





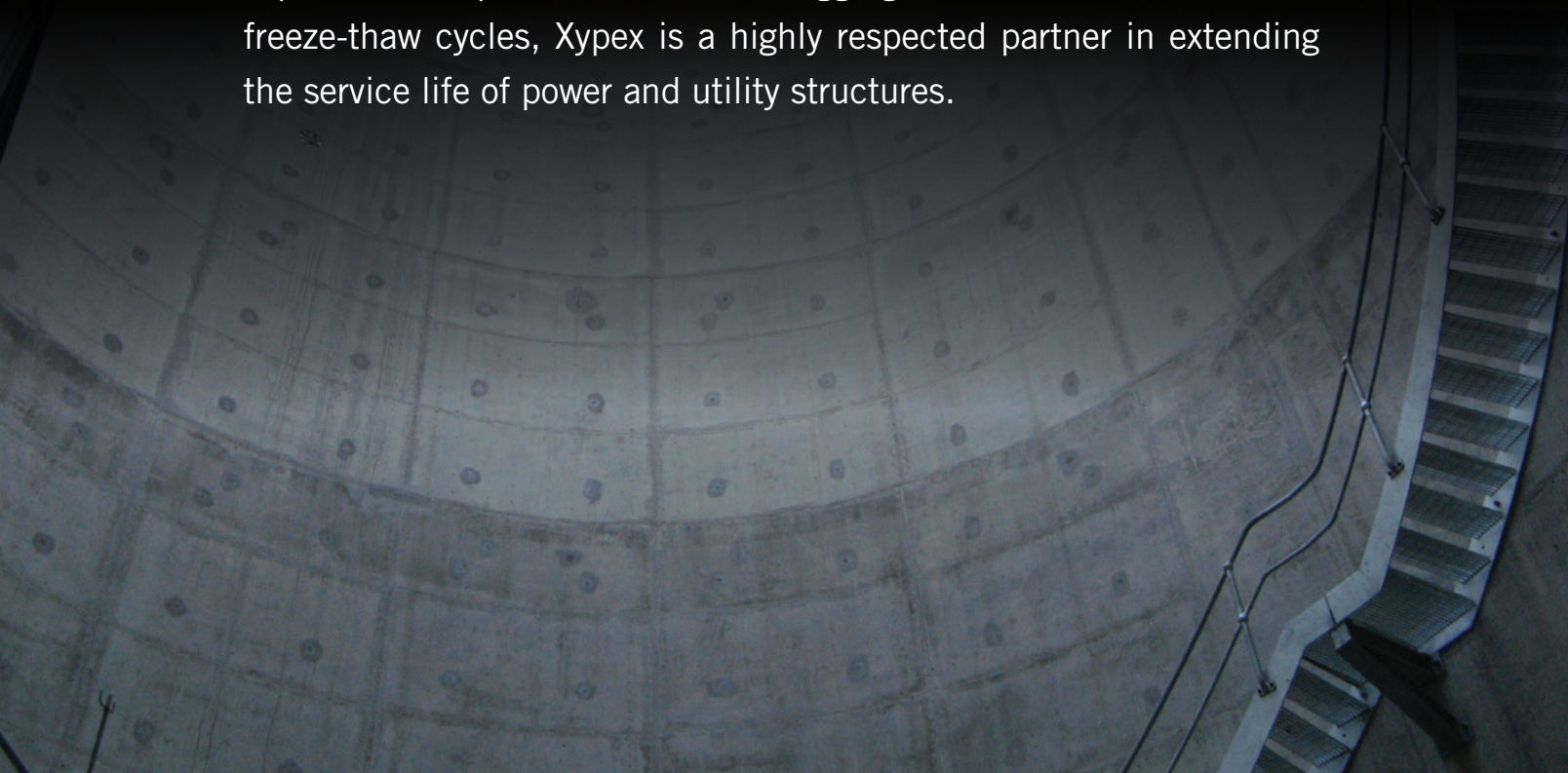
## Meeting the Challenge

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# Protecting Power & Utility Structures

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Due to their very nature, concrete power and utility structures can be seriously compromised by hydrostatic pressure and chemical attack. Without proper protection, structural integrity is soon compromised, leading to expensive remediation efforts and a shortened life span. Once moisture has reached the reinforcing steel, an expansive oxidation process begins to take place causing the formation of cracks and spalling in the concrete. When cracking takes place and is combined with weathering effects such as freeze-thaw damage or accelerated corrosion in hot weather climates, this deterioration takes place at a faster pace. With over 50 years of experience in 90 countries around the world, Xypex Crystalline Technology has been used in power and utility structures to waterproof, protect, repair and enhance the durability of concrete subject to water and chemical attack. In this challenging environment, where structures are also exposed to sulphate attack, alkali-aggregate reaction, abrasion and freeze-thaw cycles, Xypex is a highly respected partner in extending the service life of power and utility structures.





