delhi, India

KEY BENEFITS OF XYPEX IN TBM

- Waterproofing of precast segments, station boxes and transitions from TBM to other tunnel construction methods
- Improved durability and increased service life
- Waterproof under positive and negative pressure
- Self-healing of concrete cracks up to 0.5 mm



CUT & COVER

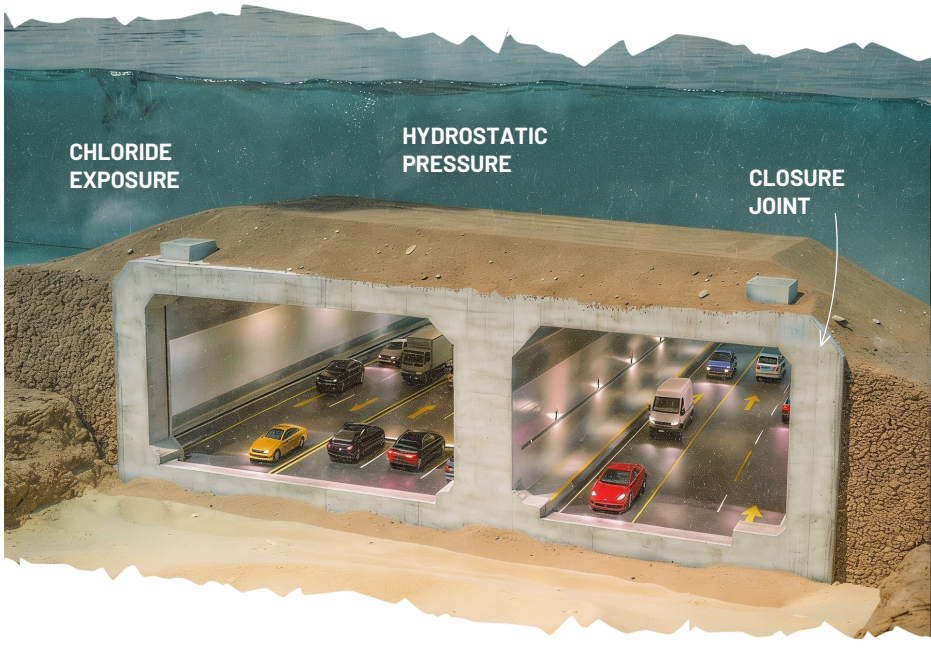
KEY BENEFITS OF XYPEX IN CUT & COVER

- Reduced excavation width by eliminating externally applied waterproofing
- Reduced labour onsite
- No risk of membrane puncture during construction
- Extended service life

IMMERSED TUBE

KEY BENEFITS OF XYPEX IN IMMERSED TUBE

- Self-healing of cracks up to 0.5 mm
- Increased durability and protection from harsh marine chlorides, sulphates and other aggressive groundwater
- Waterproofs against extreme hydrostatic pressure after submersion
- Consistent integral protection across precast elements and closure pours



XYPEX

A MORE SUSTAINABLE SOLUTION

For more information, visit xypex.com/sustainability or scan the QR code.

Sustainability

Our crystalline technology provides permanent concrete waterproofing that supports resilient infrastructure, extends service life, and enables circular construction practices. Central to our commitment is helping projects reduce their carbon footprint while achieving their durability and sustainability objectives.

EXTENDS SERVICE LIFE

UP TO **187** YEARS

REDUCES HUMAN PRESENCE ON JOBSITE

Type III EPD

1.5 LEED POINTS per product

HPD

1 LEED POINT per product

100% RECYCLABLE & REUSABLE packaging & concrete

REDUCES REPAIRS

Permanent one time application

NO VOCs

LEED low emission credit – Eurofins data**

REDUCES CONSTRUCTION TIME

LCA

Life Cycle Assessment

"FROM CRADLE TO GRAVE"

~60%

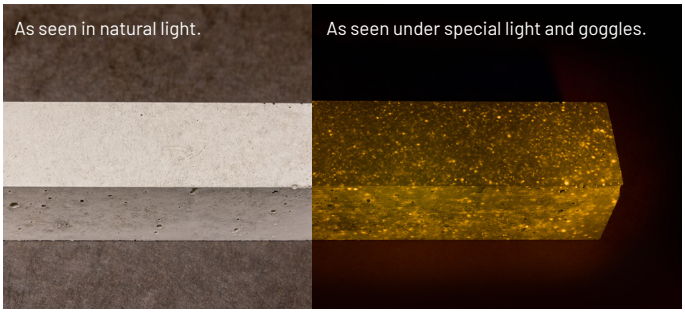
LOWER CARBON FOOTPRINT

than typical waterproofing technology

VDS Visual Detection System

Confirm Presence of Xypex in Hardened Concrete

Xypex Admix products include the proprietary Visual Detection System (VDS) tracer, allowing engineers and inspectors to verify the presence of Xypex in hardened concrete. This unique feature allows for independent confirmation of crystalline in the concrete.



AMÉRICO VESPUCIO ORIENTE II

Santiago, Chile

Following a rigorous competitive evaluation of four crystalline products, Xypex Admix was selected for the 5.2 km underground section of the AVO II highway tunnel — achieving the lowest water penetration depth and full compatibility with fibre-reinforced shotcrete.



Certified to ISO 9001:2015

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For more information on Tunnels scan the QR code.