# The Structures – The Problems

Xypex products play a key role in the waterproofing of concrete against water leakage, even against extreme hydrostatic pressure. The unique Xypex technology also protects concrete against the effects of sulfate attack and crack or joint failure.



## Protecting Power & Utility Structures

The waterproofing and protection of concrete in power and utility structures has the following objectives:

*To prevent the passage of water through the concrete due to hydrostatic pressure so as to protect the interior of the substructure from water-damage, and the reinforcing steel from corrosion. Depending on the local environment, concrete should also be protected from sulphate and chemical attack.*

The nature of concrete and its installation means having to deal with permeability problems created by the natural porosity of the concrete as well as defects (faulty cold and construction joints, honeycombs, rock pockets and tie holes), joint leaks, freeze/thaw damage and drying shrinkage cracks. These problems typically leave the structure open to active leaks and accelerate the possibility of reinforcing steel corrosion and surface deterioration.

## Cracking

Cracks in the concrete are the most obvious means by which water and damaging chemicals can enter a structure. These cracks form in a number of different ways, but the most common are drying shrinkage, thermal cracking, strain formed cracks, settlement cracks and plastic shrinkage cracking in the slab.



## Surface Deterioration

The principal cause of surface deterioration in power plant structures is the impact of freeze-thaw damage. This damage can be long term, resulting in some form of surface rehabilitation during the service life of the structure.



## Sulphate Attack & Alkali Aggregate Reaction

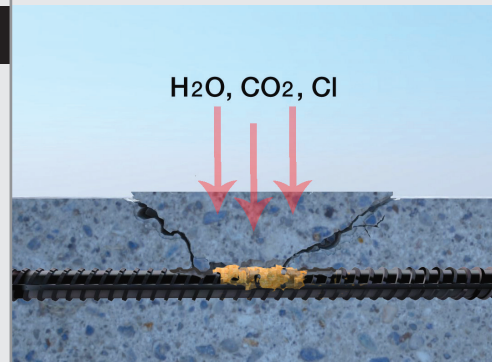
Where sulphates are present in water or soils, the permeability of concrete and the presence of water allows sulphate ions to diffuse into the concrete and create an expansive reaction causing spalling and deterioration. A similar effect is caused by Alkali Aggregate Reaction whereby the presence of water in concrete permits a reaction between silica in certain aggregates and the alkalis in cement.



## Water Permeability & Corrosion

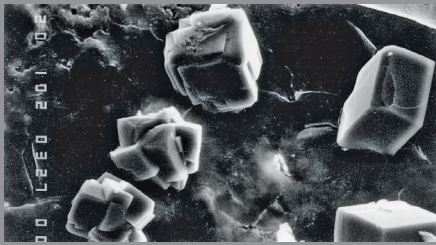
The primary purpose of waterproofing concrete power and utility structures is to prevent the intrusion of water into the structure and thus protect the reinforcing steel from the damaging effects of corrosion.

The nature of concrete and the problems associated with placement and consolidation means having to deal with permeability issues permitting the penetration of water into the substrate and through to the reinforcing steel. With the presence of oxygen this can initiate corrosion.

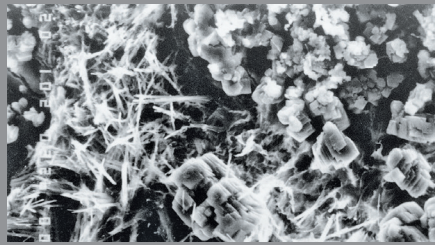




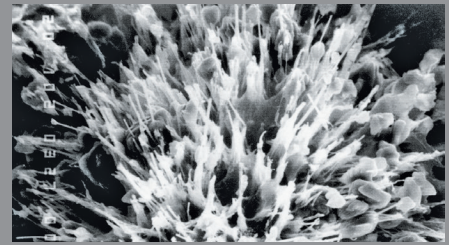
# The Permanent Solution



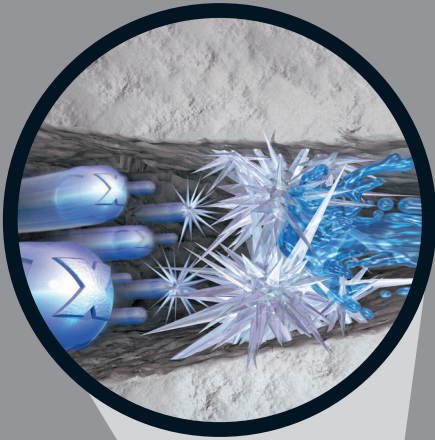
CONCRETE UNTREATED



CRYSTALLIZATION INITIATED



CRYSTALLIZATION MATURE



## Xypex Crystalline Technology

Xypex products use the natural porosity of concrete and chemical diffusion to penetrate its pores and capillaries. Inside the concrete, Xypex chemicals react with un-hydrated cement particles and the by-products of cement hydration to form a non-soluble crystalline structure deep within the substrate. In this condition, the concrete becomes impermeable, preventing the penetration of liquids and chemicals from any direction even under extreme hydrostatic pressure. The chemical resistant properties of the crystalline structure will help mitigate the attack of sulphates and chlorides. In prolonging the durability of concrete, Xypex has also proven to be effective against the damaging effects of Alkali Aggregate Reaction as well as having the ability to self-heal static cracks up to 0.5 mm (0.02 in). Xypex also improves the freeze-thaw durability of concrete.



## Proven Performance Worldwide

Comprehensive quality systems and standards along with thorough testing in the lab and the field have resulted in Xypex's highly respected position in the concrete industry. Xypex has been extensively tested by independent testing laboratories in the U.S., Canada, Australia, Japan, Europe and other countries.



## The Xypex Advantage

Xypex Crystalline Technology works inside the concrete, thus avoiding typical problems associated with traditional barrier products.

<ul style="list-style-type: none"> <li>✓ Permanent and reactivates whenever water is present</li> </ul>	<ul style="list-style-type: none"> <li>✓ Not subject to deterioration problems encountered by surface coatings and membranes</li> </ul>
<ul style="list-style-type: none"> <li>✓ May be applied on negative or positive side of concrete surface</li> </ul>	<ul style="list-style-type: none"> <li>✓ Requires no additional protection as with preformed membranes</li> </ul>
<ul style="list-style-type: none"> <li>✓ Self-heals static cracks up to 0.5 mm (0.02 in)</li> </ul>	<ul style="list-style-type: none"> <li>✓ Resistant to chemical attack</li> </ul>



# The Right Products

## Xypex Admix Advantages

- Permanent integral waterproofing
- Enhances concrete durability
- Value engineering
- Non-toxic
- Non-combustible
- Resists damaging effects of water penetration and chemical attack

## Xypex Admix for New Concrete Construction

Xypex Admix is the preferred choice for installing Xypex Crystalline Technology into most new concrete structures. Because Xypex Admix is blended into the mix at the time of batching, it becomes an integral part of the entire concrete matrix, thus reducing the potentially damaging effects of water penetration and chemical attack. The addition of Xypex Admix to concrete is a highly effective method of enhancing the durability of concrete structures.



Precast



Cast-in-place



Shotcrete

## Xypex Coating Advantages

- Doesn't require a dry surface
- Apply to either side of the concrete
- Won't puncture, blister or tear
- No costly surface priming or leveling
- Sealing, lapping & finishing, protection during backfilling not required
- Permanent waterproofing
- Enhanced concrete durability
- Doesn't contain VOCs
- Non-toxic and non-combustible
- Can be applied safely in confined spaces

## Rehabilitation & Repair

Xypex's coating systems and repair products enable owners, engineers and contractors to economically and confidently repair structures that have been damaged due to the effects of chloride attack, sulfate attack, Alkali Aggregate Reaction or surface deterioration through abrasion and freeze/thaw. Xypex Concentrate and Modified are applied as slurry coatings to the surface of the concrete. Unlike other materials that need a dry substrate, Xypex products require a moist surface – a condition typical of leaking structures. This type of environment is conducive to the Xypex Crystalline process. Xypex Patch'n Plug, Concentrate Dry-Pac and Megamix products are specifically designed to permanently repair concrete defects such as static cracks and faulty cold or construction joints. These products are also effective at filling tie-holes and sealing around pipe penetrations. Xypex Megamix returns structural integrity to severely damaged concrete, whilst maintaining the same protective properties of Xypex-treated concrete.

## Other Accessory Products

- FCM 80
- Megamix I & II
- Gamma Cure
- Xycrylic Admix



Coating  
Concentrate & Modified



Plugging  
Patch'n Plug



Rehabilitation  
Patch'n Plug & Megamix



Visit us online at [xypex.com](http://xypex.com)  
for more info & product details.



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Zilina Dam, Slovakia



Nuclear Waste Storage Bunkers, Canada



Coal Storage at Power Station, China



Prague City Utility Tunnels, Czech Republic

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